Table 11: National Historic Places within the Streetcar Route Area of Potential Effect

Map ID	Name	Address	Date designated
A	**West Side Commercial Historic District**	12/22/2000	
	Plankinton Block/Julius Simon Dry Goods	331 W Wisconsin Ave	
B	**Historic Third Ward Historic District**	03/08/1984	
	F. Mayer Boot & Shoe Co.	342 N Water St	
	Merchant Mills Block	343-345 N Broadway St	
	E.R. Godfrey & Sons Co.	400 N Broadway St	
	Broadway Produce Co.	342 N Broadway St	
C	**East Side Commercial Historic District**	09/23/1986	
	Mackie Bldg	225 E Michigan Ave	
	Commercial Vernacular Bldg—No longer there	511 N Broadway St	
	Schlitz Brewing Co Bldg—No longer there	525-527 N Broadway St	
	Italianate Bldg—No longer there	529 N Broadway St	
	Mackie Bldg Addition	533 N Broadway St	
	Lawrence Block	602-606 N Broadway St	
	Loyalty Block	605-617 N Broadway St	
	Lawrence Block	608 N Broadway St	
	Lawrence Block	612-614 N Broadway St	
	Commercial Bldg	618-624 N Broadway St	
	Commercial Bldg; Originally associated with AHI# 110773**	625 N Broadway St	
	Lawrence Block	626 N Broadway St	
	Commercial Bldg	627-635 N Broadway St	
	Lawrence Block	626-628 N Broadway St	
	Commercial Bldg; Originally associated with AHI# 41166**	630 N Broadway St	
	J.A. Noonan Block	307 N Broadway St	
	Herman Building/Railway Exchange Building	229-231 E Wisconsin Ave	
	Wisconsin Telephone Company Bldg	722 N Broadway St	
D	**Plankinton Avenue-Wells-Water Street Historic District**		06/13/1986
	Milwaukee City Hall	200 E Wells St	
E	**Cass/Juneau Avenue Historic District**		11/03/1988
	A. Brandt Flats	1210-1212 N Van Buren	
F	**Prospect Avenue Mansions Historic District**		04/07/1990
	Collins-Elwell-Cary House	1363 N Prospect Ave	
	The Fenwick Apartments	1409 N Prospect Ave	
	Apartment Building	1417 N Prospect Ave	
	Willard Merrill House	1425 N Prospect Ave	
	Charles D. Mann House	1429 N Prospect Ave	
	Thomas H. Spence House	1437 N Prospect Ave	
	First Church Christ Scientist Sunday School	1443 N Prospect Ave	
	First Church Christ Scientist	1451 N Prospect Ave	
	William H. Osborne House	1509 N Prospect Ave	
	Fred Kraus House	1521 N Prospect Ave	
	Elizabeth M. Black House	1537 N Prospect Ave	
	A. Story Goodrich House	1543 N Prospect Ave	
	Frederick T. Goll House	1550 N Prospect Ave	
	David Vance House	1551 N Prospect Ave	
G	**East Brady Street Historic District**		03/09/1990
	Wm. F. Mueller Garage	1669 N Farwell Ave	
	J. Kunitzky Block	1673-1677 N Farwell Ave	

Table 11 continued

Map ID	Name	Address	Date designated
	Individual Properties (not already listed above)		
1	Turner Hall	1034 N. 4th Street	8/2/84
2	John Pritzlaff Hardware Co.	143 W. St. Paul Avenue	
3	First Unitarian Church	1009 E. Ogden/1342 N. Astor 12/30/74	
4	Abbott Row	1919-43 E. Ogden	3/3/83
5	St. John's Roman Catholic Church	812 N. Jackson Street	12/31/74
6	Wisconsin Consistory Building	790 N. Van Buren Street	9/26/94
7	Sixth Church of Christ Scientist	1036 N. Van Buren Street	3/27/80
8	McIntosh-Goodrich Mansion	1584 N. Prospect Avenue	8/31/00
9	Adler, Emanuel D., House	1681 N. Prospect Avenue	9/13/91
10	Allis, Charles, House	1630 E. Royall Place	1/17/75

*See Historic Resources Map in Figure 27.
**AHI is the Architecture & History Inventory housed at the Wisconsin Historical Society

Table 12: Locally Designated Landmarks and Districts within the Streetcar Route Area of Potential Effects

Name	Address	Date Designated
Turner Hall	1034 N 4th St	11/07/1977
St. John's Roman Catholic Cathedral	812 N Jackson St	4/15/1992
Wehmer Apartment Building	802 N Van Buren St	(Processing)
Sixth Church of Christ Scientist	1036 N Van Buren St	5/17/1983
First Unitarian Church	1009 E Ogden Ave/1342 N Astor St	2/12/1991
George W. Peck Row House	1620-1628 N Farwell Ave	6/16/1998
Adler, Emanuel D., House	1681 N Prospect Ave	11/26/2002
McIntosh-Goodrich Mansion	1584 N Prospect Ave	12/20/1985
Goll, Frederick J. House	1550 N Prospect Ave	12/11/2002
Allis, Charles, House	1630 E Royall Pl	12/07/1982
East Brady Street Historic District		4/9/1990
East Side Commercial Historic District		11/17/1987

The streetcar route passes through or is adjacent to seven NRHP-listed historic districts and nine individually listed properties. One additional property (property #2 in Table 11) was previously determined eligible for the NRHP, but is not registered. Locally designated landmarks and districts in the APE are listed in Table 12. In addition to the historic properties in Tables 11 and 12, twenty other properties along the streetcar route were identified by the study team as potentially eligible for listing on the NRHP. These are listed in Table 13 and also mapped in Figure 27. The historians researched these properties and consulted with SHPO to determine their NRHP eligibility.

Studies showed that five of the twenty properties in Table 13 are not eligible for listing on the NRHP. The primary reasons for ineligibility included a loss of architectural integrity due to changes to the structures or there were other better examples of the architectural style found in the City. Fifteen of the twenty resources were determined to be NRHP-eligible historic resources. These buildings were eligible because of their architecture (Criterion C) or because they were associated with people or events that contribute to the nation's history (Criteria A and B). No potentially eligible historic districts were identified within the APE. SHPO reviewed the study's findings and found that they concurred with all but five of the

eligibility determinations, disagreeing that these properties are eligible for inclusion in the NRHP because, in their opinion, the properties do not meet the NRHP criteria.

The description of the Criteria used for recommending listing in the NRHP is as follows:

Criterion A: Resources associated with events that have made a significant contribution to the broad patterns of our history.
Criterion B: Resources associated with the lives of significant persons in or past.
Criterion C: Resources that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

Table 13: Properties Surveyed and Their Eligibility for Listing on the National Register

Map ID*	Property Name	Property Address	Eligibility for Listing on the National Register
1	Milwaukee Arena	444 W. Kilbourn Ave.	Eligible under Criteria A and C
2	Milwaukee Journal Buildings	333 W. State St.	Eligible under Criteria A and C
3	Municipal Building	841 N. Broadway	Eligible under Criterion C
4	Milwaukee Athletic Club	758 N. Broadway	Eligible under Criterion A
5	St. John Cathedral Complex	812 N. Jackson St.	Eligible under Criteria A and C
6	Mary Brazell Investment Property/Milwaukee Children's Free Hospital	1462 North Farwell Ave.	Eligible under Criterion A**
7	Candon Court Apartments	804 N. Van Buren St.	Not Eligible
8	Juneau Village	1009, 1029, 1100 and 1129 N. Jackson St.	Not Eligible
9	Blackstone Apartments	709 E. Juneau Ave.	Eligible under Criterion C
10	Dorsey's Dancing Academy	1428 N. Farwell Ave.	Eligible under Criterion A
11	Devonshire Apartments	1504 N. Prospect Ave.	Eligible under Criterion C**
12	Summerfield Court Apartments	1479-1495 N. Farwell Ave.	Eligible under Criterion C
13	Gainsborough Apartments	1531 - 1535 N. Farwell Ave.	Not Eligible
14	Paul Weise Building	1534 N. Farwell Ave.	Not Eligible
15	George W. Peck Rowhouse	1620-1628 N. Farwell Ave.	Eligible under Criteria B and C
16	Justus & Margaret Vallat Houses	1708 & 1714–1716 N. Farwell Ave.	Eligible under Criterion C
17	Prospect Terrace Apartments	1710 – 1724 N. Prospect Ave.	Eligible under Criterion C**
18	Edgewater Apartments	1742 N. Prospect Ave.	Eligible under Criterion C**
19	Royal Apartments & Royal Annex	1525 and 1533 E. Royall Pl.	Not Eligible
20	Royalton Apartments	1614 E. Royall Pl.	Eligible under Criterion C**

*See Historic Resources Map in Figure 27.
** SHPO does not agree that these properties meet the criteria for eligibility.

Archaeological Resources in the APE

Regarding the potential for archaeological resources within the APE in Figure 26, consultation with Native American Tribes, SHPO/BSPO was initiated by the FTA in coordination with the City of

Milwaukee. See Appendix G for correspondence. Because of the presence other structures, paved surfaces, and the lack of exposed soils, locations of archaeological artifacts or remains underground cannot be identified or investigated. Due to prior excavation for the highway bridges, other structures, roads, and urban infrastructure, it is not likely that any intact archaeological remains or artifacts are present. No Tribes indicated the presence of archaeological resources, undoubtedly due to the fact that the land is highly disturbed. The likelihood of intact artifacts or remains is very low. Coordination with SHPO/BSPO is ongoing.

Environmental Effects

Under the No Action Alternative a streetcar system in downtown Milwaukee would not be constructed and there would be no direct effects on historic or archaeological sites in the study area from the introduction of a streetcar system. The No Action Alternative wouldn't enhance the type of reinvestment in the downtown that the City is hoping to see from the implementation of streetcar service. More about reinvestment is included in the discussion of the streetcar LPA below.

Construction of the streetcar LPA would require little to no new subsurface disturbance of soils. All soils in the study area have been disturbed at some time in the past. The majority of the excavations are not expected to occur below the existing roadbed where the rails will be placed. Utilities and the maintenance facility will likewise be on soils that were formerly disturbed through urban development. It is unlikely that any buried deposits would be identified, exposed or adversely affected by construction. This means that it is unlikely that archaeological resources will be uncovered during construction of the streetcar tracks or utility work. Additional construction related effects are reported in Section 5.2.5.

Based on the historic survey and the preliminary design plans, no lands from historic properties will be required and no construction will be done that would enter historic property boundaries.

The streetcar itself and the associated improvements at the stops will not be substantially different from other transportation or urban features of the landscape and so no aesthetic impact to historic structures is anticipated.

The effects of vibration on historic structures, which can be more fragile than new structures is a common concern. However, no vibration impacts were identified along the streetcar route. More information about vibration impacts is included in Section 5.2.2 (Noise and Vibration).

Aesthetic changes associated with redevelopment could change the appearance of the general setting. It is expected that these changes will be positive. See Section 5.1.5 for a discussion of the effects of the streetcar LPA on aesthetics.

Reinvestment and development downtown that may be triggered by the streetcar project could have two different effects that are hard to predict. On one hand downtown reinvestment and growth could make an historic site so lucrative that a property owner/developer could propose to tear it down and modernize. On the other hand the City of Milwaukee has a historic preservation ordinance that provides certain kinds of legal protection for buildings or sites that have been declared historic. A "Certificate of Appropriateness" is required from the Milwaukee Historic Preservation Commission for permission to alter or remove historic buildings. See Section 5.3.5 for a discussion of Indirect Effects such as this.

Transportation infrastructure in the road right of way, including such things as roads, bus stops, traffic signals and signage, is already a major part of the visual landscape of this highly urbanized area. Overall changes including the improvements at the stops and the OCS and track will be minor given the urban context.

Mitigation Measures

If archaeological remains such as human bones are discovered during construction all work in the vicinity of the find will stop immediately and the area protected. The State Historic Preservation Office (SHPO), Burial Sites Preservation Office (BSPO), the Federal Transit Administration, and the City of Milwaukee will be notified immediately in accordance with Wisconsin Statue 157.70. This will entail evaluating the find to determine if it if significant and whether mitigation through avoidance or recovery is necessary. Work may proceed only after authorization from the BSPO.

Other mitigation measures may be applied to the project as determined necessary through the continuing coordination with SHPO. All review and documentation under Section 106 of the National Historic Preservation Act will be completed prior to issuance of a Finding of No Significant Impact for the project.

5.1.5 Aesthetics

Transportation infrastructure in the road right of way, including such things as roads, bus stops, traffic signals and signage, is already a major part of the visual landscape of this highly urbanized area. Overall changes including the improvements at the stops and the OCS and track will be minor given the urban context.

Affected Environment

This section describes the aesthetic character of the study area. The section divides the study area into ten districts as defined by the City's Downtown, Northeast Side and Third Ward area plans. The affected districts are shown in Figure 28 and their unique urban characteristics are explained below.

Downtown West

The Downtown West District is comprised of a mix of large-scale uses that provide space for residential, educational, commercial, and governmental land uses. New commercial and residential development is located in the Pabst Brewery redevelopment complex, commonly referred to as "The Brewery". The Milwaukee Area Technical College (MATC) and Milwaukee County government campus are located south of The Brewery. This area includes the neoclassical county courthouse building. Milwaukee's Central Library is also located in this district and has a dominating visual presence on the far west end of Wisconsin Avenue.

Old World Third

The Old World Third District is a popular entertainment district that blends historic with contemporary design. Old World Third is named for a portion of the district that contains the last remnants of a Germanic commercial and residential neighborhood that includes the original block facades that date back to the mid-1800s. Large assembly venues such as the Bradley Center; US Cellular Arena, and the Milwaukee Theater are major entertainment attractions that represent the district's contemporary design.

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Figure 28: Neighborhood Districts from Milwaukee Area Plans

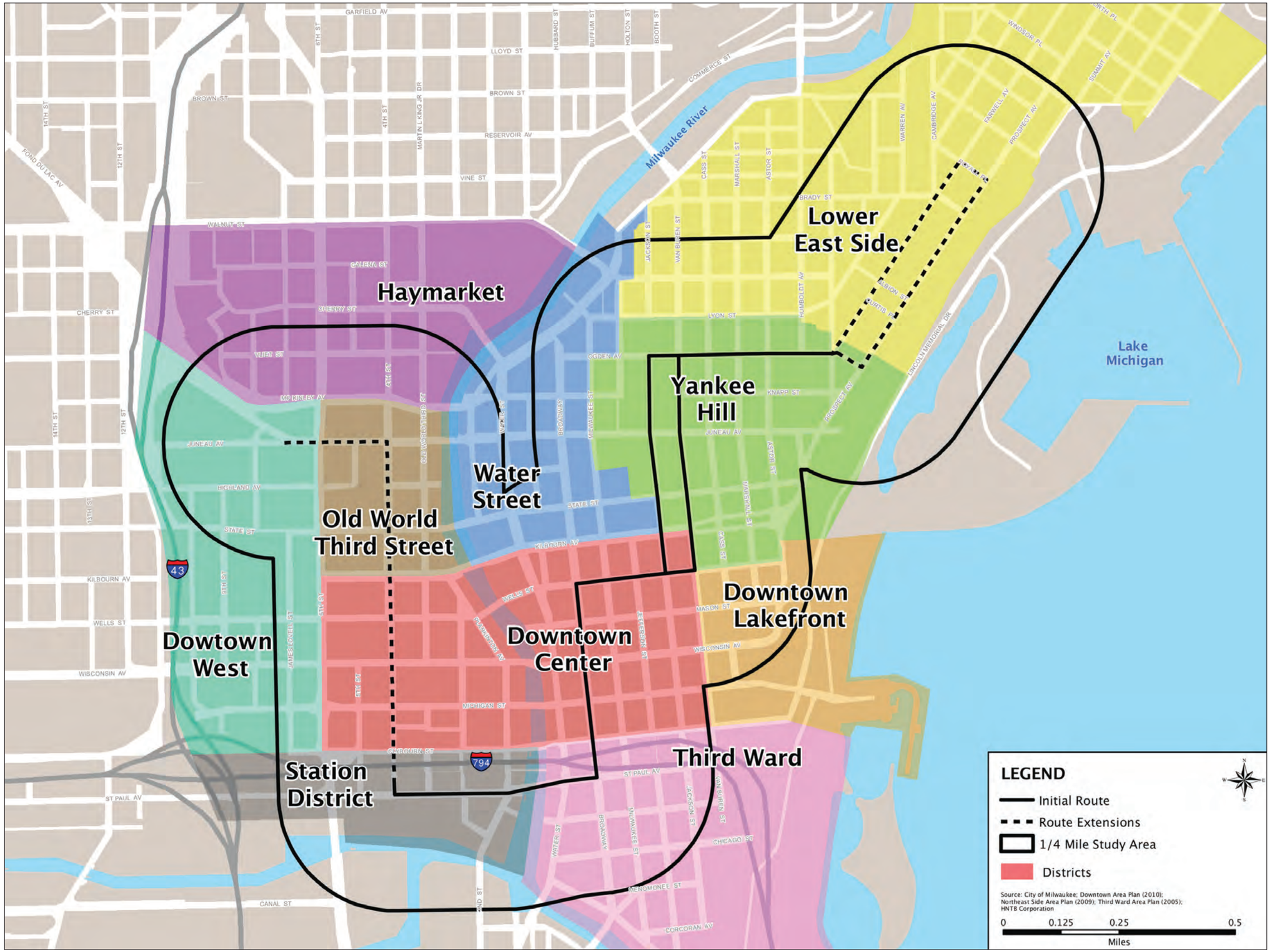

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Figure 29: Photo of Downtown Center

Broadway is a wide street in the Downtown Center neighborhood (East Town). The south end of Broadway has a wide right of way with rows of historic and turn-of-the-century facades. This photo is looking south from the intersection of Broadway and Wisconsin Avenue. Image: HNTB Corporation.

Downtown Center

The Downtown Center District is Milwaukee's traditional downtown. It contains the highest concentrations of multi-story office buildings and has a mix of uses. The District has major employers, bars, restaurants, shopping, and entertainment. Many of Milwaukee's historic or iconic buildings are within this district. Figure 29 shows an image of a street in the Downtown Center District.

Station District

The Station District surrounds the newly renovated Intermodal Station at 5th and St. Paul streets. Nearby are the U.S. Postal Service distribution center and a number of surface parking lots located under and adjacent to Interstate 794. Multi-story warehouse style buildings are prominent, many having been renovated into loft-style condominiums and mixed use office and residential uses. Other prominent visual features in this neighborhood include the Sixth Street Viaduct as well as the Marquette Interchange and Interstate 794 bridges. Figure 30 shows an image of the Station District.

Figure 30: Photo of the Station District

This photo shows the Station District including the Intermodal Station, a parking lot, US Postal Service Center and the Sixth Street Viaduct Bridge. Image: HNTB Corporation

Third Ward

The streetcar route runs along the northern border of the Third Ward District between the Milwaukee River and Broadway. The Historic Third Ward is a burgeoning neighborhood consisting of renovated mid-rise commercial and warehouse buildings with trendy shops and restaurants. The popular Public Market is located here and helps to preserve the historic feel of the area as shown on Figure 31.

Figure 31: Photo of the Public Market in the Third Ward

The Public Market is located in the Third Ward District. This picture shows how the Interstate 794 bridges are a prominent part of the landscape. Image: HNTB Corporation

Downtown Lakefront

The Downtown Lakefront District is primarily a place of commerce that is inhabited by large, vertical office buildings. The large lakefront is surrounded with open spaces and includes cultural institutions such as the Milwaukee Art Museum and the War Memorial.

Water Street

The Water Street District is a well known entertainment district that includes a variety of bars, restaurants, and entertainment venues. The district is comprised of older and historic buildings accompanied with new infill development.

Yankee Hill

The Yankee Hill District contains the highest residential density within downtown. It has many dense multi-storied residential apartments and condominiums. There is a mixture of older and some newer residential complexes. Commercial and entertainment uses are located in many buildings at the street level.

Lower East Side

The Lower East Side District serves as a transition between the density of downtown living and the less dense urban neighborhoods to the north. The district includes several destination retail businesses and mixed use neighborhoods. The Lower East Side provides a variety of housing alternatives for residents with diverse architectural styles.

The City of Milwaukee has made an effort to enhance the aesthetics of the downtown by providing trees that line many of the streets. All City-owned trees are common deciduous trees, although the size of trees varies throughout the project area. Generally, street trees within the Downtown West, Old World Third, Downtown Center, Station, and Third Ward districts are small and medium sized trees with relatively

small calipers compared to the large trees that can be found in the Yankee Hill and Lower East Side Districts.

Environmental Effects

Under the No Action Alternative a streetcar system in downtown Milwaukee would not be constructed. The physical elements associated with the streetcar would not be introduced into the landscape and so views would not change. The City's plan that streetcar would spur positive changes in the character of downtown may not be realized under the No Action Alternative.

The environmental effects related to the aesthetics of the streetcar LPA are discussed below. Construction related temporary impacts are addressed in Section 5.2.5.

Streetcar Stops

Streetcar stops as shown in Figure 15 and Figure 18 will typically include pavement bump-outs that extend into the street, shelters, benches, trash cans and other ancillary elements. Most of these features are already used at shelters for the existing MCTS bus system as shown in Figure 32.

Figure 32: Photo of a Milwaukee County Transit System Bus Shelter

The streetcar stops will be designed to blend into the existing streetscape. Shelters will be about the same size as the existing bus stops at approximately eight feet wide and nine feet high for basic shelters and 12 feet wide and 9 feet high for the enhanced shelters. All shelters will use transparent glass. A conceptual

platform and shelter plan is shown in more detail in the project plans in Appendix A. Ticket machines will be located at all of the shelters proposed for the streetcar. Figure 33 is a photo of an existing parking ticket machine in the City of Milwaukee; the same machines are proposed to be used for the streetcar ticket machines.

Figure 33: Photo of a Ticket Machine

Image: HNTB Corporation

Tracks

The project will introduce tracks along the route's streets. While this is a new feature, it is expected to have a minimal affect on the physical and visual appearance of the street because the rails will be embedded in the roadway as shown in Figure 34. The track zone will be approximately two feet deep and eight feet wide. The rail itself will be about six inches deep and four feet, eight and one/half inches wide. Appendix A shows the proposed track details.

Electrical System

The project will introduce an electrical overhead contact system (OCS) with wires, supporting poles and substations along the route. This will reintroduce overhead wires similar to the overhead electrical wires that were in place above ground in the past to provide electrical service to buildings, traffic signals, trolleys, and streetcars. The OCS was chosen over other electrical systems because its single wire is more aesthetically pleasing. In addition, overhead wires will utilize existing street light and traffic signal poles to reduce the potential for clutter in the street and make the OCS less visible. The City is developing a plan to match the OCS to the current poles and fixtures.

Streetcar Vehicles

The streetcar vehicles will be no less visually appealing than buses. For some people, the streetcar will even be considered visually appealing with its modern, streamlined look.

Figure 34: Streetcar System Rendering on Broadway

Rendering of proposed streetcar system located at the intersection of North Broadway and East Michigan Street. Image: HNTB Corporation.

Street Trees

Some of the 346 street trees within the corridor may need to be trimmed so that the streetcar can operate beneath them. The streetcar will require 20 feet of clearance between ground level and any overhanging tree branches. Currently the City requires that branches overhanging the street right of way be trimmed to a height at least 10 feet above the level of the street. Approximately five trees would be removed for the construction of the streetcar stops and up to an estimated 35 street trees may be removed or impacted due to close proximity to (within 5 feet) the OCS poles. This means up to approximately 11% of the threes along the route could be affected. Final planning would seek to minimize loss of healthy or substantial trees.

Historic Structures

The potential for visual impacts to historic structures is limited since this is an existing transportation corridor and not expected to disturb or alter any of the characteristics that qualify the identified buildings as being historic. Determinations of no adverse effect will be completed in consultation with SHPO as part of the historic review process under Section 106 of the National Historic Preservation Act. Any mitigation measures agreed upon as a result of the Section 106 process will be applied to the project.

Streetcar Maintenance Facility

The proposed maintenance facility will include the introduction of a new building where there is currently none. Other new visible features on the site will include lighting and accessory uses such as loading docks, parking, and the track yard. Much of the facility will not be visible because it will be constructed beneath Interstate 794. The new building will fit in with the existing uses in the area that include commercial office buildings, warehouses and many transportation uses such as Interstate 794 and surface parking lots and structures.

Providing daylight for the building will be difficult because it will be built under the Interstate 794 bridges. The facility will have large windows on the north and east sides of the building and skylights in the roof between the highway bridges above to maximize daylight. The large windows will enable people traveling past the facility to see inside. Visible interior areas include maintenance areas and administrative offices.

The building and fencing around the maintenance facility are expected to fit within the aesthetic character of its surroundings. Building materials, colors, and detailing are intended to be aesthetically pleasing. Design of the building is anticipated to be a modern style consistent with the modern streetcar theme and the nearby Milwaukee Intermodal Station. Overall, the building is not expected to change the aesthetic character of the area.

Mitigation Measures

While the streetcar project will introduce some new elements into the streetscape, the project's features are urban and will be designed to fit with the context of the various neighborhoods and districts within the study area. The following features of the project are expected to minimize visual effects.

The streetcar improvements including the maintenance facility, the electrical overhead contact system (poles, wires and substations) and other physical elements at the streetcar stops will be designed to fit in with the existing surroundings with the intent of enhancing the character of downtown in a positive way to meet the purpose of the project.

Overhead wires will utilize existing street light and traffic signal poles to reduce the potential for clutter in the street and make the OCS less visible.

Mature, healthy trees will be avoided where practical. The City will replace street trees as is appropriate to the character of the project's design.

5.1.6 Section 4(f) Resources (Parks, Historic Lands, and Wildlife Refuges)

This section discusses Section 4(f) resources.

Existing Conditions

The Department of Transportation Act of 1966 protects publically owned public parks, recreation areas, wildlife and waterfowl refuges, and historic sites from transportation projects that use federal funds like the streetcar. The Act does not allow the project to use land from these resources unless deemed by the person with authority over the property that there is no feasible and prudent avoidance alternative and that all impacts to the property have been minimized to the extent possible.

The streetcar route runs adjacent to historic buildings. An analysis of the historic buildings along the route is included in the Historic and Archaeological Resources section of this report (See Section 5.1.4).

The Oak Leaf multi-use recreational trail is located east of Prospect Avenue along the lakefront. Figure 35 shows the extent of the trail within the study area. Figure 36 shows the location of City and County owned parks near the streetcar route including those shown in Table 14. Some parks are immediately adjacent to the project's area of impact, but the project was designed to avoid the use of Section 4(f) properties.

