



I-35 Connects

MIC and MnDOT

I-35 CORRIDOR PLAN

Existing Conditions Report | November 2023



Duluth-Superior
Metropolitan Interstate Council
A Division of ARDC



**BOLTON
& MENK**



DEPARTMENT OF
TRANSPORTATION



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EXECUTIVE SUMMARY

Interstate 35 (I-35) is among the most important, and historically controversial, infrastructure projects within the Duluth-Superior area. A comprehensive study of I-35 therefore must take stock of the existing infrastructure, how it interacts with local and regional facilities, how it supports, or inhibits, different modes of travel serving different purposes. Additionally, such a large study area and prominent interregional corridor plays a large role in the local economy, land use, and environment, all of which must be considered and evaluated alongside I-35's infrastructure and operations.

Key takeaways from the existing conditions analysis found on the following pages are summarized below:

- The roles of I-35 are diverse throughout the area – from providing critical interregional access, to both defining and separating communities – each with varying degrees of impact on adjacent land uses.
- Much of the adverse impacts of the corridor – particularly connectivity barriers, safety issues, and land use separation – occur within neighborhoods with disproportionately high percentages of renters, those who don't own a car, and those who commute with modes other than cars.
- Unlike other Minnesota metro areas, Duluth's population and real estate markets have largely remained stagnant over the last several decades – a trend estimated to continue into the immediate future.
- Traffic fluctuates along I-35 and at key interchanges seasonally and daily, with summer months and weekend traffic combining to increase traffic volumes by 10-19 percent above average, and winter traffic decreasing over 15 percent from average.
- Just 10 percent of traffic originating south of the project limit continues north through to TH 61 and the North Shore.
- Notable proportions of short (<2 miles) trips occur in the Cody, Fairmount, Spirit Valley, Downtown, Endion, and Congdon Park neighborhoods surrounding the interstate, indicating there may be demand for non-motorized travel across and along the corridor.
- Much of the study area experiences acceptable traffic operations during peak hours and throughout the day. Intersections in the Canal Park area do experience more significant delays for a few hours of the day.
- All segments of I-35 within the study area operate above expected safety levels, particularly where interchange and ramp spacings and design are substandard. The majority of ramp terminals and surrounding intersections operate either above the statewide average crash rates, or with a statistically significant deviation from the expected crash rate.



BACKGROUND

STUDY AREA

This I-35 Corridor Study is evaluating a 14-mile segment of the interstate 35 corridor, from the St. Louis/Carlton County line, to London Rd/TH 61 in Duluth.

I-35 is the primary gateway to northeastern Minnesota (especially from the Twin Cities) and the major thoroughfare in the Duluth-Superior metropolitan area. The roadway's history is both storied and controversial and has undeniably been integral to the City of Duluth and surrounding metropolitan area. I-35 has served the region for nearly 50 years as the very last completed sections of the National Interstate System.

Major connections to US & TH 61, US 2, US 53, and I-535 are made within the study area, providing direct access to and between Duluth, northwestern Wisconsin, the Twin Cities, Minnesota's Iron Range, North Shore, and the Canadian border.

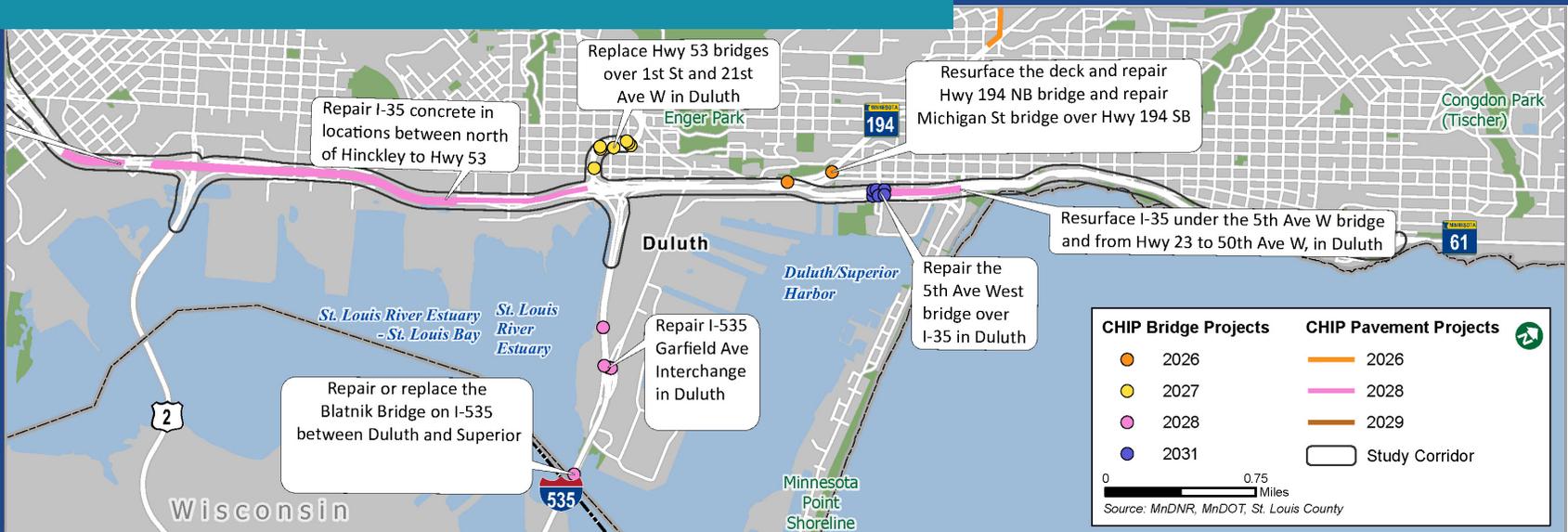
The 14-mile study area travels through several distinct areas of the region, all with unique characteristics that bring different sets of challenges and opportunities. As such, the study area has been segmented into three subareas as highlighted in the project overview map.





PROGRAMMED IMPROVEMENTS

MnDOT identifies and budgets for maintenance and improvement projects on all roadways under its jurisdiction in the Capital Highway Investment Plan (CHIP) for a 10-year planning horizon. Programmed projects within the study area are identified in the map below.





CONTEXT

LAND USE

The study area is a living reflection of the region's deep interconnections with shipping and industry, anchored by Duluth's shipping yards and canal. Duluth was once among the nation's most prominent port cities, driven by its connection to both the Atlantic Ocean via the Great Lakes and Pacific Ocean via a network of rail lines. This unique position drove an immense population and employment boom through the 19th and early 20th centuries, with the city's population peaking in 1960 at 107,000 people. Industrial and manufacturing uses dominated the city's landscape, primarily along and near the lakefront where daily ships from around the world entered into port to collect or deposit goods. This boom spilled out into neighboring cities, with Proctor's population and development oriented around the steel and rail yards at the center of Downtown.

Like much of the rest of the country however, Duluth and the surrounding region couldn't escape the drastic industrial decline that occurred until the late 1900s. The decline was largely catalyzed by the closing of US Steel in the 1970s, and economic shifts across the country. Over the subsequent decades, Duluth lost a significant piece of its economic base, and population dropped by nearly 20 percent before leveling off around the 1990s. Over the last several decades, Duluth and surrounding communities have emphasized regional and state-wide tourism, leveraging the surrounding natural environment and location on the western edge of Lake Superior.

ENTER INTERSTATE 35

The extension of I-35 into northern Minnesota was a long sought after extension, connecting the region to the Twin Cities and the rest of the country.

Once completed, I-35 had immense impacts on land uses across the study area, particularly for Duluth. Undoubtedly, the expansion of the interstate led to new inter- and intra-state access to the region, aiding in local efforts of economic renewal and tourism—specifically for Canal Park in the later 1900s.

However, the price of such access was immense. Construction of the interstate led to the demolition of hundreds of buildings. While public outcry and lawsuits redirected the corridor's northern alignment, and preserved lakefront access near Leif Erickson Park, the southern segments of Duluth received less critical consideration. As the corridor carved a path across Grand Ave and Central Ave, and in between Michigan and Oneota St, hundreds of homes, businesses, factories, and public institutions were razed, displacing hundreds of residents.



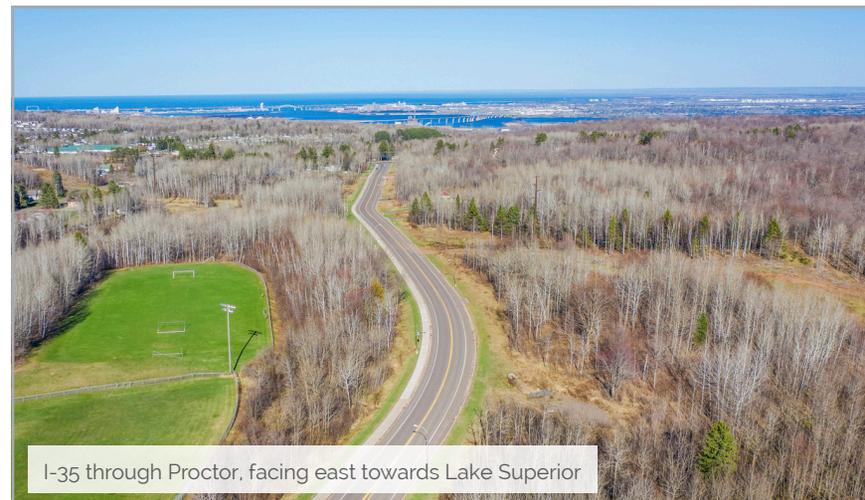
LAND USES TODAY

Land uses through the study area reflect this historic rise, fall, and stabilization of the region. While downtown Duluth continues to anchor the region's commercial and tourism heart, industrial and traditionally blue-collar homes remain south of downtown, along the waterfront – echoing the historic locations of shipping-oriented industries and their workers lived. Further inland, the City of Proctor is centered around the CN rail yards and US 2, which relied on rail, and eventually vehicle access to the Ports of Duluth, for its economic vitality.

RURAL SUBAREA

Land Uses

The rural subarea is almost entirely undeveloped wooded hills and rural residential, with occasional breaks of limited, highway-oriented commercial and small-scale industrial uses. These tend to be concentrated immediately around or adjacent to I-35 interchanges access ramps and cater largely to regional and statewide shipping, freight, or regional tourists traveling to or through Duluth. Additional speciality uses dot across the landscape including camping, hiking, and most notably, Spirit Mountain Recreation Area.



I-35 through Proctor, facing east towards Lake Superior

There are minimal anticipated land use changes throughout the rural subarea. The City of Proctor has expressed the strongest aspirations for land use development along the corridor.

At the Boundary Ave interchange, the primary entrance to Spirit Mountain, the city has expressed intent towards pursuing growth of highway-oriented commercial uses. Proctor has also pursued studies towards rethinking its downtown, located on US 2 with direct access off of I-35, a major freight route and regional connector from the interstate.

Relevant Plans Reviewed:

- Proctor Comprehensive Plan (2016)
- Proctor Transportation Plan (2021)
- Imagine Duluth 2035 (2018)
- Spirit Mountain Master Plan Update (2017)
- St. Louis County Comprehensive Land Use Plan

I-35 as Connector

Within the rural areas of the I-35 corridor, the interstate provides vital connections necessary for statewide access to an otherwise regionally-oriented transportation system and land uses. The Highway 61 and Midway Rd interchange offers direct access to industrial uses along the St. Louis River estuary, while Boundary Ave and US 2 are critical connections with the City of Proctor. Midway road also provides an alternative southern connection to the Gary-New Duluth neighborhoods, offering more direct interstate access.

Without the connections created by I-35 area access, connectivity, and economic activity may be at risk..

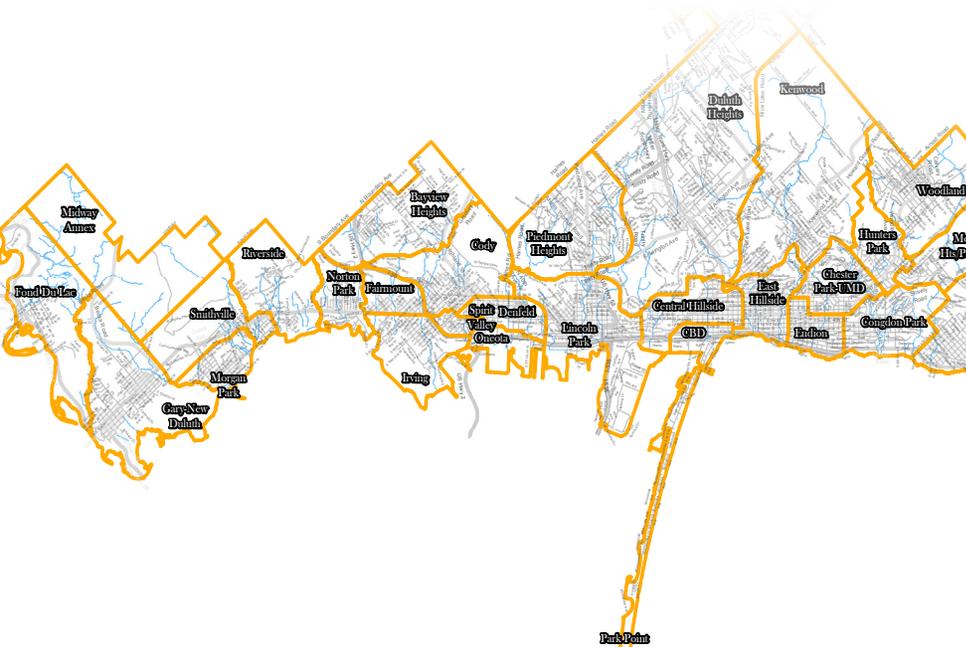


URBAN SUBAREA

Land Uses

Land uses quickly densify within the urban subarea, assuming a traditional urban neighborhood character oriented along long commercial corridors. The urban subarea is rooted in the historic industrial and blue-collar backbone of Duluth. Unlike the steep lakefront of east Duluth, the city's western neighborhoods rest at a flat landing between the hills and waterfront, resulting in topography more conducive to shipping and port access. The subsequent industrial and shipping uses established along the waterfront provided a wealth of well-paying jobs, and a foundation for the city and region's major growth in the late 1800s through early 1900s .

The regional downturn of the late 20th century, however, hit West Duluth and Lincoln Park especially hard. Much of its historic shipping and manufacturing character remains, but, it is a remnant of its former peak.



Today the neighborhoods of West Duluth are anchored by single family, traditional urban block neighborhoods, with corridor-oriented commercial. Neighborhood centers are concentrated along Grand Ave, Central Ave, and W Superior St. The heart of the city's industrial uses remain within West Duluth, framed between Grand Ave and the I-35 corridor. Unlike the Downtown Subarea, the waterfront is dominated almost entirely by shipping-oriented industrial uses.

The commercial node along Central Ave and Grand Ave, framed to the south by the interstate, has long been recognized as a focal point with immense potential for reinvestment. Duluth's Comprehensive Plan identified the area (under the title Spirit Valley), as a Core Investment Area, identified in part for its redevelopment potential and opportunity towards being a neighborhood-oriented destination. A more recent study was done for corridor through Fairmount and Irving, which highlighted additional redevelopment opportunities. The Irving Fairmount Brownfields Revitalization Plan outlined plans to densify housing and commercial uses along corridors in each neighborhood.

Further east, Lincoln Park has witnessed a renaissance of economic activity, anchored by the Duluth Heritage Sports Center and the Superior St Commercial Corridor. With a growing reputation as the Craft District, Lincoln Park has experienced an immense "makers" transformation over the last several years, reflective of the neighborhoods industrial and manufacturing DNA.

Relevant Plans Reviewed:

- Imagine Duluth 2035
- Irving Fairmount Brownfields Revitalization Plan
- Lincoln Park Small Area Plan
- Bayfront District Small Area Plan (2010)
- West Duluth Neighborhood Revitalization Plan
- Lincoln Park Neighborhood Revitalization Plan

I-35 as Divider and Definer

As land uses along the interstate begin intensifying at Cody St, the role of I-35 transitions from connector to divider and definer. This is particularly true for West Duluth's neighborhoods, land uses, and amenities.

Unlike in downtown Duluth, interstate construction through the urban subarea occurred prior to the wave of national scrutiny of urban interstate projects that emerged in the 1960s and 70s. I-35 was built with comparatively little regard towards land use and livability impacts. As such, it is here that the impacts of the corridor's construction were felt especially heavily, as hundreds of homes, businesses, and institutions were either destroyed or relocated.

As it winds through West Duluth, the interstate divides the collection of once cohesive neighborhoods and establishes a physical border around Norton Park, Bayview Heights,

Fairmount, Cody, Irving, Spirit Valley, Denfeld, and Oneota (which approximately comprise West Duluth and Lincoln Park). The result is an interstate that has become the literal defining feature for each neighborhood.

Unique to this area, I-35 elevates from 63rd Ave N to Central Ave, creating an elevated physical and psychological divider between neighbors and neighborhoods. While this elevation does permit for some through-access, the resulting passageways are generally unwelcoming - particularly for bicyclists and pedestrians and at night. As the corridor returns to- and below-grade, crossings become immensely more difficult and interspersed. The result is a hard "edge" along the southern borders of West Duluth and Lincoln Park, further dividing the area from the adjacent waterfront and job centers.

DOWNTOWN SUBAREA

Land Uses

Downtown Duluth hosts the densest land uses of the entire study area. With it is the central business district for the entire region comprised of major employers, civic, government, and entertainment uses. Like West Duluth, portions of downtown rest on a relatively flat landing between the hills and the lake; however, topography quickly climbs as you move north and west through downtown. The resulting views, elevations, and land use implications have become intricately associated with downtown's development and layout.

Downtown also hosts the region's major commercial and tourism destination anchored by Canal Park and the adjacent entertainment district. With the regional industrial downturn of the late 20th century, Duluth turned its attention to attracting tourism, leveraging its location along Lake Superior and surrounding topography and natural resources. Acting as the "Gateway to the North Shore," Duluth

has established a reputation of a model mid-sized city, centered on livability and affordability – particularly compared to peer cities. Canal Park is the focal point of this tourism effort, offering exceptional views of both the waterfront and downtown alongside entertainment and recreation.

Anchoring the east side of downtown is the Essentia and St. Luke's medical campuses, two major regional medical districts near the heart of downtown. Further east near the end of the study area, land uses transition back to residential. These neighborhoods are laid out across fairly dense urban residential blocks comprised of interspersed single and multifamily housing. Owing in part to topography, industrial uses never established in East Duluth compared to West Duluth, resulting in higher percentage of residential land use, compared to West Duluth and Lincoln Park.

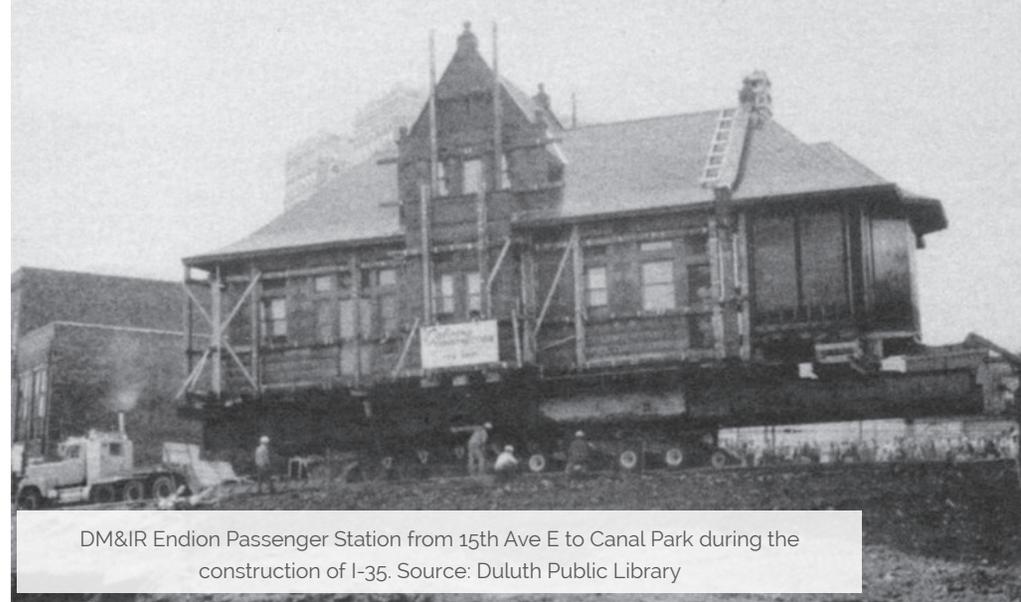


I-35 as Segregator

Construction of the interstate stopped at Mesaba Ave in the 1970s. The city then began to wrestle with where to bring the interstate through downtown. Initial designs envisioned the I-35 extending out over Lake Superior. This would have functionally cut off the entire area from the lake, and obstructed views that Duluth is now famous for. Unlike West Duluth, downtown was the beneficiary of heightened national urban interstate scrutiny, which sought to better integrate I-35 within the existing built form of downtown. Over the course of nearly two decades, driven largely by citizen advocacy groups, the alignment was directed to its current location. Despite the scrutiny and realignment, construction still resulted in immense clearance and displacement through downtown, with numerous buildings being destroyed or relocated. The notable Bridge Yard railroad yards for example, took a remarkable 10 years to coordinate and complete its relocation.

Today, as I-35 reaches its final few miles, it must be recognized as being a cornerstone to the city's tourism efforts. The interstate ushers in tourists to the city and was critical to supporting the tourism boom that has reshaped the city's identity. This access has come at a price as I-35 reaches downtown, it takes on the role of segregator of land uses, destinations, and identities. While downtown Duluth and Canal Park are collectively the cultural, economic, and tourist heart of the region, the bisecting interstate has functionally created two distinct "places"—downtown's central business center identity, and Canal Park's tourism identity. This has made a cohesive blending of downtown and Canal Park impossible – the few hundred feet separating the two may as well be miles.

Further east along the corridor, starting around the Jay Cooke Plaza Tunnel, the interstate segregates the commercial, medical, and residential districts from direct access to the lakefront. Running generally adjacent to the shoreline, the interstate frames the edge of the city, creating a series of a de facto "overlooks" along Jay Cooke



DM&IR Endion Passenger Station from 15th Ave E to Canal Park during the construction of I-35. Source: Duluth Public Library

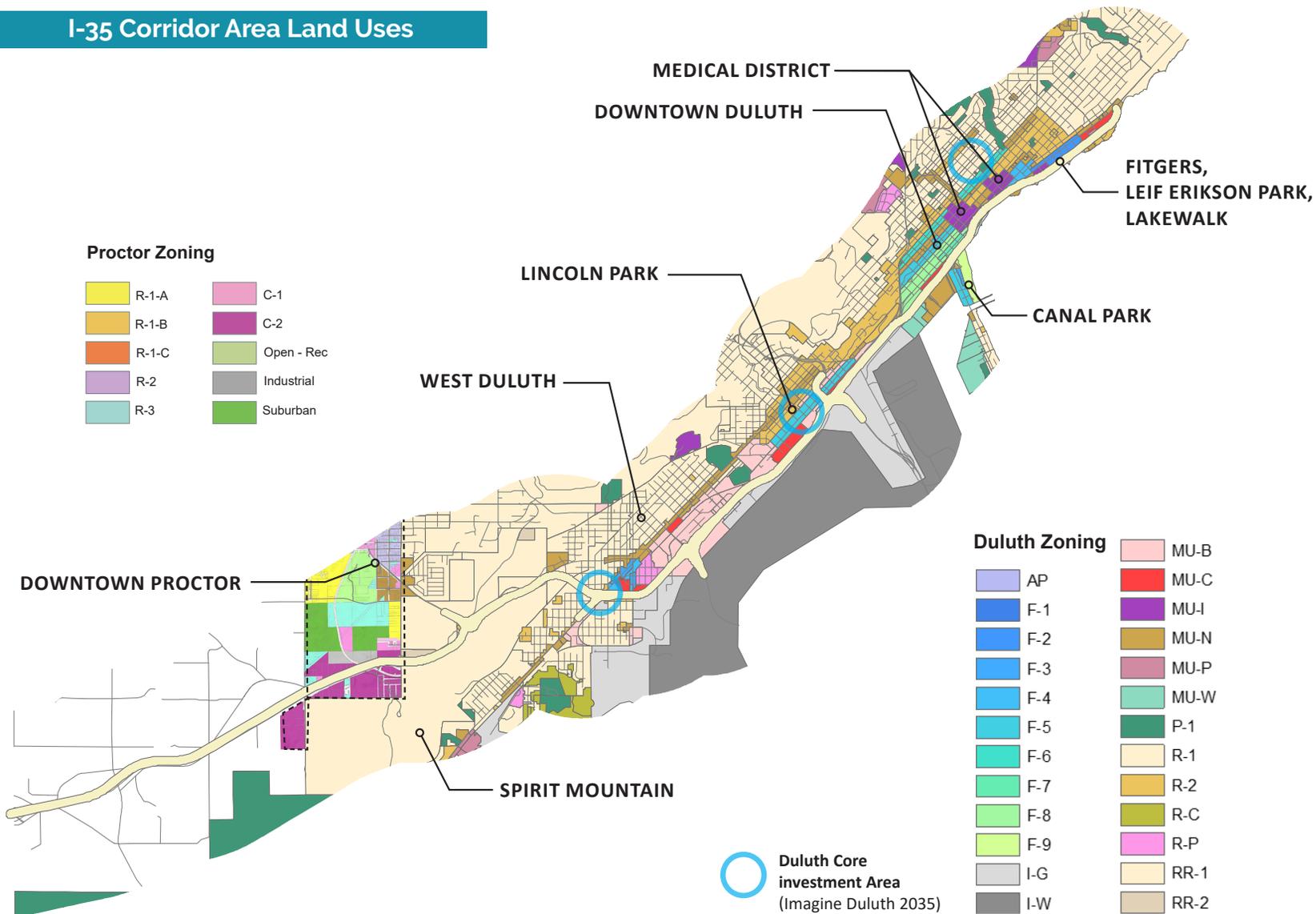
Plaza, the Rose Garden, and South St. While the Lake Walk, Leif Erikson Park, and past interstate capping efforts have attempted to address this segregation, much of the Downtown area remains physically unable to access the waterfront.

Renewed efforts have merged to reconsider the role of the interstate's impacts on Duluth's land uses, particularly in and around Downtown. Organizations like the Duluth Waterfront Collective have begun to catalyze attention to reconsider and reevaluate the role and future of the interstate. These efforts are gaining traction they harken back to initiatives nearly 50 years ago by groups like the Citizens for Integration of Highways and the Environment, who led some of the first coordinated concerns about the original highway alignment through downtown.

Relevant Plans Reviewed:

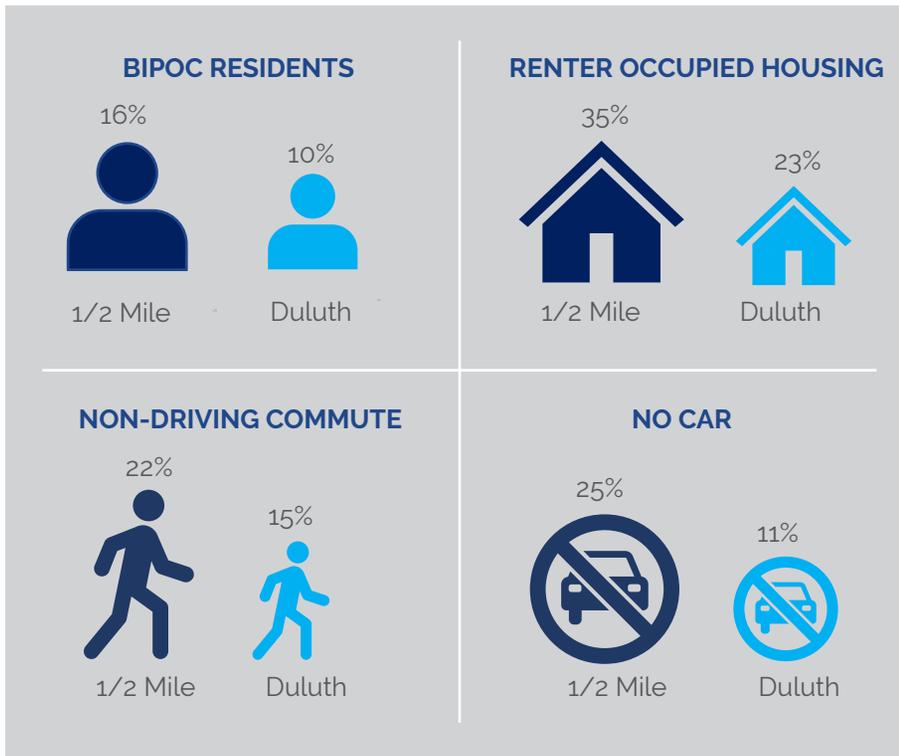
- Imagine Duluth 2035
- Bayfront District Small Area Plan

I-35 Corridor Area Land Uses

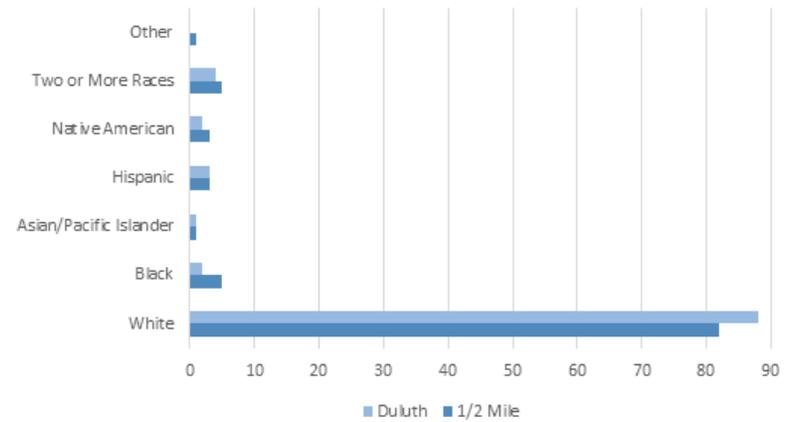


DEMOGRAPHICS

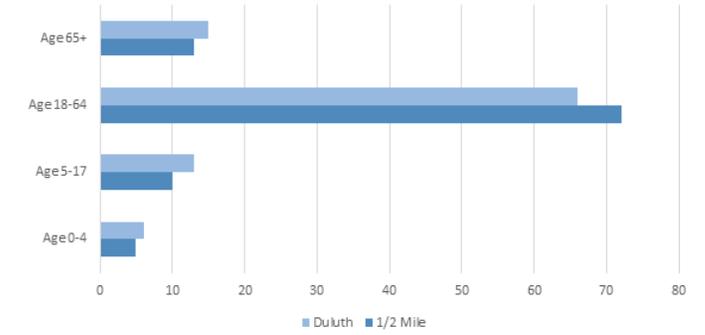
Compared to the City of Duluth, the 1/2 mile area surrounding the I-35 corridor is populations along the corridor itself tend to be higher rates of renters, residents without vehicles, Black, Indigenous, and People of Color (BIPOC), and have a lower household income. This demographic profile is driven largely by residents within West Duluth, Lincoln Park, and the core of Downtown, which represents the majority of populated areas within the study area footprint.



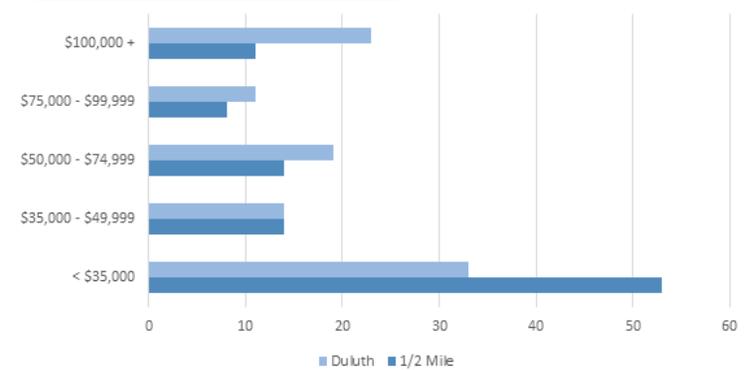
RACE



AGE



Household Income



Regionally, after peaking in the mid 1900s, there was a sharp population and jobs declined, spurred by regional and national economic shifts and subsequent loss of industrial and blue-collar jobs. This downturn lasted for decades and didn't level off until around the 1990s. Since the turn of the century, the region, including the I-35 corridor, has been in a state of relative population and employment stasis. Much speculation and attention has been given to the region's stagnation over multiple decades, which has seen area population, age division, racial diversity, income, and home ownership all remain relatively unchanged since the early 2000s.

The 1-mile area surrounding the length of the corridor reflects similar trends, remaining essentially unchanged over the last 12 years.

Summary	Census 2010	Census 2020	2022
Population	43,396	43,213	43,158
Households	19,711	19,988	19,913
Families	8,985	-	8,877
Average Household Size	2.15	2.09	2.09
Owner Occupied Housing Units	9,420	-	9,856
Renter Occupied Housing Units	10,292	-	10,057
Median Age	32.0	-	34.9

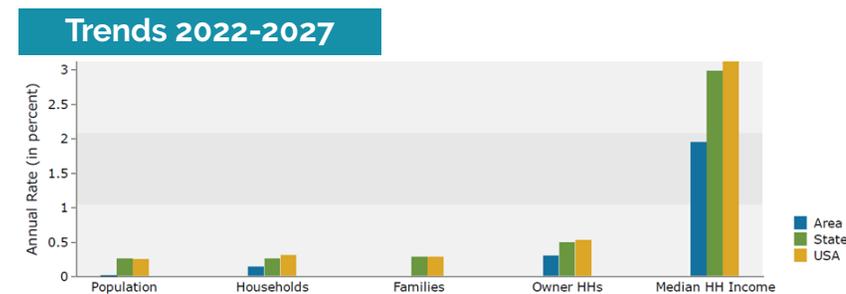
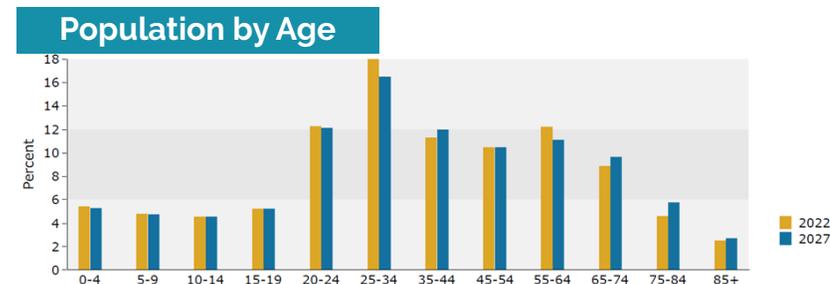
source: Esri

Future estimates for the 1-mile area out to 2027, anticipates almost entirely unchanged demographics and socioeconomic - population, age, income, or home ownership.

