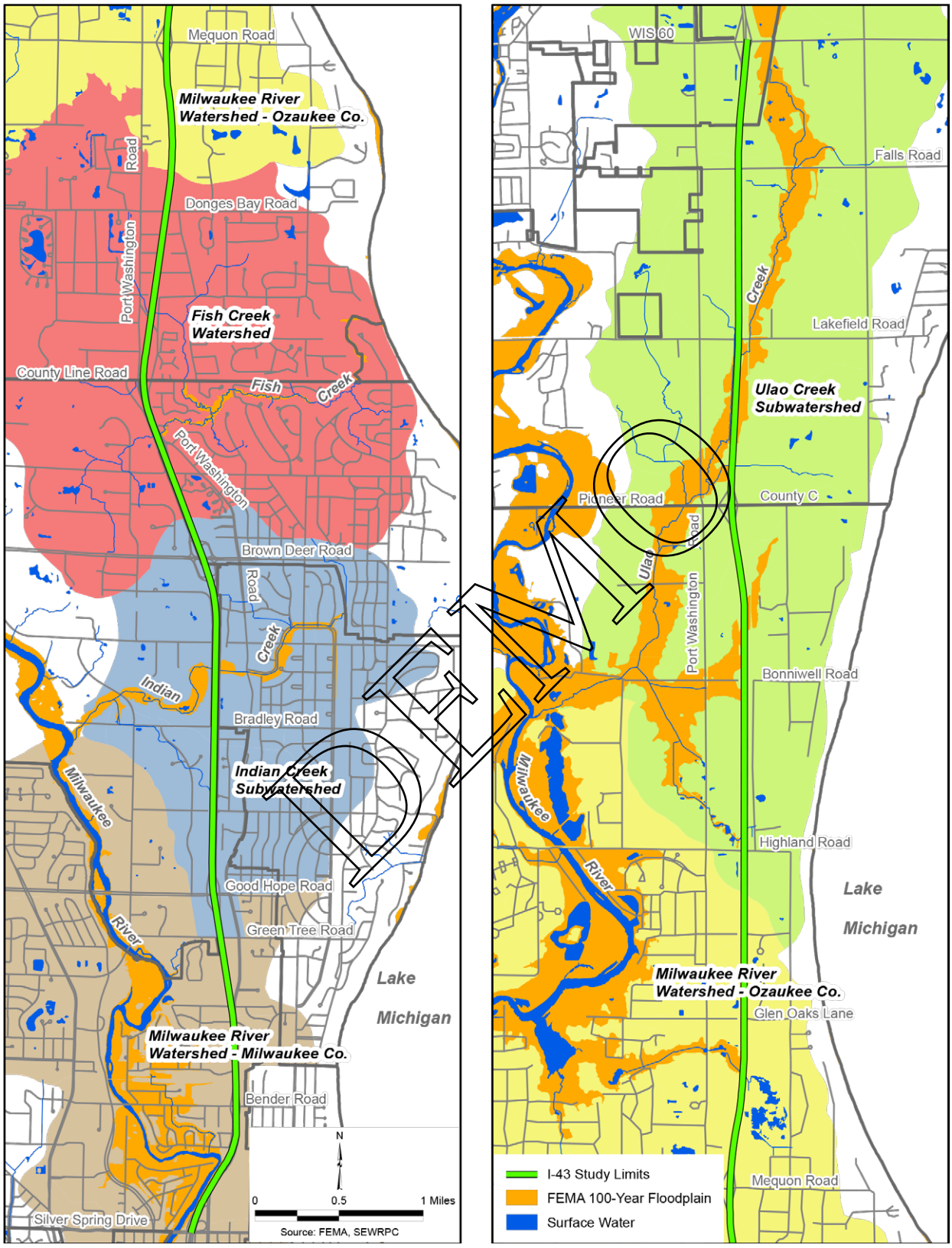
Exhibit 3-17: I-43 North-South Freeway Study Corridor Watersheds and Floodplains



FISH CREEK WATERSHED

Fish Creek is a tributary of Lake Michigan that passes under I-43 north of the County Line Road interchange via a box culvert that is 8 feet by 4 feet. It flows primarily southeast for about 3.4 miles, until joining Lake Michigan at the Milwaukee/Ozaukee county line. An unnamed tributary of Fish Creek crosses under I-43 approximately 100 feet south of County Line Road. Fish Creek is not listed as impaired waters under Section 303(d) of the Clean Water Act.

WILD AND SCENIC RIVERS

No designated wild and scenic rivers are located within the study corridor.

STORMWATER

In the study area, the majority of runoff from the freeway system is collected either by inlets and conveyed in storm sewer pipes or by overland flow through ditches. The storm sewer system, like most in urban areas, empties directly into streams and rivers. From the southern limits of the study area to about 0.1 miles north of Good Hope Road, runoff is collected via storm sewer and transported to the Milwaukee River. From about 0.1 miles north of Good Hope Road to the northern ramps of the Brown Deer Road interchange, runoff drains to Indian Creek (Indian Creek Subwatershed) via storm sewer and ditches. Stormwater drains via storm sewer and ditches, to Fish Creek, a tributary of Lake Michigan, beginning at the north ramps of the Brown Deer Road interchange to 0.75 miles south of Mequon Road (Fish Creek Watershed).

From 0.75 miles south of Mequon Road to Highland Road, stormwater drains to the Milwaukee River via ditch flow. From Highland Road to the northern limits of the study area, WIS 60, runoff drains to Ulao Creek via ditch flow (Ulao Creek Subwatershed).

Residents and local officials have commented on flooding problems in the study corridor along Indian Creek. Another notable problem area is at Nicolet High School, where an existing WisDOT storm sewer collects runoff from I-43, a roughly 70-acre area east of the freeway and, until recently, runoff from the high school campus. After a severe flood event in 2010, Nicolet High School constructed infrastructure on its property to manage the campus stormwater. Stormwater from the campus no longer drains via the WisDOT storm sewer.

The MMSD is developing total maximum daily load (TMDL) limits on behalf of the Wisconsin Department of Natural Resources for the watersheds within the Milwaukee area, including the Milwaukee River and its tributaries. TMDL is the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards. The TMDL pollutants of interest are fecal coliform bacteria, phosphorus and sediment. EPA anticipates approving a TMDL Implementation Plan to meet water quality standards in the Milwaukee River watershed in late 2014. Additionally, EPA is planning to update standards for post-construction stormwater runoff volumes. WisDOT has coordinated with MMSD and WDNR regarding the current status of TMDL requirements and other standards that may be implemented in the future, but will continue to comply with current TRANS 401 requirements for stormwater management.

GROUNDWATER AND WATER SUPPLY

Groundwater sustains lake levels, provides the base flows for regional streams, and makes up a major source of water supply for domestic, municipal and industrial users. Like surface water, groundwater is susceptible to depletion in quantity and deterioration in quality.

Three major aquifers underlie the I-43 North-South Freeway Corridor study area. From the land surface downward, the three aquifers are the sand and gravel deposits of glacial origin; the shallow dolomite strata of the underlying bedrock; and the deeper sandstone, dolomite and siltstone complex. These aquifers yield water to wells, springs, lakes and streams. Because of their relative proximity to the land surface and their hydraulic interconnection, the first two aquifers are commonly referred to collectively as the "shallow aquifer," while the latter is commonly referred to as the "deep aquifer." The shallow and deep aquifers are separated by the Maquoketa shale formation, which provides a relatively impermeable barrier between the two aquifer systems.

Within the study area, the water supply is provided via wells and public utilities (see **Subsection 3.7**). According to EPA's list of designated sole-source aquifers, no sole-source aquifers – as defined by Section 11424(e) of the Safe Drinking Water Act[21] – are in Wisconsin.

WisDOT contracts with Milwaukee and Ozaukee counties to clear the corridor of snow and ice. Road salt (sodium chloride) is applied to I-43 within the study corridor during winter weather conditions, and WisDOT sets guidelines on when and how much salt is applied. Milwaukee and Ozaukee counties submit records indicating the type and amount of deicer used for each application. Salt storage sites must have an impermeable base and cover, as well as a holding basin to contain runoff. These requirements help minimize the impact to groundwater from storage facilities.

3.10.2. Impacts to Water Resources

WATER QUALITY

Water quality impacts can occur due to stormwater runoff[22] from highways and are associated with constructing, operating, and maintaining roadways. The primary construction impact is the potential for erosion and siltation into streams. An increase in suspended sediment can reduce aquatic productivity by limiting photosynthesis, lowering oxygen levels, and covering food sources and fish spawning areas.

Runoff pollution is rainwater or melting snow that washes off roads, bridges, parking lots, rooftops and other impermeable surfaces. As it flows over these surfaces, the water picks up dirt and dust, rubber and metal deposits from tire wear, antifreeze and engine oil that has dripped onto the pavement, along with pesticides, fertilizers and litter. These contaminants are carried into lakes, rivers and streams and have the potential to affect water quality, vegetation and associated aquatic life.

The effects of pollutants from stormwater runoff would be worst at locations that discharge directly to waterways. Winter maintenance includes applying deicing agents, usually salt and sand. Deicing salts can also affect water quality by increasing the chloride levels during runoff and snowmelt. Salt flows into ditches and travels to receiving waterways. Salt spray from passing vehicles drifts as a mist and deposits on vegetation and soil.

The most common deicing agent used in Wisconsin is sodium chloride, commonly referred to as road salt. According to the Special Report 235 by the Transportation Research Board (TRB)

[21] *EPA, 2004*

[22] *EPA, 1995*

titled *Highway Deicing: Comparing Salt and Calcium Magnesium Acetate* (1991), the impacts of road salt can adversely affect roadside vegetation, streams and groundwater; however, these impacts depend on a wide range of factors. Traffic levels, wind direction and intensity, and the frequency of salt application affect the extent of damage to vegetation. Threshold levels vary based on the species, temperature, light, humidity, wind, soil type, drainage patterns, precipitation, plant size and water availability.

In general, chloride is thought to be more harmful than sodium to plants. Chloride can cause stress similar to drought conditions when it accumulates in plants. Sodium's impact can be detrimental to plant growth but is less direct. A 1990 Nevada DOT study found that the slope of the roadside is a key factor in determining where salt reaches vegetation.[23] In flat areas, the salt exposure was an average of 17 feet from the edge of pavement.

Runoff from roadways or melting snow enters the ground through ditches adjacent to the study corridor. Studies have found that concentrations are highest within 5 feet to 10 feet of the edge of pavement; some studies have found increased sodium and chloride levels in soil up to 30 feet from the pavement. Salt spray can deposit on leaves and branches. Road salt can enter water supplies by percolation through soil into groundwater.

Stormwater runoff from pavement is typically warmer than stream water temperature, and therefore, increased runoff can potentially raise stream temperatures. Increased stream water temperatures can impair habitat for cold-water aquatic species by lowering the amount of dissolved oxygen available and increasing the amount of biological activity, further affecting dissolved oxygen levels.

WATER QUANTITY

The build alternatives would increase the amount of stormwater runoff and runoff rate from the roadway compared with that of the No-Build Alternative. **Table 3-23** provides the estimated maximum amount of impervious area in each subwatershed for the No-Build Alternative and build alternatives, as well as the percent increase in the number of impervious acres when comparing the No-Build Alternative with the build alternatives. While the impervious area of the build alternatives increases, it represents less than a 2 percent increase of impervious area in the Fish Creek watershed, and only a 0.2 percent increase of impervious area in the Milwaukee River watershed. At the subwatershed level, the percent increase of impervious area is greatest in the Ulao Creek subwatershed, which is relatively small and much less developed compared to the urbanized areas of the Milwaukee River watershed.

WisDOT is also coordinating with the city of Glendale to determine if the existing storm sewer on the Nicolet High School campus will have adequate capacity after reconstruction of I-43, or if it will be necessary to create separate drainage systems for I-43 and the area east of the freeway. Regarding Indian Creek, the MMSD has already begun implementation of flood control measures to alleviate the flooding problems that exist there. The I-43 reconstruction project will be designed such that there will be no increase in peak discharge rates of runoff from the right of way, and there will be no adverse hydraulic impacts at the freeway crossing.

[23] *Caltrans and Nevada DOT, 1990*

Table 3-23: Alternatives Comparison for Subwatershed Impervious Area

	Subwatershed		No-Build/Existing Conditions			Build/Proposed Conditions*				
County	Name	Area (acres)	I-43 Impervious Surface (acres)	Total Impervious Surface (acres)	Total Percent Impervious	I-43 Impervious Surface	Percent Increase Impervious Surface	Total Percent Impervious	Percent Increase in I-43 Impervious Surface	Percent Incease in Total I-43 Impervious Surface*
Milwaukee	Ulao Creek	10,240	48	307	3.0%	78	337	3.3%	63%	9.8%
	Milwaukee River (North)	8,203	28	2,461	30.0%	39.6	2,473	30.1%	41%	0.5%
	Indian Creek	2,240	25.4	464	20.7%	35.9	474	21.2%	41%	2.3%
	Milwaukee River (South)	3,293	20.6	2,305	70.0%	33.6	2,318	70.4%	63%	0.6%
	Milwaukee River (Remaining)	424,024	0	36,466	8.6%	0	36,466	8.6%	-	-
Milwaukee River Watershed TOTAL		448,000	122	42,003	9.4%	187	42,068	9.4%	53%	0.2%
Fish Creek		3,432	23.1	618	18.0%	34.9	630	18.3%	51%	1.9%

Notes:

Indian Creek – 3.5 sq mi (MMSD Indian Creek Study), % imp computed using subbasin CNs from study.

Ulao Creek – 7,941 ac south of WIS 60 (I-43 Corridor Drainage Map), 16 sq mi total (Ulao Creek Partnership), % imp from Ulao Creek Watershed Restoration and Stewardship Plan.

Milw R North – 8,203 ac (I-43 Corridor Drainage Map), % imp estimated relative to other subwatersheds, land use and TR-55.

Milw R South – 3,293 (I-43 Corridor Drainage Map), % imp estimated based on land use and TR-55.

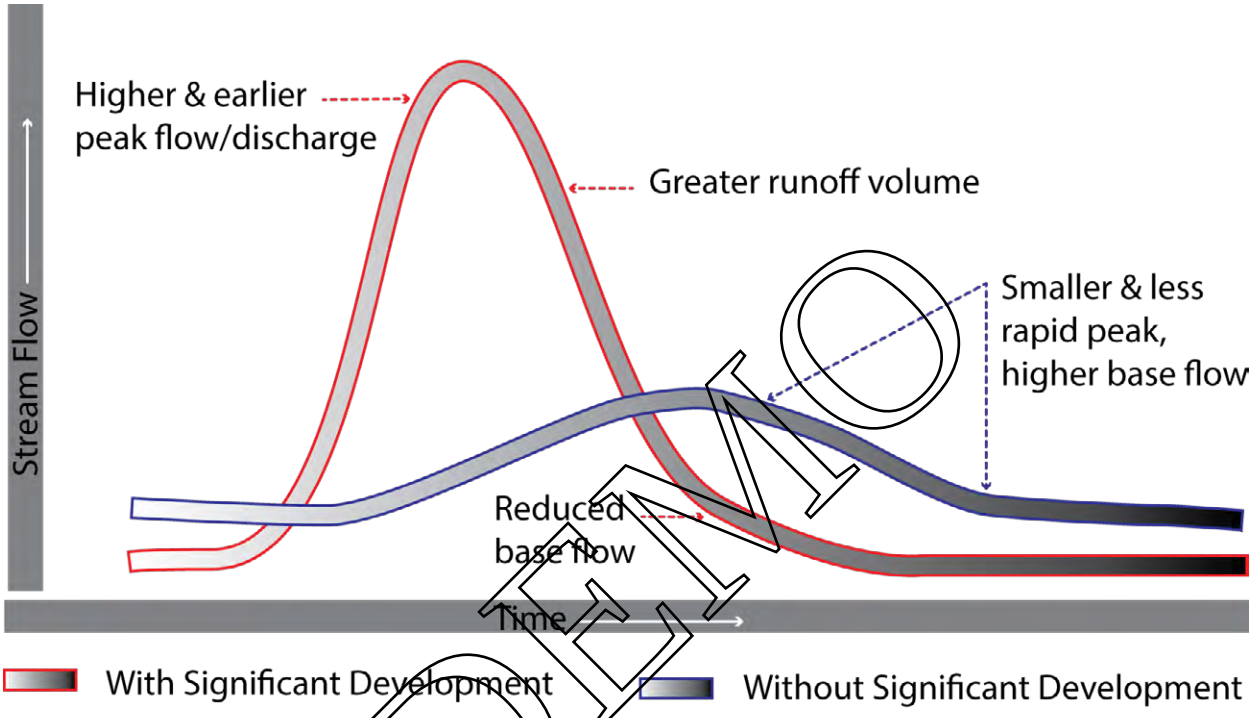
Milw R Total – 700 sq mi (SEWRPC 208 Plan Update), % imp computed based on land use from Plan and TR-55.

Fish Creek – 3,432 ac (I-43 Corridor Drainage Map), % imp estimated relative to Indian Creek subwatershed.

**Assumes full access interchange at County Line Road and Highland Road*

The amount of stormwater runoff from highways increases proportionately to the amount of impervious surface (pavement). Therefore, greater impervious surface can increase the amount of water in area streams above their carrying capacities, resulting in more frequent and severe flooding. An increase in runoff volume can also extend the period of high flow rates and velocities in stream channels, thus increasing the potential for erosion and sedimentation[24]. The potential impacts of greater impervious surface are a concern of the MMSD, which has an ongoing program of rehabilitating major streams in the Milwaukee area. **Exhibit 3-18** illustrates the relationship between impervious area and stream flow.

Exhibit 3-18: Relationship between Impervious Areas and Stream Flow



In response to the potential impacts of increased stormwater runoff, WisDOT and FHWA are evaluating several best management practices to minimize the amount of runoff that enters water bodies, reduce the flow's velocity, and improve the water quality of the runoff by removing sediment and pollutants (**Subsection 3.10.3**). WisDOT is also coordinating with the city of Glendale to determine if the existing storm sewer on the Nicolet High School campus will have adequate capacity for storm events.

WisDOT and the WDNR have a cooperative agreement that contains a memorandum of understanding regarding stormwater discharges to waters of the state. This memorandum of understanding requires WisDOT to implement a stormwater-management program for its projects that is consistent with Section 402(p) of the Clean Water Act, Chapter 283 of the State Statutes, and the *Wisconsin Administrative Code NR 216*.[25]

Wisconsin Administrative Code Chapter Trans 401 outlines stormwater-management and erosion-

[24] *Bent et al., 2001*

[25] Wisconsin Administrative Code Natural Resources Chapter 216

control procedures for WisDOT projects. *Trans 401* follows stormwater performance standards set forth in NR 151 and stormwater permit code set forth in NR 216. As applied to the I-43 North-South Freeway Corridor Study, *Trans 401* requires removal of 40 percent of total suspended solids for the study area, buffer areas upstream of waterways and wetlands, and maintain existing drainage conditions.

STREAM CROSSINGS

All creeks and tributaries along the I-43 North-South corridor are conveyed under the highway via pipe or box culverts. The build alternatives would either replace or extend existing culverts to accommodate new construction. Culvert design would incorporate features to maintain low flow conditions.

Culverts and pipes have a greater effect on stream hydrology than bridges. The normal stream bottom transitions to a human-made bottom. In low-flow conditions, flat culvert bottoms tend to spread the stream flow very thinly, sometimes making it difficult for fish to swim through the culvert. Erosion at the down-stream exit of the culvert or pipe can result in a “perched” outfall, making stream passage difficult.

Ulao Creek runs parallel to I-43 on the west side, for about 2,000 feet between Lakefield Road and County C. The proposed design includes features such as steeper sideslopes to avoid impacts to the creek.

Fish passage in Ulao Creek is of special concern in the study area. Ozaukee County’s Fish Passage Program is in the process of improving connectivity of Ulao Creek, including maintaining passage under I-43. The culvert design criteria for the build alternative would include the county’s criteria to allow for aquatic organism passage.

GROUNDWATER AND WATER SUPPLY

According to TRB *Special Report 235 titled Highway Deicing: Comparing Salt and Calcium Magnesium Acetate* (1991), road salt can enter water supplies by percolation through soil and into groundwater. Upon entering fast-moving streams and larger rivers, salt water usually has little or no effect because concentrations are quickly diluted. In general, only wells near salt-treated highways are susceptible to salt infiltration. Wells most likely to be effected are those within 100 feet down gradient of the roadway in the direction of groundwater movement. Wells may be located on properties adjacent to the I-43 corridor in the villages of River Hills and Bayside and the town of Grafton.

NO-BUILD ALTERNATIVE

Under the No-Build Alternative, the current level of stormwater quality control (i.e. suspended solids removal) would continue. South of Good Hope Road, stormwater would continue to drain off the existing pavement and enter area waterways essentially untreated. North of Good Hope Road, stormwater runoff would continue to be treated by the existing grass roadside swales. The current volume and discharge rates of stormwater would drain off the study corridor and local roadway system into Fish Creek, Indian Creek, Ulao Creek and, subsequently, the Milwaukee River. Existing culverts would not be replaced and, therefore, any existing barriers to fish passage would remain. The No-Build Alternative would not change existing groundwater conditions or the drinking water supply.

BUILD ALTERNATIVES

No new water crossings would be required. The build alternatives require replacing and/or extending all 21 existing culverts carrying waterways under the study corridor. The build alternatives could require up to 5,000 feet of culvert replacement. Some existing culverts could be left in place and extended based on the culverts’ structural condition. WisDOT will work

with the WDNR during the design of new or extended culverts to facilitate a natural streambed condition and maintain or improve aquatic organism passage and with Ozaukee County with regards to Ulao Creek and any work already performed through the Fish Passage Program.

Peak flows and total suspended solids increase because of increased impervious surface. MMSD has expressed concern about an increase in the volume of stormwater runoff from the study corridor, noting that increased runoff could increase the likelihood of stream bank erosion and downstream flooding. Stormwater best management practices have been evaluated for effectiveness throughout the study limits in available open spaces or where the roadway alternatives leave the exiting alignment, creating available space. Stormwater peak flows and total suspended solids will be controlled to meet *Trans 401*.

The build alternatives are not expected to adversely affect the drinking water supply or localized groundwater at or near the surface. Because sizeable dewatering or depressurizing activities during construction are not anticipated, temporary impacts on the groundwater system are not expected or would be minimal in isolated locations such as creeks, stream beds and other low-lying areas. No noteworthy changes in chemical characteristics of the surface material are anticipated and no degradation of water quality entering the aquifer is expected. Stormwater directed to storm sewers and ditches would help avoid impacts to wells that may be present on nearby properties.

3.10.3. Mitigation of Adverse Impacts to Water Resources

WisDOT will implement stormwater-management techniques for the build alternatives. The build alternatives would increase impervious area and therefore increase the amount of stormwater runoff from the study area freeway and local roadway system. However, these alternatives also provide the opportunity to implement best management practices to treat the runoff and bring the study corridor and local roadway system in compliance with state stormwater-management regulations that limit the amount of pollution in runoff.

Stormwater treatment measures will be evaluated during the study's design phase. Best management practices can be utilized for stormwater management. Best management practices options are listed below and shown in **Exhibit 3-19**.

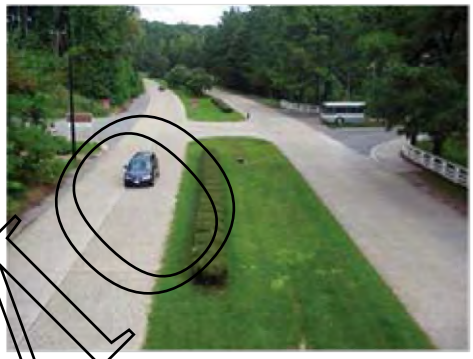
- **Retention basins (wet detention basins):** Retention basins have a permanent pool of water year round. The permanent pool allows pollutant particles in stormwater runoff to settle out over an extended period of time. Nutrient uptake also occurs through increased biological activity.
- **Dry detention basins:** A dry detention basin is typically designed to store runoff and discharge it slowly to reduce the peak discharge downstream. As normally designed, these basins typically have little effect on the volume of stormwater released to the receiving water. The peak flow reduction is often accomplished through use of a multistage outlet structure that allows increased discharge as water levels in the basin increase.
- **Infiltration devices:** Infiltration devices such as trenches or grass swales are used to slow the water flow so that more water is absorbed into the ground, and more pollutants are removed from runoff.
- **Grass ditches:** This best management practice generally helps reduce total suspended solids to meet the regulatory goal of *Trans 401*. The majority of the stormwater quality-control in Milwaukee and Ozaukee counties would be achieved with this best management practice.
- **Trapezoidal swale through infield:** This best management practice combines grass ditch treatment with peak flow reduction, and it is considered to provide the same level of total suspended solids control as grass ditches.

Exhibit 3-19: Examples of Stormwater Best Management Practices

Wet Detention Basin

Dry Detention Basin

Infiltration Devices

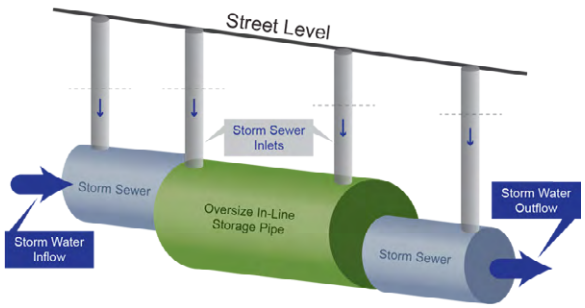


Grass Ditch

Trapezoidal Swale

Vegetated Rock Filter

Swale Block/Ditch Check



In-line Pipe Storage

- **Vegetated rock filters:** This best management practice may be used at outfalls to waterways or anywhere concentrated runoff leaves the right of way. It is similar in concept to a level spreader, which attempts to reintroduce sheet flow and also provides a small amount of peak flow and volume reduction.
- **Swale blocks/ditch checks:** These are small, earthen berms are constructed in the bottom of ditches at regular intervals to detain runoff from frequent storms. This best management practice provides reduced peak flow and possible infiltration benefits depending on soil.
- **In-line storage:** This method is not desirable from a water quality standpoint but would manage water quantity. Storm sewer pipes would be designed larger than normal to provide storage in the sewer during rain events, and then the water is gradually released after the rain event ends.

Due to space limitations, cost and the urban nature of the corridor from the southern study limits to Good Hope Road, best management practices will include street sweeping and in-line pipe storage. North of Good Hope Road to Mequon Road, ditches and detention basins may be used in addition to street sweeping and in-line pipe storage. The study corridor becomes fully rural north of Mequon Road, and roadside and median ditches along the I-43 corridor become viable best management practices to reduce total suspended solids. Preliminary estimates show that maximizing opportunities for best management practices using open space at the northern end of the corridor will reduce total suspended solids in excess of *Wisconsin Administrative Code Trans 401* requirements for the entire study corridor.

During preliminary engineering, WisDOT will continue coordination with the city of Glendale to determine if the existing storm sewer at Nicolet High School will have adequate capacity. If the storm sewer will not have adequate capacity, WisDOT will consider a range of options that could include adding capacity to the existing stormsewer or separating freeway runoff from non-freeway sources.

To comply with State Statute 87.30 and *Wisconsin Administrative Code NR 216*,[26] and to address concerns raised by MMSD, WisDOT and FHWA are investigating retention and detention basins to manage stormwater from the proposed improvements. The retention and detention basins would also improve water quality by allowing solid pollutants such as sand and grit to settle out of the water before it flows into storm sewers or streams. If these retention basins, detention basins or both are built, WisDOT would landscape the area around the basin. Wetlands within the study area limit space for retention and detention basin placement. Potential locations for retention basins, detention basin or both include:

- Milwaukee County: Stormwater detention basins may be located within the infields at the Brown Deer Road interchange.
- Ozaukee County: Stormwater detention basins may be placed within the right of way along the west side of I-43 at the Mequon Road interchange, both north and south of Mequon Road.

WisDOT will further assess the water quality and quantity management options during the design phase. WisDOT will coordinate with EPA and Milwaukee and Ozaukee counties to meet any new runoff volume standards when necessary. WisDOT will continue to coordinate with Ozaukee County to incorporate design criteria to accommodate fish passage at stream crossings to the greatest extent practicable.

[26] Wisconsin Administrative Code NR 216 *states that WisDOT bridge "construction may not cause any obstruction to flood flows."*

3.11. FLOODPLAINS AND HYDRAULICS

3.11.1. Affected Environment

Floodplains provide natural flood control by decreasing water velocities and temporarily storing flood water, thus also removing pollutants and excess nutrients, and providing erosion control. Floodplains also carry regional flood discharges, provide wildlife habitat, and supply corridors for wildlife movement. These functions vary among locations depending upon vegetative cover, waterway hydrology, and distance from the waterway.

The 100-year floodplain is the area predicted to flood during a 100-year storm. A 100-year storm is a storm that has a 1 percent chance of occurring in any given year. Areas within the 100-year floodplain may flood during smaller storms too. The Federal Emergency Management Agency uses the 100-year floodplain as a basic mapping tool for its federal flood insurance program, and many municipalities use it to regulate development.

I-43 crosses or lies adjacent to floodplains at several locations along the study corridor. The floodplain includes the floodway, flood fringe, shallow-depth flooding, flood storage and coastal floodplain areas.[27]

The floodway is considered the channel of a river or stream. The portions of the floodplain adjoining the channel are required to carry regional flood water.[28] The flood fringe is the portion of the floodplain outside of the floodway, which is covered by the flood water during the regional flood. The term flood fringe is generally associated with standing water rather than flowing water.[29] Shallow-depth flooding areas do not exceed a flooding depth of 1 foot or duration of six hours during a flooding event.[30] Flood storage consists of the floodplain areas that store flood water and reduce the regional flood discharge.[31] The nearest coastal floodplain is along the coast of Lake Michigan,[32] outside of the I-43 North-South Freeway Corridor study area.[33]

Table 3-24 shows where the 100-year floodplain crosses or is in close proximity to the study corridor. **Exhibit 3-17** in **Subsection 3.10.1** illustrates floodplain locations in the I-43 North-South Freeway Corridor study area. Residents and local officials have commented on flooding problems in the study corridor along Indian Creek.

[27] Wisconsin Administrative Code NR 116.03(16)
[28] Wisconsin Administrative Code NR 116.03(22)
[29] Wisconsin Administrative Code NR 116.03(14)
[30] Wisconsin Administrative Code NR 116.03(42)
[31] Wisconsin Administrative Code NR 116.03(21)
[32] Wisconsin Administrative Code NR 116.03(4)
[33] *WDNR, 1986*

Table 3-24: 100-Year Floodplain Locations and Crossings

County	Location	Source
Milwaukee	Immediately west of I-43 from Silver Spring Drive to Montclaire Avenue	Milwaukee River
Milwaukee	Between Bradley and Dean Roads	Indian Creek
Milwaukee	Immediately east of Port Washington Road and I-43, about 0.3 miles south of County Line Road	Fish Creek
Ozaukee	Immediately west of I-43 about 0.7 miles north of Mequon Road	Unnamed stream
Ozaukee	Immediately west of I-43 about 80 feet north of Highland Road	Unnamed tributary to Ulao Creek
Ozaukee	Crosses I-43 southwesterly, just south of County C/ Pioneer Road to near Bonniwell Road	Unnamed tributary to Ulao Creek
Ozaukee	Crosses the freeway near Lakefield Road and runs in north-south direction along freeway for approximately 1.5 miles to County C	Ulao Creek
Ozaukee	Immediately east of I-43/WIS 60 interchange	Unnamed stream

Source: National Flood Insurance Program Flood Insurance Rate Map

3.11.2. Impacts to Floodplains

Executive Order 1198 on Floodplain Management, and Code of Federal Regulations (CFR) 23 CFR § 650A – Bridges, Structures, and Hydraulics, direct federal agencies to take action to reduce the risk of flood loss; minimize the impacts of floods on human safety, health and welfare; and to restore and preserve the natural and beneficial values served by floodplains. The executive order also requires agencies to elevate structures above the flood base wherever possible. The purpose of the order is to avoid the long- and short-term adverse impacts associated with the occupancy and modification of floodplain and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

Through the WisDOT-WDNR cooperative agreement, WisDOT is required to determine the impact of new or modified bridges and box culverts on the 100-year flood elevation.[34] A hydraulic analysis of both existing and proposed conditions is conducted to determine if the bridge or culvert causes a change in the 100-year flood elevation. Property owners, local zoning authorities, and the Wisconsin DNR are notified if the base flood elevation increases by more than 0.01 foot. It should be noted that minor lengthening of most box culverts often do not require a hydraulic analysis unless there are known deficiencies in hydraulic capacity.