Table 14: Parks and Open Space within a Quarter-Mile of Streetcar Route

Park Name	**Address**	**Type of Park**
MacArthur Square	901 N. 9th St.	Commons area next to County Courthouse Not a designated City or County Park
Unidentified green area on Juneau Ave	n/a	Not a City or County Park
4th and Mineral Play Area	937 South 4th St.	Children's play area
Pere Marquette Park	900 N. Plankinton	Commons area
Zeidler Union Square	301 W. Michigan Street	Commons area
Red Arrow Park	920 N. Water Street	Commons area and skating rink
Milwaukee School of Engineering Ball diamond	Milwaukee and State Streets	Ball field (Not a City or County Park)
Cathedral Square Park	520 E. Wells Street	Commons area
ODonnell Park	910 E. Michigan Street	Trail segment, pavilion, commons area
Cass Playground	1620 N. Cass Street	Courts and children's play area
Veteran's Park	1010 N. Lincoln Memorial Drive	Commons area, trail
Burns Commons	1300 N. Franklin Place	Commons area
East Side Bike Trail	1700 N. Prospect Avenue	Bike trail, green space
McKinley Park	1750 N. Lincoln Memorial Drive	Open Space, lakefront, courts
Pulaski Street Playfield	1840 North Pulaski St.	Sport fields and children's play area

Figure 35: Trails and Bike Paths

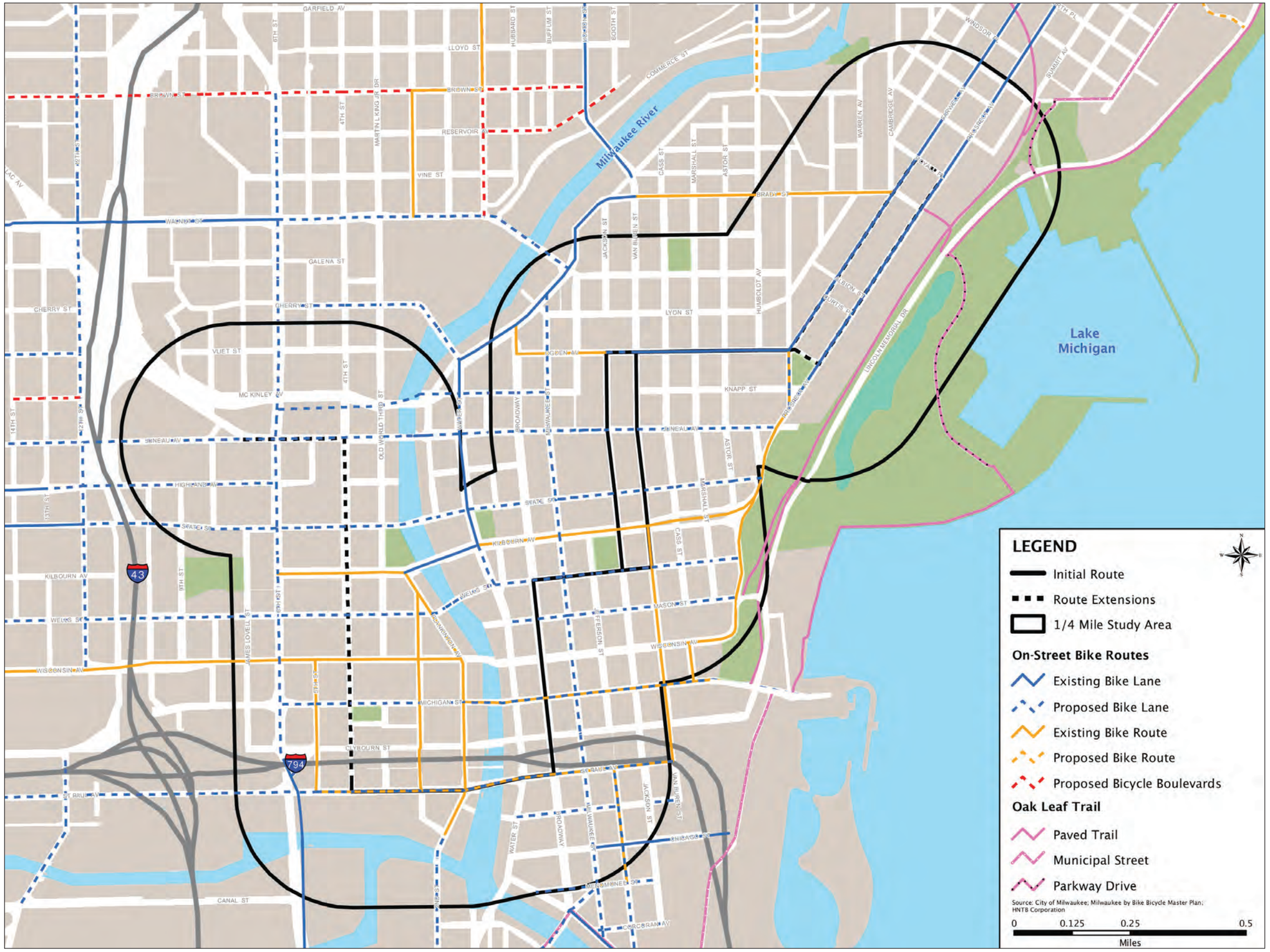

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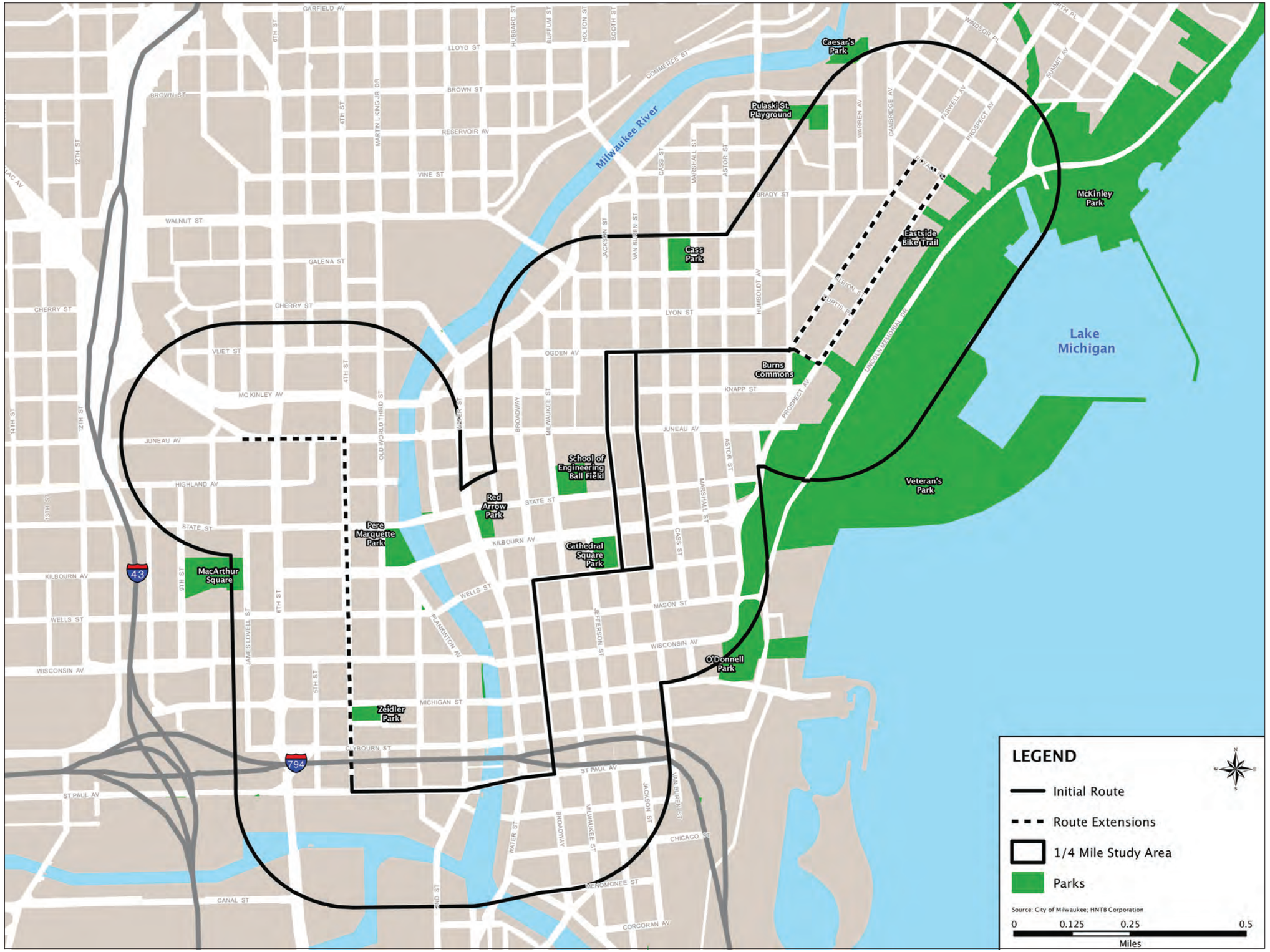
Figure 36: Public Parks and Open Space



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Environmental Effects

Under the No Action Alternative, the streetcar will not be constructed and would not require the use of any publicly-owned public parkland, recreation areas or wildlife or waterfowl refuges or historic properties in the project area.

The streetcar LPA also will not use any Section 4(f) property. The streetcar starter system and extensions run within the existing right of way and therefore no Section 4(f) resource land will be acquired by the City for this project. The City also plans to avoid any temporary easements for construction within the adjacent parks.

The parks may be used more if the streetcar LPA results in an increase in pedestrian traffic. Also, the streetcar would make it easier for people to get to concerts, festivals and other events that occur at parks within the study area since residents and visitors would not have to worry about driving and finding a parking space.

Mitigation Measures

No resources protected by Section 4(f) will be used therefore no mitigation measures are needed.

5.1.7 Safety and Security

This section reviews the potential hazards associated with the streetcar project and the design features that will be incorporated to maximize safety and security.

Existing Conditions

The study area currently contains common safety issues associated with crime and conflicts that typically occur between pedestrians, vehicles and bicyclists that share the roads. The Milwaukee Police Department is responsible to preventing, responding to and solving crimes. The city streets are equipped with typical traffic controls such as traffic lights, signs and lane markings.

Environmental Effects

Under the No Action Alternative, the City would not install the safety and design features associated with the streetcar project. The City hopes that the streetcar will be a catalyst for change in downtown Milwaukee. The City would not reap the benefits they expect the project to produce including an increase in pedestrian activity and overall downtown investment. The City will not see the expected benefit from the additional pedestrian activity stimulating a reduction in street crime due to having more “eyes on the street”.

The environmental effects of the streetcar LPA related to safety for a variety of factors are discussed below.

Passenger and Driver Safety

The streetcar could help improve safety within the study area and reduce crime by increasing pedestrian activity along the route and increasing “eyes on the street.” Typically transit is safe for passengers and drivers. However, there is always the possibility of crime occurring around stops and on the streetcar vehicles

Accessibility

All vehicles and stops will comply with the Americans with Disabilities Act (ADA) to accommodate the safety of disabled passengers. The vehicles will provide allocated space and/or priority seating for

individuals who use wheelchairs. Also, the streetcar vehicle and stops will avoid physical barriers that prohibit or restrict access and will include low floor level boarding for easy boarding and departing.

Pedestrian, Vehicle and Bicycle Safety

The streetcar project will add a new transportation mode within the street right of way. Since the streetcar will operate in mixed traffic similar to a bus, many of the safety precautions pedestrians, bicyclists and drivers currently use will continue to be applicable. Some considerations are discussed below.

The streetcar vehicles will be equipped with turn signals, side view mirrors, and emergency braking systems to aid the driver and avoid collisions. A speed governor will be used, which is a device that makes sure the streetcar stays within the speed limit.

Pedestrians will need to look and listen for the streetcar before crossing the tracks and they should avoid crossing in front of the streetcar vehicle even if it is stopped (except at crosswalks).

Automobiles will need to keep a safe distance behind the streetcars and sudden turns in front of the streetcar vehicle should be avoided.

Parked automobiles will need to check for the streetcar before opening their door because the streetcar will not be able to swerve around the door. For the same reason, parked vehicles will need to make sure their vehicle does not stick out beyond the parking lane.

Approximately 18 blocks of the streetcar routes will have painted bike lanes located between the parking lane and the streetcar track lane. Bicyclists will need to use caution with the tracks and cross at a 90-degree angle. If the bicyclist deviates too far from this ideal angle, the bicyclist's front wheel may become trapped by the gap on either side of the rail. Motorcyclists should also cross at a 90-degree angle to avoid slipping on the rail.

Mitigation Measures

Mitigation measures are discussed below.

Passenger and Driver Safety

A number of design elements are being incorporated to maintain safety and security on the streetcar vehicles and at stops. The project design will consider crime prevention and will provide good visibility. To increase personal security, the project will use transparent glass shelters and ample light at the stops. Fare collection will take place at meters that will be placed along the streetcar corridor instead of on the vehicles. Streetcar operators will also receive safety training to handle problems with belligerent or threatening people. In addition, the City is considering the need to install security cameras on the vehicles. Furthermore, the City may hire a roaming fare checker to randomly confirm ticket purchases. Having this official on duty may be an additional deterrent for criminal activity.

Accessibility

Streetcar stops and shelters will be designed to comply with guidelines by including such things as firm stable surfaces, no steep slopes, space to maneuver from the shelter to the streetcar doors, and safe linkages to the sidewalk. Stop platforms will be positioned to coordinate smoothly with the vehicle threshold and to minimize vertical and horizontal gaps.

Pedestrian, Vehicle and Bicycle Safety

The City will appropriately place warning signage and/or pavement markings to direct pedestrians, bicyclists and vehicular traffic as necessary to avoid hazards.

Openings for the streetcar wheel flanges along the track shall meet minimum standards to minimize injury to pedestrians, bicyclists and motorcyclists traveling across or along the tracks.

The streetcar design will make specific accommodations to maintain safety for bicyclists. Where there is through-traffic, bike lanes will be kept separate from the track lane to minimize the likelihood that a bike tire would become stuck in the groove that holds the streetcar wheel. Figure 37 shows an example of a sign that is used to alert bikers to this situation.

At intersections, transition zones will be provided to prepare bicyclists for interaction with the track and to provide a means for crossing the track at 90 degrees. The transition zones will include directional signage and pavement markings to guide bikes across the tracks at 90 degrees. Figure 38 shows a diagram of how these transition zones will be applied in select locations along the route.

Where stops are located, bike lanes will stay to the right of the stop between a stop island and the curb as shown on Figure 38 and Figure 39. Bike lanes may also be relocated to the opposite side of one-way streets to avoid any potential conflicts with the streetcar.

Additional design treatments intended to increase bike and pedestrian safety will be investigated and included as necessary as streetcar plans progress through to final design.

The City of Milwaukee will implement an education program before the streetcar becomes operational to prepare the public for the new transportation mode. Education efforts will continue after the streetcar service opens.

Figure 37: Bike Sign Example

Sign alerts bikers to be cautious around the streetcar tracks. (Image: HNTB Corporation)

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Figure 38: Diagram of Bike Transition Zones and Stop Islands

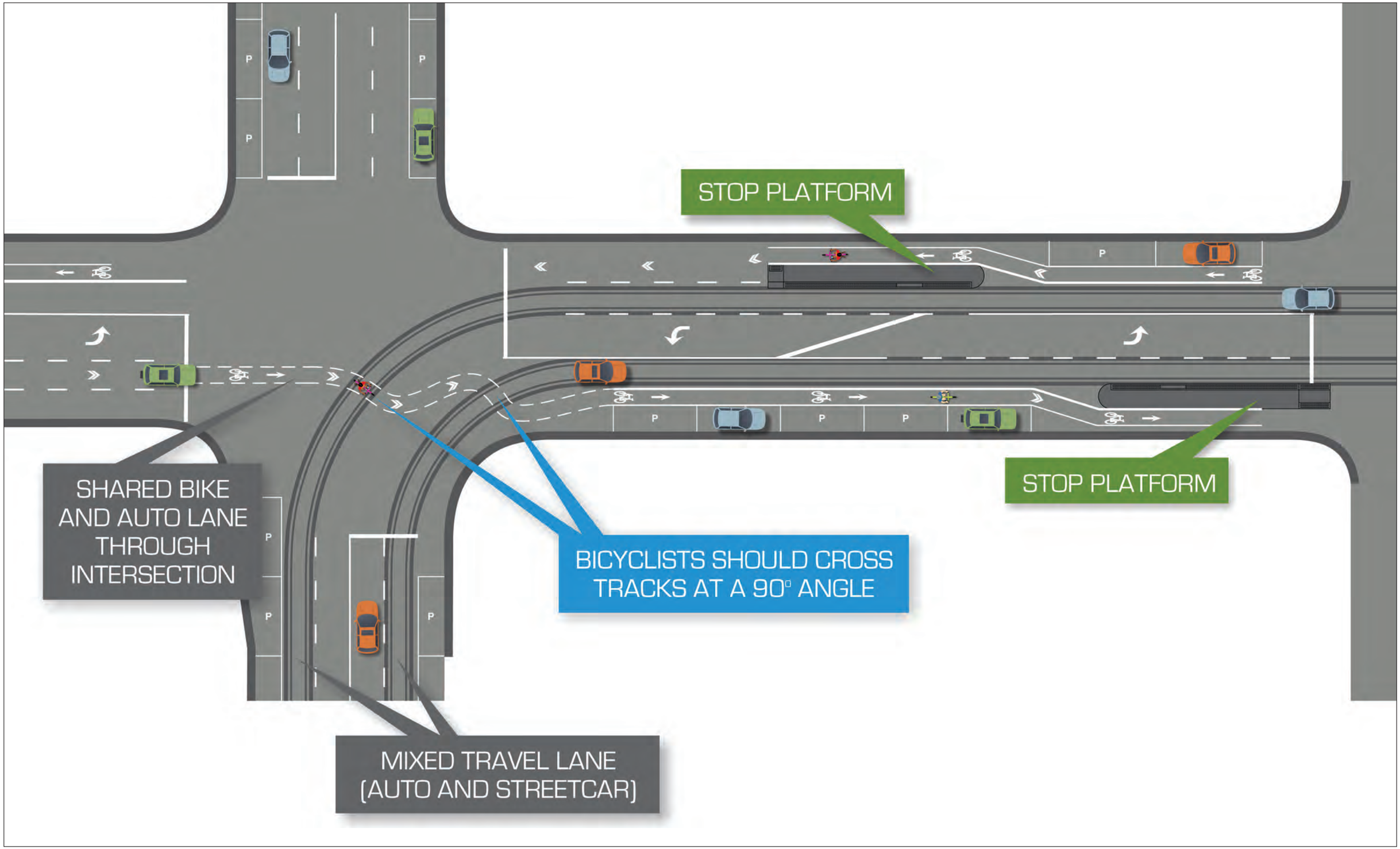

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Figure 39: Example of a Bike Lane at a Stop Island in Portland

Image: HNTB Corporation

5.1.8 Permits Required for Project

Permits required for the project are listed below. Correspondence with Agencies regarding any required permits is included in Appendix G (Agency Correspondence).

Federal Permits and Approvals

Federal Permits will not be required for this project.

Section 404 permits (which are issued in coordination with a State 401 Water Quality Certification) and Section 9 permits from the Coast Guard are not required for the streetcar project. These permits will be required for the St. Paul Avenue Bridge rehabilitation project, which is a separate project that will be completed prior to the construction of the streetcar. As noted in previous sections, the rail for the streetcar will be installed on the St. Paul Avenue Bridge as part of the bridge rehabilitation project. Based on past experience with other recent bridge rehabilitation projects, the City does not anticipate any issues with the issuance of permits.

State Permits and Approvals

State permits will not be required for this project.

A Wisconsin Department of Natural Resources (DNR) *Construction Site Storm Water Discharge Permit*, NR216 and NR 151 Wis. Adm. Code, normally required for projects with land disturbance over one acre, will not be required for this project because a permit is not needed if the stormwater is discharged to the combined sewer system. As noted above under Federal Permits, a DNR Section 401 Water Quality Certification will be applied for under a separate bridge maintenance project that will include installation of track over the St. Paul Avenue Bridge.

The Milwaukee Streetcar project is exempt from the Wisconsin Department of Natural Resources NR 411 Construction and Operation Permit for Indirect Sources as discussed in Section 5.2.1.

The Wisconsin Coastal Management Program reviewed this project to determine if it would affect a State Coastal Area. They did not have any comments and chose not to do a coastal consistency review based on a lack of potential impacts. See correspondence in Appendix G.

Local permits and approvals

This section discusses local permits and approvals.

Maintenance Facility

The City of Milwaukee requires use approval for all public and private buildings through the Board of Zoning and Appeals (BOZA). The streetcar maintenance facility site plan will be reviewed by the Department of City Development staff and approved by BOZA.

Stormwater Management Plan

The City of Milwaukee requires a stormwater management plan for all projects that disturb greater than one acre of land. The roadway work is not applicable to the City's stormwater management ordinances. The maintenance facility, being over an acre in size would normally be required to follow the City's stormwater requirements, which is to reduce the 100-year storm peak stormwater runoff rates from the project area by 10%. However, the freeway bridges above the maintenance facility site drain east to an outfall at the Milwaukee River, and only low stormwater flows are diverted to the combined sewer system. Therefore, this area contributes a relatively small amount of runoff to the combined sewer system during severe storms, and is not a sufficient source of runoff to meet the City Ordinance's requirements for the project.

Due to the lack of change in stormwater runoff, the project will be exempt from the City of Milwaukee stormwater requirements.

Common Council

The City of Milwaukee Common Council will be required to approve the financial plan for the project, thereby enabling the funding for the capital and operating expenses for the project.

5.2 PHYSICAL FACTORS

This section describes the physical factors related to the streetcar project.

5.2.1 Air Quality

This section discusses the air quality factors associated with the streetcar project.

Affected Environment

The Clean Air Act of 1970 established the National Ambient Air Quality Standards (NAAQS). These were established to protect public health, safety, and welfare from known or anticipated effects of air pollutants. The NAAQS contain criteria for carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter (PM_{10}, 10 micron and smaller along with $PM_{2.5}$, 2.5 micron), ozone (O_3), and sulfur dioxide (SO_2). Wisconsin's ambient air quality standards are identical to NAAQS with two additional criteria for particulate matter (total suspended particulates) and a 1-hour ozone standard. Appendix D presents the National and Wisconsin Ambient Air Quality Standards.

The Clean Air Act Amendments of 1977 and 1990 required all states to submit a list to the U.S. EPA identifying those air quality regions, or portions thereof that meet or exceed the NAAQS or cannot be classified because of insufficient data. Portions of air quality control regions that exceed the NAAQS for any criteria pollutant are designated as nonattainment areas for that pollutant. The Clean Air Act Amendments also established time schedules for the states to attain the NAAQS. Exceeding the NAAQS pollutant level does not necessarily constitute a violation of the standard. Some of the criteria pollutants are allowed to exceed the maximum level once per year, while for other pollutants, criteria levels cannot be exceeded. Violation criteria for other pollutants are based on the number of times a criteria pollutant was recorded as being exceeded. Appendix D lists the number of times a U.S. EPA criteria pollutant is allowed to be exceeded.

The streetcar study area is located within the Southeastern Wisconsin Intrastate Air Quality Control Region #239, which includes the City of Milwaukee. Milwaukee is currently in attainment status for five of the seven criteria pollutants (carbon monoxide, lead, nitrogen dioxide, PM_{10}, and sulfur dioxides), and has been classified as being in moderate nonattainment[23] for the 8-hour ozone standard and nonattainment for $PM_{2.5}$.

Environmental Affects

This section describes the environmental affects related to air quality.

Under the No Action Alternative, the streetcar would not be constructed and air quality would remain unaffected by the streetcar operations and construction activities.

The effects of the streetcar LPA are discussed below.

Carbon Monoxide

The Wisconsin Department of Natural Resources NR 411 Construction and Operation Permits for Indirect Sources primary purpose is to control carbon monoxide emissions from indirect sources. The streetcar project would create changes in traffic circulation within the study area. Proposed changes on the local streets to accomplish these circulation changes will all take place within the existing pavement width. The proposed changes will not create any additional intersection legs, will not create increases in traffic of 1,200 or more vehicles per hour within 10 years of the streetcar's starting operation, and will not shift traffic closer to any doorway, window or other opening of an existing building or the building setback. Therefore, by the definitions presented in NR 411.04 (2)(b)2 and 5, the streetcar project is exempt from NR 411.

[23] There are six non-attainment classifications for ozone ranging from "Marginal" to "Extreme". A "Moderate" designation, which is the second lowest designation, means that the 3-year average of the of the annual fourth-highest daily maximum 8-hour ozone concentration for an area ranges from 0.092 to 0.106 ppm. The standard is 0.075 ppm.

Ozone and PM2.5

The streetcar study area, as stated earlier, is located within the Southeastern Wisconsin Intrastate Air Quality Control Region #239, which has been designated as being in nonattainment for the ozone and fine particulate matter ($PM_{2.5}$) NAAQS. Therefore, the project is required to meet Transportation Conformity Rule requirements of 40 CFR Part 93. The Southeastern Wisconsin Regional Planning Commission (SEWRPC), the region's Metropolitan Planning Organization, completed a regional conformity analysis for ozone and$PM_{2.5}$ demonstrating that projected emissions from the planned transportation system do not exceed the air emission budgets established in the Wisconsin State Implementation Plan. Evidence of the conformity analysis is included in the SEWRPC Memorandum Report No. 196 titled, *Assessment of Conformity of the Year 2035 Regional Transportation Plan and the Year 2009-2012 Transportation Improvement Program With Respect to the State of Wisconsin Air Quality Implementation Plan – Six County Southeastern Wisconsin Ozone Nonattainment Area and Three County Fine Particulate ($PM_{2.5}$) Nonattainment Area*.

The streetcar project is included in the SEWRPC Memorandum Report No. 196 as Project Number 905 and has been identified as an exempt project and is considered to have no impact on air quality. The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) determined the SEWRPC Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP) to be in conformance with the transportation planning requirements of Titles 23 and 49 U.S.C., The Clean Air Act Amendments (CAAA), and related regulation on June 16, 2010.

Mitigation Measures

The streetcar project is exempt from the carbon monoxide requirements of NR 411. The project is included in the 2009 through 2012 Transportation Improvement Program (TIP) for Southeastern Wisconsin which has been determined to be in conformance with the transportation planning requirements of Titles 23 and 49 U.S.C., The Clean Air Act Amendments (CAAA), and related regulations. Therefore, no mitigation measures are needed because the streetcar project will not cause or contribute to any new violation of any standard, increase the frequency or severity of any existing violation of any standard, or delay the timely attainment of any standard.

Construction Air Quality

Demolition and construction activities can result in short-term increases in dust and equipment-related particulate emissions in and around the project area. The potential air quality impacts will be short-term, occurring only while demolition and construction work is in progress. Dust control during construction and equipment maintenance would be accomplished in accordance with the City of Milwaukee's Standard Construction Specifications.

5.2.2 Noise and Vibration

The noise and vibration impact assessment is based on the guidelines established in the Federal Transit Administration's (FTA's) *Transit Noise and Vibration Impact Assessment* document, which is also referred to as the FTA Guidance Manual.[24] The FTA Guidance Manual provides background information on transit noise and vibration, establishes FTA's transit noise and vibration impact criteria, and presents methodologies for assessing and mitigating noise and vibration impacts. The following impact assessment presents the existing conditions along the streetcar corridor, projects future noise and vibration levels,

[24] *Transit Noise and Vibration Impact Assessment.* Prepared by Harris Miller Miller & Hanson, Inc. Federal Transit Administration, FTA-VA-90-1003-06. May 2006.

compares the future levels to the impact criteria, identifies impacts and, if needed, assesses potential mitigation measures.

Noise

Noise Background

Noise is a form of vibration that can cause pressure variations in air and water. The ear is sensitive to this pressure variation and perceives it as sound. The intensity of these pressure variations causes the ear to discern different levels of loudness. These pressure differences are most commonly measured in decibels.

The decibel (dB) is the unit of measurement for noise. The decibel scale audible to humans spans approximately 140 dB. A level of zero decibels corresponds to the lower limit of audibility, while 140 decibels produces a sensation more like pain than sound. The decibel scale is a logarithmic representation of the actual sound pressure variations. For example, a 26% change in the energy level only changes the sound level one dB. The human ear would not detect this change except in an acoustical laboratory. A doubling of the energy level would result in a 3 dB increase, which would be barely perceptible in the natural environment. A tripling in energy sound level would result in a clearly noticeable change of 5 dB in the sound level. A change of ten times the energy level would result in a 10 dB change in the sound level. This would be perceived as a doubling (or halving) of the apparent loudness.

The human ear has a non-linear sensitivity to noise. To account for this in noise measurements, electronic weighting scales are used to define the relative loudness of different frequencies. The "A" weighting scale is widely used in environmental work because it closely resembles the non-linearity of human hearing. Therefore, the unit of A-weighted noise is dBA.

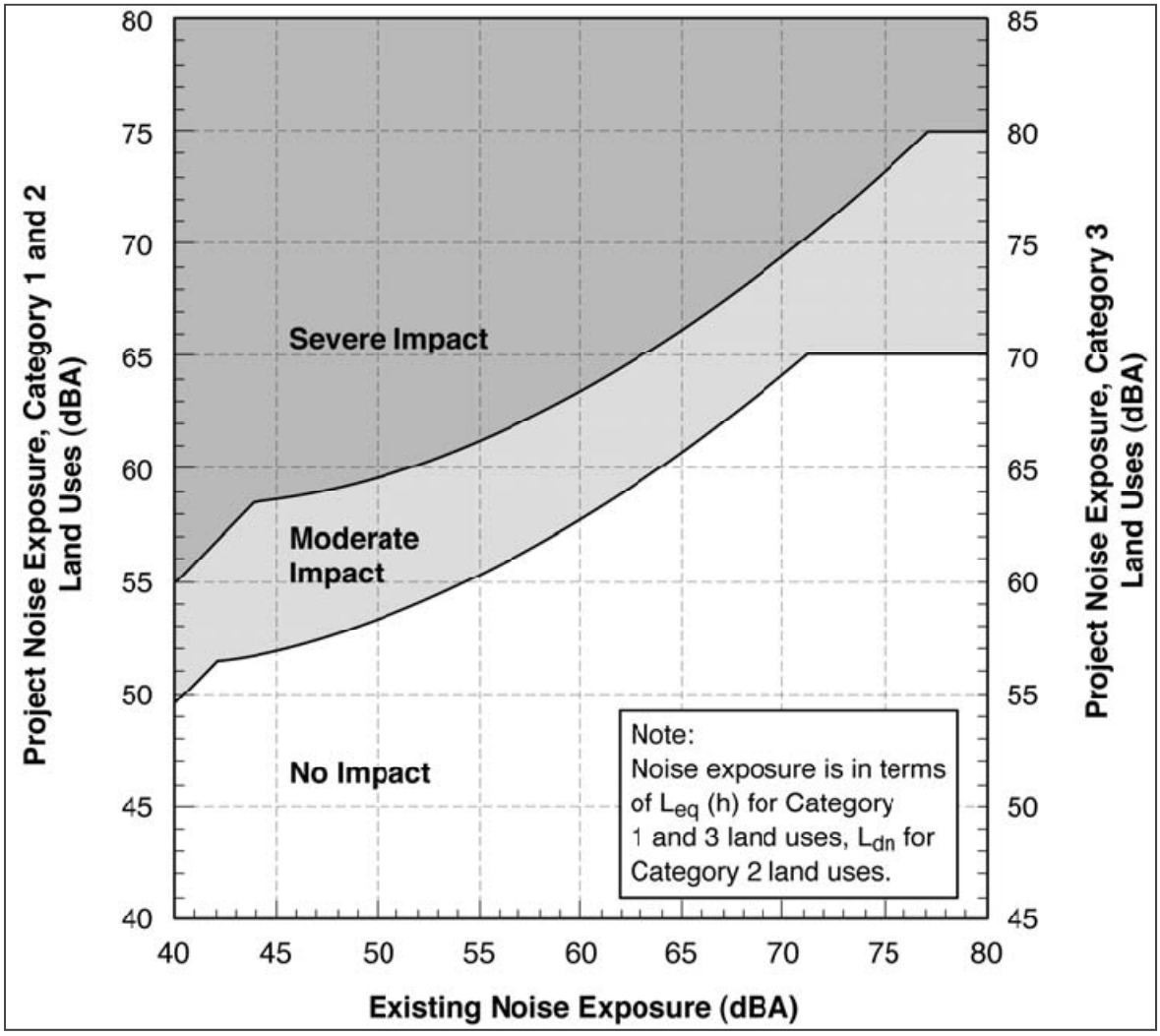
Time-varying characteristics of environmental noise are analyzed statistically to determine the duration and intensity of noise exposure. In an urban environment, noise is made up of two distinct parts. One is ambient or background noise. Wind noise and distant traffic noise make up the acoustical environment surrounding the project. These sounds are not readily recognized, but combine to produce a non-irritating ambient sound level. This background sound level varies throughout the day, being lowest at night and highest during the day. The other component of urban noise is intermittent, higher in pitch, and louder than the background noise. Transportation noise and local industrial noise are examples of this type of noise. Sounds of this nature can be disturbing; brief and intense noises can interrupt, annoy or startle. It is for these reasons that environmental noise is analyzed statistically.

