# 3. Land Uses, Demographics, & Growth Scenarios

The types, locations, and densities of different land uses - as well as their proximity to different demographics - all have an influence on transportation. This chapter takes stock of those factors within the Lincoln Park neighborhood and It briefly considers how changes in those factors could move transportation issues in a positive or negative direction.

With the use of three different growth scenarios, the chapter explores what those changes might mean in terms of the objectives that were identified in Chapter 1. This chapter also provides the background information used to assess the individual modes of transportation in subsequent chapters.

Image source: MIC (2011)

**Figure 3.1 |**

**View of Lincoln Park from Skyline Parkway**

Lincoln Park is home to a wide variety of land uses, with much of the industrial uses concentrated at the southern end of the neighborhood, along the interstate.

## Existing Land Use Patterns

The neighborhood is, broadly speaking, several blocks of residential development along the Duluth hillside, with commercial and industrial uses concentrated along the interstate and the waterfront. Above W 3rd Street, there is a mix of mostly single-family homes, recreational lands (such as the iconic Lincoln Park), institutional uses (eg. Lincoln Park Middle School), and undeveloped lands. Below W 3rd Street is a mix of multi-family residences, commercial uses, and industrial uses, with light industry (e.g. warehousing, manufacturing, etc.) north of I-35, and heavy industry (eg. ore docks and waste treatment plant south of I-35.

### *Types and densities of land uses:*

Using the land use classification scheme shown in Table 3.1, the

**Table 3.1 | Land-use types in Lincoln Park[1]**

| Land Use Category | Acres | % |
|---|---|---|
| Single Family Residential | 207.8 | 20% |
| Multi-family Residential | 65.5 | 6% |
| Mixed-use Commercial | 4.5 | 0% |
| Commercial | 53.8 | 5% |
| Public/Semi-public | 122.9 | 12% |
| Light Industrial | 48.6 | 5% |
| Industrial | 211.7 | 20% |
| Transitional | 3.8 | 0% |
| Recreational | 83.0 | 8% |
| Undeveloped | 255.4 | 24% |
| *TOTAL* | *1,057.0* | *100%* |

*Data source:* MIC estimates

1. Does not include estimate of land occupied by public roadways.

lands in the Lincoln Park neighborhood (as defined by the study boundary and excluding the areas occupied by roadways) is roughly 26% residential, 25% industrial, and 24% "undeveloped"- which is represented by unoccupied, vegetated lands that often impede the ability to build on them because of aspects of topography, geology, and hydrology. The remaining 25% is a mix of public/semi-public (schools, churches, post offices, etc.) (12%), recreational (8%), and commercial uses (5%).

Each land-use type and density has different rates of trip-generation. In order to better study the effects of the different land uses and densities within Lincoln Park, the study area was divided into eleven sub-areas. The boundaries of those sub-areas were based on major roadways, or physical or natural features that could be considered as potential impediments or delay to movement of motorized or non-motorized trips across them. The sub-areas, as well as the various land uses found within them, are displayed in Map 3.1 shown on page 16.

Table 3.2 shows the densities of buildings, residents, and employees found within each of the sub-areas. Concentrations of residents or employees create patterns of higher travel demand, and it can be seen by these numbers that sub-areas 4, 5, and 8 are the densest residential areas in the neighborhood, whereas sub-area 9 represents a dense employment area with some residential, like apartments above shops at street-level (Figure 3.2).

The impacts that the various mixes of land uses and densities might have on travel demand throughout the neighborhood is explored later in this chapter. Before doing so, however, it is also important to consider the potential ramifications that zoning regulations may have on these patterns over time.

**Table 3.2 | Density ratios for the study sub-areas**

| Sub-area | Acres | Percent acres occupied by building footprints | Residents/ acre | Employees /acre |
|---|---|---|---|---|
| Sub-area 1 | 431.7 | 2.8% | 2.9 | 0.2 |
| Sub-area 2 | 269.2 | 2.8% | 3.0 | 0.3 |
| Sub-area 3 | 112.4 | 6.9% | 6.1 | 0.4 |
| Sub-area 4 | 120.1 | 12.4% | 11.3 | 0.2 |
| Sub-area 5 | 86.8 | 13.3% | 14.1 | 0.1 |
| Sub-area 6 | 112.3 | 8.5% | 2.0 | 1.7 |
| Sub-area 7 | 77.2 | 13.8% | 8.1 | 5.9 |
| Sub-area 8 | 75.4 | 17.1% | 14.0 | 4.0 |
| Sub-area 9 | 66.5 | 17.7% | 4.6 | 14.4 |
| Sub-area 10 | 116.1 | 17.7% | 0.0 | 7.5 |
| Sub-area 11 | 376.2 | 4.4% | 0.0 | 0.1 |

*Data source:* US Census Bureau 2010 SF 100%; US Census Bureau LEHD; MIC estimates.

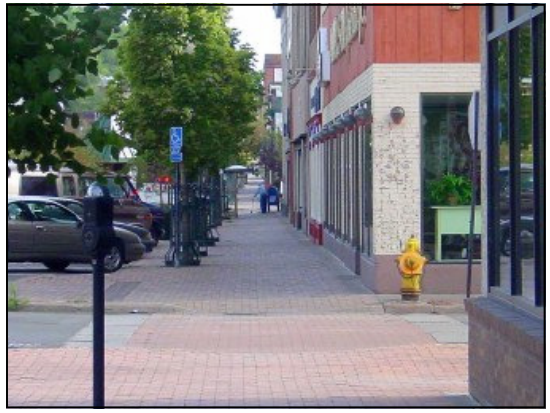
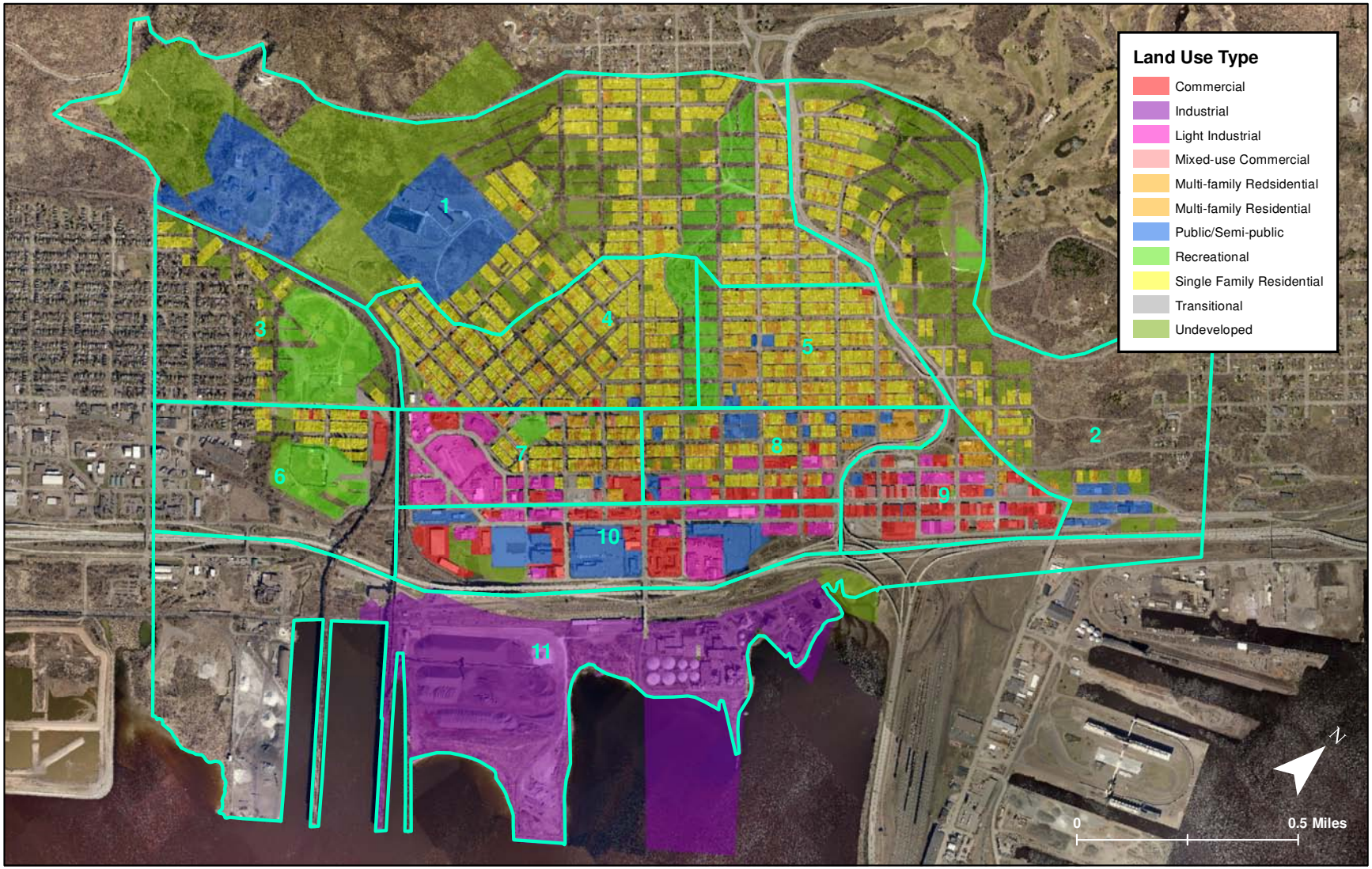


Image source: MIC (2011)