WisDOT is required to assist affected municipalities in updating floodplain information in its zoning ordinance for submittal to the Federal Emergency Management Agency (FEMA), if requested. WisDOT provides the results of the analysis, the hydraulic models developed, mapping, and other exhibits developed for analysis.

[34] *WDNR and WisDOT, 2002*

NO-BUILD ALTERNATIVE

No floodplains would be affected under the No-Build Alternative.

BUILD ALTERNATIVES

The build alternatives would result in roughly 4.92 acres of fill being placed in the 100-year floodplain, including both floodway and flood fringe impacts. The I-43 mainline crosses floodplain associated with Ulao Creek and its tributaries in the vicinity of Bonniwell Road and the County C interchange. Filling impacts are primarily limited to areas where freeway mainline must be expanded to the outside and for culvert replacement or extension. The greater share of impact is related to the Modernization – 6 Lanes alternative for the I-43 mainline in Ozaukee County. A new Highland Road interchange and the County C interchange would impact a small area of floodplains associated with Ulao Creek and its tributaries. **Table 3-25** summarizes alternatives where floodplain impacts would occur. See also **Appendix A** for location of 100-year floodplains in the study corridor.

Table 3-25: Alternatives Comparison for 100-Year Floodplain Impacts

Alternative	Floodplain Impact (acres)	Comments
I-43 Mainline: Modernization – 6 Lanes		
Ozaukee County	4.22	Impacts to Ulao Creek and its tributaries, and tributaries to the Milwaukee River
Highland Road interchange		
Tight Diamond	0.14	Impacts to Ulao Creek tributary
County C interchange		
Diamond	0.56	Impacts to Ulao Creek tributary
Total range of impact of build alternatives	*4.92*	

3.11.3. Mitigation of Adverse Impacts to Floodplains

Consistent with 23 CFR § 650A, WisDOT will minimize risks associated with unavoidable floodplain impacts to the greatest extent practicable. The build alternatives include measures to minimize impacts by widening the I-43 mainline to the inside and steepening sideslopes where practicable. All structures would have adequate capacity for 100-year flood flow without public or emergency vehicle interruption from damage to the roadway or structures. The structures would not increase the base flood elevations by more than 0.01 foot. None of the floodplain crossings would cause a substantial potential for interruption or termination of a transportation facility needed for emergency vehicles or the community's only evacuation route. Crossings would be consistent with local floodplain management goals and objectives, which include maintaining the natural and beneficial floodplain values and avoiding support of incompatible floodplain development. Additionally, floodplain crossings would be designed to avoid impacts to existing flood profiles on adjacent landowners' properties. The build alternatives do not support development in floodplains, as communities surrounding the I-43 North-South Freeway Corridor study area have floodplain management regulations in place to prevent inappropriate development.

3.12. WETLANDS

The U.S. Army Corps of Engineers' (USACE) *Wetland Delineation Manual* (1987) defines wetlands as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions." According to the manual, an area must meet three criteria to be considered a jurisdictional wetland: a prevalence of hydrophytic vegetation; the presence of hydric soils; and wetland hydrology.

> ***Hydrophytic vegetation*** *is plant life that thrives in wet conditions.* ***Hydric soils*** *are soils formed under wet conditions such as flooding or ponding for a time period long enough during the growing season to create anaerobic conditions, or reduced oxygen, in the soil.* ***Wetland hydrology*** *is a term that describes the various conditions that indicate wet or saturated soils during the growing season. Such conditions can include drift lines, water marks, soft or waterlogged ground or thin layers of sediment deposits in the area.*

Wetlands are important because they:

- Provide vital plant and animal habitats.
- Improve water quality by cleansing water of pollutants.
- Control flooding.
- Provide recreation areas.

Wetlands provide function and value depending on their position in the landscape and proximity to other plant communities, wildlife and associated habitats, and the built environment. Wetland functions include floral diversity, wildlife habitat, fishery habitat, flood/storm water attenuation, water quality protection, shoreline protection and groundwater, as well as aesthetics, recreation, and education. The preliminary wetland investigation indicated a wide distribution of non-native species and the prevalence of many of those species along plant community edges or disturbed areas.

Although the functions and values of wetlands within the I-43 North-South Freeway Corridor study area were not formally assessed on an individual basis as part of the preliminary investigation, their positions in the landscape and proximity to the existing roadway corridor suggests that they improve water quality by removing sediment and nutrients, and providing flood attenuation by storing water and slowing runoff velocity.

3.12.1. Affected Environment

WisDOT made a preliminary determination of wetland boundaries in the study corridor in May 2012. Wetland determinations and boundaries were estimated based on vegetation and obvious wetland hydrology field indicators. Once identified, the wetlands were then grouped by wetland classification. Preliminary investigations of the study corridor identified a total 158 wetlands. Wetland locations are shown on maps in **Appendix A**. **Appendix D** includes a table describing wetlands mapped in the study corridor. If a build alternative is selected at the conclusion of the EIS process, official wetland delineations would be conducted in a subsequent engineering phase in accordance with the USACE 1987 *Wetland Delineation Manual* and the *2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual; Northcentral and Northeast Region (Version 2.0)*. **Appendix D** also provides a preliminary indication if the USACE has jurisdiction over the listed wetlands.

Milwaukee County contains 51 of the identified wetlands, none of which are located within an environmental corridor or an isolated natural area. Ozaukee County contains 107 identified wetlands: 12 are within a primary environmental corridor; seven are within secondary environmental corridors; and three are within an isolated natural resource area (see **Subsection 3.14.1** for descriptions of environmental corridors and natural areas). In both counties, the majority of the wetlands are associated with roadway ditches. Of the 158 wetlands, 10 are considered high quality or possibly high quality, due to a relative lack of disturbance. Most of these high-quality wetlands are located within primary and secondary environmental corridors.

EPA, in cooperation with USACE, has implemented an advanced identification of wetland disposal areas (ADID) program to identify wetlands and other waters that are inappropriate for the disposal of fill or dredged material. In southeastern Wisconsin, SEWRPC and the WDNR are consulted during advanced identification of such wetlands to support the objectives of the areawide water-quality management plan, which seeks to preserve high-value aquatic areas by redirecting development outside primary environmental corridors. Discharging dredged or fill material into wetlands and other waters located in primary environmental corridors is generally considered not to conform with the Clean Water Act's Section 404(B)(1) guidelines.

Six ADID wetlands are in the study corridor: Three are associated with the primary environmental corridor found in Mequon; one is within an isolated natural resource area at the MMSD Greenseams property in the northeast quadrant of the I-43/Mequon Road interchange; and the other two are outside of designated environmental corridors or natural areas. Maps in **Appendix A** show locations of ADID wetlands.

WETLAND CLASSIFICATIONS

WisDOT's *Wetland Mitigation Banking Technical Guideline* (WisDOT, 2002) was used to classify wetlands in the I-43 North-South Freeway Corridor study area. Classifications of wetlands identified within the study corridor include wet meadow, shallow marsh, riparian wetland-emergent, riparian wetland-forested, shrub-scrub and wooded swamp. Many of the wetlands identified include more than one wetland classification, with multiple wetland types interspersed within a complex of wetlands. A description of each classification follows.

WET MEADOW (M)

Wet meadows commonly occur in poorly drained areas such as shallow lake basins and the land between shallow marshes and upland areas. These wetlands are often in areas where farming is prevalent, leading historically to their draining and filling for agricultural uses. Wet meadows are typically drier than other Wisconsin wetland types, except during periods of seasonal high water. For most of the year, they do not contain standing water, though the high water table allows the soil to remain saturated.

SHALLOW MARSH (SM)

Shallow marshes form in saturated or inundated soils and are characterized by seasonal standing water. Soils in shallow marshes are usually saturated during the growing season and are often inundated with 6 inches or more of water. Shallow marshes in Wisconsin are typically found in shallow lake basins or sloughs; on the border of deep marshes on the landward side; in seep areas near irrigated lands; and in areas where water collects due to drainage off roadways, ditches and other depressional areas.

RIPARIAN WETLAND – EMERGENT OR FORESTED (RPE/RPF)

Riparian land refers to terrain adjacent to rivers and streams that is subject to periodic or occasional flooding. Riparian wetlands are typically narrow, wet areas that are adjacent to streams. They are periodically saturated or inundated because both surface and subsurface water flows toward them. The plant species that grow in riparian areas are adapted to tolerate wide fluctuations in hydrology.

Emergent riparian wetlands typically consist of riparian wet and sedge meadows, bars and mud flats. Vegetation within these areas is similar to that found in similar wetland communities not associated with stream or riverine systems. Riparian vegetation plays a role in many physical processes within stream and riverine systems. Shading provided by riparian vegetation helps to moderate water temperatures, keeping waters cool in the summer and providing an insulating effect in the winter. Emergent vegetation in riparian systems acts as a filter for sediment, fertilizers, pesticides, herbicides and road-related runoff such as petrochemicals generated on adjacent lands. Riparian vegetation also promotes bank stability and contributes organic matter and large woody debris to some stream systems, which is an important component of in-stream habitat.

SHRUB-SCRUB WETLAND (SS)

Scrub-Shrub wetlands, also known as shrub swamps, are similar to forest swamps but with vegetation less than 20 feet tall. Shrub swamps are found along slow moving streams and in floodplains. Forested and shrub swamps are often found adjacent to one another, reflecting the change in topography, hydrology, and past disturbances including timber removal. Soils in shrub swamps are often saturated throughout much of the year and are sometimes inundated by as much as a few feet of water.

HARDWOOD (WOODED) SWAMP (WS)

Forested or wooded swamp wetlands are often inundated with floodwater from nearby rivers and streams. Sometimes, they are covered by several feet of very slowly moving or standing water. In very dry years, they may represent the only shallow water for miles and their presence is critical to the survival of wetland dependent species. Some of the primary functions of wooded swamps include stormwater and floodwater retention, as well as wildlife habitat for a variety of upland and wetland-dependent species.

3.12.2. Impacts to Wetlands

NO-BUILD ALTERNATIVE

No wetlands would be affected under the No-Build Alternative.

BUILD ALTERNATIVES

The build alternatives could impact a maximum of 27.46 acres of wetlands as a result of filling for the I-43 North-South Freeway Corridor Study mainline and interchange alternatives. **Table 3-26** summarizes a comparison of wetland impacts by location and mainline and interchange build alternatives. **Appendix D** provides a summary table summarizing each wetland in the I-43 North-South Freeway Corridor study area and their respective anticipated impacts. Of the total wetland acres impacted, about 2.51 acres are ADID wetlands, largely occurring along the I-43 freeway mainline.

Table 3-26: Alternatives Comparison for Wetland Impacts

Impacted Wetland Type	I-43 Mainline South Segment Modernization – 6 Lanes	Good Hope Rd Interchange	Brown Deer Rd Interchange		County Line Rd Interchange			Mequon Rd Interchange	Highland Rd Interchange		County C Interchange	WIS 60 Interchange	I-43 Mainline North Segment Modernization – 6 Lanes	Minimum Wetland Impact (acres)	Maximum Wetland Impact (acres)
	Shifted East (acres)	Tight Diamond (acres)	Diamond (acres)	DDI[2] (acres)	Split Diamond Hybrid[3] (acres)	No Access (acres)	Partial Diamond (acres)	Tight Diamond (acres)	Tight Diamond (acres)	No Access (acres)	Diamond (acres)	Reconstruct Ramps (acres)	Green Tree Rd to WIS 60 (acres)		
Wet Meadow (M)		0.03	0.53	0.51	1.01	1.01	1.01	0.90		0.01	0.71	0.26	3.05 (includes 0.35 acre ADID wetlands)	6.47	6.50
Wet Meadow/Riparian wetland (M/RPF)													0.09	0.09	0.09
Wet Meadow/Shallow Marsh (M/SM)									1.11	0.33	1.56	0.54	2.54	4.97	5.75
Wet Meadow/Shallow Marsh/Hardwood Swamp (M/SM/WS)									1.24	0.60			1.69 (includes 1.16 acres ADID wetlands)	2.29	2.93
Wet Meadow/Scrub-Shrub (M/SS)									2.55	0.76	1.59		0.24 (includes 0.19 acre ADID wetlands)	2.59	4.38
Wet Meadow/Hardwood Swamp (M/WS)											0.11		1.03	1.14	1.14
Wet Meadow/Floodplain Forest (RPE/RPF)											0.05			0.05	0.05
Shallow Marsh (SM)			0.22	0.21							0.40 (includes 0.01 acre ADID wetlands)	0.48	0.64	1.73	1.74
Shallow Marsh/ Hardwood Swamp (SM/ WS)											0.54		1.46 (includes 0.80 acre ADID wetlands)	2.00	2.00
Scrub-Shrub (SS)													0.01	0.01	0.01
Scrub-Shrub/Hardwood Swamp (SS/WS)	0.54	0.01												0.55	0.55
Shallow Marsh/ Scrub-Shrub (SM/SS)											0.23		0.11	0.34	0.34
Wooded Swamp (WS)	0.14	0.07			0.02		0.02	0.01	0.53	0.40	0.67		0.57	1.86	2.01
Total	*0.68*	*0.11*	*0.75*	*0.72*	*1.03*	*1.01*	*1.03*	*0.91*	*5.43*	*2.10*	*5.86*	*1.28*	*11.43*	*24.09*	*27.49*

1. Includes 0.61 acres of wetland impacts from Union Pacific RR relocation.
2. DDI = Diverging Diamond interchange.
3. Impacts are the same under both subalternatives (grade separation/without grade separation).

The I-43 Mainline North Segment Modernization – 6 Lanes alternative has the greatest overall impact to wetlands, potentially filling just over 11 acres of wetlands, largely in Ozaukee County where there is more open, undeveloped land surrounding the study corridor. Impacted wetlands consist of wet meadow wetlands and wetland complexes consisting of wet meadow, shallow marsh and hardwood swamp. Both a new interchange at Highland Road and a reconstructed diamond interchange at County C each would impact the largest acreage of wetlands among the interchanges in the study corridor.

3.12.3. Mitigation of Adverse Impacts to Wetlands

Presidential Executive Order 11990, Protection of Wetlands, requires federal agencies to avoid, to the extent practicable, long- and short-term adverse impacts associated with the destruction or modification of wetlands. More specifically, the order directs federal agencies to avoid new construction in wetlands unless there is no practicable alternative. The order states that where wetlands cannot be avoided, the proposed action must include all practicable measures to minimize harm to wetlands. FHWA regulations 23 CFR 777 also provide policy and procedures for mitigating adverse environmental impacts to wetlands and natural habitat.

The Clean Water Act's Section 404(b)1 Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR § 230) are administered by EPA and USACE. The guidelines state that dredged or fill material should not be discharged into aquatic ecosystems (including wetlands), unless it can be demonstrated that there are no practicable alternatives to such discharge; that such discharge will not have unacceptable adverse impacts; and that all practicable measures to mitigate adverse effects are undertaken.

WisDOT has initiated – and will continue – coordination with resource agencies including the WDNR, USACE and EPA to evaluate avoidance measures, as well as minimization and mitigation measures for unavoidable impacts. The USACE does not concur with the preferred Highland Road tight diamond interchange alternative since the No Access alternative is the least environmentally damaging alternative to wetlands. The No Access alternative creates substantially greater traffic operations and business access impacts at the Port Washington Road/Mequon Road intersection, which requires added infrastructure to accommodate traffic volumes. The alternative does not meet the purpose and need of being consistent with SEWRPC's 2035 regional transportation plan. But, if Mequon determines not to participate in the local cost-share for interchange construction, WisDOT would move forward with the No Access alternative as the preferred alternative. See **Subsection 5.2** for a summary of coordination activities.

MEASURES TO MINIMIZE HARM

In accordance with state and federal agency policies and regulations for wetland preservation, including the Section 404(b)(1) guidelines, the following sections describe wetland mitigation strategies for the I-43 North-South Freeway Corridor Study alternatives.

AVOID AND MINIMIZE WETLAND IMPACTS

Because wetlands are scattered along the study corridor, including in the ditches that drain the freeway, it would not be possible to avoid wetland impacts completely during freeway reconstruction. Of the 158 wetlands identified within the study corridor, the build alternatives would avoid impacts to approximately 71 wetlands. By widening to the inside of the freeway mainline, the Modernization – 6 Lanes alternative avoids about 2.7 acres of wetlands. Additional minimization

measures such as steepening slopes avoids an additional 3.7 acres of ADID wetlands.

WisDOT will investigate additional measures to avoid and minimize wetland impacts, such as keeping roadway side slopes as steep as practicable; disposing of excavated material on new roadway side slopes or in upland areas; using equalizer pipes to maintain wetland hydrology; minimizing sedimentation and siltation into adjacent wetlands by using strict erosion-control measures; and using detention ponds, where feasible, to reduce pollutant loading and protect streams from sedimentation.

WETLAND COMPENSATION

If a build alternative is implemented, a wetland mitigation plan would be developed during the future project's design phase, in consultation with state and federal agencies. Where there is no practicable alternative to filling wetlands, state and federal regulations require compensatory mitigation. Compensation for unavoidable wetland loss will be done in accordance with the July 2012 WisDOT-WDNR memorandum of understanding titled *Compensatory Mitigation for Unavoidable Wetland Losses Resulting from State Transportation Activities*.

The memorandum of understanding on compensatory mitigation states that mitigation banking is the preferred compensation option, though WisDOT and WDNR agree that other practicable and ecologically valuable project specific opportunities may be pursued on a case-by-case basis. Consistent with federal rules and the *Wetland Mitigation Banking Technical Guideline*, the mitigation goal is to compensate wetland loss as near as practicable to the area where the loss occurs, recognizing important factors such as land acquisition availability, resource sensitivity, project schedules, and the linear nature and length of WisDOT projects that may cross multiple watersheds.

The mitigation banking guidelines also recommend compensation ratios for wetland debits from an established wetland mitigation bank site. The wetland compensation ratios reflect the types of impacted wetlands versus types available at the established mitigation site and whether the mitigation site is in the same watershed as the impacted wetlands.

Compensation will also be done in accordance with WisDOT's *Wetland Mitigation Banking Technical Guideline* developed in 1993 and updated in 1997 and 2002, in cooperation with the WDNR, USACE, EPA, FHWA and U.S. Fish & Wildlife Service (USFWS), and in accordance with the regulations for compensatory wetland mitigation issued jointly by USACE and EPA in 2008 (33 CFR § 325 and 33 CFR § 332; and 40 CFR § 230 (April 10, 2008).

3.13. THREATENED AND ENDANGERED SPECIES

3.13.1. Affected Environment

WisDOT contacted the WDNR Bureau of Endangered Resources and the USFWS to identify threatened and endangered species that may be present in the I-43 North-South Freeway Corridor study area. USFWS indicated that no federally listed threatened or endangered species are known to occur in the study area (**Appendix C**). Other protected species and critical habitat are discussed in this section.

STATE-LISTED SPECIES

The WDNR indicates the following threatened and endangered species may be present in the

study corridor (see WDNR letters in **Appendix C** dated May 8, 2012, and Nov. 6, 2012):

- Endangered plants: none indicated.
- Threatened plants
  - Forked aster (Aster furcatus)
  - Hairy beardtongue (Penstemon hirsutus)
- Endangered animals: striped shiner (Luxilus chrysocephalus).
- Threatened animals
  - Redfin shiner (Lythrurus umbratilis)
  - Greater redhorse (Moxostoma valenciennesi)

WisDOT also conducted a wetland plant species field review in September 2012 and found one threatened plant species in the study corridor – the seaside crowfoot (Ranunculus cymbalaria) – that was not indicated by the WDNR. Although the forked aster and hairy beardtongue were not observed in the field, suitable habitat does occur along the study corridor.

OTHER PROTECTED SPECIES

Barn swallows commonly nest under highway bridges. Under the U.S. Migratory Bird Treaty Act, destruction of swallows and other migratory birds or their nests is unlawful unless a permit has been obtained from the USFWS. It is, however, permissible to net or knock down nests without eggs. The WDNR also requires minimization measures to protect bats that may use bridges for summer roosting.

CRITICAL HABITAT AREAS

Critical species habitat areas are tracts of land or water that support state- or federally listed rare, threatened and/or endangered plant or animal species. No federally designated habitat areas are present in the I-43 North-South Freeway Corridor study area.

Various state-designated critical aquatic habitat areas are located along the study corridor in Milwaukee and Ozaukee counties. The Milwaukee River is a major aquatic habitat and supports multiple fish species.

The Milwaukee River runs generally from north to south west of I-43, and it is considered a critical aquatic habitat area for various aquatic species. Upstream from Port Washington Road to Brown Deer Road, critical fish species are present in the river, including the endangered striped shiner and threatened redfin shiner and greater redhorse. This section of the Milwaukee River runs just along the west side of I-43 between Silver Spring Drive and Montclaire Avenue.

Between Brown Deer and Mequon roads, the Milwaukee River also provides a rare species habitat, particularly for the threatened greater redhorse.

Upstream from Mequon Road to County C, the Milwaukee River supports diverse fish and mussel populations. This reach of the Milwaukee River bends east and lies as close as 0.6 miles west of I-43 between Highland Road and Glen Oaks Lane.

From County C to WIS 57, the Milwaukee River is considered an aquatic area of countywide or regional significance and supports critical fish species such as the threatened greater redhorse and redfin shiner, along with the endangered striped shiner.

SEWRPC also identifies an area near the I-43 North-South Freeway Corridor study area as a critical species habitat because it supports a population of the threatened forked aster plant.

3.13.2. Impacts to Threatened and Endangered Species

NO-BUILD ALTERNATIVE

The No-Build alternative would not affect state-listed or federally listed threatened and endangered species. No critical species habitat areas would be impacted under the No-Build Alternative.

BUILD ALTERNATIVES

The build alternatives could impact state-listed threatened and endangered species.

Potential habitat for the seaside crowfoot may be impacted due to widening and reconstruction activities in wetlands and streams throughout the corridor. Critical species habitat for the forked aster may also be impacted by construction activities. All other critical species habitat areas would be avoided.

Work in any of the streams in the study corridor could impact the striped shiner, redfin shiner and greater redhorse. Bridge replacement could also adversely affect nesting migratory birds and roosting bats.

3.13.3. Mitigation of Adverse Impacts to Threatened and Endangered Species

Impacts to threatened and endangered species can be avoided through mitigation measures.

PLANTS

To avoid and minimize impacts to the forked aster and the seaside crowfoot, WisDOT would physically relocate any plants found. If needed, field surveys would be conducted during design if a build alternative is selected at the conclusion of the environmental study phase. The need for and extent of field surveys would be determined in consultation with the WDNR and other interested agencies. The timing of the field survey would coincide with the optimal identification periods established by the WDNR. If a particular plant species is found to be within the study's area of potential effect, further measures to avoid or minimize impacts would be evaluated. Where avoidance is not possible, WisDOT would coordinate with the WDNR on possible mitigation measures such as transplanting affected plants outside the area of potential effect.

FISH

To avoid and minimize impacts to listed fish species, WisDOT would use erosion-control best management practices, incorporate fish passage design criteria (**Subsection 3.10.3**) and follow the restriction dates listed below for work in streams to protect endemic fish spawning activities:

- Fish Creek: Implement cold water and warm water restriction of work (no in-stream work between Sept. 30 and June 15).
- All other stream crossings: Implement warm water restrictions (no in-stream work between March 15 and June 15).
- As long as physical work is done within the construction window (such as installing cofferdams), then work could continue in protected area (such as working within the cofferdam).

BIRDS

In the winter/early spring prior to construction, WisDOT would inspect bridges for the presence of nesting birds, remove empty nests and install netting on the structure before May 1.

BATS

Minimization measures are required to protect bats that may use bridges for summer roosting. WisDOT would use the following WDNR protocol:

- Demolitions occurring from Aug. 16 to May 31 do not have any restrictions.
- Demolitions between June 1 and August 15 have restrictions. Unless bats are excluded before April to prevent them from using the bridge, demolition may not occur from June 1 to Aug. 15.

3.14. OTHER NATURAL RESOURCES

3.14.1. Affected Environment

Many of the natural resources in the I-43 North-South Freeway Study corridor occur within environmental corridors and natural areas. In addition to wetland and stream resources, the study corridor also contains upland habitat and associated wildlife. These resources are discussed in below.

ENVIRONMENTAL CORRIDORS

As defined by SEWRPC, environmental corridors are areas in the landscape containing especially high-value natural, scenic, historic, scientific, and recreational features. In southeastern Wisconsin, they generally lie along major stream valleys, around major lakes, and in the Kettle Moraine area. These features occur in an essentially linear pattern of relatively narrow, elongated areas. **Exhibit 3-20** shows the locations of environmental corridors in the study corridor.

Primary environmental corridors include a variety of important natural resource and resource-related elements and are at least 400 acres in size, 2 miles long, and 200 feet wide. The primary environmental corridors include some of the best remaining woodlands, wetlands, and wildlife habitat areas in the study area. These corridors have great environmental and recreational value. Their preservation in an essentially open, natural state will serve to maintain a high level of environmental quality in some segments of the study corridor.

Secondary environmental corridors contain substantial, but smaller, concentrations of natural resources and generally connect to primary environmental corridors. Secondary environmental corridors are at least 100 acres in size and 1 mile long.

Smaller concentrations of natural resources that are separated physically from the environmental corridors by intensive urban or agricultural land uses are also important. These areas, which are at least 5 acres large and 200 feet wide, are defined as isolated natural resource areas (INRAs) (**Exhibit 3-20**).

Primary environmental corridors, secondary environmental corridors, and isolated natural resource areas are found in both Milwaukee and Ozaukee counties. The following designated environmental corridors and natural areas lie adjacent to or cross the I-43 corridor study area.

PRIMARY ENVIRONMENTAL CORRIDORS

- Along the Milwaukee River in the city of Glendale, adjacent to the west side of I-43 from Silver Spring Ave, north for about half a mile, to just south of Montclaire Avenue.
- Along Fish Creek in village of Bayside, about 500 feet east of I-43 and 400 feet east of Port Washington Road, just south of County Line Road.
- Wetlands and woodlands in the city of Mequon, east and west of I-43, extending for about a mile south of the County C interchange to just south of Bonniwell Road.

SECONDARY ENVIRONMENTAL CORRIDORS

- Along Ulao Creek in the town of Grafton, crossing I-43 between County C and Lakefield Road.
- In the village of Grafton, wetlands in the northeast quadrant of the WIS 60 interchange.

ISOLATED NATURAL RESOURCE AREAS

- Woodlands in the village of River Hills, west of I-43, between Dean and Bradley roads on residential properties.
- Wetlands in the city of Mequon, north of Mequon Road; wetlands are predominately east of I-43 but also extend west across I-43 south of Glen Oaks Lane.[35]
- Woodlands in the city of Mequon, west of I-43 and south of the senior living center at Highland Road.
- Woodlands in the town of Grafton, west of I-43 and south of County C.
- Woodlands in the town of Grafton, west of I-43, east of Port Washington Road, south of Falls Road.
- Woodlands in the village of Grafton, about 350 feet west of I-43, east of Port Washington Road, and south of WIS 60.

Milwaukee and Ozaukee counties are designated as a coastal area by Wisconsin's Coastal Zone Management Program (WCMP); however, no special coastal areas are located in the study area. Based on WisDOT's review, the study appears to be consistent with the WCMP's goals.

NATURAL AREAS

Natural areas include tracts of land or water so minimally modified by human activities that they are believed to represent examples of pre-settlement landscape. SEWRPC provides information about known natural areas in southeastern Wisconsin in *Planning Report No. 42: A Regional Natural Areas and Critical Species Habitat Protection and Management Plan for Southeastern Wisconsin.* Natural areas are categorized as having significance of statewide or greater (NA-1), countywide or regional (NA-2), local (NA-3), or critical species habitats [36]. Natural areas tend to be located within a primary environmental corridor, a secondary environmental corridor or an isolated natural resource area. SEWRPC surveyed the following plant communities in order to assess each natural area: prairies, oak openings, lake dunes, upland woods, lowland hardwoods, tamarack relicts, bogs, fens, and miscellaneous wetlands such as shrub-carrs, sedge meadows, and deep and shallow marshes.

[35] *SEWRPC notes that this is a planned primary environmental corridor.*

[36] *SEWRPC, 1997*

MILWAUKEE COUNTY

According to SEWRPC,[37] two natural areas in Milwaukee County are in proximity to the I-43 study corridor (**Exhibit 3-20**):

- Kletzsch Park Woods in the city of Glendale is a natural area of local significance located in a primary environmental corridor. Owned and maintained by Milwaukee County, this site is a located along the west bank of the Milwaukee River and features remnant, disturbed mesic and dry-mesic forest, as well as diverse flora.
- The Schlitz Audubon Center Woods and Beach is also a natural area of local significance within a primary environmental corridor along the shores of Lake Michigan. Located in the village of Bayside about a mile east of I-43 and privately owned by the National Audubon Society, the 54-acre site includes sand beaches, mesic woods and a steep ravine.

Given their distances from I-43, it is unlikely that any future project in the I-43 North-South Freeway Corridor study area would affect these natural areas.

OZAUKEE COUNTY

SEWRPC[38] identifies the following two natural areas near or along the I-43 North-South Freeway Corridor study area in Ozaukee County:

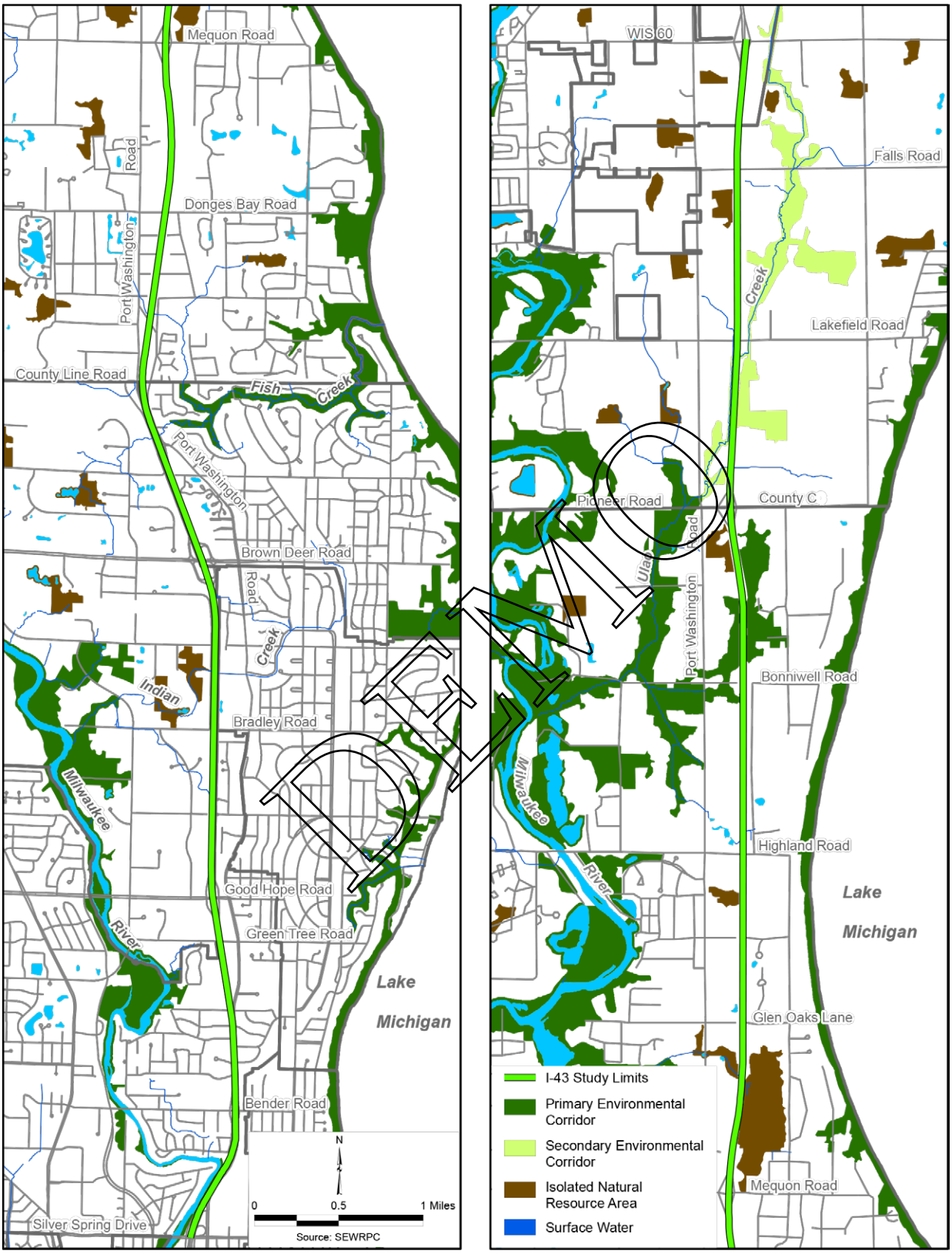
- Fairy Chasm is a natural area of statewide or greater significance. Located in a primary environmental corridor, it runs along Fish Creek to Lake Michigan (**Exhibit 3-20**). Fairy Chasm is owned by the Ozaukee Washington Land Trust and is a designated state natural area. Fish Creek flows through a 100-foot-deep chasm in this natural area. Unique conditions have created a microclimate for species typically found further north. It is not open to the public. The site extends south into Milwaukee County.
- The Mequon Wetland, along the east side of I-43 between Mequon Road and West Glen Oaks Lane, is a natural area of local significance located in an isolated natural resource area (**Exhibit 3-20**). MMSD owns the land as part of its Greenseams flood management program,[39] and SEWRPC recommends that it be preserved without additional protective ownership.