The single number descriptors, Leq(h) and Ldn, are used to assess transit noise. The Leq(h) is the equivalent steady-state sound having the same A-weighted sound energy as that contained in the time-varying sound over a one-hour period. The Leq correlates reasonably well the effects of noise on people. The Day-Night Sound Level, or Ldn, is based on the A-weighted equivalent sound level for a 24-hour period, with an additional 10 decibels added to the actual or projected noise levels during the nighttime hours (10 PM to 7 AM). All noise levels in this environmental assessment will be A-weighted sound levels.

Noise Criteria

The FTA's noise impact criteria are based on a comparison of existing and future outdoor noise levels. The criteria were developed to address potential annoyance in a residential environment using Ldn as the noise descriptor. The Ldn noise level descriptor is defined as the 24-hour Leq where the nighttime noise from 10:00 PM to 7:00 AM is increased by 10 decibels prior to including the noise levels in the 24-hour calculation. A graphical representation of the FTA criteria is presented in Figure 40.

Figure 40: Federal Transit Administration's Noise Impact Criteria



The FTA established three land use categories, identified as Category 1, 2, and 3:

1. Tracts of land where quiet is an essential element in their intended purpose such as outdoor amphitheaters and concert pavilions,
2. Residences and buildings were people normally sleep, and
3. Institutional land uses such as schools, libraries, theaters and churches with primarily daytime and evening use.[25]

Affected Environment

Ambient noise measurements were taken at seven locations along the proposed route: one park, a fire house, and five residential areas. A total of 28 measurements were taken for 15-minute durations during four time periods; morning, afternoon, evening on November 9, 2010 and late night (after 10:00 PM) on November 10, 2010. The measurements were made with an integrating sound level analyzer meeting

[25] *Transit Noise and Vibration Impact Assessment.* Prepared by Harris Miller Miller & Hanson, Inc. Federal Transit Administration, FTA-VA-90-1003-06. May 2006, Table 3.2, pp 3-5.

ANSI and IEC Type 1 specifications. The data collected during each measurement is presented in Table 15.

Table 15: Measured Existing Noise Levels, dBA

Field Site #	Site Description	Date	Start Time	Duration	Noise Level		
					Ambient dBA L_{eq}	Train dBA L_{eq}	Train Horn L_{max}
1	29 ft east of N. 2nd St., 57 ft north of W. St. Paul Ave.	11/9/10	7:30 AM	15 min.	66		
		11/9/10	12:30 PM	15 min.	64		
		11/9/10	8:53 PM	15 min.	75	78	95
		11/10/10	12 midnight	15 min.	60		
2	49 ft east of N. Broadway St., 82 ft south of E. Wells St.	11/9/10	8:01 AM	15 min.	66		
		11/9/10	12:54 PM	15 min.	65		
		11/9/10	9:23 PM	15 min.	62		
		11/10/10	0:21 AM	15 min.	59		
3	In Cathedral Square between N. Jackson and N. Jefferson Streets, 20 feet north of E. Wells St.	11/9/10	8:27 AM	15 min.	63		
		11/9/10	1:35 PM	15 min.	62		
		11/9/10	9:43 PM	15 min.	59		
		11/10/10	0:40 AM	15 min.	55		
4	N. Van Buren St. entrance to 1300 N. Jackson St., 33 feet west of N. Van Buren St., 6 feet north of driveway	11/9/10	8:57 AM	15 min.	64		
		11/9/10	1:56 PM	15 min.	63		
		11/9/10	10:06 PM	15 min.	61		
		11/10/10	1:01 AM	15 min.	56		
5	20 feet east of N. Marshall St., 15 feet south of E. Ogden St.	11/9/10	7:28 AM	15 min.	66		
		11/9/10	12:29 PM	15 min.	64		
		11/9/10	9:02 PM	15 min.	60		
		11/9/10	11:58 PM	15 min.	56		
6	43 feet east of N. Prospect Ave., 6 feet north of Foot Path to N. Lincoln Memorial Drive	11/9/10	8:09 AM	15 min.	63		
		11/9/10	1:00 PM	15 min.	63		
		11/9/10	9:32 PM	15 min.	60		
		11/10/10	0:18 AM	15 min.	57		
7	20 feet east of N Farwell Ave., 8 feet Curtis Pl.	11/9/10	8:39 AM	15 min.	69		
		11/9/10	1:23 PM	15 min.	68		
		11/9/10	9:55 PM	15 min.	64		
		11/10/10	0:37 AM	15 min.	61		

Source: HNTB Corporation. November 2010.

The existing Ldn noise levels for each site were developed from the four measurement periods at each site. The 15-minute measurements were distributed over a 24-hour day to represent the diurnal nature of city noise levels. The resulting Ldn noise levels along Juneau Avenue, 4th Street, Wells Street, and Jackson Street are 64 dBA. Daily activities along Ogden Avenue, Prospect Avenue, Broadway and Farwell Avenue are slightly greater, resulting in Ldn noise levels ranging from 65 to 69 dBA. The Ldn noise level along St. Paul Avenue is 75 dBA as a result of the train operations through the Milwaukee Intermodal Station. The resulting Ldn noise levels along the study area are presented in Appendix E, Tables F- 4-X(Cat 2) and 4-X(Cat 3).

Environmental Effects

Under the No Action Alternative, the streetcar would not be constructed and ambient noise levels would remain unaffected by the streetcar operations and construction activities.

The effects of the streetcar LPA are discussed below.

There are six potential noise sources from streetcar operations:

- Wheel/rail rolling noise, which is a function of operating speed and the condition of the wheels and rails
- Wheel/rail impact noise at turnouts
- Wheel squeal on tight radius curves. This is extremely variable and was not modeled for this EA. The streetcars will be equipped with a container of liquid, that when applied in the area of the wheel contact with the rail reduces the friction and decreases the potential for wheel squeal. This friction modifier will be formulated for all weather usage. Application of the friction modifier will be controlled by the operator.
- Streetcar auxiliary equipment – ventilating units, electric drive motors, etc. (These are typically not major noise sources on modern streetcars.)
- Warning device noise is not an issue on this project as the streetcars will be sharing the right-of-way with local traffic and will only be sounded if the operator feels it is necessary to avoid a problem. The streetcars will be equipped a bell and a horn. The bell will be used under normal operating conditions while the horn will only be used if the operator feels that there is a dangerous situation.
- Traction power substations (substations) will be located at three locations within the study area. The substations consist of single story prefabricated buildings that contain transformers. These buildings will be heated and cooled with wall mounted HVAC systems. The transformers within the substation create a low frequency hum; the HVAC systems will create noise levels similar to an air conditioner.

Land use along the streetcar corridor is a mixture of commercial, mixed commercial/residential, residential, churches, schools and public buildings. Based upon the FTA's three land use categories, Figure 40, there are no known Category 1 land uses along the corridor and the primary areas of interest are Category 2 land uses; mixed commercial/residential and residential; and Category 3 land uses; churches and schools. Noise mitigation is to be considered when measures are necessary to mitigate severe impacts or moderate impacts that border on severe.

The projected Ldn noise levels were developed using the equations in the FTA Guidance Manual. The Ldn noise level is a function of the noise source (how loud the streetcar is at a given distance and speed), adjustments for operating speeds, and distance from track to a receiver, (a building or a group of buildings at the same distance from the track) along with daytime and nighttime pass-bys per hour. Manufacturer's noise source data on three modern streetcars operating at 25 mph with the proposed headways were used in the analysis. The resulting Ldn noise levels and impacts along the study area are presented in Appendix E.

There are 69 residential buildings (FTA Criteria - Land Use Category 2) along the corridor; these buildings represent single family residences, multi-family residences, condominiums and hotels. The existing Ldn noise levels adjacent these buildings range from 64 to 69 dBA with the condominium on 2nd Street and St. Paul Avenue exposed to an Ldn of 75 dBA. Projected operations of the streetcar will create noise levels that range from 47 – 62 dBA, Ldn. The majority of these residential buildings will not experience a noise impact from the operations of the streetcar system. There are eight residential

buildings along the north side of Ogden Avenue, from Van Buren Street to Farwell Avenue that have an existing Ldn noise level of 65 dBA. The threshold for FTA's Moderate Impact for this area is 61 dBA Ldn. Projected operations of the streetcar will create Ldn noise levels ranging from 56 – 62 dBA. The 62 dBA noise level would expose these residences to an Ldn noise level that is 1 decibel greater than the FTA Moderate Impact threshold. These properties have been shaded in Appendix E, Table E-1. This projected impact only occurred with the source noise data from one of the modern street cars used in the noise analysis; the other two modern streetcars did not create an impact.

There are nine institutional properties (FTA Criteria - Land Use Category 3) adjacent to the proposed streetcar alignment; MATC, Cathedral Square, Metrobrook Church, Tenor High School, MSOE Walter Schroeder Library, Cathedral St. John Evangelist, St. Joan Anita High School, Lincoln Center Middle School and First Unitarian Society. Hourly Leq noise levels adjacent to these properties range from 63 to 66 dBA. Projected Leq noise levels created by the proposed operation of the streetcars range from 51 – 63 dBA. Noise levels at these receptors would not exceed the impact threshold.

There are four turnouts proposed along the streetcar route. Two of the four turnouts are located in a residential area at intersection of Ogden and Farwell Avenues. The operating speeds at the turnouts are low and will not create noise impact.

There are three substations located adjacent to the proposed streetcar route. The substation proposed to be located on the northeast corner of Cass and Knapp Streets would have residences within 60 to 100 feet of the substation. Using noise level data provided by a substation HVAC manufacturer and the procedures presented in the FTA Guidance Manual the Ldn noise level at the nearest residence would range from 51 to 55 dBA. Since the ambient Ldn noise level is in the low 60 dBA range, the noise from the substation will not create an impact according to FTA criteria.

Mitigation Measures

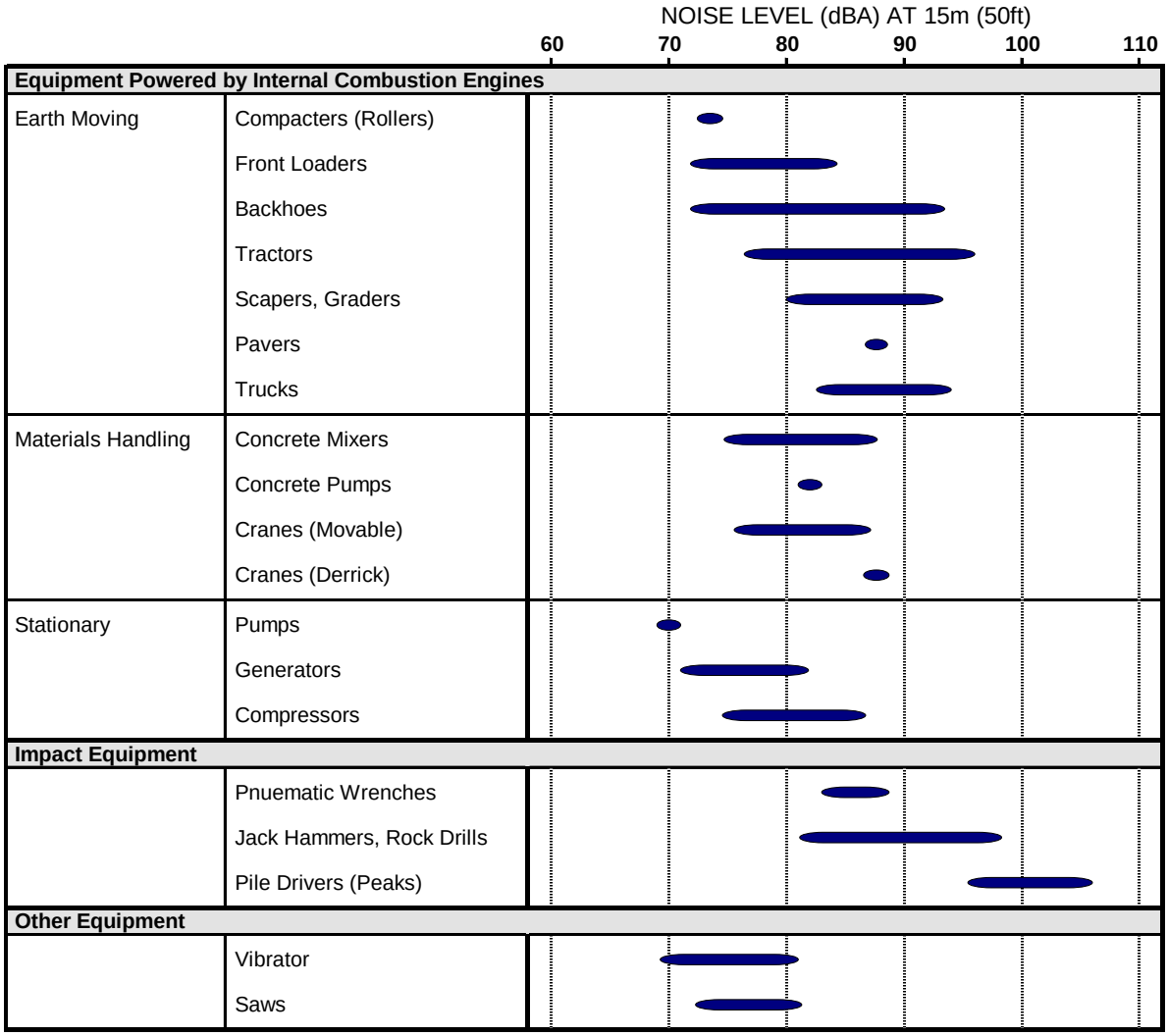
Noise mitigation generally involves the treatment of three fundamental components: the source, the propagation path and the receiver. A major source of noise from steel-wheel/steel-rail systems is the wheel/rail interaction. Resilient wheels, which have been recommended by a number of modern streetcar manufacturers, can reduce rolling noise by a minimum of 2 dB. Resilient wheels typically have rubber installed between the wheel hub and the steel wheel that rides on the rail. This mitigation measure has been utilized in the noise analysis and will be specified in the streetcar specifications. Likewise, the proposed rail design has a significant portion of the embedded rail that is not in contact with the steel wheel encased in rubber. This encasement or rubber boot can reduce noise by another 2 dB and was included in the noise analysis. The primary source of any further mitigation of the streetcar noise will be the development of an attainable noise specification for the streetcar that eliminates the Moderate Impact. Based on noise data from two modern streetcar manufacturers, preparing an attainable noise specification should not be difficult. During the life of the streetcars, maintenance of wheels by truing wheels and grinding the rails will help eliminate future increases in noise as maintaining smooth wheel/rail interaction can reduce age and wear induced noise.

Construction Noise

The major construction elements of this project are expected to be pavement removal, hauling, grading, and paving. General construction noise impacts for passersby and those individuals living or working near the project can be expected from these activities. Table 16 lists some typical peak operating noise levels at a distance of 15 m (50 feet), grouping construction equipment according to mobility and operating characteristics. Considering the relatively short-term nature of construction noise, impacts are not expected to be substantial. The structural characteristics of nearby buildings, whether wood frame, steel frame or masonry, are believed to be sufficient to moderate the effects of intrusive construction noise.

Construction noise will be controlled as recommended in Section 5.2.2 (Noise and Vibration). Construction activities will comply with the City of Milwaukee's Nuisance Ordinance (Chapter 80).

Table 16: Construction Equipment Sound Levels



SOURCE: U.S. Report to the President and Congress on Noise, February, 1972.

Vibration

Background

Ground-borne vibration and noise are caused by vibrations originating at the wheel/rail interface and propagating from the rails through the intervening soil and rock to nearby buildings. The resulting vibration may be perceptible as mechanical motion (such as windows rattling or dishes on shelves rattling). The acoustic radiation by the building components may cause an audible low-frequency rumble.

Airborne noise from streetcars generally overpowers the ground-borne noise and vibration. However, the potential impacts of ground-borne vibration and noise cannot be ignored. Ground-borne vibration and noise inside buildings are often near the threshold of human sensitivity. In this range, a small increase in vibration or noise levels can cause increases in human response. Unfortunately, variability in soil and rock conditions and building designs make prediction more difficult than for airborne noise levels.

Vibration can be described in terms of the displacement, velocity, or acceleration of a vibrating surface. The peak velocity of a vibration is used to assess building damage. However, the human body responds better to an average velocity. The peak velocity of a vibration is used to assess transit vibration. The unit for transit vibration is VdB[26] (vibration velocity in decibels).[27]

Ground-borne noise is the rumbling sound created by the vibration of a room's surfaces. The descriptor used is the A-weighted sound level, dBA. Ground-borne noise from rail facilities has a significant low frequency component. Therefore, the rumbling noise created by ground-borne noise sounds louder than broadband noise with the same dBA level.

Vibration Criteria

Ground-borne vibration and noise are not every day experiences to most people. Smooth roadways create hardly any noticeable vibration velocity levels. Most perceptible indoor vibration velocity levels are created by normal human activities in the building. Construction activities, rough roads, passenger and freight trains are the source of most perceptible outdoor ground-borne vibration velocity levels. Typical background vibration velocity levels in residential neighborhoods are usually 50 VdB or lower. The human threshold is 65 VdB.[28]

Ground-borne noise is the rumbling sound created by the vibration of a room's surfaces. The descriptor used is the A-weighted sound level, dBA. Ground-borne noise from rail facilities has a significant low frequency component. Therefore, the rumbling noise created ground-borne noise sounds louder than broadband noise with the same dBA level. The FTA criteria for ground-borne vibration and noise are presented in Table 17.

[26] Vibration velocity in decibels, VdB, is defined as the ratio of the root mean square veolocity amplitude to the reference velocity amplitude. All the vibration levels in this environmental assessment will be referenced to $1x10^{-6}$ in./sec.

[27] *Transit Noise and Vibration Impact Assessment.* Prepared by Harris Miller Miller & Hanson, Inc. Federal Transit Administration, FTA-VA-90-1003-06. May 2006. pp. 7-4.

[28] *Transit Noise and Vibration Impact Assessment.* Prepared by Harris Miller Miller & Hanson, Inc. Federal Transit Administration, FTA-VA-90-1003-06. May 2006. pp 7-5.

Table 17: Ground-borne Vibration and Noise Impact Criteria

Land Use Category	Ground-borne Vibration Impact Levels, VdB			Ground-Borne Noise Impact Levels, dBA		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where low ambient vibration is essential for interior operations.	65 VdB[4]	65 VdB[4]	65 VdB[4]	N/A[5]	N/A[5]	N/A[5]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

Notes:

1 "Frequent Events" is defined as more than 70 vibration events per day.

2 "Occasional Events" is defined as between 30 and 70 vibration events per day.

3 "Infrequent Events" is defined at fewer than 30 vibration events per day.

4 This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.

5 Vibration-sensitive equipment is not sensitive to ground-borne noise.

Affected Environment

The proposed streetcar route is within the public right-of-way of major and local streets in the central business district and adjacent neighborhoods. Therefore, typical background vibration velocity levels due to regular traffic range from 54 to 58 VdB. Vibration velocity levels due to buses can range from 62 to 68 VdB.[29]

Environmental Effects

Under the No Action Alternative, the streetcar would not be constructed and vibration levels would remain unaffected by the streetcar operations and construction activities.

The vibration assessment for the streetcar project followed the General Vibration Assessment procedures of the FTA's Guidance Manual. Ground-borne vibration levels along the proposed streetcar routes would range from 64 to 72 VdB. The results of the vibration analysis are presented in Tables E-3 (Residential) and E-4 (Institutional) for the same residential buildings and institutional properties identified in the noise section. All of these levels are below the respective FTA Impact Criteria, which ranges from 72 to 75 VdB, for the appropriate Land Use Categories and level of operations. Projected ground-borne noise levels would range from 24 – 32 dBA. None of these levels would exceed the ground-borne noise criteria, which ranges from 35 to 43 dBA.

[29]James T. Nelson, P.E., "Superconducting Super Collider Environmental Ground Vibration Study," Wilson, Ihrig & Associates, Oakland, CA, January 1987, Figure C1-C7.

Mitigation Measures

The most important vibration mitigation measures will be proper maintenance. Vibration levels can increase substantially if rail grinding to optimize track conditions, wheel truing to re-contour wheels allowing smooth contact surfaces and proper vehicle maintenance is not performed.

Conclusion

The noise and vibration analysis for the proposed streetcar project was prepared according to the FTA's Guidance Manual. There are 69 residential buildings (FTA Criteria - Land Use Category 2) along the corridor. Projected operations of the streetcar will create noise levels that range from 47 – 62 dBA, Ldn. There are only eight residential buildings along the north side of Ogden Avenue, from Van Buren Street to Farwell Avenue that would be exposed to Ldn noise levels that are 2 decibels greater than the FTA Moderate Impact threshold.

There are nine institutional properties (FTA Criteria - Land Use Category 3) adjacent to the proposed streetcar alignment. Projected Leq noise levels created by the proposed operation of the streetcars range from 51 – 63 dBA. Noise levels at these receptors would not exceed the impact threshold.

Two of the four turnouts proposed for the streetcar route are located in a residential area at the intersection of Ogden and Farwell Avenues. The operating speeds at the turnouts are low and will not create noise impact.

One of the three substations for the proposed streetcar corridor would be located on the northeast corner of Cass and Knapp Streets. The nearest residences would be within 60 to 100 feet of the substation. The Ldn noise level created by this substation would range from 51 to 55 dBA, which by definition would not be considered an impact.

The primary mitigation measure for the predicted Moderate Impact will be the development of an attainable noise specification for the streetcar. Based on noise data from two modern streetcar manufacturers, preparing an attainable noise specification should not be difficult. During the life of the streetcar maintenance of wheels by truing wheels and grinding the rails will help eliminate future increases in noise as maintaining smooth wheel/rail interaction can reduce age and wear induced noise.

Projected ground-borne vibration and ground-borne noise levels did not exceed FTA's criteria.

Vibration levels can increase substantially if rail grinding to optimize track conditions, wheel truing to re-contour wheels allowing smooth contact surfaces and proper vehicle maintenance is not performed. Therefore, the most important vibration mitigation measures will be proper maintenance.

5.2.3 Hazardous Materials

This section assesses the potential for the accidental release and the uncontrolled disposal of hazardous waste within the vicinity of the construction and operation of the streetcar LPA. Examples of hazardous waste materials include petroleum products, pesticides, herbicides, chlorinated volatile organic compounds, heavy metals, or other compounds that may be harmful to human health and the environment.

Affected Environment

The construction activities related to the streetcar LPA tracks and stops will be located within the existing public right of way, which has been previously disturbed and excavated. Since the proposed maintenance facility site is not within the existing right of way, a *Phase 1 Hazardous Materials Assessment (HMA)*

Report (HNTB, February 8, 2011) was completed for the maintenance facility site. The Phase 1 HMA was also completed for two additional proposed electrical substation location sites because they will involve excavation at greater depths than the tracks and stops. Maps of the substation locations can be found in Figure 15 and Appendix F. The Phase 1 HMA scope of work included a review of applicable regulatory databases of known or potential hazardous materials sites located near the proposed maintenance facility and substation locations; review of the physical geography in the area; review of historical documentation, and site reconnaissance.

Environmental Regulatory Database Review

Table 18 summarizes the hazardous material sites that were identified within a quarter-mile radius of the proposed streetcar maintenance facility. No hazardous materials were found on the maintenance facility site. However a number were found within ¼ mile. Review of available information for the identified hazardous materials sites indicated a minimal potential that these sites had impacted the subsurface environment at the proposed streetcar maintenance facility site based on distance from the proposed maintenance facility.

Table 18: Hazardous Material Sites Identified within 1/4 Mile of the Maintenance Facility

Site Type	No. of Identified Sites within 1/4 mile	Maintenance Facility Site
Federal, CERCLIS – NFRAP	1	0
Federal, RCRA Generators	14	0
Federal, ERNS	6	0
State, Spills	23	0
State/Tribal, SWL	1	0
State/Tribal, LUST	12	0
State/Tribal, UST/AST	33	0
State/Tribal, EC	3	0
State/Tribal, IC	4	0
State/Tribal, VCP	1	0
State/Tribal, Brownfields	1	0
State, Other	13	0

Source: Environmental FirstSearch Technology Corporation, July 16, 2010

Note: The Hazardous Materials study provides details of the locations of the identified sites and explanation of acronyms can be found in the Glossary.

Table 19: Hazardous Material Sites Identified within 1/8 mile of the North Market Street Substation Location

Site Type	No. of Identified Sites within 1/8 mile	North Market Street Site
Federal, CERCLIS – NFRAP	0	0
Federal, RCRA Generators	12	0
Federal, ERNS	0	0
State, Spills	1	0
State/Tribal, SWL	0	0
State/Tribal, LUST	3	0
State/Tribal, UST/AST	8	0
State/Tribal, EC	0	0
State/Tribal, IC	0	0
State/Tribal, VCP	0	0
State/Tribal, Brownfields	1	0
State, Other	0	0

Source: Environmental FirstSearch Technology Corporation, January 21, 2011

Note: The Hazardous Materials study provides details of the locations of the identified sites and explanation of acronyms can be found in the Glossary.

Table 20: Hazardous Material Sites Identified within 1/8 mile of the North Cass Street Substation Location

Site Type	No. of Identified Sites within 1/8 mile	North Cass Street Site
Federal, CERCLIS – NFRAP	0	0
Federal, RCRA Generators 3		0
Federal, ERNS	0	0
State, Spills	3	0
State/Tribal, SWL	0	0
State/Tribal, LUST	1	0
State/Tribal, UST/AST	3	0
State/Tribal, EC	0	0
State/Tribal, IC	0	0
State/Tribal, VCP	0	0
State/Tribal, Brownfields	1	0
State, Other	0	0

Source: Environmental FirstSearch Technology Corporation, January 21, 2011

Note: The Hazardous Materials study provides details of the locations of the identified sites and explanation of acronyms can be found in the Glossary.

Table 19 and Table 20 summarize the hazardous materials sites that were identified within a 1/8 mile radius of the proposed substation locations. No hazardous materials were found on the footprints of the substation locations; however, a number were found within 1/8 mile. Review of available information for the identified hazardous materials sites indicated a minimal potential that these sites had impacted the subsurface environment at the proposed substation locations based on distance from the proposed substation locations.

Physiographic Information Review

The proposed maintenance facility will be located beneath two land bridges at milepost 0.5 that carry traffic for east and westbound Interstate 794 and the Marquette Interchange. Geotechnical soil borings were performed at the maintenance facility site in 2002-2003 for the recently completed Marquette Interchange Reconstruction project. Review of the geotechnical soil boring logs indicated that the project site was underlain with 10 to 16 feet of historic fill.[30] The historic fill material is comprised of brick, wood, coal, cinders and slag of unknown origin. It is probable that the historic fill has impacted near surface soil at the maintenance facility site.

Historical Documentation Review

Historical documents indicated that the proposed streetcar maintenance facility was the location of several former industrial facilities, including paper box, mitten, furniture, and plumbing supply manufacturers. The former industrial land uses had the potential to impact the subsurface environment at the proposed streetcar maintenance facility site.

Historical documents indicated the North Market Street proposed electrical substation location was the site of unidentified stores, but some were identified as printing, plumbing and warehouse businesses. The

[30] Any deposit of waste material, other than by homeowners on their own property, meets the statutory definition of a landfill. Landfills that were established before 1970 and were never licensed by the Department of Natural Resources (DNR) are called "historic fill" sites.

former commercial land uses had the potential to impact the subsurface environment at the North Market Street proposed electrical substation location.

Site Reconnaissance

Site reconnaissance at the project site and surrounding properties did not reveal any evidence of the use or storage of hazardous materials.

Environmental Effects

Under the No Action Alternative, the streetcar would not be constructed and so no potentially hazardous sites would be encountered. No further investigation of sites or remediation or clean up would occur of any sites.