Trends: 2022-2027 Annual Rate	Area	State	National
Population	0.01%	0.26%	0.25%
Households	0.14%	0.26%	0.31%
Families	0.00%	0.28%	0.28%
Owner HHs	0.30%	0.50%	0.53%
Median Household Income	1.95%	2.99%	3.12%

source: Esri

Further, these future estimates are anticipated to lag both state and national growth over the next five years, as shown in the below table and images.



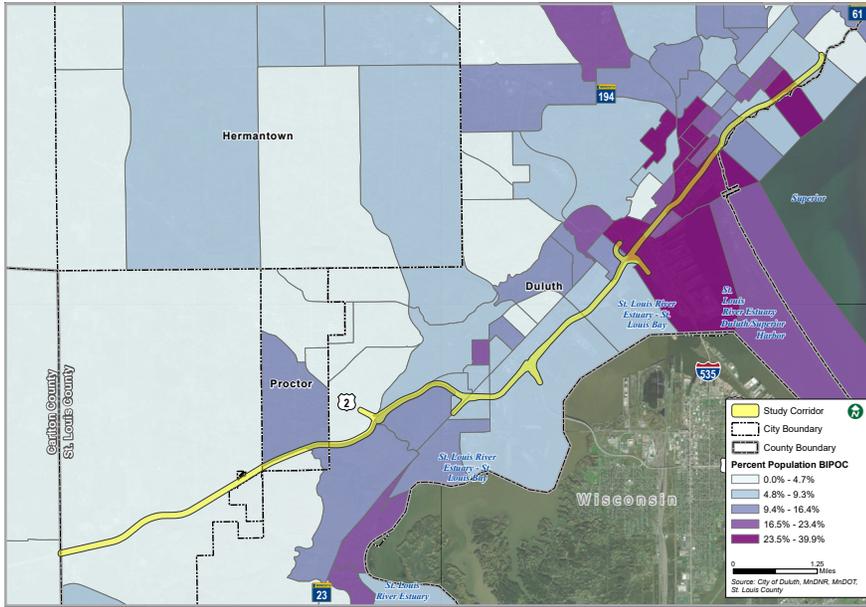
source: Esri

KEY INDICATORS

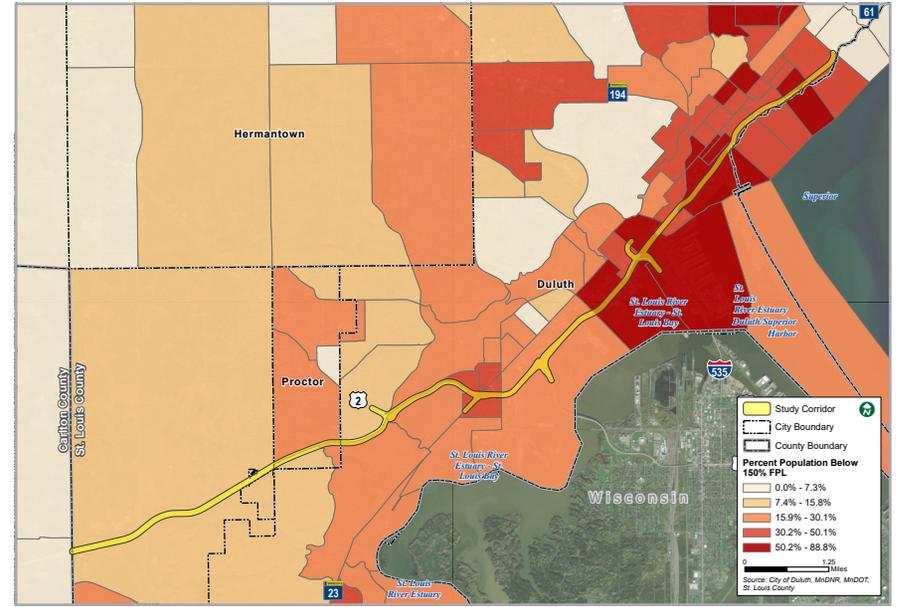
Reflective of the shipping and industrial industries' heavy presence near downtown and in West Duluth and Lincoln Park, higher rates of key demographic and socioeconomic indicators are generally concentrated within Downtown Duluth. As shown in the maps on the following page, higher rates of each tend to extend west along the I-35 corridor from the study area in Downtown.

Notably, the study area's eastern extent (I-35's termination at 26th Ave.) is approximately where there is a sudden drop off of percentage of households that rent, are without cars, and are in poverty.

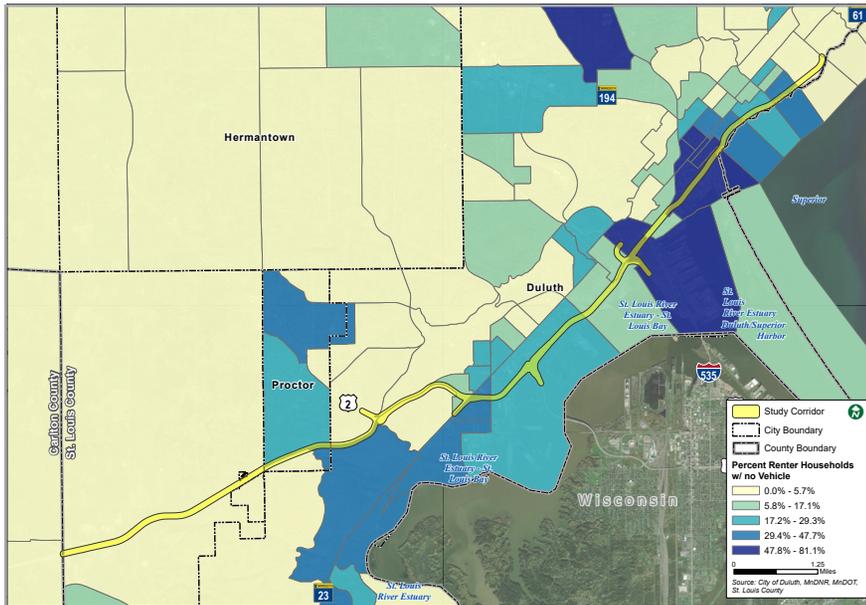
Percent of the Population BIPOC - Aug 2022



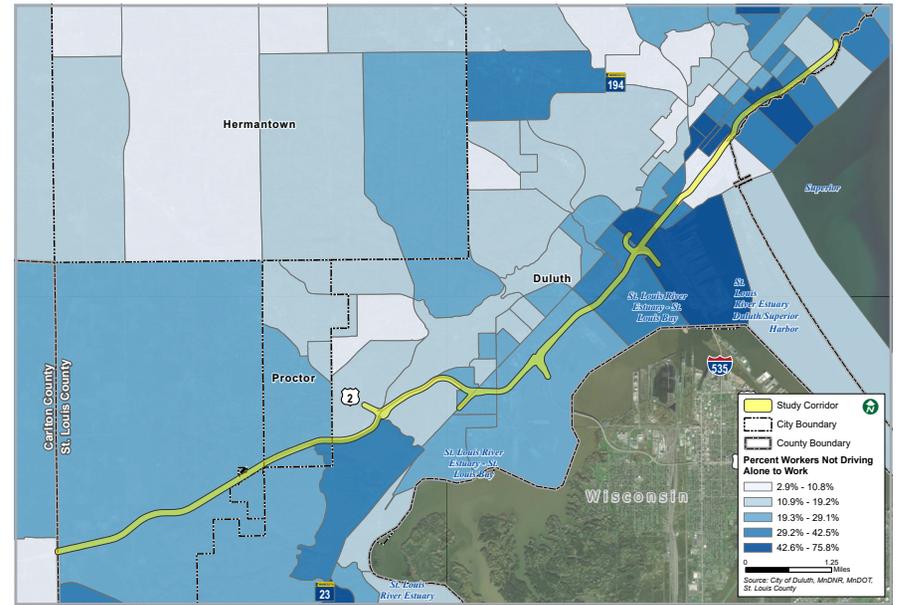
Percent of Population Below 150% FPL - Aug 2022



Percent of Renter Households with No Vehicle - Aug 2022



Percent of Workers Not Driving Alone to Work - Aug 2022



ECONOMICS

In many ways, the study area reflects a comparable story to rust belt communities elsewhere throughout the Midwest, which witnessed drastic economic and population declines in the late 20th century. Rooted heavily in national and global market shifts, the Duluth area's downturn lasted for decades as manufacturing, mining, and industrialization jobs either relocated or closed all together. While its population and workforce have largely stabilized, the area continues wrestling with compounding factors impacting its economic development goals and opportunities:

- While population and job declines have stabilized, they have largely remained stagnant since the 1990s. In the 2020 census, Duluth lagged population growth seen across the state, and particularly other mid-sized peer cities.
- Population declines were somewhat offset by diverse international immigration moving to the area; however, this immigration has not been enough to grow the area workforce.
- Despite their declines, industrial and manufacturing jobs remain a core backbone of the area's economy, particularly those related to the ports of Duluth which is a major regional economic driver. In light of this, significant effort has been made to support business development as part of a "choice community" livability focus, as well as tourism for visitors.
- Historically, people living in West Duluth and Lincoln Park have had lower income levels. While this meant area markets are more affordable, it also created barriers for attracting certain development that relies on market rents.
- The city contains a sizeable amount of non-taxable land and buildings, reducing the tax base potential of the city.

STUDY AREA ECONOMICS

One measure used to assess conditions for a specific site's likelihood to redevelop, is to contrast the value of the property - the building(s) and equipment associated with the sites - against the land it rests on. If the value of the property is less than the land underneath it, market conditions are seen as generally favorable for the site to redevelopment.

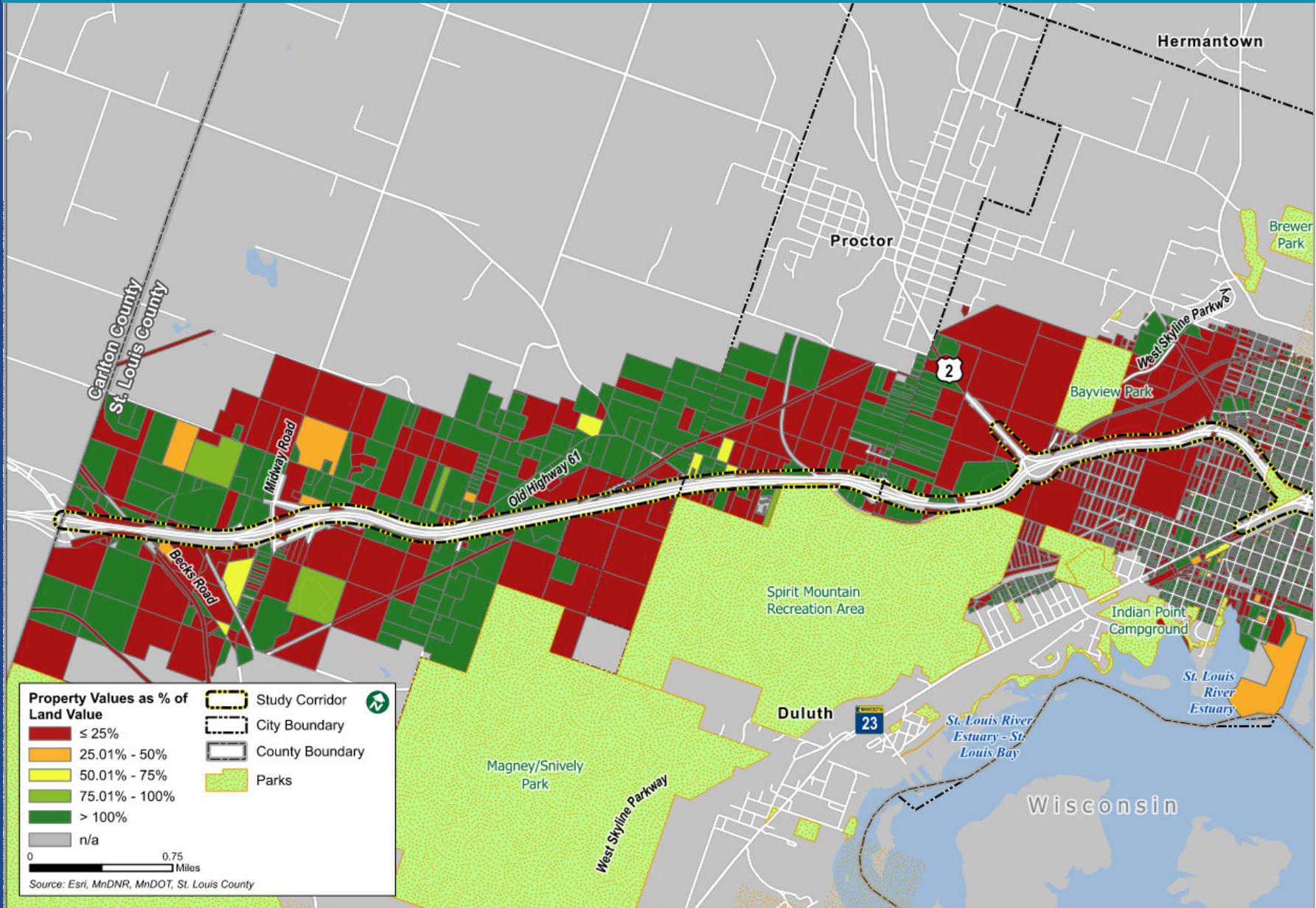
Looking at the area immediately surrounding the study area, there are a significant number of properties in which the land is more valuable than the above property. This suggests, on paper at least, that there should be favorable conditions for redevelopment along much of the corridor, and that there is a large inventory of potentially favorable sites.

Alternatively, what it may instead suggest, is that if there are such a large number of sites that appear favorable to infill redevelop but haven't, other factors may be at play - such as market conditions, site specific constraints, or both.

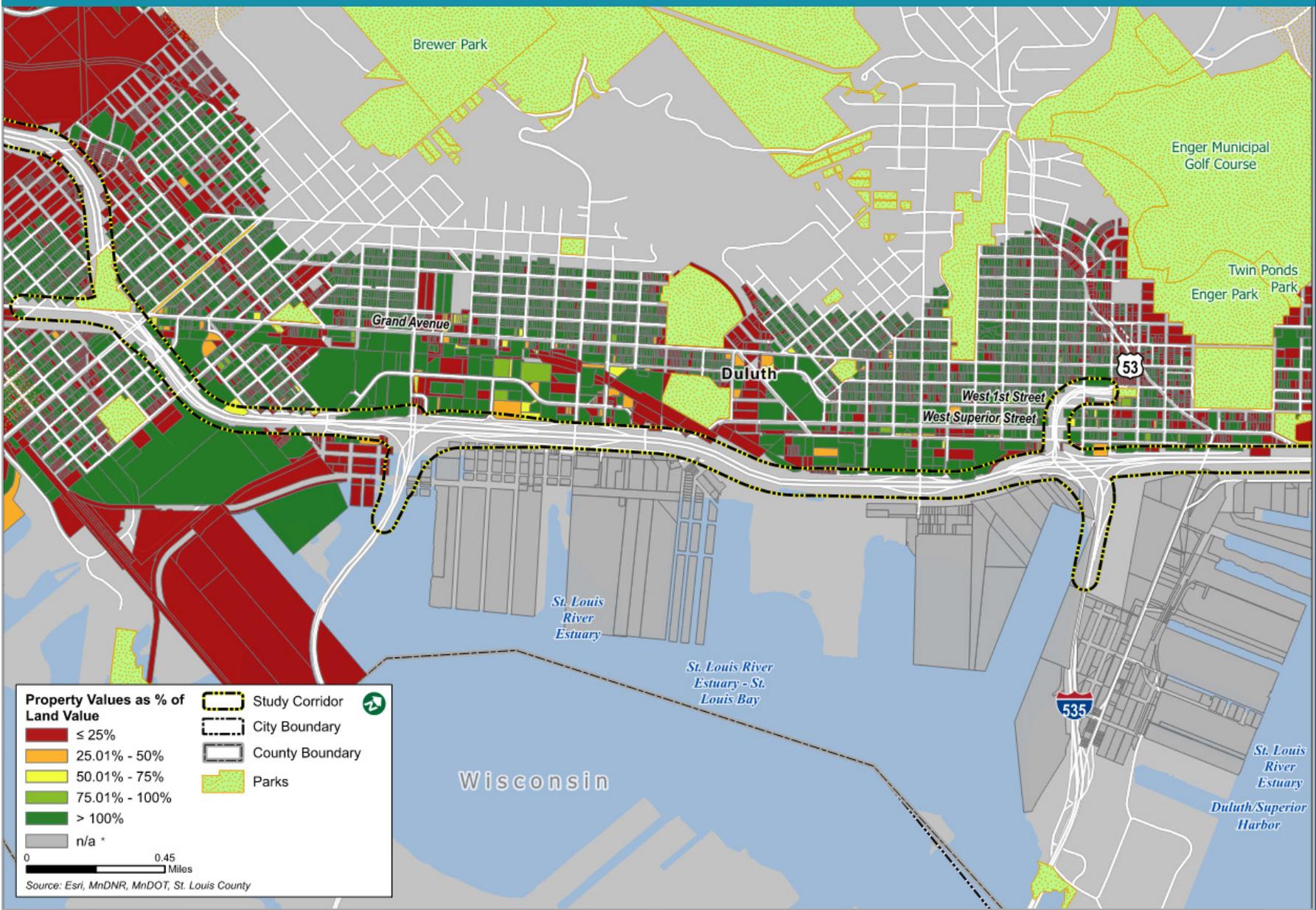
Naturally, there are a multitude of factors that go into the development decisions of any one site. Some known study area specific development constraints much of the study area faces include:

- Challenging geography, geology, and weather
- Aging public infrastructure with expensive reinvestment needs
- Aging private properties with expensive reinvestment needs, due to lack of maintenance and historically vacant properties.
- Lack of density for efficient transportation and utilities
- Challenging topography that makes development either expensive or infeasible
- Brownfield sites and/or those that need remediation
- Limited stock of flat, greenfield sites
- Small and/or irregular lots
- Land use policies or protections
- Concentrated economic inequality

Rural Area - Hwy 61 to Cody Street - Sept 2022



Urban Area - Cody Street to Garfield Avenue - Sept 2022



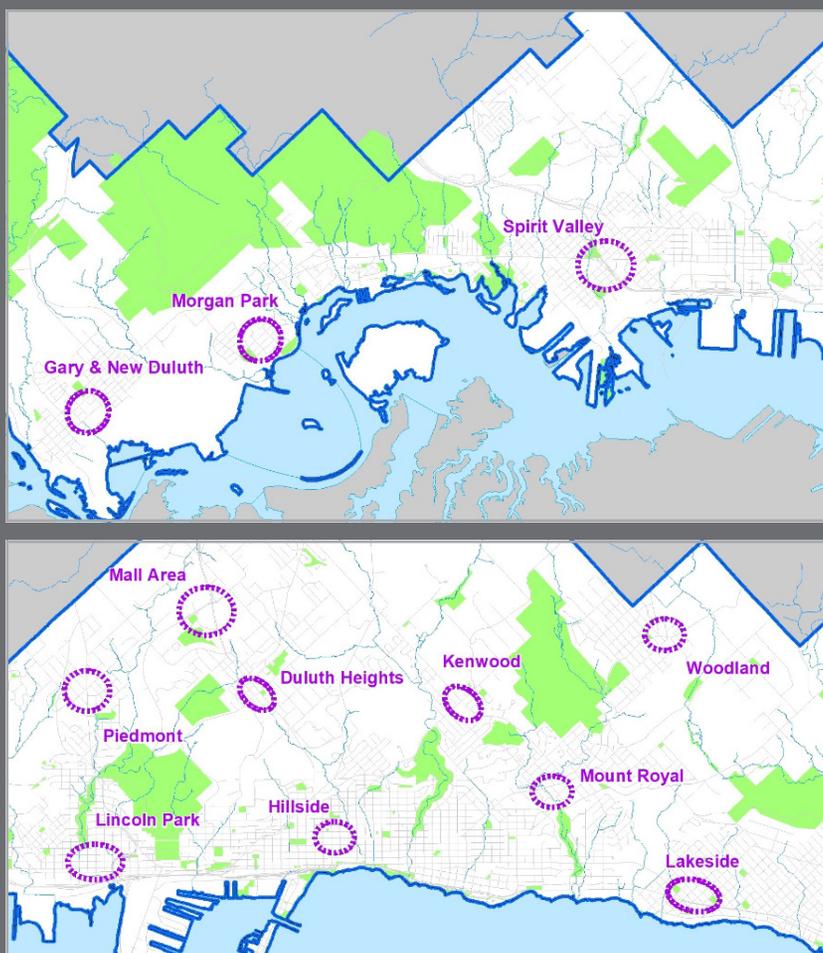
*Industrial and shipping lots along the east edge of the corridor were assumed very unlikely to change from their current use and operations, and were therefore not assessed as part of this analysis

Downtown Area - Garfield Avenue to London Road - Sept 2022



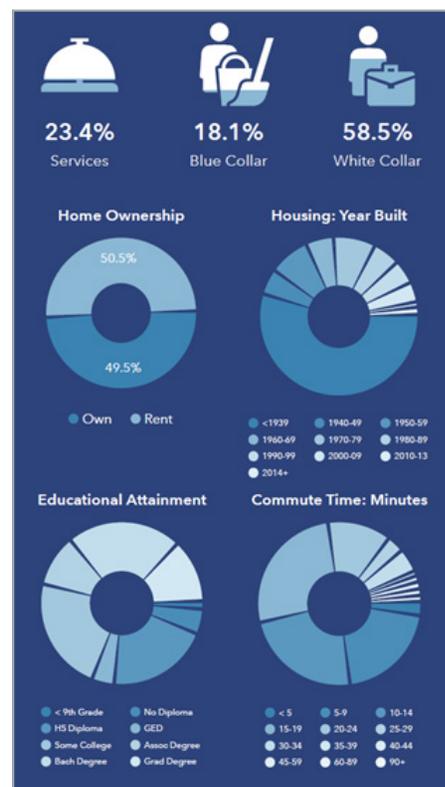
*Industrial and shipping lots along the east edge of the corridor were assumed very unlikely to change from their current use and operations, and were therefore not assessed as part of this analysis

Duluth has taken efforts to catalyze and drive development along the study area. Reimagine Duluth 2035 identified a series of Core Investment Areas, highlighted below, in which to concentrate economic development efforts.



HOUSEHOLD SNAPSHOT

The more than 43,000 people who live within 1/2 mile of the corridor work in comparatively higher rates of blue-collar and service jobs than the surrounding region. Household income trends below both Duluth and Proctor average, and nearly 20 percent of residents spend at least 30 percent of their income on housing costs—a general threshold of cost burdened households. Notable, about 7 percent of area households spend 50 percent or more of the income on housing costs, a threshold of a severe cost-burdened household.

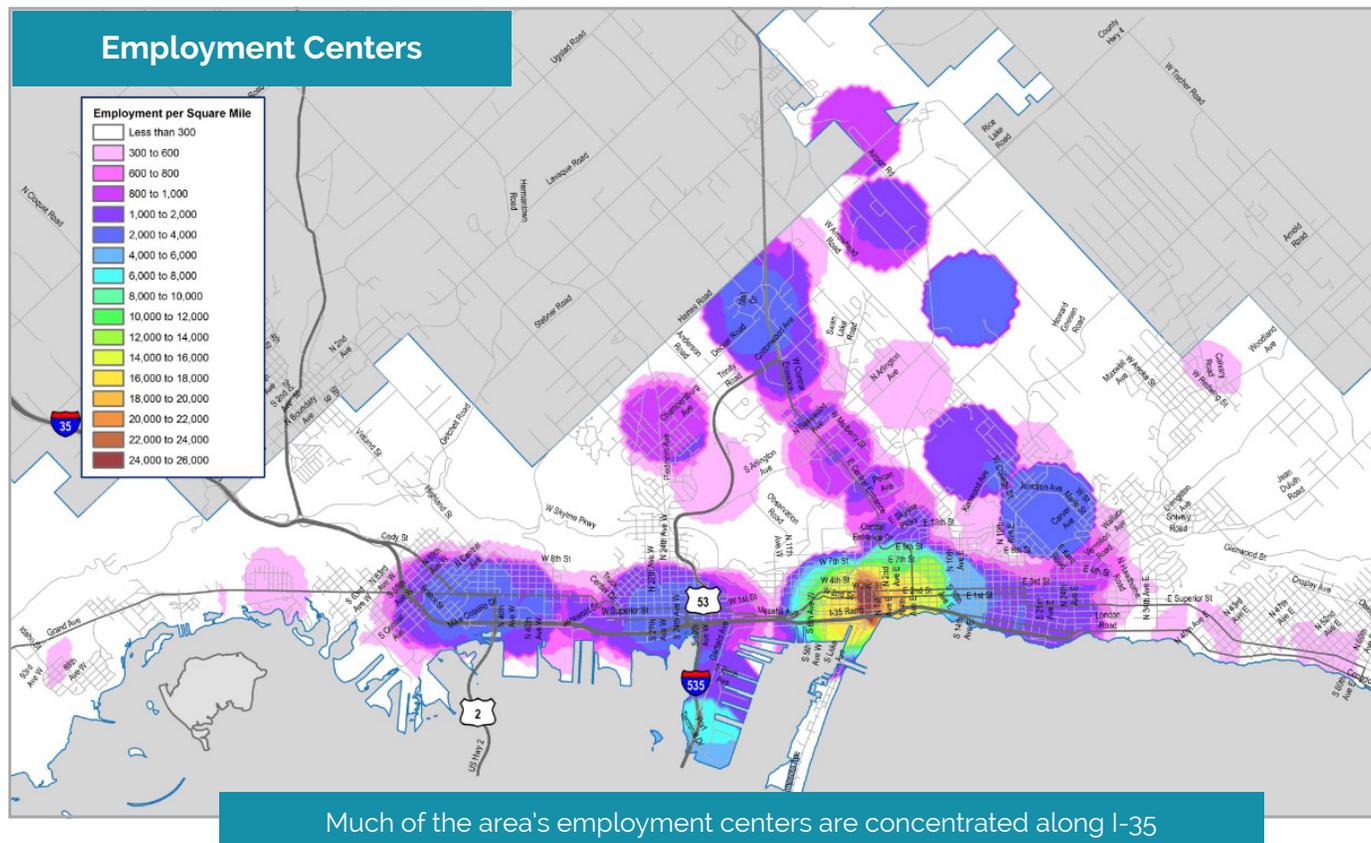


ECONOMICS AROUND I-35

The interstate plays a somewhat conflicting role economically with the study area, and Duluth at large. It has undoubtedly been the lifeline in the recent history of the city, ushering in visitors to support its tourism, helping the city maintain its industrial and manufacturing businesses, and providing critical regional access. Conversely, the interstate also brings a series of likely negative impacts such as concentrating development around interstate

access points, a risk of “blighting” adjacent residential uses, and carrying harmful environmental and public health impacts.

UMD is currently studying the economic impacts of the interstate focused on downtown Duluth to help shed light on the totality of its impacts. As that study progresses, findings will be incorporated into the I-35 Corridor Study.



“Duluth and the surrounding region can ensure continued growth and support of its industry clusters through focusing on workforce development, educational resources, transportation/logistics, road infrastructure, water transportation, and supporting business services.

As the largest city of the Arrowhead region, Duluth is positioned to attract new people and potential workforce to both work and live in the region. With 6.7 million tourist visits per year, there are many opportunities to attract new residents and expand on the workforce supply for the coming years.”

-Imagine Duluth 2035



ENVIRONMENT

The existing environmental conditions, or affected environment, within the I-35 corridor are provided to further define the baseline environmental conditions for the study area. The affected environment consists of the various social, economic, and environmental resources that could constrain alternatives development or be impacted by future transportation improvements. This assessment is not intended to provide sufficient detail for state and/or federal environmental review, but rather to identifying potential constraints that will advise the development of concept alternatives.

This section contains an overview of the current environmental conditions within approximately 500 feet of the I-35 corridor that could affect alternatives development. It is recognized that transportation facilities such as I-35 have potential impacts that can reach beyond the immediate area surrounding the corridor, but this analysis is intended to identify potential "fatal flaws" and "stewardship opportunities" that will be considered in the development of alternatives.

A desktop assessment of the corridor was completed using a variety of federal, state, and local online resources to identify potential environmental constraints and impacts that future projects along the corridor could encounter. As individual project alternatives are developed and refined, a more detailed assessment of potential impacts will be required.

Social and Economic

Highway corridors and transportation networks can directly affect social and economic conditions of an area. The existing I-35 corridor provides local, regional, and interstate connections



for the Duluth region. The presence of the highway corridor has influenced and shaped the existing economic environment including businesses in the commercial/retail, entertainment/tourism, and manufacturing/industrial sectors. To varying levels, these businesses rely on I-35 for the movement of goods and services and by providing efficient access for visitors that are attracted to the Duluth area.

As shown in the following images, and in the Appendix, higher rates of Environmental Justice (EJ) variables are generally concentrated in Duluth, in and around Lincoln Park, Central Hillside, and downtown. This is also where the city and region's shipping and industrial uses have been centralized and continue to operate.

Transportation corridors tends to provide several unique social and economic benefits, however also present temporary and permanent negative impacts as well. Temporary social and economic impacts are often associated with construction activities that may result in short-term reductions in mobility or access through construction zones. Permanent social impacts can occur when transportation corridors disrupt community cohesion or create barriers between neighborhoods or parts of a community. A transportation corridor like I-35 can limit access between land uses and create challenges for efficient pedestrian/bicycle movements.

ENVIRONMENTAL CONDITIONS

The existing highway typical section and corresponding right-of-way varies along the I-35 corridor. In areas between Highway 61 (Exit 245) and approximately Boundary Ave (Exit 249) the typical section generally consists of a rural divided (wide center grass median) roadway section. Between Boundary Ave and Grand Ave/Central Ave the typical section transitions back and forth between a rural divided and urban divided (narrow concrete barrier) roadway section. The presence of an urban section through this segment of the corridor is commonly introduced in areas constrained by topographic features (bedrock and steep slopes). North of Central Ave the I-35 corridor is predominately an urban divided section that is generally constrained by existing development. Portion of the corridor through the downtown area have been further reduced using retaining walls, bridges, and tunnel structures. Future improvements along the corridor may require acquisition of right-of-way and/or temporary easements. Coordination with landowners, residents, and/or businesses would be required for any acquisitions, access changes, or relocations in accordance with state and federal law, including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

SURFACE WATER RESOURCES

Surface water resources generally include lakes, rivers, streams, and wetlands. Water resources were desktop-evaluated using aerial imagery, U.S. Fish & Wildlife Service (USFWS) National Wetland Inventory (NWI) maps, Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs), and various mapping tools.

The study area, located in the Lake Superior Basin and St. Louis River and Nemadji River Watershed Districts, is rich with water resources including several wetlands, rivers/streams/creeks, and Lake Superior.

Wetland resources have the potential to be protected by several decrees, including Executive Order 11990, Protection of Wetlands; Sections 401, 402, and 404 of the Clean Water Act (US Army Corps of Engineers [USACE]); Section 10 of the Rivers and Harbors Appropriation Act (USACE); Minnesota Wetland Conservation Act (local government unit); the Shoreland Development section under Minnesota Statute 103F; Minnesota Statute 103G - Waters of the State, pertaining to public waters and public waters wetlands (MnDNR); and watershed district rules.

Numerous wetland basins and artificial ditch wetlands are located in the southern rural segment of the study area. Other surface waters (waterways/drainway) within the study area generally flow toward the St. Louis River and Lake Superior, which are prominent surface waters in the region. The I-35 highway corridor crosses over several creeks and unnamed waterways. These include, but are not limited to, the following:

- Stewart Creek
- Knowlton Creek
- Kingsbury Creek
- Keene Creek
- Merritt Creek
- Miller Creek
- Coffee Creek
- Chester Creek

Surface waters within the study area are shown within the Appendix.

Several resources in the study area are considered "impaired waters" due to elevated pollutant levels that exceed limits of one or more parameters for surface water quality. An interactive map tool (Impaired Waters 2022 (arcgis.com)) developed by the Minnesota Pollution Control Agency (MPCA), depicts impaired waters and provides information the type of impairment(s).

Floodplains constitute land situated along rivers and their tributaries that are subject to periodic flooding in any given year. Executive Order 11988 - Floodplain Management requires federal agencies to take actions to reduce the risk of flood losses and flood impacts on human safety, health, and welfare, whenever possible. Pursuant to EO 11988, potential effects on floodplains must be evaluated and alternatives that avoid adverse effects and incompatible development in floodplains must be evaluated. If it is found that the only practicable alternatives require impacts within a floodplain, it is necessary

to design or modify the project to minimize potential harm to or within the floodplain.

An assessment of the I-35 corridor was completed by reviewing Floodways or Special Flood Hazard Areas identified on FEMA Flood Insurance Rate Maps (FIRMs). These online resources are intended to aid in determining the presence of floodplain areas and not for detailed impact assessments.

The I-35 corridor study area passes through the following FIRMS:

- 2704210025C
- 2704210040D
- 2704210035C
- 2707411650C
- 270420002C

Several of the surface waters previously listed have designated floodplains. Some rivers and creeks have established 100-year flood elevations, which generally indicate higher risk areas, others are merely designated as "Zone A" indicating a moderate-to-low risk area where special precaution is still needed. Any project that impacts a floodplain will be required to obtain permits for construction in these areas from the local floodplain administrators.

A field aquatic resources delineation should be completed during the environmental review process for future proposed improvements. Impacts to any of the identified surface water resources may require permits pursuant to the local, state, and federal regulations previously listed. In general, impacts to wetlands must be avoided, minimized, and mitigated in sequence. Increased impervious surface area may necessitate implementation of stormwater handling measures. Best management practices during construction activities to improve water quality and minimize erosion/sedimentation are typically required.

REGULATED MATERIALS & HAZARDOUS/ CONTAMINATED WASTE SITES

Regulated materials and hazardous/contaminated sites can be hazardous to human health and the environmental well-being of an area. The Environmental Protection Agency (EPA) is the federal agency that regulates the remediation of hazardous waste and contaminated areas. In addition to the EPA, the Minnesota Pollution Control Agency (MPCA) is responsible for enforcing state and federal environmental laws to regulate where and how materials are stored and their ultimate disposal.

In review of the MPCA's "What's in My Neighborhood" database (see Appendix), numerous potentially hazardous/contaminated properties are in proximity to the I-35 corridor. These sites are scattered throughout the study area, but a higher concentration is found in the urban segments (north of Grand Ave), which correspond with existing and historical manufacturing and industrial land uses.

Due to the likelihood of encountering regulated materials or hazardous/contaminated sites along the I-35 corridor, it is recommended a Phase I Environmental Site Assessment be completed as part of a more detailed design phase and prior to any right-of-way acquisition or construction activities commencing in the corridor. Knowing the type and magnitude of material/contamination can be used to advise the development of alternatives/design options and lower the risk of liability and high remediation costs.