[37] *Planning Report No. 42: A Regional Natural Areas and Critical Species Habitat Protection and Management Plan for Southeastern Wisconsin*

[38] *Planning Report No. 133. A Park and Open Space Plan for Ozaukee County (Third Edition)*

[39] *MMSD*

Exhibit 3-20: Locations of Environmental Corridors and Natural Resource Areas



UPLAND HABITAT AND WILDLIFE

Primary and secondary environmental corridors and isolated natural resource areas contain some of the best remaining wildlife habitat in southeastern Wisconsin and include upland and wetland areas. This section refers to only nonagricultural upland cover types. Wetland cover types are discussed in **Subsection 3.12**.

UPLAND HABITAT

In the I-43 North-South Freeway Corridor study area, upland habitat occurs in environmental corridors, isolated natural resource areas, and other tracts of land that have forested or grassland cover. Although much of the land adjacent to the study corridor is developed or used for agriculture, upland habitat areas are scattered throughout the study corridor, particularly in residential areas, parks and open space, and adjacent to wetlands or waterways.

Uplands in southeastern Wisconsin can be categorized as woodlands, shrub communities or grasslands.[40] Upland plant communities in the study area provide habitat for a variety of common amphibians, reptiles, birds and mammals. Upland habitat areas, particularly those in environmental corridors, are part of an important wildlife corridor system.

WOODLANDS

Woodlands – or upland woods – provide vital wildlife habitat and outdoor recreation opportunities. Woodlands' indirectly valuable functions include reducing soil erosion and stream sedimentation, reducing stormwater runoff, and promoting groundwater recharge, which helps maintain water tables and stream and lake levels. There are limited woodlands located adjacent to the study corridor. During wetland field reviews, WisDOT identified scattered high-quality remnant woodlands throughout the corridor. Woodlands, as identified by SEWRPC's 2035 regional land use plan are primarily located in the village of River Hills along I-43; along Fish Creek in the village of Bayside near the Mequon Road interchange; and along Ulao Creek in the town of Grafton. Upland woods plant communities are also located in the aforementioned Fairy Chasm State Natural Area and the Donges Bay Gorge, Kletzsch Park Woods and Schlitz Audubon Center Woods natural areas.

No land in the I-43 study area is enrolled in Wisconsin's Managed Forest Law program,[41] which provides tax incentives to landowners who adhere to sustainable forestry practices.[42]

WILDLIFE

Wetlands and uplands in the study corridor provide habitat for a variety of mammals, songbirds, waterfowl, raptors, amphibians, insects and reptiles. Common mammals found in upland habitats include white-tailed deer, opossums, shrews, gray and red squirrels, red foxes, raccoons, striped skunks, cottontail rabbits, coyotes, woodchucks, mice, gophers, chipmunks, voles and weasels. Common bird species include American goldfinches, wild turkeys, sparrows, owls, wrens, thrushes, warblers, hawks, woodpeckers, and vireos. Common reptiles include brown snakes, garter snakes, Eastern milk snakes, fox snakes and turtles.

SEWRPC identifies wildlife habitat areas in the Milwaukee River Watershed in *Planning Report No. 13: A Comprehensive Plan for the Milwaukee River Watershed*.[43] The wildlife areas are categorized into those of high, medium and low values. In the I-43 North-South Freeway

[40] *SEWRPC, 1995*

[41] *Sections 77.80 to 77.91, Wisconsin Statutes;* Wisconsin Administrative Code NR 46

[42] *WDNR, 2013*

[43] *SEWRPC, 1970*

Corridor study area, wildlife habitat areas of all three classes are largely found in Ozaukee County within a primary or secondary environmental corridor or an isolated natural resource area.

3.14.2. Impacts to Environmental Corridors and Isolated Natural Areas

NO-BUILD ALTERNATIVE

Under the No-Build Alternative, no environmental corridors or designated natural areas would be affected.

BUILD ALTERNATIVES

ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS

The build alternatives would impact primary and secondary environmental corridors and isolated natural resource areas at limited areas in Ozaukee County (**Table 3-27**). Impacts to primary and secondary environmental corridors would be located immediately next to the I-43 mainline in and at the County C interchange. Isolated natural resource areas would be impacted along the I-43 mainline and at the Mequon Road, Highland Road and County C interchanges.

NATURAL AREAS

The build alternatives would avoid designated natural areas.

Table 3-27: Alternatives Comparison for Impacts to Environmental Corridors

Alternative	Primary Corridor Impacts (acres)	Secondary Corridor Impacts (acres)	Isolated Natural Resource Area Impacts (acres)
I-43 Mainline Modernization – 6 Lanes	1.32	1.19	0.37
Mequon Road interchange – Tight Diamond	0.00	0.00	0.14
Highland Road interchange – Tight Diamond	0.00	0.00	0.16
County C interchange - Diamond	0.05	0.38	0.76
Total	*1.37*	*1.57*	*1.29*

3.14.3. Mitigation of Adverse Impacts to Environmental Corridors and Natural Areas

While no mitigation measures are proposed, WisDOT will minimize impacts to environmental corridors, isolated natural resources, and natural areas adjacent to the study corridor, the Modernization – 6 Lanes alternative for the freeway mainline would be widened to the inside in the existing median. WisDOT would consider design measures such as steepened slopes to further avoid and minimize impacts. Such measures would be determined in coordination with the WDNR during preliminary engineering.

Through avoiding and minimizing impacts to primary and secondary corridors, isolated natural resource areas, and designated natural areas, impacts to upland and wildlife habitat can also be avoided and minimized. During preliminary engineering, WisDOT will coordinate with Ozaukee County to confirm no affected properties are in conservation or wetland reserve programs.

3.15. NOISE

3.15.1. Affected Environment

Sound is a form of vibration that causes pressure variations in elastic media such as air and water. Noise is defined as unwanted and disruptive sound. 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 (dB), the unit of measurement for sound.

The decibel scale audible to humans spans about 140 dBs. A level of 0 dB corresponds to a lower limit of audibility, while 140 dBs produces a sensation more like pain than sound. The decibel scale is a logarithmic representation of the actual sound pressure variations. Therefore, a 26 percent change in the energy level only changes the sound level by 1 dB. The human ear would not detect this change, except in a controlled environment. Doubling the energy level would result in a 3-dB increase, which would be barely perceptible in the natural environment. Tripling the energy sound level would result in a clearly noticeable change of 5 dBs in the sound level. A change of 10 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 nonlinear 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 nonlinearity of human hearing. Therefore, the unit of measurement for a decibel A-weighted noise level is dBA.

Traffic noise is not constant. It varies as each vehicle passes a point. The 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: ambient (background) noise and urban noise.

Background noise generated by wind and distant traffic makes up the acoustical environment surrounding the project. These sounds are not readily recognized, but they combine to produce a nonirritating ambient sound level. This background sound level varies throughout the day, being lowest at night and highest during the day. Urban noise is intermittent and louder than the background noise. Transportation noise and local industrial noise are examples of this type of noise. It is for these reasons that environmental noise is analyzed statistically.

The statistical descriptor used for traffic noise is Leq. Leq is the constant, average sound level that during a period of time contains the same amount of sound energy as the varying levels of the traffic noise. The Leq correlates reasonably well the effects of noise on people. It is also easily measurable with integrating sound level meters. The time period for traffic noise is one hour. Therefore, the unit of measure for traffic noise is Leq(1h) dBA.

Highway noise sources have been divided into five types of vehicles: automobiles, medium trucks, heavy trucks, buses and motorcycles. Each vehicle type is defined as follows:

- **Automobiles:** All vehicles with two axles and four tires, includes passenger vehicles and light trucks weighing less than 10,000 pounds.
- **Medium trucks:** All vehicles having two axles and six tires with a vehicle weight between 10,000 and 26,000 pounds.
- **Heavy trucks:** All vehicles with three or more axles with a vehicle weight greater than 26,000 pounds.

- **Buses:** All vehicles designed to carry more than nine passengers.
- **Motorcycles:** All vehicles with two or three tires and an open-air driver/passenger compartment.

Noise levels produced by highway vehicles can be attributed to three major categories:

- Running gear and accessories (tires, drive train, fan, and other auxiliary equipment)
- Engine (intake and exhaust noise, radiation from engine casing)
- Aerodynamic and body noise

Tires are the dominant noise source at speeds greater than 50 mph for trucks and automobiles. Tire sound levels increase with vehicle speed but also depend upon road surface, vehicle weight, tread design and wear. Change in any of these can vary noise levels. At lower speeds, especially in trucks and buses, the dominant noise source is the engine and related accessories.

NOISE LEVEL MEASUREMENTS

Existing noise level measurements were conducted on May 16, 2013, at 26 representative residential areas adjacent to the I-43 North-South Freeway Corridor study area: one at Craig Counsell Park, and one at Nicolet High School. The measurements were made in accordance with FHWA guidelines using integrating sound level analyzers meeting American National Standards Institute and International Electrical Commission Type 1 specifications. Noise measurements were conducted for a period of 20 minutes at each site. Traffic counts were taken at each site, concurrent with the noise measurements. **Table 3-28** presents the data collected at the 28 sites. The locations of the field sites are shown in **Appendix E**.

COMPARISON OF FIELD DATA VERSUS MODELED NOISE LEVELS

The FHWA Traffic Noise Model® (TNM) Version 2.5 was used to model the field measurements, utilizing traffic data collected during the measurements. WisDOT compared the field measurements to the output from TNM to assess the applicability of the model to the specific conditions in the study area.

Comparing the modeled noise levels with the field-measured noise levels confirms the applicability of the computer model to this study. Traffic counts concurrent with the noise measurements were taken at all 28 of the measurement sites. The traffic data from these 28 sites were used in the model. The modeled traffic counts at 27 of the 28 sites compared within ±3 dBs of the measured levels. Field site 14 (FS-14) had a difference of 4 dBs; this represents reasonable correlation because the human ear can barely distinguish a 3-dB change in the Leq(1h) noise level in the urban environment. The site-by-site comparison is presented in **Table 3-29**.

Table 3-28: Measured Existing Noise Levels

Field Site	Site Description and Distance from Road	Noise Level dBA Leq (h)
1	Residence, 540 ft. east of I-43 edge of pavement, just south of sidewalk on West Monrovia Avenue, in line with western edge of home at 130 West Monrovia Avenue.	53
2	Craig Counsell Park, 353 ft. east of I-43 edge of pavement, on pitcher's mound of northwest most softball field.	58
3	Residence, 697 ft. east of I-43 edge of pavement, 12 ft. south of edge of pavement on West Clovernook Lane, in line with western edge of home at 192 West Brentwood Lane.	50
4	Residence, 131 ft. east of I-43 edge of pavement on edge of pavement on West Clovernook Lane, just west of driveway on a home at 318 West Clovernook Lane.	64
5	Residence, 841 ft. west of I-43 edge of pavement, on edge of pavement on West Apple Tree Road, on western edge of driveway of home at 621 West Apple Tree Road.	54
6	Residence, 81 ft. west of I-43 edge of pavement, 11 ft. south of edge of pavement on West Apple Tree Road, in line with eastern edge of 405 West Apple Tree Road.	70
7	Nicolet High School, 397 ft. west of I-43 edge of pavement, 15 ft. east of southeast corner of Nicolet High School's Fine Arts Building; in line with southern edge of Fine Arts Building.	63
8	Residence, 606 ft. west of I-43 edge of pavement, 15 ft. east of edge of pavement on North Ironwood Lane, 15 south of driveway for home at 6904 North Ironwood Lane.	54
9	Residence, 400 ft. east of I-43 edge of pavement, 5 ft. south of edge of pavement on West Fransee Lane, in line with eastern edge of driveway for home at 519 West Fransee Lane.	59
10	Residence, 74 ft. east of I-43 edge of pavement, at the center of landscaped cul-de-sac on West Fransee Lane.	73
11	Residence, 1,055 ft. west of I-43 edge of pavement, on North Pheasant Lane edge of pavement at northeast corner of 7805 North Pheasant Lane.	53
12	Residence, 444 ft. west of I-43 edge of pavement, at northern end of hedge of home at 7790 North Pheasant Lane, 32' east of edge of home at 7790 North Pheasant Lane.	60
13	Residence, 133 ft. east of I-43 edge of pavement, at northwest corner of northwest parking lot at The Porticos apartment complex, 48 ft. south of tennis courts, 38 ft. east of base of berm.	64
14	Residence, 230 ft. east of I-43 edge of pavement, 1.5 ft. north of West Bergen Drive, in line with eastern edge of home at 522 West Bergen Drive.	60

Field Site	Site Description and Distance from Road	Noise Level dBA Leq (h)
15	Residence, 314 ft. west of I-43 edge of pavement, 16 ft. east of North Lodgewood Road, 59 ft. north of driveway for home at 89660 North Lodgewood Road.	54
16	Residence, 97 ft. east of I-43 edge of pavement, in the center of bench and grilling area just west of 905 West Fairy Chasm Road.	63
17	Residence, 94 ft. east of I-43 edge of pavement, on southern edge of cul-de-sac at West Sierra Lane, 35 feet from right-of-way fence, in line with western edge of home at 1111 West Sierra Lane.	68
18	Residence, 1,108 ft. east of I-43 edge of pavement, 15 west of home 712 North Haddonstone Place, in line with northern edge of home at 712 North Haddonstone Place.	48
19	Residence, 1,228 ft. east of I-43 edge of pavement, 2 ft. north of West Revere Road, in line with hydrant in front yard of home at 108 West Revere Road.	51
20	Residence, 345 ft. east of I-43 edge of pavement, 5 ft. north of West Dandelion Lane, west of driveway entrance at 810 West Dandelion Lane.	56
21	Residence, 1,727 ft. east of I-43 edge of pavement, 5 ft. south of West Seacroft Court, in line with western edge of home at 423 West Seacroft Court.	47
22	Residence, 231 ft. west of I-43 edge of pavement, in the southeast corner of parking area in front of wing at Newcastle Place.	68
23	Residence, 354 ft. east of I-43 edge of pavement, 5 ft. north of West Bonniwell Road, in line with western corner of home at 600 West Bonniwell Road.	59
24	Residence, 264 ft. west of I-43 edge of pavement, at end of cul-de-sac on Fox Tail Lane, at entrance of driveway for 740 Fox Tail Lane.	56
25	Residence, 666 ft. east of I-43 edge of pavement,26 ft. south of Lakefield Road centerline near home at 1142 Lakefield Road, in line with eastern edge of 1138 Lakefield Road.	66
26	Residence, 425 ft. east of I-43 edge of pavement, at western edge of driveway to home at 1019 West Shaker Circle, in line with western edge of home at 1019 West Shaker Circle.	56
27	Residence, 169 ft. west of I-43 edge of pavement, at eastern edge of driveway to home at 1311 West El Rancho Drive, 65 ft. west of stop sign, in line with eastern edge of home at 1311 West El Rancho Drive.	64
28	Residence, 101 ft. west of I-43 edge of pavement, 31 ft. west of North Pheasant Lane edge of pavement, 6 ft. south of driveway entrance pillar for home at 9355 North Pheasant Lane, east of berm.	72

Source: HNTB Corporation, May 16, 2013

Table 3-29: Field Site Validation

Field Site	Noise Level, dBA Leq		Difference in Noise Level, dBA Leq (Modeled Noise Level Minus Measured Noise Level)
	Measured	Modeled	
1	53	56	3
2	58	60	2
3	50	53	3
4	64	67	3
5	54	54	0
6	70	73	3
7	63	61	-2
8	54	57	3
9	59	61	2
10	73	73	0
11	53	52	-1
12	60	59	-1
13	64	62	-2
14	60	64	4
15	54	54	0
16	63	65	-2
17	68	71	-3
18	48	49	-1
19	51	52	-1
20	56	59	-3
21	47	47	0
22	68	66	-2
23	59	57	-2
24	56	56	0
25	66	66	0
26	56	56	0
27	64	63	-1
28	72	71	-1

3.15.2. Noise Impacts

The noise analysis presents the existing and future noise levels at various locations in the study area. The determination of noise abatement measures and locations is within the framework of WisDOT's *Facilities Development Manual Chapter 23: Noise* (FDM 23 Noise), effective July 28, 2011. FDM 23 Noise is WisDOT's FHWA-approved interpretation of 23 CFR § 772. The noise level criteria (NLC) for considering barriers abutting various land uses are presented in **Table 3-30**. The noise level descriptor used is the equivalent sound level, Leq(1h), defined as the

steady state sound level, which in a stated time period (usually one hour) contains the same sound energy as the actual time-varying sound.

Noise abatement measures will be considered when the predicted noise levels approach or exceed those values shown for the appropriate activity category in **Table 3-30**, or when the predicted traffic noise levels substantially exceed the existing noise levels. “Approach” is defined as being within 1 dBA less than the noise levels shown in **Table 3-30**. The WisDOT has defined an increase over existing noise levels of 15 dBs or more as being a noise impact.

Table 3-30: Noise Level Criteria for Considering Barriers

Activity Category	Leq (h) (dBA)[1] (Evaluation Criteria)	Description of Land Use Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[2]	67 (Exterior)	Residential
C[2]	67 (Exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails and trail crossings.
D[3]	52 (Interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E[2]	72 (Exterior)	Hotels, motels, offices, restaurants/bars and other developed lands, properties or activities not included in A-D or F.
F	–	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	–	Undeveloped lands that are not permitted.

Source: WisDOT FDM 23 Noise, Effective July 7, 2011.

1. “Leq” means the equivalent steady-state sound level, which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same period. For purposes of measuring or predicting noise levels, a receptor is assumed to be at ear height, located 5 feet above ground surface. “Leq(h)” means the hourly value of Leq.

2. Includes undeveloped lands permitted for this activity category or publicly-owned recreation lands formally designated in a public agency’s master plan.

3. Use of interior noise levels shall be limited to situations where a determination has been made that exterior abatement measures will not be feasible and reasonable and after exhausting all outdoor mitigation options.

FHWA's TNM was used to model existing (2010) and the 2040 build alternative noise levels. The following parameters were used in this model to calculate an hourly Leq(h) at a specific receiver location:

- Distance between roadway and receiver
- Relative elevations of roadway and receiver (ground-level receivers are assumed to be 5 feet above the ground; second- and third-story receivers are assumed to be 15 feet and 25 feet above the ground, respectively)
- Hourly traffic volume in light-duty vehicles (two axles, four tires); medium-duty vehicles (two axles, six tires); and heavy-duty vehicles (three or more axles)
- Vehicle speed
- Roadway grade
- Topographic features including retaining walls and berms
- Noise source height of the vehicles

Appendix E shows 836 representative receiver locations numbered N1 through N674, plus 98 second-story and 37 third-story receivers, along with the noise measurement locations FS-1 through FS-28. These receivers were selected to model the noise impacts at outdoor areas of frequent human use for 1,215 receptors representing 1,184 residences (including apartments), seven schools, three parks, six places of worship, three daycare centers, two hospitals, two hotels, a library and an active sports area. The results of the computer modeling are presented in **Appendix E**.

Increases in future traffics volumes throughout the entire corridor, as well as changes to the horizontal and vertical alignments of the proposed improvements, would create changes in noise levels along the corridor.

Appendix E provides detailed information on impacts at individual receptors by alternative. Depending on the combination of alternatives at County Line Road (No Access alternative, Partial Diamond alterntive and Split Diamond Hybrid subalternatives) and Highland Road (No Access and Tight Diamond), between 1,008 to 1,036 receptors would experience a change of ± 3 decibels. A few receptors would experience a decrease in levels, with a maximum decrease of 7 decibels occurring at two receptors with three of the alternatives. The maximum increase would be 9 decibels and that increase would occur at one receptor under one alternative.

The following are the projected range of numbers of receptors that would be exposed to design year (2040) noise levels that approach or exceed the levels in **Table 3-30**.

- Residential: 279-285
- Parks: 0
- Schools: 0
- School – active sports area: 2
- Places of worship: 1
- Day care centers: 1-2
- Hospitals: 0
- Hotels: 0
- Active sports areas: 0
- Libraries: 0

None of the receptors would be exposed to a noise impact based on WisDOT's increase over existing criteria of 15 decibels.

UNION PACIFIC RAILROAD RELOCATION

The UP Railroad relocation would shift the existing mainline track approximately 45 feet north of the existing track at the nearest residence. The Federal Transit Administration's (FTA) Transit Noise and Vibration Impact Assessment[44] guidance manual and a "supplemental freight rail analysis spreadsheet tool, developed for the Chicago Rail Efficiency And Transportation Efficiency (CREATE) program using the FTA procedures,"[45] was used to develop the existing and future noise and vibration levels in the area of the track relocation.

The FTA noise impact criteria are based on a comparison of existing and future outdoor noise levels. In areas were existing rail noise is present, the criteria is the allowable increase in noise exposure when the increase in project noise is compared to the existing noise. 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, 10:00 pm to 7:00 am, is increased by 10 decibels prior to including the noise levels in the 24-hour calculation.

The FTA ground-borne vibration and noise are based on human sensitivity. The most appropriate descriptor for human response to vibration is velocity. One single number descriptor, VdB, is used to assess transit vibration. Vibration velocity in decibels is ratio of the rms velocity amplitude to the reference velocity amplitude. 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.

The FTA noise and vibration criteria are presented in **Appendix E**.

The factors considered in developing the existing and future Ldn noise levels and vibration levels include:

- Distance between track and residences;
- Operation speed;
- Number of locomotives;
- Number of cars;
- Track condition;
- Number of train operations during the day, 7 a.m. to 10 p.m.;
- Number of train operations during the night, 10 p.m. to 7 a.m.; and
- The Ldn noise level from I-43.

The existing Ldn noise levels in the area of the proposed relocated track, including traffic noise from I-43, range from 57 to 73 dBA Ldn. The future Ldn noise levels with the relocated track would range from 58 to 71 dBA Ldn. The proposed relocated rail track, based the noise criteria presented in **Appendix E**, would create no noise impact at 20 residences and a moderate noise impact at three residences next to the proposed relocated track. The FTA noise impact criteria presented in **Appendix E** is based on the increase in noise levels over existing noise levels. "Since the noise impact criteria are delineated as bands or ranges, project noise can vary 5-7 decibels within the band of Moderate Impact at any specific ambient noise level. If the project and ambient noise plot falls just below the Severe range (**Appendix E**), the need for mitigation is strongest. Similarly, if the plot falls just above the No Impact threshold, there is less need."[46]

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

[45] *http://www.fra.dot.gov/Page/P0216, accessed January 10, 2014.*

[46] *Transit Noise and Vibration Impact Assessment, page 3-12.*

The moderate impact for the proposed relocation is less than one decibel above the Moderate Impact curve based on an existing Ldn noise level of 64 dBA (**Appendix E)**. Therefore, noise mitigation has not been considered.

The existing ground-borne vibration levels in the area of the proposed relocated track range from 61 to 74 VdB. The ground-borne noise levels range from 26 to 39 dBA. The future ground-borne vibration levels in the area of the proposed relocated track would range from 62 to 79 VdB, while the ground-borne noise levels would range from 27 to 44 dBA. The vibration levels are below the FTA's Category 2 Infrequent Events criteria presented in **Appendix E**.

3.15.3. Noise Impact Mitigation

Based upon the requirements of 23 CFR § 772 and within the framework of FDM 23 Noise, various methods were reviewed to mitigate the noise impact of the proposed improvements. Among those considered were restricting truck traffic to specific times of the day; prohibiting trucks; altering horizontal and vertical alignments; acquiring property for construction of noise barriers or berms; acquiring property to create buffer zones to prevent development that could be adversely impacted; and insulating public use or nonprofit institutional buildings, berms and sound barriers.

Restricting or prohibiting trucks is counter to the project's purpose and need. Design criteria and recommended termini for the proposed project preclude substantial horizontal and vertical alignment shifts that would produce noticeable changes in the projected acoustical environment. Due to right of way limitation the construction of noise berms is neither feasible nor reasonable. Therefore, only the construction of noise barriers was reviewed. Abatement is recommended only when it is feasible and reasonable to construct a noise barrier.

FDM 23 Noise has established criteria for determining feasibility and reasonableness and is summarized as follows:

- The barrier must provide a minimum 5-dB reduction to be considered feasible.
- One receptor or common use area must meet the 9-dB design goal for the noise barrier to be considered for reasonableness.
- A noise barrier must reduce noise levels by a minimum of 8 dBs for a receptor or common use area to be considered as benefited for the purposes of determining reasonableness. The total cost of the barrier may not exceed $30,000 per benefited receptor.
- If a common noise environment exists within the project termini, cost averaging of multiple barriers within the common noise environment may occur as part of the reasonableness determination. Noise barriers exceeding $60,000 per benefited receptor cannot be included in the cost averaging. The order of cost averaging of eligible multiple barriers will start with the most cost-effective noise barrier increasing to the second most cost-effective barrier to the third, etc., until the average cost approaches or equals but does not exceed $30,000 per benefited receptor. The noise barriers included in the cost averaging may be carried forward for a determination of whether or not the barrier(s) will be incorporated into the project.
- WisDOT must receive a vote of support for the project from a simple majority of all votes cast by the owners or residents of the benefitted receptors

WisDOT analyzed the feasibility and reasonableness of 14 noise barriers at 13 locations including historic sites, Section 4(f) lands and two day care centers adjacent to the freeway system within the I-43 North-South Freeway Corridor study area. **Table 3-30** presents the results of the barrier analysis including barrier locations; future Leq(h) noise levels without and

with a barrier; barrier lengths and heights; estimated costs; the number of residential units benefited; the noise reduction provided by the barriers; and the cost per residential unit. Maps and **Appendix E** identify barrier locations that are feasible and resonable. Thirteen of the 14 noise barriers analyzed would meet WisDOT's feasibility criteria, of which five noise barriers would meet both of the FDM 23 Noise definitions for feasible and reasonable noise mitigation.

SECTION 4(F) PROPERTIES

The following section describes the noise mitigation elvaluation for Section 4(f) properties in the study corridor. WisDOT analyzed each 4(f) property as being one receptor for the noise barrier feasible and reasonableness analysis. The FHWA concurs with WisDOT's reasoning for addressing each 4(f) property as one receptor.

CRAIG COUNSELL PARK 4(F) (N21, N22 AND FS-2)

The build alternative would increase noise levels within the park 2 to 4 dBA. The resulting noise levels would range from 56 to 59 dBA Leq, which is below the of 67 dBA Leq Noise Level Criteria. Therefore, noise mitigation for the park was not analyzed.

CLOVERNOOK HISTORIC DISTRICT (N99, N104, N105, N110)

At this location, the I-43 mainline profile would be lower than the existing freeway north of Acacia Road, which lowers the future noise levels at the homes in the historic district fronting I-43 between 3 to 4 dB. Noise levels at homes south of Acacia Road, that front I-43 would see noise levels increase 4 to 6 dB. While noise levels decline at some locations, three of the four homes in the historic district that front I-43 would exceed the noise level criteria for considering noise barriers (**Table 3-30**). **Appendix E** presents a table and a corridor map showing noise levels for the Clovernook Historic District. WisDOT evaluated a noise barrier for this area. However, as shown in **Table 3-31**, Noise Barrier 2 was feasible but not reasonable at this location.

NICOLET HIGH SCHOOL ATHLETIC FIELD 4(F) SECTION (N65 – N70)

Under the build alternative, the I-43 mainline profile would be lower than the existing freeway, which lowers the future noise levels at the athletic fields between 1 to 5 dBA. There would be a noise impact at two locations east of I-43 at the soccer field at the south end of the athletic fields and at the tennis court nearest the freeway on the north end of the athletic fields. While noise levels decline at both locations, 5 dB for the soccer field and 4 dB for the tennis court, future noise levels would be 66 and 68 dBA Leq(h), respectively, which exceeds criteria presented in **Table 3-30**. See **Appendix E** for a table and a corridor map showing noise levels for the Nicolet High School Athletic Field. The athletic field is considered 1 representative receptor. Feasible noise abatement for one receptor is not reasonable. A similar example of a noise barrier modeled for one receptor is Noise Barrier 8, as shown in **Table 3-31**.

MAPLE DALE SCHOOL ATHLETIC FIELD 4(F) SECTION (N241 – N244)

Traffic noise from the build alternative would increase noise levels 3 dB to 69 dBA Leq(h) at one location, the baseball diamond nearest I-43, N244. This noise level exceeds the criteria in **Table 3-30**. Maple Dale School sits between two residential developments. The noise barrier analyzed for this area was found to be feasible and reasonable, **Table 3-31**, Noise Barrier 3. See **Appendix E** for a table and a corridor map showing noise levels for the Maple Dale School Athletic Field.

KATHERINE CARPENTER PARK (N452 – N458)

The build alternatives would increase noise levels within the park 1 to 3 dBA. Depending on the alternative, the resulting noise levels would range from 54 to 65 dBA Leq, which are below the of 67 dBA Leq Noise Level Criteria. Therefore, noise mitigation for the park was not analyzed.

HENNINGS FARMSTEAD (N667)

Noise levels would increase 3 dB to 69 dBA Leq(h) at N667, which exceeds the criteria in **Table 3-30**. See **Appendix E** for a table and map showing the noise level information for N667. As shown in **Table 3-31**, noise mitigation for this location, Noise Barrier 13, was found to be feasible, but not reasonable.

HENNINGS HOUSE (N672)

Under the build alternative, noise levels would increase 5 dBA to 67 dBA at the house, which exceeds the noise level criteria for considering noise barriers. See **Appendix E** for a table and map for additional information on the Hennings House. Feasible noise abatement for one receptor is not reasonable. A similar example of a noise barrier modeled for one receptor is Noise Barrier 8, as shown in **Table 3-31**.

SUMMARY OF NOISE IMPACT MITIGATION

Based on the noise analysis, WisDOT would be likely to incorporate the feasible and reasonable noise barriers shown in **Table 3-31** into the project's final design if a build alternative is selected. During the design phase of the project the location of feasible and reasonable noise mitigation would be reassessed. If final design results in substantial changes in roadway design from the conditions modeled for the DEIS or FEIS, noise abatement measures would be reviewed. A final decision about whether to install abatement measure(s) would be made upon completion of the project's final design and through the public involvement process, which would solicit input from residents and property owners who would benefit from the construction of feasible and reasonable noise barriers.