For the streetcar LPA, no new right of way will be purchased. Construction of the streetcar tracks will generally take place within the existing public right of way and only the top two feet of the ground will be disturbed by construction activities for track construction. According to the City of Milwaukee, the right of way within the study area has been previously excavated and no issues with hazardous materials have occurred as a result of other roadway construction projects within the vicinity of the streetcar project. For these reasons, the construction activities that take place within the public right of way for track construction are not expected to expose hazardous materials.

Construction for the streetcar's electrical substation locations will take place at three locations; first, at the maintenance facility; second, on City of Milwaukee owned property on North Market Street; and finally, within the existing right of way at North Cass Street. In general, construction of the electrical substations would consist of excavating to a depth of four feet below the ground surface. An exception to this would be the North Market Street location where no geotechnical studies were performed and the site will require excavating into a side-slope. Excavation depths at this location would range from 4 to 12 feet below ground surface.

Hazardous material issues are not expected as a result of contractor storage during construction. Contractor storage areas will be located at the ground surface. The contractor would be responsible for any spills that they generate. Additional discussion of construction impacts are discussed in Section 5.2.5.

There are two locations where substantial excavation is required for this project. The first location is at the proposed streetcar maintenance facility. In general, construction of the streetcar maintenance facility would include excavations to estimated maximum depths of approximately 12 feet below ground surface. The disturbed soils may include historical fill such as brick fragments, wood, coal, cinders, and slag, as noted in the 2002-2003 geotechnical soil borings performed at the site. Proper management of the potentially impacted historic fill/soil during construction will be required as regulated by the Wisconsin Department of Natural Resources.

Mitigation Measures

To reduce the project's environmental liability and risk, additional analysis of the proposed maintenance facility site and proposed substation location at North Market Street are necessary. According to the WisDOT Facilities Development Manual, Procedure 21-35-10, Phase II HMAs are warranted to characterize the historical fill and subsurface soil conditions that may be disturbed during site construction at both locations. A Phase II HMA typically includes a focused investigation of the subsurface media through soil and potential groundwater sampling with laboratory analytical analysis. If the results of the Phase II HMA indicate that the historical fill and/or subsurface soils at the project site are impacted with contaminants above regulatory standards, "Special Provisions and a Notice to

Contractors" will be developed and incorporated into the construction specifications to address impacted soils.

5.2.4 Traffic and Transportation

This section evaluates the streetcar project's effects on buses and other street-running vehicles, pedestrians, and bicyclists.

Transit

This section describes existing transit service within the study area and how streetcar operations may or may not affect this transportation mode.

Affected Environment

The Milwaukee County Transit System (MCTS) provides existing bus service in the study area. Section 2.2.2 describes the existing transit services in detail.

The Downtown Business Improvement District (BID) owns and operates a limited service rubber tire trolley in the summer months (June-September). The trolley serves downtown attractions and operates between 11 AM and 10 PM

Environmental Effects

Under the No Action Alternative the streetcar line would not be constructed. MCTS will continue to operate and make decisions on their routes and service without consideration of an additional transit mode (streetcar).

The streetcar LPA will introduce a new transit transportation mode within the study area. The streetcars are intended to circulate people around downtown and to nearby neighborhoods. Streetcars will not have a dedicated travel lane and will operate in a mixed traffic lane along with cars and trucks; similar to existing bus service. Streetcars will be in service seven days a week throughout the year between 5 AM and midnight, Monday through Friday, 7 AM to midnight on Saturday, and 7 AM to 10 PM on Sundays. There will be a 10-minute wait between cars (10-minute headways) during the weekday daytime and 15-minute headways on weekends. The details of the new service are fully described in Section 4.

Streetcars are not expected to affect existing transit services. However, the Milwaukee County Transit System (MCTS) has indicated to the City that they might evaluate the need to modify bus stop locations to integrate bus and streetcar services.

According to preliminary plans, a Megabus[31] and other intra city bus services loading zone located on the west side of 4th Street about 50 feet north of St. Paul Avenue, would also be affected. This existing passenger loading zone is not a permanent location (there is no platform or shelter) and would need to be moved to a new location.

Construction related impacts are reported in Section 5.2.5.

Mitigation Measures

The City will meet with MCTS to coordinate streetcar and bus service.

[31] Megabus is a low-cost intercity privately operated bus service.

The City will coordinate with Megabus and other intra city bus services to relocate their 4th Street passenger loading zone to a similarly convenient location.

Vehicular Traffic

This section describes the existing vehicular traffic within the study area and how the implementation of the streetcar may affect traffic operations. The project team prepared a technical memorandum[32] describing the traffic operations with and without the implementation of the streetcar and describes the improvements needed for each intersection along the streetcar route. These improvements or "final requirements" include any Transit Signal Priority (TSP) strategies, Opticom equipment, additional signals or geometric improvements needed to maximize traffic safety. The results of the traffic study are summarized below. Figure 22 shows where many of the proposed changes to improve traffic operations will be located, including changes to lanes, traffic signals, driveways, parking and loading zones.

Affected Environment

The existing street network in the study area is largely oriented on a grid. The network offers ample capacity for daily trips around the downtown area and to and from nearby neighborhoods.

The City of Milwaukee traffic signals are currently working with 170 controllers that use emergency vehicle preemption (EVP) through the "Opticom" system. Vehicle detection equipment such as Opticom detects a signal sent when the driver pushes a button to activate a light signal to allow vehicles to travel through signalized intersections.

Environmental Effects

The study team evaluated existing and future traffic operations at all affected intersections for the morning (AM) and afternoon (PM) peak hours[33] under three scenarios:

- Existing 2010 conditions (Existing)
- Future (2030) conditions without streetcars (No Action Alternative)
- Future (2030) conditions with streetcars (Streetcar LPA)

Traffic operations were evaluated under each of these three scenarios using computer software that simulates existing and future traffic conditions at each intersection along the streetcar route. The results of this evaluation show the level of service and delay for the intersections and each turning movement at those intersections. The three scenarios were then compared to one another.

Level of service, or LOS, is a quality measure of traffic operations based on the delay to drivers. The scale ranges from LOS A to LOS F with LOS A representing the best operating conditions, and LOS F representing the worst operating conditions. For this analysis, LOS E or above was considered acceptable.

In general, the addition of the streetcar would increase the overall delay at most intersections along the streetcar route. Additional delay may occur when vehicles backup behind the streetcar at stops; or at intersections with a transit signal phase; or because of backups at downstream intersections. However,

[32] *Milwaukee Streetcar Traffic Operations* technical memorandum from HNTB Corporation to City of Milwaukee. January 5, 2011.

[33] A peak hour or rush hour is an hour of day when traffic is the heaviest. Peak hours happen primarily during the morning and evening commute periods. The AM peak hour used was from 7:00am-8:00am and the PM peak hour used was from 4:00pm-5:00pm.

nearly all the intersections still operate acceptably, that is at a LOS E or better. Appendix H contains the LOS comparison for all of the studied intersections.

The improvements proposed with the streetcar LPA sought to maximize the efficiency of the system overall and all intersections would operate at a satisfactory LOS with the streetcar. In fact at the intersections of Ogden and Jackson in the AM and Royall and Farwell in the PM, the No Action Alternative's level of service will be an unsatisfactory LOS F and the streetcar project improves operations to a LOS B and LOS D respectively. When further comparing the No Action Alternative to the streetcar LPA, some intersections in the study corridor will benefit from a better LOS while others will have a decreased LOS. Overall LOS will worsen slightly at eight intersections in the morning peak hour and improve at three intersections. In the evening peak hour, LOS will worsen at five intersections and improve at eight intersections. Many intersections however, would be the same LOS with or without the streetcar.

Several changes to lane configurations are proposed with the implementation of the streetcar. The City of Milwaukee, under a separate project, is converting Wells Street to a two-way street east of 6th Street. This change to Wells Street is incorporated into the streetcar design. The conversion of Wells Street increases eastbound delay, or reduces the traffic operations, along Wells Street in both morning and evening peak hours at intersections along the streetcar route. The exception is at 4th Street and Wells Street in the afternoon peak hour where the eastbound delay decreases. However, it is expected that Wells Street traffic will utilize other east/west streets such as Kilbourn Avenue or Wisconsin Avenue, which would thereby reduce delays on Wells Street. The majority of the intersections along Wells Street operate acceptably, but intersection operations may be improved with signal timing adjustments.

The streetcar plans include converting Broadway from a one-way to a two-way street between St. Paul Avenue and Clybourn Street. This will require lane and signal modifications to maintain acceptable operations at the Broadway and Clybourn Street intersection. These changes will improve the future operations of the nearby intersections at Michigan Street, Wisconsin Avenue, Mason Street and Wells Street, which are influenced by traffic backups at the existing Broadway and Clybourn Street intersection.

Due to the track layout, adding streetcar service will also require changing the lane configuration on St. Paul Avenue from one lane in each direction to two lanes eastbound and one lane westbound. However, the addition of an eastbound streetcar stop in the median at the St. Paul Avenue and Plankinton Avenue intersection will reduce the number of eastbound through lanes, from two lanes to one lane, and increase delay, particularly during the morning peak hour travel time. Regardless, the eastbound left turn operates at an unacceptable LOS F in the future with or without a streetcar. All other traffic movements would still operate within acceptable levels of service.

The intersections of Juneau Avenue and 4th Street and Kilbourn Avenue and 4th Street have lane configuration changes to accommodate stop locations. The change at Juneau Street and 4th Street has minimal impact to the intersection delay while still maintaining an acceptable level of service. The change at State Street and 4th Street increases the intersection delay, however, the level of service remains within acceptable limits.

Implementing streetcar service may result in lower levels of service at some intersections due to a decrease and/or lack of available lanes for vehicles, streetcar operations within a mixed travel lane and increased pedestrian volumes at stop locations. Intersection operations can be improved with signal timing adjustments, which would be made by the City of Milwaukee as needed.

Based on the proposed track alignment and the streetcar stop locations, a total of four intersections will need to be signalized, five intersections will require a transit signal phase, and five intersections will

require the installation of the Opticom detection system described above. A transit signal phase is a period of time when all directions of vehicular traffic will have a red light, but the transit vehicle can move through the intersection. The standard symbol for this is a vertical bar as shown in Figure 41. When the vertical bar appears on the signal lights, it gives the transit vehicle permission to proceed through the intersection while all other vehicle must wait. A transit signal phase is used when there is a potential conflict with other traffic.

Figure 41: Example of a Transit Signal Phase from Tacoma Streetcar

Source: HNTB Corporation

One intersection will require other signal improvements. These changes are necessary because the streetcar conflicts with other vehicles within the intersection. The required changes are summarized by location in Table 21.

Table 21: Transit Signal Priority Applications and other Signal Requirements

	Add a new signal	**Add a Transit Signal Phase^**	**Install Opticom detection system**	**Necessary Signal Improvements**
Initial Route				
St. Paul Avenue and 4th Street	X	X	X	None
St. Paul Avenue and 2nd Street	X	X	X	None
Jackson Street and Ogden Avenue	X*			None
Farwell Avenue and Ogden Avenue		X	X	None
Clybourn Street and Broadway				New northbound signal phase
Route Extensions				
Juneau Avenue and 6th Street		X	X	None
Prospect Avenue and Ogden Avenue		X	X	None
Prospect Avenue and Royall Place	X	X	X	None
Farwell Avenue and Royall Place	X*			None

*The addition of a signal is recommended regardless of the streetcar project due to poor traffic operations.

The new traffic signal that includes a transit signal phase and Opticom at St. Paul Avenue and 4th Street will increase delays while it allows for southbound left turning streetcars to clear the intersection before other traffic can proceed on a green signal. Eastbound and westbound delays increase with the new signal; however, the overall intersection operates acceptably.

In the No-build scenario, the Jackson Street and Ogden Avenue intersection will have substantial delays along Ogden Avenue that result in LOS F. In order to improve operations, a new traffic signal at this intersection is recommended but not required because the streetcar does not conflict with vehicles. By adding a signal, the delays decrease significantly and the intersection operates acceptably. Installing a signal at the Ogden Street and Jackson Street intersection will not only improve operations, but also reduce traffic backups and benefit operations at the Ogden Street intersections at Van Buren Street and Cass Street.

The Ogden Street intersections with Farwell Avenue and Prospect Avenue will require new transit signal phases to allow the streetcar to traverse the intersections without conflicting with traffic.

A transit signal phase at the Prospect Avenue and Royall Place intersection is required because the streetcar turns left onto Royall Place from the right lane on Prospect Avenue. To accommodate the transit signal phase, a new signal must be installed along with the Opticom system. This requirement will result in increased delay; however, the level of service will remain within acceptable limits.

The Farwell Avenue and Royall Place intersection has poor traffic operations in the No Action Alternative scenario. This is primarily due to traffic backups downstream at the Farwell Avenue and Brady Street intersection. Installing a signal for the streetcar at Royall Place will improve traffic operations in the PM peak hour. However, the signal will at the same time increase delays on Royall Place because a longer green time would be given to the heavier traffic flows on Farwell Avenue.

The temporary effects of construction activities on traffic are discussed in Section 5.2.5 (Construction Impacts).

Mitigation Measures

The streetcar project proposes a number of measures to eliminate conflict between the streetcar and vehicles and to mitigate delays that would occur as summarized above and described in detail in the *Milwaukee Streetcar Traffic Operations* technical memorandum. To address the conflicts and minimize delays, the City of Milwaukee will make the necessary improvements to lane configurations; install new traffic signals; install transit signal phases and Opticom; and add a signal phase to the existing signal network.

Bicycle and Pedestrian Facilities

This section describes the effects associated with bicycle and pedestrian facilities.

Affected Environment

The streets within the study area have sidewalks. The City of Milwaukee also has an extensive network of existing, planned and proposed bicycle routes and lanes. Bike lanes are painted on the street pavement. Streets that are not wide enough for bike lanes, but are important bike connections are signed as designated bike routes. The Oak Leaf recreation trail travels in a north-south direction along the eastern edge of the study area near Lake Michigan.

A map of the existing pedestrian movements in the downtown is included in Figure 4.

Environmental Effects

Under the No Action Alternative the streetcar line would not be constructed. Pedestrian activity won't be generated by the streetcar and pedestrians and bicyclists would not benefit from this system that could otherwise extend walk and bike trips. Also, the expected benefits this added bicycle and pedestrian traffic could have through an increase in potential customers to businesses won't be realized.

Overall the streetcar LPA system is expected to benefit pedestrians and bicyclists within the study area by providing a new efficient high quality transit system that can extend walk and bike trips. The stops and the vehicles will be ADA-compliant to make sure the system is accessible to everyone including the disabled. A description of the accessibility features can be found under Section 5.1.7 (Safety and Security).

Preliminary plans indicate the potential placement of overhead contact system (OCS) poles at locations where sidewalk basements exist, between Michigan Street and Wisconsin Avenue along Broadway. In accordance with Chapter 245-5 of the City of Milwaukee Municipal Code, a sidewalk basement is entirely below a sidewalk and adjoining a building or structure that is maintained and operated by the adjoining building's property owner. The basement is within the public right of way and occupancy and use of the basements may be revoked by the City at any time. The sidewalk basements shall not interfere with any public work or improvement and the City reserves the right at any time to construct under or within the basement for public service at the expense of the property owner.

Preliminary plans indicate the potential placement of overhead contact system (OCS) poles at locations where sidewalk basements exist, between Michigan Street and Wisconsin Avenue along Broadway. In accordance with Chapter 245-5 of the City of Milwaukee Municipal Code, a sidewalk basement is entirely below a sidewalk and adjoining a building or structure that is maintained and operated by the adjoining building's property owner. The basement is within the public right of way and occupancy and use of the basements may be revoked by the City at any time. The sidewalk basements shall not interfere with any public work or improvement and the City reserves the right at any time to construct under or within the basement for public service at the expense of the property owner.

The exact location and placement of the OCS poles will be determined during future design phases of the project. If impacts are determined, the City will coordinate with sidewalk basement property owners

The project will add approximately 1,200 linear feet of new bike lanes along Wells Street and will maintain about 8,500 linear feet of existing bike lanes along Prospect Avenue, Farwell Avenue and Ogden Avenue. The new bike lane along Wells Street will help connect missing links of the existing downtown bike system and will improve multi-modal transportation connections by allowing bicyclists to bring bikes on the streetcar.

Special considerations are also being incorporated into the project's design to minimize the impact to bicyclists on roads, at intersections and at stops that contain existing and planned bike lanes. Bike lanes would stay to the right of the stop or be relocated to the opposite side of one-way streets to avoid any potential conflicts with the streetcar.

Bicyclists will need to become accustomed to the new vehicle technology and the rail system embedded in the roadway. One concern is where bicyclists would cross the rail at a non-90 degree angle and bike wheels get caught in the rail track. This situation generally occurs at intersections where the streetcar is turning. This is discussed in greater detail under Section 5.1.7, Safety and Security.

Mitigation Measures

Mitigation measures recommended under Section 5.1.7, Safety and Security, will be implemented to increase bicycle and pedestrian safety.

Parking

This section discusses impacts to parking within the study area.

Affected environment

The streetcar study area currently contains approximately 7,750 on-street parking spaces. This includes both metered and non metered spots. The study area also has a large number of parking spaces within public parking structures and lots. Even so, on-street parking is a valued asset, especially in the higher density residential areas on the northeast side. Demand for parking is high during the evening and nighttime hours. On-street parking is also important to the many retailers within the study area that rely on convenient access to their establishments as well events and entertainment venues.

Environmental Effects

The No Action Alternative would not remove any parking.

The streetcar LPA would remove approximately 121 on-street parking spaces at various sites along the streetcar route (see Figure 22). As a result of the streetcar project and the conversion of Broadway to a two way street, fourteen new on-street spaces will be added along Broadway between St. Paul Avenue and Clybourn Street. Therefore, 107 on-street parking spaces would be removed as a result of this project which is approximately 1.4% of the 7,750 total on-street parking spaces in the study area. A few of the downtown parking structures are sometimes underutilized and the City expects that the added connectivity that a streetcar would provide may encourage the use of the parking structures more. The streetcar is also expected to support the City's "park once" policy, which allows passengers to have greater mobility in the study area without having to drive vehicles between locations. The entire streetcar study area contains approximately 67,000 parking spaces.

To preserve the greatest amount of parking within the study area, the streetcar was designed to operate in an existing travel lane with other vehicles. This means parking is maintained along the alignment except at stop locations and limited areas requiring transit-only lanes.

Mitigation Measures

The City will continue to coordinate with the affected businesses and residents to inform them of changes to parking before the streetcar begins service.

Loading Zones

This section discusses the potential impacts to loading zones.

Affected environment

Loading zones are located throughout the study area. Most businesses along the streetcar route have alley access where they load and unload. However, many businesses and delivery trucks often deliver goods in front of the businesses even where a loading zone is not designated. During times when traffic is light, trucks will often pull up next to the parking lane and unload their goods.

Environmental effects

The No Action Alternative would not affect loading zones.

Overall, impacts to loading zones are expected to be minimal along the proposed streetcar route since most businesses are served by alley access. The streetcar project would require the removal of one officially marked loading zone on Broadway between Wisconsin Avenue and Michigan Street. Another loading zone along 4th Street between Wisconsin Avenue and Wells Street that serves the Frontier Airlines Center will be partially impacted by a streetcar stop platform. See Figure 22.

Businesses that receive deliveries in front of their businesses in areas that do not have officially designated loading zones may need to change their delivery patterns to avoid blocking the streetcar

service. Some businesses may need to instruct their delivery services to drop off in the alley or delivery times may need to be adjusted.

Mitigation measures

For the two loading zones that need to be eliminated, alternate loading zones are available. For the loading zone on Broadway, an alternative loading zone for the property is available on Michigan Street. For the loading zone on 4th Street, only a portion of the zone will be impacted and loading may continue along the remaining portion of the zone. Also, an alternate loading zone for this property is available along Wells Street.

To minimize loading zone impacts and to assist businesses with changes to loading zone patterns, the City of Milwaukee will coordinate with the affected businesses and inform them of changes to loading zones before the streetcar begins service.

Driveways

This section discusses effects to driveways along the streetcar alignment.

Affected environment

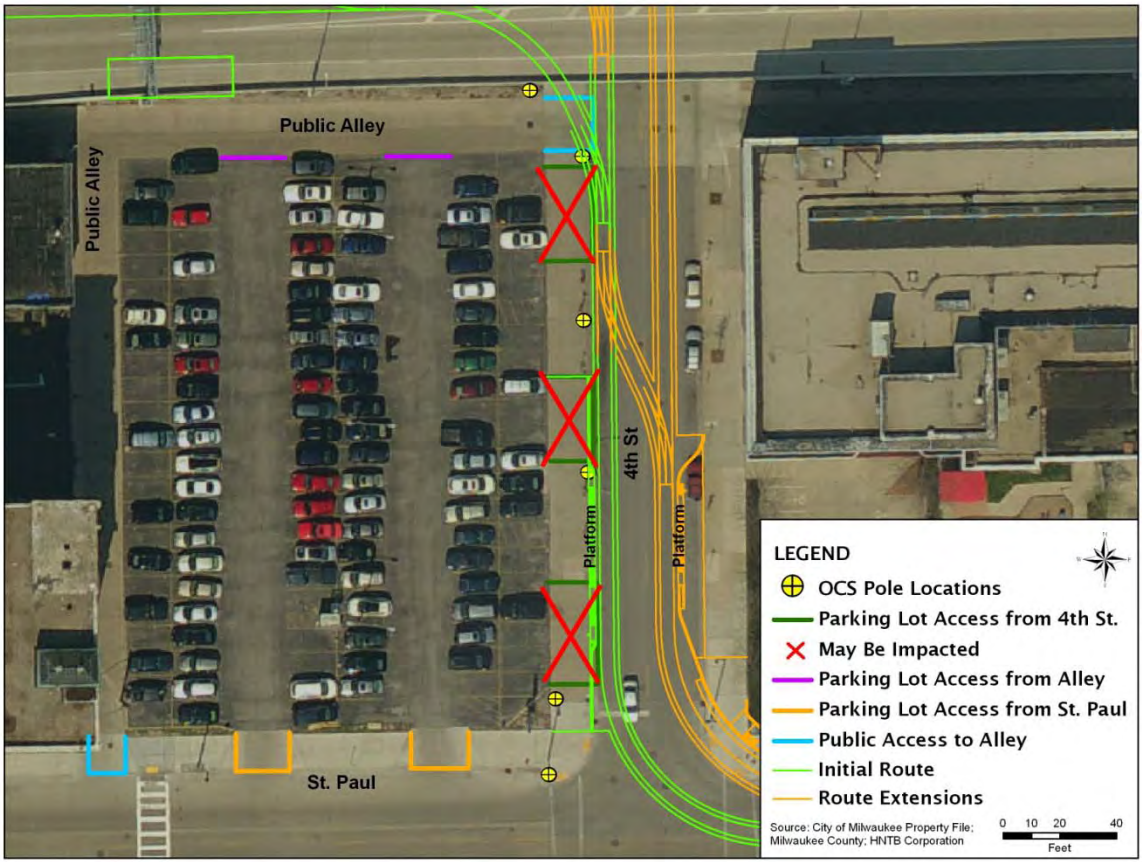
The study area has relatively few driveway access points due to its urban nature. Many properties only have roadway access at the rear of the property via the alley system. However, some properties do have driveways that serve as a primary or secondary access point to the local street network.

Environmental effects

The No Action Alternative would not affect driveways.

There is one surface parking lot located at the northwest corner of 4th Street and St. Paul Avenue (404 W. St. Paul Avenue) where three driveways along 4th Street will need to be removed for a streetcar stop. The two driveway access points on St. Paul Avenue will remain. Public alley access from St. Paul Avenue and 4th Street will also remain. See Figure 42.

Figure 42: Parking Lot at 4th Street and St. Paul Avenue



No other driveway access points will be affected by the streetcar project.

Mitigation measure

The City will work with the owner of the affected parking lot to ensure that driveway access is provided.

Intercity Transportation

This section describes the effects associated with intercity transportation.

Affected Environment

The Milwaukee Intermodal Station provides intercity passenger service to rail passengers on Amtrak and bus passengers on a number of privately operated bus lines. Another intercity bus service, Megabus, provides a stop on 4th Street, just north of St. Paul Avenue near the Intermodal Station.

Environmental Effects

Under the No Action Alternative, the City would not get the added transit connections they would like the streetcar to provide.

The streetcar LPA is expected to provide additional transit connections for intercity travelers. This should increase convenience and encourage more use of intercity bus and rail transportation as an alternative to driving personal vehicles to downtown Milwaukee.

Mitigation Measures

Since the streetcar project is expected to benefit intercity transportation by providing intra-city connections, no mitigation measures are recommended.

5.2.5 Construction Impacts

This section explains construction activities and their consequences. Construction activities include:

- Installation of tracks and associated roadway construction
- Construction of the maintenance facility
- Construction of the streetcar stops
- Construction of the power system and substations
- Installation of communications equipment
- Signaling and signage

All work will conform to industry specifications and standards. Impacts are expected to be temporary and last the duration of construction.

Proposed Construction Activities

Construction of the initial phase is currently expected to begin at the end of 2011 and be completed by the end of 2013, with the goal of beginning streetcar service by the end of 2013. Actual construction schedules for the Milwaukee Streetcar will be developed during final design.

The final construction plans, including methods, staging and sequencing, will be determined in coordination with the project's yet-to-be-determined contractor. The contractor will be directed to install the track in small sections, typically two to four blocks at time, to minimize the length of time businesses and residents are affected.

A staging area could be located on the maintenance facility site to store materials, supplies and equipment. The contractor may also need several smaller staging areas throughout the project for track, materials, and equipment. Another option the City has is to use City-owned vacant lots for staging if any are conveniently located near the area of construction.

The City will abide by its *Street Construction and Work On Public Ways Ordinance* (Chapter 115), which regulates construction activities within the street to protect the public from potential safety and environmental effects associated with construction activities. Welded rail to be used for the project will be temporarily stored at one of the City existing storage sites.

Prior to construction activities it will be necessary to relocate, modify, or protect in place all public and private utilities and underground structures that may conflict with excavations. This will include steam tunnels, duct banks, utility vaults, and power and communication lines.

No other conflicting road construction projects are scheduled at this time, but the City will coordinate with any other construction projects in the area of construction to avoid undue disruptions to traffic.

Overall, construction of the maintenance facility is projected to take approximately 16 months. Construction of the initial route and extensions track, power system, other streetcar infrastructure, and utility work is expected to take approximately 26 months. If portions or all of the extensions are not funded, construction could finish sooner.

The St. Paul Avenue Bridge over the Milwaukee River is scheduled for replacement in summer 2012 under a separate City program that is selectively replacing or rehabilitating the numerous City bridges across the Milwaukee River. The City is taking the opportunity to incorporate tracks as part of their replacement project rather than having to retrofit it later to accommodate the streetcar project. This will save the City both time and money. This EA does not review impacts of the bridge construction as it is a separate project.

The in-street streetcar system construction for the initial route would begin at the proposed maintenance facility near 4th Street and St. Paul Avenue and continue down St. Paul Avenue. It is expected that the project would then proceed northward. The route extensions would then be installed in a similar fashion when funding becomes available.

The streetcar tracks and overhead power system would be installed in segments of different lengths. The length of these segments will be determined in consultation with the City's traffic engineers. The decision would be based on the need to expedite construction and the need to minimize interruptions to others in the street including transit vehicles, drivers, walkers, and bicyclists.

Staging areas for construction would likely require using one or two lanes of traffic and/or parking lanes. Vehicular and pedestrian access for all residents and businesses in the vicinity of the project would be maintained at all times through the use of signing, fencing, bridging over construction trenches, and the use of flaggers as necessary to safely direct people through the construction zones.

Streetcar system construction activities may be divided into two or more crews segregated geographically to avoid compounding the potential disruption to the public. Details such as this would be determined and implemented by the construction contractors.

Typically, system construction would begin with the relocation or adjustments of any utility lines or manholes. Crews will then install the foundation and systems for any new traffic signals and poles and overhead electrical wires. Substations would also be placed. This would entail excavation and construction of a concrete slab foundation. Metal building substations will be reused from a streetcar operation in Los Angeles, California. These will be placed on the foundations. Other construction activities will include the construction of the streetcar stops. This will involve placement of shelters and pavement improvements as indicated by the final design plans.

An eight-foot wide, 24 inches deep trench in the roadway pavement would then be cut, excavated, and prepared for the track slab. Rails would then be put into place. The track slab concrete would then be poured, finished, and cured. The adjacent pavement would then be restored to provide a smooth driving surface where necessary.

In general, construction activities would primarily occur during daytime hours. All work will comply with the City of Milwaukee's Noise Ordinance. Nighttime construction would require and conform to a noise variance to be obtained by the project from the City of Milwaukee.

Environmental Effects

Under the No Action Alternative, no immediate construction related effects would occur. However, it is to be expected that at some point, similar roadway construction would be done to maintain or reconstruct the roadway.

Following is a description, by discipline area, of the potential short-term environmental effects of construction activities associated with the streetcar LPA.