NOISE

Noise is generally defined as unwanted sound, and can be intermittent or continuous, steady or impulsive, stationary or transient. Noise levels discernible by humans and animals are dependent on several variables, including distance and ground cover between the source and receiver and atmospheric conditions. Perception of noise is affected by intensity, frequency, pitch and duration. Noise

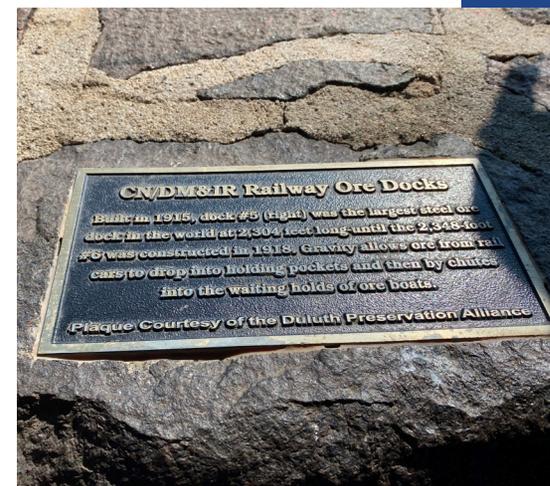
levels corresponding to human hearing are quantified by A-weighted decibels (dBA).

HISTORIC/ CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108) requires that federal agencies consider the effects of their undertakings on historic properties. An historic property is any prehistoric or historic district, site, building, structure, or object included on, or eligible for inclusion on, the National Register of Historic Places (NRHP). The Section 106 review process is defined in regulations promulgated by the Advisory Council on Historic Preservation (ACHP), "Protection of Historic Properties" (36 CFR Part 800).

According to the NRHP interactive mapping tool (National Register of Historic Places (nps.gov), there are several listed historic buildings/properties and an historic district on the NRHP within the study corridor. Confidential historic properties or historic properties that have yet to be identified may also be present along the corridor. Projects along the corridor should include a records search at the State Historic Preservation Office (SHPO) records, field cultural resources inventory, and coordination with the SHPO to ensure all historic properties are identified and properly handled.

A map of area historic places is located in the Appendix.



WILDLIFE HABITAT, THREATENED & ENDANGERED SPECIES

From the standpoint of both a state and federal environmental review process, it is important to evaluate biological resources to determine if a project has the potential to adversely affect unique wildlife habitats as well as state and/or federal threatened and endangered (T&E) species.

The rural segment of the study area is generally surrounded by naturally wooded upland habitat with pockets of wetland habitats. According to the Minnesota Biological Survey (MBS), there is one site of biodiversity significance located south of I-35 between the St. Louis County Rd 13/ Midway Rd (Exit 246) interchange and the Broadway Ave Interchange (Exit 249). The site is ranked "outstanding" due to the presence of a ecologically intact and functional landscape.

Minnesota s, including Minnesota Statutes, section 84.0895 and Minnesota Administrative Rules part 6134 and 6212.1800 through 6212.2300, provide protections and restrictions that in some cases prohibit taking/destroying, purchasing, importing, possessing, transporting, or selling endangered, threatened, or special concern species, including their parts or seeds, without a permit. Similar federal laws protect federally-listed species under Section 7 of the Endangered Species Act of 1973, amended. The federal ESA directs all federal departments and agencies to "...conserve endangered species and threatened species and utilize their authorities in furtherance of the purposes of this Act." The Act must ensure "...that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the



destruction or adverse modification of designated critical habitat."

A review of the Minnesota Natural Heritage Informational System (NHIS) database and assessment using the USFWS federal IPaC interactive tool was completed for the I-35 corridor study area. The results of the reviews indicate several state and/or federal T&E species are present in proximity to the study area. The listings in both the NHIS and IPaC consisted of rare plants, animals, native plant communities, and other rare features. Due to the sensitivity of these resources, no listing or visual representation/ location information can be provided. It is recommended that further review, agency coordination, and potentially a biological assessment be conducted as part the future phases of project development.

SECTION 4(F)/6(F) RESOURCES

Section 4(f) of the Department of Transportation Act (23 U.S.C. 138) prohibits federal transportation agencies from approving the use of public parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless no feasible and practicable avoidance alternative exists. If such an avoidance alternative is not available, only the alternative with the least harm, including all possible planning to minimize harm, can be approved.

A review of aerial imagery and the City of Duluth's Essential Spaces: Duluth Parks, Recreation, Open Space & Trails Plan (Essential Spaces (duluthmn.gov) identified several recreational properties that are adjacent or in close proximity to the I-35 corridor. These resources include, but are not limited to, the following:

- Bayfront Park
- Cross City Trail
- Duluth Rose Garden
- Gichi-ode Akiing/Corner of the Lake Park
- Jay Cooke Plaza/Tunnel Park
- Keene Creek Park/Dog Park
- Lakewalk Park
- Lakewalk Trail
- Leif Erickson Park
- Sister Cities Park
- Spirit Mountain Recreation Area

In addition to recreational/park properties, sites determined to be on or eligible for listing on the NRHP that may be identified during project-specific surveys and coordination would be protected by Section 4(f).

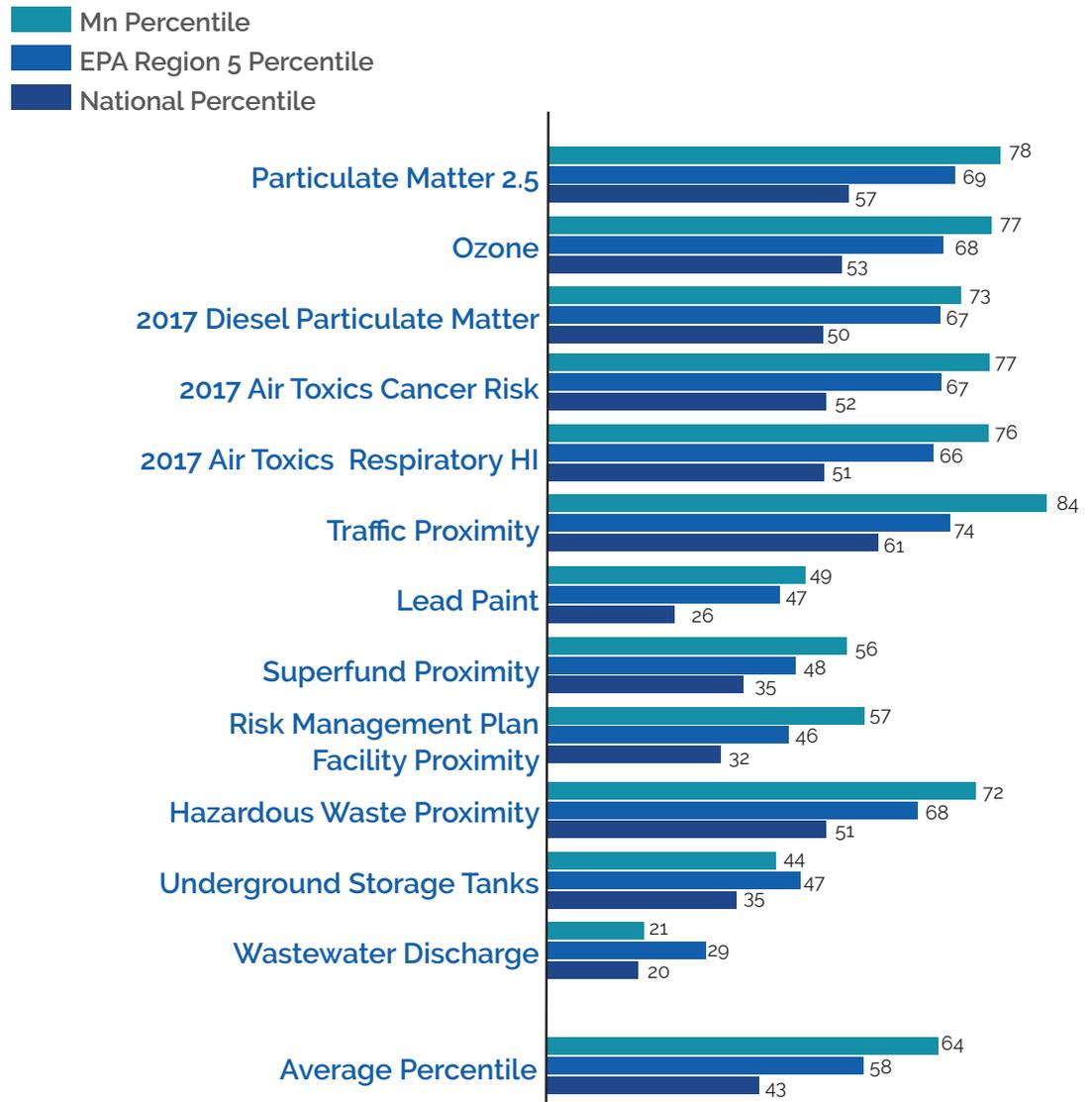
Section 6(f) of the Land and Water Conservation Act requires that the conversion of lands or facilities acquired with Land and Water Conservation (LAWCON) funds be coordinated with the Department of Interior through the Minnesota Department of Natural Resources (MnDNR). When such a conversion occurs, replacement in-kind (land value and recreational function) is typically required.

According to the MnDNR list of LAWCON funded sites, there are several properties in the City of Duluth. Further coordination will be required with the MnDNR during the design phase of any future project(s) to determine if any Section 6(f) implications existing that would require a formal conversion process.

ENVIRONMENTAL JUSTICE

Comparatively across all of EPA's Environmental Justice (EJ) Variables, the 1 mile area surrounding the study area ranks in the top 64 percent percentile for MN, 58 percent percentile for EPA Region 5, and 43 percent percentile for the US.

As shown in Appendix, factors are generally concentrated in Duluth, in and around Lincoln Park, Central Hillside, and Downtown. This is also where the city and region's shipping and industrial uses have been centralized and continue to operate.



INVENTORY

TYPICAL SECTIONS

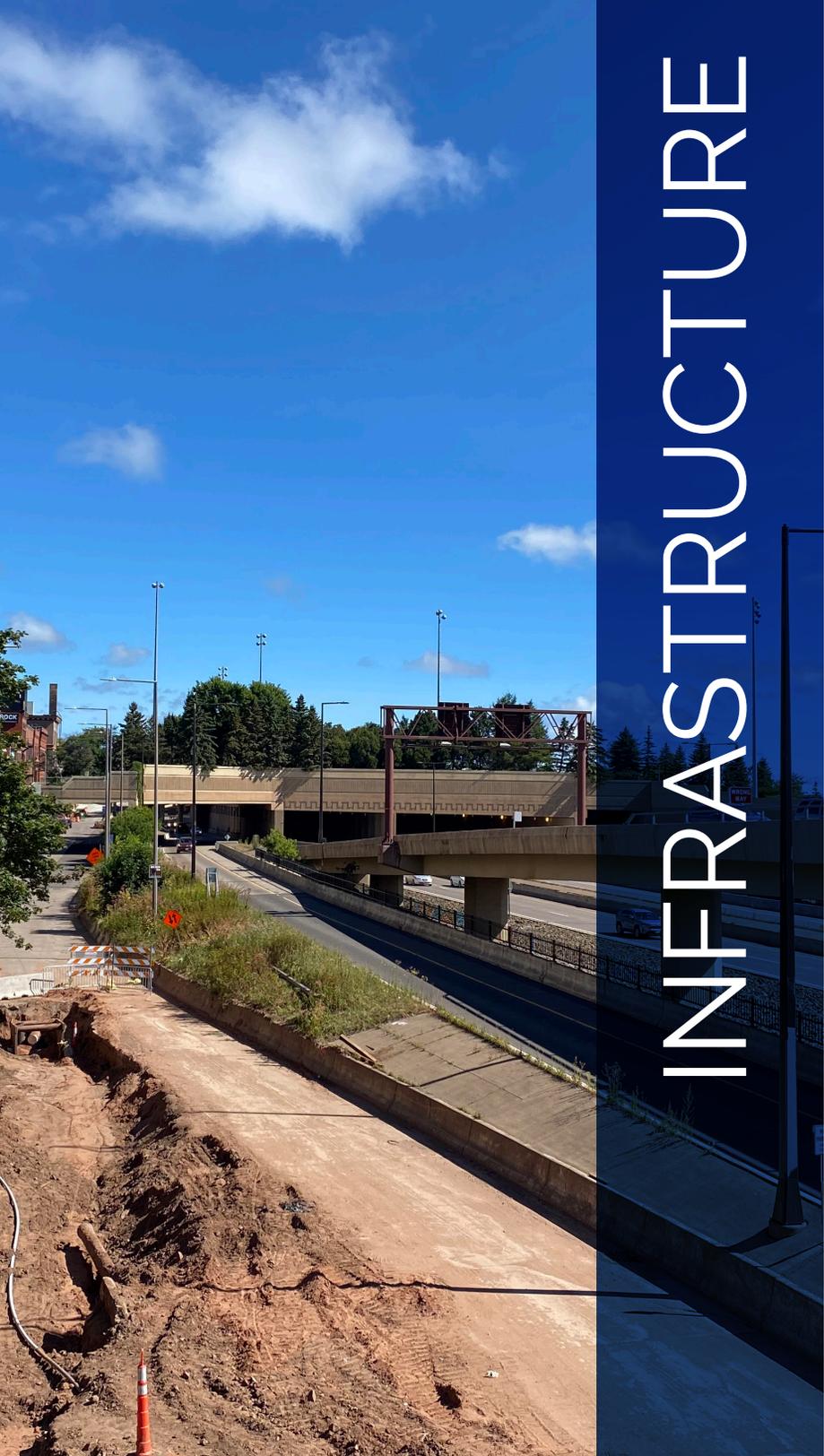
Throughout the I-35 study area, the corridor context and typical roadway design changes numerous times. Beginning from the southern study limits at the Highway 61 interchange, the corridor traverses across a primarily rural and undeveloped landscape. The typical freeway section consists of a high speed (70 mph) four-lane divided roadway with a wide grass center median and grass ditches that collect and convey runoff from the roadway.



Image representative of the rural 4-lane divided section near Midway Rd interchange with Mountain Drive frontage road on east side of the corridor (right side). Google Map Link: <https://www.google.com/maps/@46.7178721,-92.2462226,395m/data=!3m1!1e3>

Entering Duluth and the Hilltop area, the corridor begins to transition to reflect the urban environment that require several bridge structures (underpasses/overpasses) and special design elements to accommodate urban development and challenges presented by the surroundings (bedrock outcrops and steep slopes). While the majority of the corridor remains a four-lane divided section, other design elements change including the median

INFRASTRUCTURE



width and type (narrow concrete barrier vs. wide grass median), drainage features (grass side slopes vs curb/gutter), and the use of guardrail in several areas to limit the roadway footprint.

Moving north into the downtown Duluth area, the urban freeway section is wider with the number of lanes being accommodated (interchange exit/entrance auxiliary lanes) but is also compressed to the extent possible with a center concrete median barrier, outside guardrail/concrete walls and three tunnel structures.

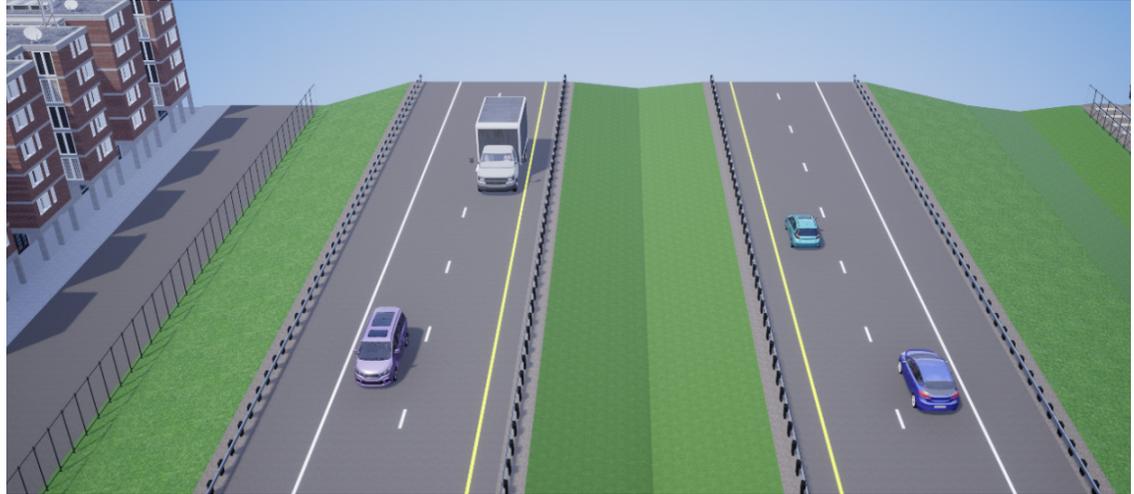


Image representative of I-35 near the 27th Ave W interchange. Google Map Link: <https://www.google.com/maps/@46.7572456,-92.1313781,190m/data=!3m1!1e3>

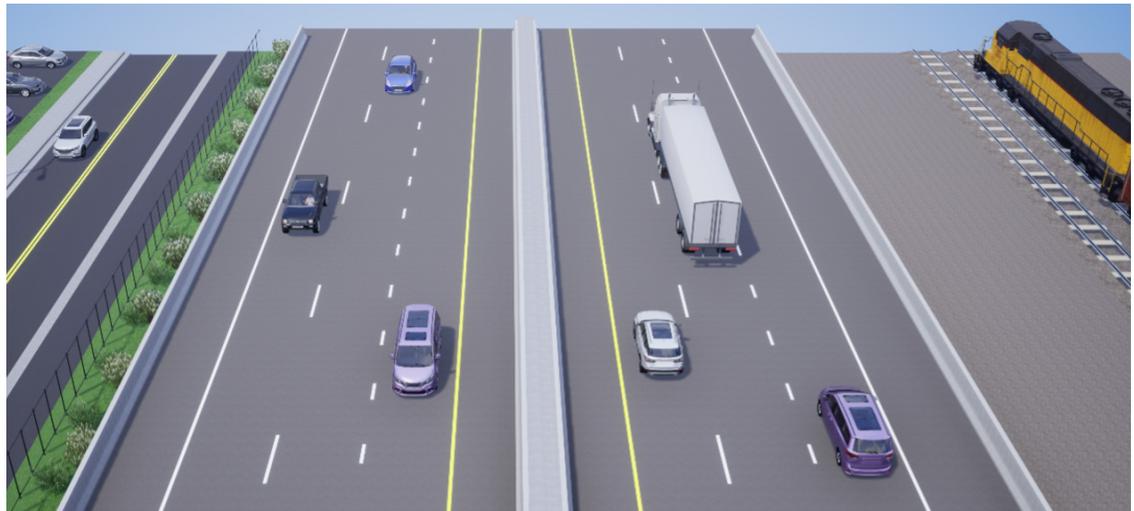


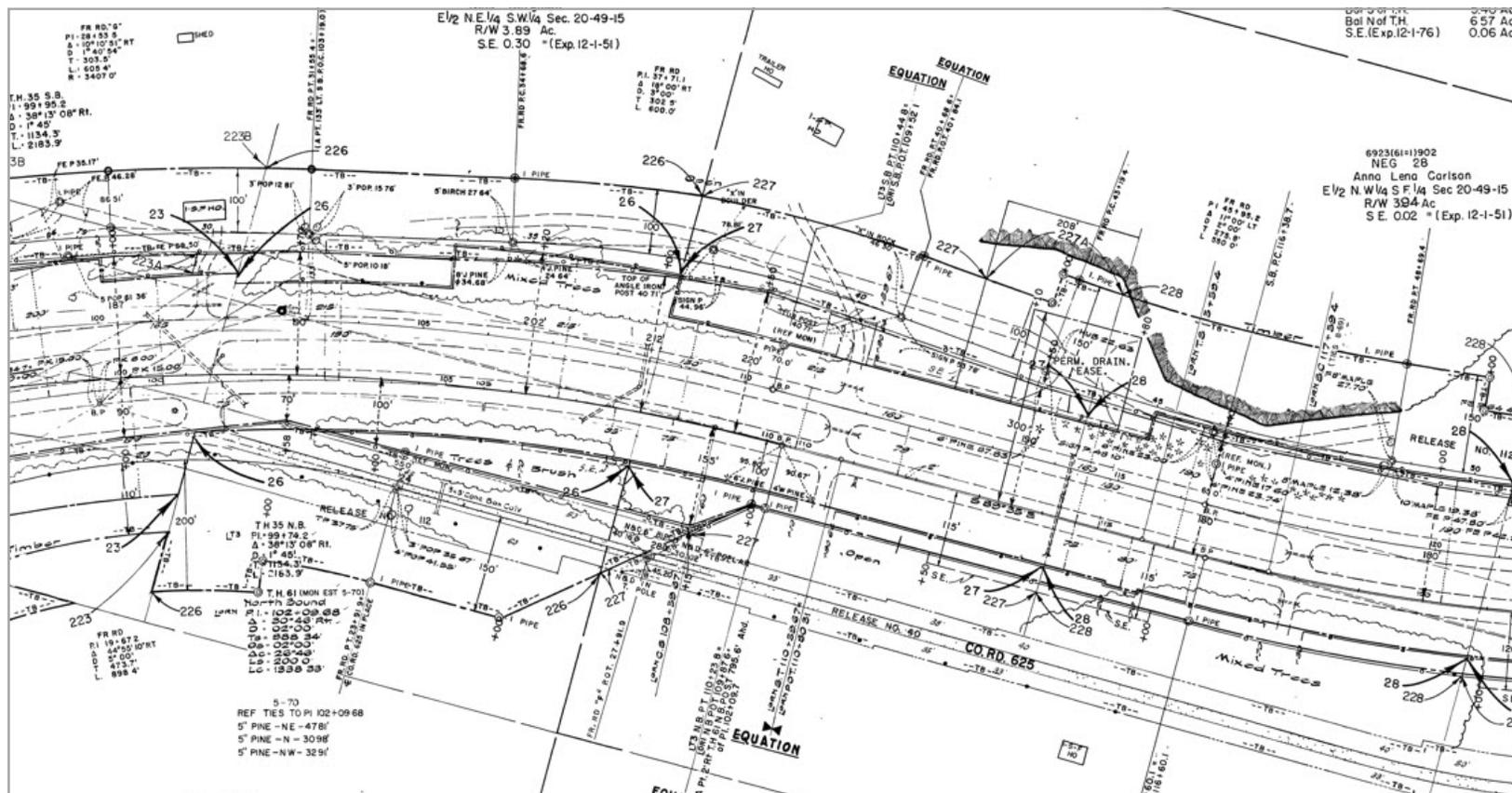
Image representative of I-35 near the Garfield Ave overpass with Lower Michigan St on the west. Google Map Link: <https://www.google.com/maps/@46.7688503,-92.1191202,118a,35y,42.58h,45t/data=!3m1!1e3https://www.google.com/maps/@46.7688503,92.1191202,118a,35y,42.58h,45t/data=!3m1!1e3>

RIGHT-OF-WAY

Right-of-way (ROW) is the available space owned by MnDOT on which the I-35 corridor resides. ROW is often a constraining factor in developing alternatives, because acquiring additional ROW can be costly, increase project delivery deadlines, or stop a project altogether. Similar to the roadway typical section, the existing ROW widths vary considerably along the corridor,

depending on the location and transportation features being accommodated in a particular area.

The MnDOT [Right of Way Mapping and Monitoring Tool \(arcgis.com\)](http://arcgis.com) provides access to a series of electronic ROW figures. These maps will be further utilized in the development of concept alternatives.



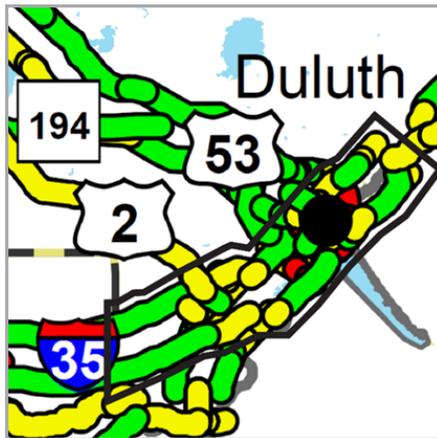
2021 RIDE QUALITY INDEX (RQI)

Pavement Conditions

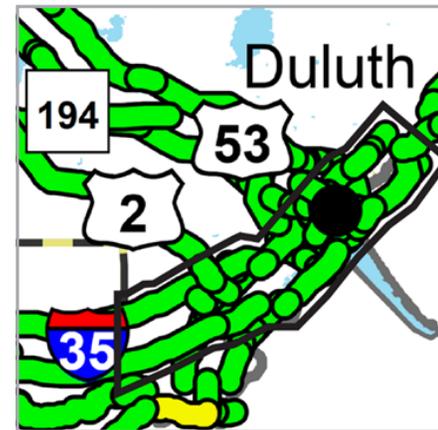
Pavement conditions are rated Primarily Good (3.1 – 5.0), with some sections of Fair (2.1 – 3.0): Right at the northeastern end of I-35 (Near London Rd), to the east of Canal Park, and also near the intersection with US US 2. This section heads down the hill into Duluth and stretches from near Spirit Mountain Ski Area down toward the city. There are no areas with Poor RQI within the project area.

Surface Rating (SR)

All the surface ratings for this stretch of I-35 are considered to be "Good". Every part of the project area is a 2.5 or above on the scale. There are no areas with either Fair or Poor surface ratings within the project area.



**ATP 1
2021 Pavement Condition**
Ride Quality Index (RQI)
 — Poor (0.0 - 2.0)
 — Fair (2.1 - 3.0)
 — Good (3.1 - 5.0)

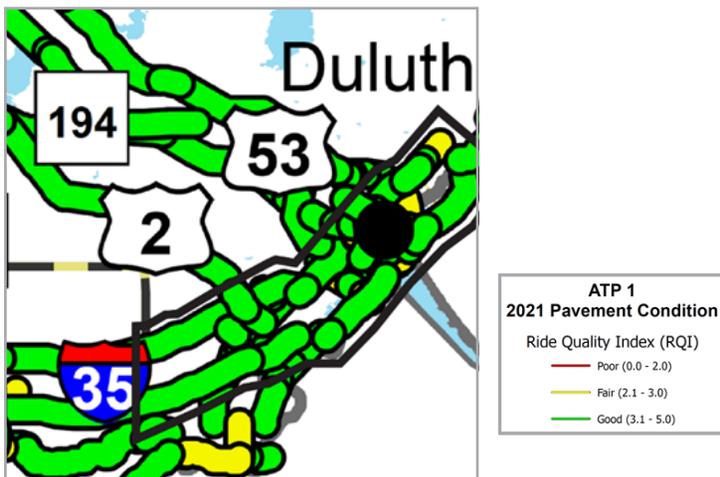


**ATP 1
2021 Pavement Condition**
Surface Rating (SR)
 — Poor (0.0 - 1.6)
 — Fair (1.7 - 2.4)
 — Good (2.5 - 4.0)

2021 RIDE QUALITY INDEX (RQI)

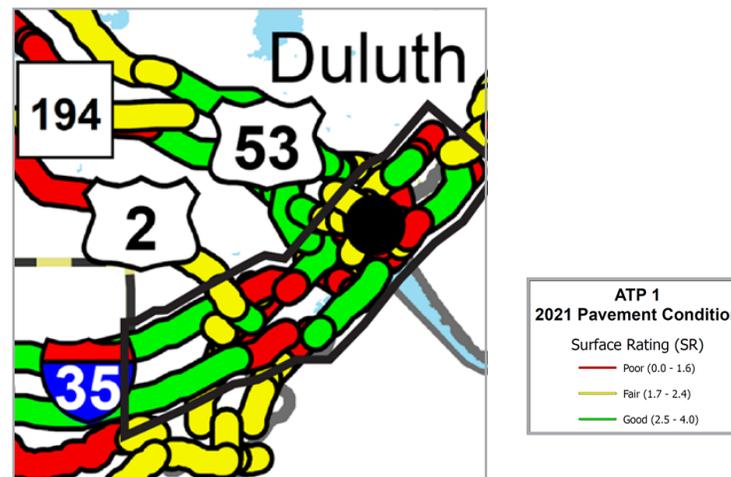
Pavement Quality Index (PQI)

Every section of the project area, except for westbound I-35 near London Rd, has a PQI rating of Good. This section by London Rd has a PQI of Fair. There are no spots within the project area that have a Poor PQI.



Remaining Service Life (RSL)

Remaining Service Life (RSL) can be divided into five sections within the project area. From the western edge of the project bounds to the junction with US 2, the RSL is High (12+ Years). The segment between US 2 and Central Avenue has a RSL of Low (0-3 Years) for both directions. From here until Canal Park the pavement is in good condition again, with a RSL of High. Northeast of Canal Park, the pavement is in worse shape. The northbound pavement has a section of Low RSL, while the southbound pavement has a Medium remaining service life. After this, the northbound direction has a RSL of High for the rest of the project area (all the way to London Rd). The southbound direction has approximately half of the remaining pavement rated as High, but the section closest to London Rd is rated as Low.



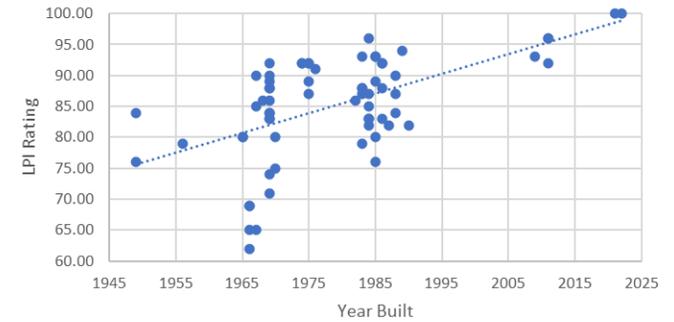
BRIDGES

Information about all of the bridges along the project corridor was collected, with every overpass and underpass inventoried. All information was retrieved from the [MnDOT Bridge Information Interactive Map](#).

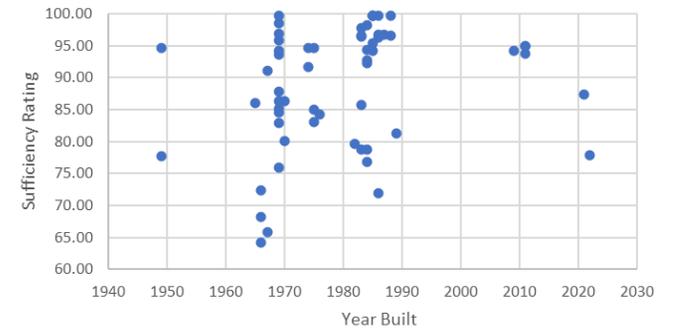
Trends and notes regarding bridge condition:

- According to the MnDOT Bridge Information Interactive Map, there are 67 bridges along the project corridor (as of August 2022).
- There are 12 different types of bridges along the corridor. The most common type of bridge is the steel continuous-beam span. There are 23 of these bridges.
- There are significantly more bridges along the lakefront/bayfront portion of the freeway than there are west of Duluth.
- Local Planning Ratings (LPI) generally followed a trendline, with more recently constructed bridges having higher LPI ratings than older bridges.
- Sufficiency ratings were more scattered than LPIs and depended less on the age of the structure. The average Sufficiency Rating is 88.8, with a maximum rating of 99.8 and a minimum of 64.2.
- The longest bridge connected to the project area is the Richard I. Bong Bridge at 8,320 feet long.

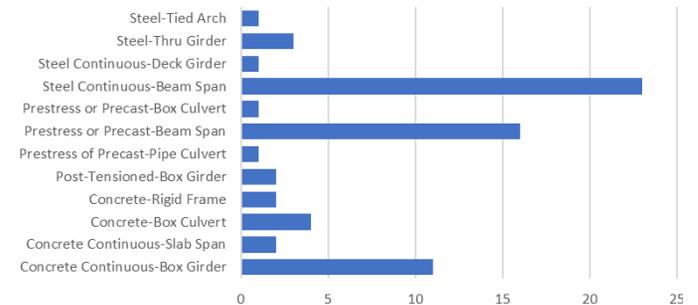
Local Planning Index Ratings



Sufficiency Rating

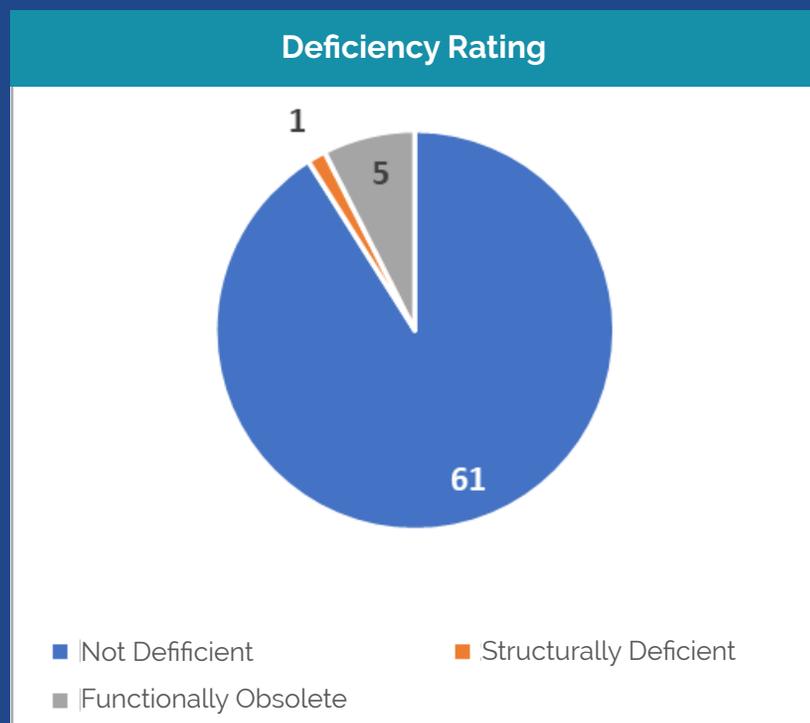


Bridge Type



Deficiency Rating

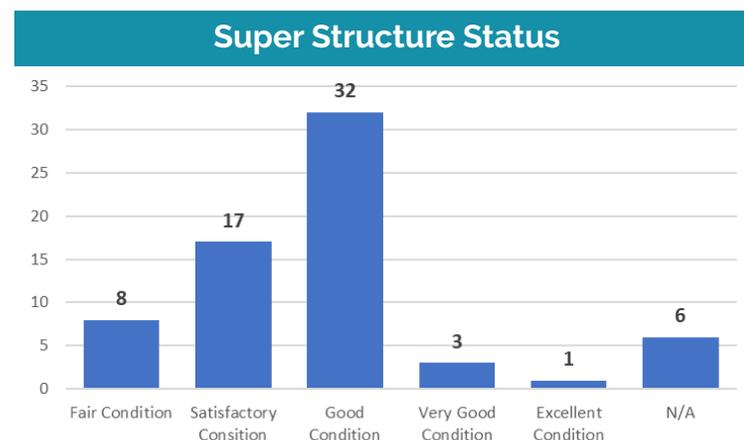
More than 90 percent of bridges along the interstate corridor were found to be Not Deficient. The only structurally deficient bridge is the 5th Ave W / Harbor Drive bridge in downtown Duluth. It is the older bridge in the project area (built in 1966). Functionally obsolete bridges include: 40th Ave W overpass, S 37th ½ Ave W overpass, Exit 25 6A from Northbound I-35 to Mesaba Ave, E Superior St over I-35 (at Brewery Historic District Tunnel), and E Superior St over I-35 (at Jay Cooke Plaza Tunnel).