**Figure 3.2 |**

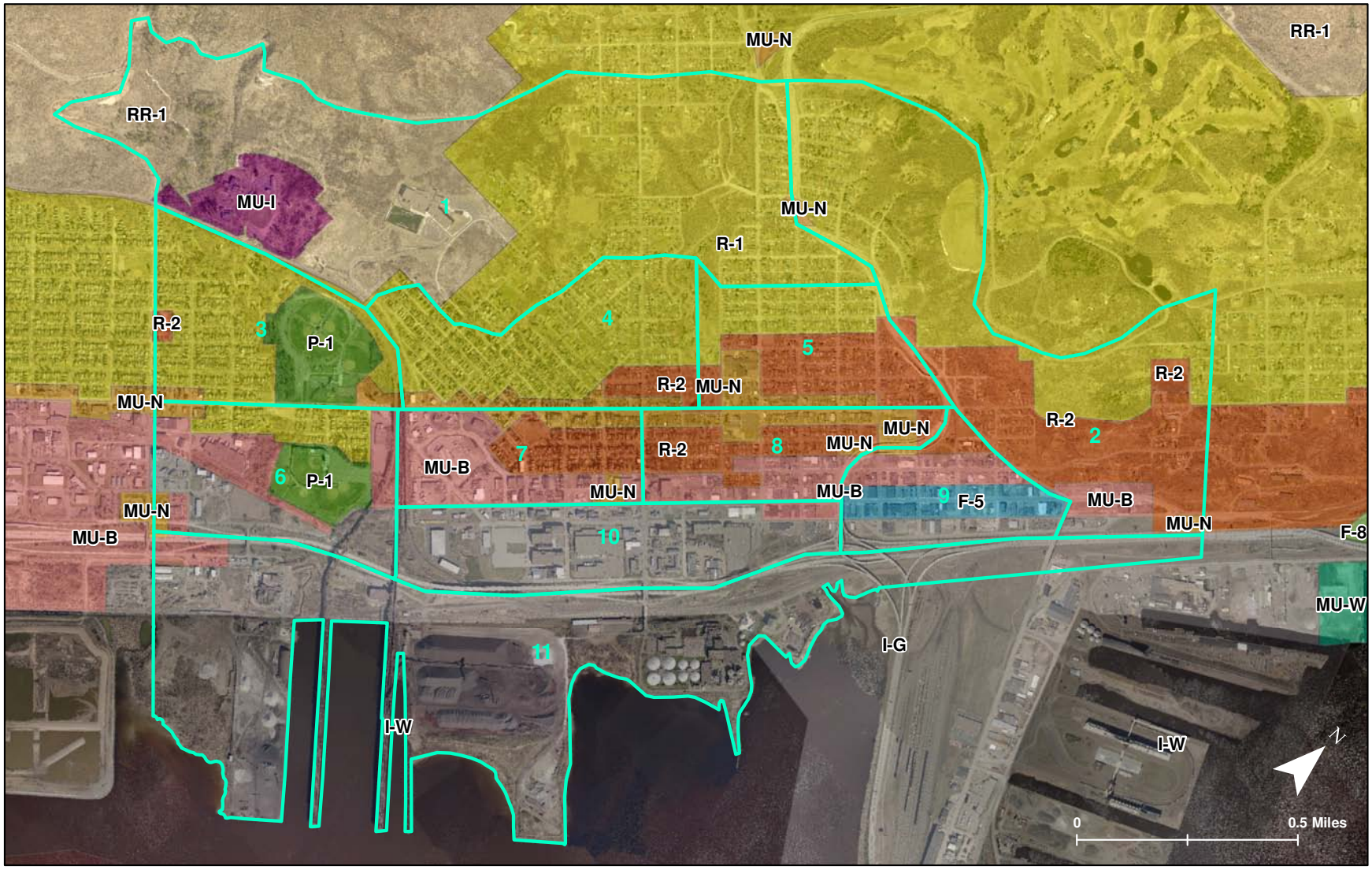
**Higher density, mixed-use urban form in sub-area 9**

The kinds of urban density found in sub-area 9 produces greater travel demand, but also creates a situation where some of that travel demand can be satisfied by walking, biking, or public transit.




**Map 3.1 | Land Uses within the Lincoln Park Study Area and Sub-areas**

The boundaries of the study's eleven sub-areas were laid over the available land use data to help define the different contexts in each of the sub-areas.




**M a p 3.2 | Land use zoning districts within the Lincoln Park Study Area and Sub-areas**

The study's sub-area boundaries were also referenced against the current zoning districts in the neighborhood in order to compare the existing zoning regulations to the actual land uses on the ground. Descriptions for each of the zoning districts shown in the map above can be found in Table 3.3 on page 18.

**Table 3.3 | Zoning Districts within the Lincoln Park study area**

| Zoning District | Characteristics | Min Lot Size* |
|---|---|---|
| Rural Residential (RR-1) | Large lot, single-family, detached residential uses; 5-acre minimum per dwelling. | 5 Acres |
| Residential-Traditional (R-1) | Single-family, detached residences, duplexes and townhomes on moderately sized lots; minimum lot size less than an acre. | 0.05 Acres* |
| Residential-Urban (R-2) | Allows for multi-family apartments and townhouses in an urban setting; minimum lot size less than an acre. | 0.05 Acres* |
| Mixed-Use Neighborhood (MU-N) | Accommodates a mix of residential and non-residential uses that serve the neighborhood in close proximity. | 0.05 Acres* |
| Mixed-Use Business (MU-B) | Intended to accommodate light industrial and technology-based operations. | NA |
| Mixed-Use Industrial (MU-I) | Established to accommodate the kinds of development needs and impacts that are unique to large institutional developments, while also protecting surrounding neighborhoods from adverse impacts of those developments. | NA |
| Form Based District 5 (F-5) Mid-Rise Community Shopping and Office | Intended to protect the form and style of existing structures; allows for a mix of residential, commercial, and public uses. | NA |
| Industrial-General (I-G) | Intended to provide for general to heavy-impact processing or manufacturing operations. | NA |
| Industrial-Waterfront (I-W) | Intended to provide for water-dependent and port-dependent industrial uses. | NA |
| Park and Open-Space (P-1) | Intended to protect and reserve lands for recreational, scenic, and natural resource uses. | NA |

*Source: City of Duluth Unified Development Code.*

* Minimum lot size allowed, dependent on the specific use (e.g. townhouse vs. single-family dwelling).

*Zoning:*

Map 3.2 on page 17 shows the current zoning districts relative to the eleven sub-areas. It is presented next to Map 3.1 in order to compare differences between the existing land uses and zoning in the neighborhood. By referencing the general descriptions of the different zoning districts in Table 3.3 on page 18 with the information in maps 3.1 and 3.2, some inconsistencies between zoning and the actual uses can be recognized. In particular, sub-area 10 contains a lot of commercial uses that are not consistent with the uses allowed in an Industrial-General (I-G) district.

Discrepancies between land uses and zoning in the neighborhood exist largely because market demand has been increasingly nudging the existing land use patterns on the northern side of the interstate to transition to more commercial and recreational uses. In many ways, that transition is positive for the neighborhood's residents: it brings more goods, services, and recreational opportunities in closer proximity to them, while moving the potentially undesirable impacts of industrial activities further away.

The City of Duluth's Small Area Plan (SAP) process has been aimed at identifying ways to adjust the zoning in Lincoln Park in order to both correct existing discrepancies and also support a transition to land use patterns that are deemed more desirable by the neighborhood's residents. Some preliminary recommendations that have come out of that process are to change the I-G zoning in sub-area 10 to Mixed-Use Business (MU-B) and to extend the Form-Based District 5 (F-5) in sub-area 9 further westward along Superior Street into sub-areas 7 and 8. These changes would effectively move more industrial

activities further away from the residential areas and encourage the development of a more walkable, mixed-use commercial district between the residential and industrial areas.

Changes like those being proposed in the SAP would not happen overnight, but would change transportation patterns significantly. The higher densities of commercial and residential uses would lead to greater levels of traffic in those sub-areas. And yet, depending on the actual developments that locate in there (as well as certain aspects of the transportation system) a significant portion of that added traffic could be met by modes other than personal automobiles.

*Major activity centers:*

Besides the general patterns of land use, the presence and locations of major "activity centers" - places that attract large groups of people (at least occasionally) - also have a great deal of impact on transportation in an area. The Lincoln Park neighborhood contains a number of such centers.

For the purpose of this study, activity centers were defined as places where more than 100 people would likely travel to and congregate at any given time. Once identified, these locations were classified as either "Regular" or "Occasional" activity centers. They are shown in Map 3.3 on page 20 according to that distinction.

Improving connections between a number of the neighborhood's activity centers is an objective that has been identified in the SAP process. In particular, improving non-motorized connections between the Lincoln Park Middle School and nearby recreational opportunities has been called out as a priority This objective has been carried forward in this study and is discussed more in Chapter 7.

*Zones of employment:*

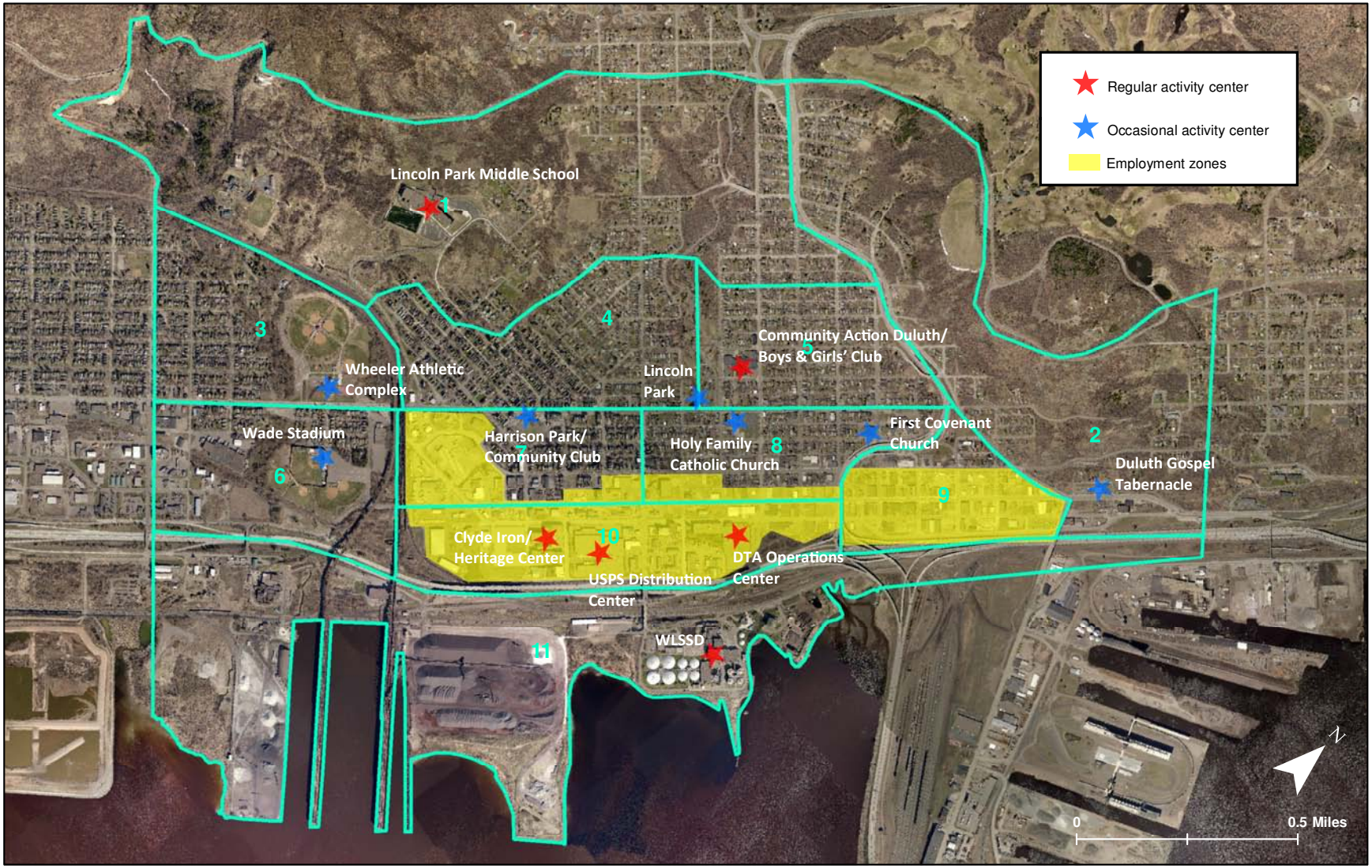
While not every place of employment can be considered an activity center as defined above, places of employment tend to exist together within areas of regular activity. Map 3.3 on the following page identifies such an area within the Lincoln Park neighborhood - an area where the employment density averages more than 10 employees per acre.