Transit

Construction will result in transit route and bus stop detours around the area of construction activities. MCTS would need to notify riders of detours and closed/temporary bus stops. Affected bus routes that currently coincide with the proposed streetcar route exist along St. Paul Avenue (bus Routes 18, 19, and 57), Ogden Avenue (Routes 10, 11 and 30), Farwell and Prospect Avenues (Route 30), and Juneau Avenue (Route 33). Bus routes cross the streetcar route along St. Paul Avenue at the intersections with 4th Street, 5th Street, 2nd Street, Plankinton Street and Water Street. Bus routes also cross the streetcar route along Broadway at the Michigan Street, Wisconsin Avenue, and Kilbourn Avenue intersections.

The Downtown Trolley route coincides with the streetcar route along Ogden Avenue between Van Buren and Farwell, as well as along Van Buren between Wells and Ogden Avenue and along Wells Street between Broadway and Van Buren.

Traffic

Traffic will be temporarily impacted because construction activities would result in the temporary closure of traffic lanes, parking lanes and/or turn lanes. Turning restrictions may also be required. The use of segmented construction, temporary bus stops, and steel plate bridges over construction trenches to provide pedestrian and business access will minimize the effects to traffic.

Lane closures would be limited to one or two lanes and may include the parking lane. The City's intention is to maintain at least one travel lane in each direction. Side street access would also be maintained through the use of steel plates over construction trenches whenever feasible.

Local truck turning restrictions may be required at some intersections during construction. Truck detour signs would be provided as necessary. Closure of truck routes during construction is not proposed. Truck routes include WIS 32 (Wells Street, Prospect Avenue and Farwell Avenue) and WIS 18.

Local business, bicycle and pedestrian access would be maintained during construction through the use of steel plating over trenches and short-term detours when necessary.

Land Use and Economic Development

The economic development effects of construction of the streetcar project include the short-term construction jobs that would be created and the economic benefits for Milwaukee's workforce.

As discussed in Section 5.1.2 (Economic Development) a total of 475 construction related jobs are anticipated for this project.

Construction could have temporary economic impacts to businesses where access is disrupted during construction. The project will use typical construction management practices to avoid or minimize adverse economic consequences, such as avoiding full access closures, providing temporary alternate access and signage, and ongoing communication with business owners.

Neighborhoods and Communities

Construction activities will affect adjacent neighborhoods and communities by temporarily increasing noise, creating dust, setting up construction zones and signage, altering or reducing access, establishing detours, and temporarily disrupting utilities as they are relocated or reinforced. The project will follow industry standards to avoid or minimize these effects on neighborhoods and communities as described here under each of the discipline areas.

The City will abide by its *Street Construction and Work On Public Ways Ordinance* (Chapter 115), which regulates construction activities within the street to protect the public from potential safety and environmental effects associated with construction activities.

Noise

During construction, the use of heavy equipment will cause temporary increases in sound levels near the construction and staging areas. Construction activities will occur within close proximity of some of the buildings along the alignment, including public, commercial, and residential buildings. Because construction methods will limit construction activities in any one area for extended periods, any such intrusive noise would be temporary and would not be considered a noise impact under FTA criteria.

The project will also need to comply with the City of Milwaukee's Nuisance Ordinance (Chapter 80). In general, the project's construction activities would occur during weekday daytime hours and noise must be minimized through the use of proper equipment operation and maintenance. Projects lasting more than 10 days in residential districts are required to be shielded or located so as not to cause unnecessary noise.

More information about construction noise impacts can be found under Section 5.2.2 of this document.

Air Quality

Grading and excavation activities will temporarily, and for short durations create dust. There will also be emissions from construction equipment. Construction contractors will be required to use measures to control dust, such as applying water or other dust suppressants during dry weather. More information about air quality impacts can be found under Section 5.2.1 of this document.

Soil Erosion

Construction will require grading and/or excavation at the maintenance facility and substations, and for installation of the tracks, poles, and signals. Best Management Practices (BMPs) will be required by the Wisconsin Department of Natural Resources as part of their construction permitting process. The City also has requirements regarding construction site erosion control measures. These requirements will minimize the amount of soil that leaves the construction sites or that enters the stormwater system.

Visual and Aesthetic Resources

Construction of the streetcar facilities will cause temporary visual impacts relating to the presence of construction equipment, the disruption of the streetscape, and the storage of construction materials and supplies. Due to the temporary nature and the fact that construction is a common visual element in the City of Milwaukee, the severity of visual impacts will be low. See Section 5.1.5 for a discussion of all Aesthetic Impacts.

Historic, Archaeological and Cultural Resources

Construction of the streetcar is not expected to adversely affect any known historic, archaeological or cultural resource. Minor temporary changes in the vicinity of known resources could include: nearby excavation activities, vibration, dust, exhaust, and other airborne matter.

Unknown archaeological or cultural resources could be present. The City would protect such unknown resources from adverse effect by taking the following actions, as necessary to comply with Federal and state regulations: notification to, and consultations with regulatory agencies and/or tribes; temporarily stopping construction work at the site to conduct additional surveying and/or documentation; removal and preservation of any artifacts; or other actions as appropriate.

Parks

The City plans to avoid any disruption to nearby parks and access will remain open from other sides of parks that have adjacent streetcar construction. No changes to existing access are expected. Temporary noise and dust related to streetcar construction is not expected to negatively affect use of any parks during construction.

Hazardous Materials

Unknown sites contaminated by hazardous materials may or may not be present within the street right of way. The City of Milwaukee handles work in the roadway by monitoring the soil during construction and any potentially contaminated soil encountered would be managed appropriately under applicable regulations. If contaminated soil is uncovered, remedial actions could include the excavation and proper disposal of impacted soils by properly trained and equipped subcontractors before construction begins or proceeds. Remediation associated with any discovered sites could cause a delay in the project depending upon when the discovery is made.

Adverse impacts to construction workers from contamination would be avoided or minimized through the development and implementation of a hazardous materials work plan. The work plan would be designed for the project and would include actions if construction activities uncover contaminated soil, or if spills occur. Construction impacts related to hazardous material for this project are not significant.

Water Resources

Construction effects on water quality would be negligible because construction will follow the Wisconsin Department of Natural Resource's requirements for erosion control. The amount of exposed soils will be limited. Only a few blocks at any one time will be exposed during construction.

Sometimes during construction very large rain storms can release sediment or cause an accidental spill into stormwater during construction. However, onsite Best Management Practices to control erosion and maintain sediment would limit the scope and effect of these events.

Utilities

Some of the utilities will interfere with excavation work associated with installation of the track. Some will need to be relocated away from the proposed facilities. Temporary interruptions in services (perhaps several hours) could be experienced during relocation or rerouting of utilities. Streets will remain open, with partial lane closures as necessary. More details regarding Utilities are included in Section 5.2.6 (Utility Impacts).

Staging Areas

Staging areas for construction are not expected to have an impact because of the application of regulations in Chapter 115 designed to handle temporary use of the public rights of way.

Mitigation Measures

The following is a summary of the various mitigation measures that apply to construction activities. Many of these measures are addressed in greater detail in the other sections of this document where the individual topics are discussed.

The City will utilize its *Public Works Support for Business Program*[34], which is designed to help nearby businesses before and during construction projects. This program incorporates best practices from around

[34] http://city.milwaukee.gov/mpw/supportforbusiness/

the country and provides tools such as a handbook of tips and resources, signage, project summaries, and regular e-mail updates about the projects.

The City will coordinate closely with MCTS so they can notify riders of any bus and/or trolley detours and temporary closed/relocated bus stops.

The City will continue to coordinate with property owners to manage and minimize access closures and relocations during construction. Construction management practices to minimize business impacts will be implemented including avoiding full access closures and providing temporary alternative access and signage as appropriate.

Construction dust and noise will be controlled as recommended in Section 5.2.1 and Section 5.2.2 (Air Quality and Noise). Construction activities will comply with the City of Milwaukee's Nuisance Ordinance (Chapter 80). Dust abatement shall be included in the specifications.

Best Management Practices for erosion control will be developed and applied as required by the Wisconsin Department of Natural Resources as part of their construction permitting process. The City will comply with City of Milwaukee regulations regarding construction site erosion control. Examples of these measures include lining existing storm sewer inlets with filter fabric, placing silt fence and hay bales to prevent exposed soils from running off the site during rain events. Standard details will include measures to control dirt tracking such as using tracking mats or other actions as necessary to accommodate trucks leaving the maintenance facility work zone and any staging areas along the route.

If archaeological or cultural resources are uncovered during construction, all work must stop and the contractor and/or City of Milwaukee must comply with applicable Federal and State regulations.

No changes to existing access to any public parks will be made during construction.

If the results of the planned Phase II Hazardous Materials Assessment indicate that the historical fill and/or subsurface soils at the project site are impacted with contaminants above regulatory standards, a "Soil Management Plan" will be developed to manage soils generated during site construction. "Special Provisions and a Notice to Contractors" will also be developed and incorporated into the construction specifications to address impacted soils.

The City will continue to coordinate with utility providers so that any required changes to their facilities will minimize disruption to services and be coordinated with the construction schedule.

Construction and staging areas will be maintained as required by the City under Chapter 115 and any other applicable regulations of the City's ordinances. Site cleanliness of staging areas shall be included in the specifications. The contractor will be required to restore the staging area to its original condition once the project is completed. All standard City requirements regarding construction site control will be followed.

5.2.6 Utility Impacts

This section addresses the location of utility infrastructure within the streetcar routes and how the proposed streetcar may affect them. Additional utility related items are discussed in Section 5.2.8 Stray Current and Corrosion and Section 5.2.5, Construction.

Affected Environment

The study area has an extensive public and private utility system. This includes underground gas lines, water mains, communication and data lines, storm and sanitary sewer lines, steam lines, traffic management systems, and street lights. Table 22 lists utility types and providers for the utilities along the streetcar route. Most of the utilities are located underground in concrete vaults with access through manholes. However, overhead power lines (mostly overhead lighting lines) can be found throughout some areas of the study area.

Table 22: Utilities and Utility Providers

Utility Provider	Type	Facility
American Transmission Company	Electric Transmission	Underground 138kV lines
AT&T Corporation	Communications	Underground fiber optic lines
AT&T Wisconsin	Communications	Underground copper & fiber optic lines
Global Crossing	Communications	Underground fiber optic lines
Hughes Communications	Communications	Broadband / satellite
KDL	Communications	Underground fiber optic lines
Level 3	Communications	Underground fiber optic lines
MCI WorldCom	Communications	Underground copper & fiber optic lines
Midwest Fiber Networks/CableCom	Communications	Underground copper & fiber optic lines
Milwaukee Metropolitan Sewerage District	Sewer	Underground storm & sanitary lines
Milwaukee, City of	Communications - Cable	Underground copper & fiber optic lines
Milwaukee, City of	Communications – Duct	Underground communications ducts
Milwaukee, City of	Lighting & Signals	Street lights, underground copper communications & electric lines
Milwaukee, City of	Sewer	Underground sanitary & storm sewers
Milwaukee, City of	Water	Underground distribution and transmission water mains
Paetek/McLeod, USA	Communications	Underground copper & fiber optic lines
TDS MetroCom	Communications	Underground fiber optic lines
Time Warner Cable	Communications	Underground copper & fiber optic lines
TW Telecom	Communications	Underground fiber optic lines
US Signal	Communications	Underground fiber optic lines
We Energies – Electric	Electric	Underground electric distribution lines
We Energies – Gas	Gas	Underground gas distribution & transmission lines
We Energies – Steam	Steam	Underground steam distribution lines
Wisconsin Dept. of Transportation – ITS	Communications	Freeway traffic management systems
Wisconsin Dept. of Transportation – Lighting	Lighting Freew	ay lighting
Wisconsin Dept. of Transportation – Storm	Sewer	Underground storm sewer lines

Environmental Effects

The No Action Alternative would not require any changes to utilities.

Construction of the streetcar LPA is primarily confined to the existing road right of way, which is where most public and private utilities are located. Utilities that conflict with the placement of the streetcar alignment would need to be relocated or reinforced.

Given the prevalence of underground utilities in the study area, preliminary engineering studies indicate that underground utility lines would need to be relocated or reinforced on nearly all blocks along the

streetcar alignment. It is anticipated that utility relocations will be within the existing public right of way and will be placed as close as possible to their existing location. However, a few private utility companies have indicated that they may consider moving their utilities to a different street. The final locations will be determined during the final design phase of the project.

The streetcar alignment does not contain overhead utilities such as telephone, fiber optic, electric and other overhead wire utilities. However, some overhead lighting lines may need to be adjusted to accommodate the project.

The only utility-related work that is anticipated outside the streetcar right of way is related to the installation of substations which provide power to the streetcar system. See Section 4.2.4 for more information about the streetcar's power system. The power to these substations will be provided through existing WE Energies lines. New connections to these utilities will be needed.

Utility adjustments would be made according to standard utility construction practices. The privately owned utilities would be relocated or adjusted by the facility owner. City utilities would be relocated as part of the project's construction by the construction contractor on behalf of the City. Modifications to utilities will be coordinated with utility service providers to ensure that service disruptions are minimal. No long term utility interruptions are expected.

Other construction related impacts are further discussed in Section 5.2.5.

Mitigation Measures

The City will continue to coordinate with utility providers throughout project design and make modifications to the track design to minimize impacts. The City will continue to coordinate with utilities during the construction phase to avoid any interruptions to utility services. It is anticipated that during final design memorandums of understanding will be developed with certain utilities to define scope, schedule and criteria for facility relocations.

5.2.7 Energy Use

The streetcar will be powered by electricity. Streetcars typically require a peak current of 1,100 Amps during acceleration. Typically, energy will be delivered to the streetcar via an overhead contact system at 750 volts direct current (VDC). The VDC is supplied to the overhead contact system from a power substation that is housed in a single story prefabricated buildings approximately 14 feet by 40 feet (560 square feet) in size and approximately 11 feet high. Figure 43 shows an example of a substation building. The power substation would receive its power from the local utility, WE Energies, at primary distribution voltage of 13.3 KV. The power demand for a power substation would be approximately 1,500 kilowatts.

Power substations would be spaced along the route at intervals to maintain required power levels. The initial streetcar route would require two power substations. One would be located at the Milwaukee Municipal complex behind the 809 Broadway building and the other one would be within the public right of way near the northeast corner of Cass and Knapp streets. A third power substation would be required for the route extensions. This substation would be located at the streetcar maintenance facility site. Appendix F shows the site plans for the power substations. Figure 15 shows the approximate locations of the substations.

For the initial route the total annual energy consumption would be approximately 1,400,000 kilowatt hours. The total annual energy consumption for the initial system and the extensions would be approximately 2,450,000 kilowatt hours. For energy savings associated with the project, refer to Section 5.2.9 Livability and Sustainability Measures.

In addition to streetcar operations, the construction of the system will consume energy. This would be related to the energy required to obtain and transport new materials and equipment to build the maintenance facility and install the track, power system, stops and other roadway improvements. Fuel usage will depend upon vehicle types.

Figure 43: Example Photo of a Power Substation

Source: HNTB Corporation

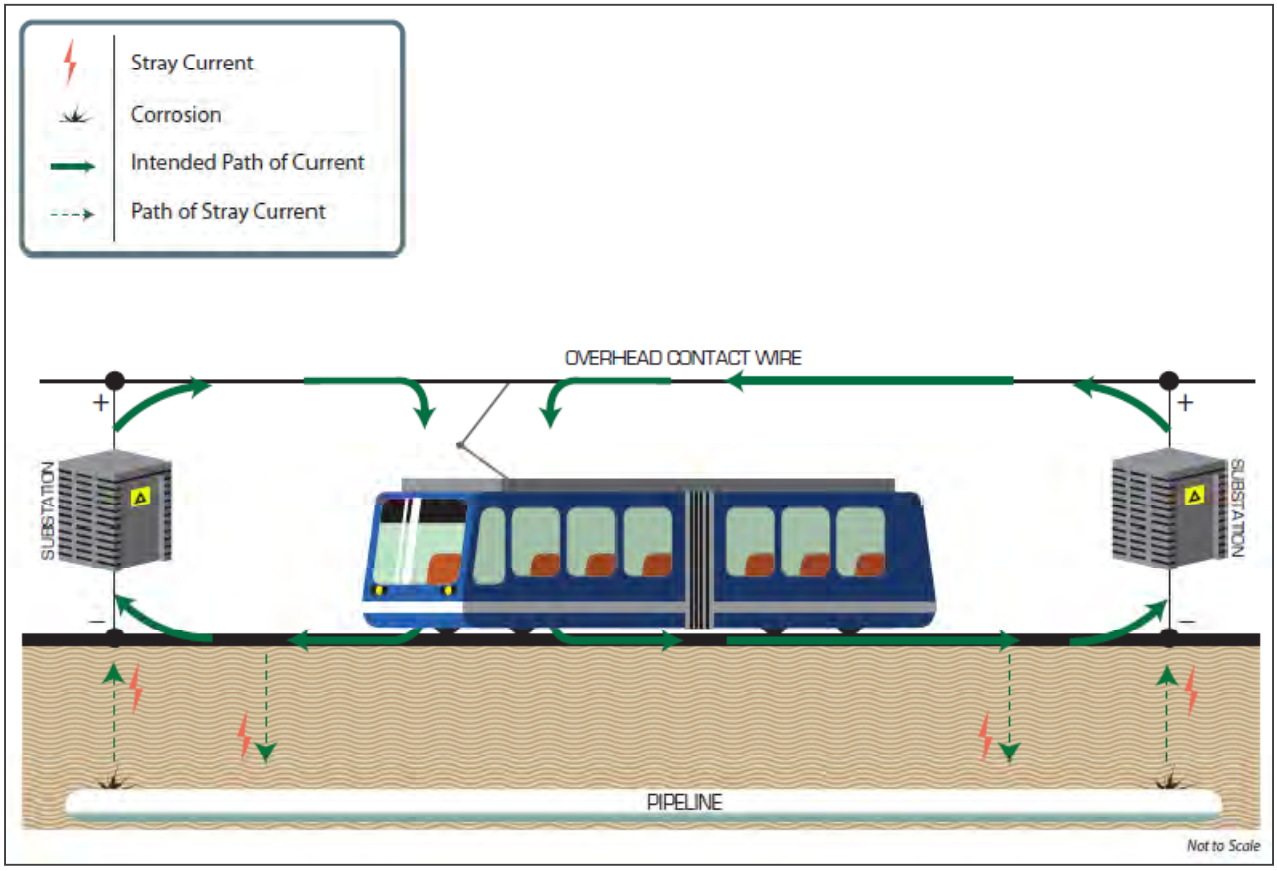
5.2.8 Stray Current and Corrosion

This section discusses concerns relating to stray current and corrosion that is associated with the streetcar's electrical system.

Affected Environment

The electricity used to power the streetcar is designed to create a current that flows between the substations, overhead wires and where the wheels touch the track. In some instances, a small portion of the electrical current may stray outside this circuit and into the ground below. Although not harmful to people, stray current has the potential to corrode nearby metal pipelines and structures that run beneath the street. Figure 44 shows how stray current reaches the pipeline.

Figure 44: Diagram of Stray Current and Corrosion Process



Source: HNTB Corporation

Environmental Effects

Under the No Action Alternative, there would be no additional stray current created in the study area.

Under the streetcar LPA, if left unchecked, stray currents could corrode pipelines and other underground structures. This could lead to extra maintenance issues for the City and others that have utilities buried beneath the ground.

Since this is a known issue, the streetcar project has developed design criteria to minimize stray current. The design criteria address ways to minimize stray current along the traction power system and along the rails. Methods to control stray current are also discussed for the maintenance facility and for the water drainage system. One of the main measures to control stray current for the streetcar system will be a "rubber boot" that wraps around the underground rail surface as shown on Figure 45.

Figure 45: Photo Example Showing Construction of Embedded Rail with Rubber Boot

This is an example of a streetcar track being constructed in Portland, Oregon that shows how the rubber boot is wrapped around the rail to reduce noise, vibration and stray current. Image: City of Milwaukee.

Mitigation Measures

The City will continue to work with private utilities to implement feasible design methods to minimize stray current.

The City will implement corrosion control measures as discussed above to minimize stray current and minimize corrosion on streetcar facilities and public utilities. Corrosion control measures will be designed to conform or exceed the latest versions of relevant local, state, and national codes and standards.

The rail design will include the installation of a rubber boot to help minimize stray current and reduce noise and vibration. A dielectric coating made up of a material that is a poor conductor of electricity could also be applied to the rail components to prevent stray current.

5.2.9 Livability and Sustainability Measures

This section describes how the streetcar project supports livability and sustainability measures that are encouraged by the Federal Transit Administration.

Livability

The City of Milwaukee is investing in the community's livability with the Milwaukee Streetcar project. The Federal Transit Administration defines livability investments as projects that deliver not only transportation benefits, but also are designed and planned in such a way that they have a positive impact on qualitative measures of community life.

The streetcar project would add a new convenient transportation option that circulates residents, visitors and employees throughout downtown Milwaukee and the nearby neighborhoods. This would support

Milwaukee's compact neighborhoods and improve access to goods and services, employment, housing, recreation and entertainment. It would also improve connections to other modes of transportation by providing a direct link to the Milwaukee Intermodal Station.

The project's improved transportation access is particularly important for the streetcar study area because its population tends to have less access to automobiles and relies on public transit and walking more frequently. As discussed in Section 4.1.3, Environmental Justice, a larger number of households, 77%, have only one vehicle or no vehicles compared to 65% citywide and 58% countywide. Also, over 35% carpool, use transit, bike or walk compared to 28% citywide and 22% countywide.

The streetcar project is a coordinated land use and transportation decision that is a critical component of the City's Downtown Area Plan. The plan emphasizes land use policies to increase density and intensity within downtown and encourages improved connectivity between high density residential neighborhoods, the Intermodal Station, cultural and entertainment facilities, retail districts and office buildings. The plan recognizes a streetcar system is needed to support these development and connectivity goals.

Sustainability

The Federal Transit Administration believes transit has an important role in promoting environmental sustainability by improving air quality, reducing green house emissions and saving energy.

The streetcar project would support sustainability by reducing automobile travel and reducing green house gas emissions. The project team estimates an annual reduction of 205,000 vehicle miles traveled for the initial route and the route extensions. For greenhouse gas emissions, the streetcar project could have an annual reduction of 190,000 pounds from people switching from autos to the streetcar and an 835,000 pound reduction from people switching from bus to streetcar. This information is shown in Table 23.

Table 23: Reductions in Vehicle Miles Traveled and Greenhouse Gas Emissions

Annual reduction	Initial Route	Route Extensions	Total
Vehicle miles traveled	105,000 miles	100,000 miles	205,000 miles
Greenhouse gas emissions (auto trips shifted to streetcar)	100,000 pounds	90,000 pounds	190,000 pounds
Greenhouse gas emissions (bus trips to streetcar)	745,000 pounds	90,000 pounds	835,000 pounds

Source: HNTB Corporation

The City is also considering purchasing power substation buildings formerly used in Los Angeles, CA. Reusing the buildings in Milwaukee would eliminate the need to use new materials for construction.

The maintenance facility would be located under the Interstate 794 bridges and would receive very little sunlight. As a result, several exterior areas of the building would be constructed with an energy efficient translucent panel, called Kalwall, to maximize the penetration of natural light. According to the manufacturer, Kalwall contributes to green design because its solar reflectance helps to reduce air conditioning costs and it helps reduce the amount of energy used by the building since fewer lights are needed.

Recycled fly ash could also be used in the concrete mixture for the track zone. Fly ash is captured from the chimneys of coal fired power plants and is typically disposed of in landfills. Using this material in the concrete would reduce waste in landfills and would reduce the demand for virgin materials that would be quarried for the production of the concrete pavement.

As the project proceeds, the City will continue to look for other opportunities to incorporate sustainability measures.

5.2.10 Water Quality/Resources

This section describes the water resources within the study and the potential effects associated with the streetcar project.

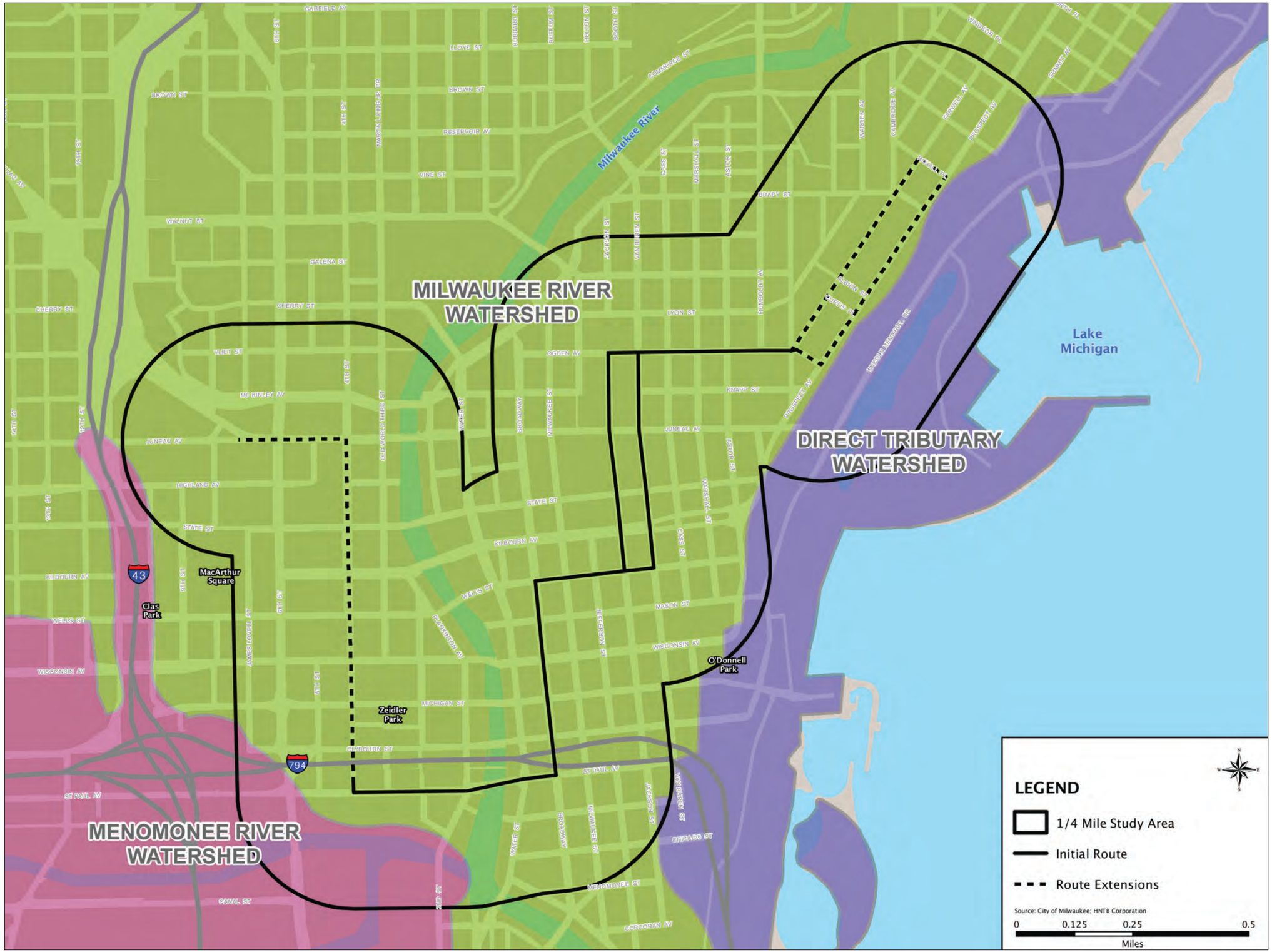
Affected Environment

The project is located within the southern quarter of the Milwaukee River Basin, within the Milwaukee River South watershed.

The watershed covers about 168 square miles. Land cover in the watershed is a mix of rural and urban uses. Overall, the watershed is about 33% urban, with agriculture (25%), grasslands (21%), forests (12%) and wetlands (6%) making up the rest of the major land cover types. Fourteen cities and villages are found in this watershed.[35] Figure 46 shows the watersheds present in the Milwaukee region.

[35] Wisconsin Department of Natural Resources. dnr.wi.gov/water. Accessed online December 2010.

Figure 46: Watersheds in the Milwaukee Area



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The Milwaukee River, shown in Figure 46 running north and south through the study area, has been extensively modified through straightening and lining with sheet pile. As with most urban rivers, the condition of the river is described by the state Department of Natural Resources as "poor" in the study area and has a limited ability to support diverse biological communities due to pollution.

The project is entirely within an urban developed area on existing right of way. Very minimal pervious soils are present in the construction zones. Most of the maintenance facility site is covered by freeway bridges and very little rainfall reaches the surface of the site.

The project is under the jurisdiction of the Milwaukee Metropolitan Sewerage District and the City of Milwaukee stormwater management ordinances.

Environmental Effects

Under the No Action Alternative, no change in impervious surfaces is expected and so no change in stormwater runoff is expected and the No Action Alternative would not adversely affect stormwater runoff or water quality. Due to the lack of change in stormwater runoff and water resource impacts, the No Action Alternative is not expected to adversely impact aquatic species.

The Streetcar LPA, like the No Action Alternative, will not be adding new impervious surfaces. The Streetcar LPA is exempt from Milwaukee Metropolitan Sewerage District permit requirements because of the lack of new impervious surfaces.