Super Structure Status

The category most bridges fall under regarding their super structure status is Good Condition. There are 10 categories that a bridge's super structure rating can be classified under (not including N/A) that range from Failed Condition to Excellent Condition. None of the bridges in the project area are classified in the lowest five categories. The lowest classification seen in the project area is Fair Condition, with 8 bridges. One bridge is classified in Excellent Condition. This is the 27th Ave W overpass over I-35 in the Lincoln Park neighborhood of Duluth. This bridge was completed in 2021. There are eight bridges in Fair Condition, which should be monitored into the future. They are:

- Overpass over railroad tracks west of S Boundary Ave
- S Boundary Ave overpass over I-35
- Railroad bridge over NB I-35 at US 2/I-35 interchange
- Railroad bridge over SB I-35 at US 2/I-35 interchange
- Entrance ramp to SB I-35 from N Central Ave
- Exit Ramp from NB I-35 (Exit 252) onto N Central Ave
- 40th Ave overpass over I-35
- Railroad bridge owned by Canadian National over I-35 near Wade Stadium (eastern of two railroad bridges)



RETAINING WALLS AND TUNNELS

RETAINING WALLS

Retaining walls are vital pieces of infrastructure that are used in multiple locations along the I-35 corridor. Designed as walls to hold back a mass of soil to produce the desired flat area for the freeway, there are 12 retaining walls within the project corridor. Notably, 11 of those 12 are within the last 2.5 mile stretch of I-35 north of Lake Ave, with most connected to the tunnel complex that better connects downtown Duluth to Lake Superior. The other retaining wall is located on the crest of Thompson Hill, directly across from the Minnesota Welcome Center. This specific retaining wall is used below the freeway surface to keep the grade level, while the other retaining walls are used to keep a mass of earth from falling onto the freeway within the gaps of the tunnel system. It is important to be aware of these elements due to the extreme importance they play in the success of the freeway system.

Thompson Hill Retaining Wall

This retaining wall is approximately 1,000 feet long and keeps I-35 from spilling onto the railroad tracks below. It is on the section of freeway heading down the hill toward the city of Duluth and has an average slope of -2.3 percent. This retaining wall is significantly older than the others on the corridor and is made from stone.

Between Lake Avenue and the Tunnel System

There are two retaining walls located between Lake Ave and the start of the series of four tunnels, one on the downtown side and one on the Canal Park side of the freeway. The downtown

side retaining wall separates the freeway from Michigan St., while the Canal Park side wall separates the freeway and a single set of railroad tracks from the pathway along Sister Cities Park. The downtown side wall is short, while the Canal Park side wall starts short and gets taller as it moves northeast. Both retaining walls are made from concrete.

Tunnel System Retaining Walls

There is a set of six retaining walls between the set of four tunnels, one on each side of the road between every tunnel. All six retaining walls are tall, as this is the trenched section of the freeway. Each retaining wall in this section is made from concrete.

North of the Tunnel System

In the northernmost section of I-35, there are three additional retaining walls. All three are on the downtown side of I-35, with none on the lake side. Moving towards London Rd, the first runs for 3,500 feet between the exit of the Leif Erikson Tunnel to S 21st Ave E, ending at the start of the southbound entrance ramp at S 21st Ave E. The next picks up directly under the S 21st Ave E overpass and continues for 1,200 feet, becoming shorter and shorter before eventually disappearing. The final retaining wall starts about 300 feet north of the end of the second retaining wall and wraps around the corner of the freeway until London Rd.

TUNNELS

Northeast of Canal Park and the Lake Ave intersection, I-35 goes through a series of four tunnels. These tunnels help to bridge the gap between downtown Duluth and the lakefront, covering sections of the freeway for easier access. These connections lessen the impact the freeway has as a barrier, especially for pedestrians and bicyclists. The tunnels were part of a public input process that began in 1959. When finally constructed in the 1980s and early 1990s, they remain an important investment in connecting the city to the waterfront.

The four tunnels are all located within a 1.1 mile stretch of the freeway, and are topped by Gichi-ode' Akiing Park, the Brewery

Historic District, Jay Cooke Plaza, and Leif Erikson Park. The tunnels were constructed using the cut and cover method, and cost approximately \$200 million. The tunnel under Brewery Historic District, the second entered while going northbound, is the shortest tunnel at 500 feet. The third tunnel, covered by Jay Cooke Plaza, is 600 feet, and the first tunnel under Gichi-ode' Akiing Park is 785 feet. The longest tunnel of the four is the northernmost tunnel, under Leif Erikson Park, and is 1,480 feet long. This was the final piece of infrastructure completed along I-35, with the ribbon cutting ceremony on October 28, 1992, officially completing the 1,593-mile freeway stretching from Laredo, Texas to Duluth.





Utilities

Major utilities are commonly located within road rights-of-way. There are many reasons for this including but not limited to: cost of right-of-way acquisition, ease of access, and necessity for the functioning of items related to transportation (i.e. lights, signals, etc.).



Public Utilities

Public utilities are those that are owned and maintained by a governmental agency such as the City of Duluth. Public utilities found within, crossing, or in proximity to I-35 include urban and rural storm water management systems. Typical features include drainage ditches, culverts, treatment ponds/infiltration basins, curb and gutter with catchment structures, and storm sewer pipes used to collect and convey runoff to treatment and discharge locations.



Private Utilities

Private utilities are those that are owned and maintained by private companies. Sometimes these have shared uses between public and private entities. These can include both above and below ground power lines, gas lines, and communication lines.



Lighting & Signage

Roadway lighting is a vital aspects of corridor safety. Multiple studies have shown a reduction in crashes per vehicle mile traveled when sufficient roadway lighting is provided, in some cases reducing crash rates up to 60 percent. For I-35, most of the study area includes corridor lighting. Short segments in the rural areas, between Highway 61 and Russell Rd, do not contain lighting, except for the interchange areas at Highway 61 and County Rd 13, which include lighting.



DESIGN REVIEW

EXISTING DESIGN CONSIDERATIONS

The physical characteristics of the I-35 and interchanges contribute to congestion/mobility and safety issues along the corridor. Inadequate interchange and ramp spacing, and heavy entering and exiting volumes at certain interchanges leads to considerable weaving problems. Other design elements such as route continuity/lane configuration throughout the corridor, horizontal and vertical curves, sight distance, and clear sight lines in curves can all contribute to the corridor's performance in terms of existing mobility and safety conditions.

Interchange Spacing

According to MnDOT's Road Design Manual, the minimum desirable interchange spacing in rural areas is 2 miles with 5- to 10-mile spacing preferred. In urban areas, the minimum desirable interchange spacing is 1 mile¹ with preferred spacing at 2 miles.

The I-35 corridor study area has several substandard ramp spacing and weaving distance issues throughout the corridor. In some portions of the downtown Duluth area, collector distributor roads have been added to connect interchanges that are in close proximity (e.g., 5th Ave W/Harbor Dr. and Lake Ave/Canal Park Dr).

The distance between the 27th Ave W interchange ramps and the US 53 ramps are less than 1,000 feet apart, creating a challenging situation where entering/exiting traffic must make critical movements as they weave into and out of I-35 traffic at higher speeds.

¹Minnesota Department of Transportation. (2001). Road Design Manual. 6-1.04.04

Route Continuity and Lane Configuration

Driving in heavy traffic through complex highway sections and interchange areas can create anxiety and confusion for motorists, especially aging drivers and those unfamiliar with a city or segment of roadway. Complexities can result from various design features including the addition or reduction in the number of travel lanes (widening from four to six lanes), lane drops or lanes that abruptly turn into exit ramps.

The I-35 study area is characterized by several features that disrupt route continuity and/or have non-traditional design elements. These include left lane entrance/exit ramps (e.g., Grand Ave interchange), altering the number of through lanes, and lane configuration (lane drops and auxiliary lanes). FHWA discourages and currently tries to prohibit the use of left exits for driver expectancy reasons. Complex interchanges associated with the I-35/US 2 E (Bong Bridge) and the I-35/US 53 (Can of Worms) require intense attention and rapid decision-making to navigate these complex interchange areas.

Bridge Lengths

The length of a bridge is not a design deficiency, but longer bridge structures can often be associated with safety/operational and maintenance challenges. Longer bridges can create drainage/stormwater runoff concerns in both conveyance and treatment. Winter icing conditions are also a concern as snow melt or wet pavement conditions can icy-over sooner than a section of roadway built at-grade. These conditions may

require additional salting to remove accumulated ice, which is both a short-term and long-term maintenance cost. Other long-term maintenance concerns stem from the fact that bridge rehabilitation and replacement of all structures, especially longer more complex bridges come at a high cost.

The I-35 corridor has several long bridge structures including a few of substantial length. These include the segment of I-35 between 63rd Ave W and Central Ave (bridge is approximately 3,200 feet and the segment of I-35 from the US 53 (Can of Worms interchange) to approximately Harbor Dr that involves the freeway being built on structure/bridge for over 1.5 miles.

Other Design Deficiencies

Substandard shoulder widths are present within the study area, including the barrier section beginning near Ugstad Rd to Boundary Ave and the bridge opening for I-35 under the railroad bridges near US 2, which has reduced inside and outside shoulders.

Inadequate sight distance, clear sight lines in curves, or substandard horizontal and vertical curves can contribute to safety and mobility conditions along I-35 and at the interchanges located throughout the study area. Further detailed analysis for areas of heavy congestions and/or hot-spot crash locations is needed to isolate the root cause of the issue and whether certain design deficiencies are contributing to the problem.

UTILITY

Existing transportation activity in the study area was evaluated using a combination of data sources, including:

- 13-hour turning movement data at 26 intersections (collected in June 2022). This data includes truck counts and non-motorized counts
- Where available, MnDOT daily traffic data was obtained for segments of I-35, intersecting roadways, and ramps
- StreetLight Insight transportation data was utilized to supplement the two datasets above. StreetLight Insight can be used for a variety of data types, including daily traffic estimates, hourly turning movement estimates, non-motorized traffic estimates, and origin-destination data
- Pedestrian and bicycle volume data was obtained from the MIC at a number of key crossings of the study corridor using a variety of counting methods. This data was used to calibrate StreetLight data for non-motorized volumes where unavailable.

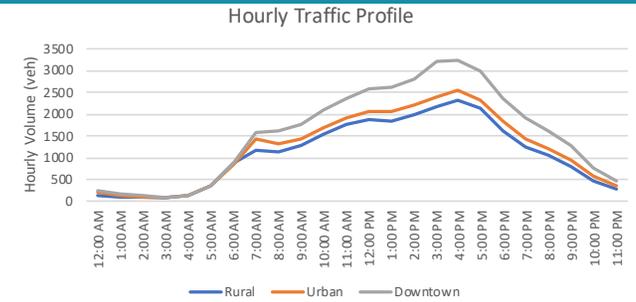
Daily traffic volumes on I-35 range from a low of around 16,000 vehicles per day on the north end of the study corridor near TH 61 and London Rd/S 26th Ave E, to a high of nearly 47,000 vehicles per day between the Twin Ports Interchange and Mesaba Ave.

TRAFFIC PATTERNS

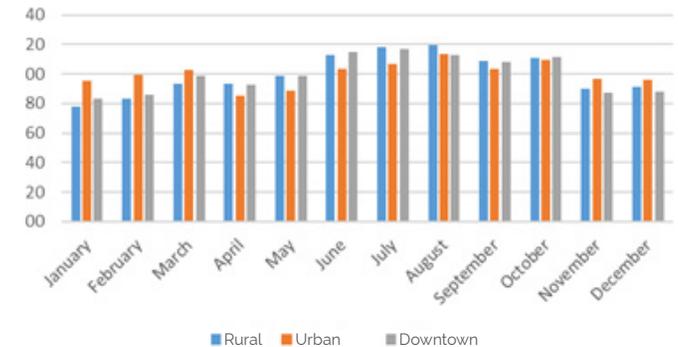
As expected for a heavy tourism community, Fridays tend to see the highest traffic volumes with a 16 percent increase in daily traffic compared to the average day. This pattern of increased weekend traffic is intuitive to an area with heavy tourism activity, especially during the summer months. Monday and Tuesday both experience the lowest average daily volumes with a 10 percent decrease from the average daily volumes, likely due to a respite in tourism activity.

The downtown area is the only subarea in which Saturday volumes are higher than Friday volumes, with a 16 percent increase from average. Similarly, this area uniquely sees a large decrease in daily volumes on Sunday with 10 percent less than average traffic experienced.

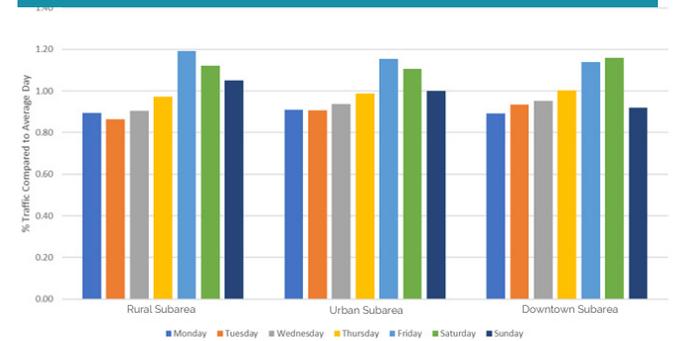
Hourly Traffic Profile



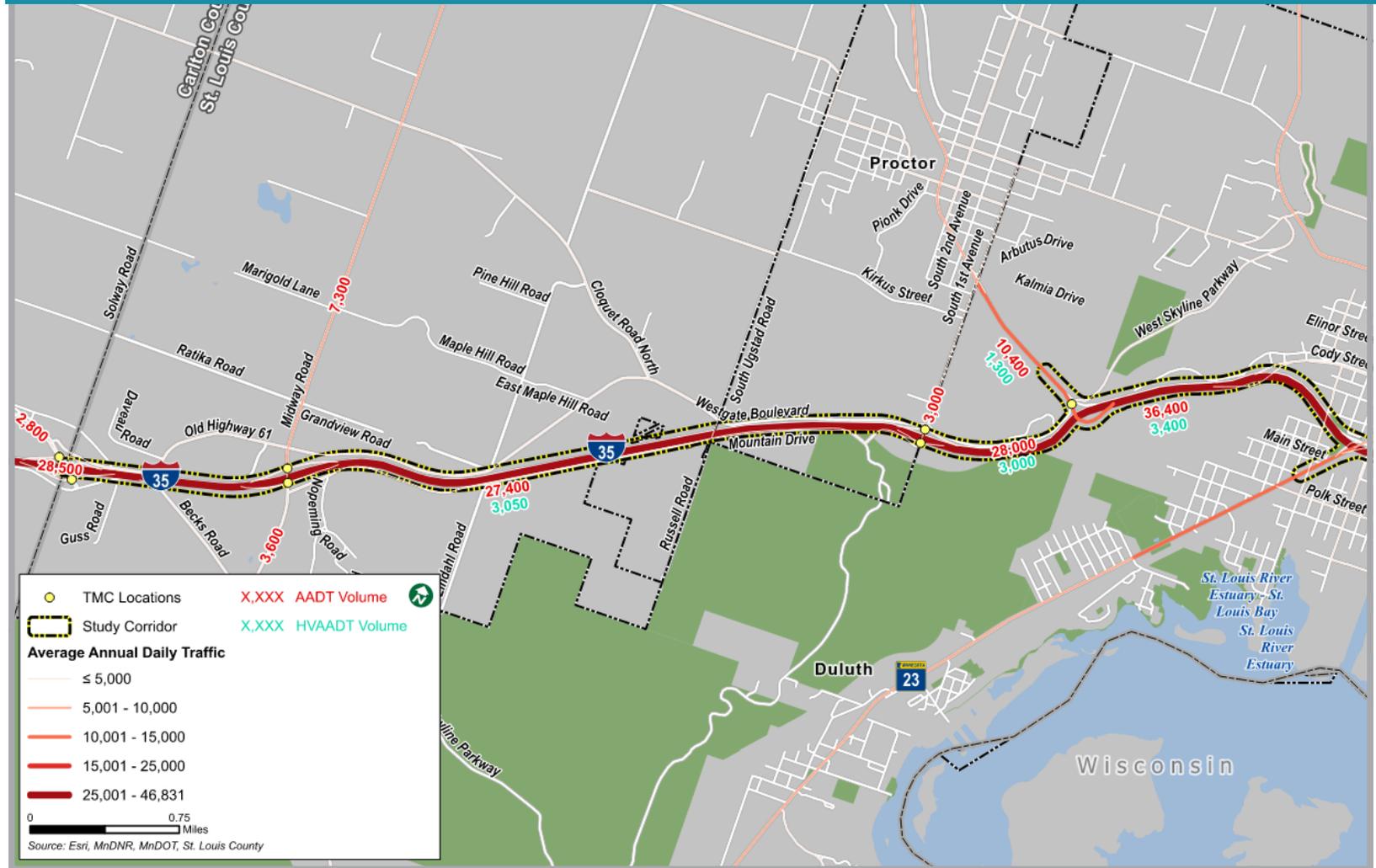
Monthly Traffic Profile by Subarea



Weekly Traffic Profile

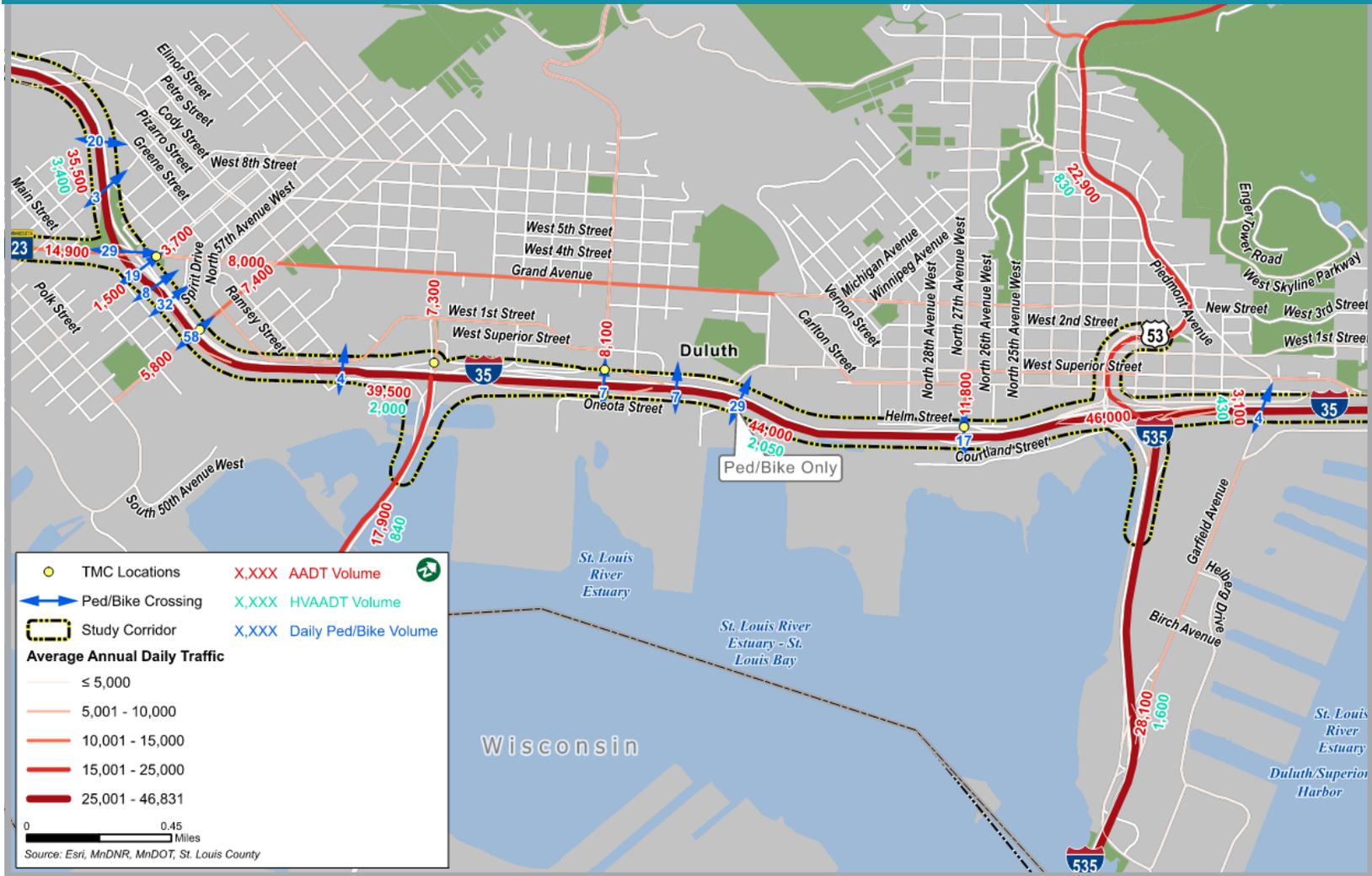


Rural Subarea - Hwy 61 to Cody St - Aug 2022

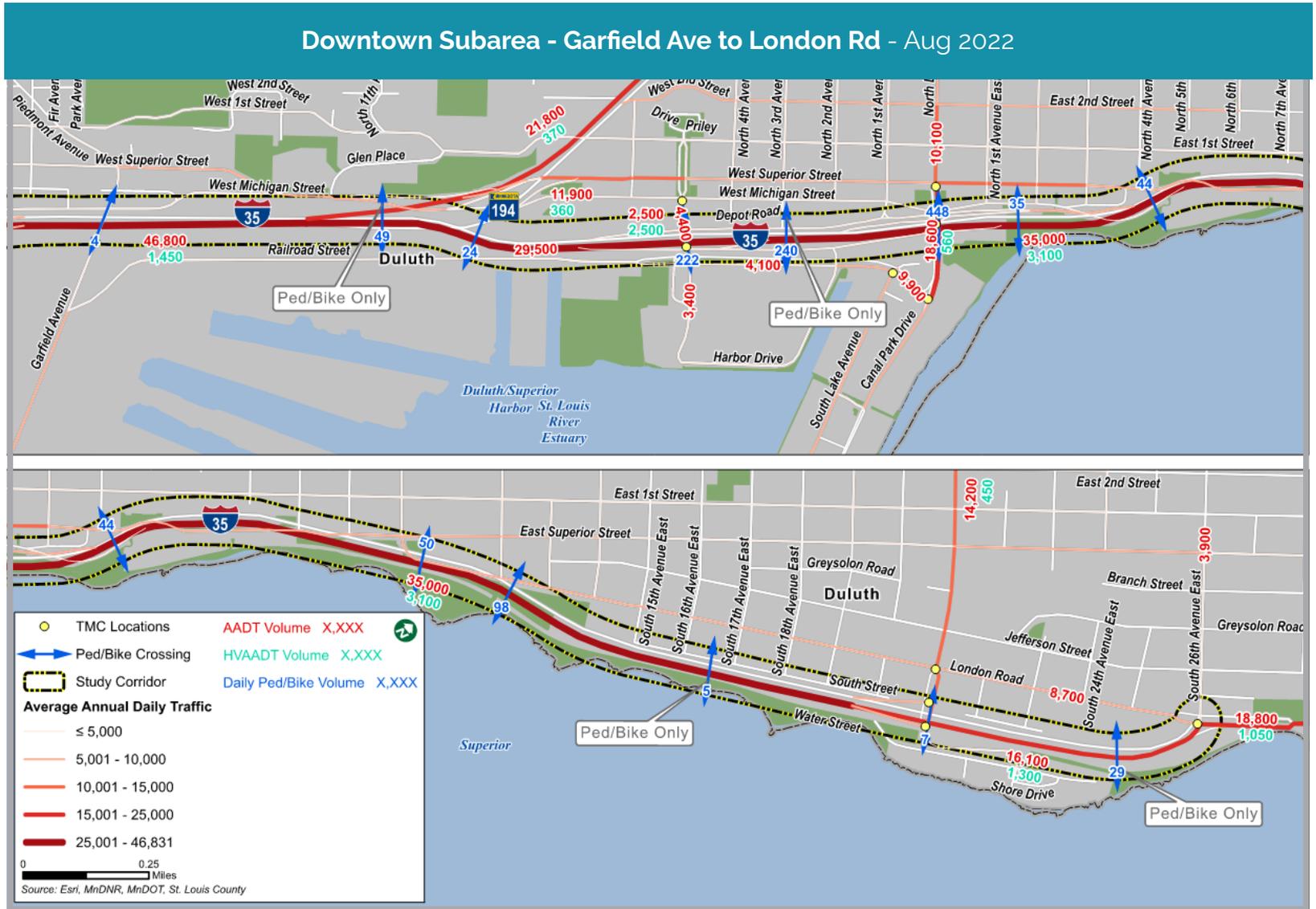


The rural subarea experiences the largest fluctuation in change from the annual average traffic volumes with a difference of nearly 11,000 vehicles per day between the highest and lowest monthly average volumes. A 19 percent increase in traffic in comparison to the annual average is experienced in August and a 22 percent decrease is experienced in January; both are the greatest deviations observed within the project area.

Urban Subarea - Cody St to Garfield Ave - Aug 2022



The urban subarea experiences the smallest fluctuations in seasonal traffic with only April and May deviating from the annual average by more than 10 percent. This area also does not experience the decrease in traffic during the winter months experienced by the rural and urban subareas.

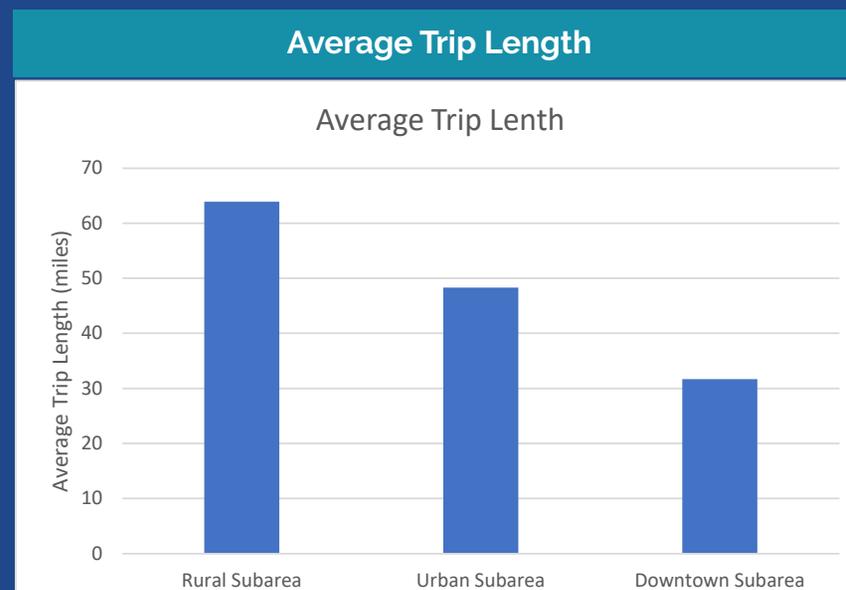


The downtown area experiences similar fluctuations in seasonal traffic as seen in the rural subarea and follows the general monthly pattern as well. Seasonal deviations reach up to 17 percent difference from the annual average; January shows a 17 percent decrease from average while July shows a 17 percent increase in traffic volumes from the annual average.

AVERAGE TRIP LENGTH

Reflective of their respective contexts', average trip lengths vary greatly across each subarea. Average trips measured through the rural subarea are approximately 64 miles. Average lengths in the urban subarea average 48 miles, while the downtown subarea averages 32 miles.

Lower trip lengths in both the urban and downtown subareas are almost certainly a result of more local, short-distance trips.



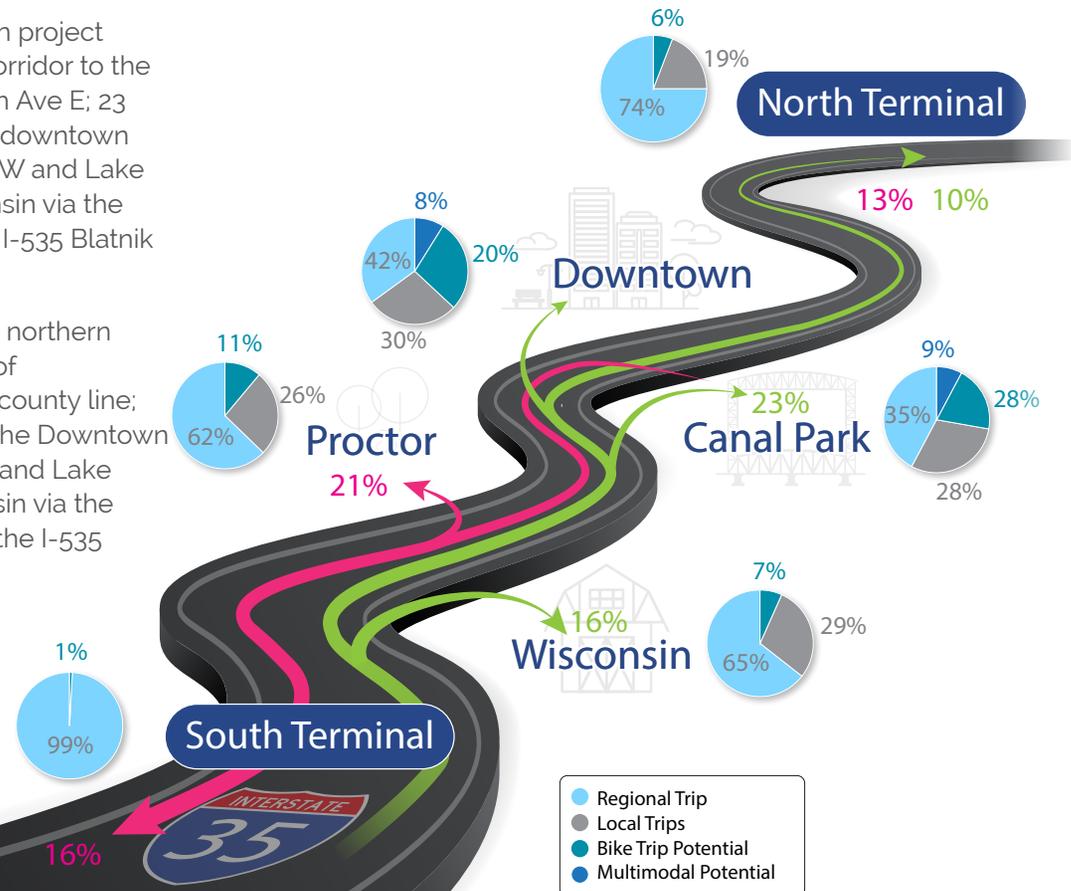
ORIGIN-DESTINATION

Origin-Destination data obtained from StreetLight Insight provides information on how traffic flows through the corridor and to/from areas along the route. Forty-four analysis zones were placed along segments of I-35 between interchanges and at all major entrance and exit points.

Key findings are summarized below:

- 10 percent of trips originating from the southern project limit are observed traveling the length of the corridor to the northern project limit at TH 61/London Rd/26th Ave E; 23 percent are observed exiting I-35 at one of the downtown area exits (Mesaba Ave, W Superior St, 5th Ave W and Lake Ave); 12 percent make the crossing into Wisconsin via the US 2 Bong Bridge while only 4 percent use the I-535 Blatnik Bridge.
- Seventeen percent of trips originating from the northern project limit are observed traveling the length of the corridor to the southern project limit at the county line; 46 percent are observed exiting I-35 at one of the Downtown area exits (Mesaba Ave, Superior St, 5th Ave W and Lake Ave); 6 percent make the crossing into Wisconsin via the US 2 Bong Bridge versus the 10 percent using the I-535 Blatnick Bridge.
- Considering traffic originating in Canal Park and entering I-35, 13 percent travel north on I-35 to its end at TH 61 and 10 percent travel south to the county line. 16 percent exit via 21st Ave E.

- Traffic entering I-35 via US 2 in Proctor is predominately destined for the US 2 Bong Bridge to Wisconsin (27 percent) and the Central Ave exits (41 percent); 18 percent of Proctor traffic is destined for the downtown exits.



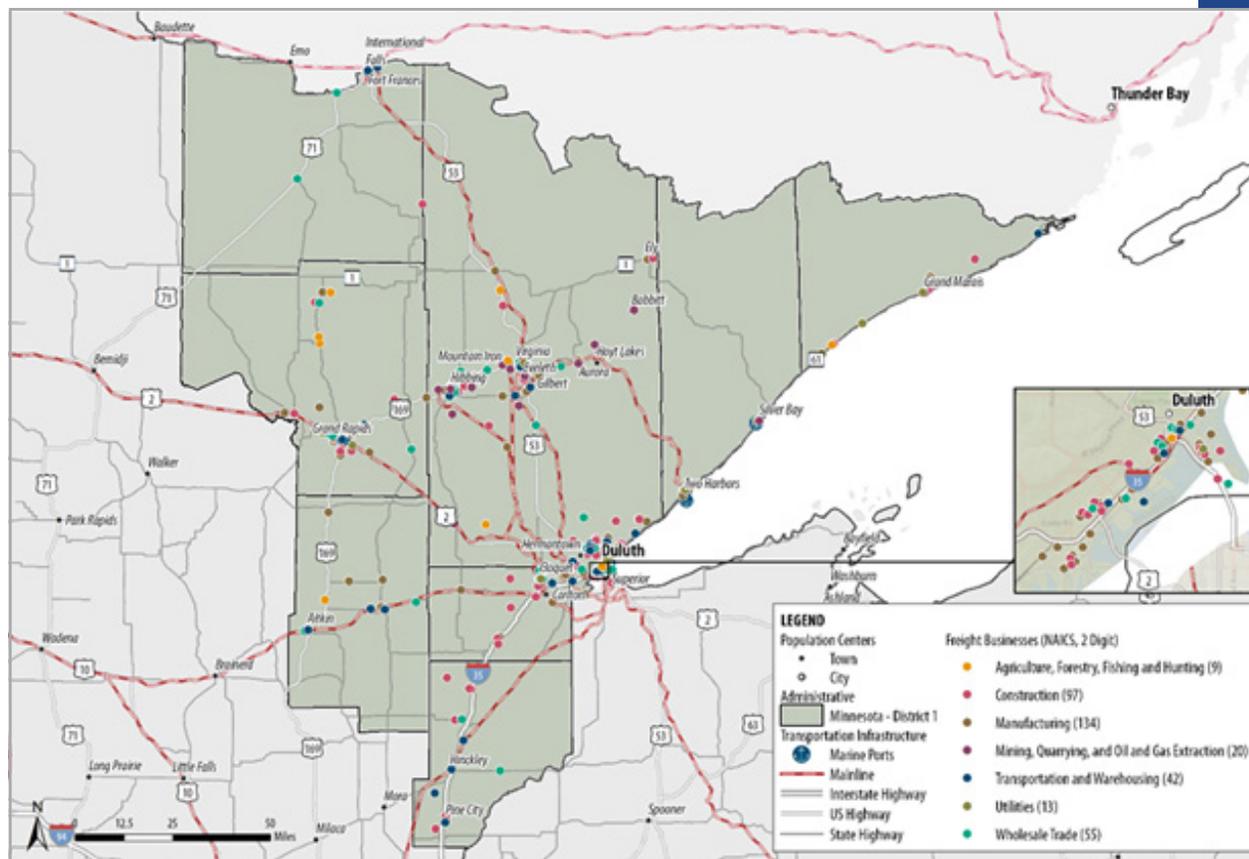
FREIGHT ANALYSIS

Northeastern Minnesota covers almost one-quarter of Minnesota's land area and relies on a multimodal freight transportation system that supports the safe and efficient movement of bulk freight products such as iron ore, timber, and manufactured goods (e.g., metal and paper products). The multimodal transportation system includes I-35, state, and local highways, major railway lines, multiple pipelines, two commercial service airports, and three ports along Lake Superior.