Sub-areas 9 and 10 contain the greatest concentration of jobs, while sub-areas 7 and 8 contain smaller "zones" of employment concentration. Because most people tend to work eight hour days between approximately the hours of 8 AM and 5 PM, large flows of employees are expected to move to and from these zones during morning and evening peak travel periods. Also, different degrees of customer–related and delivery-related traffic will be drawn to those zones, depending on the types of employment there (e.g. manufacturing, retail, etc.). Table 3.4 shows the number of estimated jobs found in the employment zones in each sub-area, as categorized according to three general job types. It also shows three trip-generation rates typically used to estimate trips based on those job types. The estimates suggest that the neighborhood's busiest employment zones attract about 2,500 trips daily.

**Table 3.4 | Job and trip-generation estimates of employment zones**

| | Retail | Service | Other | Trip Gen Score |
|---|---|---|---|---|
| *Trip Gen Weight* | *9.28* | *3.09* | *1.10* | *NA* |
| Sub-area 7 | 7 | 305 | 131 | 1,152 |
| Sub-area 8 | 7 | 105 | 27 | 419 |
| Sub-area 9 | 116 | 398 | 214 | 2,542 |
| Sub-area 10 | 143 | 156 | 572 | 2,438 |

*Data source: US Census Bureau LEHD 2011; MIC estimates.*




**M a p 3.3 | Zone of concentrated employment and the location of major neighborhood activity centers within the Lincoln Park Study Area**

Most of the jobs within Lincoln Park are located in sub-areas 9 and 10, which attracts concentrated movements of commuter traffic during regular AM and PM peak travel periods on a daily basis. Major activity centers are scattered throughout the neighborhood that can generate significant traffic at off-peak times.

| Land Use | Unit | Trip Rate (trips per unit) | Lincoln Park Study: floor area of land use per sub-area | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| City park | Acres | 0.19 | | | | 8.3 | 6.9 | | | | 0.1 | | |
| Recreational community center | 1,000 SF | 1.45 | | | 3,000 | | 167,000 | | 3,300 | | | 86,000 | |
| Multi purpose recreational facility | Acres | 5.77 | | | 23.0 | | | 10.0 | 3.0 | | | | |
| Middle School/Elementary School | 1,000 SF | 1.19 | 320,000 | | | | | | | | | | |
| Daycare | 1,000 SF | 12.46 | | | | 860 | | | | 3,200 | | | |
| Church | 1,000 SF | 0.55 | | 18,000 | | 19,000 | 29,000 | | | 82,000 | | | |
| Assisted Living Facility | Beds | 0.22 | | | | | | | | 150 | | | |
| Convenience market (open 15-16 hrs) | 1,000 SF | 34.57 | | | | | | | | | | | |
| Convenience market with gas pumps | 1,000 SF | 50.92 | | | | | | | | | 4,600 | 17,500 | |
| Slavation Army (Apparel Store) | 1,000 SF | 3.83 | | | | | | | | | 6,800 | | |
| Fast food resturant w/ drive thru | 1,000 SF | 33.84 | | | | | | | | | | | |
| Fast food resturant w/o drive thru | 1,000 SF | 26.15 | | | | | | | | | | 8,900 | |
| Bakery (Coffee/Donut shop w/o drive thru) | 1,000 SF | 40.75 | | | | | | | | 1,200 | | | |
| Resturaunt | 1,000 SF | 7.49 | | | | | 2,400 | | | 3,000 | 3,800 | 16,000 | |
| Drive-in Bank | 1,000 SF | 24.3 | | | | | | 2,000 | | | 9,400 | 2,900 | |
| US Post Office | 1,000 SF | 1.22 | | | | | | | | | | 8,700 | |
| Drinking Place | 1,000 SF | 11.34 | | | | | | | | 12,000 | 20,000 | 2,500 | |
| Liqour Store (using "supermarket") | 1,000 SF | 9.48 | | | | | | 2,400 | | 2,400 | | | |
| Auto Parts and Service Center | 1,000 SF | 4.46 | | | | 6,500 | 9,000 | | | 6,900 | | | |
| WLSSD* | NA | | | | | | | | | | | | NA |

**Table 3.5 |**

**Unit estimates of key land use types in each sub-area in the Lincoln Park neighborhood**

| Land Use | Unit | Trip Rate (trips per unit) | Lincoln Park Study: estimated daily trips to sub-area | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| City park | Acres | 0.19 | 0.0 | 0.0 | 0.0 | 1.6 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Recreational community center | 1,000 SF | 1.45 | 0.0 | 0.0 | 4.4 | 0.0 | 242.2 | 0.0 | 4.8 | 0.0 | 0.0 | 124.7 | 0.0 |
| Multi-purpose recreational facility | Acres | 5.77 | 0.0 | 0.0 | 132.7 | 0.0 | 0.0 | 57.7 | 17.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| Middle School/Elementary School | 1,000 SF | 1.19 | 380.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Daycare | 1,000 SF | 12.46 | 0.0 | 0.0 | 0.0 | 10.7 | 0.0 | 0.0 | 0.0 | 39.9 | 0.0 | 0.0 | 0.0 |
| Church | 1,000 SF | 0.55 | 0.0 | 9.9 | 0.0 | 10.5 | 16.0 | 0.0 | 0.0 | 45.1 | 0.0 | 0.0 | 0.0 |
| Assisted Living Facility | Beds | 0.22 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 33.0 | 0.0 | 0.0 | 0.0 |
| Convenience market (open 15-16 hrs) | 1,000 SF | 34.57 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Convenience market with gas pumps | 1,000 SF | 50.92 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 234.2 | 891.1 | 0.0 |
| Slavation Army (Apparel Store) | 1,000 SF | 3.83 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 26.0 | 0.0 | 0.0 |
| Fast food resturant w/ drive thru | 1,000 SF | 33.84 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fast food resturant w/o drive thru | 1,000 SF | 26.15 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 232.7 | 0.0 |
| Bakery (Coffee/Donut shop w/o drive thru) | 1,000 SF | 40.75 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 48.9 | 0.0 | 0.0 | 0.0 |
| Resturaunt | 1,000 SF | 7.49 | 0.0 | 0.0 | 0.0 | 0.0 | 18.0 | 0.0 | 0.0 | 22.5 | 28.5 | 119.8 | 0.0 |
| Drive-in Bank | 1,000 SF | 24.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 48.6 | 0.0 | 0.0 | 228.4 | 70.5 | 0.0 |
| US Post Office | 1,000 SF | 1.22 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.6 | 0.0 |
| Drinking Place | 1,000 SF | 11.34 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 136.1 | 226.8 | 28.4 | 0.0 |
| Liqour Store (using "supermarket") | 1,000 SF | 9.48 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 22.8 | 0.0 | 22.8 | 0.0 | 0.0 | 0.0 |
| Auto Parts and Service Center | 1,000 SF | 4.46 | 0.0 | 0.0 | 0.0 | 29.0 | 40.1 | 0.0 | 0.0 | 30.8 | 0.0 | 0.0 | 0.0 |
| WLSSD* | NA | NA | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 100.0 |
| | | | | | | | | | | | | | |
| Number of jobs (x2 trips) | NA | NA | 150 | 196 | 94 | 56 | 10 | 376 | 908 | 610 | 1,910 | 1,742 | 74 |
| | | | | | | | | | | | | | |
| **Estimated daily trips** | NA | NA | **531** | **206** | **231** | **108** | **328** | **505** | **930** | **989** | **2,654** | **3,220** | **174** |
| **Attraction weight** | NA | NA | 5 | 2 | 2 | 1 | 3 | 5 | 9 | 9 | 25 | 30 | 2 |