In addition, the roadway work is not applicable to the City's stormwater management ordinances. The maintenance facility would normally be required to follow the City's stormwater requirements, which is to reduce the 100-year storm peak stormwater runoff rates from the project area by 10%. However, the freeway bridges above the maintenance facility site drain east to an outfall at the Milwaukee River, and only low stormwater flows are diverted to the combined sewer system. Therefore, this area contributes a relatively small amount of runoff to the combined sewer system during severe storms, and is not a sufficient source of runoff to meet the City Ordinance's requirements for the project.

Impacts due to construction activities including mitigation measures to address soil erosion are further discussed in Section 5.2.5.

Mitigation Measures

Since providing detention storage on the maintenance facility site for only 1.4 acres of land disturbance would not be practical, the preliminary assessment recommended that the City consider an exemption from meeting their Chapter 120 detention requirement for the streetcar project[36]. If some level of stormwater management is preferred, whatever stormwater does accumulate on the maintenance facility site during severe storm events could be captured and stored for use as wash water, landscape irrigation, or detained and discharged at a very limited rate to the combined sewer system. The City might also be able to compensate for this exemption by providing the required storage volume on another City project site.

The City requires implementation of a Stormwater Management Plan and an Erosion and Sediment Control Plan for land disturbing projects. The Milwaukee City Engineer will ensure the application of this

[36] The City of Milwaukee Ordinances Chapter 120 – Storm Water Management Regulations sets forth requirements for detention on development sites.

requirement is carried through. The construction contractor will apply the required measures during construction.

During construction of the track, substations and maintenance facility, soils will be exposed. The City Engineer will ensure that the contractor uses Best Management Practices to minimize soil erosion and runoff. An erosion control plan will be developed and approved by the City Engineer to minimize release of soils into the stormwater system. See also Section 5.2.5 for examples of Best Management Practices.

DNR will not require a Construction Site Storm Water Discharge Permit, per NR216 and NR 151 Wis. Adm. Code because it does not apply if stormwater will be discharged to the combined sewer system. The City will continue to coordinate with the DNR on construction site permit requirements as design progresses.

Existing storm sewer inlets that slope down from the affected areas will be lined with filter fabric under the grates and periodically cleaned of sediments collected during construction. Silt fence will be placed and will be maintained until the ground stabilization measures are established. Where excavation dewatering is required, sediment-laden water will be pumped into a sediment basin prior to discharge. Silt fence and hay bales may be placed as required at the perimeter of the impacted areas.

An Erosion Control Plan will be prepared and implemented and will include those items mentioned above to manage stormwater runoff. All erosion control measures will be coordinated through the City.

5.2.11 Wetlands and Floodplains

This section discusses the wetlands and floodplains located within the study area.

Affected Environment

Wetland and floodplain areas are shown on Figure 47. Wetlands within a quarter mile of the route are limited to a 14.4 acre lake/pond within Veteran's Memorial Park approximately 633 feet east of the Prospect Avenue route. The Milwaukee River is a sheet pile lined channel and flooding is confined to the channel.

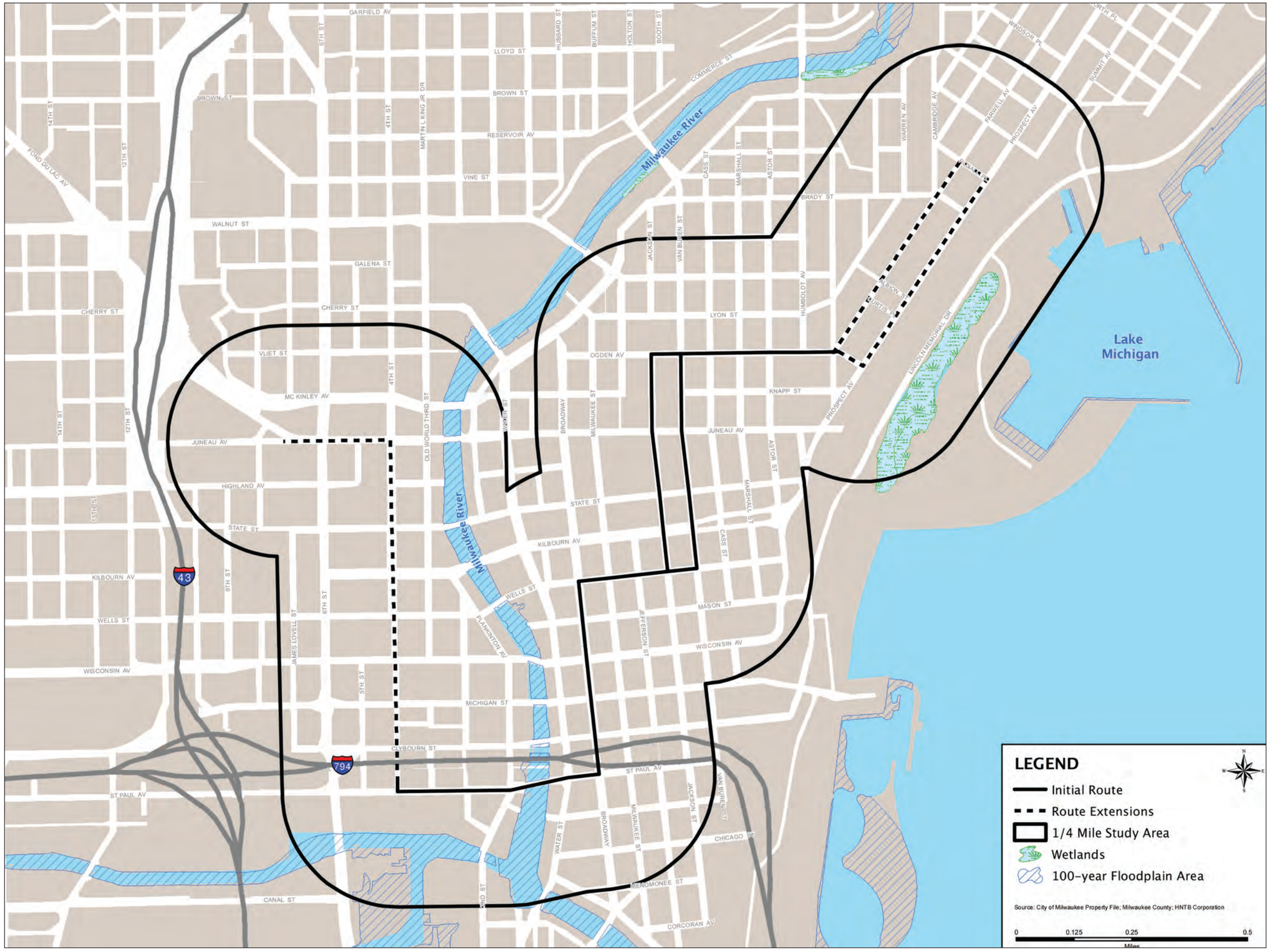
Environmental Affects

No construction will affect the wetlands or occur within a floodplain under both the No Action Alternative and the LPA. Therefore, no wetland or floodplain impacts are expected as a result of the streetcar project.

Mitigation Measures

The City of Milwaukee will use Best Management Practices during construction to make sure water resources are protected. See Section 5.2.5 (Construction Impacts).

Figure 47: Wetlands and Floodplains



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5.2.12 Biological Impacts

The Wisconsin Department of Natural Resources Natural Heritage Inventory of threatened and endangered species database was searched. Since 1975, state endangered Striped Shiner fish are present in the Milwaukee River and a Peregrine Falcon bird nest site is present on a building in the area. Neither of these species will be impacted by the No Action Alternative or by construction and operation of the streetcar LPA. See correspondence with DNR in Attachment G. This fully developed urban landscape does not support any protected plant communities that may provide habitat to protected species. As a result, no further action under the 1973 Endangered Species Act, as amended is needed.

5.2.13 Coastal Zone Management

Through its Federal Consistency authority, the Wisconsin Coastal Zone Management Program (WCMP) reviews federally-affiliated projects that are likely to have impacts on coastal uses and resources within the coastal zone, which includes the fifteen counties adjacent to Lake Superior, Green Bay and Lake Michigan. The WCMP chose not conduct a federal consistency review for this project, since no impacts are expected. See correspondence from the WCMP in Appendix G.

5.3 INDIRECT EFFECTS

This section of the EA discusses the indirect effects associated with the streetcar project. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. (40 CFR § 1508.8)

5.3.1 Methodology

The methodology for determining indirect effects is based on the multi-step process outlined in the guidance provided by the Federal Highway Administration (FHWA) in the National Cooperative Highway Research Program (NCHRP). Although this guidance is not specifically for Federal Transit Administration projects, it is still relevant because the guidance is based on compliance with the Code of Federal Regulation 771. This regulation prescribes the policies and procedures that all federal agencies are required to follow for implementing the National Environmental Policy Act.

The steps involved in the analysis include:

1. Scoping (determine the approach for the analysis)
2. Study area (define the study area and describe its context and notable features)
3. Indirect effects (identify the impact causing activities, identify the indirect effects, evaluate the effects and identify consequences and mitigation measures)

These steps will be described in the following sections.

5.3.2 Scoping

It was determined that the indirect effects analysis would be based on trend data, local plans, case studies, local knowledge and professional expertise. Input from stakeholder briefings that were held during the Alternative Analysis phase of the Milwaukee Streetcar project was also used to describe the context of the study area and to identify indirect effects. See Section 6.1.2 and Section 5.1.3 for list of stakeholder briefings. Then, the outcome of the analysis was confirmed with Department of City Development staff familiar with past trends and future development plans.

5.3.3 Study Area

This section defines the study area where indirect effects are anticipated and describes the context of the study area and its notable features.

Define the Study Area

The indirect effects study area is defined as a one quarter mile around the streetcar route. The study area used for this analysis is the same as the study area used for the streetcar project as discussed in Section 2.2.1. One quarter mile is considered a reasonable distance that people are generally willing to walk and therefore, the extent the streetcar is likely to have an indirect effect.

Describe the Study Area's Context

The study area encompasses a large portion of downtown Milwaukee including the central business district in the East Town neighborhood and the large civic, entertainment and corporate office uses in the Westown area. The streetcar study area also includes portions of neighborhoods that are adjacent to downtown including the Historic Third Ward, Yankee Hill, Lower East Side and Brady Street. In addition, portions of the Park East and Pabst Brewery redevelopment areas are located in the study area. The study area is shown on Figure 3.

The following sections describe the development trends, relevant plans and development policies that characterize the study area.

Study Area Development Trends

Trends related to population, housing, economics and land use are summarized below. Additional information on these topics is located in Section 2, Purpose and Need, Section 5.1.1, Land Use and Section 5.1.2, Economic Development.

- Population and Housing

Over the past 15 years the study area has seen substantial reinvestment in new housing. The housing growth is largely due to an influx of students, young professionals and empty nesters relocating to, or choosing to live in and around downtown. In 2000, the study area had a population of 19,806, according to the U.S. Census Bureau. Since that time, over 3,400 new housing units have been added to the study area[37].

- Economic Trends

The study area had an estimated 87,885 jobs in 2000. The majority of employment within the study area is office related professions such as management, financial, business and administrative support occupations[38]. Trends show a steady increase in new office space over the recent decades. According to the City of Milwaukee, from 1980 to 2010 the downtown area has added over 4.4 million square feet of office space.

In addition to office related employment, the study area also contains employment related to retail goods and services. The study area contains over 3.2 million square feet of occupied retail space. Major retail

[37] City of Milwaukee permit data 2000 – 2010.

[38] *Milwaukee Downtown Market Analysis, 2007*. Milwaukee Downtown Business Improvement District #21, University of Wisconsin-Extension Center for Community and Economic Development, and University of Wisconsin-Extension Milwaukee County.

corridors within the study area are focused around Wisconsin Avenue, Water Street, Milwaukee Street, Van Buren Street, Brady Street and Broadway in the Historic Third Ward. Figure 5 shows the retail corridors.

Cultural and entertainment uses also contribute substantially to the study area's economy, which contains a large concentration of attractions and activity generators. See Figure 5. Events and activities draw approximately 10 million attendees per year within the study area[39]. Downtown attractions have helped to support over 3,400 hotel rooms within the study area. This includes over 600 hotel rooms that have been added since 2000 from new hotel developments.

- Existing Land use

Table 8 provides a breakdown of the existing land use types within the study area and is depicted in Figure 24. Residential land uses comprise the largest land use category at 208 acres and are concentrated on the northeast side of the study area where there is a large amount of high-density multi-story housing. Public land uses are the second largest category within the study area at 185 acres. They are concentrated on the western side of the study area where the large scale civic and entertainment facilities are located. The next largest land use category is 168 acres of commercial. The commercial land uses are focused along the Wisconsin Avenue and Michigan Street corridors to the east and west of the Milwaukee River in the area of downtown that is considered the traditional downtown core.

Transportation, vacant and manufacturing land uses make up smaller portions of the study area. Transportation land uses are primarily associated with Interstate 794 on the southern end of the study area as well as the large surface parking lots next to the freeway. Vacant lands are generally associated with the lands contained in the Park East redevelopment area. The study area contains very little manufacturing, construction and warehousing land uses which is typical of the downtown urban setting.

Relevant plans

The City of Milwaukee recently completed a comprehensive planning effort to comply with the State of Wisconsin's comprehensive planning legislation. The plans that address the study area are discussed below.

- Citywide Policy Plan

The Citywide Policy Plan was approved by the Common Council on March 2, 2010. The Plan's Transportation chapter has many policies that support the development of transit. Specifically, the Transportation chapter states the City should support the development of bus rapid transit, streetcar, or an express bus network to promote transportation options that connect the greatest number of people to the greatest number of destinations. The plan also supports development policies that benefit transit. For example, the transportation chapter states the City should provide zoning and incentives for Transit Oriented Development (TOD). The plan also supports the development of multiple modes of transportation and tries to create a balance between various modes (vehicles, transit, walking, biking) within the street and highway network.

- Downtown Area Plan

The City of Milwaukee Common Council approved the Downtown Area Plan on October 12, 2010. The plan is an update to the previous Downtown Plan that was completed in 1999. The updated plan refocuses efforts to increase density and intensity within downtown and to connect activity centers such as the Intermodal Station, the convention center and offices that are dispersed throughout a relatively large

[39] City of Milwaukee Permit Data.

downtown area. To achieve these goals, the plan has set forth land use and transportation policies and recommendations to support density, walking and mixed use development. The streetcar project is identified as a catalytic project in the plan.

- Northeast Side Area Plan

The Northeast Side Area Plan, which covers the area northeast of downtown Milwaukee along the Prospect/Farwell corridor, including the Lower East Side and Brady Street neighborhoods, was approved by the Common Council in 2009.

Regarding transit improvements, the plan states that the City should "develop a fixed-route transit system with street embedded guideway or rail as an economic development tool that provides an enhanced development environment along transit routes and confidence for investors that the route is fixed for long-term cumulative investment; that it is there to stay." In addition, the plan states that "transit should connect people to jobs by getting the majority of transit users to major employment centers in the most efficient way possible" and that Farwell and Prospect Avenues are key transit corridors in the City.

Regarding development, the plans supports continued high density mixed use development that is sensitive to the neighborhood's context along the Prospect and Farwell corridors. Farwell is planned to have a focus on commercial uses and Prospect is planned to have a residential focus. For Brady Street the plan recommends strengthening this neighborhood scale commercial district by seeking adaptive reuse, renovation and infill development.

- Third Ward Area Plan

The Third Ward Area Plan was adopted in May 20, 2006 for the historic neighborhood just south of downtown. The Plan provides guidance for the reuse of existing structures and encourages mixed-use, infill development on vacant and underutilized parcels. The Plan recommends all new development and redevelopment should fit with the mid-rise urban character of the neighborhood and provide sufficient density (30 – 110 dwelling units per acre) to cover the blocks and give definition to the streets. Higher density developments are permitted at landmark sites.

- A Regional Transportation Plan for Southeastern Wisconsin: 2035

The Southeastern Wisconsin Regional Planning Commission updated the region's transportation plan in 2006. The transit section recommends areas where corridor studies should be conducted to determine rapid and express transit guideway corridors. The streetcar project area is included as a corridor study as part of the Milwaukee Connector Study.

According to the plan, once recommendations for the corridor studies have been completed, the Commission, at the request of the transit operator, would amend the regional plan to include the fixed guideway transit recommendation. The plan states transit is important to the region because it provides convenient access to metropolitan services for those without automobiles and provides an alternative transportation mode along heavily traveled corridors. Also, the plan states guideway transit is expected to promote higher density land development and redevelopment at and around stations, which is important to promote the implementation of the regional land use plan.

Since the Regional Transportation Plan has been adopted, the locally preferred alternative and Preliminary Engineering for the streetcar have since been added to the 2009-2012 Transportation Improvement Program for Southeastern Wisconsin under No. 155.

Development Policies and Regulations

The following sections describe the relevant policies and regulations that direct development within the study area.

- Zoning

The City of Milwaukee has various zoning districts that regulate the development of land within the study area. The downtown area is regulated by zoning districts that are specific to downtown. The areas surrounding downtown are regulated by various residential, commercial, industrial and special zoning classifications. Table 24 shows the acres of land by each zoning category and Figure 48 shows the zoning map.

Table 24: Zoning Districts by Acres of Land

Districts	Zoning Category	Acres	Percent
Residential	Single Family	0	0%
	Two-Family 49		6%
	Multi-Family 63		8%
	Residential and Office	18	2%
Commercial	Neighborhood Shopping; Local Business; Commercial Service; Regional Business	12	2%
Industrial	Industrial-Office; Industrial-Light; Industrial-Mixed; Industrial-Heavy	34	4%
Downtown	High-Density Residential	84	10%
	Residential and Specialty Use	9	1%
	Neighborhood Retail	12	2%
	Major Retail	32	4%
	Office and Service	103	13%
	Mixed Activity	111	14%
	Civic Activity	89	11%
	Downtown Industrial	9	1%
Special	Parks 11	0	14%
	Institutional 0		0%
	Planned Development	7	1%
	Redevelopment 61		8%
All	Total 803		100%

Source: City of Milwaukee Property Files

- Tax Incremental Districts (TID)

The City of Milwaukee creates tax incremental districts (TID) to provide incentives and financial resources for public improvements to encourage redevelopment. The City of Milwaukee has created more than 70 TIDs to support projects throughout the City. Fifteen TIDs (Numbers 17, 23, 30, 34, 37, 39, 41, 46, 47, 48, 49, 57, 60, 67, and 70) are active within the study area boundaries. These TIDs have supported the development of offices, apartments, retail stores and hotels. They have also been used to fund the renovation of historic properties and building facades and the construction of the Riverwalk, street improvements, and parking structures.

- Business Improvement Districts (BID)

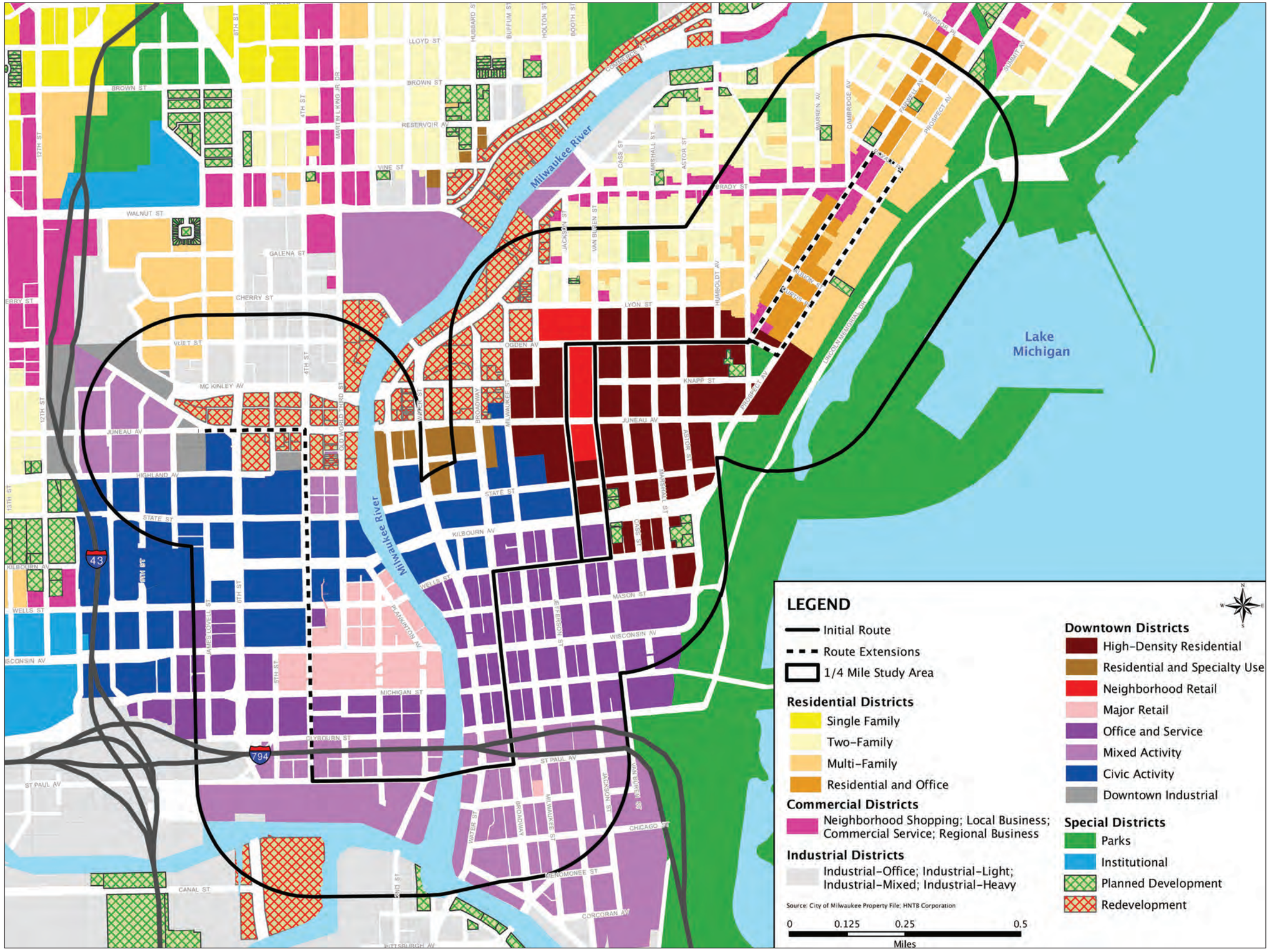
Business Improvement Districts (BID) are administered through the City of Milwaukee. Property owners within a BID voluntarily collect annual assessments to raise funds for streetscape improvements, marketing, recruitment, and other projects that enhance the local business environment. The Department

of City Development helps business organizations develop BIDs. The city currently has more than 40 operating BIDs. Nine of those are currently operating within the study area including the Historic Third Ward, Riverfront Plaza, Westown, Historic King Drive, North Water Street, Brady Street, Milwaukee River Walk, Milwaukee Downtown and the Menomonee Valley.

- Stormwater

The City of Milwaukee requires a stormwater management plan for improvements or subdivision of property. The stormwater management plan addresses the quality and quantity of stormwater runoff. A stormwater management plan is required for development that involves an increase of one-half acre or more of impervious surface or construction during redevelopment that would disturb an area larger than two acres.

Figure 48: Study Area Zoning Districts



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Inventory the Study Area's Notable Features

This section identifies the natural, cultural/historic, and socio-economic features within the study area.

- Parks

The majority of the parks in the study are owned and operated by Milwaukee County. These include Zeidler, Pere Marquette, Red Arrow, Cathedral Square, Veteran's, and O'Donnell parks. The City of Milwaukee owns and operates Cass Park and Burns Commons is primarily privately owned with a small section owned by Milwaukee County. Parks are shown on Figure 36.

- Bike Trails

As shown on Figure 35, the study area contains several existing and planned bike trails and routes. The Oak Leaf Trail bisects the eastern section of the study area through Veteran's and O'Donnell parks along Lake Michigan. The Oak Leaf Trail is a system of over 100 miles of trails throughout Milwaukee County that travels along a mixture of off-road paved trails, park drives and municipal streets. The study area also contains several on-street bike routes throughout the study area. Existing routes are along Wisconsin Avenue, Kilbourn Avenue, Van Buren Street, Prospect Avenue, Brady Street and others. The Milwaukee Bike Plan shows several more on-street bike routes are planned within the study area.

- Water Resources

The study area contains the Milwaukee River, which divides downtown into east and west sides. Lake Michigan is also located just east of the study area. Since the area is highly urbanized the only remaining wetlands are located within the open space corridor along Lake Michigan. Floodplains are limited to the areas adjacent to the Milwaukee River. See Figure 47.

- Historic buildings and districts

The study area contains several historic districts and properties as discussed in Section 5.1.4.

- Affordable housing

The study area contains several developments that have received some type of financing mechanism that requires a percentage of units to be affordable. The developments and their total number of units are shown in Table 25. Developments that used federal housing tax credits must maintain the affordable units for at 30 years. The affordable housing units associated with Housing Authority developments would be maintained in perpetuity.

Table 25: Affordable Housing Developments

Financing Mechanism	Development	Total Units*
Government bonding	Yankee Hill	350
Federal housing tax credits	City Hall Square	90
	Majestic Lofts	135
	Blue Ribbon Lofts	95
	Park East Lofts	85
Housing Authority City of Milwaukee	Convent Hill	120
	Hillside	470
	Arlington Court	230
	Riverview 18	0

Source: City of Milwaukee

*"Total units" is for the development, not necessary total affordable units.

5.3.4 Impact Causing Activities

The impact causing activities associated with the streetcar project are grouped into three categories: streetcar infrastructure, modifications to traffic operations and roadways and streetcar service. A summary of these activities is provided below. A more detailed description of the activities is provided in Section 4, Description of Locally Preferred Alternative.

Streetcar Infrastructure

The streetcar project will introduce new infrastructure into the street environment. This includes the streetcar tracks and stops and the infrastructure associated with the electric power system including three substations, poles and wires. A maintenance facility will also be constructed. See Section 4.2 for more detailed information.

Modifications to Traffic Operations and Roadways

The physical infrastructure improvements will require modifications to traffic operations and roadways to make sure the streetcar and other traffic modes operate safely and efficiently. Modifications include new lane configurations at some intersections and along some through streets, new traffic signals at some intersections and new transit or vehicle phases at existing signalized intersections. A new bike lane will be provided along Wells Street and a few locations will have transit only lanes and transit layover locations. Some parking will also be removed primarily at stop locations and some loading zones may be altered. See Section 5.2.4 for more details.

The effects related to modifications to traffic and roadways will have some direct impacts as documented in Section 5.2.4 on transportation. However, engineering designs are expected to minimize these effects. The potential for indirect effects related to traffic and roadway modifications is discussed under Section 5.3.5.

Streetcar Service

The streetcar service will be a modern fixed guideway transit vehicle. Streetcar stops will be spaced every one to three blocks. The initial streetcar route would have 22 stops and the extensions would add 18 stops for a combined total of 40 stops.

The streetcar would operate seven days per week with more frequent service during most of the day and somewhat less frequent service during early mornings, late night hours and on weekends. The streetcar would have 10 minute headways during the weekday daytime and 15 minute headways on weekends, late night, and early morning. It would operate Monday through Friday between 5 AM and midnight, 7 AM to midnight on Saturday and 7 AM to 10 PM on Sundays. The end-to-end travel time is about 15 minutes for the initial system and 28 minutes for the system with the extensions. See Section 4.4 for more details.

The streetcar operations which will improve mobility throughout the study area with a fixed route transit circulator are expected to cause growth inducing indirect effects. These effects are discussed in the next sections.

5.3.5 Identification and Analysis of Indirect Effects

This section identifies and analyzes indirect effects that may result from the impact causing activities discussed in the previous Section.

Effects Related to Streetcar Infrastructure

While the streetcar infrastructure will have some direct impacts as discussed in Section 5, no indirect effects are expected as a result of the infrastructure. This is also true for the No Action Alternative.

Effects Related to Traffic Operation and Roadway Modification

The potential for indirect effects related to traffic and roadway modifications is discussed in this section. The streetcar would add another mode of transportation to the street network, which could increase traffic congestion and affect traffic flow. It may also add some traffic delays at intersections where lanes are temporarily blocked when the streetcar stops or makes turns. This may indirectly cause roadway traffic to use other streets within the study area, which would add traffic on other streets. Although this could happen, it is not likely to be significant. Nearly all intersections would still operate with acceptable levels of service after the streetcar is in operation. In addition, delays as a result of the streetcar are minimized because the streetcar operates in a mixed traffic lane with other vehicles. Furthermore, the streetcar will only add one extra vehicle to the street about every 10 to 15 minutes.

Effects to traffic flow and traffic operations would not occur under the No Action Alternative.

Effects Related to Streetcar Service

The streetcar operations that will improve mobility throughout the study area with a fixed route transit circulator are expected to cause growth inducing indirect effects. This section first reviews a range of factors to determine the likelihood growth inducing indirect effects would occur. Then, this section discusses the specific effects that are anticipated as a result of induced growth.