Table 3-31: Noise Barrier Summary

Barrier Number	Locations	Existing Leq(h) Noise Levels, dBA	Range of Future Leq(h) Noise Levels, dBA		Noise Reduction (dB)	Barrier Characteristics		Cost[a]	Number of Units Attenuated	Cost/Unit	Feasible and Reasonable
			w/o Barrier	Barrier		Length (ft)	Height (ft)				
1	East of I-43 from UP Railroad to Daphne Road	48-69	51-67	48-69	2-7	1,763	24	$761,418	0	-	N
2	West of I-43 from the UP Railroad to Nicolet High School	50-72	50-75	48-64	8-9	2,991	12-18	$857,772	7	$122,539	N
3	East of I-43 from Good Hope Road to Brown Deer Road	45-75	48-77	45-66	8-16	8,999	9-24	$3,088,098	104	$29,693	Y
4	West of I-43 from Dean Road to Brown Deer Road	56-70	58-72	56-63	8-9	1,800	9-18	$534,546	2	$267,273	N
5	East of I-43 from Brown Deer Road to County Line Road	44-72	46-76	40-65	8-14	4,699	9-24	$1,409,238	108	$13,049	Y
6	West of I-43 from Fairy Chasm Road to County Line Road	54-71	58-73	56-65	8-11	2,499	9-18	$664,092	6	$110,682	N
7	West of I-43 from County Line Road to Port Washington Road	54-66	56-69	55-64	8-9	1,357	9-24	$446,634	3	$148,878	N
8	West of I-43 from Port Washington Road to Zedler Lane	70	73	64	9	600	9-15	$140,382	1	$140,382	N
9	East of I-43 from Port Washington Road to Donges Bay Road	53-71	55-72	50-65	8-13	2,600	9-24	$1,058,382	11	$96,217	N
10	West of I-43 from Winesap Court to Baldwin Court	41-73	44-76	44-68	8-13	998	9-21	$291,114	10	$29,111	Y
11	East of I-43 from Glen Oaks Lane to Dandelion Lane	55-66	53-71	52-63	8-9	4,089	9-24	$1,450,818	6	$241,803	N
12	West of I-43 from Liebau Road to Highland Road	35-73	37-76	35-67	8-16	2,977	21	$1,125,414	91	$12,367	Y
12A	West of I-43 from Liebau Road to Highland Road (Highland Road No Access alternative)	35-73	37-77	37-77	8-16	3,008	21	$1,136,988	92	$12,369	Y
13	West of I-43 at Lakefield Road	57-67	62-70	58-62	8-9	1,004	12-21	$314,000	2	$157,005	N

[a] *Based on $18.00 per square foot*

[b] *Did not attain noise design goal and is not feasible.*

3.16. AIR QUALITY

3.16.1. Affected Environment

The Clean Air Act of 1970 requires the EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to protect public health, and the environment. To date, NAAQS have been established for six criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} – levels of 10 microns and smaller, and $PM_{2.5}$ – levels of 2.5 microns and smaller), and sulfur dioxide (SO_2). **Table 3-32** presents the National and Wisconsin Ambient Air Quality Standards.

Exceeding the NAAQS pollutant level does not necessarily constitute a violation of the standard. Some of the criteria pollutants (including carbon monoxide) are allowed one exceedance of the maximum level per year, while for other pollutants, criteria levels cannot be exceeded. Violation criteria for still other pollutants are based on recorded exceedances. **Table 3-32** lists the allowable exceedances for EPA criteria pollutants.

The Clean Air Act Amendments (CAAA) of 1977 and 1990 required all states to submit a list to EPA identifying 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 CAAA also established time schedules for states to meet the NAAQS.

States that have nonattainment areas are required to prepare State Implementation Plans (SIP) that lay out a plan to show how the state will improve the air quality to attain the NAAQS. Both new and improvement highway projects must be contained in the area's Regional Transportation Plan (RTP) and the Transportation Improvement Program (TIP). The SEWRPC along with the state of Wisconsin is responsible for preparing the RTP and TIP. Once the RTP and TIP are completed, they are submitted to the FHWA for review and approval according to the requirements of the CAAA and related implementation regulations.

The primary pollutants from motor vehicles are unburned hydrocarbons, nitrogen oxides, carbon monoxide, and particulates. Volatile organic compounds and nitrogen oxides can combine in a complex series of reactions catalyzed by sunlight to produce photochemical oxidants, such as nitrogen dioxide and ozone. Because these reactions take place during a period of several hours, maximum concentrations of photochemical oxidants are often found far downwind from their sources. These pollutants are regional problems.

Carbon monoxide is a colorless, odorless gas that is the byproduct of incomplete combustion, and is the major pollutant from gasoline-fueled motor vehicles. Carbon monoxide emissions are greatest from vehicles operating at low speeds and before complete engine warm up (within about eight minutes of starting). Congested urban roads tend to be the principal problem areas for carbon monoxide.

Particulate matter includes both airborne solid particles and liquid droplets. These liquid particles come in a wide range of sizes. PM_{10} particulates are coarse particles, such as windblown dust from fields and unpaved roads. $PM_{2.5}$ particulates are fine particles generally emitted from activities such as industrial and residential combustion and from vehicle exhaust. Particulates from transportation can be a localized issue when a project is determined to be a project of air quality concern for either PM_{10} or $PM_{2.5}$ emissions.

Table 3-32: National and Wisconsin Ambient Air Quality Standards

Pollutant	Primary/ Secondary	Averaging Time	Level	Form
Carbon monoxide	Primary	8 hours	9 ppm	Not to be exceeded more than once per year
		1 hour	35 ppm	
Lead	Primary and secondary	Rolling 3-month average	0.15 µg/m3[1]	Not to be exceeded
Nitrogen dioxide	Primary	1 hour	100 ppb[5]	98th percentile, averaged over 3 years
	Primary and secondary	Annual Mean	53 ppb[2]	Annual Mean
Ozone – WI	Primary and secondary	1 hour	0.12 ppm[3]	
		8 hours	0.08 ppm	
Ozone	Primary and secondary	8 hours	0.075 ppm[4]	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
$PM_{2.5}$	Primary	Annual	12 µg/m_3	Annual mean, averaged over 3 years
	Secondary	Annual	15 µg/m_3	Annual mean, averaged over 3 years
	Primary and secondary	24 hours	35 µg/m_3	98th percentile, averaged over 3 years
PM_{10}	Primary and secondary	24 hours	150 µg/m_3	Not to be exceeded more than once per year on average over 3 years
Sulfur dioxides	Primary	1 hour	75 ppb[4]	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Secondary	3 hour	0.5 ppm	Not to be exceeded more than once per year

Source: http://www.epa.gov/air/criteria.html. Accessed May 29, 2013.

Notes:

1. Final rule signed Oct. 15, 2008. The 1978 lead standard (1.5 µg/m_3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

2. The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the one-hour standard.

3. Wisconsin Administrative Code, Chapter NR 404.04, November 2011.

4. Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth highest daily maximum eight-hour concentration, averaged over three years) and related implementation rules remain in place. In 1997, EPA revoked the one-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The one-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

5. Final rule signed June 2, 2010. The 1971 annual and 24-hour SO2 standards were revoked in that same rule-making; however, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

The freeway system within the I-43 North-South Freeway Corridor study area is located within the Southeastern Wisconsin Intrastate Air Quality Control Region #239. Ozaukee County is currently in attainment status for five of the six criteria pollutants, and has been redesignated to a maintenance area for the eight hour ozone standard. Milwaukee County is currently in attainment status for four of the six criteria pollutants, has been redesignated to a maintenance area for the eight hour ozone standard and is in nonattainment for $PM_{2.5}$. As such, the I-43 North-South Freeway Corridor Study is required to meet Transportation Conformity Rule requirements found in 40 CFR § 93. This project is included in an amendment to SEWRPC's transportation improvement program (TIP) *A Transportation Improvement Program for Southeastern Wisconsin: 2011-2014.*[47] The TIP amendment was approved on Jan. 19, 2012, by Resolution No. 2012-01. The I-43 North-South Freeway Corridor Study is also identified in the updated 2013-2016 TIP.

The FHWA and FTA determined on Oct. 18, 2012, that SEWRPC's 2035 regional transportation plan – as updated in *Memorandum Report No. 197: Review, Update and Reaffirmation of the Year 2035 Regional Transportation Plan* and *A Transportation Improvement Program for Southeastern Wisconsin: 2011-2014* – conforms with the transportation planning requirements of U.S. Code (USC) Titles 49 and 23, the Clean Air Act Amendments, and related regulations.

In addition to the NAAQS criteria for air pollutants, EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, nonroad mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries).

In April 2007, under authority of the Clean Air Act § 202(l), EPA signed a final rule titled "Control of Hazardous Air Pollutants from Mobile Sources," which sets standards to control MSATs. Under this rule, EPA set standards on fuel composition, vehicle exhaust emissions, and evaporative losses from portable containers. Beginning in 2011, refineries were required to limit the annual benzene content of gasoline to an annual average refinery average of 0.62 percent. The rule also sets a new vehicle exhaust emission standard for non-methane hydrocarbon including MSAT compounds, to be phased in between 2010 and 2013 for lighter vehicles and 2012 and 2015 for heavier vehicles.

Greenhouse gases are trace gases that trap heat in the earth's atmosphere. Some greenhouse gases such as carbon dioxide occur naturally and are emitted to the atmosphere through natural processes and human activities. Other greenhouse gases are created and emitted solely through human activities. The principal greenhouse gases that enter the atmosphere because of human activities are carbon dioxide, methane, nitrous oxide and fluorinated gases.[48]

3.16.2. Air Quality Impacts

The air quality impact analysis for this project was conducted in accordance with WisDOT, FHWA and EPA technical guidance and procedures. Recent FHWA technical guidance provided methodologies on when, and recommendations on how to perform an MSAT analysis. As a result WisDOT and FHWA performed a qualitative analysis of MSAT emissions. The results of the MSAT analysis are summarized in this subsection. More information about MSATs is presented in **Appendix F**.

[47] *TIP 787: "Preliminary engineering for reconstruction of IH 43 from Silver Spring Dr. to STH 60 in Ozaukee and Milwaukee Counties (14.11 mi)."*

[48] *http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html. Accessed October 30, 2013.*

CARBON MONOXIDE

FHWA Technical Advisory 6640.8A states the following:

> *"Carbon monoxide is a project-related concern and as such should be evaluated in the draft EIS. A microscale CO analysis is unnecessary where such impacts (project CO contribution plus background) can be judged to be well below the 1- and 8-hour National Ambient Air Quality Standards (or other applicable State or local standards). This judgment may be based on (1) previous analyses for similar projects; (2) previous general analyses for various classes of projects; or (3) simplified graphical or "look-up" table evaluations. In these cases, a brief statement stating the basis for the judgment is sufficient."*

WisDOT compared the projected 2040 design-year traffic volumes for the I-43 North-South Freeway Corridor Study with the 2035 design-year traffic volumes that served as the basis for the CO modeling conducted for the Zoo Interchange project. The mainline, cross street and ramp volumes for the Zoo Interchange project were all greater than the projected volumes for the I-43 North-South Freeway study. The CO concentrations modeled for the Zoo Interchange project were less than 75 percent of the NAAQS; therefore, the CO concentrations would be well below the CO NAAQS for the I-43 North-South Freeway study.

MOBILE SOURCE AIR TOXICS ANALYSIS

EPA announced in December 2010 that its Motor Vehicle Emission Simulator (MOVES) would be required for use on projects after Dec. 20, 2012. On Dec. 6, 2012, FHWA issued its *Interim Guidance Update on Mobile Source Air Toxics Analysis in NEPA* requiring the use of MOVES for air quality analysis on documents prepared in accordance with the National Environmental Policy Act (NEPA). FHWA has developed a tiered approach to analyzing MSATs in NEPA documents that includes the following three levels of analysis:

- No analysis for projects with no potential for meaningful MSAT effects.
- Qualitative analysis for projects with low potential for MSAT effects.
- Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

Annual average daily traffic (AADT) for the 2040 Modernization – 6 Lanes alternative ranges from 67,800 at the northern terminus of the study corridor to 120,500 at the southern terminus. Based on FHWA's three levels of analysis, the I-43 North-South Freeway Corridor Study has a low potential for meaningful increases in MSAT emission (**Appendix F**); therefore, a qualitative analysis was performed in the study area.

The amount of MSAT emissions emitted for the No-Build Alternative and the Modernization – 6 Lanes build alternatives presented in this DEIS would be proportional to the vehicle miles traveled (VMT), assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for the build alternatives would be slightly higher than that for the No-Build Alternative, as the build alternatives' AADT is 11 percent to 14 percent greater than the No-Build Alternative. This slight change is because the additional capacity of the build alternatives increases the efficiency of the roadway and attracts rerouted trips from other highways in the transportation network including US 45, US 41, WIS 145 and WIS 57. The resulting increase in VMT would lead to higher MSAT emissions for the build alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes.

The emissions increase is offset somewhat by lower MSAT emissions rates due to increased speeds. According to EPA's MOVES2010b model, emissions of all of the priority MSATs decrease

as speed increases. Because the estimated VMTs under the No-Build Alternative and build alternatives vary by less than 15 percent, no appreciable difference in overall MSAT emissions is expected between the two alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs, which are projected to reduce annual MSAT emissions by more than 80 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures; however, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

FHWA and WisDOT have provided a qualitative analysis of MSAT emissions relative to the No-Build Alternative and Modernization – 6 Lanes alternatives. The FHWA and WisDOT have acknowledged that a future project in the study area may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain. Because of this uncertainty, the health effects from these emissions cannot be reliably estimated.

$PM_{2.5}$ HOT-SPOT ANALYSIS

The Transportation Conformity Rule was amended by EPA with the final rule on March 10, 2006. The amended Transportation Conformity Rule requires a hot-spot analysis to determine project-level conformity in $PM_{2.5}$ and PM_{10} nonattainment and maintenance areas. A hot-spot analysis is an assessment of localized emissions impacts from a proposed transportation project and is only required for "projects of air quality concern."

Representatives from WisDOT, FHWA Wisconsin Division, EPA, WDNR and SEWRPC comprise an interagency consultation team that is in the process of determining whether the I-43 North-South Freeway Corridor Study would or would not be considered "a project of air quality concern." If the project is determined to be "a project of air quality concern," a quantitative hot-spot analysis for the preferred alternative would be performed.

With the assistance of SEWRPC and preliminary comments from EPA, WisDOT, FHWA and WDNR prepared a "$PM_{2.5}$ Project Summary Form" for review by the interagency consultation team (see **Appendix C**, page C-98). The EPA, FHWA and FTA have provided preliminary concurrence on WisDOT's position (see **Appendix C**, C-94 through C-96). WisDOT will hold an interagency consultation prior to approving the FEIS to confirm the findings. The Project Summary Form submitted to the interagency consultation team for review and comment presents WisDOT's position that the proposed improvements for the I-43 corridor do not make the I-43 project a project of air quality concern.

3.16.3. Measures to Mitigate Adverse Air Quality Impacts

Based on the air quality analysis completed for the proposed improvements, this project will not contribute to any violation of the NAAQS. MSAT emissions will decrease, and neither carbon monoxide nor $PM_{2.5}$ levels will exceed the air quality standards. Therefore, no measures to mitigate air quality impacts have been identified.

3.17. HAZARDOUS MATERIALS

3.17.1. Affected Environment

WisDOT conducted a Phase I Hazardous Material Survey Assessment that included a records search referencing databases, aerial photographs, topographic maps, historical as-builts, Sanborn maps and windshield surveys. Sources reviewed for information included regulatory agency (EPA and WDNR) listings, and past or present land use that would indicate the potential for the use or management of hazardous materials or the generation of hazardous waste. If such information was found, the parcel was noted as a potential hazardous material site. WisDOT also conducted a survey of the structures in the corridor to determine the potential presence of lead-paint and asbestos. A summary of the initial findings include the following:

Both asbestos and lead-based paint pose a health risk if inhaled or ingested.

- The Phase I Assessment identified 100 potentially hazardous materials sites or parcels adjacent to the I-43 North-South Freeway study corridor. Of the 100 sites identified, 30 are recommended for further investigation, including field sampling and testing. Additional investigations may not necessarily occur at all of the 30 recommended sites, as some sites might not be impacted by construction activities.
- Additional hazardous materials investigation, including field sampling and testing may occur at sites identified in the Phase I Assessment; but are not included in the 30 sites already recommended. These sites would be assessed on a case-by-case basis and this determination would depend upon the anticipated construction activities that may occur on, or adjacent to those sites.
- Of those 30 sites recommended for further investigation, half include leaking underground storage tanks. Other potential concerns include historical gas stations, historical auto repair sites, historic dry cleaner sites, underground storage tanks and aboveground storage tanks. Fourteen sites have already been screened for the environmental repair program, indicating contaminated soil or groundwater. Contaminated soils, groundwater or underground storage tanks may be encountered if future utilities or roadway excavations occur at these sites.
- Two additional sites were associated with historical oil fill pipes.
- The Phase I Assessment also indicated that any soils to be disturbed within the UP Railroad ROW would most likely be impacted with industrial railroad contamination.
- WisDOT also conducted a survey of all the structures in the study area to determine the presence of asbestos-containing materials. Of the 30 structures within the study area (two box culverts, one pedestrian tunnel, 26 roadway or freeway bridges, and one railroad bridge), 10 contain asbestos, including freeway bridges at Green Tree Road, County Line Road, Port Washington Road, Donges Bay Road, Mequon Road (2 structures), CTH C, Lakefield Road (2 structures) and Falls Road.
- Bridges to be demolished in the study corridor may contain lead-based paint.

3.17.2. Hazardous Materials Impacts

NO-BUILD ALTERNATIVE

The No-Build Alternative would not affect any potentially contaminated sites.

BUILD ALTERNATIVES

The build alternatives would affect many of the potentially contaminated sites recommended for further analysis. The WDNR and other affected parties will be notified of the results of field sampling and testing. WisDOT will work with concerned parties to ensure disposition of any contamination is to the satisfaction of the WDNR, WisDOT Environmental Services Section and FHWA.

Ten of the structures that would be replaced within the freeway system of the I-43 North-South Freeway study corridor contain asbestos-containing materials. WisDOT considers all paint on bridges to be lead-based paint. Buildings to be acquired under the build alternatives could also contain asbestos-containing materials or lead-based paint.

3.17.3. Mitigation of Adverse Hazardous Materials Impacts

If a build alternative is selected, WisDOT would conduct a follow-up Phase 2 survey to determine if sites present an environmental risk. WisDOT would develop remediation measures for contaminated sites that cannot be avoided during the design phase. Disturbance near potentially contaminated sites would be minimized to the extent possible and practicable. As applicable, the contract special provisions would include a Notice to Contractor describing the potential contamination with names and locations of the sites. The areas of potential contamination would be marked on the plan sheets with reference to check the Notice to Contractor in the special provisions.

WisDOT will include special provisions to notify contractors of potential presence of oil storage tanks or potential contaminated soils before proceeding with any construction activities at those sites. The Phase I Assessment also indicated that any soils to be disturbed within the UP Railroad right of way would most likely be impacted with industrial railroad contamination. Any excavated contaminated materials within the UP Railroad corridor areas should be characterized and managed appropriately during construction activities.

The regional WisDOT office would work with concerned parties to ensure that the disposition of any petroleum contamination is resolved to the satisfaction of the WDNR, WisDOT and FHWA before acquiring any questionable site, and before advertising a future project for letting.

Nonpetroleum sites would be handled on a case-by-case basis, with detailed documentation and coordination with the FHWA as needed. During the future project's real estate acquisition phase, WisDOT would survey all buildings that need to be demolished to determine whether asbestos is present. A predemolition inspection should be completed at any relocated structures to determine the presence of additional hazardous materials. A notification of demolition and/or renovation and application for permit exemption (WDNR Form 4500-113) must be submitted to the WDNR 10 days before demolition or abatement activities.

During the future project's real estate acquisition phase, WisDOT will survey all buildings that need to be demolished to determine whether asbestos is present.

Standard special provision 203-005, Abatement of Asbestos Containing Material Structure __ (bid item 203.0210.S), will be included in the plan. The contractor will be responsible for completion of the Notification of Demolition and/or Renovation (WDNR Form 4500-113).

3.18. HISTORIC SITES

WisDOT completed a survey of historic and potentially historic resources in 2012. The department established an area of potential effect (APE) within which it conducted the survey. The APE included properties adjacent to the I-43 corridor, Jean Nicolet Road, Port Washington Road in Milwaukee County and arterial street intersections with Port Washington Road in Ozaukee County. To account for potential work on crossing streets, the APE included adjacent properties along cross streets and their intersection with Port Washington Road, which runs closely parallel to I-43.

Buildings and structures are historically significant if listed on the National Register of Historic Places (NRHP) or meet criteria for eligibility to be listed in the NRHP. Eligibility for the NRHP relies on three criteria including:

- **Criterion A:** Structures associated with events that have made a significant contribution to broad patterns of history.
- **Criterion B:** Structures associated with the lives of persons significant in the past.
- **Criterion C:** Structures 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.

3.18.1. Affected Environment

The historic survey identified 10 properties that warranted further detailed investigation. An additional historic district was also identified during detailed investigations. The detailed study determined that five properties and a residential historic district are eligible for listing on the NRHP. An additional residential property in the APE is already listed on the NRHP. All of the properties are significant under the architecture Criterion C. The properties are noted in **Table 3-33**. **Section 4** provides detailed descriptions of the properties.

Table 3-33: Historically Significant Properties

Property	Address	Description
North Shore Water Treatment Plant	400 Bender Road, city of Glendale, Milwaukee County	Distinctive example of Contemporary style architectural style; eligible for NRHP
Clovernook Estates Residential Historic District	Properties on Acacia Road, West Apple Tree Road, West Clovernook Lane, West Daphne Road, North Elm Tree Road and North River Road; city of Glendale, Milwaukee County	Significant concentration of Period Revival-style homes and structures; eligible for NRHP
Elderwood/The House in the Woods	6789 N. Elm Tree Road, city of Glendale, Milwaukee County	Significant for German cottage architecture, listed on NRHP
Phillips Petroleum Company Service Station	7575 Port Washington Road, city of Glendale, Milwaukee County	Highly intact example of a mid-20th century gas station; eligible for NRHP
Johann Friederich and Catherine Hennings Farmstead	1143 Lakefield Road, town of Grafton, Ozaukee County	A good example of farmstead property type; eligible for NRHP
Henry and Mary Hennings House	745 Port Washington Road, town of Grafton, Ozaukee County	Distinctive example of quarried stone construction eligible for NRHP

3.18.2. Impacts to Historic Sites

NO-BUILD ALTERNATIVE

The No-Build Alternative would not impact historic properties.

BUILD ALTERNATIVES

The impacts of the build alternatives are summarized in **Table 3-34**. **Section 4** provides detailed discussion of effects of the build alternatives. WisDOT initiated Section 106 consultation with SHPO, which may determine other effects.

Table 3-34: Historic Site Impacts

Property	Impact
North Shore Water Treatment Plant	Reconstruction of the I-43 mainline South Segment would impact about 0.16 acre of the property between its boundary and the plant's fence line. The acquisition would not physically impact the underground reservoirs located inside the fence.
Elderwood/The House in the Woods	An underground stormwater pipe runs within a WisDOT easement on the Elderwood property. The existing stormwater pipe would be replaced within the existing easement, which avoids impact to the house and surrounding property. Construction to excavate and replace the pipe would occur within the easement. There would be temporary impacts of ground disturbance within the easement.

3.18.3. Section 106 Consultation

WisDOT and FHWA have consulted with SHPO as required under Section 106 of the National Historic Preservation Act (NHPA). The SHPO concurred that the study alternatives will not have an adverse effect on historic properties (see **Appendix C**, page C-74).

WisDOT also coordinated with Tribes that may be interested in participating in the Section 106 consultation process. WisDOT sent initial coordination letters to tribes in July 2012 to invite them to become consulting parties. The Forest County Potawatomi Tribe expressed interest in the study and requested results from cultural resource studies (see **Appendix C**, page C-71).

Additional Tribal coordination continued through the study with WisDOT providing updates through WisDOT's coordination meetings held with Tribal Historic Preservation Officers in October 2012 and April 2013. Subsequent to the April 2013 meeting, WisDOT sent out additional correspondence to Tribes to request further participation in the Section 106 consultation process. The Ho-Chunk Nation expressed interest in the study (see **Appendix C**, page C-69).

In October 2013, WisDOT forwarded copies of the Phase I archeolgical survey for I-43 North-South corridor to both the Forest County Potawatomi and Ho-Chunk Nation.

3.19. ARCHAEOLOGICAL RESOURCES

3.19.1. Affected Environment

WisDOT completed a Phase I Archaeological survey of the I-43 North-South Freeway study corridor in June 2013. Survey methodology included literature and records review and field survey. Records and field review identified three sites of archaeological significance within the study area – a campsite/village and two cemeteries. The site of the campsite/village was paved and included a storage building; the site was not relocated. Both cemeteries are located along Port Washington Road. Lakefield cemetery is located just north of Lakefield Road, about 800 feet west of the I-43 freeway. Union cemetery is located about 1,300 feet south of Bender Road, about 100 feet east of Port Washington Road. The survey encountered no archaeological resources in the study corridor.

Archaeological surveys find whether an area being considered for development is likely to contain significant archaeological resources. The surveys help agencies assess whether archaeological remains can be avoided or if resource recovery is needed before development work begins.

3.19.2. Impacts to Archaeological Resources

NO-BUILD

The No-Build Alternative will not affect archaeological resources.

BUILD ALTERNATIVES

The build alternatives would not impact archaeological resources or cemeteries in the study corridor. The I-43 Mainline Modernization – 6 Lanes alternatives would be largely confined to the existing freeway footprint and would not affect Lakefield cemetery. Similarly, neither reconstruction of the I-43 mainline or Port Washington Road would impact Union Cemetery. **Sheets 1 and 16 in Appendix A** show the relationship of the cemeteries to the build alternatives.

3.20. RECREATIONAL RESOURCES AND PUBLIC LAND USES

Public and private parks, recreation and conservation properties are located near the I-43 North-South Freeway Corridor study area. **Exhibit 3-21** and **Exhibit 3-22** show the parks and recreation areas within the vicinity of and next to the study corridor, which are discussed below. **Section 4**, the Section 4(f) Evaluation, provides detailed information on public recreation properties.

3.20.1. Affected Environment

PUBLIC PARKS AND RECREATION AREA/PUBLIC USE LANDS

There are seven public park and recreation areas and public use lands in the study corridor as summarized below.

- **Craig Counsell Park:** The village of Whitefish Bay owns this park located on the east side of Port Washington Road, just south of the UP Railroad bridge.
- **Nicolet High School athletic fields:** The 46-acre school campus includes a 6-acre upper athletic field on the east side of I-43 and track and field facilities, a football field, tennis courts and softball fields on the west side of the freeway.
- **River Hills Memorial Park:** The approximately 2.35-acre park is part of the 11-acre village of River Hills' village hall and public works facilities.
- **Maple Dale Middle School Playground:** The 12-acre school property includes a public playground adjacent to the east side of I-43.
- **Katherine Kearney Carpenter Park:** This 35-acre park is in the city of Mequon, just north of County Line Road, east of I-43.
- **MMSD Greenseams Property:** The Greenseams property, also known as the Mequon wetland, is a 84-acre conservation property for stormwater management and water quality protection. It is located east of I-43 and north of Mequon Road.
- **Bonniwell Wildlife Habitat Area:** The 30-acre open space is located in the southeast corner of Port Washington Road/Bonniwell Road intersection, about 1,100 feet west of I-43.

PRIVATE RECREATION AREAS

Notable private recreation areas in the study area include the following:

- **Missing Links Golf Course and Driving Range:** This facility is a privately run par-3 golf course and driving range in the northwest quadrant of the Highland Road crossing of I-43.
- **The Family Farm:** The Family Farm is a 46-acre privately owned and operated farmstead established for petting and feeding farm animals.
- **Other recreation resources:** A number of privately owned and operated riding stables are in the town of Grafton. Horse trails traverse through the town and cross under I-43 on public right of way on Lakefield Road.

3.20.2. Impacts to Public Parks and Recreation Areas/Public Use Lands

NO-BUILD ALTERNATIVE

The No-Build Alternative would not affect park or recreation areas.

BUILD ALTERNATIVES

The Modernization – 6 Lanes alternative directly impacts Craig Counsell Park and Nicolet High School athletic fields. Under the build alternative, reconstructing Port Washington Road to four lanes would acquire up to 0.05 acres of strip right of way at Craig Counsell Park. At Nicolet High School, reconstructing I-43 and replacing the existing pedestrian tunnel under the highway would acquire up to 0.28 acres of strip right of way from the portion of the school property with athletic facilities on the east side of I-43. **Section 4** provides more discussion of impacts.

No impacts are anticipated at the identified private recreational properties along the I-43 North-South Freeway study corridor. The new Highland Road interchange would be constructed within existing right of way, avoiding the Missing Links Golf Course. The widening that would be done under the I-43 mainline Modernization – 6 Lanes alternative would occur within existing right of way at the Family Farm. The I-43 overpass at Lakefield Road would be reconstructed to allow horse-riding passage within the Lakefield Road right of way.

3.20.3. Mitigation of Adverse Impacts to Public Parks and Recreation Areas/Public Use Lands

WisDOT used measures to avoid and minimize impacts to public parks and recreation areas, by reducing roadway footprints to the greatest practicable extent by using retaining walls. The pedestrian tunnel replacement between Nicolet High School main campus and its upper athletic fields would benefit public recreational uses on the school property by providing an ADA-compliant connection that can be used by both pedestrians and bicyclists. Steeper slopes at Craig Counsell Park minimize the amount of right of way needed to reconstruct Port Washington Road. WisDOT will evaluate providing sufficient room at the I-43 overpass at Lakefield Road to allow horse-riding passage. Additional information on avoidance and minimization measures and coordination with local officials can be found in **Section 4**.