**Table 3.6 |**

**Trip generation rates and daily for Lincoln Park neighborhood sub-areas**

*Data sources: US Census Bureau LEHD 2011; Trip Generation, 7th Ed, ITE (2003)*

** WLSSD has reported an average of 100 service trucks traveling to their site daily.*

*Trip generation estimates:*

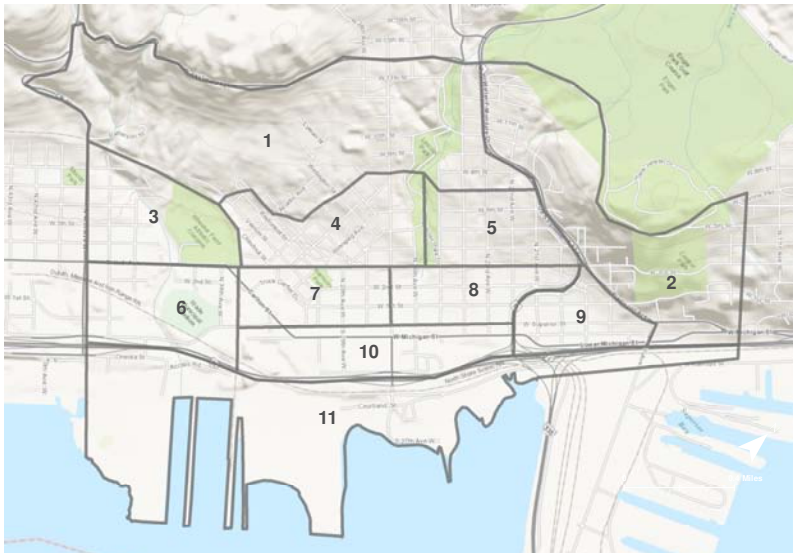
Another way to assess the relative degrees of travel demand to the different sub-areas of the neighborhood is to use trip generation estimates specific to the land uses found within those sub-areas. Table 3.5 on the page 21 provides a general summary of the degree which different land uses are found in each of the sub-areas, while Table 3.6 shows the conversion of those differences into estimated daily trips added to the estimated number of employees in each sub-area to derive a relative estimate of travel demand. The information in Table 3.6 indicates that sub-areas 9 and 10 generate more than 16x the levels of traffic than is generated in each of the other sub-areas. It should also be noted that these estimates do not account for trips produced by the households within the sub-areas.

*Topography:*

In addition to land use type and densities, slope can have an impact on travel behaviors. A lower percentage of daily trips will be made by walking, biking, or even public transit, if slopes are excessive in an area.

Slopes are a significant factor in the Lincoln Park neighborhood, as the majority of the residential areas sit along the Duluth hillside. There are some dramatic elevation changes in sub-areas 1, 2, and 3. Slopes are also a significant feature in sub-areas 4 and 5, as well (see Map 3.4).

According to American with Disabilities Act Accessibility Guidelines (ADAAG), a maximum grade for running slope is at 5%. As shown in Table 3.7, a substantial portion of the roadways (and sidewalks) within sub-areas 1 through 5 exceed that threshold. This poses a significant challenge for meeting the objectives for multi-modal integration and non-motorized connectivity between activity centers and recreational areas.




**Map 3.4 | Topographic characteristics within the study's sub-areas**

Sub-areas 1 through 5 have significant slopes that can make non-motorized travel difficult

**Table: 3.7 | Average running slope for roads within the Lincoln Park sub-areas**

| Sub-area | Miles of roads | Percent of roads over 5% slope |
|---|---|---|
| Sub-area 1 | 8.1 | 64.3% |
| Sub-area 2 | 9.8 | 65.3% |
| Sub-area 3 | 2.1 | 10.0% |
| Sub-area 4 | 4.6 | 51.3% |
| Sub-area 5 | 3.2 | 60.4% |
| Sub-area 6 | 3.5 | 2.9% |
| Sub-area 7 | 2.3 | 0.0% |
| Sub-area 8 | 2.0 | 15.8% |
| Sub-area 9 | 3.6 | 20.5% |
| Sub-area 10 | 2.7 | 10.8% |
| Sub-area 11 | 3.8 | 8.1% |

*Data source:* USGS (2014); MIC estimates (2014).

## Demographics

Characteristics at the household level also have an affect on transportation patterns in an area. Attributes such as household size, household income, and the number of vehicles per household tend to translate into different travel behaviors and needs. Household incomes below national poverty guidelines, for example, are more likely to face transportation challenges and tend to be more dependent on public transit services.

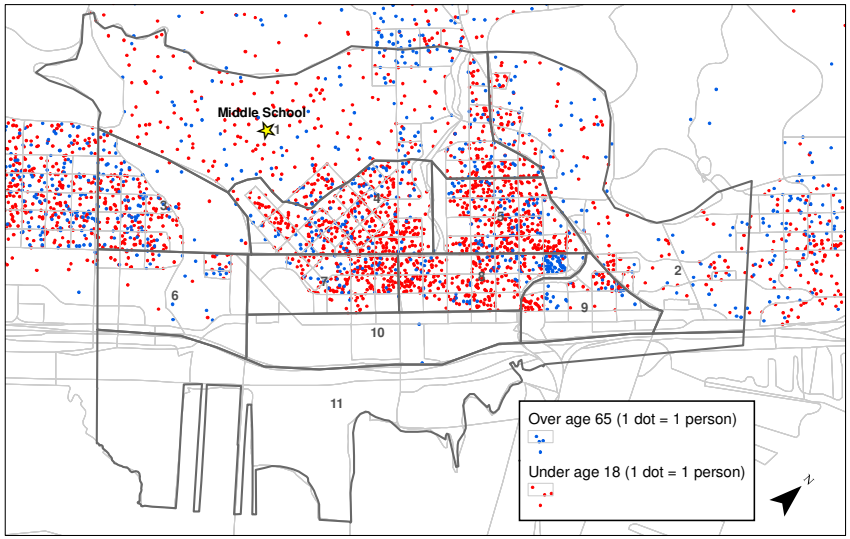
Table 3.8 shows the average household characteristics for the eleven sub-areas, while Map 3.6 on page 23 shows the location and concentrations of people in the neighborhood (by census block), as well as the differences in median household income among the various sub-areas. Sub-areas 6, 7, and 9 each have median household incomes below the national poverty guideline for a family of four in 2015 ($24,250), as well as substantial concentrations of residents. Thus, the demand for "active transportation" options (e.g. walking, biking, public transit) is expected to be higher in these sub-areas. Sub-area 8, however, appears to have the greatest number of households with no auto-ownership (Table 3.8). This is largely due to the presence of Mid Towne manor, a senior living facility. This facility also generates a high degree of demand for alternative modes of transportation.

Map 3.5 at right shows the concentration of residents under 18 years of age or over age 65. Such concentrations would indicate areas where active transportation amenities such as quality sidewalks or paths are anticipated to be in higher demand. These patterns also provide an indication of where transportation challenges and inefficiencies might exist, such as the location of the Lincoln Park Middle School relative to the concentration of students of lower-income families in sub-areas 7, 8, and 9. These

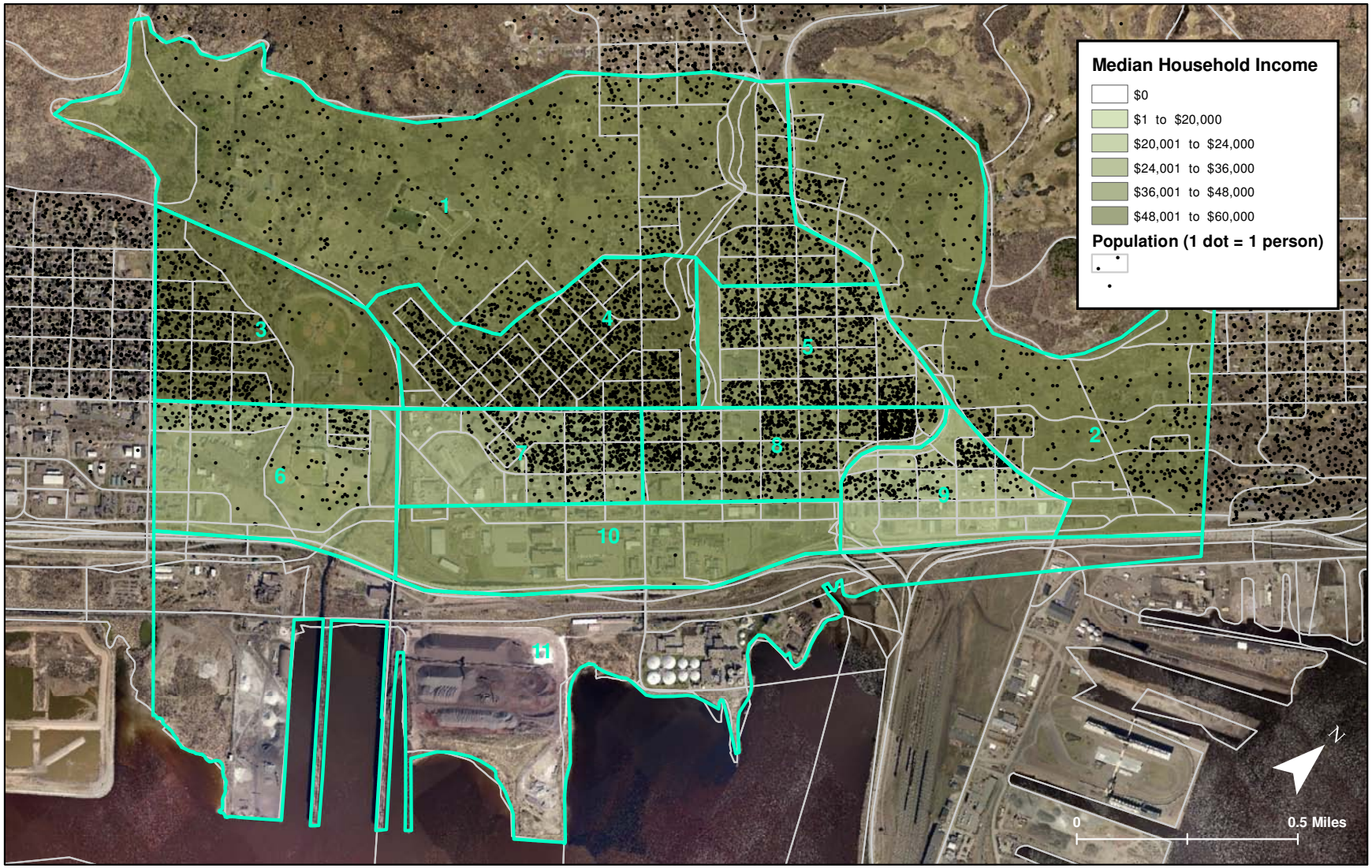
**Table 3.8 | Household (HH) characteristics by study sub-area**

| Sub-area | Number of HHs | Average HH size | Median HH income | Est. HHs with no vehicles |
|---|---|---|---|---|
| Sub-area 1 | 520 | 2.4 | $35,245 | 15 (2.8%) |
| Sub-area 2 | 407 | 2.0 | $41,786 | 12 (1.5%) |
| Sub-area 3 | 300 | 2.3 | $51,563 | 14 (2.3%) |
| Sub-area 4 | 543 | 2.5 | $51,563 | 15 (2.3%) |
| Sub-area 5 | 521 | 2.3 | $29,514 | 24 (1.9%) |
| Sub-area 6 | 108 | 2.0 | $24,138 | 14 (0.8%) |
| Sub-area 7 | 267 | 2.3 | $22,474 | 34 (1.6%) |
| Sub-area 8 | 530 | 2.0 | $29,514 | 68 (1.7%) |
| Sub-area 9 | 165 | 1.9 | $9,375 | 21 (0.7%) |
| Sub-area 10 | 1 | 2.0 | $29,514 | 0 (0.1%) |
| Sub-area 11 | 0 | 0.0 | $22,474 | 0 (0.0%) |