I-35 is the only major interstate within the region and is a key truck route as it directly links Duluth and the Twin Cities, provides access to other important highway corridors such as US -2, US-53, and MN-61 along with connections to NW Wisconsin via the Bong and Blatnik bridges. Trucking activities in northeastern Minnesota, including the Iron Range cities and Grand Rapids, are reliant on US highways and state routes, making their connections to I-35 in this area vitally important.

The freight-dependent businesses in northeastern Minnesota that rely on the transportation of physical goods for their operations **comprise approximately 29 percent of the areas employment and 45 percent**

of the district's Gross Domestic Product (GDP). Mining, manufacturing, and forestry stand out as important freight-dependent industries in the region. The economic impact of freight-relevant industries, primarily mining, retail and wholesale, transportation, and manufacturing contribute approximately \$6.75 billion towards the state's GDP.



Analysis finds that the most significant amount of port destined truck traffic begins in Superior, WI. Aside from industrial areas in Duluth, Proctor, Cloquet, and Grand Rapids are frequent origin locations. Smaller proportions of port destined truck traffic are detected across upper Minnesota, the Twin Cities, multiple Wisconsin locations along the I-90/94 corridors, and as far as North and South Dakota, Chicago, and northern Iowa. The table below shows a breakdown of truck trip lengths beginning and ending at the port. The table shows that there are negligible differences in trip length between trips beginning or ending in the port. Over half of all port trips are less than 10 miles in length.

Trip Length of Trucks Originating and Destined from/to the Port of Duluth

Trip Length (miles)	Percent of Trips on a Typical Weekday	
	Trips to Port	Trips from Port
0-5	36%	37%
5-10	26%	22%
10-50	16%	16%
50-100	11%	10%
100+	12%	14%

I-35 is important to all businesses that ship or move physical goods throughout northeastern Minnesota and northwestern Wisconsin. However, there are several critical industries in which I-35 plays an essential role for daily operations and continued economic stability.



MINING

The northeastern portion of Minnesota is a major center for the mining industry in the state and Upper Midwest. This part of the state is the largest producer of iron ore in the country. Most of the mining establishments are concentrated along the Mesabi Iron Range and utilize the rail and port systems for outbound shipments, which are suited to handle the heavy, high volumes of taconite iron ore that is produced. Specifically, taconite is moved by rail to three ports: Duluth-Superior, Two Harbors, or Silver Bay. Within the Iron Range, there are 12- 14 trains a day dedicated to carrying ore to ports.

The roadway network in the region is also a critical asset for the inbound movement of materials supporting the mining industry, including equipment and fuel. Many of these truck-borne loads are either oversized or overweight and utilize the I-35 corridor to connect to US 53, US 2, and MN 61.



FORESTRY

Minnesota's forestry industry is primarily concentrated in the northeastern part of the state and the presence of both forest resources and forestry products companies means that wood products are one of the key commodities moving along the transportation network. Forestry-related manufacturing occurs in central St. Louis County, Itasca County, and around Duluth-Superior, but the extraction of forest products occurs across northeastern Minnesota. The forestry industry's freight needs involve rail, truckload, and maritime modes of transportation. Therefore, establishing safe and efficient connections among these modes is vital for the industries continued success.



MANUFACTURING

St. Louis, Carlton, and Itasca Counties stand out as particularly important centers for manufacturing employment, with towns such as Grand Rapids, Virginia, and Duluth hosting concentrations of manufacturing jobs. The manufacturing industry's freight needs are varied due to the wide variation in the types of products and value. However, trucking and rail are the most used modes for manufacturing-related firms. Since manufacturing firms are often engaged in trade with other states or countries, strong and reliable connections to other regions outside of the area are key considerations for many firms. Again, I-35 in the Duluth area provides many of the critical roadway connections.



MARITIME

Duluth lies at the western end of an important maritime trade corridors: the Great Lakes and St. Lawrence Seaway. The lakes and seaway provide the area with access to the Atlantic Ocean and foreign trade markets. In particular, they serve as an important trade corridor for bulk goods such as iron ore from northeastern Minnesota, grain from the Great Plains, and coal from Wyoming.

The northeast region has three active lake ports, including Duluth-Superior, Two Harbors, and Silver Bay. Two Harbors and Silver Bay nearly exclusively serve the iron mining industry, while Duluth-Superior's services are more varied, including substantial iron, grain, coal, cement, limestone, and other dry bulk terminals, as well as a public terminal capable of handling project cargoes. These three ports are among the most heavily used ports on the Great Lakes System with the

Duluth-Superior port frequently cited as the world's biggest freshwater port by tonnage handled.

The Duluth Port also includes the Duluth Intermodal Container Terminal, which is designed to handle up to 50,000 annualized containers. This is a rail served, land based intermodal container hub where container shipments of imports and exports are handled and moved between railroads and trucks. This terminal is heavily reliant on the I-35 corridor through Duluth and all the highway connections it provides. It is critically sensitive to the generally free flowing conditions of I-35 and lack of low vertical clearance structures.



AVIATION

I-35 through Duluth also provides connections to the Duluth International Airport, Range Region Airport, and Falls International Airport via Highway 53. The Duluth airport includes two major operators: Fed Ex and UPS who both utilize I-35 in the Duluth area and the connections it provides throughout the region and state.

OPERATIONS

AM and PM peak hour operations were analyzed using Highway Capacity Manual (HCM) methodology for segments of I-35 in the rural subarea and at ramp terminal and adjacent at grade intersections within this subarea using the collected turning movement count data. Analysis finds that all intersection and segments operate acceptably during the peak hours, with all locations providing the MnDOT standard Level of Service (LOS) C or better. Several movements and approaches operate at LOS D during the PM peak hour and no maximum queue distances are shown to exceed two or three vehicles.

AM and PM peak hour operations were analyzed in Vissim from Grand Ave to London Rd. The peak hour intersection and approach operations are summarized in the following pages. During the AM peak hour, all intersections operate with LOS C or better overall and all intersection approaches operate with LOS D or better except the 26th Ave E approach at the intersection of TH 61/London Rd/26th Ave E which operates with LOS E. During the PM peak hour all intersections operate with LOS C or better overall except the intersection of Lake Ave at Superior St which operates with LOS D. All approaches operate with LOS D or better except the following which operate with LOS E:

- Southbound 63rd Ave W at Grand Ave
- Westbound Helm St at 27th Ave W
- Westbound Superior St at Lake Ave
- Eastbound I-35 Exit Ramp at 21st Ave E
- Southbound 26th Ave E at I-35/London Rd

The corridor LOS was also analyzed during the peak hours and is summarized in the following pages. The LOS thresholds are based on density or speed according to the Highway Capacity Manual (HCM) for basic freeway, merge and diverge, freeway weaving segments, and urban street segments. These figures indicate that most of the corridor operates with LOS A-C showing free-flow or nearly free-flow operations. There is however some congestion near the signalized intersection at TH 61/London Rd/26th Ave E during both peaks. Also, during the AM peak hour northbound I-35 near Grand Ave and north of Highway 535 operates with LOS D showing some capacity limitations.

Due to peaked traffic flows, there are a number of maximum queues that may exceed the provided storage and/or link length and back into upstream intersections for short periods of the peak periods. In all cases, the average queue lengths are manageable and adequate storage capacity is often provided.

Additionally, a 12-hour analysis was completed for the downtown area including the 5th Ave W and Lake Ave interchanges and the adjacent intersections. The hourly intersection LOS is shown in the table below.

Hourly Intersection Level Of Service

Intersection	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
5th Ave & Railroad St	B	A	A	A	A	A	A	A	B	B	B	A
Harbor Dr & 5th Ave	A	A	A	A	A	A	A	A	A	A	A	A
S I-35 & 5th Ave/Harbor Dr	B	B	B	B	B	B	B	B	B	B	B	B
N I-35 & 5th Ave/Harbor Dr	B	B	B	B	B	B	B	B	B	B	B	B
5th Ave & Michigan St	A	A	A	A	A	A	A	A	A	A	A	A
I-35 & Railroad St/Harbor Dr	A	A	A	A	A	A	A	A	A	A	A	A
Railroad St & Lake Pl Dr/Lake Ave	A	A	A	A	B	B	B	B	B	B	C	B
Railroad St & Lake Ave/Canal Park Dr	B	B	B	B	B	B	B	B	B	C	C	B
I-35 & Lake Ave	A	A	A	A	A	A	A	A	A	B	A	A
Lake Ave & Superior St	B	B	B	B	B	B	B	C	C	D	C	B

This table indicates that vehicle operations are acceptable throughout the day. Most intersections operate with LOS A or B throughout the day which indicates that there is excess capacity throughout the project area, even during the peak travel times.

The worst movement LOS at each intersection was also analyzed throughout the day. This is shown in the table below. This indicates that most movements operate with LOS D or better, but a few movements operate with LOS E.

Hourly Limiting Movement Level of Service

Intersection	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
5th Ave & Railroad St	B	B	B	A	B	B	B	B	B	C	B	A
Harbor Dr & 5th Ave	A	A	A	A	B	B	B	B	B	B	B	B
S I-35 & 5th Ave/Harbor Dr	C	B	B	B	B	B	C	C	C	C	D	B
N I-35 & 5th Ave/Harbor Dr	C	C	C	C	C	C	C	C	C	C	D	C
5th Ave & Michigan St	B	B	A	A	B	B	A	B	B	B	B	A
I-35 & Railroad St/Harbor Dr	C	C	C	C	C	C	C	C	D	D	D	C
Railroad St & Lake Pl Dr/Lake Ave	D	E	D	D	E	D	D	D	D	D	D	E
Railroad St & Lake Ave/Canal Park Dr	D	D	D	D	D	D	D	D	D	D	D	D
I-35 & Lake Ave	C	C	C	C	C	C	C	C	C	D	D	C
Lake Ave & Superior St	C	C	C	C	C	C	C	D	D	E	D	C

Analysis of the full corridor area reveals that there are few capacity-related operational issues during the peak periods of regular summer traffic conditions. Adequate capacity is provided to carry traffic volumes, which are well documented as being highest during these summer months. Throughout much of the corridor there is adequate capacity to accommodate the potential for traffic growth and fluctuations in traffic volumes due to local events. Delays do exist off of the I-35 corridor where frequent heavy traffic volumes are experienced in the Lake Ave, Canal Park Drive, and Railroad St areas. The most notable traffic deficiencies are found at the terminus of the I-35 corridor at the TH 61/London Rd/26th Ave E where the urban divided freeway transitions to a conventional roadway at a signalized intersection.

Existing Peak Operations AM and PM exhibits can be found in the Appendix.

CONNECTIVITY

An excellent tool for vehicular mobility throughout Duluth and northern Minnesota, the I-35 corridor can also be a challenge for some users, especially for pedestrians, bicyclists, and transit riders. Since pedestrians and bicyclists cannot use the freeway itself, and only a select few transit routes run on the freeway, the ability for those users to cross the corridor to get to their destinations is vital. Yet the corridor often acts as a barrier, with crossing locations either few and far between, inconvenient, or inaccessible for some. The following series of maps shows the current conditions of the multimodal system of infrastructure within the project corridor.

Non-motorized activity

- There are 23 available grade-separated crossings of I-35 in the downtown and urban areas.
- Ninety-one percent of pedestrian trips using these crossing locations are 2 miles or less in length. Only 41 percent of bike trips using these crossing locations fit the same metric.
- Highest volume crossings are at Lake Ave and 5th Ave W, which were found to carry 448 and 222 non-motorized users during the 13-hour count period in late-June.
- Streetlight Insight data calibrated with physical count data throughout the corridor also finds that the DECC skyway carries 240 pedestrians across the interstate on a typical day.
- 10 of the identified crossing locations carry fewer than 10 pedestrians per day- the Wade Stadium pedestrian bridge was found to carry the lowest pedestrian volume of all crossings.
- The seven crossings under I-35 between Thompson Hill and Grand Ave typically carry between 20 and 60 non-motorized per day, with the exception of the 58th Ave W underpass, resulting in over 200 non-motorized trips underneath the highway on a typical day.

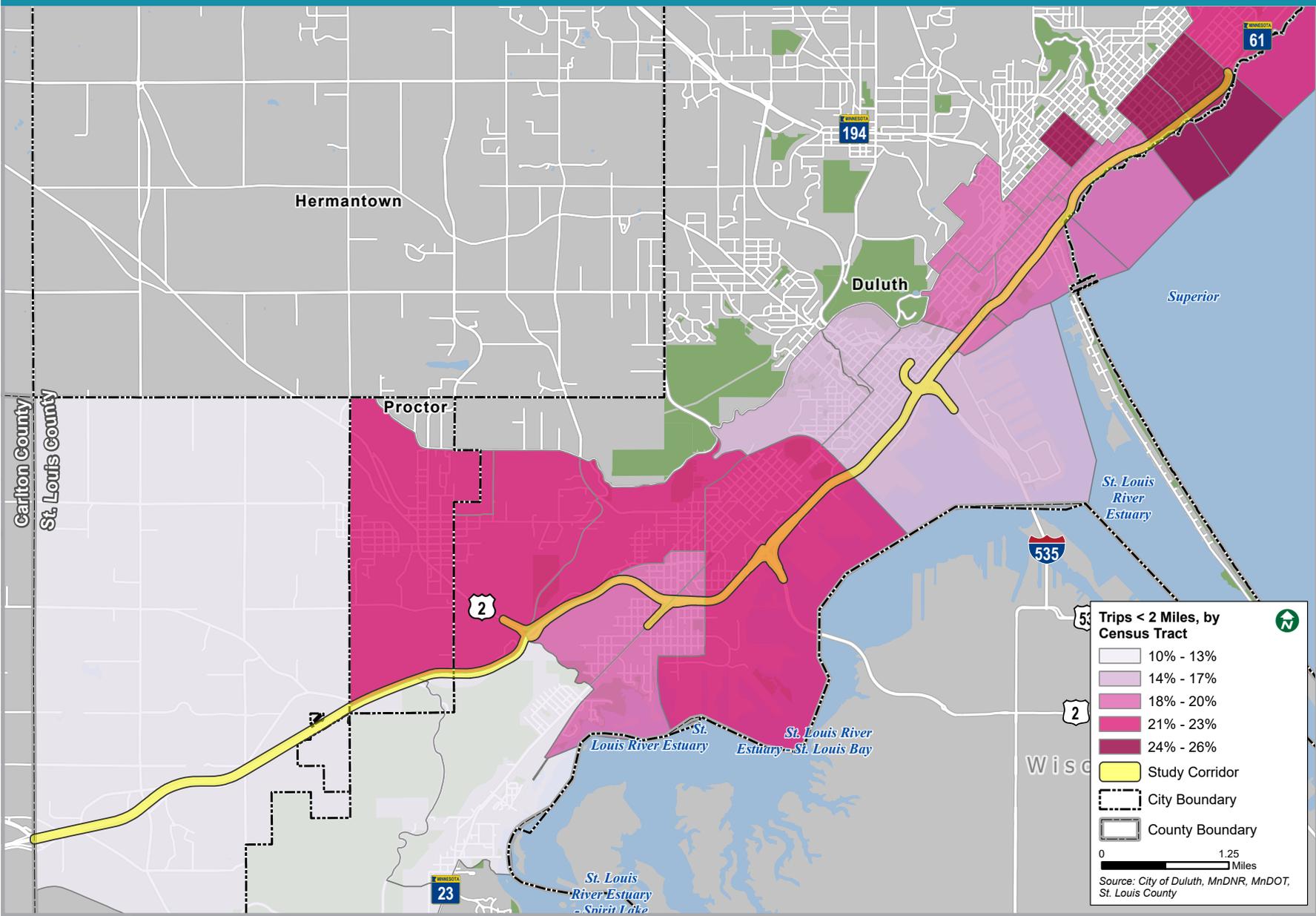
LATENT DEMAND

Origin-destination data obtained via StreetLight Insight is able to identify trips starting or ending within the study area that are 2 miles or less in length. Areas with high proportions of these trips might be suffering from a lack of infrastructure supporting non-motorized trips and users are forced to make these short distance trips via vehicle.

This analysis suggests that there are opportunities to increase non-motorized activity through most of the corridor as a number of tracts within the urban and downtown areas feature over 20 percent of trips of 2 miles or less. While most of these areas feature dense urban populations and zoning activity, there are some surprising results.

Areas with the highest proportion of short trips are located at the northern end of the study area from S 15th Ave E to the I-35 terminus at TH 61, as well as one tract north of the downtown area. Addition areas with high numbers of short trips are located in the Cody, Denfield, and Lincoln Park neighborhoods surrounding the Grand Ave and Central Ave interchanges, as well as the Canal Park, Bayfront, and downtown areas.

Trips Less Than 2 Miles



Trips < 2 Miles, by Census Tract

- 10% - 13%
- 14% - 17%
- 18% - 20%
- 21% - 23%
- 24% - 26%

Study Corridor

City Boundary

County Boundary

0 1.25 Miles

Source: City of Duluth, MnDNR, MnDOT, St. Louis County

PEDESTRIAN BARRIER

The following four pages of maps highlight the barriers to pedestrian movement through the project corridor. The largest and most critical gaps are in the urban and downtown subareas, with crossings over I-35 between located between the Richard I. Bong Bridge and Canal Park being especially difficult. In downtown Duluth. The two most important crossings are 5th Ave W and North Lake Ave, which connect downtown to Bayfront Park (including the Duluth Entertainment Convention Center

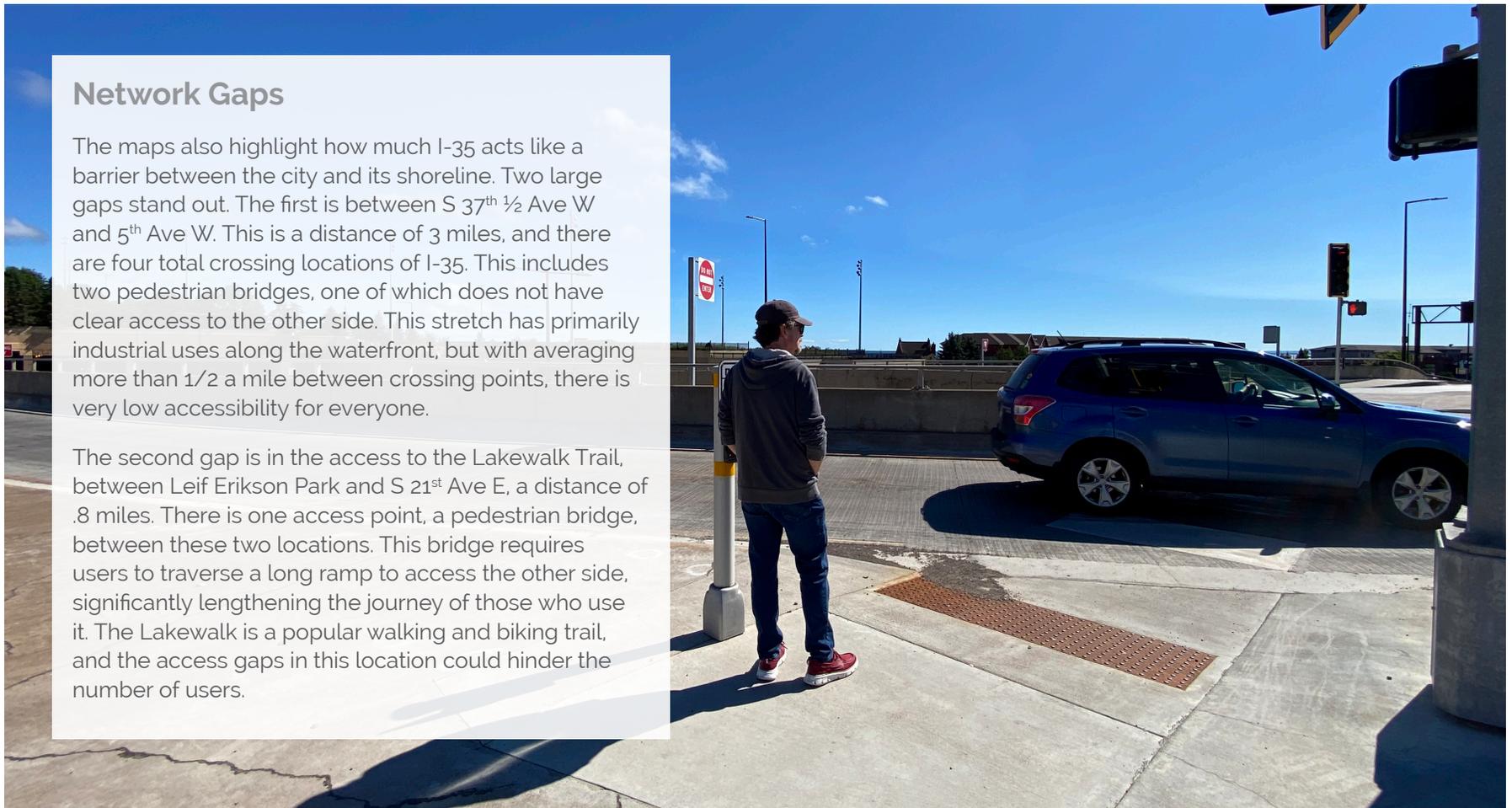
[DECC], Amsoil Arena, and the Great Lakes Aquarium) and to Canal Park. Both crossings have major barriers, and due to the high numbers of visitors at these locations, it's important to identify the shortcomings of the current infrastructure.

Pedestrian Barrier exhibits are located in the Appendix.

Network Gaps

The maps also highlight how much I-35 acts like a barrier between the city and its shoreline. Two large gaps stand out. The first is between S 37th ½ Ave W and 5th Ave W. This is a distance of 3 miles, and there are four total crossing locations of I-35. This includes two pedestrian bridges, one of which does not have clear access to the other side. This stretch has primarily industrial uses along the waterfront, but with averaging more than 1/2 a mile between crossing points, there is very low accessibility for everyone.

The second gap is in the access to the Lakewalk Trail, between Leif Erikson Park and S 21st Ave E, a distance of .8 miles. There is one access point, a pedestrian bridge, between these two locations. This bridge requires users to traverse a long ramp to access the other side, significantly lengthening the journey of those who use it. The Lakewalk is a popular walking and biking trail, and the access gaps in this location could hinder the number of users.



SUBSTANDARD PEDESTRIAN AREAS

The following crossings of I-35 are highlighted due to their high pedestrian and vehicle volumes and substandard pedestrian facilities. Two of these facilities, Lake Ave and 5th Ave, are the main connections from downtown Duluth to Canal Park and Bayfront Park.

Lake Avenue

Lake Ave is the main connection between downtown Duluth and Canal Park, the tourist and commercial heart of the city. This intersection has an average daily traffic volume of 18,600 vehicles and sees an average of 448 daily pedestrian and bike crossings. While generally easy to cross in a motor vehicle, this crossing as a pedestrian is a challenge.

Pedestrians are not able to cross from one side of Lake Ave to the other over I-35, they can only travel down Lake Ave. To cross to the freeway, there are three separate crosswalks that must be navigated. While the center crosswalk has a pedestrian signal, the two side crosswalks have no pedestrian signage or control. These side lanes are for right turns from Lake Ave onto the I-35 entrance ramps and right turns from the I-35 exit ramps to Lake Ave. There are yield signs up for drivers, but no other traffic control devices.

The three separate crosswalks have a total crossing distance totaling 200 feet, including the two islands between the crosswalks. The center crosswalk is 60 feet, while the two side crosswalks are each 25 feet. The center crosswalk on both sides of the road has a cement curb without any pedestrian ramps taking up much of the marked crosswalk space, leaving pedestrians with a choice of either hopping onto the curb or moving out into the intersection to go around it. This makes this



crosswalk even more dangerous for users who cannot mount the curb.

In addition, the pedestrian ramps in the intersection are not ADA compliant. As mentioned above, the center crosswalks do not have a clear crossing space between the curb ramps, as there is a cement curb between them

within the crosswalk. There are no APS push buttons at either pedestrian signal and the signals do not have countdown timers.

5th Avenue W

5th Ave West is the primary connection to Bayfront Park and the Duluth entertainment complex, which includes AMSOIL Arena, and DECC Arena. The AADT is 4,400, and there are 222 daily pedestrian and bicycle crossings. These numbers are higher on days where there are events. To cross I-35, there is a sidewalk on 5th Ave W solely on one side of the road. There are two crosswalks, which cross the southbound I-35 exit ramp and the northbound I-35 entrance ramp. Each of the crosswalks is approximately 50 feet. This crossing can be a difficult and uncomfortable journey. While the sidewalk is 8 feet wide, there is no buffer between the sidewalk and the four lanes of traffic. It is a loud environment, with traffic moving quickly underfoot on the freeway. The curb ramps are unusually short and steep, making

crossing the corridor difficult for anyone who is not fully able bodied. The ramps are also not ADA compliant.

Current conditions are substandard, and changes are especially important to consider. As previously discussed in the infrastructure inventory section, MnDOT has been looking at replacing this crossing due to its importance and the structural deficiency of the bridge. The initial study was conducted from October 2021 to June 2022 and included stakeholder and public engagement pieces to gather information regarding usage and shortcomings of the current bridge crossing. Four concepts were also created after consulting with the public, including an option that removes all vehicular traffic from the bridge.

Central Avenue

While not as heavily traveled as the Bayfront and Canal Park crossings, Central Ave is an important crossing of I-35 in west Duluth, connecting the Irving and Spirit Valley neighborhoods. North of the intersection is a large commercial center, which includes restaurants, a theater, a grocery store, and other businesses.

off ramps for I-35. N Central Ave does not have any stop signs, with both off ramps having two oversized stop signs located at each exit, one on each side of the road. Central Ave runs directly north to south, with sidewalks on both sides of the street north of I-35 and under the freeway but only has sidewalks on the west side of the street on the south side of I-35.

There are no signals at this double intersection, which has on and

The crossing distance is longer than necessary, especially at

the southwest crossing. The exit ramp is two lanes and 24 feet wide, but due to the large, sweeping curb radius of the corner, the crossing distance for pedestrians is approximately 50 feet, making crossing this section more challenging. The other exit ramps have much shorter crossing distances. The southeast crossing has a similarly

The Duluth Lakewalk

The Duluth Lakewalk is an 8-mile paved pedestrian and bicycle trail that runs from Kitchi Gammi Park to Bayfront Park. Much of this trail is along the shore of Lake Superior, with one section along the mouth of the St. Louis River (St. Louis Bay) as it approaches Bayfront Park. The path originally was only ½ mile in length when it opened in 1983, but with the help of the group “Friends of the Lakewalk,” the trail has been extended to its current size.

In addition to providing spectacular views, the Lakewalk also connects to popular destinations along the water. Part of the Lakewalk runs along the lake shore in Canal Park, a popular destination for tourists and locals alike. In this section, there are two separate paths, the paved path that is part of the Lakewalk and is used for bicycles, and a separate boardwalk for pedestrians. Great views of Duluth and the Aerial Lift bridge can be found from this path. Another section runs through Bayfront Park and along St. Louis Bay, which gives users access to the park, AMSOIL Arena, the Duluth Entertainment and Convention Center (DECC), and more.

In recent years, powerful storms have produced giant waves that have damaged or destroyed sections of the Lakewalk, including within Canal Park. In 2018, sections of the boardwalk were washed away after a particularly powerful storm. To protect the shoreline, Duluth built a retaining wall

and placed large boulders along the shoreline in Canal Park to help absorb the force of the waves. This project was completed in October 2020.

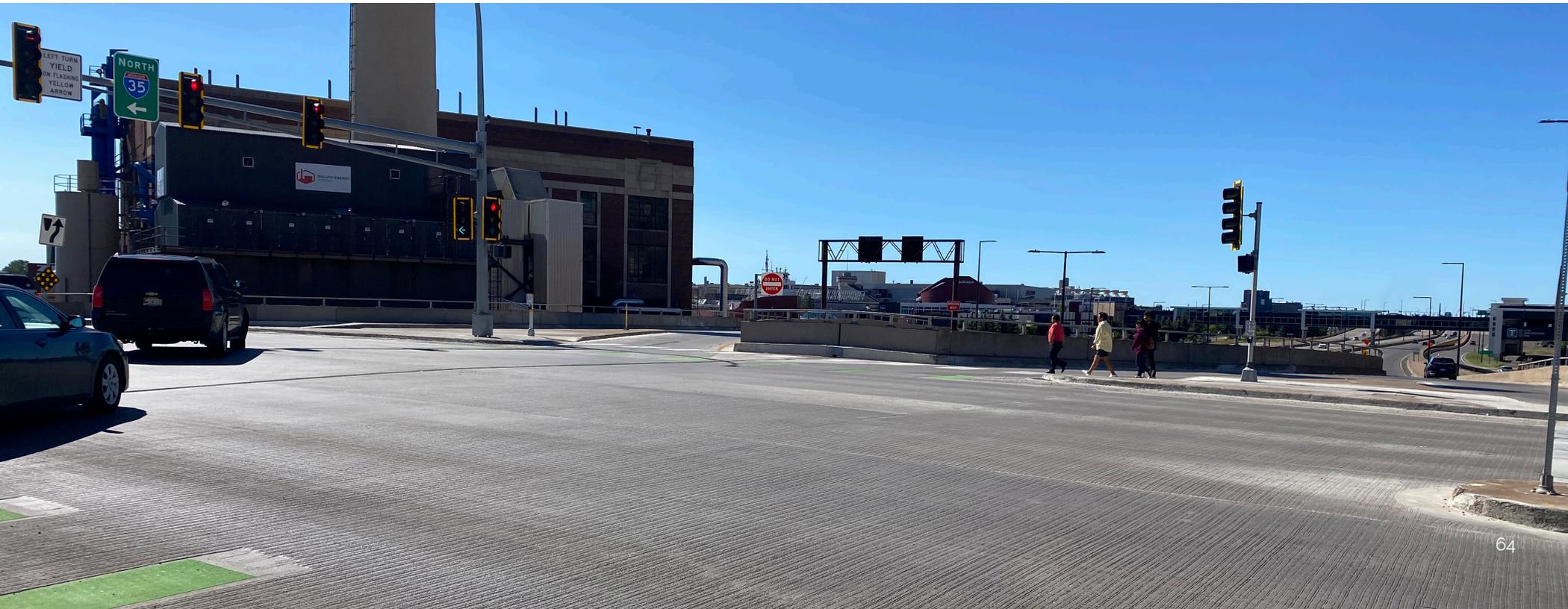


SIDEWALK CONDITIONS

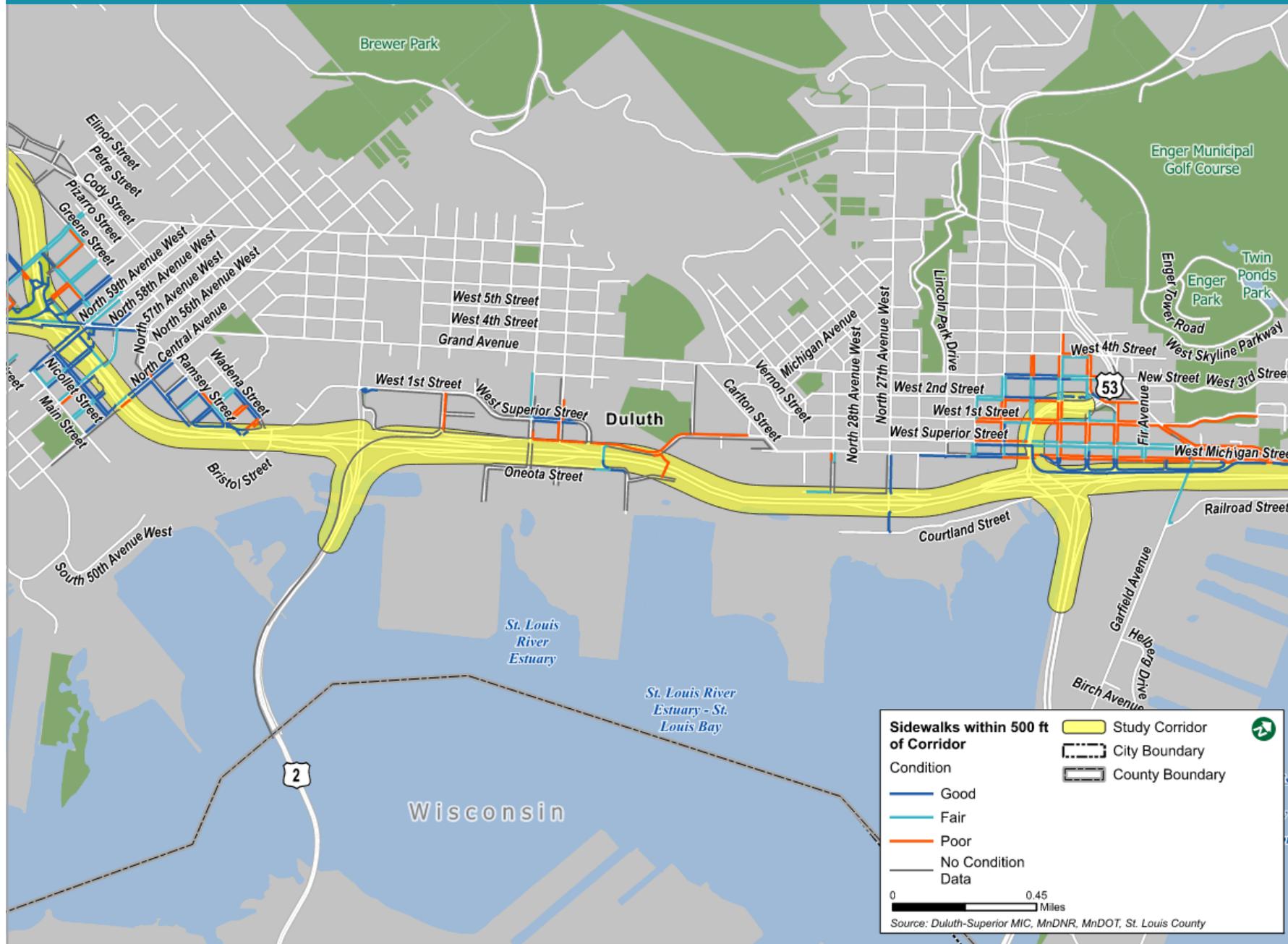
The following series of three maps shows the condition of sidewalk segments located within 500 feet of the corridor. This data was collected by the Duluth–Superior MIC, and is rated on a scale of excellent, good, fair, and poor. No map of the rural subarea was made, as there are very few sidewalks along that stretch within 500 feet of the road and no condition data available for the ones that do exist. Of note, no sidewalks within the study area were classified as being in excellent condition.