Exhibit 3-21: Locations of Parks, Recreation and Open Space in the South Segment

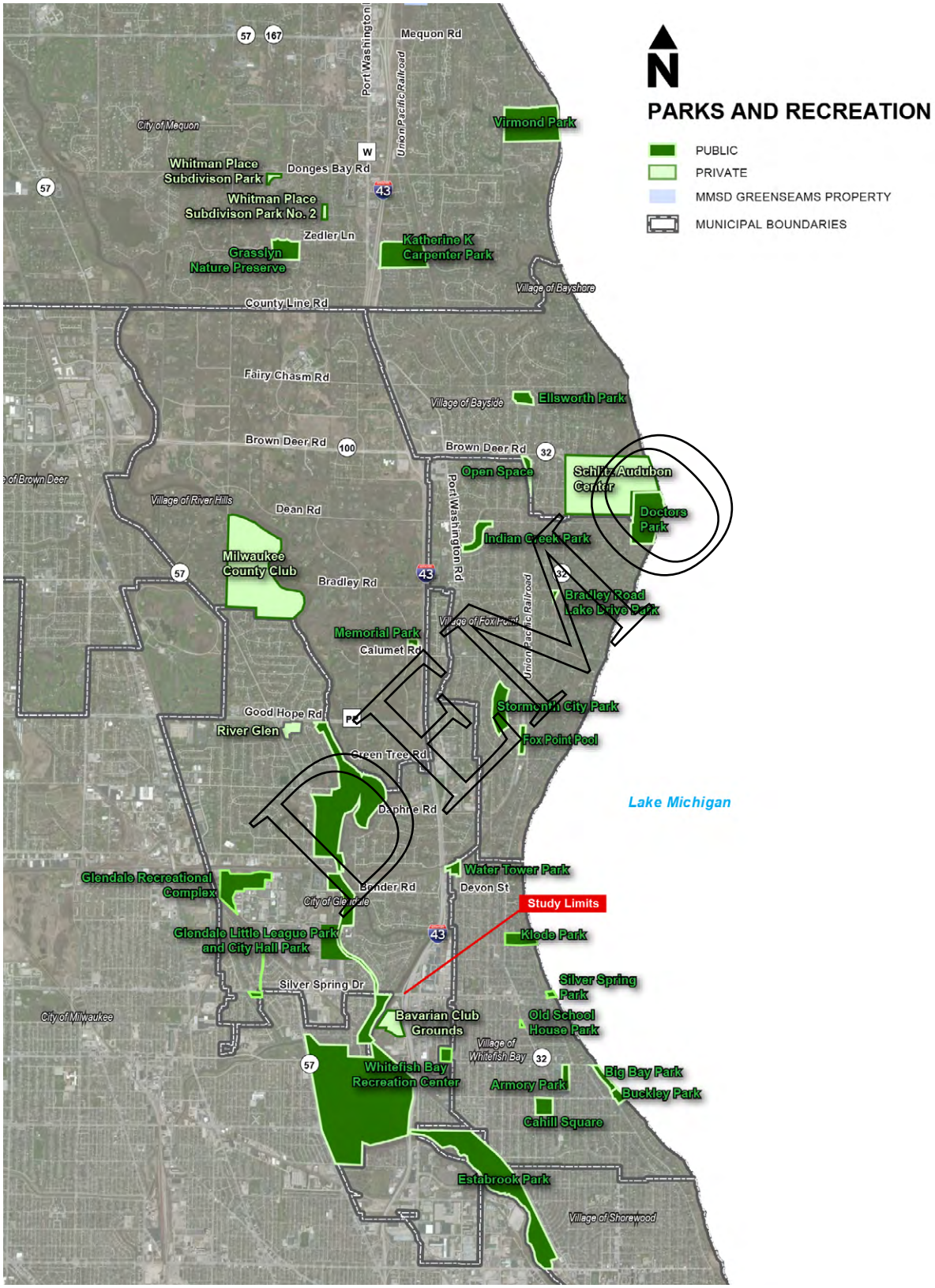
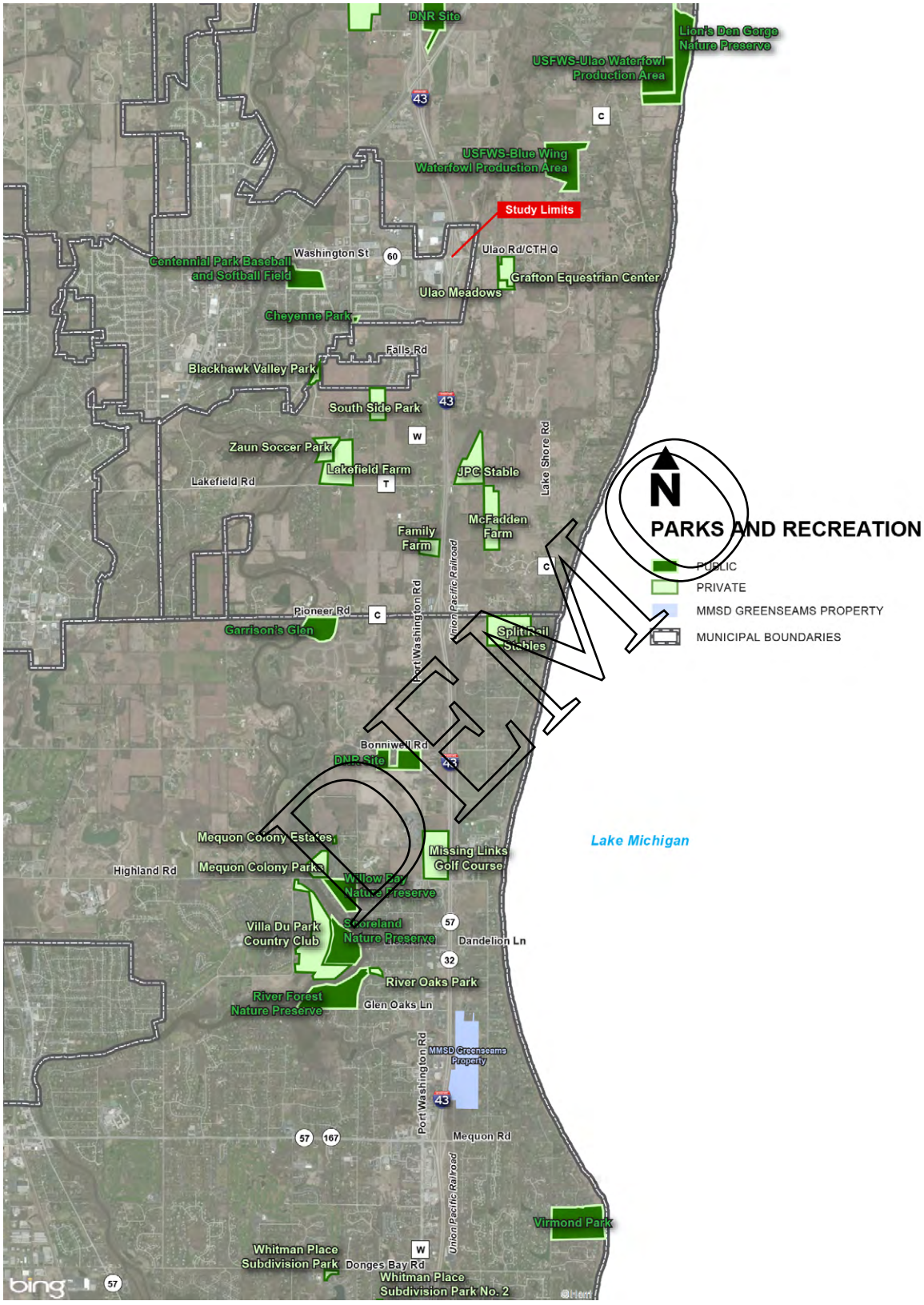


Exhibit 3-22: Locations of Parks, Recreation and Open Space in the North Segment



3.21. CONSTRUCTION

This section identifies effects that would be expected during the construction phase. Construction activities for the I-43 North-South Freeway Corridor study area would include removing existing structures and roadways, bridge construction and widening, retaining wall construction, earthwork, utility relocations, drainage improvements, traffic control, traffic signals, barrier installation, lighting and paving.

Many factors would influence actual construction. Funding is not yet available for the construction of an alternative selected through this study. For this reason, the expected construction duration is not known at this time. Like most transportation projects, construction details cannot be fully defined until design advances past the conceptual stage. All of the build alternatives would have similar construction impacts and are therefore discussed generally.

3.21.1. Construction Costs

NO-BUILD ALTERATIVE

The No-Build Alternative would not initially incur construction costs. However, the study corridor would eventually have to be replaced, which would incur future construction costs.

BUILD ALTERNATIVES

The immediate economic impact of the build alternatives would be expenditure of state and federal funds to reconstruct the I-43 North-South Freeway Corridor Study corridor. **Table 3-35** summarizes the construction costs. The estimate includes real estate acquisition, design costs, construction cost and contingency.

Table 3-35: Build Alternative Construction Costs

Build Alternative	Construction Cost (2013)
I-43 Mainline Modernization – 6 Lanes and interchanges at Good Hope Road, Brown Deer Road, County Line Road, Mequon Road, Highland Road and County C	$ 452 million

WisDOT has tentatively scheduled construction to begin as early as 2020, depending on funding availability and legislative approval. WisDOT and FHWA will use annual inflation rates tied to the Global Price Index, which vary from year to year.

3.21.2. Operation and Maintenance Cost

NO-BUILD ALTERNATIVE

The economic impact of the No-Build Alternative would be the long-term cost of maintaining the existing freeway, including pavement resurfacing or replacement, and bridge rehabilitation or replacement. Increased traffic volumes, particularly heavy trucks, would contribute to the frequency of required pavement maintenance. The public and local governments would bear the increased costs associated with crashes and reduced travel reliability compared with the build alternatives.

BUILD ALTERNATIVES

Maintenance costs under the build alternatives would be less than for the No-Build Alternative because the pavement, bridges and interchanges would be new.

3.21.3. Construction Employment

NO-BUILD ALTERNATIVE

No substantial short-term economic impacts associated with construction employment would result from the No-Build Alternative.

BUILD ALTERNATIVES

Substantial short-term economic impacts would result from the build alternatives compared with the No-Build Alternative. These impacts may be measured by increases in state output and economic activity, employment and job earnings.

Construction expenditures would occur over the duration of construction, directly creating new demand for construction materials and jobs. These direct impacts would lead to indirect or secondary economic impacts, as output from other industries increases to supply the construction industry. The direct and indirect impacts of construction expenditures cause businesses in all industries to employ more workers, leading to induced impacts as the additional wages and salaries paid to workers lead to higher consumer spending, creating new demand in many other economic sectors. The construction job opportunities resulting from the build alternatives would consist of a combination of new jobs and shifting of existing construction jobs to the I-43 North-South Freeway Corridor study area. The types of construction jobs required for reconstructing a highway include:

- Concrete workers
- Asphalt workers
- Truckers
- Heavy equipment operators
- Electricians
- Iron workers
- General laborers
- Engineers
- Surveyors
- Landscapers

3.21.4. Construction Impacts and Mitigation

NO-BUILD ALTERNATIVE

If the No-Build Alternative is selected, no construction impacts other than regular maintenance would occur in the short term. However, WisDOT would perform maintenance on the study corridor freeway and local roadway system more frequently and eventually replace it, resulting in periodic lane closures, construction noise, dust, and other impacts as portions of the freeway are replaced.

BUILD ALTERNATIVES

The section identifies impacts associated with the build alternatives and possible mitigation measures. Commitments would be addressed throughout planning, design and construction phases. Many of these commitments are made as part of construction specifications and implemented during the construction process.

NOISE

Noise would be generated by construction equipment used to reconstruct the study corridor freeway and local roadway system. Typical construction equipment would include dump trucks, graders, cranes, bulldozers, pile-driving equipment and pavement construction equipment. The noise generated by this construction equipment would vary greatly, depending upon the equipment type and model, mode and duration of operation, and specific type of work effort; however, typical noise levels may occur in the 75-to-95-dBA range (at 50 feet). Other distance-typical noise-level ranges are shown on **Table 3-36**.

Table 3-36: Typical Construction Site Noise Levels

Distance from Construction Site (feet)	Range of Typical Noise Levels (dBA)
25	82-102
50	75-95
100	69-89
200	63-83
300	59-79
400	57-77
500	55-75
1,000	49-69

Sources: EPA and WisDOT

Variations in building setbacks and land use, local intensity of specific construction activities, and sequencing and timing of construction would result in varying degrees of exposure to construction noise and subsequent varying levels of resulting impacts. Adverse effects related to construction noise are anticipated to be of a localized, temporary and transient nature.

To reduce the potential impact of construction noise, WisDOT's construction contract will contain provisions requiring operation of motorized equipment in compliance with all applicable local, state and federal laws and regulations relating to noise levels permissible within and adjacent to a construction site. All motorized construction equipment would be required to have mufflers constructed in accordance with the equipment manufacturer's specifications or a system of equivalent noise reducing capacity. WisDOT would also require that mufflers and exhaust systems be maintained in good operating condition, free of leaks and holes.

Ground-borne vibration has the potential to affect nearby buildings. Blasting and impact pile driving are traditionally associated with high levels of vibration. Excavation and backfilling can generate vibration that is perceptible or noticeable in nearby buildings.

Vibration created by the movement of construction vehicles such as graders, loaders, dozers, scrapers and trucks are generally the same order of magnitude as the vibration caused by

heavy vehicles traveling on streets and highways. In general, ground-borne vibration from vehicles on streets is not sufficient to impact adjacent buildings.

Buildings that are in good structural condition would likely not be affected by construction-related vibration. WisDOT would coordinate with adjacent property owners before construction to determine if any buildings near construction areas are in poor structural condition. In communities that do not have vibration ordinances, WisDOT would comply with the Wisconsin Department of Workforce Development vibration regulations.

AIR QUALITY (EMISSIONS AND DUST)

Demolition and construction activities can result in short-term increases in dust and equipment-related particulate emissions in and around the study area. Equipment-related particulate emissions could be minimized if the equipment is well-maintained. The potential air quality impacts would be short-term, occurring only while demolition and construction work is in progress and local conditions are appropriate.

Air quality impacts during construction would be generated by motor vehicle, machinery and particulate emissions resulting from earthwork and other construction activities. Construction vehicle activity and the disruption of normal traffic flows may result in increased motor vehicle emissions within certain areas. Construction vehicle emission impacts could be mitigated through implementing and maintaining a comprehensive traffic control plan, enforcing emission standards for gasoline and diesel construction equipment and stipulating that unnecessary idling and equipment operation is to be avoided. All contractors would be required to comply with all applicable air quality regulations. Dust suppression measures would be implemented throughout the construction process including covering loads of soil, debris and other materials during transport on streets or highways; stabilizing and covering stockpile areas as necessary to avoid windblown dust impacts; and stabilizing and revegetating exposed areas after construction.

Several air quality construction mitigation best management practices are available to assist in reducing diesel emission impacts from construction equipment. Off-road diesel engines can contribute significantly to the levels of particulate matter and nitrogen oxides in the air. In recent years, EPA has set emissions standards for engines used in most new construction equipment. However, it may be several years before all equipment in use is equipped with engines that meet EPA standards. In order to combat this, several strategies can be implemented to reduce emissions from the older engines that are in operation today.

Reductions in pollutant emissions from older off-road diesel engines can be obtained through a variety of strategies including:

- Reducing idling.
- Properly maintaining equipment.
- Using cleaner fuel.
- Retrofitting diesel engines with diesel emission-control devices.

By reducing unnecessary idling at the construction site, emissions would be reduced and fuel would be saved. Proper maintenance of the diesel engine would also allow the engine to perform better and emit less pollution through burning fuel more efficiently. Switching to fuels that contain lower levels of sulfur reduces particulate matter. Using ultra-low sulfur diesel does not require equipment changes or modification. Using fuels that contain a lower level of sulfur also tends to increase the effectiveness of retrofit technologies. Retrofitting off-road construction equipment with diesel emission-control devices can reduce particulate matter, nitrogen oxides,

carbon monoxide or hydrocarbons, in addition to other air pollutants.

Diesel particulate filters can be used to physically trap and oxidize particulate matter in the exhaust stream and diesel oxidation catalysts can be used to oxidize pollutants in the exhaust stream.47 In the final design phase, WisDOT will consider including these measures on a voluntary or mandatory basis.

Fugitive dust impacts generated by construction would be mitigated by standard dust-control measures, which may include the following: frequent watering of construction sites that have large expanses of exposed soil; watering debris generated during demolition; washing construction vehicle tires before they leave construction sites; and securing and covering equipment and loose materials before travel.

Dust control during construction would be accomplished in accordance with WisDOT's Standard Specifications for Road and Bridge Construction, which requires the application of water or other dust-control measures during grading operations and on haul roads. The location and operation of concrete batch plants would be in accordance with the standard specifications, and any special provisions developed during coordination with the WDNR regarding air quality standards and emissions. Any portable material plants would be operated in accordance with WDNR air quality requirements and guidelines. Demolition and disposal of residential or commercial buildings is regulated under WDNR's asbestos renovation and demolition requirements.[49]

TRAFFIC/CONCEPTUAL CONSTRUCTION STAGING

During construction, traffic would be diverted from the study corridor freeway system. Other freeways and local streets would experience increased traffic volumes as drivers avoid construction.

After the construction staging plan is developed, WisDOT would analyze how much traffic would divert from the study corridor freeway system to local streets adjacent to the study corridor such as Port Washington Road, Jean Nicolet Road, Lake Shore Drive and other north-south routes. WisDOT would develop a TMP to minimize delay and disruption in the construction area. Transportation management strategies for a work zone include temporary traffic control measures and devices, public information and outreach, and operational strategies such as transportation operations and incident management strategies. During the design phase, WisDOT and FHWA would evaluate diversion routes to determine if improvements to these routes are necessary. In addition to roadway improvements, signal timing modifications, temporary signals, parking restrictions, intersection improvements, incident management, and demand management options may be instituted during construction to ease potential congestion and delay.

Freeway and local street lane closures would be staged to ease disruptions to the extent possible. Other mitigation measures may include the following:

- Holding workshops to determine methods to reduce the effects of construction on area businesses, residents, commuters, community services, and special events.
- Implementing a community involvement plan to inform the public, including radio, Internet, print and television.
- Encouraging the use of transit and carpooling through advertising, temporarily reduced rates, additional routes, and expanded or new park-and-ride lots.

49 Wisconsin Administrative Code Chapter NR 447

- Encouraging businesses to modify their work schedules and/or shipping schedules to avoid peak traffic hours.

TRANSIT, PEDESTRIAN AND BICYCLE IMPACTS

MCTS routes that use the study corridor would be able to continue service using normal routes, but they may experience delay depending on the nature of construction work at any specific time. It is anticipated that MCTS routes using Port Washington Road would largely be able to continue on existing routes, with some temporary modifications, depending on construction activities. Construction activities may require temporarily relocating bus stops if Port Washington Road is expanded to four lanes.

Local street closures and entrance and exit ramp closures may require bus route modifications. MCTS routes that pass over or under the study corridor on Brown Deer Road may have to be modified if the street is closed during construction where it passes over I-43.

Pedestrians and bicyclists that cross over or under the study corridor may need to temporarily modify their routes during construction. As noted previously, local street closures would be staged to minimize or avoid closure of adjacent streets at the same time.

EROSION/WATER QUALITY

Construction in and near waterways would be performed in accordance with WisDOT's *Standard Specifications for Road and Bridge Construction*; *Wisconsin Administrative Code Trans 401* chapter titled "Construction Site Erosion Control and Stormwater Management Procedures"; and the WisDOT-WDNR cooperative agreement.

There is potential for erosion during construction as soils are disturbed by excavation and grading. Appropriate techniques and best management practices would be employed to prevent erosion and to minimize siltation to environmentally sensitive resources in the study area. Erosion-control devices would be installed before erosion-prone construction activities begin. WisDOT would consult with the WDNR to agree on specific erosion-control measures to include in construction plans and contract special provisions. The construction contractor would be required to prepare an erosion-control implementation plan that includes all erosion-control commitments made by WisDOT while planning and designing the future project. The WDNR reviews the erosion-control implementation plan. The following erosion-control measures may be used during construction:

- Minimizing the amount of land exposed at one time
- Silt fencing
- Sedimentation traps
- Dust abatement
- Turbidity barriers
- Street sweeping
- Inlet protection barriers
- Temporary seeding
- Erosion mats
- Ditch or slope sodding
- Seeding and mulching exposed soils

Under revisions to the WisDOT-WDNR cooperative agreement, *Memorandum of Understanding on Erosion Control and Stormwater Management*, disturbed land would be re-seeded with a mix of fast growing grasses following construction. Drainage systems would be maintained, restored or re-established in a manner that would not impound water.

Additional impact mitigation techniques during construction would include the following, as needed, at a particular location:

- If dewatering is required, dirty water would be pumped into a stilling, or settling, basin before it is allowed to re-enter a stream.
- Trenched-in erosion bales would be installed in areas of moderate velocity runoff; clean-aggregate ditch checks would be installed in ditches with moderate to high velocity runoff during and after construction; and ditches would be protected with erosion bales and matting in conjunction with seeding.
- Storage and fueling of construction equipment would be done in upland areas, away from environmentally sensitive areas. Accidental spills during refueling at construction sites or as a result of an accident involving hazardous material haulers would be handled in accordance with local government response procedures. First response would be through local fire departments and emergency service personnel to ensure public safety and to contain immediate threats to the environment. Depending on the nature of the spill, the WDNR would then be notified to provide additional instructions regarding cleanup and restoration of any affected resources. The cost of cleanup operations is the responsibility of the contractor or carrier involved in the spill. Further, WisDOT's standard specifications state that public safety and environmental protection measures shall be enforced by the construction contractor.
- Contractors would be required to follow WDNR guidelines for ensuring that construction equipment used in or near waterways is adequately decontaminated for zebra mussels and plant exotics including purple loosestrife and Eurasian milfoil.

Subsection 3.10.3 provides additional information about water quality mitigation and best management practices.

MATERIAL SOURCE/DISPOSAL SITES

The construction contractor is responsible for the selection of material source sites. Material would most likely be obtained from local existing quarry sites. Unusable excavated material would be disposed of by the contractor in accordance with WisDOT's *Standard Specifications for Road and Bridge Construction*, or special provisions to ensure protection of wetlands and waterways. Local zoning, reclamation plans and other approvals may be needed for materials source and disposal sites.

Soil and excavated material (including vegetation) would be stockpiled or disposed of in an upland area, away from wetlands, streams, and other open water; and, where applicable, silt fence would be placed between the disposal area and wetland and open water areas. If any material sources are necessary to construct the future project, appropriate erosion-control measures would be applied to these sites during and following construction; and following use, such sites would be properly seeded, mulched and protected from erosion. Any portable materials plants would be managed to prevent erosion, and WDNR would be able to review site plans including any gravel-washing operations, high-capacity wells, and site closure and restoration.

INVASIVE SPECIES

WDNR promulgated an invasive species rule in August 2009 (*Wisconsin Administrative Code NR 40*, "Invasive Species Identification, Classification and Control"). The rule states that reasonable precautions should be taken to prevent or minimize the transport, introduction, possession or transfer of invasive species. Reasonable precautions include best management practices such as those recommended by the Wisconsin Clean Boats, Clean Water program and Stop Aquatic Hitchhikers campaign.

In response to *Wisconsin Administrative Code NR 40*, the Wisconsin Council on Forestry led development of invasive species best management practices for utility and transportation corridor construction and maintenance activities. This effort included representatives from WisDOT, WDNR, utilities, highway construction industry, Wisconsin County Highway Association, Wisconsin Towns Association, and the Public Service Commission. A manual titled *Invasive Species Best Management Practices for Transportation and Utility Rights-of-Way* (latest version Jan. 6, 2009) provides best management practices that reduce the impact of non-aquatic invasive species. The manual is intended to help utility and transportation practitioners comply with the reasonable precaution requirements in *Wisconsin Administrative Code NR 40* and it has been made available to statewide to contractors by the Wisconsin Transportation Builders Association. The manual contains the following best management practices on soil disturbance and transport of material:

- Plan activities prior to construction to limit the potential introduction and spread of invasives
- Manage the load of transported materials to limit the spread of invasives
- Establish staging areas and temporary facilities in locations free of invasives
- Use soil and aggregate material from sources free of invasives
- Manage stockpiles to limit the spread of invasives
- Clean equipment prior to moving between infested and non-infested areas.
- Minimize soil disturbance by using existing roads, access points and staging areas
- Stabilize disturbed soils as soon as possible and use non-invasive seed for revegetation.

In addition, contractors would be required to follow WDNR guidelines for ensuring that construction equipment used in or near waterways is adequately decontaminated for zebra mussels and plant exotics including purple loosestrife and Eurasian milfoil.

CULTURAL RESOURCES

If previously unrecorded cultural resources are found during construction, activities in the site area would be immediately halted, and the project manager would immediately notify WisDOT's Bureau of Technical Services, who would then notify FHWA and any interested consulting parties.

3.22. INDIRECT AND CUMULATIVE EFFECTS

This subsection summarizes the indirect and cumulative effects (ICE) analyses of the I-43 North-South Freeway Corridor Study alternatives. A more detailed discussion of indirect and cumulative effects is provided in the *I-43 North-South Freeway Corridor Study Indirect and Cumulative Effects Analysis* report (WisDOT 2013), which is included as **Appendix I** on the CD included with this EIS.

The CFR Title 40 defines indirect and cumulative effects as follows:

- Indirect effects are caused by the action (the I-43 North-South Freeway Corridor Study alternatives) 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 the 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).
- Cumulative effects are the impacts on the environment, which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time (40 CFR § 1508.7).

3.22.1. Indirect Effects

The indirect effects analysis used the following systematic six step approach as outlined in WisDOT's *Guidance for Conducting an Indirect Effects Analysis* (WisDOT 2007):

- Step 1: Scoping, selecting activities, and determining the study area
- Step 2: Inventory the study area and notable features
- Step 3: Identify the impact-causing activities of the proposed project alternatives
- Step 4: Identify the potentially significant indirect effects
- Step 5: Analyze the indirect effects and evaluate assumptions
- Step 6: Assess consequences and identify mitigation activities

Each step is summarized in the following subsections.

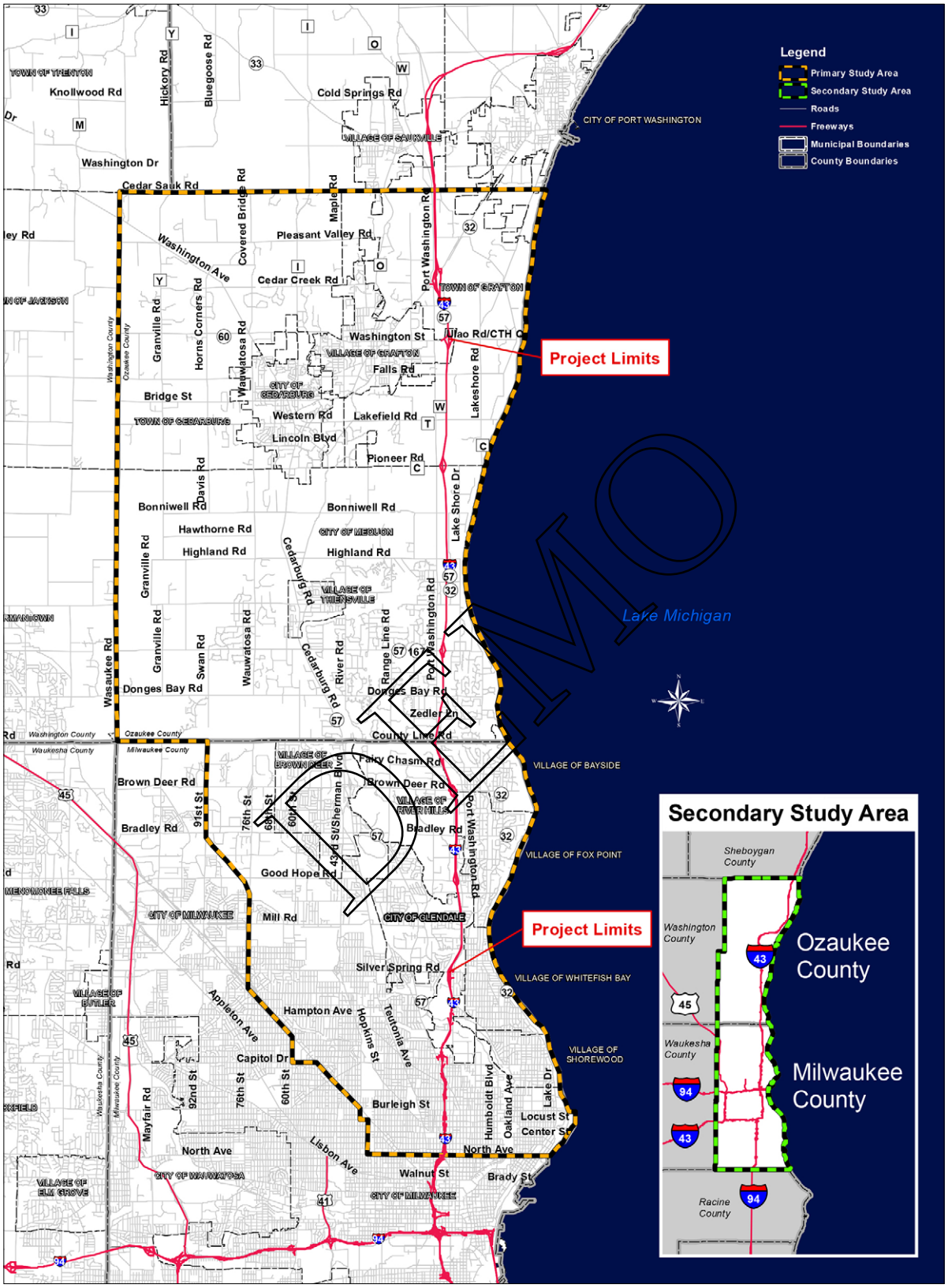
STEP 1: SCOPING, SELECTING ACTIVITIES AND DETERMINING THE STUDY AREA

WisDOT developed a qualitative approach for the indirect effects analysis, which is based on trend data, land use and economic development plans, natural and historic resource inventories, and input from local and regional stakeholders.

Stakeholder input was an important component of the analysis. Stakeholder input helped determine the indirect effects study area, collect information about the study area and identify potential indirect effects. WisDOT conducted stakeholder interviews early on in the study process (January-March 2013) with local government representatives and economic development organizations. Additional stakeholder interviews were conducted in October 2013. WisDOT held a focus group meeting on July 11, 2013, to obtain input on the indirect effects analysis and to finalize the study area boundary. Meeting documentation is provided in the ICE report.

The study area for the indirect effects analysis is based on information collected and analyzed in Step 2 below and stakeholder input. Two study areas, a primary and a secondary, were evaluated for the indirect effects analysis. The study areas are shown on **Exhibit 3-23.**

Exhibit 3-23: Indirect Effects Analysis Primary Study Area



The primary study area contains areas that have the greatest likelihood for indirect effects. The boundary for the primary study area, with the exception of the city of Milwaukee, follows civil divisions for the following communities in Milwaukee and Ozaukee counties:

- Milwaukee County: city of Milwaukee (only a portion of the city), city of Glendale and the villages of Shorewood, Whitefish Bay, Fox Point, Bayside, River Hills and Brown Deer.
- Ozaukee County: cities of Mequon and Cedarburg, the villages of Thiensville and Grafton and the towns of Cedarburg and Grafton.

The primary study area encompasses the existing commercial and industrial areas served by the I-43 North-South corridor that could be susceptible to change over the transportation planning horizon of 2040. It also includes planned residential and business areas that may be developed by 2040. In addition, the primary study area contains residential neighborhoods, business districts and environmental resources that could be indirectly affected by potentially induced land use effects and the encroachment of infrastructure. The most detailed information was collected for the primary study area.

The secondary study area includes the areas in Milwaukee and Ozaukee counties outside the primary study area. The purpose of the secondary study area is to provide an understanding of intraregional demographic and land use trends that may be influenced by the I-43 North-South corridor beyond the primary study area boundaries. Milwaukee and Ozaukee counties were selected for the secondary study area because I-43 is the major transportation corridor that links communities and businesses along the corridor within the two counties.

The timeframe for the analysis is 2040—20 years after construction—which coincides with the design year of the freeway project and the availability of population, employment and land use information.

STEP 2: INVENTORY THE STUDY AREA AND NOTABLE FEATURES

This section summarizes the population, employment, and land use trends for the primary and secondary study areas and inventories natural and cultural resources. More detailed information is provided in the ICE report and in **Subsection 3.6** and Subsections 3.10 to 3.14.

POPULATION TRENDS

Milwaukee and Ozaukee counties are located within the southeastern Wisconsin region, which is comprised of Milwaukee, Racine, Kenosha, Ozaukee, Washington, Waukesha and Walworth counties. According to SEWRPC, the region had a population of 2,019,970 in 2010, which was a 4.6 percent increase since 2000.

Milwaukee County is the most populous county in the region with a population of 947,735 as of 2010. After several decades of population decline, the county's population increased slightly by 7,571 (0.8 percent) between 2000 and 2010. Ozaukee County is the least populous county in the region with a population of 86,395 as of 2010. Ozaukee County's population has been steadily increasing for several decades. Between 2000 and 2010, the county's population increased by 4,078 (5 percent), which was its slowest rate of growth in several decades.

Milwaukee County's share of the regional population has been declining for the past several decades. In 1960 Milwaukee County contained 65.8 percent of the region's population, and 46.9 percent of the region's population in 2010. Ozaukee County's percentage of the regional population has increased slightly from 2.5 percent in 1960 to 4.3 percent in 2010.

SEWRPC's 2050 population projections show both counties are expected to gain population. Milwaukee County is expected to add nearly 28,969 persons between 2010 and 2050, which is a 3.1 percent increase. Ozaukee County is expected to add nearly 22,680 persons by 2050, which is a 26.3 percent increase.

While population has increased overall in Milwaukee and Ozaukee counties, the primary study area contained 298,051 people in 2010, which was a 2.2 percent decrease since 2000. The Milwaukee County portion of the primary study area had a total population of 239,000 in 2010, which was a decrease of just over 9,600 (-3.9 percent) since 2000. The Ozaukee County portion of the primary study area had a population of 59,051 in 2010, which was a 5.1 percent increase since 2000.

EMPLOYMENT TRENDS

Employment levels for the southeastern Wisconsin region in 2010 were at 1,176,600, which was a 2.7 percent decrease from 2000. According to SEWRPC, prior to the 2000s, the region had experienced a substantial net increase in jobs each decade going back to at least 1950. Job losses during the 2000s were due to the national economic recession that occurred in the late 2000s.

Milwaukee County is the largest county in the region in terms of employment. It had 575,400 jobs in 2010. Within the region, Milwaukee County was the hardest hit by the economic recession of the late 2000s and lost 42,900 jobs between 2000 and 2010. Prior to the 2000s, Milwaukee County had relatively slow, but stable employment growth. Within the region, Ozaukee County contains the smallest numbers of jobs. In 2010, the county had 52,500 jobs, which was a slight increase of 2,100 jobs since 2000. Ozaukee County's employment growth during the 2000s (4.2 percent) was much slower in comparison to the employment growth experienced during the 1990s (43.6 percent) and the 1980s (24.5 percent).SEWRPC's employment projections show that both counties are expected to gain employment between 2010 and 2050. Milwaukee County is expected to add over 33,000 jobs and Ozaukee County is expected to gain nearly 17,000 jobs.[50]

According to the U.S. Census Transportation Planning Package (CTPP) place of work data, the city of Milwaukee contains the largest number of jobs at 288,037 (whole city) as of the 2006-2010 reporting period, which was a gain of 2,677 employees since 2000. The city of Mequon, city of Glendale and village of Brown Deer contained the next largest amounts of employment at 14,635, 14,454 and 8,712, respectively, during the 2006-2010 reporting period. The city of Mequon gained over 1,300 employees between 2000 and the 2006-2010 reporting period, while Glendale and Brown Deer saw a reduction of 446 and 698 jobs, respectively. The remaining communities within the primary study area had employment levels under 6,000 during the 2006-2010 reporting period. Of these communities, the villages of Whitefish Bay and Fox Point had an increase in employment, while the village of Shorewood, city of Cedarburg and village of Grafton experienced a slight decline in employment.