*Data sources:* US Census Bureau 2010 SF 100%; US Census Bureau 2012 5-yr ACS 2014; MIC estimates




**Map 3.5 | The location Lincoln Park residents under age 18 or over age 65**




**Map 3.6 | Median household income levels and the concentrations of population and within the Lincoln Park Study Area**

Lincoln park residents are concentrated in in the center of the neighborhood. Some areas of the neighborhood, such as sub-areas 7 and 9 have concentrations of individuals living at or near nationally recognized poverty levels.

challenges are addressed further in the discussions regarding specific modes of transportation in subsequent chapters.

## Growth Scenarios

As with any neighborhood, the land use, employment, and demographic patterns in Lincoln Park are expected to change over time. While it is difficult to predict what those changes will be exactly, or how fast they will occur, some best guesses can be brought forward based on the existing conditions and trends observed. Those guesses can be grouped and modified under different scenarios for the purposes of planning.

Three basic scenarios were considered while conducting this study: a "Low Growth" scenario, a "High-growth, Low-density" scenario, and a "High-growth, High-density" scenario. They are based on variations in the patterns previously discussed in this chapter. Aspects of each scenario are compared and contrasted throughout the following chapters in order to help identify potential challenges or opportunities regarding the neighborhood's transportation assets in coming years. The different characteristics of each scenario are summarized in Table 3.9, and the implications of those differences are discussed in the summaries below.

*"Low Growth" scenario:*

Under the low growth scenario, it is assumed that economic and social conditions will not dramatically change the existing land use patterns in the neighborhood in coming decades. Based on this assumption, adaptive reuse of existing facilities is expected, and only small increases in the number of households and jobs follow. A general lack in reinvestment throughout the neighborhood reflects a shift towards an older and lower-income population with increasing mobility challenges.

**Table 3.9 | Growth scenarios and assumptions used for analysis**

***Scenario 1: "Low Growth"***

- Land-use mix stays the same
- Land-use density stays the same
- Housing stock ages / minimal revitalization
- Median household income goes down
- Overall population stays the same
- Household density goes up modestly
- Proportion of residents older than 65 goes up
- Proportion of residents younger than 18 goes up modestly

***Scenario 2: "High-growth, Low-density"***

- Growth mainly occurs outside the neighborhood
- Land-use patterns stay approximately the same
- Modest increases in density commercial and light-industrial uses
- Substantial reinvestment and redevelopment of single family homes
- Median household income goes up
- Overall population sees a modest increase
- Household density goes down modestly
- Proportion of residents older than 65 goes up modestly
- Proportion of residents younger than 18 goes up modestly

***Scenario 3: "High-growth, high-density"***

- Substantial growth within the neighborhood
- Land-use patterns change: less industrial, more commercial uses.
- Land-use density goes up
- Increased mixed-use development
- Household density goes up substantially below 5th street (goes down modestly above 5th St)
- Median household income goes up
- Overall population goes up
- Proportion of population ages 19-40 goes up

*"High-growth, Low-density" scenario:*

Under this scenario, high rates of growth are expected to occur in the City of Duluth, but mostly as lower-density development outside of the Lincoln Park neighborhood. Some multi-family units are built in sub-area 6 in response to targeted, public-private investments in the area, but - either because zoning regulations had not allowed for higher densities elsewhere in the neighborhood, or because the real estate market did not produce the demand for it – most of the growth in new households has occurred in the small amounts of buildable lands remaining in sub-areas 1 and 2.

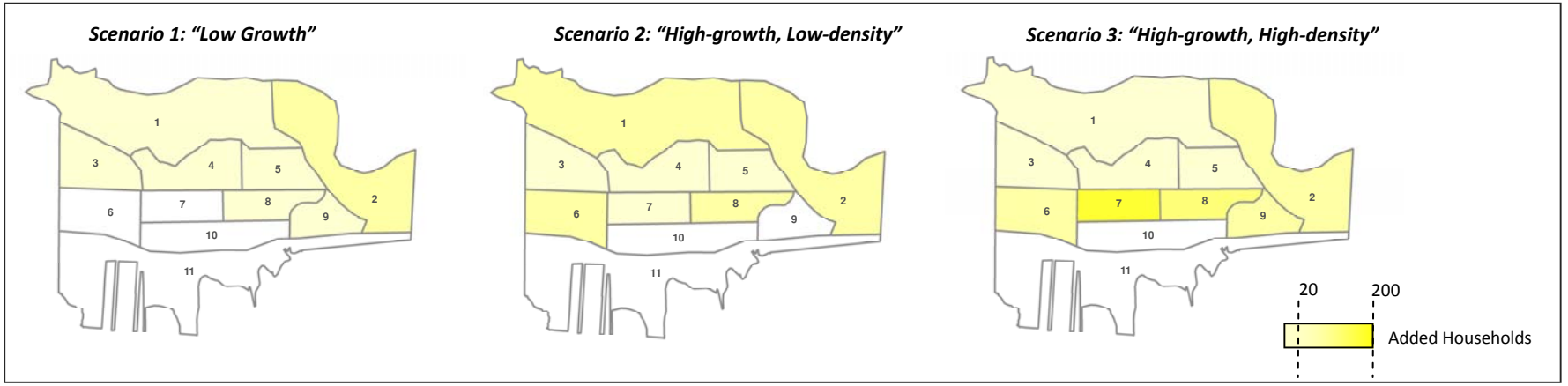
Efforts to revitalize older houses in sub-areas 5 and 7 as starter homes for new families results in a thinning of the housing stock and only very minimal increases in the number of households those areas. Meanwhile, a growing portion of the neighborhood's population has gotten older and now has lower incomes. More of these individuals have become concentrated within shared dwellings in sub-area 8.

Corresponding to the modest increases in households in the neighborhood, there has also been a modest growth in new jobs, occurring primarily in sub-areas 8, 9, and 10. The new jobs are mostly service based, some of which have replaced an outflow of industrial based jobs from the area. As a result, there is only a moderate increase in the number of additional trips generated in those areas.

*"High-growth, High-density" scenario:*

This scenario represents a renaissance of the Lincoln Park neighborhood. There has been a growing interest in the neighborhood's many amenities, and economic and market conditions have been such that large scale redevelopment of the neighborhood has happened over the years. Mixed-use, residential developments have been built in sub-areas 7 and 8, increasing both the residential and employment densities there, while significant reinvestment in the housing stocks in sub-areas 4, 5, and 6 have occurred along with increases in median household income throughout the neighborhood. While the higher densities

**Figure 3.3 | Estimates of future households by study sub-area by year 2040**



increase the demand for walking, biking, and transit trips, higher household incomes also result in more automobile trips.

A significant transformation of the neighborhood business district in sub-area 9 has occurred, with an influx of new retail jobs and higher demand for residential units in the area. Meanwhile, a substantial change over of the industrial uses in sub-area 10 to commercial uses oriented has increased the amount of traffic being generated there.

*Growth projections and trip generation estimates:*

The growth scenarios used in this study were based on household and employment projections similar to those used in the MIC's long range transportation plan for the Duluth-Superior metropolitan area, *Connections 2040*. The rates of household and employment growth are shown in Figures 3.5 and 3.6, respectively.

Growth in the number of households is expected to be relatively modest under the "Low Growth" and "High-growth, Low-