The urban subarea had areas with the worst sidewalk conditions. The Lincoln Park neighborhood, on the north side of the urban subarea map, had the largest concentration of sidewalks in poor condition.

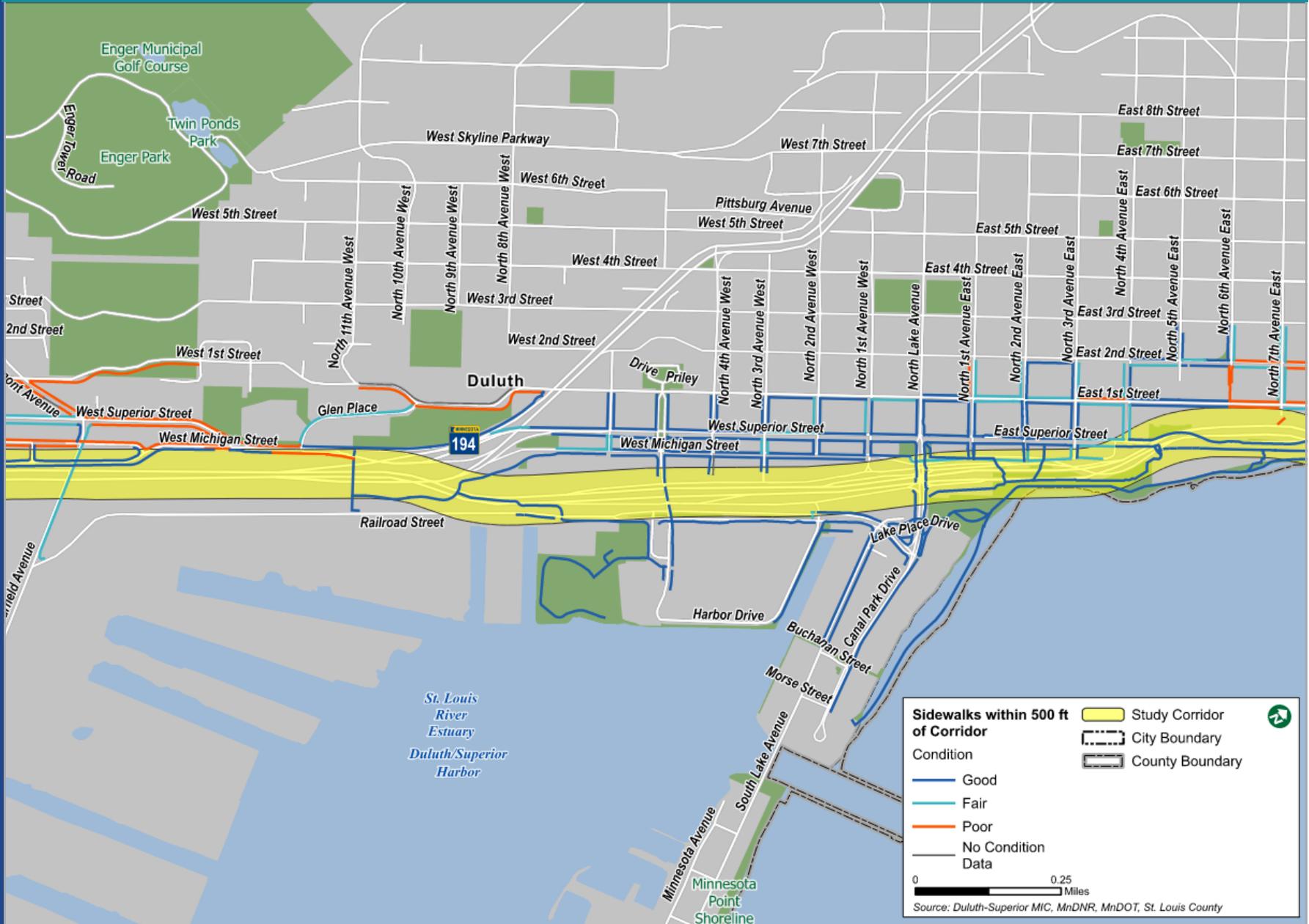
The area near the intersection of Grand Ave and the I-35 corridor had sidewalks in primarily good and fair condition, but also had sections of sidewalk in poor condition. The downtown subarea shows a variety of sidewalk conditions, but generally had better sidewalks than the urban subarea. The pedestrian dense areas of Canal Park and Bayfront Park were primarily all in good condition, including all crossings of the corridor. Sidewalks further north of Canal Park show varying conditions, although most sidewalks that ran parallel to the I-35 corridor were in good condition.



Urban Subarea - Cody St to Garfield Ave - Aug 2022



Urban Subarea - Garfield Ave to N 6th Ave E - Aug 2022



Urban Subarea - N 6th Ave to E London Rd - Aug 2022

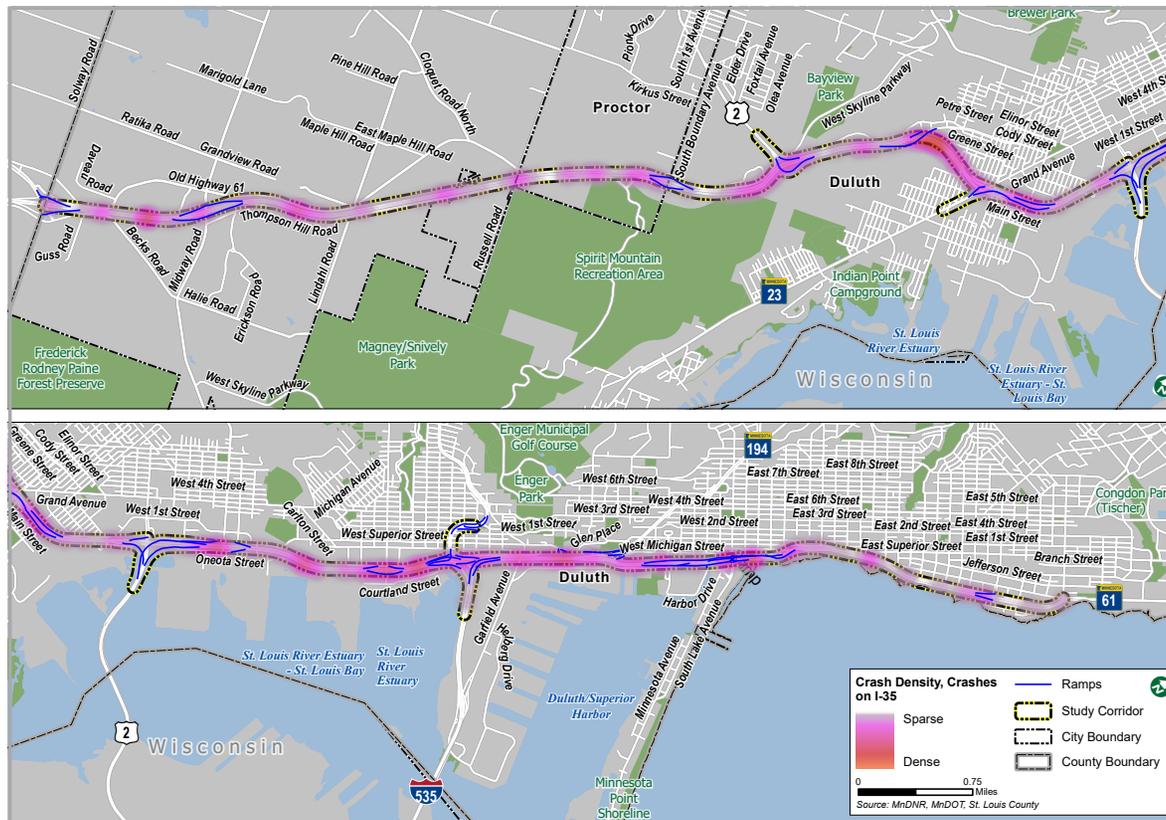


SAFETY

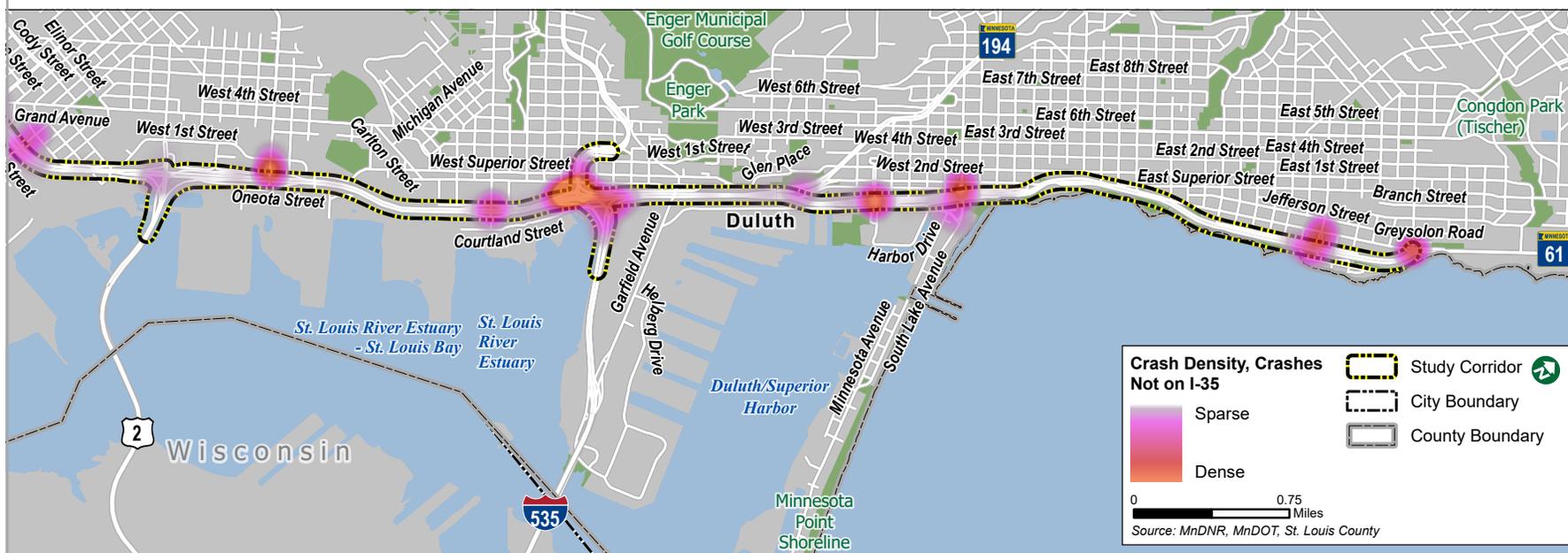
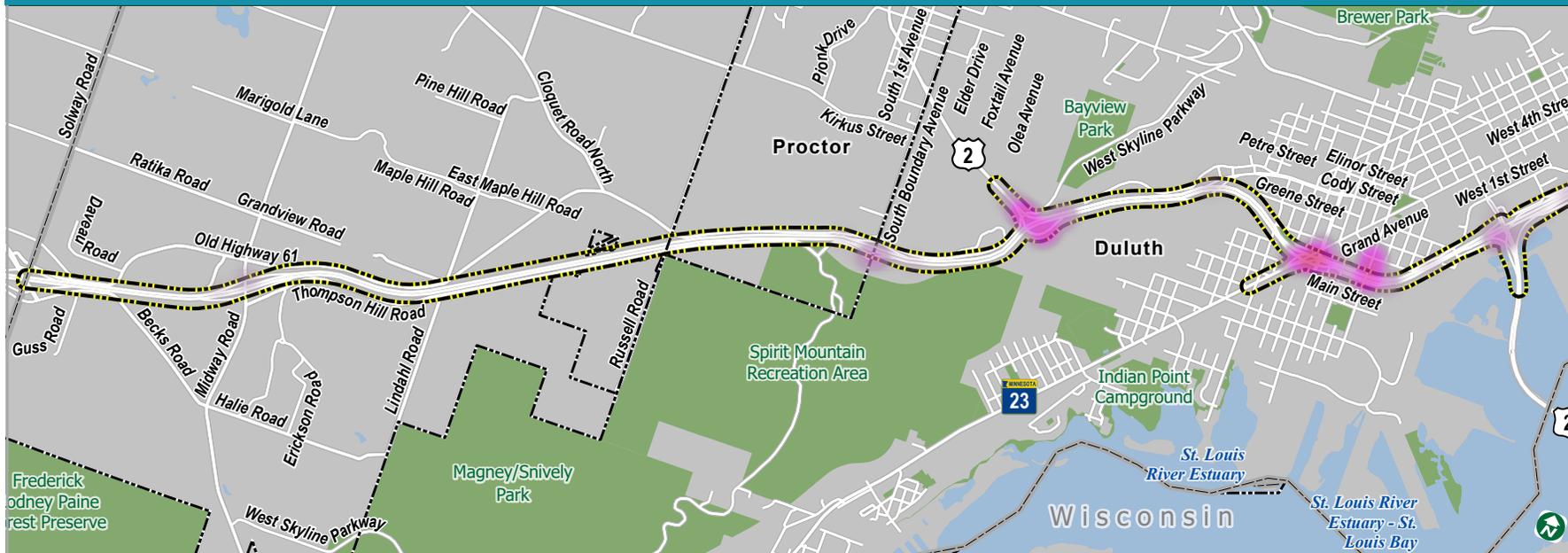
An analysis of 5- (2017-2021) and 10-year (2012-2021) crash data obtained via MnDOT's Crash Mapping Analysis Tool (CMAT) application was performed throughout the study area to assess and identify study area crash patterns and identify potential safety issues that can be mitigated with roadway improvements.

All roadway segments were found to be operating with a crash index of greater than 1.0, indicating that there is a disproportionate number of crashes at a given location when compared to the

crash history of similar intersections or segments statewide. Ten study intersections are operating with a critical index greater than 1.0, notable findings of crash history is documented within this section. Ten additional intersections are operating with crash rates at or above the statewide average crash rates of intersections with similar characteristics; these locations should be monitored for crash performance as their current performance may not require safety improvements on their own but should be considered if within a larger project area.



Crash Density - Intersection Crashes



Crash Density, Crashes Not on I-35

- Sparse
- Dense

- Study Corridor
- City Boundary
- County Boundary

0 0.75 Miles

Source: MnDNR, MnDOT, St. Louis County

SAFETY TRENDS – I-35 MAINLINE SEGMENTS

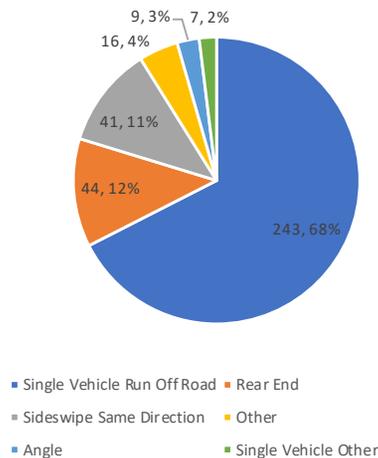
General Findings:

- Truck-related crashes are most present in the rural subarea and rare in the urban and downtown areas.
- Run off road crashes are the predominant observed type in the rural area while rear ends and sideswipe, same direction crash, and run off road become more common in the urban and downtown areas.
- Winter weather and poor surface conditions is a common theme throughout the study area with hot spots in and around tunnels, underpasses and overpasses, and on elevated structures.
- Closely spaced interchanges: 65 percent of all reported I-35 segment crashes are within 1/4 mile of an interchange. 84 percent of all crashes are within 1/2 mile of an interchange. These high proportions of crashes occurring within intersection functional areas indicates that there may be issues with closely spaced entrance and exit ramps.

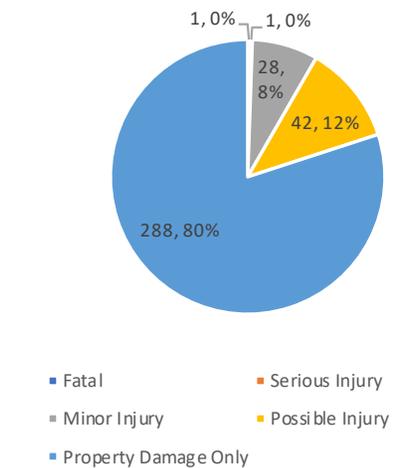
Rural Subarea

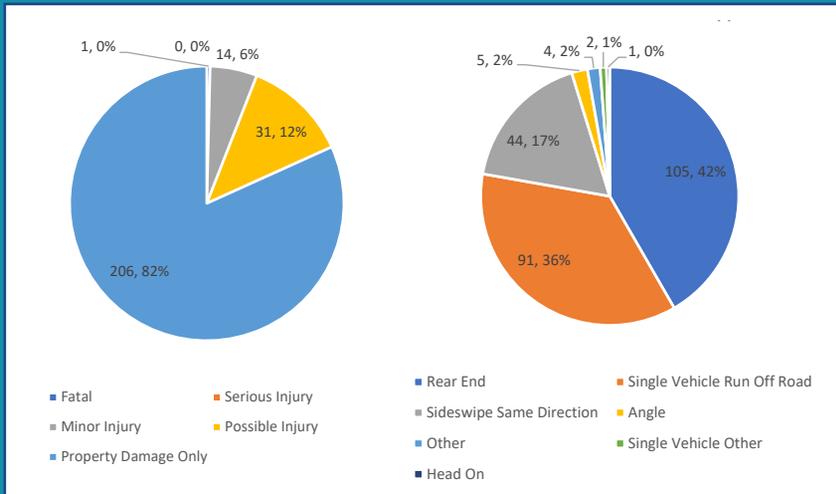
- 66 percent of all crashes observed are coded as single vehicle run off road; over 75 percent of crash reports include the phrase "lost control."
- 60 percent of all crashes occurred between November and February, indicating that crash frequency increases during the winter months - the months with the lowest traffic volumes.
- 7 percent of crashes involve a truck or heavy vehicle; most occur near the US Proctor interchange and Thompson Hill.
- 1/3 of all crashes occur in snowy weather conditions.
- 20 percent of all crashes were reported on the Thompson Hill segment of I-35 in the last five full years; over 70 percent of these are run off road crash type, common contributing factors are snow or ice covered roadway and careless driving/speeding (40 percent occur in the downhill

Rural Subarea - Crash Type



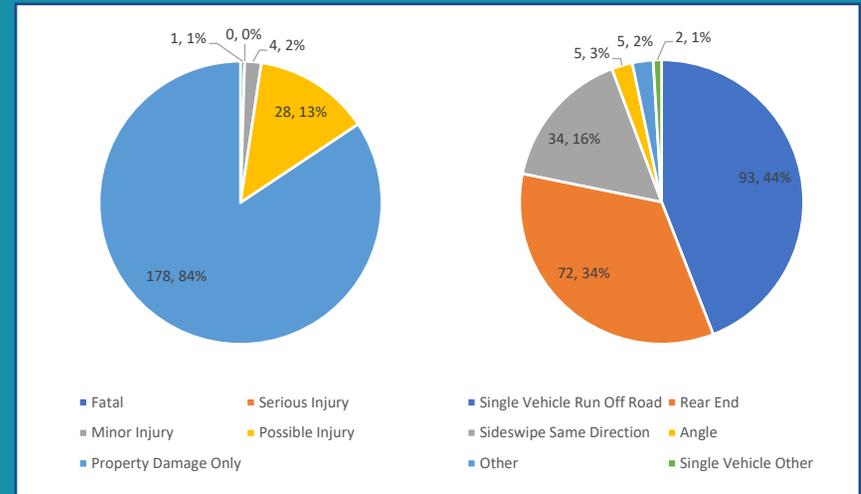
Rural Subarea - Crash Severity





Urban Subarea

- Nearly all crashes are rear ends or run off roads with an even number of the two crash types
- Half of all crashes occur during poor surface conditions (snow, ice, rain covered roadway)
- 35 percent of all crashes occur during December and January
- Hot spot present surrounding the Grand Ave-Central Ave interchange due to closely spaced ramps; 15 percent of observed crashes in this area involve a merging or weaving maneuver



Downtown

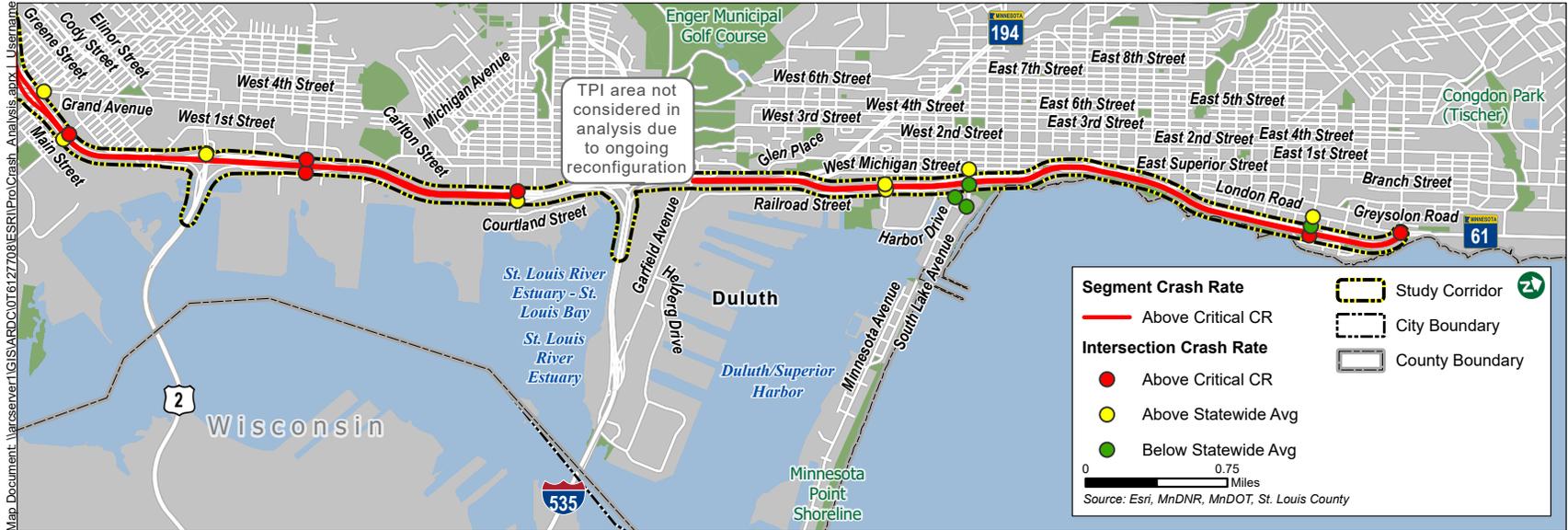
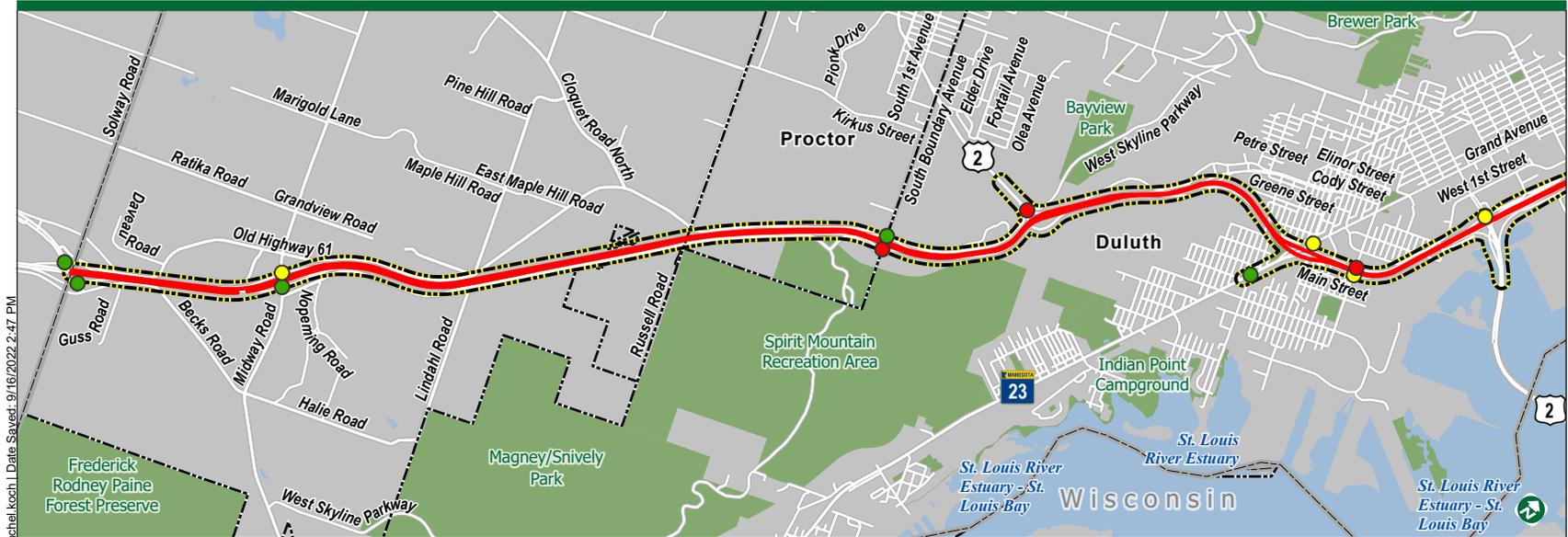
- 52 percent of crashes occur during December and February
- 43 percent occur between 2 PM and 6 PM
- 52 percent of crashes reported occur under poor surface conditions
- Hot spots are present in all three tunnels north of the Lake Ave interchange; reports indicate the majority of these are due to slick roadway surfaces during inclement weather



Duluth Area I-35 Corridor Plan

Duluth-Superior Metropolitan Interstate Council

Crash Rates
September 2022



Segment Crash Rate

- Red line: Above Critical CR

Intersection Crash Rate

- Red dot: Above Critical CR
- Yellow dot: Above Statewide Avg
- Green dot: Below Statewide Avg

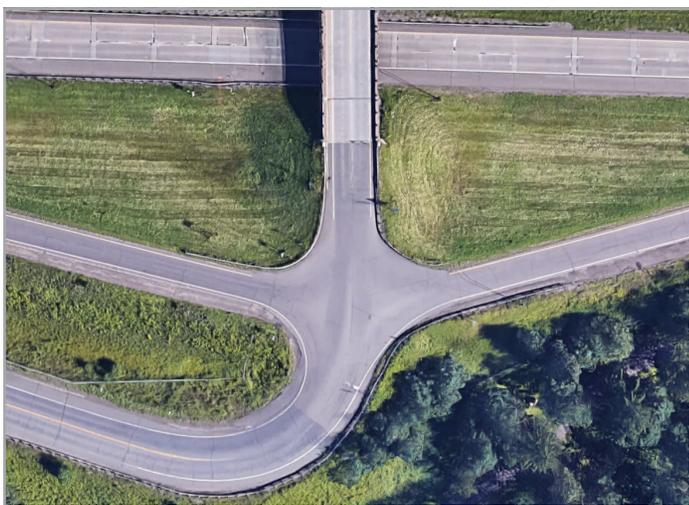
Legend

- Yellow dashed line: Study Corridor
- Black dashed line: City Boundary
- Grey dashed line: County Boundary

0 0.75 Miles
Source: Esri, MnDNR, MnDOT, St. Louis County

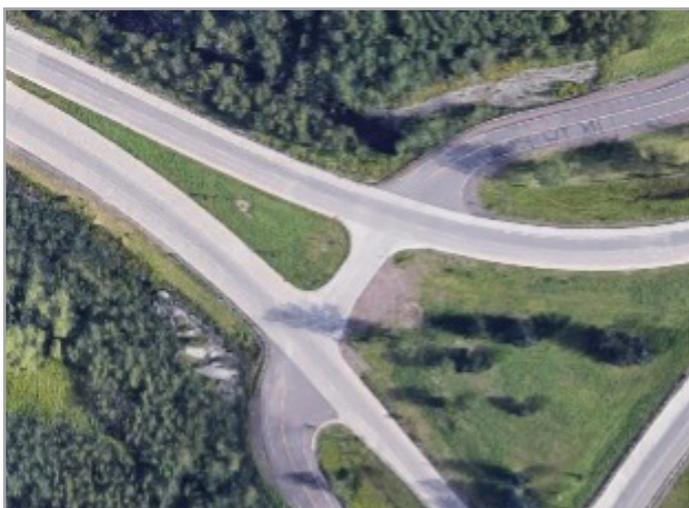
Map Document: \\arseserver1\GIS\ARDC\01612708\ESRI\Proj\Crash_Analysis.aprx | User: rachel.koch | Date Saved: 9/16/2022 2:47 PM

INTERSECTION/INTERCHANGE HOTSPOTS



I-35 Northbound Ramp at W Skyline Parkway

- 60 percent of crashes are right angle or left turn crash type, likely due to unconventional two-way stop controlled condition and tight radius curvature on the south approach



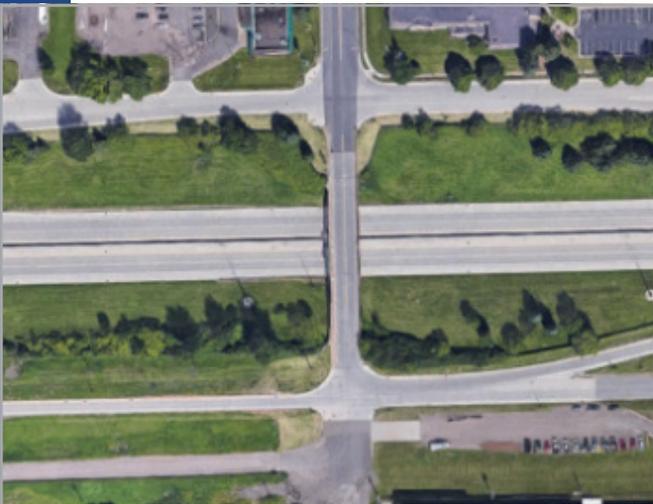
US 2 at W Skyline Parkway

- Half of all crashes occurred either during nighttime hours or in the months of December and January
- 1/3 of all reported crashes are of the sideswipe same direction crash type, likely due to lack of turn lanes on the northbound US 2 approach
- Multiple atypical design features are likely contributing to the elevated crash history at this intersection. Such features include curvature on all approaches and steep grades on Skyline Pkwy, which may limit sight distance, and the adjacent transition from one to two northbound lanes on US 2 may be contributing to the elevated crash history



Grand Avenue – Central Avenue Interchange

- Over 100 crashes have occurred on I-35 and the ramps associated with this interchange in the last five years; half of which occurred between 6 AM and 10 AM and are of the run off road crash type
- The eastbound Grand Ave ramps are a left side exit and the westbound ramps are a left side entrance, both featuring notable curvature on an elevated structure. Of the 30 crashes reported on these ramps within the last five full years, 19 are of the run off road crash type and 65 percent occurred under snow/ice roadway conditions
- Eight crashes can be attributed to traffic merging onto I-35 northbound from the Grand Ave ramps. The left entrance nature of these ramps is atypical and may create unexpected or uncomfortable interactions between merging and through traffic
- The I-35 southbound ramp at Central Ave features a critical index greater than 1.0; while no common crash trends or concerning crash severities can be identified, elevated crashes may be due to driver confusion caused by the wide northbound lane of Central Ave and transition to a narrow urban section with frequent private accesses in close proximity to the ramp terminal.



I-35 at 40th Avenue W Ramp Terminals

- Over 75 percent of reported crashes at the two ramp terminal intersections are of the angle or left turn crash type. The prevalence of the crashes may be due to driver confusion associated with the unconventional two-way stop control as the eastbound approach to the north ramp terminal is uncontrolled and Michigan St is a southbound one-way street. There are also restricted sightlines due to area vegetation and significant vertical curvature of the I-35 overpass.



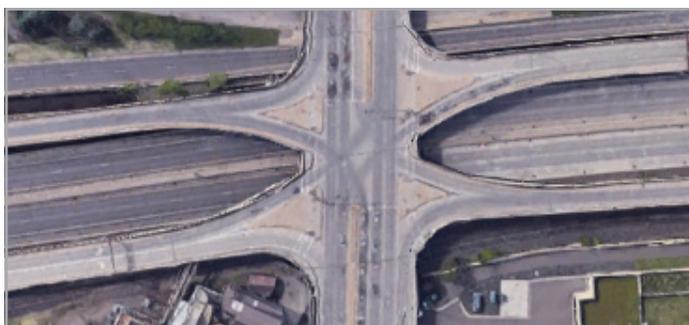
I-35 at 27th Avenue W Ramp Terminals

- Similar sightline issues are present at both ramp terminals as seen at the 40th Ave interchange. Atypical one-way frontage roads and side street stop conditions combined with poor sightlines due to the vertical curvature of the I-35 and railroad overpasses are likely contributing factors. Wide lanes with little delineation of turn lanes where heavy truck movements are common may also be contributing to the observed safety issues.



5th Avenue W Interchange

- Over half of all reported crashes are an angle crash type, commonly due to failure to comply with the traffic signals.
- Crashes appear to be most common during busy periods; 56 percent occur Friday-Sunday and 70 percent occur between 12 PM and 6 PM.



Lake Avenue Interchange

- As seen at the 5th Avenue W interchange, a spike in crashes is detected during peak traffic periods; 47% of reported crashes occur between the 4 PM to 6 PM period.
- As expected at congested signalized intersections, rear end crashes are the most prevalent type with 42% of all reported crashes.