EXISTING LAND USE

This subsection provides an overview of the existing land uses for the study areas as of 2010. In Milwaukee County, urban land uses made up 82 percent of the land area and nonurban land uses made up 18 percent. Ozaukee County, in contrast to the urbanized character of Milwaukee County, contained 26 percent urban land uses and 74 percent nonurban land uses. Residential land uses make up the largest percentage of urban land uses for both counties. Ozaukee

[50] *SEWRPC. Technical Report No. 10: The Economy of Southeastern Wisconsin Preliminary Draft (5th Edition). Jan. 23, 2013.*

County has a higher percentage of urban land in residential use at 51.3 percent compared to Milwaukee County at 40.7 percent. Transportation uses, which include all motor vehicle, air and rail related uses, is the second largest urban land use category for both counties, accounting for about 25 percent of the land area of each county. Milwaukee County contains 6.3 percent of commercial land use and 5.9 percent of industrial land use. These are slightly higher percentages in comparison to Ozaukee County that is 3 percent commercial and 4.5 percent industrial. The largest percentage of nonurban land uses in Milwaukee County is natural areas (43.7 percent), which include wetlands and woodlands. In Ozaukee County, the largest nonurban land use category is agricultural at 67.9 percent.

For the primary study area, urban land uses comprise 91.1 percent of the Milwaukee County portion of the primary study area, which is higher compared to the county as a whole. The Ozaukee County portion of the primary study area contains 40.3 percent urban land uses, which is also higher compared to the county as a whole. This is expected because the Ozaukee County portion of the primary study area contains the most urbanized areas of the county.

The distribution of most urban land uses categories within the primary study area is similar to the distribution of land uses within the individual counties as a whole. One slight difference is with industrial land uses. The Milwaukee County portion of the primary study area has a slightly higher percentage of industrial land uses (7 percent) compared to the county as a whole (5.9 percent). Industrial land uses for the Ozaukee County portion of the primary study area (3 percent) have a slightly smaller percentage of industrial land uses compared to the county as a whole (4.5 percent).

Nonurban land uses for the Milwaukee County portion of the primary study area comprise a smaller percentage of the land area (8.9 percent) compared to the county as a whole (18 percent). Natural areas comprise the majority (53.8 percent) of nonurban land uses within the Milwaukee County portion of the primary study area. Although, natural areas comprise a fairly small percentage (4.8 percent) of the overall land area within the Milwaukee County portion of the primary study area.

The Ozaukee County portion of the primary study area contains 59.7 percent nonurban land uses, which is less than the county as a whole (74 percent). Agricultural land uses make up the largest percentage (60.2) of nonurban land uses for the Ozaukee County portion of the primary study area. However, agricultural uses comprise a much smaller percentage (35.9 percent) of the overall land area of the Ozaukee County portion of the primary study area compared to the county as a whole (50.2).

LAND USE TRENDS

This section summarizes the land use and development trends within the primary study area. **Exhibit 3-24** and **Exhibit 3-25** depict the development trends within the Milwaukee County and Ozaukee County primary study areas. A community-by-community description is provided in the ICE report.

Exhibit 3-24: Land Use Trends for Primary Study Area – South Segment

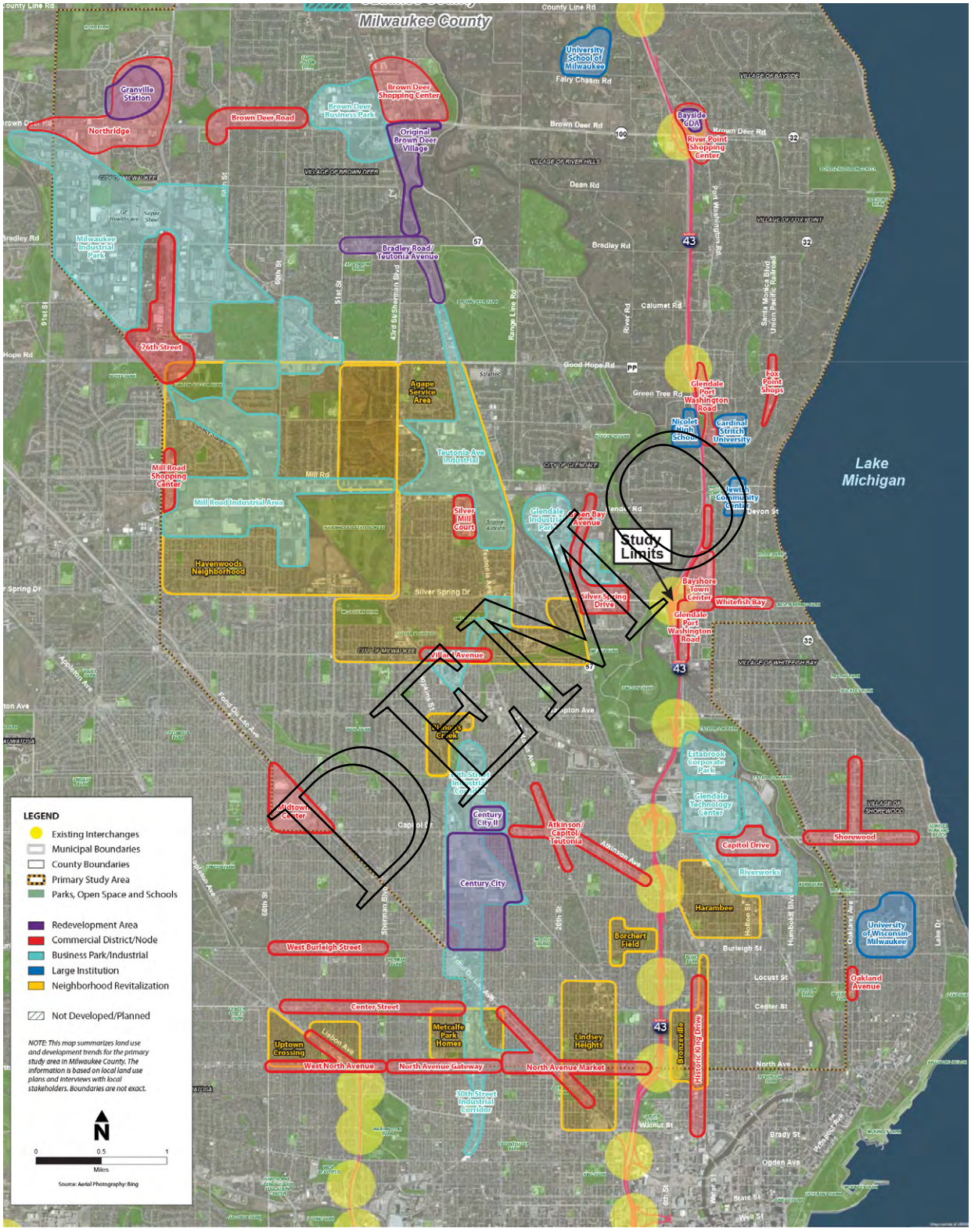
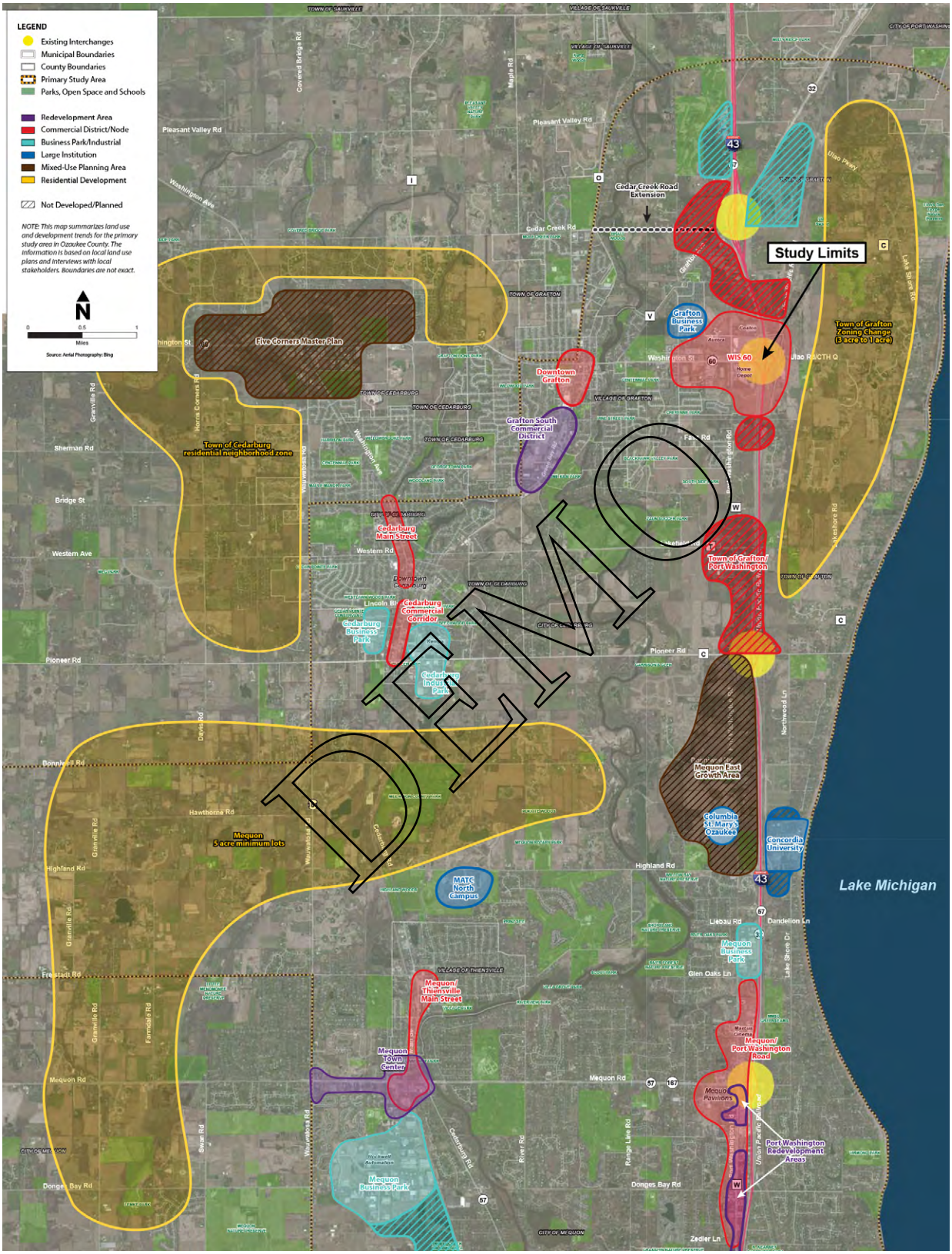


Exhibit 3-25: Land Use Trends for Primary Study Area – North Segment



Milwaukee County

Land uses in the Milwaukee County portion of the primary study area can generally be characterized by fully developed mature urban areas. The area includes portions of the north and northwest sides of the city of Milwaukee as well as the seven Milwaukee County suburbs that are known as the “North Shore.”

The residential neighborhoods within the Milwaukee County portion of the primary study range from very affluent North Shore suburban communities to some neighborhoods that are more fragile or even distressed within the city of Milwaukee. According to the SEWRPC 2035 regional land use plan, high density housing (at least 7 units/acre) is located in the southern half of the Milwaukee County portion of the primary study area and portions of the city of Milwaukee’s northwest side. The higher density areas typically follow a street grid pattern. The North Shore communities of Glendale, Fox Point, Bayside and Brown Deer contain mostly medium density housing (2.3 to 6.9 units/acre) with some areas of low density urban housing (0.7 to 2.2 units/acre) mostly along Lake Michigan. These areas tend to have a more suburban street pattern. The village of River Hills is the only Milwaukee County suburb that has a rural density residential (no more than 0.2 units/acre) classification.

The commercial areas within the Milwaukee County portion of the primary study area are located along the east-west arterials, Port Washington Road and at I-43 interchanges. The Bayshore Town Center near I-43 and Silver Spring Drive is the main regional shopping center in the Milwaukee County portion of the primary study area. Community scale commercial districts include the Brown Deer Shopping Center, River Point Shopping Center, Capitol Drive, Midtown and the former Northridge Mall/Granville Station area. Several neighborhood level commercial districts are present such as the Mill Road Shopping Center, the Fox Point Shops, the Whitefish Bay commercial district along Silver Spring Drive and the Historic King Drive district.

The Milwaukee County portion of the primary study area contains a relatively large amount of industrial land uses. The 30th Street Industrial Corridor, which includes the Century City redevelopment area, is located on the southern end of the Milwaukee County primary study area. The Estabrook Corporate Park, Glendale Technology Center and Riverworks are located on the east side of I-43 in the southern portion of the Milwaukee County primary study area. Other industrial clusters include Teutonia Avenue and Havenwoods areas and the Milwaukee Industrial Park on the city’s northwest side. The Village of Brown Deer also contains several industrial businesses.

Redevelopment opportunities within the North Shore communities are largely limited by well-established land use patterns, a large amount of land dedicated to residential uses and local land use policies that tend to favor smaller-scale developments. The city of Milwaukee portion of the primary study area presents the greatest opportunities for redevelopment at the Century City industrial park and the former Northridge Mall/Granville Station area.

Ozaukee County

The Ozaukee County portion of the primary study area encompasses the southern portion of the county. It can be characterized by established urban areas with adjacent tracts of undeveloped land and low intensity development. It is the most urbanized portion of the county and contains the county’s primary economic centers.

The urbanized areas of the Ozaukee County portion of the primary study area contain concentrations of low and medium density residential development within the urban service areas.

The non-urbanized areas have been infilling with residential uses that currently have a more scattered large lot development pattern. The communities' land use plans anticipate agricultural lands will continue to transition to residential uses over time and do not have agricultural preservation ordinances.

The Ozaukee County primary study area has two commercial districts along I-43 at Mequon Road and WIS 60. In addition, Mequon/Thiensville, the city of Cedarburg and the village of Grafton have small downtown areas with smaller scale retail and service uses. Additional community- serving commercial areas are located along Cedarburg Road at the south end of the city of Cedarburg, the south commercial district in the village of Grafton and the Five Corners area in the town of Cedarburg. The WIS 60 commercial area is the newest district within the Ozaukee County portion of the primary study area and its business base is continuing to expand. The Mequon Road district is undergoing a redevelopment phase as are the downtown districts in Grafton and Mequon/Thiensville. Historic downtown Cedarburg continues to be a draw for tourists.

The three existing business parks in the Ozaukee County portion of the primary study area are located in Grafton, Cedarburg and Mequon.

Future residential and business development is planned as part of Mequon's East Growth Area, the Five Corners Master Plan and the WIS 60 and WIS 32 interchange areas.

NATURAL AND CULTURAL RESOURCES

The Milwaukee River watershed encompasses most lands within the Milwaukee County and Ozaukee County portions of the primary study area. The primary study area also includes the Fish Creek watershed, which directly flows to Lake Michigan, and a portion of the Sauk Creek watershed in the Port Washington area.

In the Milwaukee County portion of the primary study area, the remaining natural, biological, and recreational resources generally lie within narrow bands of environmental corridors along the Milwaukee River and the Lake Michigan shoreline. The WDNR identifies the Milwaukee River as one of six legacy places in Milwaukee County, meaning the river is critical to meet the State's conservation and recreation needs over the next 50 years.[51] Also, SEWRPC classifies the Milwaukee River and Lake Michigan shoreline as a primary environmental corridor, which designates these resources as areas that contain the best remaining elements of the natural resource base in Southeast Wisconsin that are a priority for preservation. Many of the parks and public recreation resources in Milwaukee County are also located in these environmental corridors as well.

Other natural resources are also found along tributaries to the Milwaukee River and Fish Creek that cross I-43, including Indian Creek. Much of the land within the environmental corridor along the Milwaukee River is publicly owned, which preserves the resource in perpetuity. Other notable natural areas include the Kletzsch Park Woods along the Milwaukee River, Schiltz Audubon Center./ Doctors Park Woods and Beach and Fox Point Bluffs and Ravines. SEWRPC notes each of these areas contain diverse and native mesic, dry-mesic woodland habitats.

Ozaukee County is less urban than Milwaukee County and contains extensive open and undeveloped lands. As a result, the county has an extensive natural resource base. In the Ozaukee County portion of the primary study area, primary environmental corridors are located adjacent to the Milwaukee River and the many streams that feed into the river, and along the

51 SEWRPC. A Land and Water Resource Management Plan for Milwaukee County: 2012-2021. August 2011.

Lake Michigan shoreline. In its park and open space plan for Ozaukee County,[52] SEWRPC identified several notable natural areas, many of which are located along the Milwaukee River, Ulao Creek and the Lake Michigan shoreline. Some of the more substantial resources in the primary study area include:

- Fairy Chasm State Natural Area – Fish Creek flows through this area, which is a deep wooded ravine leading to Lake Michigan. The area is significant because cold air flow enables plants with more northerly affinities to grow this far south..
- Donges Bay Gorge – A deep ravine leading to Lake Michigan containing northern relict species.
- Abbott Woods and Ravine – A ravine along Lake Michigan with mesic woods and white cedar.
- Kurtz Woods State natural Area – A southern mesic hardwood, remnant of pre-settlement forests that once dominated the area.
- Ville du Parc Riverine Forest – One of the last remnants of riverine forest along the Milwaukee River.
- Mequon Wetland – An extensive mixed wetland area adjacent to I-43. It is part of the Milwaukee Metropolitan Sewerage District's (MMSD) Greenseams Program to preserve important tracts of land for flood management.
- Grafton Woods – A mesic woodlands near the Milwaukee River with diverse species.
- Cedar Heights Gorge – A gorge leading to Lake Michigan, dominated by white cedar.
- Ulao Lowland Forest – A large lowland hardwoods that contain headwaters of Ulao Creek.
- Lions Den Gorge – A deep ravine leading to Lake Michigan, dominated by white cedar and hardwoods with herbs and some northern relicts.

Many of the federal, state and county-owned park and open space sites in Ozaukee County are associated with the sites listed above, including Lion's Den Gorge Nature Preserve, U.S. Fish and Wildlife waterfowl production areas and WDNR wildlife areas. The Milwaukee River also supports a number of threatened and endangered fish species as described in **Subsection 3.13**.

Ozaukee County has been implementing a Fish Passage Program to improve watershed habitat along the Milwaukee River. The goal of the program is to reconnect 158 stream miles that lead to Lake Michigan by reducing aquatic invasive species, replacing culverts, removing a dam and creating naturelike fish-passage ways. The projects will help to reestablish lake sturgeon, walleye and northern pike fish populations.

SEWRPC notes that more than 240 historic places and districts in Milwaukee County are currently on the National Register of Historic Places (NRHP), and 34 listed properties and districts on the NRHP are in Ozaukee County. A far higher number of properties are included in the State's Wisconsin Architecture and History Inventory.[53]

WisDOT identified three new properties in Milwaukee County and two additional properties in Ozaukee County that are potentially eligible for listing on the NRHP (see **Subsection 3.18**).

[52] *SEWRPC. Planning Report No. 133: A Park and Open Space Plan for Ozaukee County. Community Assistance (3rd Edition). June 2011.*

[53] *SEWRPC, 2011*

STEPS 3 AND 4: IDENTIFY IMPACT CAUSING ACTIVITIES OF THE PROPOSED PROJECT ALTERNATIVES AND IDENTIFY POTENTIALLY SIGNIFICANT INDIRECT EFFECTS

The build alternatives were reviewed to determine the activities that have the potential to cause indirect effects. It was determined that the following impact causing activities may contribute to indirect effects as follows:

- Adding a new travel lane in each direction of the mainline freeway could indirectly affect land uses within the primary and secondary study areas by enabling faster and more reliable travel between Milwaukee and Ozaukee counties.
- Building a potential new interchange at Highland Road could facilitate planned development within the Ozaukee County primary study area, especially within the city of Mequon.
- Reconstructing existing interchanges could help facilitate development within existing redevelopment sites and planned development sites in the Milwaukee and Ozaukee primary study areas.
- Expanding Port Washington Road would help support existing land use patterns within the Milwaukee County primary study area, especially within the city of Glendale.
- The encroachment of the freeway could indirectly affect the quality of residential neighborhoods, business districts and natural resources.

STEP 5: ANALYZE THE INDIRECT EFFECTS AND EVALUATE ASSUMPTIONS

Step 5 evaluates the likelihood and magnitude of the indirect effects under the build alternatives and compares the effects to the No-Build Alternative. The subsequent sections first discuss potential land use effects. Then, the second section evaluates the potential for encroachment-alteration effects.

LAND USE EFFECTS

Several research studies have proven that transportation and land use are highly linked and that land use effects can occur as a result of improved transportation accessibility that enables faster or more reliable travel between destinations or by enabling new access to destinations. The most recent research on this topic was published in 2012 by the Transportation Research Board (TRB). The report, *Interactions Between Transportation Capacity, Economic Systems, and Land Use*, analyzed 100 transportation case studies.[54] According to the TRB report, the case studies confirmed the following typical sequence of impacts that can occur over time as a result of improved transportation accessibility:

- Land becomes more attractive as a place to live, work or recreate.
- Building construction and investment occurs.
- Residential and employment growth occurs.
- Local tax revenues rise and sales and income taxes increase.

Improved transportation accessibility alone is not enough to effect land use change. As documented in the TRB report, other non-transportation local factors such as market demand, availability of land, local government development policies, availability of sewer and water services and local economic conditions will affect the magnitude of a transportation project's long-term economic impact. According to the report, transportation case studies with supportive

[54] *Interactions Between Transportation Capacity, Economic Systems, and Land Use. SHRP2 Capacity Research. Report S2-C03-RR-1. Transportation Research Board. 2012.*

local factors were most likely to create positive economic development outcomes and case studies that lacked local supporting factors or had distressed economies inhibited economic development.

The following subsections evaluate the magnitude of potential land use effects that could result from the impact causing activities identified in Steps 3 and 4 above and considers the presence of supportive other non-transportation local factors.

New Travel Lanes

Under the build alternatives, transportation accessibility and reliability would be improved by adding one new through-travel lane in each direction throughout the study corridor for a total of six lanes. This could reduce travel times during peak travel periods and it could make travel times more consistent.

Under the No-Build Alternative, most segments of the study corridor would operate at level of service E or F either in the morning or afternoon peak hour, or both. Under the build alternatives traffic flow would improve and the study corridor would generally operate at level of service D or better during the morning and afternoon peak hour in 2040. The addition of new travel lanes would also improve traffic flow to the south of the study corridor by eliminating a known traffic bottleneck along I-43 near Bender Road in Glendale. Currently, this location is the transition between four and six freeway lanes. Six lanes are provided south of Bender Road and four lanes are provided to the north of Bender Road.

Land use effects related to the addition of new lanes are considered for the Milwaukee County and Ozaukee County primary study area because this is the area that has the most supportive non-transportation factors present and is the focus of most urban development within Ozaukee County. Effects to the secondary study are also considered for this impact causing activity because capacity expansion could have more dispersed effects that can be spread over a larger area.[55]

Milwaukee County Primary Study Area. New travel lanes are likely to facilitate planned redevelopment within the Milwaukee County primary study. This was confirmed with participants at the July 11, 2013 focus group meeting that said the I-43 corridor is highly interconnected with local land use and development because it is the primary transportation route that serves the businesses and communities within the Milwaukee County portion of the primary study area. Overall, the focus group participants believed that a modernized I-43 freeway corridor that includes capacity expansion, safety enhancements and improved aesthetics was needed to help maintain the competitiveness of the communities and business districts that are served by I-43. Also, an improved I-43 corridor could help facilitate access to employment within the county and adjacent counties because I-43 serves as the main commuting route for many Milwaukee County primary study area residents. In addition, new travel lanes could increase the competiveness of the industrial areas within the Milwaukee County primary study area by improving the efficiency of freight movements. According to local stakeholder input, transportation improvements that benefit industrial areas in Milwaukee County subsequently help to revitalize and strengthen urban neighborhoods by creating transit-accessible jobs in close proximity to minority and low-income individuals who more often than the general population need to rely on transit to reach employment.

[55] *Interactions Between Transportation Capacity, Economic Systems, and Land Use. SHRP2 Capacity Research. Report S2-C03-RR-1. Transportation Research Board. 2012.*

Other supporting non-transportation local factors are present within the Milwaukee County primary study area to help facilitate planned redevelopment. According to stakeholders and local land use plans, communities within the Milwaukee County portion of the primary study area are taking steps to revitalize distressed neighborhoods, encourage redevelopment and create industrial development. Several non-supportive local factors are also present that influence the magnitude of this land use effect. The Milwaukee County portion of the primary study area contains mature communities that are fully developed and the local population growth rates are relatively slow or declining. Also, some areas within the city of Milwaukee have high poverty rates, which can make it challenging to encourage private sector development. In addition, redevelopment opportunities within the North Shore communities are limited due to a prevalence of residential land uses and government zoning policies that protect residential neighborhoods.

Ozaukee County Primary Study Area. Adding new travel lanes would facilitate planned development within the Ozaukee County portion of the primary study area by reducing commuting times between Ozaukee and Milwaukee Counties. The Ozaukee County primary study area is an attractive place for commuters to live given its close proximity to higher paying jobs in Milwaukee County. Only about seven percent of Ozaukee County's workers are employed within Ozaukee County and just over 50 percent of the county's workforce is employed in Milwaukee County. As a result, capacity expansion may encourage more people to live in Ozaukee County, and in turn, would encourage additional commercial and industrial development (in conformance with local plans). Capacity expansion could also facilitate the continued redistribution of population between Milwaukee and Ozaukee counties. According to SEWRPC, about 9,600 people moved from Ozaukee County to Milwaukee County between 2000 and 2010 and 16,840 people moved from Milwaukee County to Ozaukee County resulting in a net in-migration of 7,200 people for Ozaukee County.[56]

Several supportive non-transportation local factors are present to support these findings. SEWRPC's projections indicate that Ozaukee County is expected to continue to increase its population and employment over the next 40 years. Also, the communities in the Ozaukee County portion of the primary study area have available land to accommodate growth either within their existing municipal boundaries or through annexation. The communities' land use plans anticipate agricultural lands will continue to transition to residential uses over time and do not have agricultural preservation ordinances. The primary study area communities in Ozaukee County are planning for new development areas and at the same time are taking steps to redevelop older business corridors. Pro-development public sector actions taken by communities within the Ozaukee County portion of the primary study area include extending sewer and water services, annexing land when petitioned by private developers, making zoning changes and creating tax increment districts and other financial incentives to promote development. Furthermore, the southern portion of Ozaukee County is desirable for business development because it is close to the existing population base and supply of labor. Even though the recession of the late 2000s has resulted in a historically slow development pace throughout the late 2000s and early 2010s, some new development is occurring within the Ozaukee County portion of the primary study area. As the economy continues to recover, it is likely that the pace of development would increase.

The magnitude of this land use effect discussed in the previous paragraphs is expected to be moderated by several factors. The original construction of I-43 greatly improved accessibility

[56] *SEWRPC. Technical Report No. 11: The Population of Southeastern Wisconsin Preliminary Draft (5th Edition). Dec. 17, 2012.*

to Ozaukee County and most likely helped to facilitate the spread of development along the I-43 corridor in Ozaukee County. The addition of new travel lanes is expected to have a smaller effect on land use for the following reasons.

- **Mature transportation system:** I-43 is an existing multi-lane, limited-access freeway corridor that is part of a mature regional transportation system that already has a high degree of accessibility. The Ozaukee County portion of the primary study area has seven existing interchanges along I-43, and SEWRPC's 2035 regional transportation plan recommends one new interchange at Highland Road. Nine interchanges are available in the Milwaukee County portion of the primary study area and all these access points would be maintained.
- **Limited travel time savings:** Although travel time reliability would be improved by the build alternatives, the improvement to travel times is not expected to be great enough to substantially change regional land use patterns since I-43 is an existing limited-access freeway corridor. Adding new travel lanes would not shorten the distance between destinations, nor would it serve lands that do not already have access to the freeway. Furthermore, during non-peak travel times, the new travel lanes would not affect travel times as traffic is currently typically free flow. Also, the speed limit would not be increased.
- **Established land use patterns/planned growth:** The communities within the Ozaukee County primary study area already have fairly established land use patterns with designated residential and business areas that are already served by the freeway system and the local arterial street network. The growth and intensity of development outside the urbanized areas is limited by a lack of sewer and water services, large lot zoning requirements, conservation easements and environmental corridors that are protected by local zoning or conservation easement. For planned development, the communities utilize comprehensive plans and supporting development policies to promote an efficient growth pattern that is consistent with existing and planned public services and the county's comprehensive plan.[57]

Milwaukee County Secondary Study Area. Adding new travel lanes to I-43 could help facilitate investment in downtown Milwaukee by allowing workers from the regional area easier access to employment. According to interviews with downtown stakeholders, less congestion along I-43 and other freeway corridors that serve downtown would make properties within downtown easier to market to prospective employers who need to attract employees from the region. The build alternatives could also help facilitate access to employment for downtown residents that work outside of downtown and in Ozaukee County. Since 2000, downtown households and population have increased by 27.2 percent and 25.5 percent, respectively.[58] According to local stakeholder input, the younger generations are very interested in living in downtown and this is encouraging new housing developments.

The western and southern areas of the Milwaukee County portion of the secondary study area are not expected to be affected by the addition of new travel lanes on the I-43 study corridor. However, less congestion may benefit some employment centers within these areas that need to attract a workforce from the regional area. These include employers that are located at the Milwaukee County Grounds and the Northwestern Mutual campus in Franklin.

Ozaukee County Secondary Study Area. New travel lanes would help facilitate local land use plans within the Ozaukee County portion of the secondary study area by making the commute

[57] *A Multi-Jurisdictional Comprehensive Plan for Ozaukee County: 2035 was approved in 2008. The plan was undertaken by Ozaukee County, 14 participating local governments, SEWRPC and UW-Extension.*

[58] *2012 Market Profile: Downtown Milwaukee. Prepared by Progressive Urban Management Associates, Inc. on behalf of Downtown Milwaukee Business Improvement District 21.*

between northern Ozaukee County and Milwaukee County easier. This could encourage more people to live within the communities that are located within the secondary study area in Ozaukee County and in turn would encourage additional business development. This was confirmed at the July 11, 2013 focus group meeting and with local stakeholder interviews.

This effect has some non-transportation local factors that support this conclusion. The communities within the secondary study area have land available within their existing municipal boundaries for additional residential development and business development. Plus, some of the townships allow large lot single-family homes sites and small subdivisions. Also, local land use plans have identified planned development areas that could be annexed and served with sewer and water services in the future. In addition, land is less expensive in northern Ozaukee County compared to southern Ozaukee County, which may support new industrial and residential development.

Other non-supportive local factors are present that would substantially minimize the magnitude of this land use effect. According to local stakeholder interviews, the pace of new development in the northern portion of Ozaukee County is very slow and very little new construction has occurred in the recent years. Also, businesses tend to be reluctant to go north of WIS 60 in Grafton due to the greater distance from the existing workforce, making it difficult to attract employees. Retail development can also be challenging because the area is farther from the population base and the communities have fairly small populations. In addition, some of the communities in this area are reluctant to extend sewer and water services to new businesses park areas. According to local stakeholder interviews, the communities prefer to wait for residential subdivisions to first pay for the majority of the cost to extend the services before sewers are extended to industrial land. Plus, several of the existing business parks have some vacant parcels to accommodate new construction.

New Interchange at Highland Road

A new interchange at Highland Road is proposed as part of the I-43 build alternatives. A new interchange would improve transportation accessibility to the Highland Road corridor and would help facilitate the city of Mequon's planned land uses by making lands near the interchange more desirable for development.

Several non-transportation local factors are present to support this finding. The city of Mequon has developed the East Growth Area Plan, which includes the area west of the freeway, east of the Milwaukee River, north of Highland Road and south of County C. The area is currently zoned for residential homes with a minimum of five-acre lots and much of the land has remained undeveloped. If Mequon implements the plan, a mixture of uses would be permitted including single-family and multifamily homes and office, industrial and retail development. The city of Mequon must take several actions for the plan to be implemented including amending the city's land use plan, changing the zoning code and extending sewer and water services. City staff has been directed by the City Council to undertake the necessary studies to facilitate these actions.

Assuming Mequon continues to implement the plan, development of this area would occur even without a Highland Road interchange. This was confirmed by local stakeholder input. The area already has transportation access to the Port Washington Road corridor, which connects to the Mequon Road interchange on the south and the County C interchange on the north. Also, Mequon is desirable from a market standpoint because of its high median household income and its close proximity to the large population base and labor force in southern Ozaukee County and Milwaukee County.