**Figure 3.5 | Household projections for the Lincoln Park study**

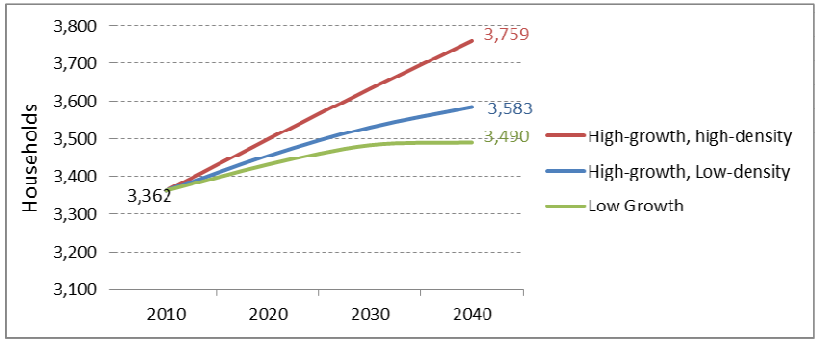



**Figure 3.6 | Employment projections for the Lincoln Park study**

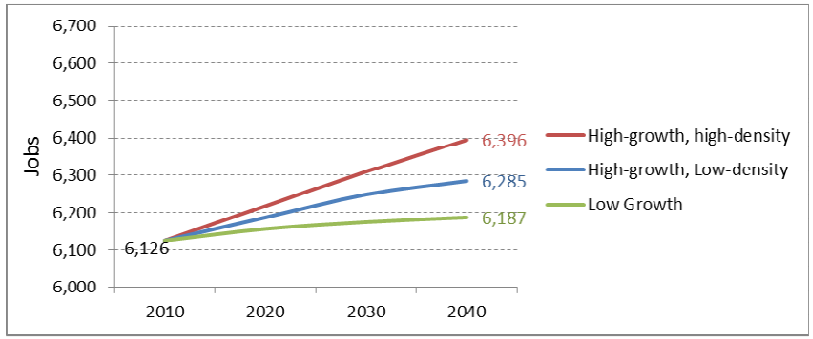



**Figure 3.4 | Estimates of added jobs by study sub-area by year 2040**

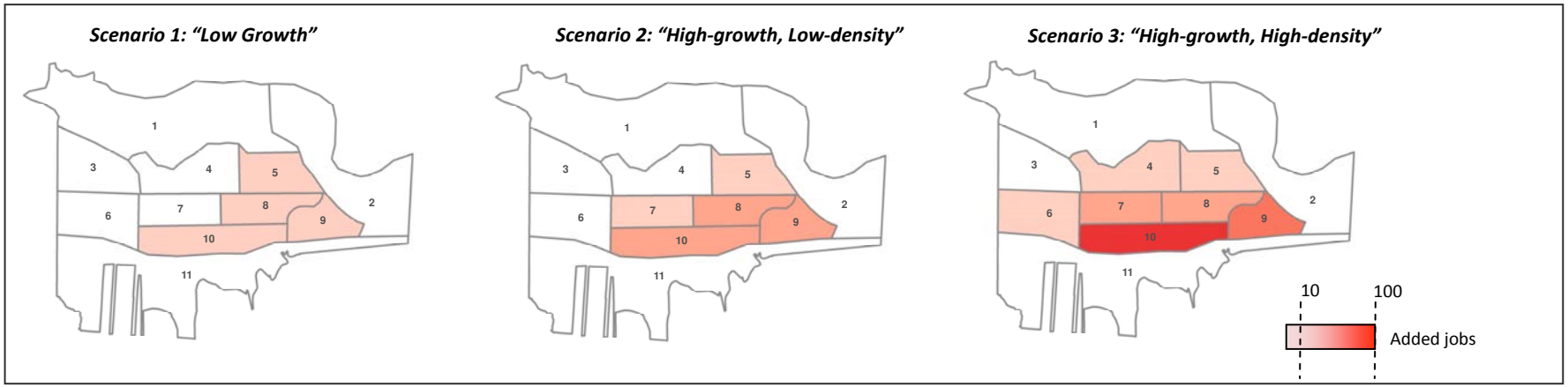


**Figure 3.7 | Estimated changes in job types by growth scenario (year 2040)**

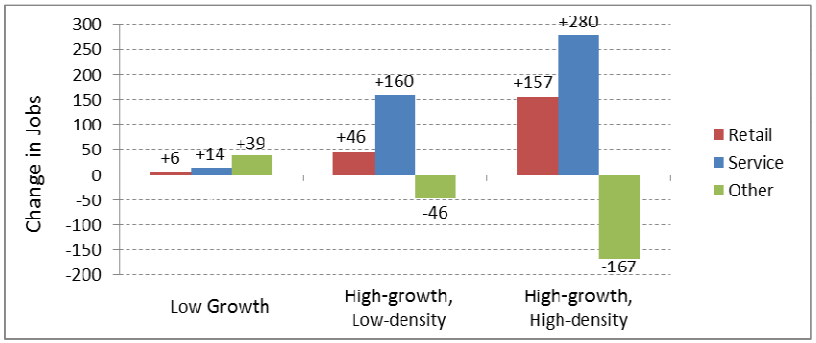
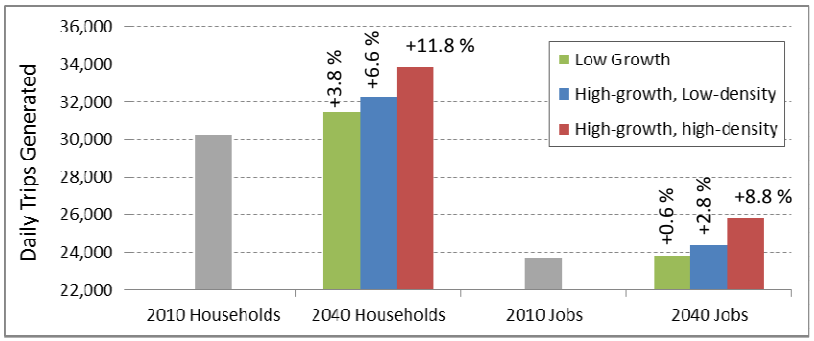



**Figure 3.8 | Daily trip estimates of future growth scenarios (year 2040)**




density" scenarios and begin to flatten by 2040, whereas the "High-growth, High-density" scenario is imagined as a strong average rate of growth through the future decades. Under the "Low Growth" scenario, 148 additional households are forecasted, while only 61 new jobs are expected. Whereas, nearly 400 households and 270 jobs are projected under the "High-growth, High-density" scenario.

It is envisioned that the higher rates of growth under the "High-growth, high-density" scenario will occur in tandem with a high degree of reinvestment activity. Thus, a transition of some of the industrial uses towards more retail- and service-related ventures is imagined. Estimates for what this transition might look like under the different scenarios are shown in Figure 3.7.

The different mix of jobs imagined in each scenario will also result in different levels of additional trips generated in the area. By applying the trip-generation rates previously discussed on page 19 to the different employment scenarios, while also applying an average rate of 9 trips/day per household, the different daily trip estimates shown in Figure 3.8 were derived.

Under the "Low Growth" scenario, job related trips are expected to grow only marginally (~150 trips/day), while household related trips would increase by more than 1,000 trips/day. Under the "High-growth, high-density" scenario, job related trips would grow by approximately 2,000 trips/day, and household related trips by more than 3,500. While there would likely be some overlap between the job and household based trips, the "High-growth, high-density" scenario could be expected to add somewhere around 4,000 additional trips to Lincoln Park's street network by 2040.

What the different levels of future traffic might mean for the various modes of transportation in the neighborhood is given further consideration in the chapters that follow. A general

discussion of their ramifications with regards to the three planning perspectives of this study is offered in the chapter summary below.

## Chapter Conclusion

The information established in this chapter has the following implications with regards to the three planning perspectives that are a focus of this study:

*Multi-modal integration:*

The current topography and general layout of the neighborhood present some difficulties for multi-modal integration. Encouraging higher-density, mixed-use development in areas where the neighborhood's major residential and commercial/industrial uses converge (in sub-areas 7, 8, and 9) would create conditions that are more supportive of multi-modal integration.

*Public investment:*

Under a lower growth scenario, the maintenance of existing transportation infrastructure (i.e. roads and sidewalks) would continue to be a challenge like it is for the City of Duluth today. Encouraging higher residential densities could serve more residents with less infrastructure, and thus reduce this burden in the future, but the higher residential and commercial densities would also have the effect of serving more transit riders at lower operational cost.

The levels of travel demand projected under a "high-growth, high-density" scenario may produce demand for additional capacity on certain roadways. Some of that added travel demand, however, could be offset by the higher density, mixed-use development that is imagined in that scenario.

*Future opportunities:*

Opportunities to adjust current zoning regulations, as well as enhance connectivity between the neighborhood's activity centers and recreational areas have already been identified the City of Duluth's SAP committee. Many of these opportunities exist within the lower portion of the neighborhood (sub-areas 6 through 10) where future redevelopment opportunities are envisioned and could both be a part of, as well as help to encourage such redevelopment.

# 4. The Road Network

The road network represents the "back bone" of the surface transportation system - the patterns of nearly all modes of surface transportation tend to reflect it, if not utilize it directly. It is also the transportation asset that most travelers in the neighborhood rely on. For example, as the numbers in Table 4.1 indicate, the vast majority of Lincoln Park's working residents depend on the road network because they are driving alone, carpooling, or using public transit in order to access work. In addition, the FHWA estimates more than 2/3 of goods in this nation are shipped by truck. Lincoln Park contains some key segments of truck routes that are important to the region. It is also home to a number of freight-related businesses. Therefore, the conditional and operational integrity of the road network is central to planning for the future of transportation within the Lincoln Park neighborhood.

This chapter provides some assessment of the road network in Lincoln Park in terms of efficiency, accessibility, connectivity, and its physical integrity. The assessment was conducted in reference to the three planning perspectives that were identified in Chapter 1 of this study, as well as the growth scenarios established in Chapter 3.

**Table 4.1: | Commute-to-work trips: Duluth and US (5-Yr est., 2009 -2013)**

| Means of travel to work | Lincoln Park, Duluth | United States |
|---|---|---|
| Worked at home | 130 (2.7%) | 4.3% |
| Taxi, motorbike, bike, or other | 77 (1.6%) | 1.8% |
| Walked | 159 (3.3%) | 2.8% |
| Transit | 269 (5.6%) | 5.0% |
| Car, truck, van - carpool | 476 (9.9%) | 9.8% |
| Car, truck, van - alone | 3,699 (76.9%) | 76.3% |
| *Total* | *4,810 (100%)* | *100%* |

*Data source: Us Census Bureau - American Community Survey, 5-Year estimate* (2009-2015).

Image source: MIC (2015)

**Figure 4.1 | View of US Highway 53 from W 5th Street & 22nd Avenue W.**

## Network Design & Function

*Functional Classification:*

The Lincoln Park neighborhood contains about 104 lane-miles of roadway. Interstate 35 and State Highway 53 together account for about 18% of this network. Minor arterial and collector routes account for approximately 30 lane-miles, and local streets account for the remaining 52.2 lane-miles. The functional arrangement of these roads is shown in Map 4.1 to the right. It is an arrangement that helps facilitate the dynamic relationship that Figure 4.2 illustrates, where there is an intentional trade-off between higher degrees of mobility and more direct access to adjacent land uses.