21st Avenue E Interchange

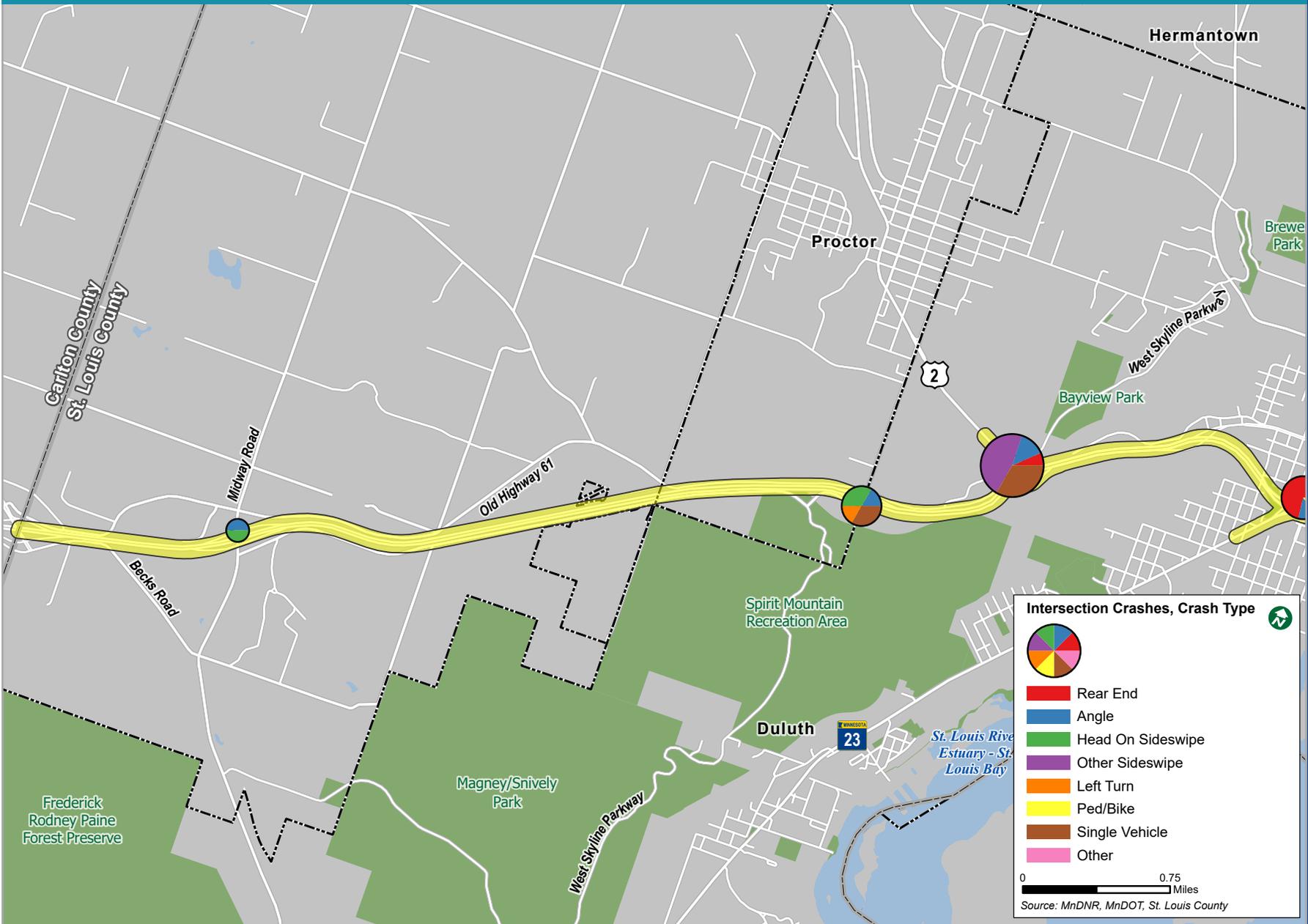
- The northbound ramp terminal is found to operate with a crash index greater than 1.0; crash history here indicates that the majority of crashes are of rear end crash type, all occurring on the I-35 off ramp approach, where delays and queuing is commonly experienced during the PM peak hour



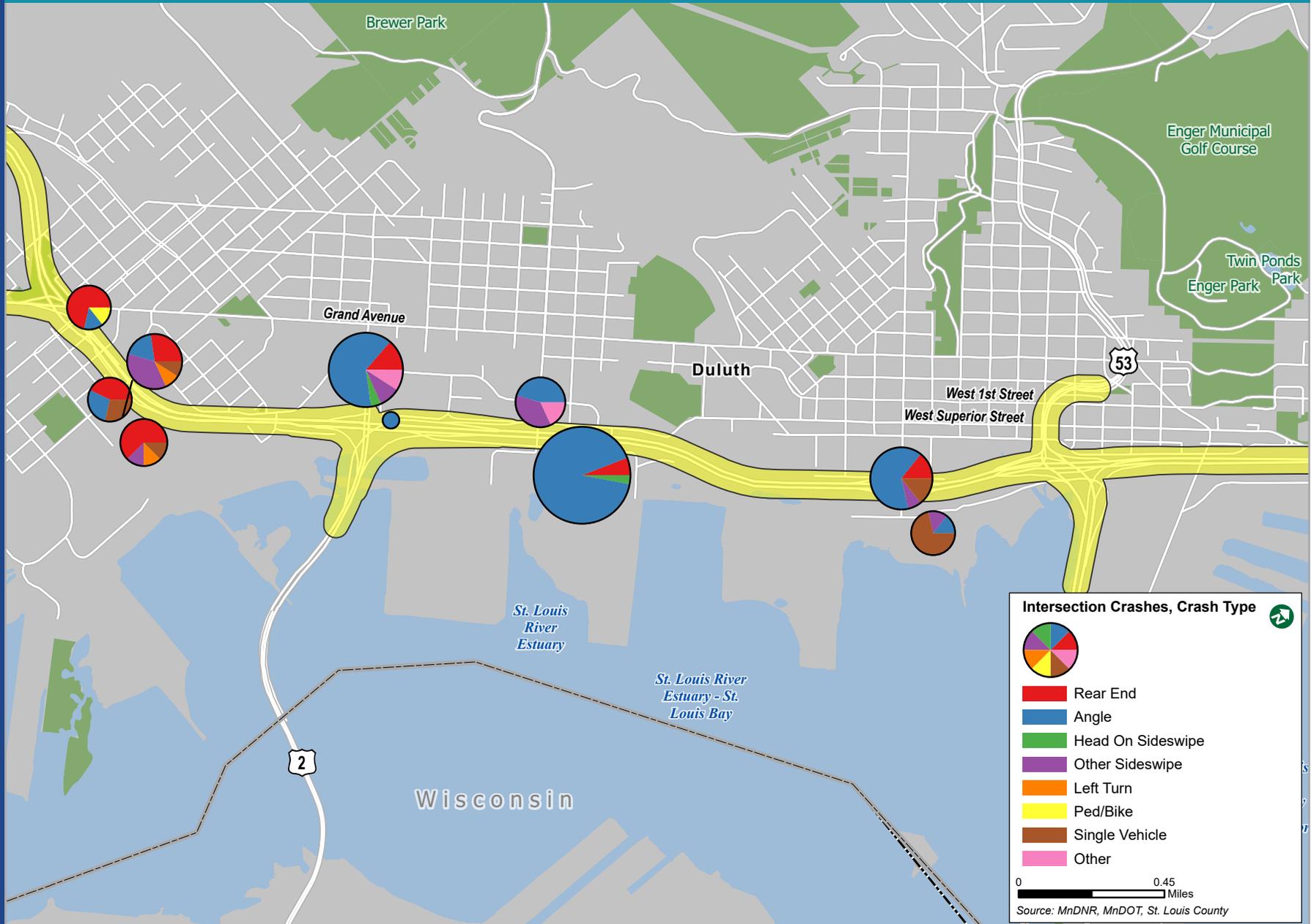
I-35 at TH 61/London Road/26th Avenue E

- 48 percent of all reported crashes occur during the 4 PM to 6 PM period
- 51 percent of crashes are of rear end crash type; 64 percent of rear ends occur in the westbound direction (TH 61)
- Sideswipe same direction crash types are also common; nearly all are attributed to the westbound dual left turn from TH 61 onto I-35

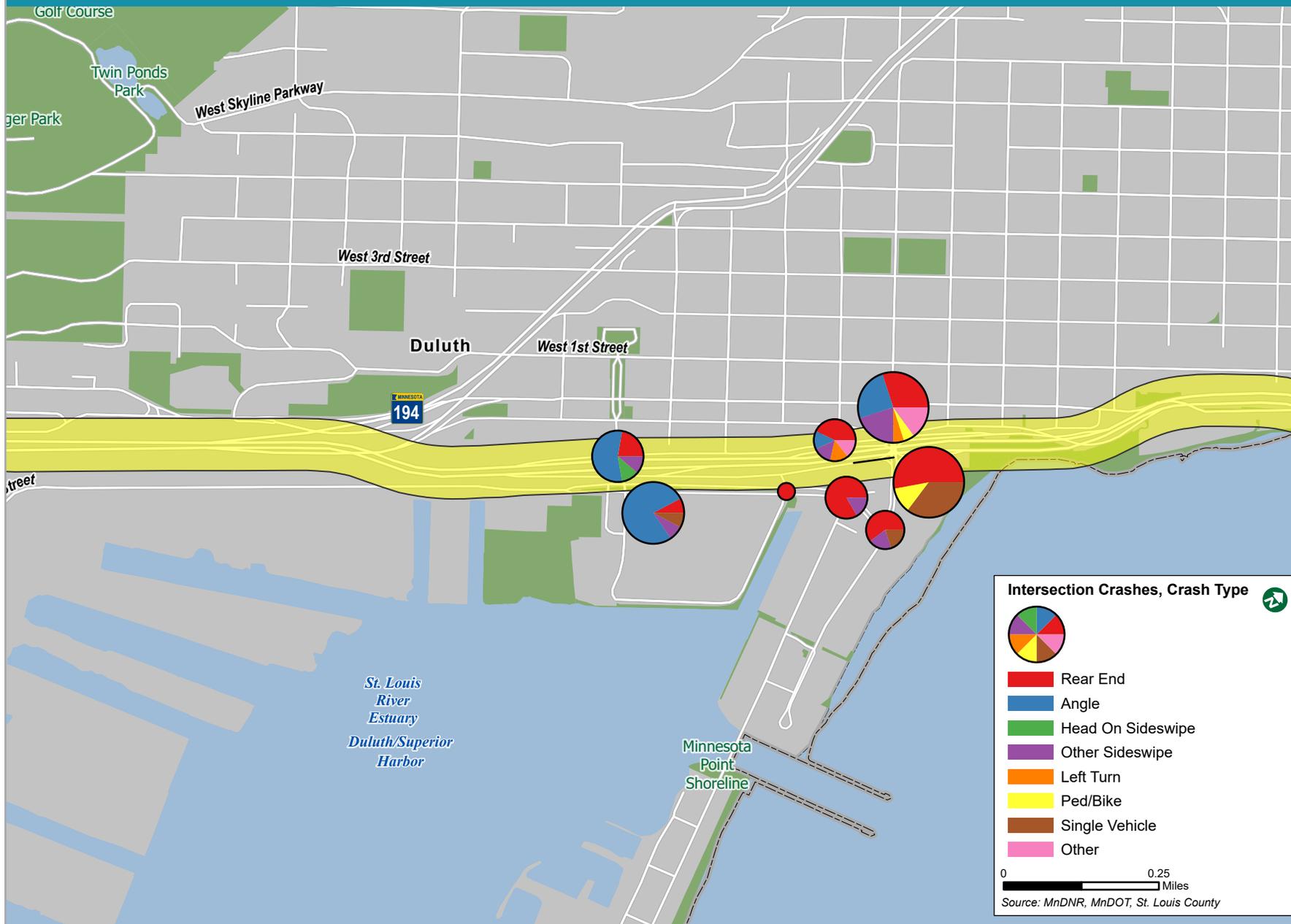
Rural Subarea - Hwy 61 to Cody St - Aug 2022



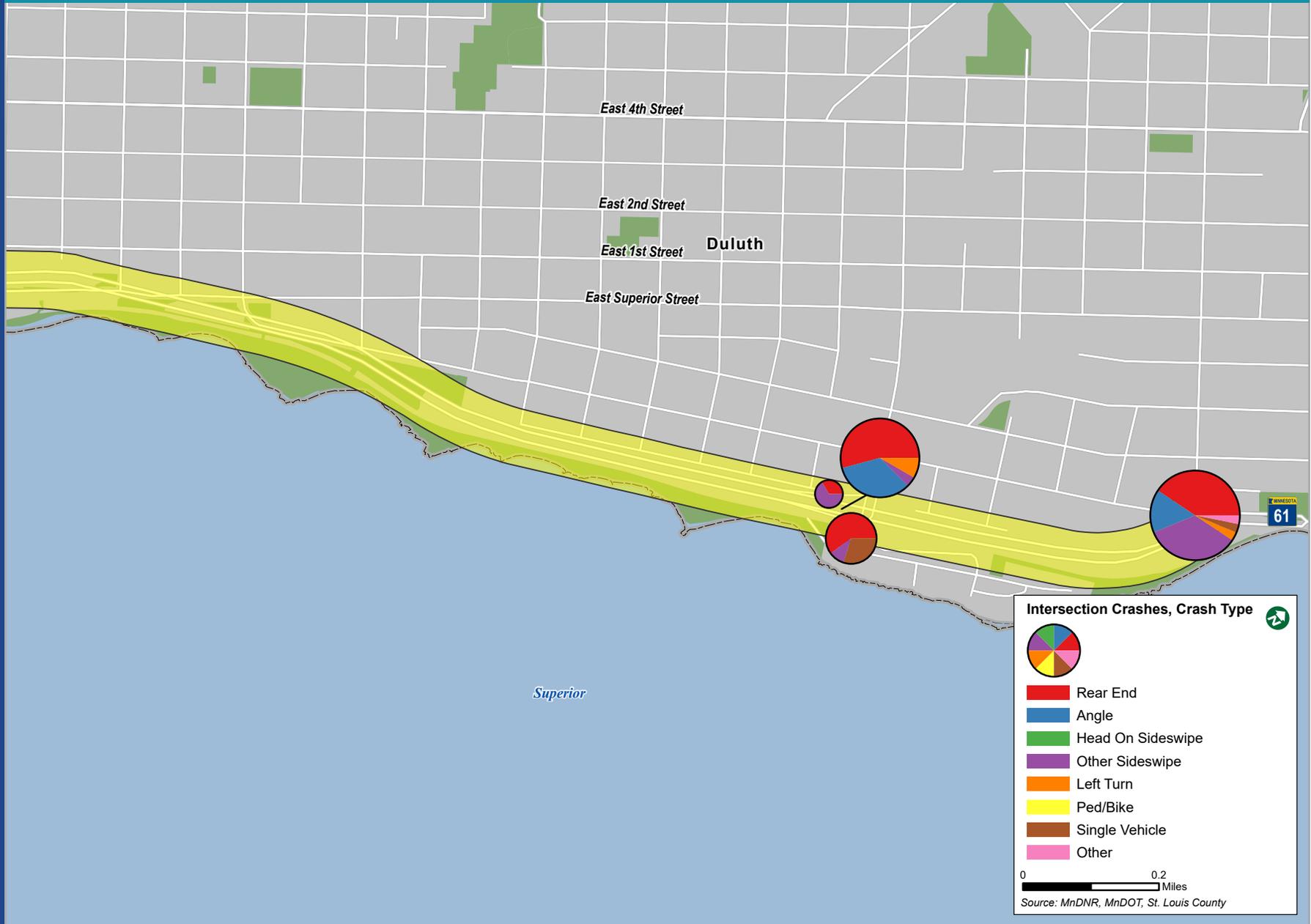
Urban Subarea - Cody St to Garfield Ave - Aug 2022

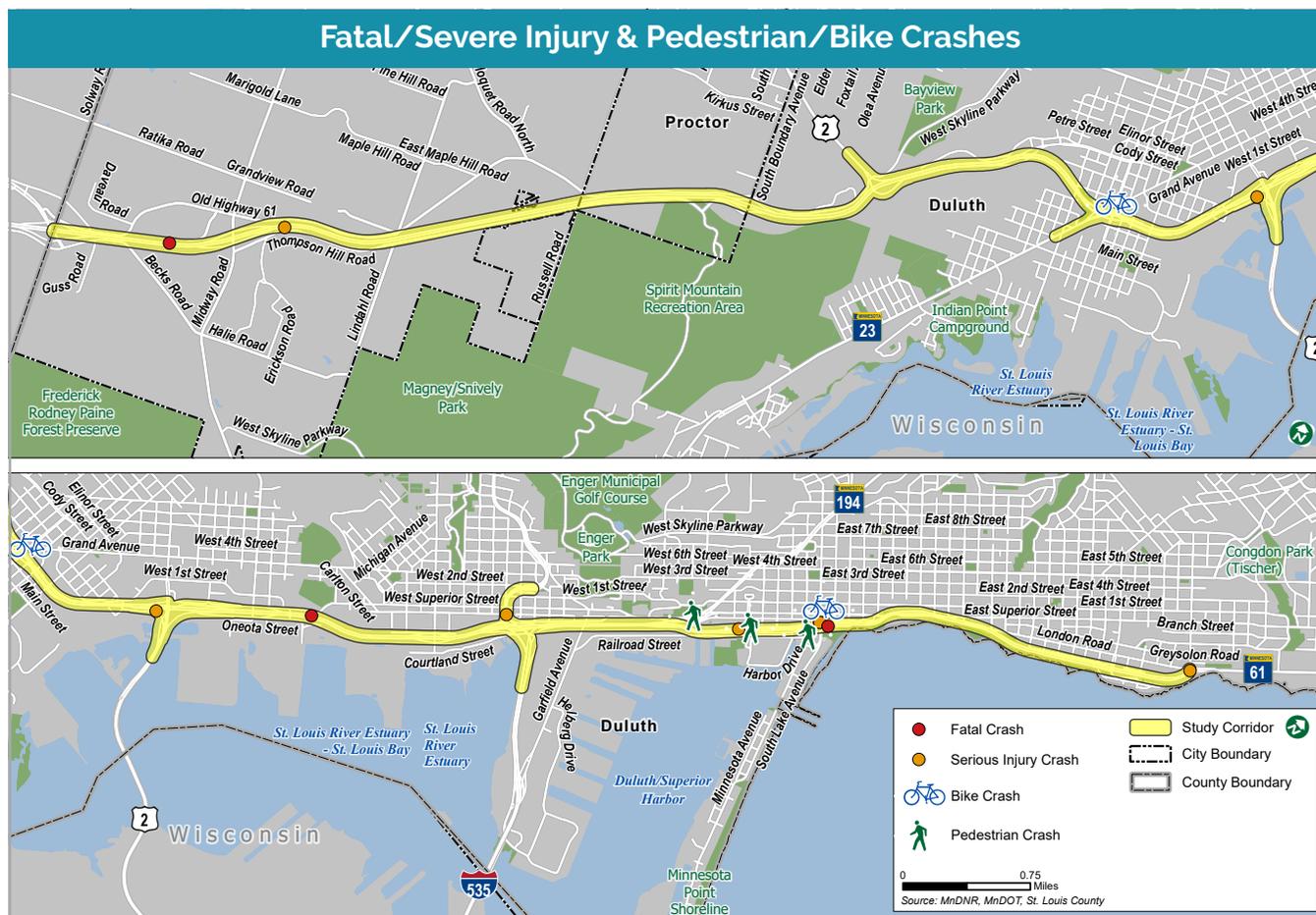


Downtown Subarea - Garfield Ave to N 6th Ave E - Aug 2022



Downtown Subarea - N 6th Ave E to London Rd - Aug 2022





FATAL AND SEVERE INJURY CRASHES

An analysis of 10-year data was performed at a large scale within the project area to better understand trends and locations of fatal and severe injury crashes, as well as pedestrian and bicycle related crashes. These crash types and severities are often rare and random in nature, making it difficult to reveal common trends and factors that can be acted upon.

General findings that better explain the reported crashes are as follows:

Fatal and Severe Injury Screening

- Four fatal and 18 severe injury crashes were reported within the project area in the last 10 years, all on mainline I-35
- Three of the four fatal crashes were run off road crashes, the fourth was a wrong way, head on collision involving an impaired driver
- Of the four reported fatal crashes, three were wrong way, head on collisions; all occurring near Wade Stadium and 40th Ave on I-35
- Half of all reported fatal/severe injury crashes occurred during nighttime hours
- Half of all reported fatal/severe injury crashes occurred between June-September, a converse finding to total crash trends where winter crashes are most common. This may be explained by the notion that higher vehicle speeds are more common in the summer when weather is favorable. Higher speeds often correlate with more severe crashes.
- 75 percent of all reported fatal/severe injury crashes involve a driver younger than 30 years old
- 75 percent of all reported fatal/severe injury crashes occurred under dry pavement conditions, and half involved a DWI

Pedestrian and Bike Crash Screening

- 12 crashes involving a pedestrian or bike occurred within the last 10 years resulting in 4 severe injuries
- Three of the four reported severe injury crashes occurred south of I-35 in the Canal Park area; two of the four were mid-block crossings, one was at a signalized intersection.
- Five crashes reported on Lake Ave and Railroad St in the Canal Park area
- Remainder of crashes are dispersed among the urban and downtown subareas with common trends including pedestrian/bike non-compliance with traffic control devices or a lack of a designated space for non-motorized travel.

APPENDIX

Key Prior Transportation Studies Related to I-35



CONNECTIONS 2040

DSMIC (2014)

Between 2003 and 2012, I-35 within the Duluth Superior Metropolitan Interstate Council (DSMIC) boundary experienced a 12 percent decrease in traffic. The document partly attributes this to the great recession, increased gas prices, and large construction projects, and expected this to reverse. Vehicle Miles Traveled (VMT) is projected to increase between 24 percent and 36 percent by 2040.

The 1992 extension of I-35 appears to have significantly improved air quality in downtown Duluth (page 4-21).

Rehabilitation work on the I-35 tunnels in downtown Duluth is a “for study” project and the Blatnik Bridge replacement (costing \$175M) with long-range time frames (2025-2040).



SUSTAINABLE CHOICES 2045

DSMIC (2019)

The guiding document for the MPO and its transportation facilities, planning towards a 2045 horizon.

Forecasts 3.4 percent growth of MIC area population by 2045; Duluth and Superior show slow growth while Hermantown and Proctor grow by over 10 percent.

Identifies the Thompson Hill section of I-35 as a larger, expensive infrastructure project that will have to be constructed in the near future.

Planning and design for the major work in the I-35 corridor has not been conducted. Costs are anticipated to be higher than what the MnDOT District 1 budget can afford, so funding will need to be sought from other sources as well, including other statewide sources.



I-35, I-535, HWY 53 TWIN PORTS INTERCHANGE

MnDOT

This MnDOT project will reconstruct the interchange between I-35, I-535 and Highway 53 in Duluth near St. Louis Bay. Key improvements this project intends to make include:

- Elimination of blind merges
- Relocation of all entrances and exits to the right side
- Lane continuity for through traffic
- Elimination of weaving issues
- Change to a conventional interchange design
- This project is scheduled to last from January 2021 to August 2024
- Estimated construction cost - \$435 million

Due to the ongoing reconfiguration of the interchange, this study will largely not consider this area for analysis or modification.

Key Prior Transportation Studies Related to I-35



DOWNTOWN DULUTH MODAL CONNECTIONS STUDY

DSMIC (2009)

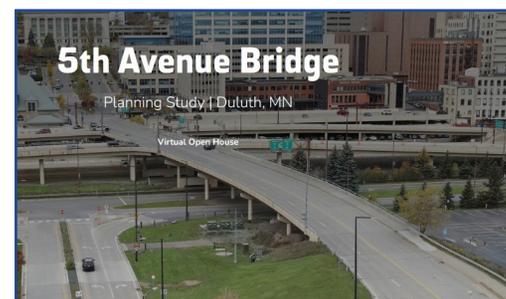
- The MIC-led study performed an assessment of existing land use conditions and transportation infrastructure in the areas included downtown Duluth, Canal Park, DECC, and Bayfront Park.
- Found that the existing infrastructure discourages non-motorized travel between downtown and the attractions on the opposite side of I-35. Skywalk facilities and transit services are inadequate or under-utilized by local and tourist traffic.
- The study ultimately made recommendations for filling multimodal gaps and increasing mobility between these key areas and included a strategy for implementation. The primary recommendation was constructing a “connectivity platform” over the interstate, connecting the downtown districts.



I-35/BAYFRONT AREA TRAFFIC MODELING AND SPECIAL EVENT TRAFFIC CONTROL PLAN

DSMIC (2019)

- The MIC led a study of event traffic and the effects on area parking, traffic, and wayfinding experiences centered around the downtown Duluth, Canal Park, DECC and Bayfront Park areas.
- The plan identifies improved signal timings, new DMS boards, static and dynamic event signage as recommended improvements impacting the I-35 corridor.



5TH AVE W BRIDGE PLANNING STUDY

- A MnDOT-led study of the existing infrastructure surrounding the 5th Ave W interchange connecting the downtown and Bayfront/DECC areas scheduled to conclude in 2022.
- The study considered several concepts that considered repurposing the existing bridge to feature dedicated pedestrian facilities, constructing a separate pedestrian bridge, or restricting the bridge to pedestrians only.
- Public feedback was highly supportive of adding pedestrian dedicated spaces and increasing mobility to area attractions. Concern was voiced about impacts to event traffic.

Key Prior Transportation Studies Related to I-35



PROCTOR TRANSPORTATION PLAN

- The plan identifies the replacement of the Boundary Ave interchange in 2035 as well as a study of the interchanges with I-35 that serve Proctor in the short-term, including a potential interchange added at Ugstad Rd.
- Multimodal connectivity across the I-35 corridor is also identified as a future need with the Munger Trail Spur under I-35 at Ugstad Rd and multimodal improvements along Boundary Ave between I-35 and US 2. Both projects are identified as long-term improvements.



DTA COMPREHENSIVE OPERATIONS ANALYSIS (BETTER BUS BLUEPRINT)

- The Duluth Transit Authority saw the need to reassess its services and infrastructure to provide better service to the region. A four-phase comprehensive planning effort lasting two years was conducted and provided recommended modifications and reconfigurations of existing bus routes, schedules for a more efficient, wider serving public transit system. Improved rider experience is provided via modernized bus stops and buses.
- Upon implementation, many trips will see significant travel time reductions with reconfigured routes adding 16,000 people to the service area.



DULUTH-SUPERIOR METROPOLITAN PEDESTRIAN PLAN (2021)

- The plan published by the MIC provides a 20-year vision with short- and long-term recommendations and strategies to improve the walking environment within the area. The plan is intended to serve as a guide to all stakeholders for prioritizing investments in the pedestrian system.
- Several high-priority pedestrian corridors crossing I-35 are identified by the plan, with few critical corridors which parallel I-35.

Key Prior Transportation Studies Related to I-35



DULUTH-SUPERIOR METROPOLITAN BIKEWAYS PLAN (2019)

- A complementary document to the MIC's Long Range Transportation Plan (LRTP), the bikeways plan serves as a guide to advancing the bicycling component of the LRTP. The plan provides design, program and prioritization guidance to area stakeholders. The bikeways plan is intended to serve as a guide to all stakeholders for prioritizing investments in the pedestrian system.
- The plan is a working, living, and adoptable document which is planned for updating every five years.
- Many crossings of I-35 are identified as in need of future bike facilities as nearly all existing crossings lack space dedicated to bicycles only.



MNDOT DISTRICT 1 FREIGHT PLAN (2019)

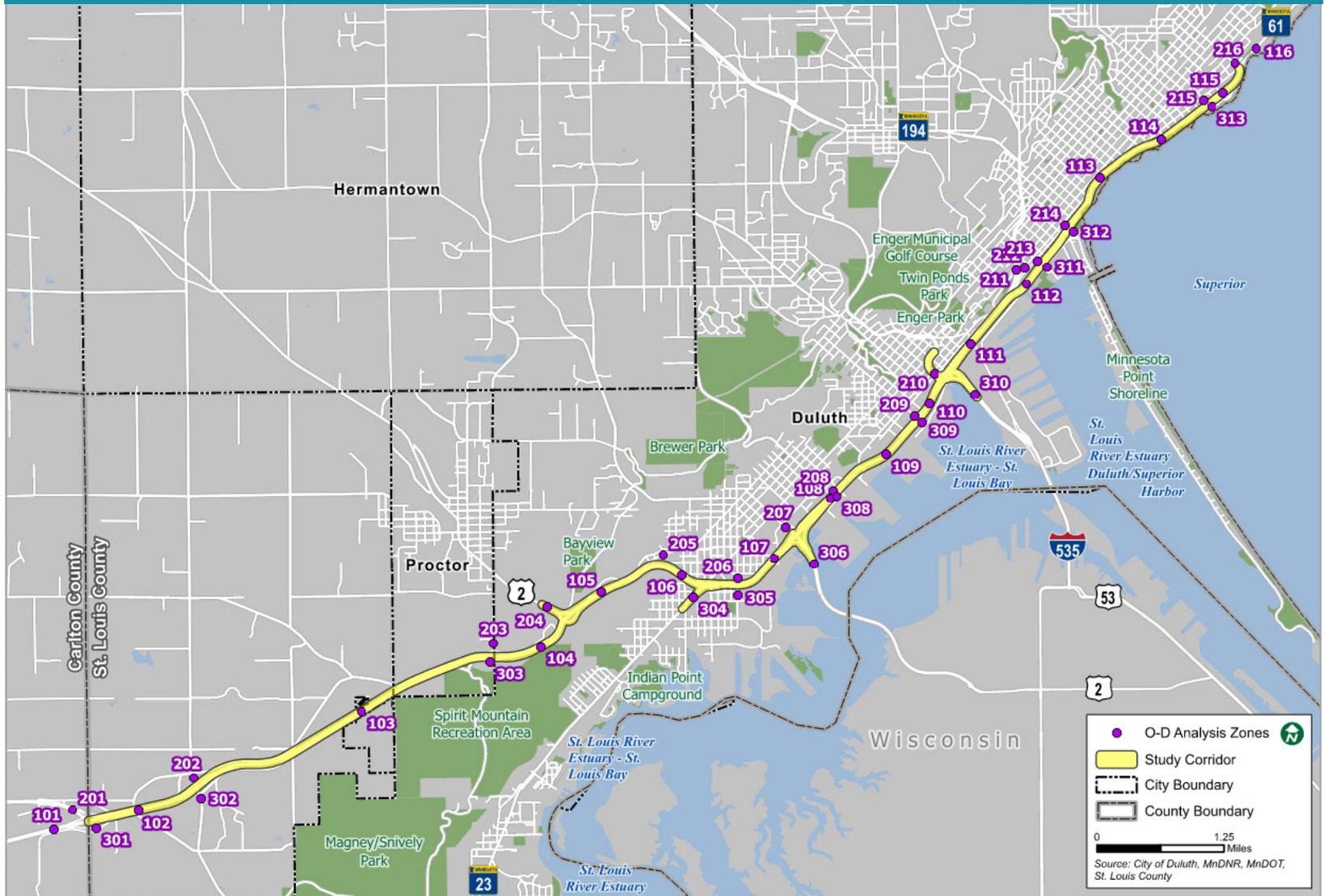
- The plan serves as an inventory of the existing freight network and the key freight producing facilities and guides a part towards supporting freight dependent industries by making sound investment in freight carrying infrastructure through a collaborative planning process.
- The plan acknowledges that I-35 is the only interstate within the district; therefore, US and state highways must carry a large number of truck traffic within the district.
- While no deficiencies are noted on I-35, the plan notes that due to weight restrictions on the Blatnik Bridge, the Bong Bridge is a crucial interstate truck link in the region. If the Bong Bridge was out, truck traffic would have to make a 170-mile detour to Superior from Duluth.



GRASSROOTS EFFORTS

Grassroots efforts opposing urban highway expansion and advocating for their removal are a growing presence across the nation. The Duluth Waterfront Collective is one such group that has been locally advocating for the removal of I-35 through the downtown Duluth area, and replacing it with a six-lane urban parkway. The reduction in the highway's footprint would create space for additional development and boosting the city's tax base, the group claims. The group has made strides in gaining public support as well as the support of various local decision makers. Other groups have advocated for the construction of a 'lid' over the interstate, covering the highway and creating green space for non-motorized travel and public parks.