A new interchange at Highland Road could also make large lot subdivisions to the west of the Milwaukee River in Mequon occur at a faster pace. This effect is not likely to be substantial because according to local stakeholder input most of the land north of Highland Road, south of Bonniwell Road, east of the Milwaukee River and west of Wauwatosa Road is already committed for existing residential subdivisions, preserved as public parks or owned by the Ozaukee Washington Land Trust. Undeveloped lands north of Bonniwell Road are available for low density residential development, but this area already has nearby freeway access with the County C corridor and interchange. Lands to the west of Wauwatosa Road, according to local stakeholder input, tend to be more influenced by the US 45 corridor to the west, rather than the I-43 corridor and are therefore not likely to be affected by the Highland Road interchange. Furthermore, the interchange would not facilitate a change in land use type or densities to the west of the Milwaukee River because Mequon is not likely to consider a land use plan amendment for this area within the timeframe of this analysis, according to the local planning director.

Reconstructing Existing Interchanges

Five interchanges would be reconstructed as part of the project: Good Hope Road, Brown Deer Road, County Line Road, Mequon Road and County C. The interchanges would be reconstructed to modern design standards to improve safety and to handle current and projected traffic operations.

Reconstructing the interchanges would help facilitate existing land use patterns and planned development or redevelopment within the Milwaukee County and Ozaukee County primary study areas. According to local stakeholder input, these access points are essential for the continued vitality of the business districts and neighborhoods that are served by these interchanges.

A discussion of the existing land use patterns that would be facilitated by interchange improvements is provided below.

- **Good Hope Road:** This interchange provides freeway access to the Port Washington Road commercial corridor on the north side of Glendale and to Cardinal Stritch University. It is also a designated state truck route that serves industrial areas in the Mill Road/Teutonia Avenue area and the Milwaukee Industrial Park area near Good Hope Road and 76th Street. Maintaining and improving this access point would help to facilitate these existing development areas.
- **Brown Deer Road:** This interchange is a gateway to several communities along Brown Deer Road, including the villages of River Hills and Bayside. Other nearby municipalities and developments served in this corridor are the village of Brown Deer, Milwaukee's Granville neighborhood and Fox Point. It serves shopping centers, office users and industrial development in Brown Deer and provides another access point to the freeway for the Milwaukee Industrial Park. Brown Deer Road is a designated state long truck route. In addition, the Brown Deer Road corridor serves future redevelopment at the former Northridge Mall/Granville Station Shopping Center and it serves the commercial areas in Bayside and Fox Point that are immediately east of the interchange. The village of Bayside is planning for redevelopment in the northeast quadrant of the interchange to encourage new office development. Many stakeholders have mentioned the current configuration of the interchange is unsafe and the proposed improvements for the interchange would help to maintain the Brown Deer Road corridor as a viable gateway that supports the various business districts it serves.
- **County Line Road:** The County Line Road interchange currently is a partial interchange configuration that provides an on ramp to southbound I-43 at County Line Road and an exit

ramp from northbound I-43 at Port Washington Road. The interchange primarily serves access to adjacent fully developed residential neighborhoods. It also provides some secondary access to Port Washington Road business districts in Mequon, Bayside and Fox Point. The project is currently evaluating full access, partial access and no access alternatives for this interchange. The full access interchange would increase access to Port Washington Road. This alternative would support the existing commercial areas and planned commercial redevelopment areas in Mequon, Bayside and Fox Point. This land use effect is not expected to be substantial because these commercial corridors are primarily served by nearby freeway access points at the Mequon Road and Brown Deer Road interchanges. Plus, the land surrounding the interchange is fully developed with mostly residential land uses that are not subject to change per local plans and zoning. The partial interchange alternative would provide the same level of freeway access in comparison to existing conditions. As a result, this alternative is not expected to contribute to indirect land use effects. The No Access alternative would reduce access in the area, but this is not expected to have a substantial land use effect. The Port Washington Road business districts in Mequon, Bayside and Fox Point primarily rely on the Mequon Road and Brown Deer Road interchanges for freeway access. Plus, the proposed designs for the interchanges at Mequon Road and Brown Deer would be able to accommodate traffic that is diverted from a County Line Road No Access alternative.

- **Mequon Road:** This interchange is the main route into the city of Mequon and serves the commercial areas along Port Washington Road to the north and south of Mequon Road. The city of Mequon has implemented two tax increment districts to the south of Mequon Road along Port Washington to encourage redevelopment of older commercial uses. The reconstruction of the interchange would help to facilitate existing and future commercial developments in this area north and south of Mequon Road.
- **County C:** The County C interchange provides access to the town of Grafton, Mequon and Cedarburg. The reconstructed interchange would help to support existing and planned development served by this interchange. Examples include the town of Grafton commercial/business corridor that is planned along Port Washington Road north of County C, existing industrial/business park areas in Cedarburg, the historic downtown of Cedarburg, Mequon's East Growth Area and the town of Grafton's planned 1-acre residential growth areas. This effect is not expected to be substantial because freeway access is already provided at County C. Other limiting factors include a lack of sewer and water services in the town of Grafton and Mequon and the presence of environmental corridors associated with the Milwaukee River and Ulao Creek that are protected from development through local zoning codes.

Expansion of Port Washington Road In Glendale

Port Washington Road between Bender Road and Daphne Road would be expanded to four lanes of traffic as part of the I-43 build alternatives. This is currently the only section of Port Washington Road in Glendale that is two lanes.

The expansion of Port Washington Road would support existing development and future redevelopment by improving traffic flow between two commercial areas within Glendale, the Bayshore Town Center and the retail node at Port Washington and Green Tree roads.

It is the project team's position that this land use effect would not be substantial because the land surrounding the road expansion area contains residential neighborhoods. Plus, the opportunities for larger scale redevelopment in this area have already occurred under existing roadway conditions. The Bayshore Town Center redevelopment was completed in 2006 and the retail node at Port Washington and Green Tree roads is fully developed. The remaining

redevelopment opportunities in this area are of much smaller scale. The Bayshore Town Center is planning to redevelop the very northern end of the site after the lease for the Sears Department store expires.

Redevelopment would occur regardless of the Port Washington Road improvements because access is already available and the property owner is already planning for redevelopments under existing conditions. Other non-transportation factors such as market demand are more likely to influence when redevelopment would occur.

Land Use Effects of the No-Build Alternative

This section discusses the land use effects of the No-Build Alternative for the study areas.

Milwaukee County. Over time, the No-Build Alternative could hinder the economic development potential of the Milwaukee County primary study area (and to a lesser extent the secondary study area) as access to local destinations becomes increasingly difficult due to increasing congestion, safety concerns and deterioration of infrastructure. The No-Build Alternative could cause development to shift away from the Milwaukee County portion of the primary study area and move to areas that have modern transportation facilities and better traffic flow. According to local stakeholder input, the I-43 corridor is the main gateway to adjacent communities and a modern freeway is needed to maintain the area's economic competitiveness within the region.

Under the No-Build Alternative, truck shipments that originate from industrial land uses in the Milwaukee County primary study area would become less efficient over time as congestion increases and travel becomes less reliable. Also, it would become increasingly difficult for the area's large labor force to access employment in Milwaukee County and other areas of the region since I-43 is the main route used by commuters. The No-Build Alternative would affect traditional commuters as well as reverse commuters. Reverse commuting has been increasing as a result of business development in Ozaukee County and increasing population in downtown Milwaukee neighborhoods.

This effect would be moderated by the fact that the Milwaukee County primary study area contains established land use patterns and has a mature transportation system in place that includes highways and a local network of arterial roadways. Plus, the area is already served by I-43 and existing interchange access points.

Ozaukee County. The No-Build Alternative could hinder the economic development potential of the Ozaukee County primary study area (and to a lesser extent the secondary study area) over time as congestion increases and commuting between Ozaukee and Milwaukee counties becomes increasingly challenging. However, the redistribution of population and employment between Milwaukee and Ozaukee counties is likely to continue because I-43 already connects the two counties and provides access to lands in Ozaukee County at the existing interchanges. Plus, the southern portion of Ozaukee County is a desirable location for residential and business development given its close proximity to a large population base and large pool of labor. In addition, quality of life issues such school districts, housing style choices and access to open space would continue to attract people to Ozaukee County regardless of the alternative.

ENCROACHMENT-ALTERATION EFFECTS

These types of indirect effects are from alterations to the behavior and function of the physical environment farther from the corridor and later in time. Encroachment-alteration effects are often associated with direct project impacts that could alter neighborhood quality of life, the vitality of business districts or the quality of natural resources. The potential for encroachment effects is discussed in the subsections below.

Neighborhoods

The greatest potential for neighborhood encroachment effects would occur in the Milwaukee County portion of the study corridor where residential neighborhoods are located in close proximity to the freeway. Residents have expressed concerns that direct project impacts such as property acquisitions, noise impacts and potential air quality impacts could diminish the quality of life for neighborhoods adjacent the study corridor. They are concerned that these potential direct impacts could indirectly affect the area by making the neighborhoods a less desirable place to live, which could diminish the value of homes or increase the amount of time it takes to sell a home.

It is the project team's position that indirect effects to neighborhoods under the build alternatives would not be substantially greater in comparison to the No-Build Alternative for several reasons. First, the overall character and setting of the neighborhoods would not change. The neighborhood areas would remain intact and local traffic patterns would not be affected. Second, the neighborhoods next to the freeway are already likely experiencing freeway proximity effects. For example, existing noise levels on the south end of the study corridor already exceed the criteria that WisDOT utilizes to assess noise impacts and a noise impact would continue to be present under the build alternative. In addition, a local real estate agent that attended the July 11, 2013, focus group meeting acknowledged that some properties near the freeway already take longer to sell. Lastly, the project would not contribute to any violation of the National Ambient Air Quality Standards (NAAQS) and, based on projected traffic volumes, FHWA expects there would be no appreciable differences in MSAT emissions between the No-Build and build alternatives.

The No-Build Alternative would not create the potential for neighborhood encroachment effects because no property acquisitions would be required and the footprint of the freeway would not change. However, the No-Build Alternative would not provide the opportunity to construct noise barriers and the freeway infrastructure would continue to deteriorate. Maintaining infrastructure is important to a community's quality of life. Also, the increasing congestion on the freeway would continue to increase air pollution emissions from idling and stop-and-go traffic.

Businesses

The build alternatives would require a total of three commercial business relocations. This direct effect is not expected to indirectly affect the local economy or the vitality of business corridors within the primary study area for the following reasons. The commercial businesses that would be relocated are small in size and are not considered anchor establishments that generate a substantial amount of customers for other adjacent businesses. In addition, the build alternatives are expected to strengthen local economic conditions by facilitating planned development within the primary study area as discussed in the Land Use Effects subsection above. According to a 2012 Transportation Research Board report that reviewed 100 transportation case studies, negative job impacts due to right of way takings were offset by new activity that occurs somewhere else nearby in nearly all the case studies that were analyzed.[59]

If a Highland Road interchange is not constructed, traffic at the Mequon Road and Port Washington Road intersection would increase. Increased congestion makes access more challenging, which could indirectly affect this business district by diminishing the area's attractiveness for existing businesses and ongoing redevelopment efforts. This effect is not

[59] *Interactions Between Transportation Capacity, Economic Systems, and Land Use. SHRP2 Capacity Research. Report S2-C03-RR-1. Transportation Research Board. 2012.*

expected to be substantial because the Port Washington Road and Mequon Road intersection would be reconfigured to handle traffic at an acceptable level of service.

The No-Build Alternative would not acquire businesses, but it would not create the potential to facilitate development within the primary study area as discussed in the Land Use Effects subsection above.

Natural and Cultural Resources

Potential indirect effects to natural resources can include reduced wetland functions and value, further habitat degradation by creating smaller habitat patches, stream bank erosion from increased stormwater volume and potential stream flow disruption and aquatic and wildlife species passage caused by box and pipe culverts. Historic properties are located along the freeway corridor. One aspect of significance for these historic properties is derived from their setting, which is an area much larger than their recorded historic boundary. This larger setting provides the context from which to interpret the historic resource, and the widened footprint of transportation systems can alter a resource's setting and context.

STEP 6: ASSESS CONSEQUENCES AND IDENTIFY MITIGATION ACTIVITIES

This section assesses the social, economic and environmental consequences of the indirect land use and encroachment-alteration effects that were discussed in Step 5 above. It also discusses potential mitigation measures that could help avoid or minimize negative indirect effects and identifies local, regional, state and federal agencies that have the authority to implement mitigation measures.

LAND USE EFFECTS

This subsection discusses the consequences and mitigation measures related to indirect land use effects for the Milwaukee County and Ozaukee County study areas.

Milwaukee County Study Areas

As discussed in the Land Use Effects subsection above, the build alternatives are expected to help maintain the competitiveness of the communities within the primary study area (and to a lesser extent within the Milwaukee County secondary study area) and help facilitate planned redevelopment. The build alternatives are also expected to facilitate access to employment within the region since I-43 is the main commuting route for many residents in the Milwaukee County primary study area. In addition, the build alternatives could benefit industrial areas by improving the efficiency of freight movements. Strong industry in Milwaukee County helps revitalize urban neighborhoods by creating transit-accessible jobs in close proximity to minority and low-income individuals that tend to rely on transit to reach employment more often than the population in general.

Redevelopment that would be facilitated by the build alternatives in Milwaukee County would be seen as positive by local communities as it would increase local tax bases and help pay for the cost of public services that are already in place. Also, redevelopment helps maintain the viability of existing urbanized areas and reduces the pressure to develop in outlying areas of the region. In addition, redevelopment promotes a compact land use pattern that minimizes the impact of development on the land. According to an EPA report, compact communities reduce environmental impacts and allow people to travel shorter distances for everyday activities.[60]

[60] *U.S. Environmental Protection Agency. "Our Built and Natural Environments: A Technical Review of the Interactions Among Land Use, Transportation, and Environmental Quality." Second Edition. June 2013. 78-80.*

The EPA report states compact communities also make public transit, sidewalks, and bike paths more practical and cost-effective because destinations are closer together.

Tools that can be implemented by local governments to aid redevelopment efforts include tax increment financing, business lending programs, business improvement districts and redevelopment authorities. Tax credit zones, Community Development Block Grant funds and brownfield remediation grants are also available from state or federal agencies in some areas of the Milwaukee County primary study area. Many of these tools are already being utilized by the local communities within the study area to create jobs, revitalize neighborhoods and reuse lands that would otherwise be underutilized or vacant.

Potential negative consequences of redevelopment that could be facilitated by the build alternatives include:

- An increase in the intensity of land uses in some areas.
- More traffic on local streets.
- Increased demand for onsite and off-street parking.
- Demolition or alteration of unprotected historic structures.
- Increased stormwater runoff that impacts water quality and increases the risk of flooding.

The best way to manage any negative effects associated with redevelopment is through local government land use and development policies. In Wisconsin, local governments have the authority under state statues to control land use decisions. Municipalities in the primary study area are already using a number of tools to manage development within their communities including comprehensive plans, subarea plans and zoning regulations. These tools help local governments determine the amount and location of development and its type and density. Plan commissions are present in all primary study area communities. One of the primary responsibilities of plan commissions is to make sure development is being implemented in accordance with local plans and ordinances.[61] Some communities within the primary study area also have architectural review boards and historic preservation commissions that create an extra layer of oversight on development aesthetics and historic resources.

Stormwater within the Milwaukee County primary study area and nearly all communities within the Milwaukee County secondary study area are under the jurisdiction of MMSD. All communities within the MMSD service area are required to follow the MMSD Chapter 13 Surface Water and Storm Water Rules to control stormwater runoff. These regulations help protect water quality and minimize the risk for flooding.

All communities within Milwaukee County, as required by Section 87.30 of the Wisconsin State Statues, have floodplain zoning in place. Minimum standards for floodplain regulations are provided in NR 116 of the Wisconsin Administrative Code. Floodplain regulations govern filling and development activities within the 100-year floodplain and prohibit nearly all forms of development in the floodway and restrict filing and development within the flood fringe. Also, all communities within Milwaukee County have shoreland-wetland regulations in place, as required by Section 62.231 and 61.351 of the Wisconsin Statues. NR 117 of the Wisconsin Administrative code establishes minimum standards for zoning ordinances that include the protection of wetlands five acres in size lying in shoreland areas.

[61] *Plan Commission Handbook. Second Edition. 2012. Center for Land Use Education. University of Wisconsin-Stevens Point.*

Many of Milwaukee County's remaining natural resources are publicly owned primarily through the Milwaukee County Park System to ensure their preservation.

To further support local regulations and policies, state and federal regulations help manage impacts to natural resources such as wetlands (WDNR Chapter 30 permits and the USACE Section 404 permits), water quality (NR 151), and threatened and endangered species (NR 27 and Endangered Species Act).

Ozaukee County Study Areas

The I-43 build alternatives would facilitate planned development within the Ozaukee County portion of the primary study area (and to a lesser extent within the Ozaukee County secondary study area) by improving commuting between Ozaukee and Milwaukee counties, improving accessibility to lands near the proposed Highland Road interchange and modernizing existing access points. The extent of this effect is expected to be much smaller in comparison to the original construction of I-43 in the 1960s because the transportation system is mature and already has a great deal of accessibility. Plus, development has already spread into southern Ozaukee County and portions of northern Ozaukee County.

Planned development that would be facilitated by the build alternatives would be seen as positive by most communities within the Ozaukee County primary and secondary study areas because it would help accomplish their land use plans and economic development goals.

Potential negative consequences of development that could be facilitated by the build alternatives include:

- Changes in community character.
- Increased cost for community services such as emergency services and schools.
- Extensions of sewer and water services.
- Annexation of land in townships by cities and villages.
- Reduction in the amount of natural resources.
- Conversion of agricultural uses to urban uses.
- Increased local traffic that may require the expansion of roadway infrastructure.
- Increased impervious space that increases stormwater runoff and affects water quality and quantities.

The best way to manage negative effects associated with development that may be facilitated by the build alternatives is through local land use and development policies that are under the jurisdiction of local governments. As discussed previously, local governments have the authority under Wisconsin state statues to control land use decisions. Municipalities within the Ozaukee County primary and secondary study areas are already using a number of tools to manage development within their communities including comprehensive plans, zoning regulations and land division ordinances. These tools help local governments determine the amount and location of development and its type and density. As discussed above, plan commissions are present in all study area communities in Ozaukee County. One of the primary responsibilities of plan commissions is to make sure development is being implemented in accordance with local plans and ordinances.[62] Some communities within the primary study area also have architectural review boards, historic preservation and landmark commissions and open space commissions

[62] *Plan Commission Handbook. Second Edition. 2012. Center for Land Use Education. University of Wisconsin-Stevens Point.*

that create an extra layer of oversight for the development review process.

In 2008, Ozaukee County in coordination with SEWRPC prepared a multijurisdictional plan for Ozaukee County. The process included participation from all 14 local governments in Ozaukee County. The plan set forth a vision for future development and natural resource protection throughout the county and included the preparation of local government comprehensive plans for all the communities in Ozaukee County.

Municipalities can utilize cooperative boundary agreements as authorized under Section 66.0307 of the Wisconsin State Statutes to determine boundary lines between cities, villages and towns. These agreements allow communities to proactively manage their borders instead of reacting to individual requests for annexation. The city and town of Port Washington have a boundary agreement in place.

Capital improvement plans are an effective way for local governments to match future capital expenditures for things such as roads, sewers, water systems and government buildings and equipment with projected revenues.[63] These plans help local governments determine if its available financial resources are consistent with their comprehensive plan.

In Ozaukee County, impacts to natural resources would be managed by local zoning ordinances that preserve environmental corridors with overlay districts and conservation districts, and by floodplain and shoreland zoning ordinances that are required by Wisconsin Statues. Other programs preserving natural areas in Ozaukee County include MMSD's Greenseams program, and the Ozaukee Washington Land Trust (OWLT) and Ulao Creek Partnership. Through the Greenseams program, MMSD purchases and manages open tracts of land for flood and water quality management. The OWLT partners with public and private landowners to preserve natural areas, typically through conservation easements. Similar activities occur in the Ulao Creek watershed through the Ulao Creek Partnership. According to SEWRPC's park and open space plan for Ozaukee County, as of 2009, 32.5 square miles of environmental corridors and isolated naturals, or 72 percent, were under protection through adopted sewer service areas plans, public and private ownership, conservation easements, or public land use regulations.[64] To further support local regulations, state and federal regulations help manage impacts to natural resources such as wetlands (WDNR Chapter 30 permits and the USACE Section 404 permits), water quality (NR 151), and threatened and endangered species (NR 27 and Endangered Species Act).

To manage stormwater, Chapter NR 216 of the Wisconsin Administrative code requires county and local governments in urbanized areas to obtain a Wisconsin Pollutant Discharge Elimination System (WPDES) Stormwater Discharge Permit. Chapter NR 151 of the Wisconsin Administrative Code requires that municipalities with WPDES permits reduce the amount of total suspended solids in stormwater runoff by 40 percent for reconstruction projects. For new construction projects, permanent control measures must be constructed to reduce the amount of total suspended solids in stormwater runoff by 80 percent. In addition, Chapter NR 151 requires that all construction sites that have one acre or more of land disturbance must achieve an 80 percent reduction in the amount of sediment that runs off the site during the construction period.

Local comprehensive plans, zoning and farmland preservation plans can be utilized by Ozaukee County communities to preserve agricultural resources. Ozaukee County has developed a farmland preservation plan that includes recommendations for the long-term preservation

[63] *Ohm, Brian W. Guide to Community Planning in Wisconsin. University of Wisconsin-Madison/Extension. 2000.*

[64] *SEWRPC. Community Assistance Report No. 133: A Park and Open Space Plan for Ozaukee County (3rd Edition). June 2011*

of farmland. Also, farmland preservation zoning classifications can be found in the Ozaukee County secondary study area. Federal and state conservation programs have also been created to help protect agricultural resources and rural lands. Federal programs include the Conservation Reserve Program (CRP), Conservation Reserve Enhancement Program (CREP) and Wetland Reserve Program (WRP). Wisconsin's Farmland Preservation Program (FPP) allows farmers who agree to maintain farmland in agricultural use to receive annual state income tax credits. According to the Ozaukee County comprehensive plan, there were 351 Wisconsin FPP contracts encompassing 21,881 acres of farmland in Ozaukee County towns and the city of Mequon. The vast majority of the contracts are located within the secondary study area in the northern half of the county.

Consistency with the SEWRPC 2035 regional land use plan is another way for local governments to have coordinated land use polices that promotes an efficient land use pattern and preserves natural resources and farmland. The key recommendations from the regional plan are:

- New urban development should be accommodated within and around existing urban centers as infill development, through redevelopment, and through the orderly expansion of planned urban service areas on lands proximate to these centers.
- The regional plan envisions a range of commercial and industrial areas.
- The primary environmental corridors, secondary environmental corridors, and isolated natural resource areas of the Region should be preserved in essentially natural, open uses, continuing to account for about 23 percent of the area of the Region.
- The prime, or most productive, farmland in the region should be preserved.

Transit Access to Employment

The Milwaukee County Transit System (MCTS) provides relatively good coverage of the county with local bus service. According to SEWRPC, MCTS provides access to 93 percent of Milwaukee County's employers with 500 or more employees.[65] MCTS also operates buses in Ozaukee County that primarily serves commuter trips on the I-43 corridor (see **Subsection 3.2.1**). The route serves primarily Ozaukee County riders working in Milwaukee. The service provides for reverse commute trips to Milwaukee County riders working in Ozaukee County, but on a more limited basis. One of the primary concerns raised by local stakeholders about development in Ozaukee County that may be facilitated by the I-43 build alternatives is that the majority of jobs in Ozaukee County are not accessible by transit. This affects the ability of lower income, transit-dependent populations in the city of Milwaukee to obtain employment and creates isolated neighborhoods with high concentrations of poverty. This was confirmed at the July 11, 2013, focus group meeting. Stakeholders stated that more transit investment is needed in the region to improve access to jobs, especially for those who do not have access to a vehicle.

A report titled *Transportation Equity and Access to Jobs in Metropolitan Milwaukee* was completed in 2004 by researchers at the University of Wisconsin-Milwaukee. It discusses how a "spatial mismatch" has been created between the region's affordable housing supply in the city of Milwaukee and the availability of low skilled jobs in suburban areas. The report states that "because low-income persons frequently do not have access to an automobile, effective public transportation is often crucial in bridging the gap between the inner-city locations of low-income populations and the increasingly suburban locations of job opportunities." The report's research confirmed the presence of a spatial mismatch in the Milwaukee region and found 81 percent

65 *SEWRPC. Planning Report No. 54: A Regional Housing Plan for Southeastern Wisconsin: 2035. March 2013.*

of families living below the poverty line are located in the city of Milwaukee; only 30 percent of businesses with strong hiring projections for entry-level workers are located in Milwaukee; and the remaining 70 percent are in the suburbs.

The spatial mismatch between workers and housing is a complex issue and has many contributing factors, including declining MCTS transit service levels, a lack of a coordinated regional transit system, limited transit services in job-rich suburbs, restrictive suburban zoning regulations that indirectly discourage affordable housing, and relatively low rates of vehicle ownership and valid driver's licenses in some areas of the city of Milwaukee.

SEWRPC recently completed the 2035 regional housing plan, which incorporated an analysis that looked at the ratio of available jobs and housing. The primary purpose of the analysis was to determine if communities with a substantial amount of existing and/or planned employment also have existing or planned workforce housing. The SEWRPC analysis found a current and projected jobs/housing imbalance for many of Milwaukee's suburban communities.

Within Ozaukee County, Mequon, Thiensville, Cedarburg, Grafton, Fredonia and Belgium were found to have a lower-cost job/housing imbalance and a moderate-cost job/housing imbalance. The village of Saukville and city of Port Washington have a moderate-cost job/housing imbalance. This means that these communities have either a higher percentage of lower-wage jobs than lower-cost housing and/or they have a higher percentage of moderate-wage jobs than moderate-cost housing. According to SEWRPC, a moderate-cost imbalance is the most common type of current and projected job/housing imbalance in the region and also tends to occur in suburban communities.

According to the SEWRPC regional housing plan, improved transit service would help provide links between affordable housing and jobs. The plan states that 17 percent of households in the city of Milwaukee did not have access to a car in 2005-2009, and only 41 percent of employers in the region are accessible by local or rapid transit service.[66] As a result, households in the City of Milwaukee that lack of access to a car are not able to access the majority of employment centers in the region. According to SEWRPC, if the transit components of the 2035 regional transportation plan were implemented, many major employment centers that are not currently served by public transit would become accessible for people without access to a car, including those that work weekend hours and second and third shifts.

According to SEWRPC, the public shared-ride taxi system operated by Ozaukee County provides connections between stops on the rapid transit services and some major employers to facilitate reverse commute travel from Milwaukee County. The employers are primarily concentrated in the Mequon-Thiensville, Cedarburg-Grafton, and Saukville areas. These services provide access to about 12 percent of the employers in Ozaukee County that have at least 100 employees.

Funding for transit is complicated by the fact that Wisconsin legislation limits WisDOT's ability to provide capital funding for transit outside traffic mitigation projects. As stated in Section 85.062(2), Wisconsin Statutes, "No major transit capital improvement project may be constructed using any state transportation revenues unless the major transit capital improvement project is specifically enumerated under subsection (3)." Furthermore, implementation of the recommended expansion of public transit in Southeastern Wisconsin would also be dependent upon attaining dedicated local funding for public transit. The local share of funding of public transit in Southeastern Wisconsin is provided through county or

[66] *SEWRPC. Planning Report No. 54: A Regional Housing Plan for Southeastern Wisconsin: 2035. March 2013.*

municipal budgets, and represents about 15 percent of the total operating costs and 20 percent of total capital costs of public transit. Thus, the local share of funding public transit is largely provided by property taxes, and public transit must annually compete with mandated services and projects. Increasingly, due to the constraints in property tax-based funding, counties and municipalities have found it difficult to provide funding to address transit needs, and to respond to shortfalls in federal and state funding. Most public transit systems nationwide have dedicated local funding, typically a sales tax of 0.25 percent to 1.0 percent, and they are not nearly as dependent upon federal and state funding.

Consistency with the SEWRPC recommendations in the 2035 regional housing plan could help to address the existing and projected jobs/housing balance discussed above. The plan advises local governments with existing and planned employment land uses that are sewered to conduct detailed analyses of their communities to confirm if an existing or planned job/housing imbalance exits. For communities that have a higher percentage of lower-wage jobs than lower-cost housing, new affordable multifamily housing developments are recommended. For communities with a higher percentage of moderate-wage jobs than moderate-cost housing, additional modest sized single-family homes on small lots would help to improve the imbalance. Progress towards achieving the recommendations in the SEWRPC housing plan is complicated by the fact that SEWRPC is an advisory agency. Local governments would need to make substantial changes to local land use plans and zoning regulations to increase the region's supply of affordable housing.

ENCROACHMENT-ALTERATION EFFECTS

This subsection discusses the consequences and mitigation measures related to encroachment-alteration effects for the primary study area.

Neighborhoods

As discussed in Step 5 above, the greatest likelihood for neighborhood encroachment-alteration effects would occur on the south segment of the study corridor. Neighborhood encroachment-alteration effects could make the neighborhoods adjacent to I-43 more susceptible to urban decline if people begin to move out of the neighborhood. Urban decline is often associated with diminished property values, lower home owner rates and increases in crime.

The neighborhood encroachment effects would be moderated by the fact that these neighborhoods are stable North Shore areas that have low poverty rates, higher home ownership rates and fairly stable population figures. The attributes that make these neighborhoods desirable places to live such as close proximity to downtown and desirable school districts would not be changed by the build alternatives.

WisDOT's community sensitive solutions (CSS) efforts that would occur as part of future project phases would help to minimize impacts from a larger-scale freeway. Also, the build alternatives would present an opportunity to construct noise barriers, where feasible and reasonable. According to the noise anaylis section of this document (see **Subsection 3.15**) there are existing noise impacts as well as noise impacts with the build alternatives. The build alternatives would reduce congestion along the freeway and minimize traffic that diverts to local streets. This would improve air quality by reducing idling and stop-and-go traffic. Also, it would improve safety on local streets by minimizing conflicts between pedestrians and vehicles especially on heavily traveled arterial corridors.

Businesses

The build alternatives are not expected to have encroachment-alternation effects on business districts within the primary study area. Any negative impact that may be caused by business relocations or expanding infrastructure is expected to be offset by economic development that could be facilitated by the build alternatives in the primary study area.

Natural and Cultural Resources

The encroachment-alteration effects discussed in Step 5 above, can contribute to stream bank instability, a loss of habitat and water quality degradation. The build alternatives are largely confined to the existing highway footprint to avoid and minimize adverse indirect effects. Additional minimization measures, which include widening I-43 to the inside of the median, using retaining walls and minimizing slopes also mitigate the potential indirect effect to wetlands as well as natural habitats. To mitigate unavoidable wetland impacts, WisDOT will implement measures outlined in the July 2012 WisDOT-WDNR memorandum of understanding titled *Compensatory Mitigation for Unavoidable Wetland Losses Resulting from State Transportation Activities*. These measures will minimize and mitigate the potential indirect effect on wetlands and habitat integrity. Also, the design team is evaluating a range of stormwater best management practices, including in-line storage, retention ponds and ditches to store and treat runoff to minimize the roadway development impacts to the surrounding streams, rivers and drainage basins.

The encroachment effect on historic resources in minimized through design to avoid the resources or reduce unavoidable impacts where practicable. The SHPO has concurred that the study alternatives would have no adverse effect on historic resources.

3.22.2. Cumulative Effects

The cumulative effects analysis considers the resources that could be affected directly or indirectly by the I-43 North-South Freeway Corridor Study build alternatives when combined with other actions that potentially affect the same resources.

The methodology used to assess cumulative effects for the I-43 North-South Corridor Study is based on the Council of Environmental Quality's 11-step process identified in the handbook *Considering Cumulative Effects under the National Environmental Policy Act* (January 1997). The 11-step process can be subcategorized into three steps: scoping, describing the affected environment, and determining the environmental consequences. The following subsection describes the cumulative effects scoping process, and then the subsection following that describes the affected environment and environmental consequences for each resource.