For the No Action Alternative, growth and development will continue to take place within the streetcar study area. However, it will be more difficult for the City to achieve their economic development and land use goals in accordance with their long range plans discussed in Section 5.3.3. The City's plans call for more compact and mixed development that is concentrated within the streetcar study area. The plans state a fixed-route transit circulator is needed to achieve this vision since land use and transportation are connected

Likelihood of Effects

The evaluation of growth inducing effects must include a range of factors in addition to the proposed transportation project. Other factors such as the availability of land, the availability of municipal services, local land use policies and regulations and market demand also play a large role in where and how much

development could occur. If these factors are favorable to development, then there is a great likelihood that an increase in transportation mobility could encourage new development. If these factors are not favorable to development, then increased transportation mobility alone would not be enough to induce growth. The following sections discuss these factors as they relate to the study area.

- Availability of Land

A land use analysis was completed for the streetcar project to identify parcels within the study area that are susceptible to change over time. The City of Milwaukee defines susceptible parcels as vacant and underutilized areas that are likely to change to a different land use or to become denser over the next 20 years as shown on Figure 49. The analysis shows the study area has approximately 135 acres of parcels that are subject to change over the long term. Approximately 112 of these acres are expected to change by 2030. [40] This is important because the availability of land increases the likelihood that new development could happen within the study area.

- Available Municipal Services

The study area is located within the City of Milwaukee and has access to a full array of municipal services including water and sewer.

- Land Use Policies and Regulations

The City of Milwaukee's land use policies in the study area are favorable to promoting development. The City's Area Plans that are applicable including the Downtown, Third Ward and Northeast Side all promote continued redevelopment of the areas that they represent.

The Downtown Area Plan specifically focuses on increasing the density and intensity within the downtown core and the Third Ward and Northeast Side area plans encourage redevelopment and infill development that is compatible with existing densities and neighborhood scale. The Citywide Policy Plan states the City should provide zoning and incentives for development policies that support transit.

The City's zoning code is also favorable to promoting development within the study area. The zoning code contains a range of residential, commercial, industrial, downtown and special zoning classifications that address the high density mixed use urban environment of the study area. See Figure 48.

The City of Milwaukee's Code of Ordinances includes regulations that oversee the designation, renovation and removal of historic properties. Any alterations to historic properties must go through a review process by the Milwaukee Historic Preservation Commission.

Furthermore, the City of Milwaukee utilizes various development tools to promote economic development and redevelopment. Tax incremental financing (TIF) is used to encourage redevelopment. The study area currently has 15 active TIF districts. Business Improvement Districts (BID) are also commonly used within the study area to enhance business districts. Currently nine BIDs are represented within the study area. In addition, businesses and property owners have access to a variety of other development tools through the City of Milwaukee including tax incentives, façade improvement grants and environmental remediation funds.

- Market demand

[40] Streetcar Technical Memorandum: Land Use and Economic Development. HNTB Corporation and City of Milwaukee Department of City Development. 2010.

Based on the trends described in Section 2, the study area has seen steady growth in new residential units, new investments in civic and cultural facilities, continued investment in retail and ongoing office development. This demonstrates that the land within the study area has market demand and it is likely that new development will continue to occur within the study area.

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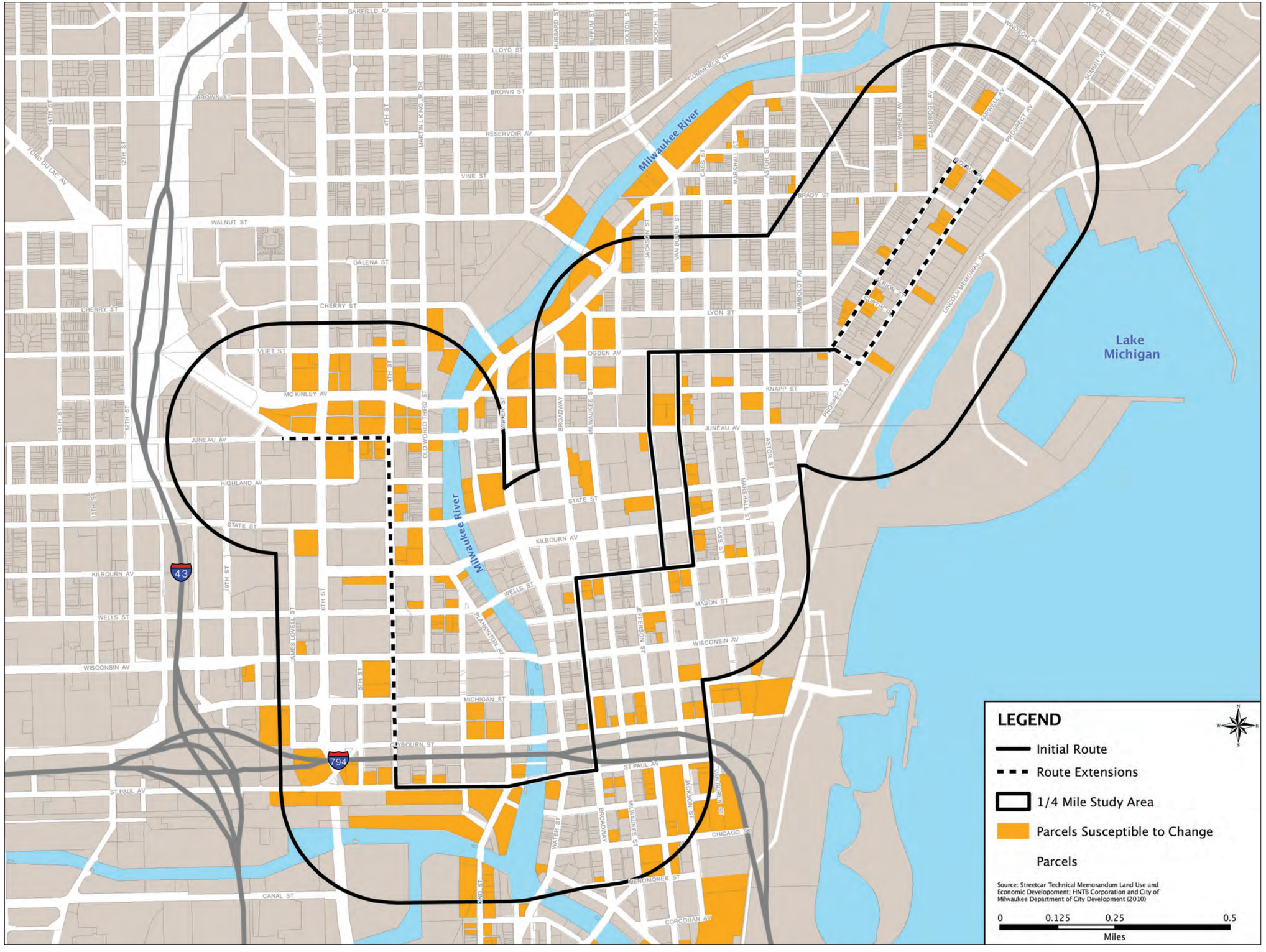
Figure 49: Parcels Susceptible to Change



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- Case Study Findings

Case studies in Portland and Minneapolis were researched to identify growth induced changes associated with the implementation of a fixed rail transit system.

Portland, Oregon

In Portland, Oregon their original four-mile segment of streetcar opened in July 2001 to connect downtown Portland with neighborhoods to the north and south. Since the route alignment was announced in 1997 several changes have occurred to properties along the route[41].

- New development is occurring. As of 2008, 10,212 new housing units and 5.4 million square feet of office, institutional, retail and hotel construction have been constructed within two blocks of the alignment, representing over $3.5 billion in new investment.
- Development is concentrating around the streetcar alignment. Fifty five percent of all central business district development has occurred within one block of the alignment. Prior to 1997, land located within one block of the streetcar only captured 19% of all development.
- Properties located closest to the alignment achieve higher densities. Prior to 1997 new projects were built to less than half of the allowable density in the central business district. Since the streetcar alignment was chosen in 1997, new development has achieved an average of 90% of density potential within one block of the alignment.
- Developers are building new residential buildings with lower parking ratios compared to other areas in the region. This makes developments more financially feasible

Minneapolis, Minnesota

The City of Minneapolis opened its first light rail line in June 2004. The 12-mile Hiawatha line links downtown Minneapolis, the Minneapolis/St. Paul International Airport and the Mall of America. According to the Metropolitan Council, the line has acted as a catalyst for new residential and commercial development since it opened. Before construction started, planners predicted areas surrounding the light rail line would add 7,000 new housing units[42]. However, one year after service started 5,400 new housing units were completed or in construction and the City had processed permits for 7,000 additional units to be constructed by 2008[43].

Commercial activity also increased with new small retailers, restaurants and coffee shops opening in the neighborhood areas, new corporate headquarters opening in downtown and an IKEA opening near the Bloomington station. Many existing businesses also reported an increase in activity[44].

A study conducted by the University of Minnesota, Center for Transportation Studies, showed properties in close proximity to the light rail line had higher property values. For residential, single family homes near the line sold for 4.2% more than homes in the comparison area and the average value of multi-family

[41] Portland Streetcar Development Oriented Transit. City of Portland, Office of Transportation and Portland Streetcar, Inc. April 2008.

[42] Home on the Hiawatha. Development along light-rail transit line exceeds early projections. www.metrocouncil.org. Accessed December 22, 2010.

[43] Home on the Hiawatha. Development along light-rail transit line exceeds early projections. www.metrocouncil.org. Accessed December 22, 2010.

[44] Home on the Hiawatha. Development along light-rail transit line exceeds early projections. www.metrocouncil.org. Accessed December 22, 2010.

properties located near a light rail station increased more than $15,500[45]. For commercial and industrial land uses, the study found an increase in property values within a one-mile radius of the rail stations. More specifically they found prices per building square foot increased from $36 to $56, with the greatest increases closer to the light-rail stations.

- Summary of Likelihood Factors

The development factors reviewed above show that the study area is favorable to development. There is land available for redevelopment, municipal services are available and the City of Milwaukee's development policies and regulations are geared toward promoting new development. Also, past market trends show that this is a desirable place within the City for development and once the current national and local economic conditions improve, the study area is expected to see new investment. Also, the case study research provides another factor that demonstrates the changes that are likely to happen when a fixed transit system is implemented in an area that has a favorable development environment.

Specific Growth Induced Effects

The combination of increased mobility from the streetcar project and a favorable development environment as discussed in the Likelihood of Effects Section, above, are likely to cause growth induced effects within the study area. These effects are expected to be similar to case study findings from other cities with similar transit systems. Growth induced effects typically include an increase in the concentration of development, increased densities, decreased parking ratios, increased pedestrian activity, accelerated growth rates and increased property values around the route and stations. Case study research suggests the greatest effect on land use and development occurs within one to three blocks of the alignment, although some transit systems have documented changes up to one mile from the alignment.

The growth inducing effects are generally considered positive as they will help the City of Milwaukee achieve their long range land use planning goals. Specific effects are discussed below.

- Facilitate New Housing Development

The City of Milwaukee's Area Plans that are relevant to the study area call for the continued development of new housing within downtown and the surrounding neighborhoods. The streetcar will help the City achieve these development goals and desired densities because a high quality transit circulator would increase mobility and reduce the need for parking. Parking is often a limiting factor for development in the study area and makes projects more difficult to finance without government assistance according to Department of City Development staff.

An analysis completed for the streetcar project to determine the capacity of future housing development within the study area found that 9,100 new housing units over the next 20 years could be constructed through the redevelopment of parcels that are susceptible to change as shown on Figure 49[46]. This includes 4,700 units for the initial route and another 4,400 units for the route extensions. This equates to 455 annual units. This rate of growth is similar to the study area's past annual rate of housing growth, which was 469 annual units between 2001 and 2010.

Based on case study research, it is likely that the area surrounding the streetcar route will capture a larger portion of anticipated development than it has in the past. It is also possible that the value of housing for

[45] Understanding the Impacts of Transitways. The Hiawatha Line: Impacts on Land Use and Residential Housing Values. A Transitway Impacts Research Program Research Brief. February 2009.

[46] Streetcar Technical Memorandum: Land Use and Economic Development. HNTB Corporation and City of Milwaukee Department of City Development. 2010.

properties adjacent to the route may increase at a faster pace than properties located farther away. Residential densities may also tend to be higher next to the route in comparison to existing development trends.

- Reuse of Historic Properties

The streetcar is expected to encourage the rehabilitation and reuse of historic buildings within the study area. These buildings often are not able to provide on-site parking, which makes it difficult for developers to obtain financing from banks that like to see at least one space per unit in Milwaukee. The streetcar may allow banks to relax parking requirements for developments that can show access to a parking facility that is removed from the development site, but along the streetcar route. This would allow the reuse of more historic properties within the study area.

Overall the streetcar is expected to benefit historic properties by encouraging the reuse of historic structures consistent with local plans. However, increased development potential within the study area could encourage the removal of historic buildings or renovations that are not consistent with the historic context.

- Encourage New Commercial Development

The streetcar is likely to facilitate new commercial development within the study area. Based on case study research, high quality transit that connects neighborhoods and destinations improves access to goods and services and strengthens commercial corridors by providing a new reliable customer base. Streetcars often increase pedestrian activity along commercial corridors and expand the distance people are able to walk, which greatly benefits retail. This would help to stabilize property values and improve occupancy rates for sections of downtown that currently have high vacancy rates and non-sustainable businesses. The streetcar may also encourage employees of downtown to utilize businesses in the study area more often since they would have more convenient access to downtown area destinations and retail goods and services.

Projections created for the streetcar project show the study area could see approximately 618,000 square feet of new retail space over the next 20 years for the initial route and another 382,000 square feet for the route extensions[47]. New office and hotel space would also be created. Projections show nearly 2.9 million square feet of office and hotel space could be added around the initial system and another 3.8 million square feet of office and hotel space could be developed around the route extensions[48].

- Improved Tourism and Entertainment Industry

Hotels, cultural and civic facilities and entertainment venues would benefit from the streetcar because their patrons would have improved connectivity to other downtown destinations on a convenient, predictable and self identifying transit route. This could encourage more people to attend events and facilities within the study area because it eliminates the inconveniences and inefficiencies (i.e. difficult to find a spot, expense of parking) often associated with downtown parking. With a streetcar system, visitors could park their car once and use transit to move from destination to destination. This is consistent with Milwaukee's Park Once Program.

- Increased Economic Development Potential

[47] Streetcar Technical Memorandum: Land Use and Economic Development. HNTB Corporation and City of Milwaukee Department of City Development. 2010.

[48] Streetcar Technical Memorandum: Land Use and Economic Development. HNTB Corporation and City of Milwaukee Department of City Development. 2010.

From an economic standpoint, the project's growth inducing effects would contribute to an increase in the City's tax base and would encourage additional business development and jobs. Based on the projections for new housing, retail and office development, the study area for the initial system with the route extensions could see 20,500 new jobs and nearly $3.35 billion in new tax base[49].

- Increased Property Values

Case study research shows that property values near streetcars are likely to increase as a result of improved transit mobility. Increasing property values can be a benefit to property owners when they sell their land and buildings.

The concern that arises with rising property values is that existing populations will no longer be able to afford to live in the affected area. This consequence is not expected to be significant within the study area.

Many neighborhoods in the study area have already seen substantial redevelopment over the past 15 years, which has given rise to distinct neighborhoods. Many of these neighborhoods are located in areas that were previously dominated by industrial land uses and had very small residential populations. In addition, current public and subsidized housing within the study area would remain. As discussed in Section 5.1.3, the study area contains several housing developments that offer affordable housing options. Developments that used affordable housing tax credits to help finance developments must remain for at least 30 years. Units provided by the Milwaukee Housing Authority would remain in perpetuity.

It is likely that additional affordable housing units will be added to the study area. The affordable housing tax credit program is a popular tool used by developers in the study area to help with financing. According to Department of City Development staff, this tool has become more popular over the past few years as this is often the only way for projects to obtain full financing during current economic conditions.

- Stormwater

New development could impact stormwater quality and quantity. However, this affect is not expected to be significant. Since the study area is already fully developed, new development is not likely to increase impervious areas. In cases where vacant land does exist, the City of Milwaukee's stormwater regulations would apply to any development that increases impervious surfaces by one-half acre or more. The city's stormwater regulations would also apply to redevelopment that disturbs an area larger than one acre.

- Parking

Another affect often associated with new development in the study area is increased demand for on-street parking. This results when developments do not contain adequate off-street parking spaces for their tenants. This is often a concern for high density areas like the Lower East Side that already have a short supply of parking especially during the evening and nighttime hours when most residents are at home.

As noted in the City's Area Plans, the streetcar would improve connections between study area destinations which would help to reduce the need for automobiles and subsequently the need for parking. It would also increase access to parking facilities that are located beyond a property's walk zone.

5.3.6 Evaluation of Indirect Effects

This section evaluates the results of the indirect effects analysis and discusses any uncertainties associated with the results. Indirect effects, which occur later in time and are farther removed from the immediate

[49] Streetcar Technical Memorandum: Land Use and Economic Development. HNTB Corporation and City of Milwaukee Department of City Development. 2010.

project, come with some inherent uncertainty because future conditions can be difficult to predict. For example, the current downturn in the economy has substantially decreased the amount of new investment that has occurred in the study area over the past two years. While past trends show the study area is positioned to see continued new investment, it is difficult to say how long the current depressed economic conditions will influence local economic development potential.

Furthermore, streetcar transit is new to Milwaukee and Wisconsin. For that reason, it is difficult to predict how the local market will respond to improved transit mobility within the study area. Stakeholder briefings with local developers showed a mixture of options. Some developers were unfamiliar with streetcar and were uncertain about its benefits for development. Conversely, some developers and property owners felt the streetcar would encourage them to pursue new projects, especially historic rehabilitations that have been stalled due to a lack of parking.

Case study evidence from other cities with similar transit systems provides a good indication of the types of land use changes that are likely to occur. However, the actual rate of development and increase in property values as a result of the streetcar is likely to be individual to Milwaukee. At this time, those rates are unknown.

5.3.7 Consequences and Mitigation Measures

The growth inducing effects of the streetcar project are generally considered positive because they are consistent with the City of Milwaukee's Comprehensive Area Plans, which seek to increase housing and commercial development. The plans also recognize the need for improved transit connections to achieve their development goals.. Specifically the Downtown Area Plan has identified the streetcar as a catalytic project that is needed to serve office workers, residents and visitors to downtown.

All new development will be required to follow the City of Milwaukee zoning and plan review processes to obtain permits through the City's Development Center. Also, the City Plan Commission adds an extra layer of review by approving developments in certain overlay zoning districts, approving zoning map changes and other aspects related to the development of the City.

Any effects related to historic properties will be managed by local regulations that are in place to manage the removal and restoration of privately owned historic properties. The City of Milwaukee has a Historic Preservation Commission that reviews applications for alterations to historic properties. The Commission must grant a certificate of appropriateness before a building permit is issued by the Department of City Development for any alterations or demolitions to historic designated properties.

The use of affordable housing tax credits and the preservation of existing public housing will continue to provide a range of housing options for residents in the study area and mitigate concerns related to rising property values.

Developments that may affect stormwater quality and quantity will also be managed by City regulations.

The City of Milwaukee's stormwater regulations will apply to any development that increases impervious surfaces by one-half acre or more. The City's stormwater regulations will also apply to redevelopment that disturbs an area larger than one acre.

Effects to on-street parking will be managed by the City's existing parking regulations. The majority of properties in the northeast side of the study area fall under residential zoning classifications (RM, RO and C9A) which are required to provide either one parking space per dwelling unit or two parking spaces per three dwelling units depending on the classification. Properties within the downtown zoning districts are not required to provide on-site parking. However, residential parking is less of a concern in these areas.

5.4 CUMULATIVE EFFECTS

Cumulative effects as defined by the Council on Environmental Quality (CEQ) are "*the impacts on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time* (40 CFR § 1508.7)."

The cumulative effects analysis considers the communities and resources that could be affected directly or indirectly by the streetcar locally preferred alternative when combined with other actions that potentially affect the same resources. The analysis is broken into the following three sections – scoping, identifying past, present and future actions that may affect resources and determining the cumulative environmental effects and consequences.

5.4.1 Scoping

Scoping identifies cumulative effects issues, the geographic scope of the effects and the timeframe for the analysis.

Cumulative Effects Issues and Geographic Area of Potential Effect

The issues and/or resources of concern addressed in this section are based on the direct and indirect effects discussed earlier in this document. The geographic area of potential effect (APE) is the area where cumulative effects may occur. The APE for this cumulative effects analysis not only takes into consideration the streetcar project, but also the cumulative effects of other actions whose geographic boundaries are larger than the project study area. Table 26 summarizes the APE for each resource.

Table 26: Area of Potential Effect by Resource

Resource	Area of Potential Effect
Land Use and economic development	Streetcar study area for land use and general downtown Milwaukee area for economic effects
Environmental justice populations	Streetcar study area
Transit and Transportation	Streetcar study area
Parking	Streetcar study area
Aesthetics	Land adjacent to the streetcar route
Noise	Land adjacent to the streetcar route
Temporary construction impacts	Land adjacent to the streetcar route
Hazardous materials	Streetcar study area
Cultural resources	Land adjacent to the streetcar route
Utilities	Land adjacent to the streetcar route
Energy G	eneral metropolitan area
Water quality	Streetcar study area

Analysis Timeframe

The timeframe of this analysis assumes a maximum of 20 years, which is based on local plans and available demographic information that typically project 10 to 20 years in the future.

5.4.2 Identify Past, Present and Reasonably Foreseeable Future Actions

The City of Milwaukee has seen extensive activity as the historic center of urban and economic development in the region and the state. The project study area is a well established urban area that is home to a stable population that has been increasing over the past 15 years. The area also supports numerous regional attractions and employment destinations. With the exception of the Park East redevelopment area, very little vacant land is available for new development and the City is focusing on redeveloping underutilized commercial areas and former industrial areas. The City's efforts as well as market demand are creating opportunities for new retail, office, and residential developments that could diversify and intensify land uses around the project corridor. See Sections 5.1.1, Land Use, 5.1.2, Economic Development, 5.4.3, Indirect Effects Study Area for more information about land use and economic development trends and projections for the study area.

Given the history of development around the project corridor and the existing demand for new development, there are many past (completed projects), present (currently on-going) and reasonably foreseeable future (planned) actions that may contribute to cumulative impacts within the area of potential effect for the various environmental resources identified in Table 26.

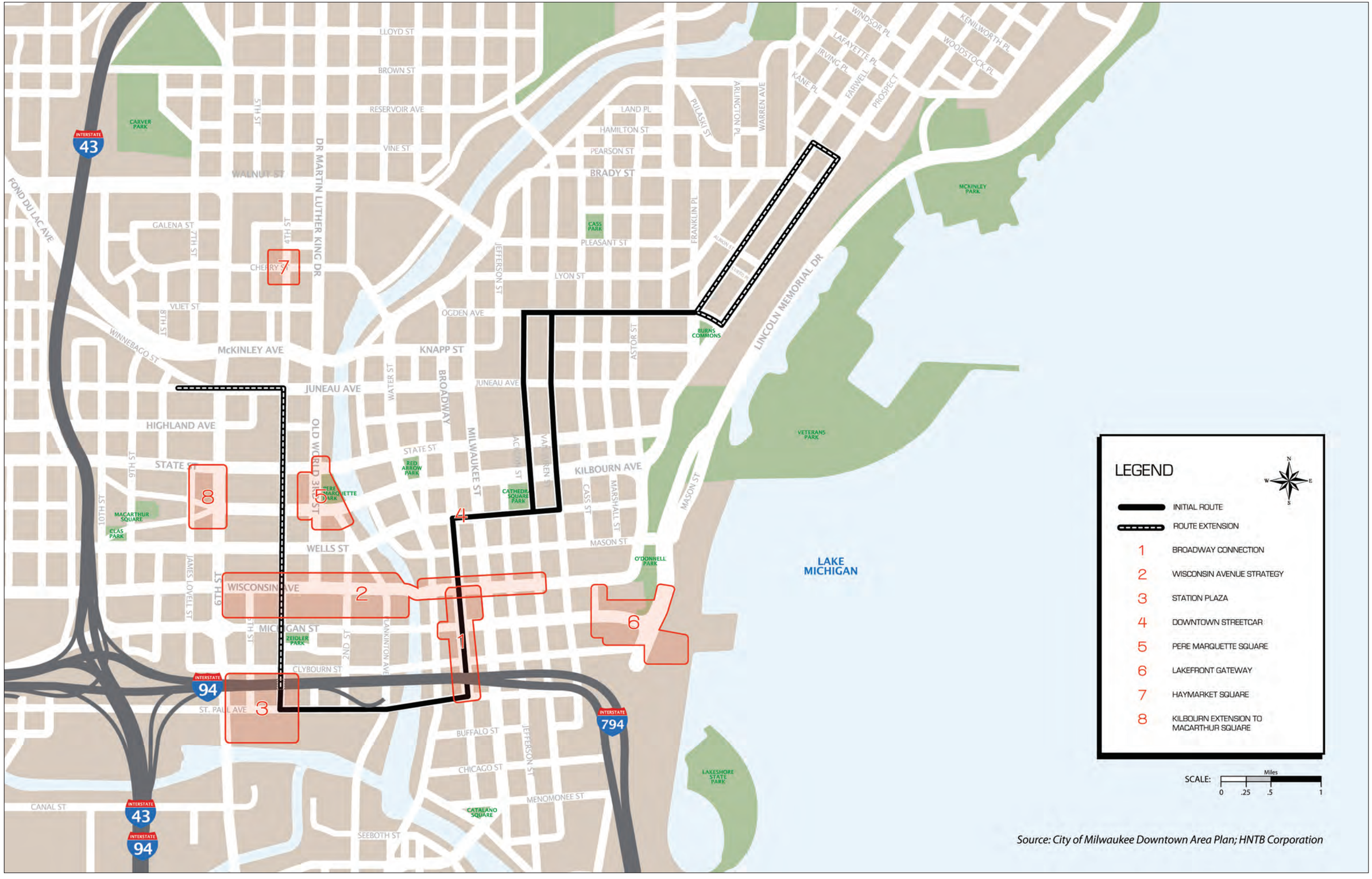
Table 27 provides a list of the more substantial actions that have occurred in the region, that when considered together may have cumulative effects on the environment.

Table 27: Past, Present, and Future Actions

Timeframe	Action
Past	Milwaukee Intermodal Station renovation
	Public Market development
	Removal of the Park East Freeway
	McKinley Avenue - Knapp Street Bridge
	Marquette interchange reconstruction
	Riverwalk implementation
	Park Once program
	Grand Avenue renovation
	Wisconsin Avenue streetscaping
	Sixth street viaduct reconstruction
	State Street Bridge reconstruction
	Historic Third Ward redevelopment
	Summerfest Grounds renovations
	Convention Center construction
	Milwaukee Theater renovation
	Past mixed use development in and around downtown
	Past office development in and around downtown
	Conversion of State Street from one-way to two-way
	Conversion of Wells Street from one-way to two-way west of 6th Street
Present	Juneau Avenue Bridge reconstruction
	Wisconsin Avenue Bridge reconstruction
	Mixed use development in and around downtown
	Riverwalk extensions
Future	A series of catalytic projects proposed in the Downtown Area Plan and the Third Ward Plan: Broadway Connection, Wisconsin Avenue Strategy, Station Plaza, Pere Marquette Square, Lakefront Gateway, Haymarket Square, Kilbourn Extension to MacArthur Square; Italian Village, Market Street reconfiguration.
	St. Paul Bridge reconstruction
	Park East development
	Redevelopment of the Pabst Brewery Complex

Milwaukee's Downtown Plan (Approved in 2010) identifies eight catalytic projects aimed at increasing economic development and community value. These projects are viewed as significant investments and improvements and will help to further Downtown's overall development goals. These projects are mapped in Figure 50 and discussed below. Implementation of the catalytic projects is based on the economy and the City's ability to attract developers to build the projects. Past efforts by the City indicate that these projects are likely to be implemented. From the 1999 Downtown Plan, the City has actually implemented or assisted in the implementation of 10 out 13 of the catalytic projects. It is likely the City will continue to provide resources for the implementation of catalytic projects.

Figure 50: Map of Milwaukee's Catalytic Projects



Source: City of Milwaukee Downtown Area Plan; HNTB Corporation

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Broadway Connection

A two-block stretch of North Broadway between E. Wisconsin Avenue and E. Clybourn Street characterized by surface parking lots and vacant historic buildings. This location serves as a "gateway" between downtown (business district) and the growing Third Ward (mixed –use residential district), and is adjacent to Interstate 794. Revitalization of existing historic buildings and the development of vacant parking lots provide great potential to accommodate a mix of residential, commercial and parking facilities to enliven this district. Redevelopment of this area will focus on extending and enhancing pedestrian connections to adjacent retail districts, attracting new forms of retail activity, and upgrading existing historic structures to preserve the aesthetic appeal and usability of this area.

Wisconsin Avenue Strategy

Wisconsin Avenue between Milwaukee and 4th streets, and Wells and Michigan streets, serves as the center for financial services and retail operations. However, due to a lack of a coordinated shopping experience amongst existing businesses, retailers have been leaving Downtown. Revitalization and expansion of this district's retail offerings would harness the high volumes of pedestrian traffic comprised of workers, residents, and visitors alike. In coordination with Business Improvement District 21's retail recruitment strategy, the City hopes to develop an overall long-range plan to enhance retail opportunities in this district. The strategy should include improvements to storefront appearances, attracting unique retail offerings, and increasing visibility and accessibility to this district.