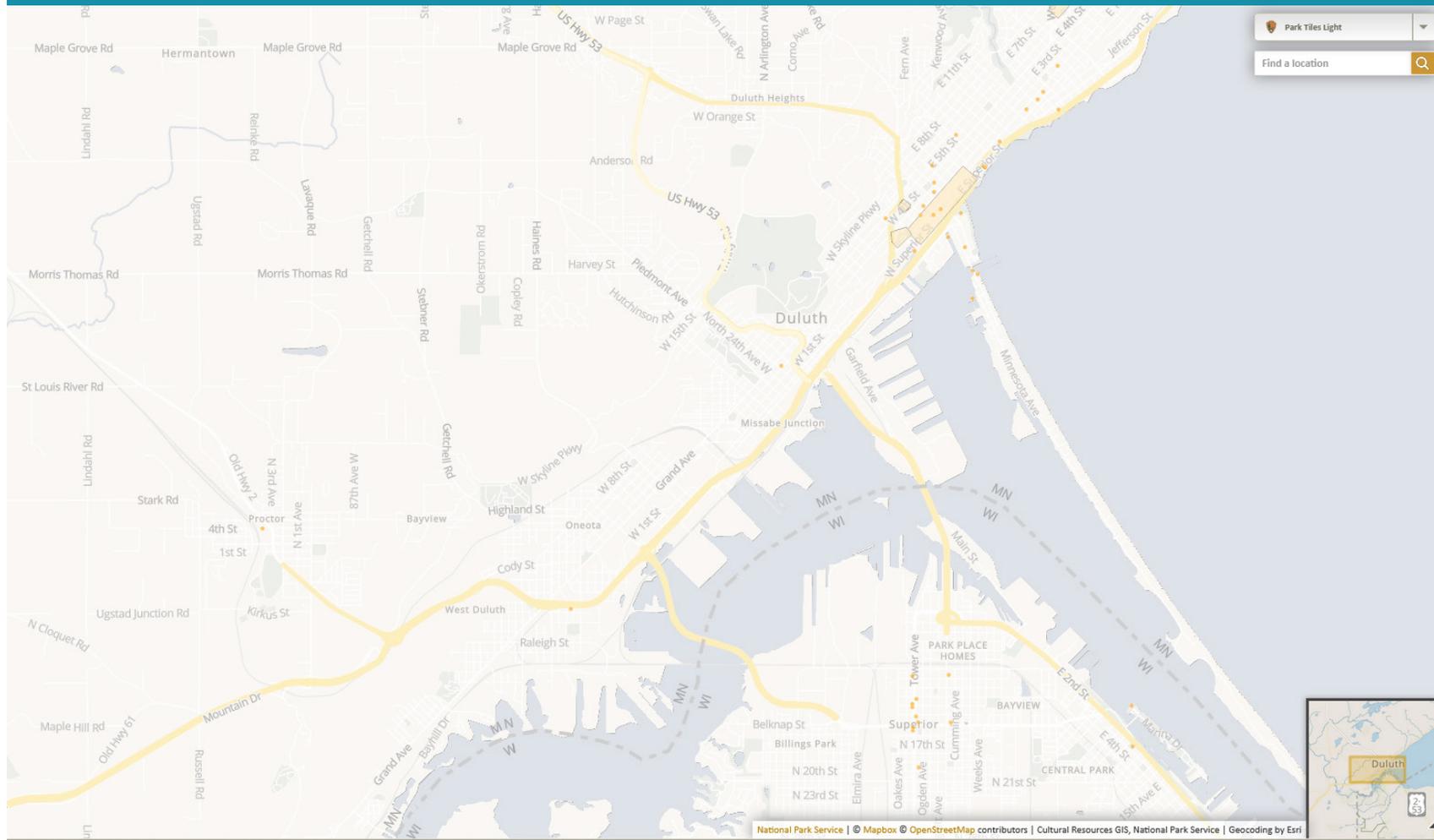
O-D Analysis Zones



O-D Analysis Zones

107	8777	9595	10579	11190	14651	14224	-	13486	14111	12941	1716	7090	4635	4700	2404	2134	732	428	196	3091	203	1531	151	152	1224	910	3559	508	437	929	2305	241	108	194	915	2981	618	261	887	118	1129	1191	698	27	
108	6483	7035	7700	8193	10091	9788	13465	-	15656	14210	1983	7707	5074	5143	2604	2307	506	272	135	1632	141	1258	133	112	1312	1038	3946	529	464	995	2555	266	63	126	708	2228	422	153	53	142	1181	1255	738	29	
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112	3901	4194	4572	4906	6002	5830	7663	7623	9970	11688	17571	-	9532	9669	4846	4224	260	155	77	952	90	736	721	2435	1694	1608	262	163	614	1694	4937	576	37	67	449	1178	223	1056	110	49	3850	2048	1116	56	
113	2380	2545	2751	2931	3514	3426	4468	4457	5927	6960	10538	9855	-	13927	7313	6251	144	74	41	512	50	424	460	1510	1039	947	204	369	568	935	6825	901	18	37	248	659	139	689	78	35	2366	310	2741	94	
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Area Historic Properties - National Register of Historic Places

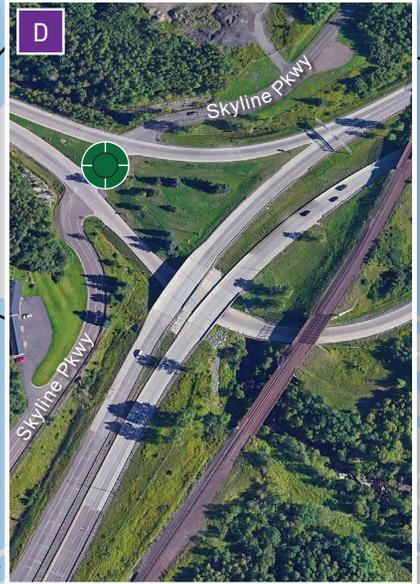
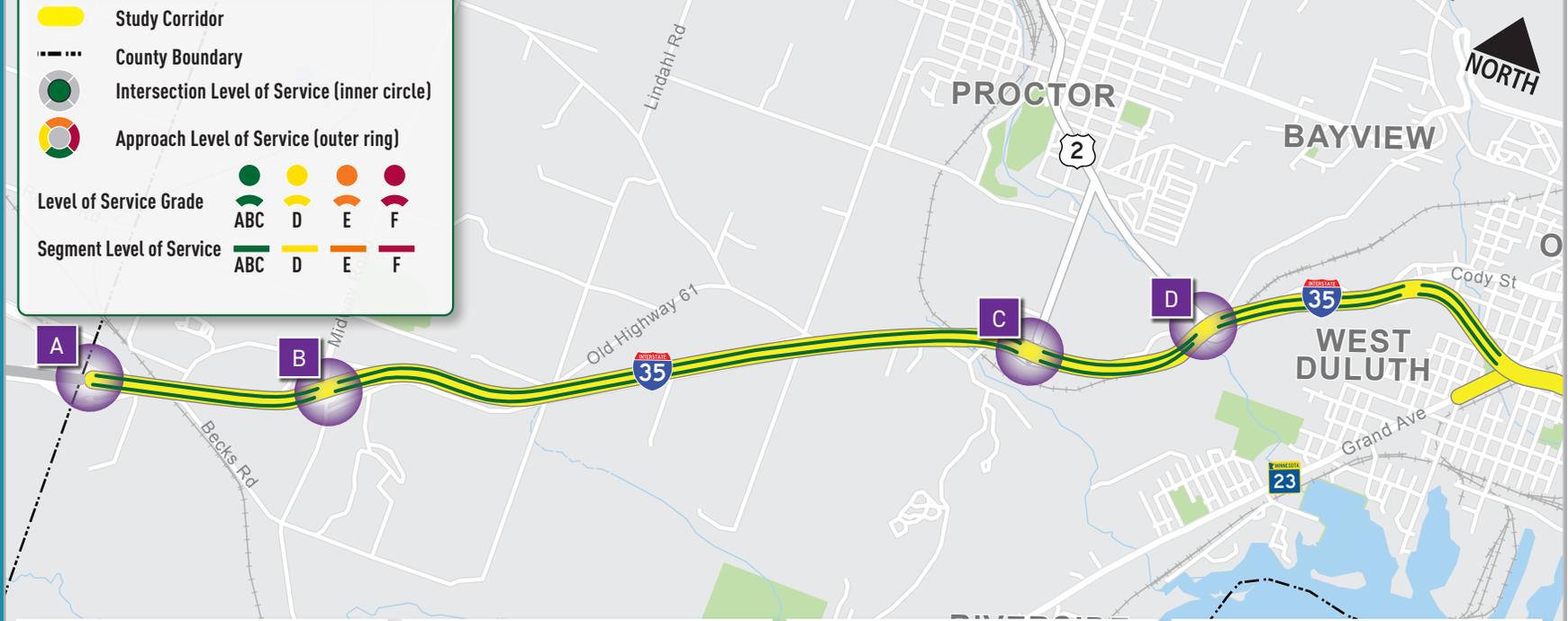


Legend

- Study Corridor
- County Boundary
- Intersection Level of Service (inner circle)
- Approach Level of Service (outer ring)

Level of Service Grade				
ABC				
D				
E				
F				

Segment Level of Service				
ABC				
D				
E				
F				





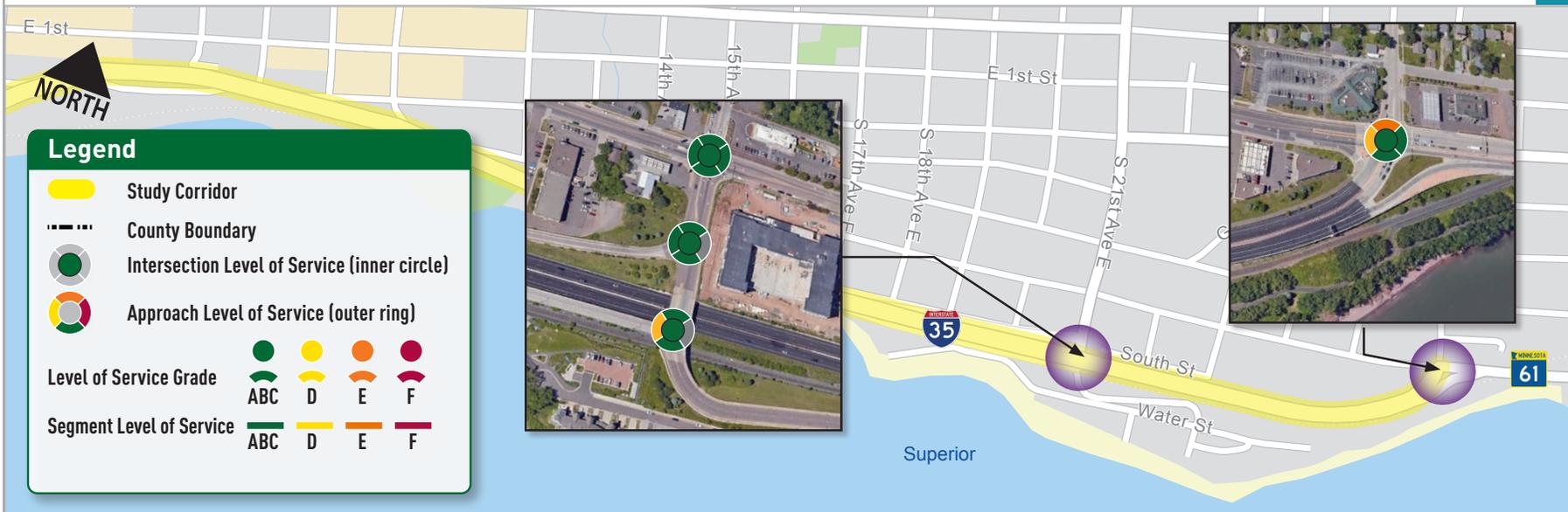
Existing Peak Operations PM - Segments

Urban Subarea - Garfield Avenue to London Road

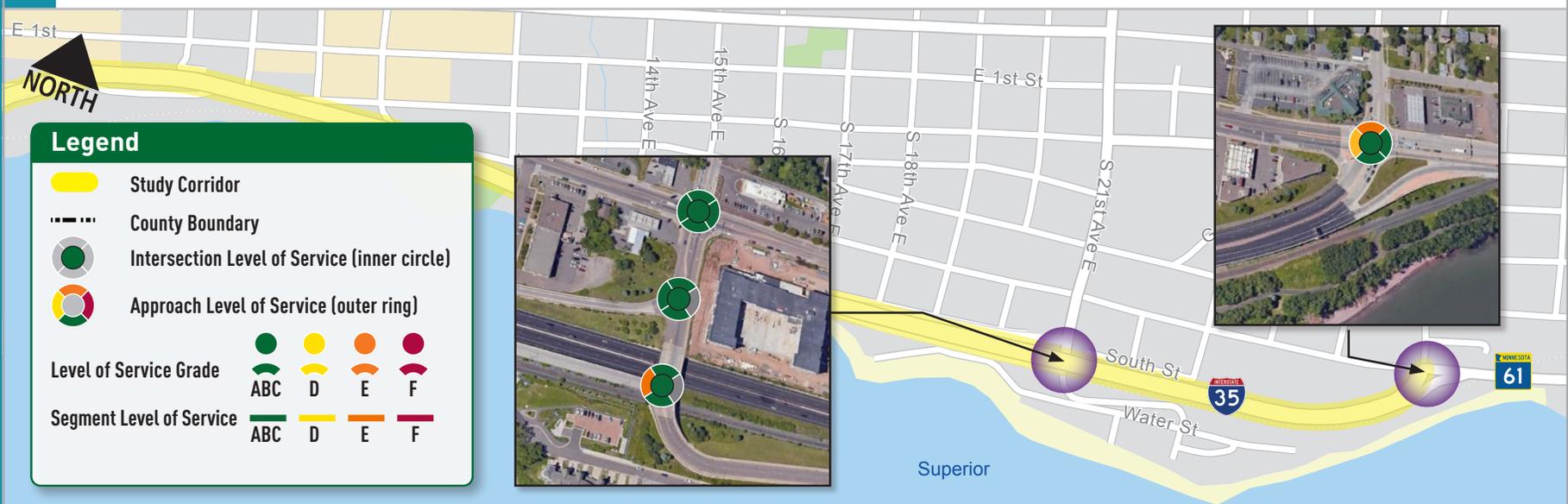
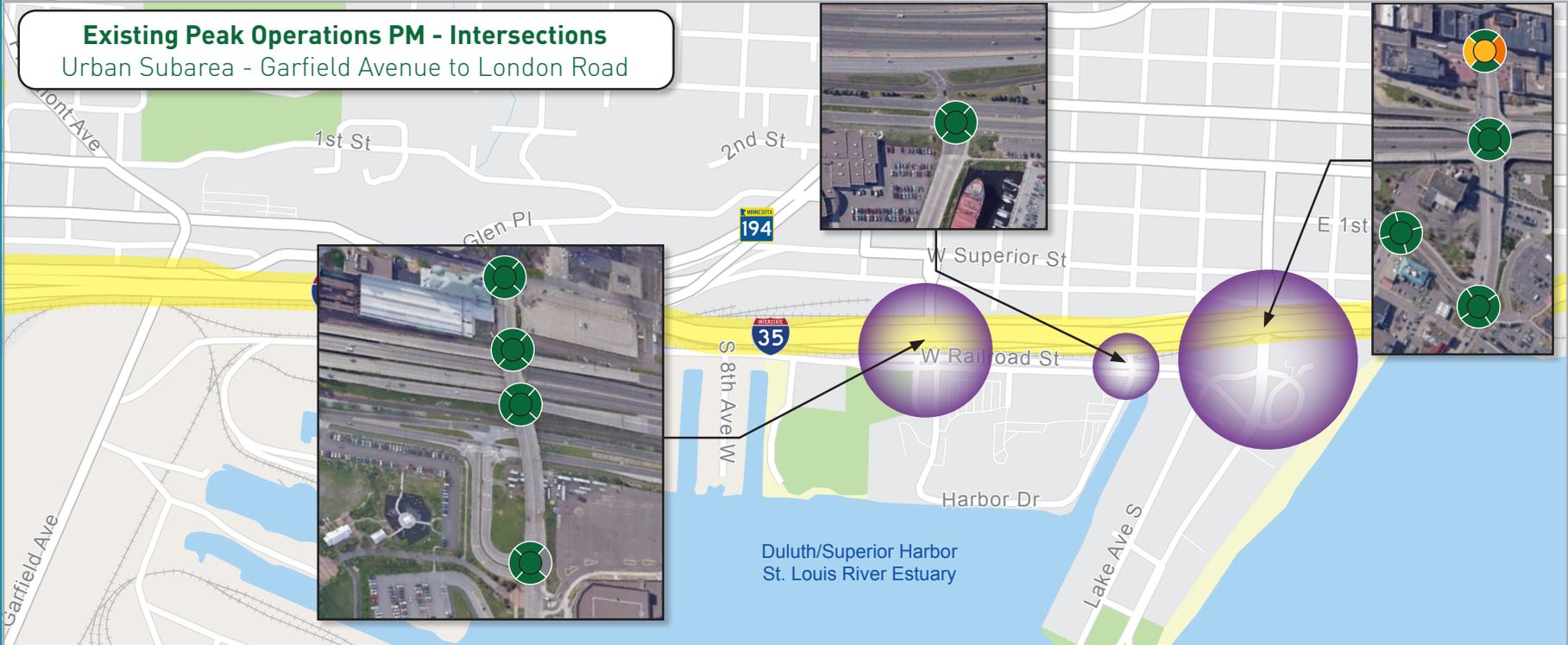
Legend

- Study Corridor
- County Boundary
- Segment Level of Service: ABC, D, E, F





Existing Peak Operations PM - Intersections
 Urban Subarea - Garfield Avenue to London Road



Legend

- Study Corridor
- County Boundary
- Intersection Level of Service (inner circle)
- Approach Level of Service (outer ring)

Level of Service Grade				
	ABC	D	E	F
Segment Level of Service				
	ABC	D	E	F

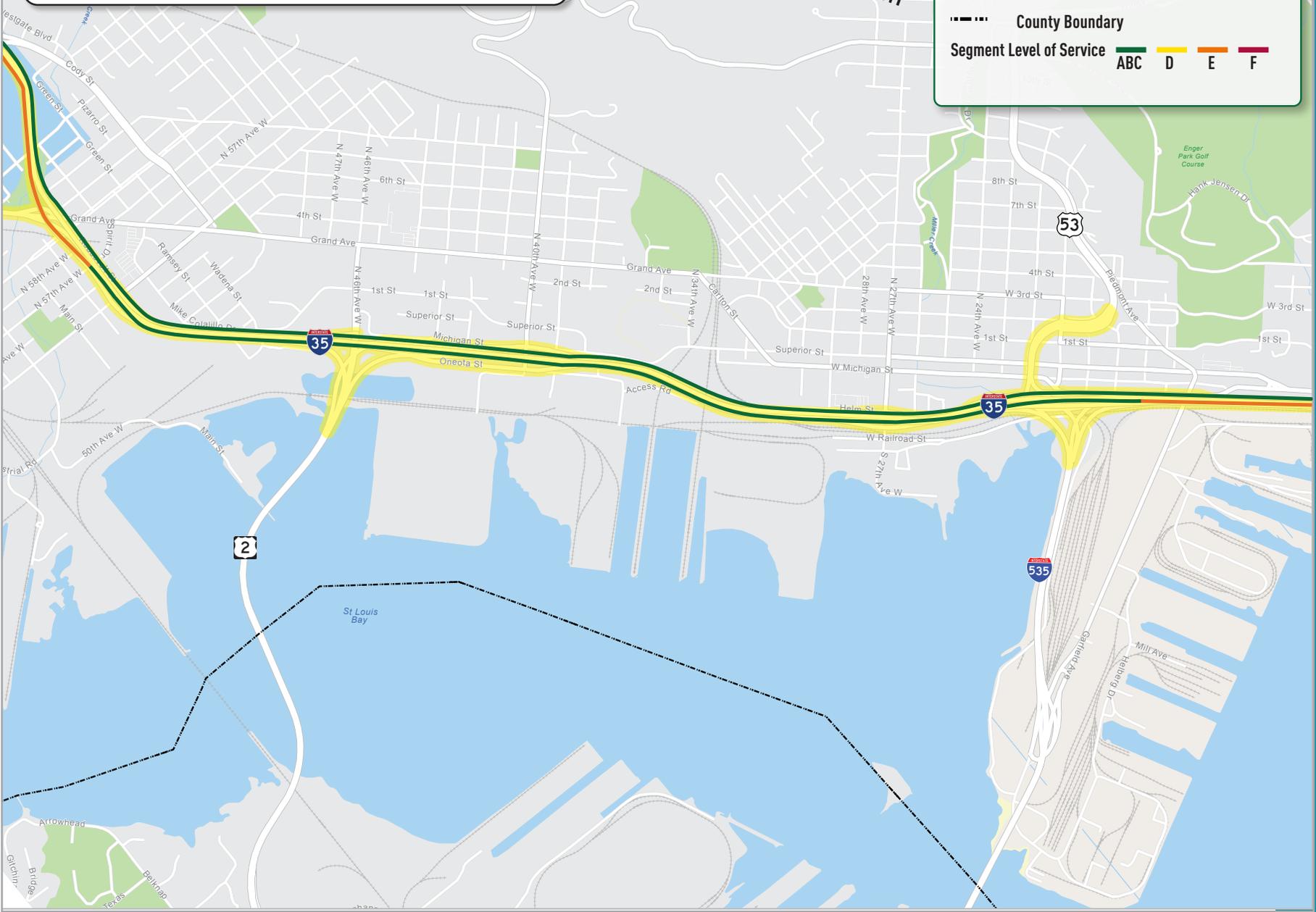
Existing Peak Operations AM - Segments
 Suburban Subarea - Cody Street to Garfield Avenue

Legend

-  Study Corridor
-  County Boundary

Segment Level of Service

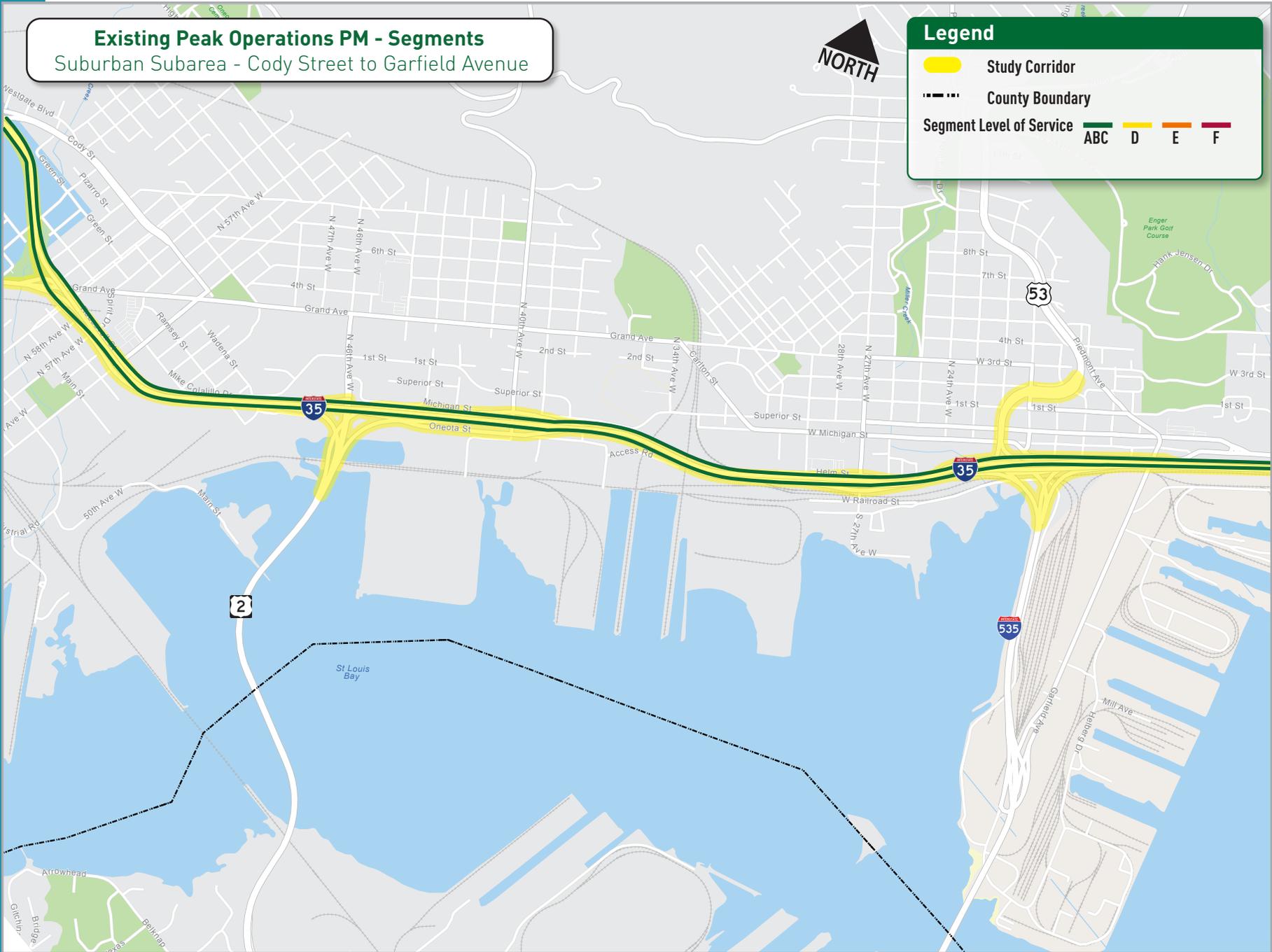
			
ABC	D	E	F



Existing Peak Operations PM - Segments Suburban Subarea - Cody Street to Garfield Avenue

Legend

-  Study Corridor
-  County Boundary
- Segment Level of Service**
 ABC  D  E  F



Existing Peak Operations AM - Intersections
 Suburban Subarea - Cody Street to Garfield Avenue



Legend

- Study Corridor
- County Boundary
- Intersection Level of Service (inner circle)
- Approach Level of Service (outer ring)

Level of Service Grade				
	ABC	D	E	F
Segment Level of Service				
	ABC	D	E	F



Existing Peak Operations PM - Intersections
 Suburban Subarea - Cody Street to Garfield Avenue



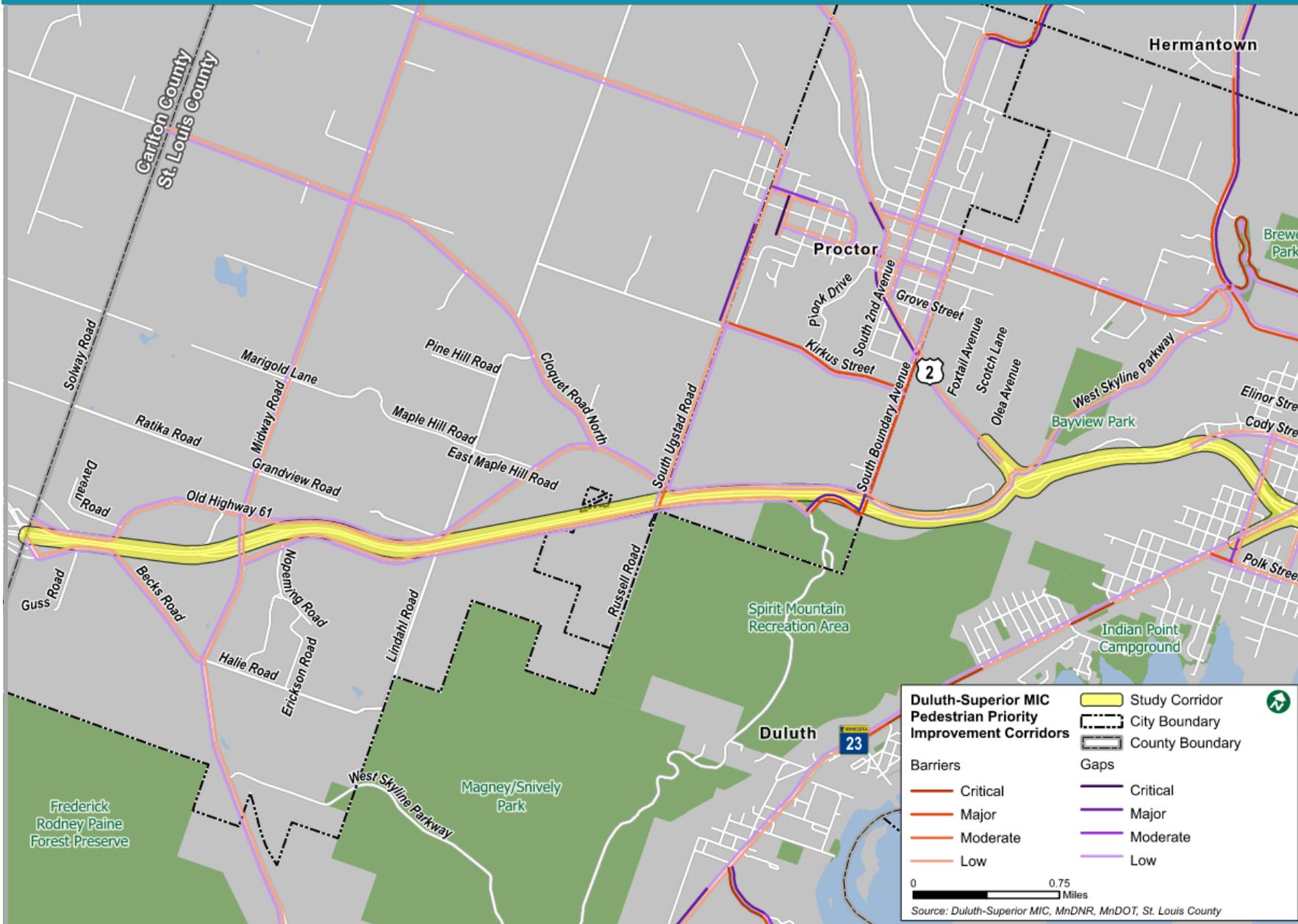
Legend

- Study Corridor
- County Boundary
- Intersection Level of Service (inner circle)
- Approach Level of Service (outer ring)

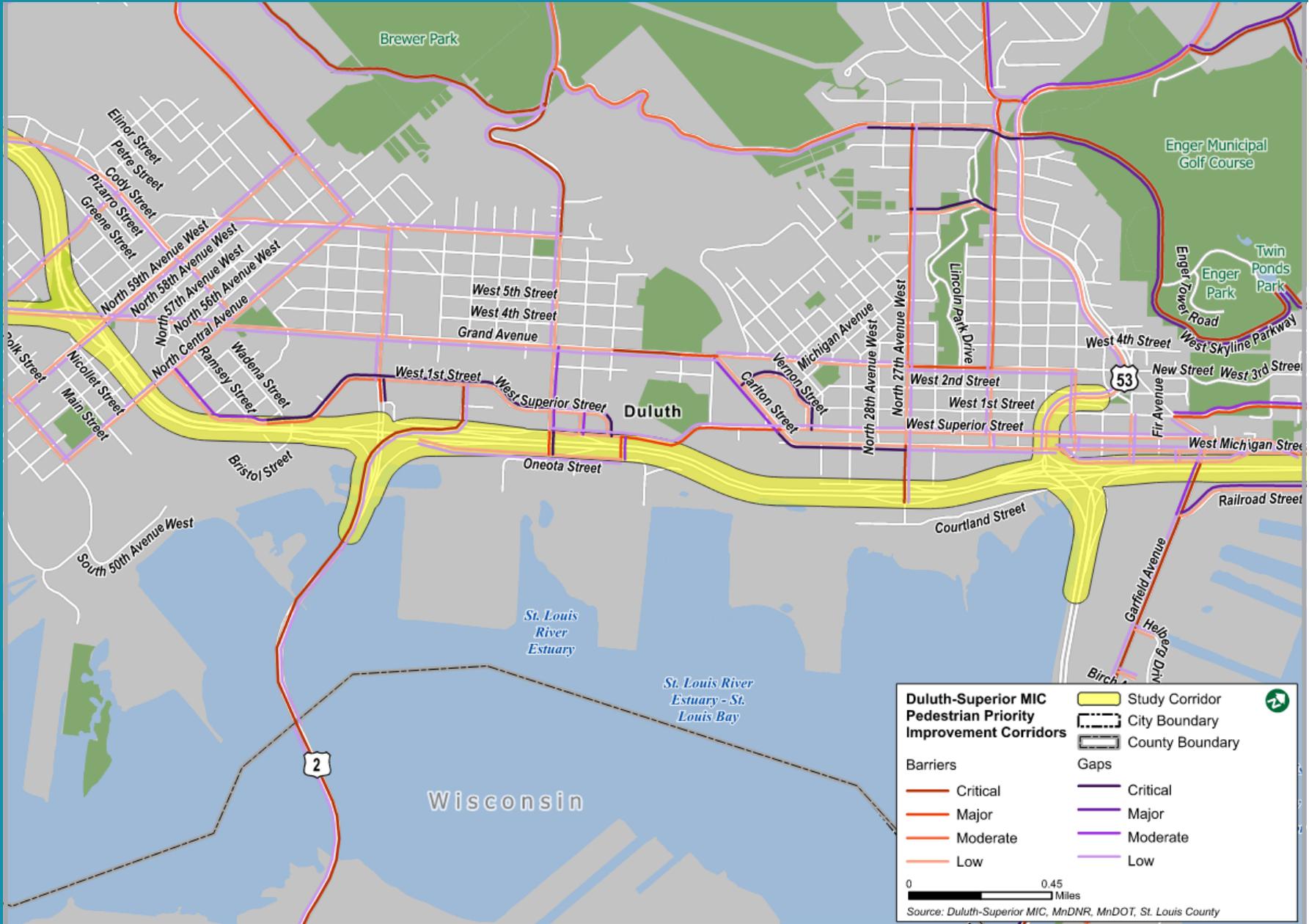
Level of Service Grade				
Segment Level of Service				



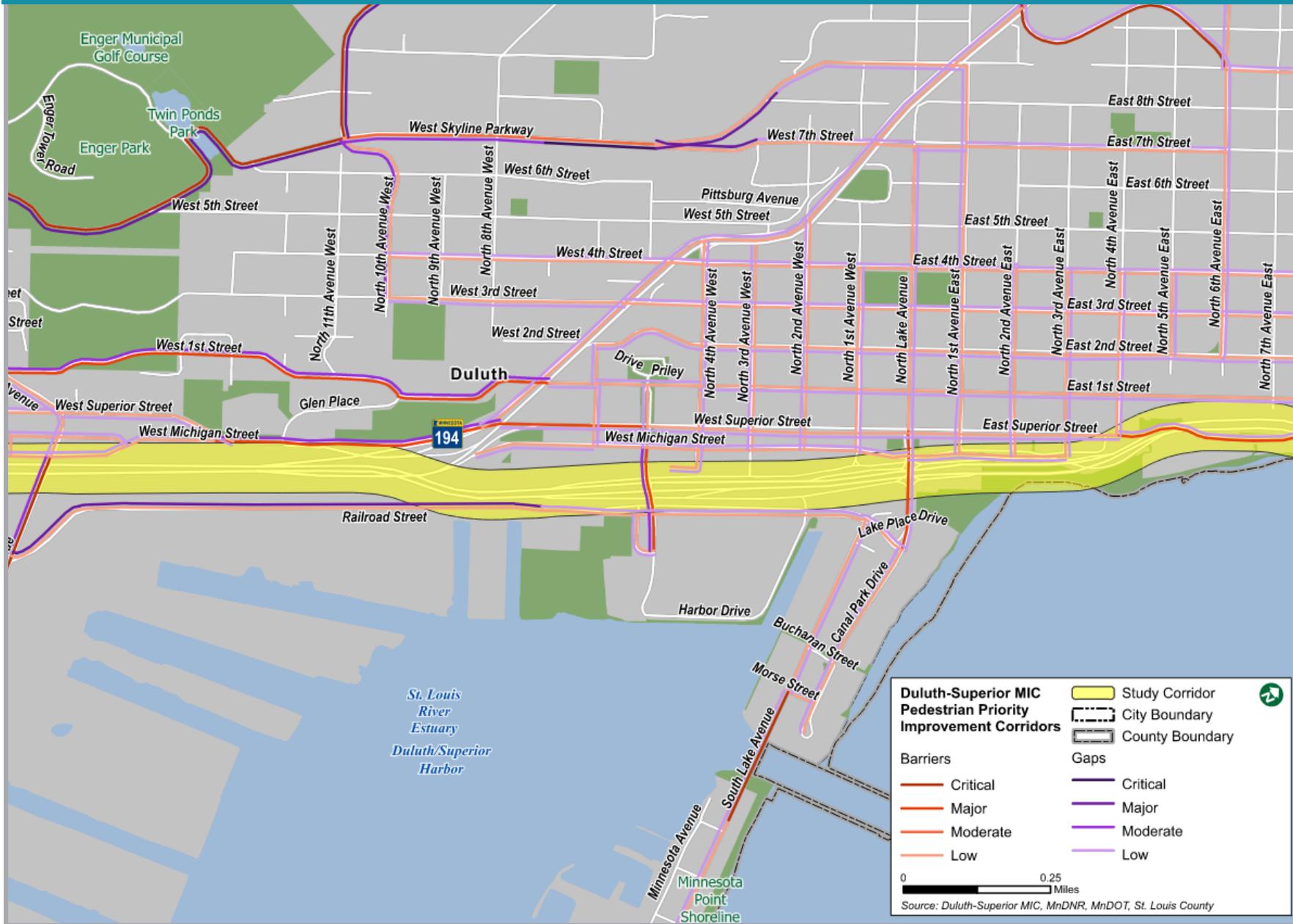
Rural Subarea - Hwy 61 to Cody St - Aug 2022



Urban Subarea - Cody St to Garfield Ave - Aug 2022



Downtown Subarea - Garfield Ave to N 6th Ave E - Aug 2022



Downtown Subarea - N 6th Ave E to London Rd - Aug 2022