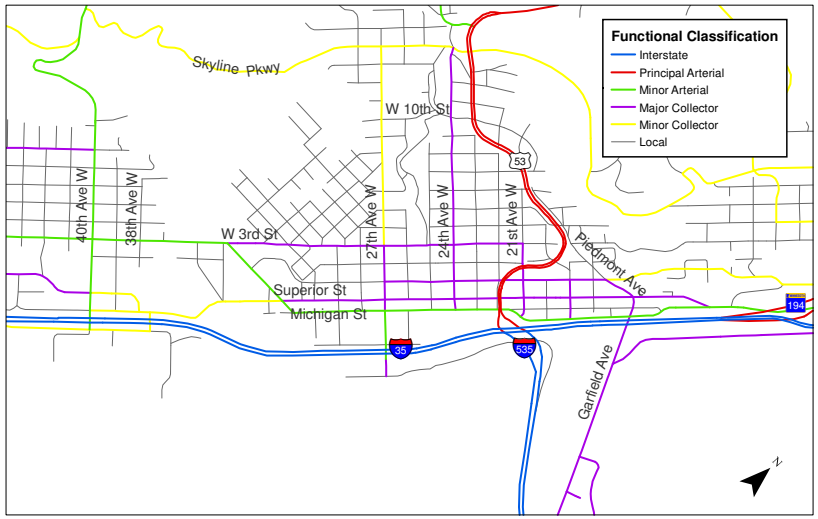
*Traffic volumes:*

In terms of daily traffic volume, the flow of traffic through the neighborhood mostly follows the functional classification of the roadways Lincoln Park. This can be seen in Map 4.2 on the following page, which shows that the annual average daily traffic (AADT) on I-35 and US Highway 53 are more than twice that of the minor arterials and major collectors within the study area.

Since the higher-order routes (interstates and arterials) carry the greatest amount of traffic, the intersections of these roads also tend to be among the most traveled. Map 4.3 on page 33 shows the location of the highest-volume intersections in the study area. It is worth noting the concentration of higher-volume intersections in the central business district (CBD) towards the east end of the neighborhood, below US Highway 53. That is an area where a substantial amount of traffic is circulating in response to the diversity and densities of land uses there.

*Traffic circulation and thru-routes:*

In addition to interstate and US 53, which allow large volumes of traffic to bypass the local street network, a number of roadways




**Map 4.1 | Functional classification of roadways within the Lincoln Park neighborhood**

The road network within the Lincoln Park neighborhood is made up of state-, county-, and city-maintained facilities. I-35 and STH 53 represent about 18% of the lane-miles in the study area, while the remaining 82% are county and city facilities that make up the local street network.

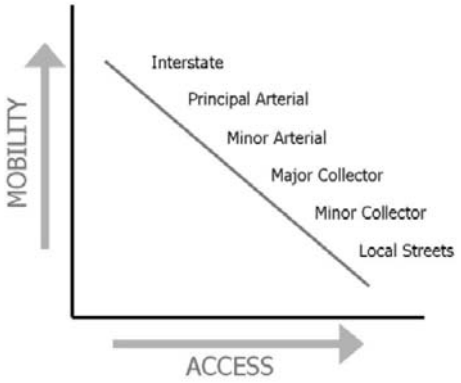
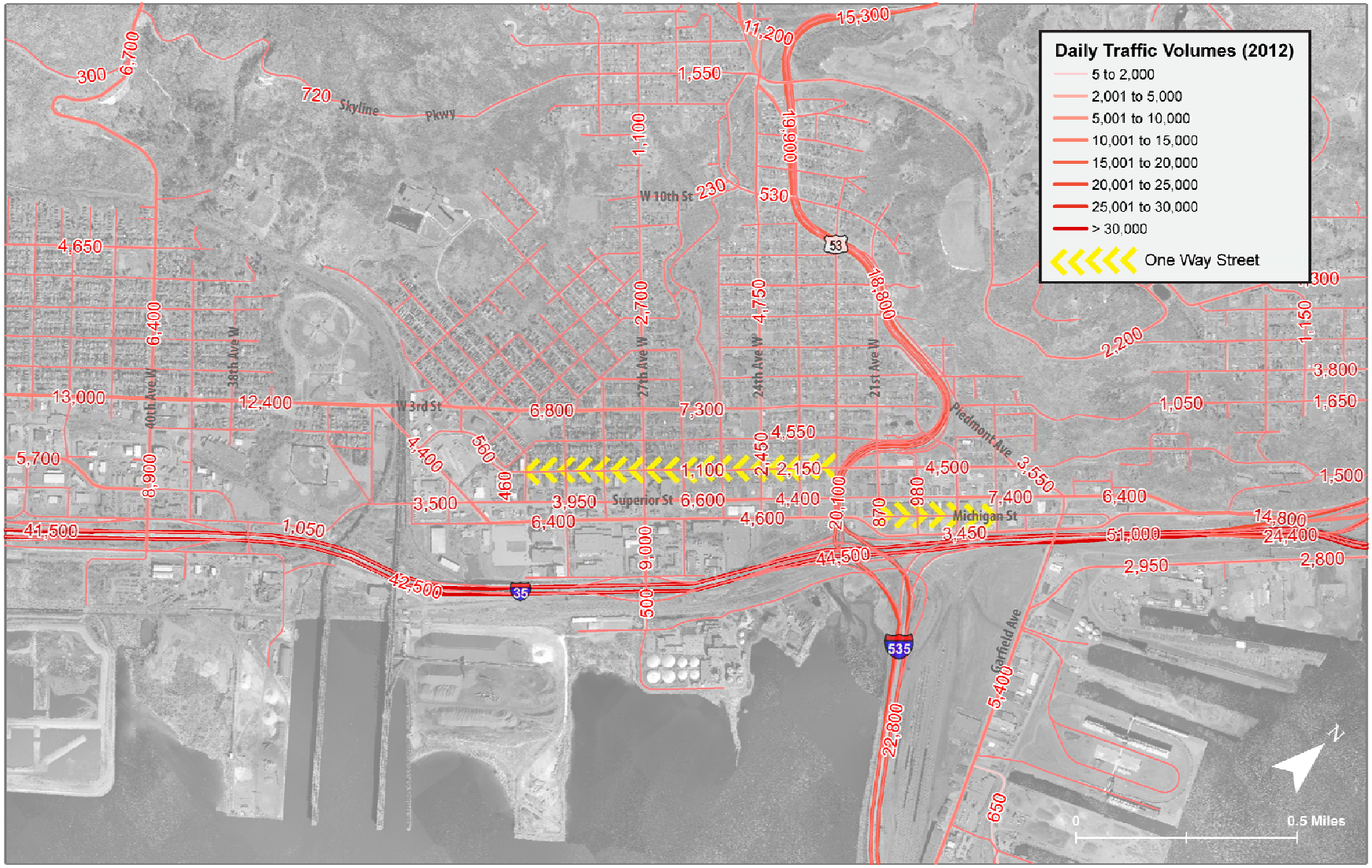


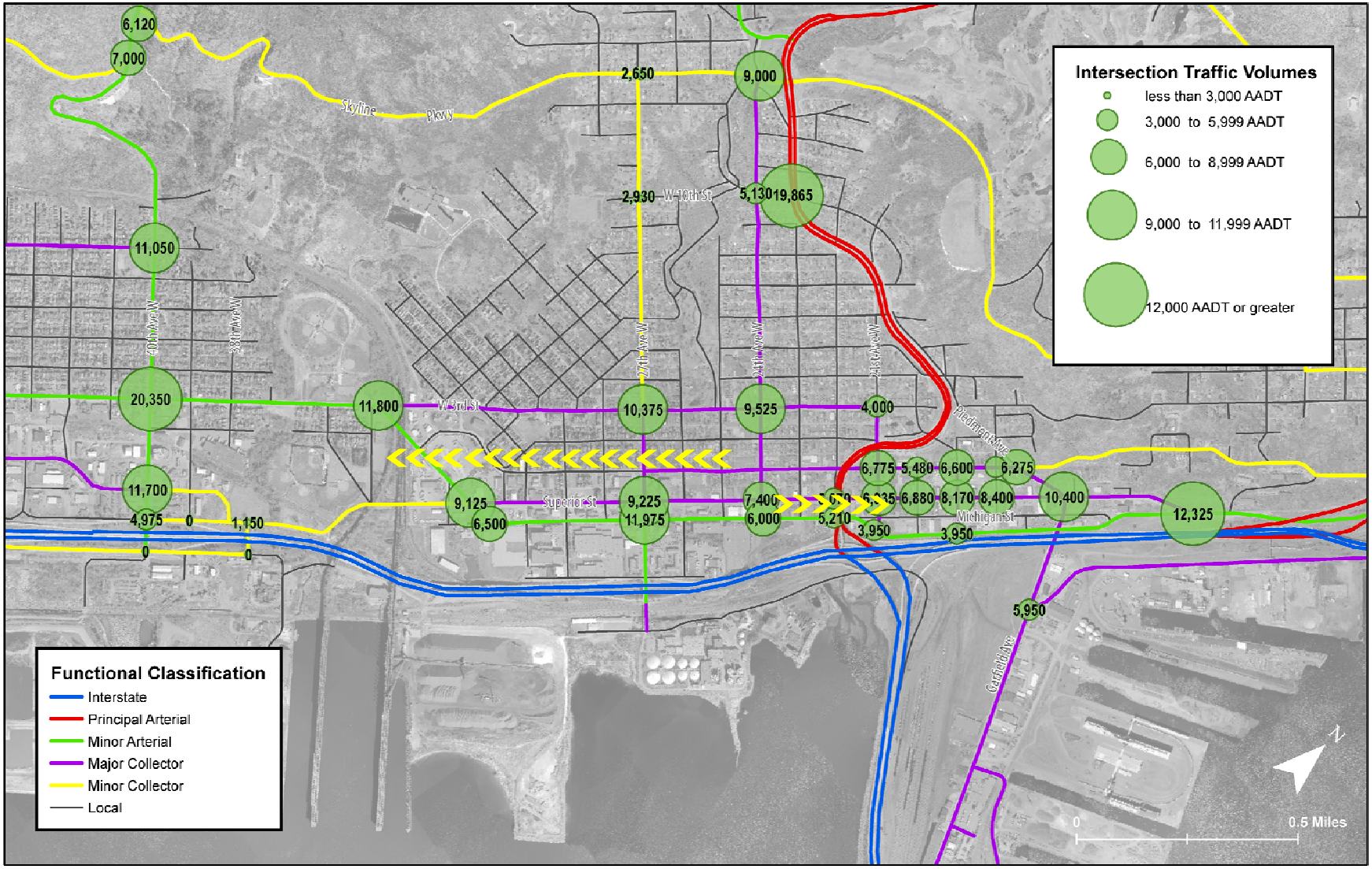

**Figure 4.2 | Roadway classification and intended function**

An illustration the dynamic relationship between mobility and access as one moves from roadways of one classification to another. Locals streets are intended primarily for access, while the function of higher-order roadways proved more mobility for more traffic, at the expense of access.