SCOPING CUMULATIVE EFFECTS

The cumulative effects analysis considers the resources that could be affected directly or indirectly by the I-43 North-South Freeway Corridor Study build alternatives when combined with other past, present or reasonably foreseeable future actions that potentially affect the same resources or human communities. Based on the anticipated direct and indirect project effects, the following resources were reviewed for potential cumulative effects:

- Agricultural lands
- Surface water quality and quantity
- Wetlands and floodplains
- Environmental corridors and stream crossings

- Air quality
- Residential properties
- Commercial properties
- Municipal tax base
- Regional land use patterns

CUMULATIVE EFFECTS STUDY AREA AND TIMEFRAME FOR ANALYSIS

The study area for cumulative effects varies depending on the resource being discussed and is shown in **Table 3-37**. The study areas include the I-43 North-South corridor, but also consider the geographic boundaries for resources that are larger than the study corridor. The resource study areas are based on the scale of human communities, watersheds and airsheds as these boundaries consider the distance a cumulative effect could travel.

The timeframe for the analysis is 2040 – 20 years after construction – which coincides with the anticipated design year of a future project, and the availability of population, employment and land use information.

Table 3-37: Cumulative Effects Study Area by Environmental Resource

Environmental Resource	Cumulative Effects Study Area
Agricultural lands	Ozaukee County
Surface water quality and quantity	Milwaukee River Watershed and Fish Creek Watershed in Milwaukee and Ozaukee counties
Wetlands and floodplains	Indirect analysis primary study area in Milwaukee and Ozaukee counties (see **Exhibit 3-23**)
Environmental corridors and stream crossings	Indirect analysis primary study area in Milwaukee and Ozaukee counties (see **Exhibit 3-23**)
Air quality	Southeastern Wisconsin Intrastate Air Quality Control Region #239
Residential properties	Milwaukee and Ozaukee counties
Commercial properties	Milwaukee and Ozaukee counties
Regional land use patterns	Milwaukee and Ozaukee counties

PAST, PRESENT AND REASONABLY FORESEEABLE FUTURE ACTIONS

Table 3-38 provides a list of the other past, present or reasonably foreseeable future actions, that when considered with the I-43 North-South Freeway study corridor study may have cumulative effects on the environment.

Table 3-38: I-43 North-South Freeway Corridor Study – Past, Present and Reasonably Foreseeable Actions Influencing Cumulative Effects

Time	Action	Location
Past	Historic urban/suburban development	Milwaukee and Ozaukee counties
	Agricultural development	Ozaukee County
	Original construction of I-43	Milwaukee and Ozaukee counties
	Marquette Interchange reconstruction	Milwaukee County
	Straightening of Ulao Creek	Ulao Creek basin
	Redevelopment of Bayshore Mall	City of Glendale
	Development of WIS 60 commercial corridor	Village of Grafton
	Purchase of preservation lands by Ozaukee Washington Land Trust and MMSD	Ozaukee County
	Oak Creek coal-fired power plant	Milwaukee County
Present	Ozaukee County fish passage program	Ozaukee County
	Ongoing commercial development in WIS 60 corridor and Port Washington Road corridor	Village of Grafton
	Purchase of lands for preservation by the Ozaukee Washington Land Trust	Ozaukee County
	Ulao Creek restoration activities	Ulao Creek Subwatershed
	Reuse of former industrial areas for industrial purposes (i.e. Century City)	City of Milwaukee
	Southeast freeways reconstruction (including I-94 North-South corridor and Zoo Interchange)	Milwaukee County
	WIS 60 Jackson-Grafton Study	Ozaukee and Washington counties
Future	City of Mequon East Growth Area plan	City of Mequon
	Expansion of commercial development north of WIS 60 near WIS 32 interchange	Town of Grafton
	Strip commercial redevelopment along Port Washington Road	City of Glendale
	Planned Ozaukee County residential growth	Ozaukee County
	Redevelopment of former Northridge Mall	City of Milwaukee
	Business park expansion in Ozaukee County	Ozaukee County
	Reconstruction of WIS 60 between US 45 and 11th Avenue in Grafton	Ozaukee and Washington counties
	Reconstruction of WIS 167 (Mequon Road) between US 145 (Pilgrim Road) to WIS 181 (Wauwatosa Road)	Village of Germantown and city of Mequon
	Extension of Cedar Creek Road between	
	County O and Port Washington Road	Town of Grafton
	Southeast Wisconsin freeways reconstruction (including I-43 between North Avenue and Silver Spring Drive, and the I-94 East-West Corridor)	Milwaukee County
	Reconstruction of I-43 north of WIS 60	Ozaukee County

DESCRIBE THE AFFECTED ENVIRONMENT AND DETERMINE THE ENVIRONMENTAL CONSEQUENCES AND POTENTIAL MITIGATION MEASURES

This section assesses the resources that could experience cumulative effects as a result of the I-43 North-South corridor build alternatives and the other past, present and reasonably foreseeable actions listed in **Table 3-38**. For each resource, the affected environment is first described. This includes establishing a baseline condition for the resources and considering the resources' capacity to withstand stress in relation to regulatory thresholds. Then, an evaluation of the environmental consequences is conducted for each resource. This includes examining the cause and effect relationship between human activities and affected resources and determining the magnitude and significance of the cumulative effects. The evaluation also considers avoidance, minimization and mitigation measures WisDOT can undertake for the build alternatives to minimize cumulative effects to the greatest practical extent. The analysis also considers other local, state and federal policies and laws that can further manage cumulative effects resulting from the direct and potential indirect effects of the project. The findings of the analysis are summarized by resource in the following subsections.

AGRICULTURAL LANDS

Affected Environment

Agriculture is a prevalent land use and important economic activity in Ozaukee County. As shown in **Table 3-39**, farmland occupied about 77,600 acres, representing about 52 percent of the county in 2007. About two-thirds of the farmland is located in the northern half of the county in the towns of Port Washington, Saukville, Belgium and Fredonia. The towns of Belgium and Fredonia combined contain about 42 percent of all farmland in the county. Farmland is also found in the southern half of the county in the city of Mequon and towns of Grafton and Cedarburg. These three communities combined contain nearly 30 percent of the county's farmland.

Table 3-39: Farmland Acres in Ozaukee County by Community – 2007

Municipality	Acres	Percent of Total
City of Mequon	10,399	13
Town of Cedarburg	7,338	9
Town of Grafton	4,608	6
Town of Saukville	10,927	14
Town of Port Washington	8,217	11
Town of Belgium	18,283	24
Town of Fredonia	14,556	19
Other cities and villages	3,273	4
County total	77,601	100

Source: SEWRPC. Community Assistance Planning Report No. 87: Public Review Draft – A Farmland Preservation Plan for Ozaukee County: 2035 (Second Edition). June 2013.

According to the Ozaukee County Farmland Preservation Plan, the county contained 513 farms in 2007. The average farm size was 138 acres, which was somewhat smaller in comparison to the statewide average of 194 acres. The 513 farms in Ozaukee County produced over $59 million of agricultural products in 2007. Dairy farming comprised more than half of this total,

with grain crops and horticulture making up the remainder. The average Ozaukee County farm produced $115,020 of agricultural products in 2007, which was a 60 percent increase from the 2002 level of $71,901, according to the farmland preservation plan, according to the plan.

Although farming is still prevalent in Ozaukee County, it is a declining land use. According to the farmland preservation plan, the number of farmland acres in the county decreased by 33 percent between 1976 and 2007. The main reason is the conversion of farmland to urban development. This has driven up the cost of farmland in the county. According to the farmland preservation plan, the average sale price of agricultural land in the county increased from $1,618 per acre in 1976 (equivalent to $5,805 in 2007 dollars) to $11,963 in 2007. However, it should be noted that the average sales price dropped significantly between 2007 and 2009 due to the economic recession.

The conversion of farmland to urban land uses is expected to continue within Ozaukee County. According to SEWRPC, the county is projected to add over 22,800 residents and 16,800 jobs by 2050. Also, none of the communities in southern Ozaukee County have agricultural preservation classifications in their land use plans. The land use plans for the city of Mequon, village and town of Grafton and city and town of Cedarburg anticipate the remaining agricultural lands will transition to mostly low density residential uses over time. The pressure to convert agricultural land uses to urban land uses is less in the northern half of Ozaukee County where the market for development is smaller. Plus, local government policies seek to protect farmland in this portion of the county. The townships of Saukville, Port Washington, Belgium and Fredonia have agricultural preservation classifications in their land use plans and the towns have agricultural preservation zoning classifications.

Ozaukee County has developed a farmland preservation plan[67] that is focused on attaining orderly development in Ozaukee County and minimizing the loss of productive farmland. The county also has a land and water resource management plan[68] that includes recommendations for the long-term preservation of farmland including implementing farmland preservation programs such as the Wisconsin Working Lands Initiative and promoting the Farm and Ranch Land Protection Program as well as other farmland incentive programs. According to the farmland preservation plan, the county contained 351 active contracts with the Wisconsin Farmland Preservation Program (FPP), encompassing 21,881 acres of farmland. The Wisconsin FPP is a key farmland preservation program that provides annual state income tax credits to farmers that maintain farmland in agricultural use.

Environmental Consequence/Potential Mitigation

The build alternatives could require the acquisition of up to 10 acres of agricultural land for highway right of way. Impacts are characterized as strip acquisitions and all farmed parcels would remain viable and accessible. These direct agricultural impacts from the I-43 North-South Freeway Corridor Study in combination with the ongoing conversion of farmland to urban land uses, may cumulatively contribute to a decline in farming in Ozaukee County.

The decision to allow development is ultimately determined by local governments through land use plans and zoning ordinances. Development on farmland zoned for agriculture would require a change in zoning and a permit from local governments. Furthermore, development will depend, in part, on the availability of sewer and water services, which is not widely available in some portions of the southern half of the county and a large portion of the northern half of the county.

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[67] *SEWRPC. Community Assistance Planning Report No. 87: Public Review Draft – A Farmland Preservation Plan for Ozaukee County: 2035 (Second Edition). June 2013.*

[68] *Ozaukee County. Land and Water Resource Management Plan 2011-2015. Plan Version 5. Feb.10, 2011.*

Overall, the cumulative effect to agricultural lands is not expected to be substantial. WisDOT is minimizing the impact of build alternatives by widening I-43 to the inside median between the northbound and southbound travel lanes and using steeper side slopes where practicable. Also, no farms would be split and existing access to farms would not be changed. In addition, the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) has determined that an agricultural impact statement would not be required, which is an indication that the agricultural impacts from the build alternatives are considered minimal by the government agency.

SURFACE WATER QUALITY AND QUANTITY

Affected Environment

The I-43 North-South corridor is located in the Milwaukee River Subwatershed and the Fish Creek Watershed, both of which discharge into Lake Michigan. The Milwaukee River Watershed contains a mix of rural and urban uses; about 33 percent urban, 25 percent agriculture, 21 percent grasslands, 12 percent forests and 6 percent wetlands.[69] Water quality in the Milwaukee River Watershed has been affected by human activities that cause point and nonpoint sources of pollution. Point sources are pollutants that are discharged to surface waters at discrete locations.[70] Common sources of point source pollution include discharges from sewage treatment plants and industrial discharges. Nonpoint sources of pollution are discharges of pollutants to the surface waters that cannot be readily identified as point sources of pollution.[71] Nonpoint sources enter surface waters via stormwater runoff from rural and urban land uses.

Point sources of pollution have been highly regulated for decades through the federal Clean Water Act and the National Pollutant Discharge Elimination System (NPDES). The WDNR regulates runoff from nonpoint sources of pollution from urban and rural land uses through NR 151 of the Wisconsin Administrative Code. Given the dispersed nature of nonpoint sources of pollution, it has been difficult to control.

Throughout the Milwaukee River Watershed, point and nonpoint source pollution have degraded surface water quality. **Table 3-40** summarizes estimated pollution loads for point and nonpoint sources to the watershed. Nonpoint sources of pollution are the largest contributor of pollutants within the Milwaukee River Watershed. Stormwater runoff from farm fields carry suspended solids from soil erosion, nutrients and pesticides to streams. Runoff from urban environments contains suspended solids from sources such as eroding stream banks and impervious surfaces like parking lots, buildings and streets and highways. Urban development is also the source of water pollutants such as fecal coliform bacteria, salts and nutrients. The Milwaukee River is listed on the WDNR's "Impaired Waters" list as a result of pollutant loads in the watershed. Also, the river has a Section 303(d) designation, which means that the water body does not meet Federal Clean Water Act standards. The Milwaukee River is considered impaired because of bacterial contamination and it has fish consumption advisories due to high concentrations of contaminants in fish tissues.[72] Fish Creek is not considered impaired.[73]

[69] *http://dnr.wi.gov/water/watershedDetail.aspx?key=924696. Accessed Nov. 20, 2013. Similar data for the Fish Creek watershed is not available.*

[70] *SEWRPC. Technical Report No. 39: Water Quality Conditions and Sources of Pollution in the Greater Milwaukee Watersheds. November 2007.*

[71] *SEWRPC, 2007.*

[72] *SEWRPC. A Land and Water Resource Management Plan for Milwaukee County: 2012-2021. Community Assistance Planning Report No. 312. August, 2011.*

[73] *http://dnr.wi.gov/water/waterDetail.aspx?key=3924909. Accessed Nov. 20, 2013.*

Table 3-40: Annual Average Pollutant – Milwaukee River Watershed

Pollution Type	Point[1]	Nonpoint[2]	Estimated Total
Biochemical oxygen demand	13.7 percent	86.3 percent	5,233,160 lbs/year
Total suspended solids	1.6 percent	98.4 percent	58,383,650 lbs/year
Fecal coliform bacteria	5.8 percent	94.2 percent	40, 826.66 trillion cells/ year
Total Phosphorus	54.0 percent	46.0 percent	274,500 lbs/year

Source: Water Quality Conditions and Sources of Pollution in the Greater Milwaukee Watersheds. Southeastern Wisconsin Regional Planning Commission. Technical Report No. 39

Notes:

1. *Where applicable, includes discharges from sewage treatment plants, combined sewer overflows, separate sanitary sewer overflows and industrial discharges.*
2. *Includes urban and rural runoff.*

A noteworthy water resource in the study area is the Ulao Creek Subwatershed, which is part of the greater Milwaukee River Watershed. The Ulao Creek Partnership in Ozaukee County is active in watershed management through a variety of restoration and stewardship projects.[74] The 16-square-mile watershed contains a 95-acre federally designated waterfowl habitat, and a 490-acre swamp that is a locally designated Significant Natural Area and contains critical species habitat. The watershed is targeted for management because of its location in an area that is seeing continuing conversion of agriculture and open space uses to residential and commercial development. Research in the subwatershed indicates that historic disturbance from agricultural and suburban development makes the creek more vulnerable to pollutant runoff and reduced species diversity.[75]

The quantity of stormwater runoff is also a concern for the study area. According to MMSD, in areas with low levels of development, depending on soil conditions, as much as 50 percent of rainfall can be absorbed directly into the ground, with only about 10 percent of this water running off the land. In contrast, where the land has been extensively developed, very little water is absorbed into the ground. Instead, more than half of the water runs off the land because of hard impervious surfaces like buildings, streets, highways and parking lots. According to MMSD, low flow conditions in highly urbanized areas can be equally as stressful for waterbodies creating conditions of lower flow and higher water temperature extremes during dry periods. This occurs because rainfall sheds off the land too quickly in urbanized areas, not allowing rainwater time to replenish the groundwater flow to the stream in a slow, sustainable manner.

The amount of stormwater runoff from highways increases proportionately to the amount of impervious surface. Runoff from roadways can increase the amount of water in area streams above normally carried capacities. Stormwater that runs off of I-43 throughout the study corridor is collected by inlets and conveyed in storm sewer pipes directly to streams and rivers in the more urbanized areas, or by overland flow through ditches in less densely developed areas.

The MMSD and its partners have been working to reduce flooding in its service area as a result of extensive flooding that occurred in Milwaukee County in 1997, 1998 and 2000 that caused $96 million of damage to homes, businesses and neighborhoods.[76] After a severe flood event in 2010, Nicolet High School constructed stormwater management facilities on its

[74] *http://www.ulaocreek.org/*

[75] *Ulao Creek Partnership. Ulao Creek Watershed Restoration and Stewardship Plan. 2003.*

[76] *http://v3.mmsd.com/milwaukeecogrounds.aspx. Accessed Sept. 13, 2013.*

campus. MMSD also purchased an 84-acre tract of land as part of its Greenseams program in the northeast quadrant of the Mequon Road interchange. The purpose of the program is to preserve land in developing urban areas to store and drain water into the ground naturally. The preserved Greenseams properties help prevent future flooding and protect flood management infrastructure. Currently, the program has protected more than 2,000 acres of land in the region.

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Environmental Consequences/Potential Mitigation

Increases in impervious surface area from the I-43 North-South Freeway Corridor Study build alternatives, in combination with ongoing urban development identified in **Table 3-38** may cumulatively affect surface water quality and quantity within the Milwaukee River and Fish Creek watersheds.

As shown in **Table 3-23** in **Subsection 3.10.2**, the build alternatives would increase the freeway's impervious area, which would increase the amount of stormwater runoff that could enter nearby streams and rivers. The freeways impervious surface would increase from 122 acres to 187 acres in the Milwaukee River watershed, which is a 53 percent increase in comparison to existing conditions. In the Fish Creek watershed, the freeway's impervious surface would increase from 23.1 acres to 34.9 acres, which is a 51 percent increase in comparison to existing conditions. The change in the freeway's impervious surface would have very little effect (0.2 percent increase) for the total Milwaukee River watershed under the build alternatives. Impervious surfaces for the Ulao Creek and Indian Creek subwatersheds would experience a 3.1 percent increase and 2.3 percent increase, respectively. The total impervious area in the Fish Creek watershed would increase by 1.9 percent as a result of the freeway project's build alternatives.

While runoff volumes would increase under the build alternatives, the water quality analysis indicates that the use of best management practices would reduce the level of pollutants in stormwater runoff compared to the existing conditions and provide the opportunity to bring the I-43 study corridor into compliance with Wisconsin's stormwater management regulations.

Current and future land development within the study area watersheds could cumulatively impact water quality despite any improvements implemented during the reconstruction of the I-43 North-South corridor project. There are both redevelopment and development activities occurring in the watersheds as documented in discussed in **Subsection 3.21.1** above. Increased impervious area from these developments could increase the likelihood of stormwater carrying sediment and other pollutants in streams that are already heavily degraded from historic urbanization.

As discussed in the water resources analysis in **Subsection 3.10**, WisDOT and FHWA are evaluating several best management practices to minimize the amount of runoff that enters water bodies, reduces flow velocity, and improves the water quality of the runoff. The use of in-line storage, retention/detention basins and ditches to manage stormwater from the build alternatives are being evaluated along the study corridor as the most practical and efficient stormwater management measures.

To mitigate the impact of nonpoint source runoff from private development, NR 151 sets performance standards for stormwater quality control measures. For example, 80 percent of the total suspended solids (TSS) from site runoff must be removed on new construction sites 1 acre or larger. After construction, permanent measures must be in place to continue removing 80 percent of total suspended solids in stormwater runoff from the site. For highway construction projects, WisDOT is required to implement stormwater management measures to remove 40 percent of the TSSs discharged from their storm sewers after construction. Best management practices required under stormwater and nonpoint runoff rules are expected to improve water quality as future projects and ongoing redevelopment occur.

Short term highway construction impacts to water quality would be avoided or minimized by using WisDOT's *Standard Specifications for Road and Bridge Construction* (2009b) and complying with Wisconsin's *Trans 401* regulations that regulate construction site erosion control and stormwater management for transportation facilities. The WDNR and local governments are responsible for monitoring the performance of stormwater management measures and making corrective actions for non WisDOT projects. WisDOT would monitor performance of its control measures through the WisDOT-WDNR cooperative agreement, *Memorandum of Understanding on Erosion Control and Stormwater Management*. This agreement requires WisDOT to implement a stormwater management program for its projects that is consistent with Section 402(p) of the Clean Water Act, Chapter 283 of the Wisconsin Statutes, and Chapter NR 216 Wisconsin Administrative Code.

As noted above, *Trans 401*, which follow performance standards of NR 151, outlines stormwater management and erosion control procedures for WisDOT projects. As applied to this study, this rule requires removal of 40 percent of total suspended solids for the study area after construction. Also, to comply with Section 88.87(2)(a) of the Wisconsin State Statutes, WisDOT's Southeast Region seeks to maintain the peak discharge rate at the design year storm event, which is generally the 25-year or 50-year storm event. Another mitigation measure is construction of buffer areas upstream of waterways. Additional coordination with WDNR will determine stormwater management measures if the build alternative is selected as the preferred alternative. WisDOT would implement best management practices for stormwater and monitoring performance and, therefore, would not cumulatively contribute to water quality impacts.

The increased impervious area from the I-43 build alternatives and urban activities throughout the watershed in the project area would contribute to increased stormwater volume. The MMSD has stated a concern about increased stormwater volumes, which can affect flooding and stream bank stability. The MMSD regulates flood management in local communities through its Chapter 13 rules. While WisDOT is not subject to MMSD Chapter 13 rules, the cumulative effects of increased stormwater volumes can be minimized through implementing best management practices for stormwater control developed through the WisDOT-WDNR liaison process. These measures, which would include stormwater retention, focus on stormwater quality, but have a secondary benefit of managing stormwater volume as well.

WETLANDS AND FLOODPLAINS

Affected Environment

Wetlands in southeastern Wisconsin have historically been drained and filled by farming practices and urban development. **Table 3-41** shows the loss of wetlands between 1836 (before European settlement) and 1990 when modern land use patterns were established. The net loss of wetland acres for Ozaukee and Milwaukee counties during this time period was 0.2 percent and 70.2 percent, respectively.

Construction in floodplains reduces their flood storage capacity. These activities have impacted the area's hydrology and diminished the ability of existing wetlands to absorb and release water slowly back into the environment. Flood elevations crest even higher in future storms because floodwater cannot be stored, causing damage to surrounding structures.

Table 3-41: Historic Loss of Wetland Acres

	Percent of County Land Area		Net Loss	
Place	**1836**	**1990**	**Acres**	**Percent**
Ozaukee County	10.9	10.9	29	0.2
Milwaukee County	10.2	3.0	11,081	70.2
Southeastern Wisconsin	16.8	10.2	110,655	39.2

Source: SEWRPC Planning Report No. 42: A Regional Natural Areas and Critical Species Habitat Protection and Management Plan for Southeastern Wisconsin

The loss of wetlands and floodplains in the region has led to the removal of native plants and animals, degradation of water quality, increased flooding and a reduction in ground water recharge. As noted above, flooding has resulted in millions of dollars in property damage in Milwaukee County. Remaining wetlands and undeveloped floodplains in both counties are important to the region's hydrology and to the flora and fauna dependent on the habitat provided by the wetlands.

The WDNR and USACE protect and regulate wetlands through Section 404 of the Clean Water Act and through state regulations. Furthermore, WDNR has identified wetlands within primary environmental corridors as unsuitable for disposal of dredge or fill materials. SEWRPC identifies primary environmental corridors as corridors of regional environmental significance.

Local communities are required by Section 87.30 of the Wisconsin Statues to implement floodplain zoning. Minimum standards for floodplain regulations are provided in NR 116 of the Wisconsin Administrative Code. Floodplain regulations govern filling and development activities within the 100-year floodplain and prohibit nearly all forms of development in the floodway and restrict filling and development within the flood fringe. Also, local communities are required by Section 62.231 and 61.351 of the Wisconsin State Statues to implement shoreland-wetland zoning. NR 117 of the Wisconsin Administrative Code establishes minimum standards for shoreland zoning ordinances that must include the protection of wetlands five acres in size lying in shoreland areas.

Environmental Consequences/Potential Mitigation

The build alternatives would impact about 27 acres of wetlands. The build alternatives also would fill about 4.56 acres of floodplain. These impacts combined with existing and future development activities as outlined in **Table 3-38** could have a cumulative impact on wetland and floodplain resources in the study area. Commercial development is expected to expand near the WIS 60 interchange in Grafton, and the city of Mequon is considering expanding residential, commercial and industrial development as part of the East Growth Area Plan. Also, the town of Grafton recently changed its lands zoned for a minimum of 3-acre lots to a minimum of 1-acre lots, which encompasses most of the town's remaining land designated for residential uses. Future highway projects, as outlined in **Table 3-38,** could also impact wetlands and floodplains. These include future reconstruction segments of I-43 and future upgrades to the WIS 167 and WIS 60 corridors in Ozaukee County.

Filling activity in floodplains and wetlands would negatively affect water quality and stormwater

volumes as discussed above. Filling would also reduce the quality of habitat and the diversity of species by allowing faster growing invasive species to become established before slower growing native species. These effects would be minimal in Milwaukee County because it is highly urbanized, but the effects could be more pronounced in Ozaukee County where agricultural and open lands are transitioning into urban or low-density suburban uses.

The cumulative effect to wetlands and floodplains would be minimized and avoided with existing regulations that restrict development activity in wetlands and floodplains. Section 404 of the Clean Water Act regulates wetland filling. Concurrently, the WDNR regulates wetland filling through NR 103 and Section 401 water quality certification for federal 404 permits.

As discussed in the previous subsection, local communities manage floodplain development through implementation of Wisconsin Administrative Code NR 116, which requires local communities to establish zoning ordinances that maximize flood protection by limiting development in floodplains. NR 117 has a similar requirement for local communities to establish zoning for shoreland and wetland protection.

WisDOT and WDNR have an established a coperative agreement that outlines the procedures to implement measures to avoid and minimize impacts to all natural resources, including wetlands and floodplains.

WisDOT and FHWA will implement avoidance and minimization measures to reduce impacts to wetlands and floodplains. Avoidance and minimization measures would include widening the freeway to the inside median between the northbound and southbound travel lanes in the north segment of the corridor and using steeper sideslopes where appropriate. To further avoid and minimize a cumulative effect on wetlands, impacts of the build alternatives would be managed according to WisDOT's *Wetland Mitigation Banking Technical Guideline*. In addition, WisDOT would minimize the cumulative effect on floodplains by designing structures with adequate capacity for the 100-year flood flow. Also, WisDOT would not increase the base flood elevations by more than 0.01 foot.

ENVIRONMENTAL CORRIDORS AND STREAM CROSSINGS

Affected Environment

SEWRPC is responsible for designating environmental corridors. Environmental corridors support southeastern Wisconsin's most important elements of the natural resource base, including wetlands, woodlands, prairies, wildlife habitat, and streams, as well as historic, recreational and scenic sites. According to SEWRPC, primary environmental corridors are at least 400 acres in size, two miles long and 200 feet wide. Milwaukee County has more than 9,000 acres of primary environmental corridors, and Ozaukee County has more than 20,000 acres.[77] Environmental corridors typically follow stream valleys, surround major lakes and flood lands. In light of historical and planned development in Milwaukee and Ozaukee counties, the preservation of this resource base is especially important. SEWPRC reports that preserving environmental corridors can reduce flooding and noise pollution, improve water quality and maintain air quality.

Local municipalities within the study area seek to protect these resources from further encroachment through zoning and permitting regulations. In Milwaukee County, the majority of the remaining environmental corridors are publicly owned to ensure their preservation. In Ozaukee County, local communities minimize impacts to environmental corridors through land use planning

77 *SEWRPC. Planning Report No. 48: A Regional Land Use Plan for Southeast Wisconsin: 2035. June, 2006.*

and zoning regulations. Other activities preserving natural areas in Ozaukee County include MMSD's Greenseams program and preservation projects and programs implemented through the Ulao Creek Partnership and the Ozaukee Washington Land Trust. Through the Greenseams program, MMSD purchases and manages open tracts of land for flood and water quality management. The Ozaukee Washington Land Trust partners with public and private landowners to preserve natural areas, typically through conservation easements. The Ulao Creek Partnership partners with private landowners and public agencies to educate the public and implement projects that improve water quality and natural habitats in the Ulao Creek watershed. According to the Ozaukee County comprehensive plan, as of 2009, over 20,000 acres of environmental corridors and natural areas, or 72 percent, were under protection through adopted sewer service area plans, public ownership, conservation easements, or local zoning ordinances.[78]

The Ozaukee County Fish Passage Program is working to complete a large-scale habitat improvement and restoration project along the Milwaukee River, and its tributaries. This program is concerned with improving waterway connectivity to allow for access to high quality habitat for native fish and wildlife. Past agricultural and urban development activities that constructed dams and culverts, along with debris build up act as barriers to fish and animal passage. Ozaukee County's Fish Passage Program includes Ulao Creek and its crossing under I-43. The creek has seen historic channelization from farming activities and previous freeway construction.

Environmental Consequence/Potential Mitigation

While most environmental corridors in the study area are in protective ownership or have protective measures in place, environmental corridors and other natural areas in areas without these protections could be cumulatively affected by the I-43 North-South Corridor build alternatives and past, present and future actions outlined in **Table 3-38**. The build alternatives would affect 4 acres of environmental corridors and isolated natural areas and cross Indian Creek, Ulao Creek and Fish Creek or their tributaries. All crossings would occur at existing crossings and no new crossings would be created.

Environmental corridors provide multiple benefits including flood management, water pollution control and refuge for wildlife. The cumulative removal of environmental corridors from the build alternatives and other developments would impair the natural functions of the corridors and the benefits they provide.

Improperly designed culverts at stream crossings create barriers for aquatic organisms. Culverts and pipes have a greater effect on stream hydrology than bridges because the normal stream bottom transitions to a human-made bottom. In low-flow conditions, flat culvert bottoms tend to spread the stream flow very thinly, sometimes making it difficult for fish to swim through the culvert. Erosion at the downstream exit of the culvert or pipe can result in a "perched" outfall, making stream passage difficult.

To minimize potential cumulative impacts to environmental corridors, WisDOT would widen the freeway mainline to the inside in the existing median, along with steepening side slopes where practicable. Potential temporary effects from construction would be avoided and minimized by using WisDOT's *Standard Specifications for Road and Bridge Construction* and complying with Wisconsin's *Trans 401, NR 216 and NR 151* regulations that oversee construction site erosion control and stormwater management. WisDOT will also continue coordination with the Ozaukee County Fish Passage program to incorporate design criteria developed for the program. Local

78 *SEWRPC. Community Assistance Planning Report No. 133: A Park and Open Space Plan for Ozaukee County. (3rd Edition). June, 2011.*

communities in the study area have land use policies, zoning and permitting regulations in place to limit development in environmental corridors and natural areas.

AIR QUALITY

Affected Environment

The Clean Air Act of 1970 established 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 most recent amendments to the NAAQS contain criteria for sulfur dioxide (SO_2), particulate matter (PM_{10}, 10 micron and smaller along with $PM_{2.5}$, 2.5 micron), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3) and lead (Pb).

The study-area freeway system is located within the Southeastern Wisconsin Intrastate Air Quality Control Region #239. Ozaukee County is currently in attainment status for five of the six criteria pollutants, and has been redesignated to a maintenance area for the eight-hour ozone standard. Milwaukee County is currently in attainment status for four of the six criteria pollutants, has been redesignated to a maintenance area for the eight-hour ozone standard and is in non-attainment for $PM_{2.5}$. See the air quality analysis in **Subsection 3.16** for more information.

Environmental Consequence/Potential Mitigation

The build alternatives, along with other activities and developments in the study area, may have a cumulative impact on air quality in the region. Other activities in the region, such as the expanded Oak Creek coal-fired power plant and continued regional traffic growth are sources of air pollutants. By the year 2040, average weekday traffic in the I-43 North-South Freeway study corridor is expected to increase by 32 percent. Early coordination with WDNR and EPA indicates that the build alternatives would not have significant air quality impacts.

The WDNR manages, monitors and enforces air quality programs in Wisconsin. To help manage the air quality program, the WDNR works with a range of industries, agencies, interest groups, and individuals to develop the State Implementation Plan (SIP) that demonstrates how Wisconsin will attain compliance with national air quality standards. FHWA also provides congestion management and air quality grants for transportation projects in nonattainment areas that will reduce transportation related air emissions.

Ultimately, EPA plays a major role in managing Wisconsin's compliance with the Clean Air Act, which includes monitoring the SIP. If the state and southeast Wisconsin region cannot achieve attainment standards, EPA can impose sanctions, such as stricter emissions rates for new developments and withholding federal funds for transportation projects.

To obtain federal funding, the reconstruction of the I-43 North-South Freeway study corridor would have to be included in transportation plans that conform to the SIP. At the regional level, SEWRPC prepares a transportation improvement program to assure conformance with the SIP. Conformity with the SIP means projects included in the transportation improvement program will not worsen air quality or delay attainment of air quality standards. The I-43 North-South Freeway study corridor is included in SEWRPC's conforming transportation improvement program; therefore, it would not contribute to a substantial negative cumulative impact to air quality, as measured by current pollutant standards.

In addition to meeting air quality standards, there is growing concern about the direct and