Station Plaza

The Milwaukee Intermodal Station provides Amtrak and intercity bus service to thousands of riders annually; serving as a gateway to and from downtown Milwaukee. However, adjacent semi-industrial land use and a lack of accessibility from this area to and from downtown and the Third Ward does not complement the Intermodal Station area as a destination in which positive first impressions are made. Improving on existing services to and from locations such as Chicago makes this a potential location for business, residential and tourism development. Improvements to the Station Plaza are intended to enhance current rail service to and from Milwaukee, create stronger links with other large cities in the region, connect to current and proposed Milwaukee transit services, and to update adjacent uses in order to create a positive impression and thus attract business, residents, and tourists to this area.

Downtown Streetcar

Milwaukee's Downtown is a large area and pedestrian mobility to and from high-use areas is often inconvenient. The development of the Milwaukee Streetcar system provides a new transit option for all types of downtown users connecting substantial office populations, nearby residential populations, downtown retail offerings, and recreational attractions. The streetcar line would link downtown's key destinations, increase intermodal connections, reduce traffic congestion, and enhance economic development potential for the entire downtown area.

Pere Marquette Square

The Old World Third Street District and areas adjacent to it are comprised of entertainment venues, retail offerings, office space and public open space. This location is ideal for the development and concentration of commercial, entertainment and residential uses. In order to strengthen the marketability and expand entertainment offerings in this district the City has proposed the development of a mixed-use complex surrounding the Journal Sentinel block and Pere Marquette Park. This project would enhance the pedestrian environment, link existing uses, create a continuous connection through Downtown, provide high quality transit access, and introduce new residential development to the area.

Lakefront Gateway

The lakefront defines Milwaukee and provides recreational open spaces with cultural, entertainment, and educational facilities used by residents and visitors. However, current traffic patterns create many pedestrian/traffic conflicts and disturb connections to and from offices, hotels and residences adjacent to the lakefront. Improvements to park space and pedestrian connections would enliven the Lakefront District and enhance Milwaukee's identity. This project seeks to realize the full potential of Milwaukee's lakefront by shifting the existing alignment of Lincoln Memorial Drive south of Michigan Street, further developing open space and cultural amenities along the lakefront, improving pedestrian access, and fully integrating with the commercial developments adjacent to the lakefront.

Haymarket Square

The Haymarket Square is an underdeveloped 15-block area with a combination of surface parking lots and low density industrial and warehouse uses. Previously isolated from downtown by the former Park East Freeway, redevelopment of mixed-use districts adjacent to the Haymarket Square displays the potential of this area. The redevelopment of this area as a mixed-use neighborhood should include development of a variety of housing types, higher density uses, attracting new businesses and jobs to the district, an increased focus on arts activities, improvement of the pedestrian environment, creating strong connections to the Milwaukee River, and incorporating transit access points to other downtown locations.

Kilbourn Extension to MacArthur Square

Originally intended to be a public space within a 33-acre civic center, MacArthur Square has become a large, eight-acre, isolated open space with no pedestrian connections and an underutilized 1,500-car underground parking garage. $20 million in renovations to the garage offers an opportunity to redesign and reconnect the square to downtown along Kilbourn Avenue. Renovations include enhancing pedestrian access to the area, creating new connections to Milwaukee's world-class entertainment and recreational venues, providing convenient vehicular access without disturbing the pedestrian environment, increasing the economic development potential of adjoining development sites, and expanding existing parking facilities to meet the needs of future users.

5.4.3 Environmental Consequences

This section describes the potential cumulative effects associated with the streetcar project and their consequences. The No Action Alternative would not contribute to any potentially negative cumulative effects within the study area and it also would not provide any positive cumulative effects.

Land use

The study area is the historic employment hub for the Milwaukee metropolitan region and contains a mixture of unique neighborhoods (Figure 28) that contain residential, commercial, entertainment and recreational land uses as shown on Figure 24. Land use and economic development trends as discussed in Sections 5.1.1and 5.1.2 and 5.3.3 demonstrate that the area has seen substantial reinvestment over the past 15 years with new housing and commercial development. The sections also demonstrate that the study area is positioned to see new investment once the local economic conditions improve.

The combined effects of potential induced growth due to the streetcar project as discussed in Section5.3.5, Indirect Effects, and other past, present and future actions as listed in Table 27 would create a cumulative land use effect within the study area. The cumulative effect would further focus development along the transit route and is likely to encourage higher quality and higher density development along the route. The cumulative effect may also accelerate the pace of development within the study area and along the route. The cumulative effect would support planned land use and development goals established by the City's

Downtown, Third Ward and Northeast Side area plans. As the indirect effects analysis shows, new development would have positive effects and any potential negative effects would be managed through the City's existing planning and permitting authority for land use and zoning as discussed in Section 5.3.5.

Economic

Cumulative economic effects are likely as a result of the past, present and future actions that have occurred in the area (Table 27) along with the direct (Section 5.1.2) and indirect (Section5.3.5) economic effects associated with the streetcar project. Construction and operation of the streetcar creates about 1,115 direct and indirect jobs, which cumulatively contribute to the employment base in the project area. See Table 10. Economic benefits would also be expected from development and redevelopment potentially induced along the streetcar routes. See Section 5.3.5. Anticipated land use change is supported by the City's local land use plans, zoning and other development policies including their use of TIDs and BIDs as described in Section 5.3.3. Specifically, the Downtown Area Plan calls for increased development density and intensity, which the streetcar project would support. The Northeast Side Area Plan supports transit development as an economic development tool.

The City of Milwaukee would be responsible to fund, operate and maintain the service. The City would procure capital, operating and maintenance funds from both federal and local sources. No funds from existing revenues are intended to be used to build and operate the service and no substantial cumulative effect on financing is expected. Section 7, Estimated Project Costs, provides additional information about funding.

Environmental Justice

The streetcar project along with existing transit services in the study area would have a positive cumulative effect on environmental justice populations in the study area. See Section 5.1.3 for more information about environmental justice populations. The streetcar is expected to increase mobility and quality of life for those whom depend on transit including the elderly and disabled. The streetcar service would increase access to recreation, employment and goods and services within the study area.

Transit

The streetcar would provide a new transit service to the study area. This would cumulatively benefits transit services within the study area by creating a frequent and convenient connection to the intercity rail and bus services at the Milwaukee Intermodal Station. Additional efficiency could be realized if MCTS bus routes are modified to coordinate with streetcar stops and schedules at some point in the future.

Vehicular Traffic

Section 5.2.4 describes the existing transportation conditions within the study area and the direct effects that would occur as a result of the streetcar project. The streetcar project would add some traffic delays at intersections where lanes are temporarily blocked when the streetcar stops or makes turns. This would contribute to a cumulative effect on traffic operations in the study area when considered with projected increases in traffic as a result of other past, present and future actions. However, this effect is not substantial because nearly all intersections would still operate with acceptable levels of service. Also, delays as a result of the streetcar are minimized because the streetcar operates in a mixed traffic lane with other vehicles.

Parking

Historic development patterns did not adequately account for parking needs in the densest areas of the study area on the northeast side. These neighborhoods experience parking shortages, particularly in the

evening and nighttime hours when residents are at home and during winter months when snow emergencies are in place. Additional parking removed for the streetcar service could have a negative cumulative effect in areas already experiencing parking shortages. However, this effect is not expected to be substantial because only a very small portion, 0.14% of the total on-street parking spaces in the study area would be impacted. The streetcar service could mitigate the effect to some degree by reducing the need to own a vehicle and providing convenient access to parking facilities in other locations of the study area. In addition, the streetcar system is designed to operate in an existing travel lane with other vehicles which preserves the greatest amount of parking spaces. See Section 5.2.4 for more information about parking.

Biking

The existing bicycle facilities and the direct effects associated with the streetcar project are discussed in Section 5.1.7and 5.2.4. Overall, the streetcar project is expected to have a positive cumulative effect on bicycling by maintaining the existing bike network and adding a new planned on-street bike route along Wells Street. However, the streetcar tracks, which could trap bicycle wheels, could create a cumulative safety effect for bicyclists by adding a new potential hazard for bicyclists traveling in the roadway with other vehicles. This effect will be mitigated with signage that alerts bicyclists (Figure 37), the use of transition zones at intersections (Figure 38) that show bicyclists how to cross the tracks at 90 degrees and outreach to educate bicyclists about the potential hazard.

Aesthetics

Streetcar infrastructure, including the electric system and streetcar stops would alter existing views as discussed in Section5.1.5, Aesthetics. Minimal cumulative negative effects are expected as the streetcar routes are heavily used transportation corridors in a dense urban setting dominated by buildings, sidewalks, light poles and bus shelters. The materials used for streetcar are designed to be visually consistent with existing street views and architecture.

The streetcar project will require the removal of one tree from the median on 4th Street where the streetcar runs in the center of the street. This is not expected to create a cumulative effect because the past, present and future actions discussed in Table 27 have not affected street tress and in some cases have increased the amount of street landscaping. Furthermore, the trees that may be removed are small enough to be replaced with comparably sized trees.

Noise

Direct impacts are anticipated, but no substantial cumulative effect is expected in an existing urban setting with existing noise from daily activities. Mitigation will help reduce effect. See Section 5.2.2 for more information about noise.

Construction

Construction is expected to occur in short segments, or reaches, along streets to avoid long term disruption to local access. Concurrent or consecutive construction projects in or near streetcar construction projects could cumulatively impact access to local streets. This effect can be avoided and minimized by coordinating construction schedules through the City's capital improvement planning process. See Section 5.2.5 for more information about construction.

Hazardous Materials

As discussed in Section 5.2.3, hazardous materials are expected to be found on the maintenance facility site. This along with other actions related to the development of property could cumulatively increase the potential for hazardous materials to be released into the environment. However, this effect would be

minimized because existing local, state and federal laws would manage the disturbance, removal and disposal of hazardous materials. Also, induced development as discussed in Section 5.3.5 could disturb additional lands within the study area. This cumulative effect could benefit the project area as development sites would require some level of clean up, which would improve the environment in the study area. However, the presence of hazardous materials could cause delays in study area development projects because hazardous waste would need to be remediated.

Historic Resources

The streetcar project has no direct effects on historic resources. However, potential indirect effects of land development could increase the pressure to reuse historic buildings or demolish them. See Section 5.3.5. If this is not consistent with the historic context of the area, this action along with demolitions and rehabilitations of historic properties that have occurred in the past as a result of other projects could have the cumulative effect of reducing the number of properties that have a historic value within the study area.

On the other hand, indirect land use changes that encourage the reuse of historic buildings in combination with other actions that have preserved historic properties could have a positive cumulative effect on historic resources by encouraging the renovation of historic structures within the study area.

All alternations to historic resources whether considered positive or negative would be managed by existing federal, state and local preservation laws that would help to avoid and minimize this effect.

Historic resources are described in more detail in Section 5.1.4.

Utilities

Streetcar construction causes short term impacts during utility relocation. A potential cumulative effect could occur if construction is concurrent or in close succession with other construction projects that cause service disruptions or inefficiencies with relocations. Ongoing utility coordination can avoid and minimize this impact. See Section 5.2.6 for more information about utilities.

Energy

New streetcar service will require additional energy for construction and operations. A cumulative effect could be expected with the indirect effect of induced development activities in the area requiring greater energy demand. Some cumulative benefit may result from decreased energy consumption by diverting trips from individual vehicles to the streetcar. See Section 5.2.7, Energy Use, for more information.

Water Quality

The streetcar project and any other induced development activities may cumulatively affect stormwater runoff in the project area, either through temporary construction activities or increased runoff from development. The City's ordinance requirement to reduce peak stormwater flow rates from the project areas by 10% minimizes this potential effect. See Section 5.2.10, Water Quality/Resources for more information.

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6. SUMMARY OF PUBLIC OUTREACH EFFORTS

This section summarizes the public outreach efforts that have been conducted for the streetcar project, a summary of the comments that have been received and future outreach activities that are anticipated.

6.1 OUTREACH EFFORTS

This section summarizes the public participation activities that have been completed for the streetcar. It includes outreach conducted during the scoping phase of the Milwaukee Connector project that began in February 2009 to review route alternatives for a downtown streetcar and route alternatives for bus rapid transit options. It also includes the more recent outreach efforts conducted for the Milwaukee Streetcar phase that began in October 2009.

Public participation is an early and continuing part of the project development process. The City depends on the public's participation to identify the community's values and the purpose and need of the project. Participation by the public helped the City select the locally preferred alternative. Information gathered from the public is necessary to help the City avoid, minimize, and mitigate impacts.

6.1.1 Outreach for the Milwaukee Connector Study Scoping Phase

During the Milwaukee Connector Study project scoping phase that started in February 2009, briefings were held with local communities and a public scoping meeting was conducted. These are summarized below.

Community Briefings

Project briefings were held with the communities of Franklin, Glendale, Greenfield, Oak Creek, Shorewood, St. Francis, and Wauwatosa prior to the public scoping meetings.

Meeting Intent

The intent of the meetings was to introduce the communities to the project and to obtain their initial feedback about the project's proposed bus rapid transit routes. During this time meetings with the City of Milwaukee were also taking place to define the study area for the streetcar.

Meeting Outcome

All communities indicated interest in being part of the Milwaukee Connector study and learning more about the project.

Public Scoping Meetings

A series of scoping meetings were held with the public for this phase of the Milwaukee Connector Study. Six meetings as shown on Table 28 were held over a two week period from February 3 through February 12, 2009.

Meeting Intent

The intent of public meetings was to introduce the public to the scoping phase of the Milwaukee Connector Study and to obtain comments on the project goals, study area, preliminary route corridors and project technologies.

Table 28: Milwaukee Connector Public Scoping Meetings

Location	Date	Number of people who signed in at meeting
Wisconsin Room - UW-Milwaukee	February 3, 2009	98
Fritsche Middle School	February 4, 2009	43
Black Historical Society	February 5, 2009	14
Northwestern Mutual Franklin Campus	February 10, 2009	50
Milwaukee County Research Park	February 11, 2009	53
Milwaukee Downtown Transit Center	February 12, 2009	87
All locations	**Total**	**345**

The meetings were conducted in an open house format with staff available to provide information and answer questions. An automated presentation was placed on a continuous loop for participants to view and five stations were set up to display information about the project. Participants were also given a meeting handout that included project information and attendees were given the opportunity to participate in a routing exercise, which allowed participants to indicate on a map where they would take bus rapid transit or streetcar.

Public notifications for the meetings were extensive. Methods included:

- Placing paid ads in print and online English and Spanish newspapers
- Placing an ad in the "Rider Insider", a MCTS publication
- Displaying the meeting notice on the monitors that run on buses
- Distributing hard copy notices throughout the Milwaukee Public Library System
- Posting notices on several online and television event calendars
- Posting the meeting locations on the Milwaukee Connector Web site
- Sending a news release to Milwaukee-area print, radio, television and online media outlets

Meeting Outcome

Over 200 comments were collected at the meetings and from the project website. Numerous comments provided general support for the study and highlighted how various alternatives would benefit downtown Milwaukee, as well as various attractions in Milwaukee. A few comments were opposed to the concept of the study and other comments discussed the need to expand the study to provide connections to jobs in the suburbs. Comments were also made about transit technologies. A considerable number of comments stated they support light rail transit instead of rubber bus technology. People offered numerous comments regarding specific origins and destinations that they would like to see served by a transit connector service. In addition, some comments discussed the study area and most often requested that parts of the Menomonee Valley be added to the study area and that the study be expanded to include transit service to the suburbs to provide access to suburban job centers.

6.1.2 Outreach for the Milwaukee Streetcar Project Phases

This section discusses outreach that has occurred specifically for the Milwaukee Streetcar project phase that began in October 2009

Public Information Meeting

A public information meeting was held on October 8, 2009 for the Milwaukee Streetcar project phase that began in October 2009.

Meeting Intent

The intent of the meeting was to obtain public feedback on the proposed streetcar routes. See Section 3 for a description of the routes that were presented at the meeting. Approximately 200 people attended the meeting.

A presentation was made and staff was available to respond to questions and address concerns. The meeting site was accessible and interpreters were available upon request. A variety of outreach methods were used to advertise the meeting to individuals and organizations.

Specific invitations were sent to local elected officials; representatives from engineering firms, housing organizations, transit groups; business associations such as chambers of commerce and business improvement districts; major transit users impacted by the proposed routes including employers, retailers, entertainment venues, schools, health care facilities; and other local organizations that represent transit-dependent populations in the study area.

Postcard notices were mailed and emails notices were sent to an extensive database of property owners and interested individuals, businesses and groups. Several stakeholder organizations also agreed to forward notices to their membership.

Paid ads were placed in seven local and statewide English and Spanish newspapers. Ads were also placed online with links to the study Web site. A news release was issued to Milwaukee area print, radio, TV and online media outlets. The meeting was also posted on several online event calendars. Posters and flyers were displayed in a number of public places in prominent places. Flyers were handed out at bus stops and at the public market.

The project Web site was updated with all of the meeting displays and the PowerPoint presentation to allow visitors to the site to attend a virtual public information meeting. Comment forms were also available online.

Meetings were held with reporters and several articles have been written about the project including several during the public comment period. Electronic media kits which included a news release, photos, video clips and project maps were available for reporters at the public meeting. The meeting was covered by three major local television stations.

Meeting Outcome

Comments related to the October 8, 2009 public meeting were accepted at the meeting and taken online and via mail through October 22, 2009. In total, 129 comments were received and are shown in Appendix B. The majority of the comments expressed support for the project and discussed the need for an improved transit system in Milwaukee to enhance connections, improve quality of life for residents and encourage economic development. A few comments stated they were opposed to the project primarily because they felt buses would provide more flexibility on routes and would be less costly.

Many comments did not specifically discuss which route alternative they preferred. However, several comments stated they preferred Alternative 1 because it connected the most destinations and activities within the study area. Some comments also expressed support for Alternative 2 because of the connections that this alternative made. Alternative 3 obtained the least support because participants felt it

didn't serve downtown's central business district and the Third Ward neighborhood even though it provided a better link to the cultural and entertainment areas along 4th Street.

Stakeholder Briefings

A series of briefings with stakeholders who are located in the streetcar study area or are interested in the streetcar because of environmental justice and/or constituent interests were conducted. The groups briefed included elected officials (Milwaukee Aldermen, Mayor Tom Barrett, Milwaukee County Supervisors, Congresswoman Gwen Moore's office); Business Improvement Districts (Brady Street, Historic Third Ward, East Town, Westown, and downtown); Wisconsin Center District; Visit Milwaukee; Public Policy Forum; Milwaukee Urban League; Independence First; Metropolitan Milwaukee Association of Commerce; WE Energies; WisDOT; and the American Civil Liberties Union. An invitation was also extended to the Greater Milwaukee Committee.

Meeting Intent

These stakeholder briefings were held to obtain feedback on the project and its route alternatives from key stakeholders in the study area. The meetings were held prior to the October 8, 2009 public meeting to obtain key stakeholder input prior to releasing the route alternatives to the general public and to encourage attendance at the public information meeting.

Meeting Outcome

The stakeholders that were briefed were overall supportive of the project. Stakeholders discussed the pros and cons of the alternatives. The connections that were made by Alternative 1 were seen as positive. Alternative 2 also connected many common destinations, but some stakeholders mentioned that it serves downtown's central business district better. Some stakeholders were concerned that Alternative 3 did not adequately service the central business district of downtown and the Third Ward. Stakeholders that represent the 4th Street area supported Alternative 3, but understood that this Alternative may not be the best starter option. Other stakeholders wanted to make sure environmental justice populations would be informed about the project and recommended that specific efforts should be made to inform the African American community as the project proceeds. Other stakeholders were concerned about how the project would affect people in wheelchairs and other stakeholders inquired if there would be local hiring requirements for the project's construction.

Steering Committee Meeting

A Milwaukee Connector Steering Committee meeting was held on May 6, 2010.

Meeting Intent

The intent of the meeting was to discuss the alternatives analysis that took place between October 2009 and May 2010 and to vote on the locally preferred alternative (LPA).

Meeting Outcome

At the meeting, the steering committee members voted and recommended a LPA. See Section 3 for a description of the LPA.

Agency Scoping Meeting

An Agency Scoping Meeting was held on August 19, 2010.

Meeting Intent

The intent of the meeting was to discuss the scope of the Environmental Assessment for the Milwaukee Streetcar with relevant agencies. The meeting included representatives from the City of Milwaukee,

Southeastern Wisconsin Regional Planning Commission, Wisconsin Department of Natural Resources, U.S. Environmental Protection Agency, Wisconsin Historical Society and HNTB Corporation.

Meeting Outcome

The agencies brought up topics that should be addressed in the environmental assessment including noise and vibration, historic resources, indirect land use changes, stormwater, the streetcar's power system and other topics.

Outreach to Environmental Justice Populations

Environmental justice has been a focus of outreach activities since the Milwaukee Connector Study started in 2000 and has continued through the more recent Milwaukee Streetcar project phases.

Meeting Intent

Environmental justice outreach for the project is intended to include input from environmental justice populations to make sure the project does not adversely affect these populations. Environmental justice outreach opportunities for the Milwaukee Streetcar project phase have included invitations to the October 8, 2009 public information meeting. In addition, meetings have been held with environmental justice organizations and individuals from the project's data base and/or recommended by the local American Civil Liberties Union. Organizational representatives with whom city staff and consulting team members met with include the American Civil Liberties Union, the Urban Economic Development Association, The Milwaukee Urban League, Independence First, Esperanza Unida, 9 to 5, Citizen Action/Good Jobs and Livable Neighborhoods, SEIU Local 1, and the NAACP. Additional information about environmental justice populations can be found in Section 5.1.3.

Meeting Outcome

Meetings with environmental justice organizations have generally produced expressions of support for the streetcar proposal, and offers from the organizations to publicly express their support. Environmental justice representatives have indicated that they understand the need to start small and start downtown. Many also expressed interest in future expansion to provide additional service to low income and minority neighborhoods and populations; local hiring requirements; job opportunities for low income and minority neighborhood residents in streetcar construction and operations; the cost to ride the streetcar; incentives and support for local business development; and accessibility for people with disabilities.

6.2 ANTICIPATED FUTURE PUBLIC OUTREACH

The City of Milwaukee and the FTA will take comments for 30 days following publication of this Environmental Assessment; and the City will work with FTA to address any comments received during the comment period in the project's anticipated Finding of No Significant Impact.

During the final design and construction phases of the project, the City of Milwaukee will conduct additional public involvement activities, which may include:

- Periodic updates sent to the project's mailing list and to property and business owners in the vicinity of the project's alignment;
- Meetings with citizen, neighborhood and business groups to discuss and receive comment on current or future design options;
- Updates to the project website;
- Coordination with neighborhood property owners, residents and businesses during construction activities;
- Media releases, as appropriate.

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7. ESTIMATED PROJECT COSTS

This chapter is a summary of the estimated project costs and potential funding sources for the Milwaukee Streetcar locally preferred alternative, including both the capital costs and the operations and maintenance costs. The City of Milwaukee will continue to work on finalizing the details of the operations and maintenance funding sources. Implementation of the funding plan depends on finalized cost estimates subsequent to further engineering analysis, coordination with stakeholders, completion of the EA, and Common Council approval.

7.1 CAPITAL COSTS

The capital costs for the initial streetcar system are estimated to be $64.6 million. The route extensions would add $40.2 million for a total combined cost of $104.8 million. All costs will be refined during final design phase. Table 29 shows the breakdown of capital costs for the initial system and the extensions based on an opening year of the streetcar system in late 2013.

Table 29: Capital Cost Summary (in 2011 Dollars)

Item	Cost for initial route	Route extensions	Total Cost
Construction*	$30,700,000	$17,400,00	$48,100,000
Vehicles/Vehicle Costs	4/$16,500,000	3/$12,400,000	7/$28,900,000
Professional Services	$8,100,000	$4,800,000	$12,900,000
Unallocated Contingency	$7,400,000	$4,400,00	$11,800,000
Escalation**	$1,900,000	$1,200,00	$3,100,000
Total	**$64,600,000**	**$40,200,000**	**$104,800,000**

Source: Capital Cost June 2011 Draft

*1.5% Annual Escalation from 2011-2013 **Does not include public/private utilities and some roadway costs

7.2 OPERATIONS AND MAINTENANCE COSTS

The estimated cost for operating and maintaining the initial streetcar system is $2.65 million. This figure is based on the preferred operations schedule indicated in Table 7 in Section 4.4.1 Service Frequency and Hours of Operation. The route extensions would add $2.24 million for a total operating and maintenance cost of $4.89 million. Table 30 shows the estimated operating and maintenance costs.

Table 30: Estimated Operating and Maintenance Costs

Route	Cost (YOE 2015)
Initial route	$2.65 million
Route extensions	$2.24 million
Total	**$4.89 million**

Source: Bay Ridge Consulting, Operations and Maintenance Technical Memorandum

YOE – Year of Expenditure

*2% Annual Escalation

7.3 PROPOSED CAPITAL FUNDING

Proposed capital funding would come from Federal Funds through the Interstate Construction Estimate funding. The City of Milwaukee's 60% portion of the Interstate Funds covers $54.9 million for the streetcar project's initial route or 85%. An additional $9.7 million will come from local funding sources as a required 15% local match. Any additional project funds needed would come from other sources. The streetcar's local capital funds are proposed to come from City of Milwaukee Tax Incremental Finance funds. According to the Tax Incremental Capacity Analysis completed for the streetcar project there is a total bondable amount of approximately $50.3 million[50] available from two existing and two proposed TIF Districts within ½ mile of the streetcar route. Table 31 shows the estimated TIF funds available for the local capital funds match.

Table 31: Maximum Bond Amount for TIF Districts

Revenue Source	Maximum Net Bondable Amount
Existing TID #1	$10,900,000
Existing TID #2	$15,900,000
Proposed TID #1	$5,500,000*
Proposed TID #2	$18,000,000*
Total	**$50,300,000**

Source: S.B. Friedman & Co, TID Capacity Analysis for Streetcar Project

*The bondable amount assumes no City of Milwaukee commitments for the TID funds other than the streetcar.

[50] *TID Capacity Analysis for Milwaukee Streetcar Project.* S.B. Friedman & Company. November 2010.

7.4 PROPOSED OPERATIONS AND MAINTENANCE FUNDING

The estimated annual operations cost for the initial route is $2.65 million and $4.89 million for the initial route and route extensions. FTA requires a 20-year commitment to operate a transit system. As shown in Table 32, the annual operating costs are intended to be financed through passenger revenue, City parking revenue and sponsorships. The project will also seek state and federal transit aid to provide additional revenue sources. If a new dedicated revenue source for a Regional Transit Authority (RTA) is approved by the State Legislature, the operating costs for the streetcar should be financed by that source. The finance plan includes commitments by the City of Milwaukee to assure operations support for the 20-year period.

Table 32: Proposed Operating Revenue for Opening Year (in 2015 Dollars)

Item	Cost for initial route	Route extensions
Passenger Revenue*	$590,000	$1,160,000
City of Milwaukee Parking Revenue	$1,850,000	$3,260,000
Streetcar Sponsorships	$270,000	$490,000
CMAQ Funds**	$0	$0
Total	**$2,710,000**	**$4,910,000**

Source: HNTB, Finance Plan Technical Memorandum

*Assumes $1 Fare

**CMAQ Funds could be available for first 3 years of service.

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9. LIST OF PREPARERS

The City of Milwaukee and other participants in the environmental assessment study and their experience is listed here.

Name	Organization	Tasks
Jeffrey Polenske, PE	City of Milwaukee	Project Director
David Windsor, PE	City of Milwaukee	Project Manager
Daniel Casanova	City of Milwaukee	Land Use and Development
Gregory Patin	City of Milwaukee	Land Use and Development
Mark Kaminski	HNTB Corporation	Consultant Project Manager
Ashley Booth	HNTB Corporation	Deputy Consultant Project Manager
Carolyn Seboe, AICP	HNTB Corporation	Purpose and Need Statement, Alternatives Analysis, Indirect Effects Analysis
Caron Kloser, AICP	HNTB Corporation	Cumulative Effects Analysis
Matt Spiel	HNTB Corporation	Impacts Analysis and documentation, data collection
Connie White, AICP	HNTB Corporation	Impacts analysis and documentation, data collection
Dan Pelczar, CPG, PG	HNTB Corporation	Hazardous Materials Impact analysis and documentation
Mike Zabel	HNTB Corporation	GIS, data collection
Jennifer Rybarczyk, GISP	HNTB Corporation	GIS, data collection
John Jaeckel, PE	HNTB Corporation	Air and Noise Studies and documentation
Kevin Cornnell, PE, RLS	HNTB Corporation	Utility Impacts
Bernard Greig, PE, LEED AP	HNTB Corporation	Energy Impacts
John Vogel	Heritage Resources Ltd.	Historical Surveys
Mike McQuillen	Heritage Resources Ltd.	Historical Determinations of Eligibility
Brian Faltinson	Heritage Resources Ltd.	Historical Surveys
Andréa E. Martin	Federal Transit Administration	Environmental Protection Specialist
R. Stewart McKenzie, AICP	Federal Transit Administration	Community Planner
Lois Kimmelman	Federal Transit Administration	Environmental Protection Specialist, Document Review