**M a p 4.2 | Annual Average Daily Traffic (AADT) in the Lincoln Park Neighborhood (2012)**

The limited-access, grade-separated freeways facilitate the majority of traffic through the neighborhood, representing 68% of the daily traffic in the neighborhood. Michigan St/Lower Michigan St (3,450 - 6,400 AADT), Superior St (3,500 - 7,400 AADT) and W 3rd St (6,800 - 12,400 AADT) are the main cross-routes passing directly through the neighborhood, while 40th Ave W (6,700 - 8,900 AADT) and 24th Ave W (2,450 - 4,750 AADT) are the main streets up the hillside.




**M a p 4.3 | Annual Average Daily Traffic (AADT) for intersections in the Lincoln Park Neighborhood (2012)**

The busiest intersections in the neighborhood correspond to the functionally classified network of roads. The busiest intersections are at W 3rd St & 40th Ave W and at W 10th St & US Hwy 53, with AADTs of about 20,000 vehicles per day. A number of busy intersections are also found along Superior St and Michigan St, as well as along W 3rd St and 24th Ave W.

serve as key thoroughfares within the neighborhood. Those roads are listed in Table 4.2 and shown in Map 4.3 with the traffic controls that exist along them.

**Table 4.2: | Key thoroughfares of the local street network in the Lincoln Park neighborhood**

| Direction | Roadway | Functional Class |
|---|---|---|
| *East/West* | Lower Michigan St *(22nd Ave W to Superior St)* | Minor Arterial |
| | Michigan St/Carlton St | Minor Arterial |
| | Superior St | Maj Collector/Min collector |
| | W 3rd St | Min Arterial/Maj Collector |
| | Skyline Pkwy | Minor Collector |
| *North/South* | 40th Ave W | Minor Arterial |
| | 27th Ave W | Maj Collector/Min Collector |
| | 24th Ave W | Major Collector |
| | 21st Ave W | Major Collector |
| | Piedmont Ave | Major Collector |

Superior Street serves as an East/West collector that facilitates efficient travel between the commercial, industrial, and institutional uses in the lower portion of the neighborhood. As seen in Map 4.3, however, there are a number of stop signs and traffic signals on this route. The connection of W 3rd Street, Carlton Street, Michigan Street, and Lower Michigan Street provide an East/West minor arterial that allows travelers to bypass those stops.

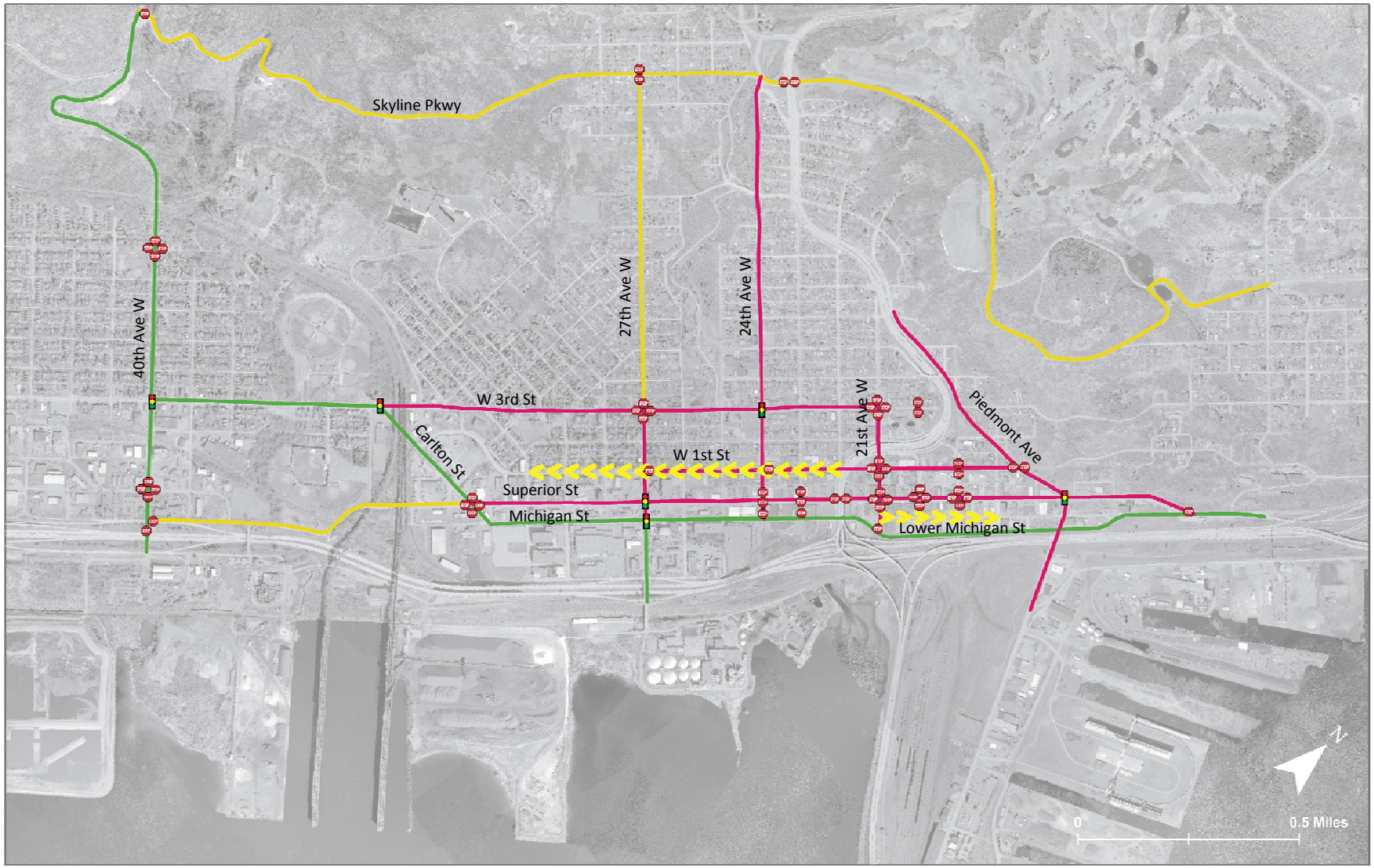
Facilitating efficient movements up and down the hillside are 40th Avenue W, 27th Avenue W, and 24th Avenue W. Whereas 27th Avenue W can be considered the main route between I-35 and W 3rd Street, it narrows significantly (to 24 feet wide) as it continues northward. Once above W 3rd Street, 40th Avenue W and 24th Avenue W become the major routes. The existing arrangement of these thoroughfares appears to provide sufficient mobility throughout the local street network. No issues of inefficient mobility were raised by stakeholders during the study, except for some concerns about travel along 27th Avenue W in the wintertime, when an already narrow street is further constrained by the accumulation of snow piles.

Some input was received about traffic delays at the intersections of Skyline Parkway & 24th Avenue W and Superior Street & Michigan Street. Conditions at these intersections are discussed further in the "Travel Demand & Mobility" section beginning on page 41.

One potential improvement to the network of thoroughfares that was recognized during this study, however, is the connection between W 3rd Street and Piedmont Avenue. That connection exists via 20th Avenue W/19th Avenue W and W 2nd Street, but the current configuration of these streets and intersections does not make it an intuitive pathway. Instead, traffic intending to access Garfield Avenue or Superior Street west of the CBD tends to travel down 21st Ave W to Superior Street, which is a busier area and involves added delay at several stop-controlled intersections. A more streamlined connection between W 3rd Street and Piedmont would offer a more efficient travel way between the 3rd Street corridor and the uses along Garfield Avenue, as well as to Superior Street heading west into downtown Duluth (see Map 4.5 on page 36).

*One-way streets:*

Maps 4.2, 4.3, and 4.4 also show the location of two one-way street segments in the neighborhood. There are a few historical reasons for why these segments remain one-way today, but the segments are the remnants of an old system designed for travel demand patterns that existed before the expansion of US Highway 53 and the creation of Lower Michigan Street. It is worth noting that neither the W 1st Street segment (one-way westbound for eight blocks) or the Michigan Street segment (one-way eastbound for three blocks) carry daily volumes much above 2,000 vehicles per day (see Map 4.2 on




**Map 4.4 | Key thoroughfares and stop controls on the local street network in Lincoln Park**

A handful of key arterial and collector routes allow for quick travel through the Lincoln Park neighborhood. With the exception of Superior Street and 21st Avenue W in the Central Business District (CBD), there is minimal delay from traffic control devices along these routes.


**Map 4.5 | Potential improved connection between W 3rd Street and Piedmont Avenue**

The dotted red line above signifies the potential for an improved alignment of the connection between W 3rd St and Piedmont Avenue in Lincoln Park. A more direct connection between the two roadways could improve access and mobility between the W 3rd Street Corridor and Superior St heading towards downtown Duluth.

page 32). From a through-way, travel-demand, or traffic operations perspective, these one-directional segments are serving no necessary function.

## Access & Connectivity

Overall, the road network in the Lincoln Park neighborhood has good connectivity, both internally and regionally. Its proximity to the interchange of I-35 and US 53 provides for quick access to interregional travel in all directions, and a redundancy of connections throughout its local street network makes for efficient internal circulation. These characteristics make the network a valuable asset for both residents and businesses.

*Access to Regional Travel Ways:*

There are two direct accesses to I-35 in the neighborhood. Freeway ramps at 40th Avenue W facilitate quick access between the interstate and Grand Avenue (W 3rd Street) at the western end of the neighborhood, and ramps at 27th Avenue W facilitate quick access to Superior Street. There are also freeway ramps immediately north of the CBD that allow quick access between that commercial area and the interchange of US 53/I-35/I-535 – known colloquially as, "the Can of Worms" (see Map 4.6 on the following page).

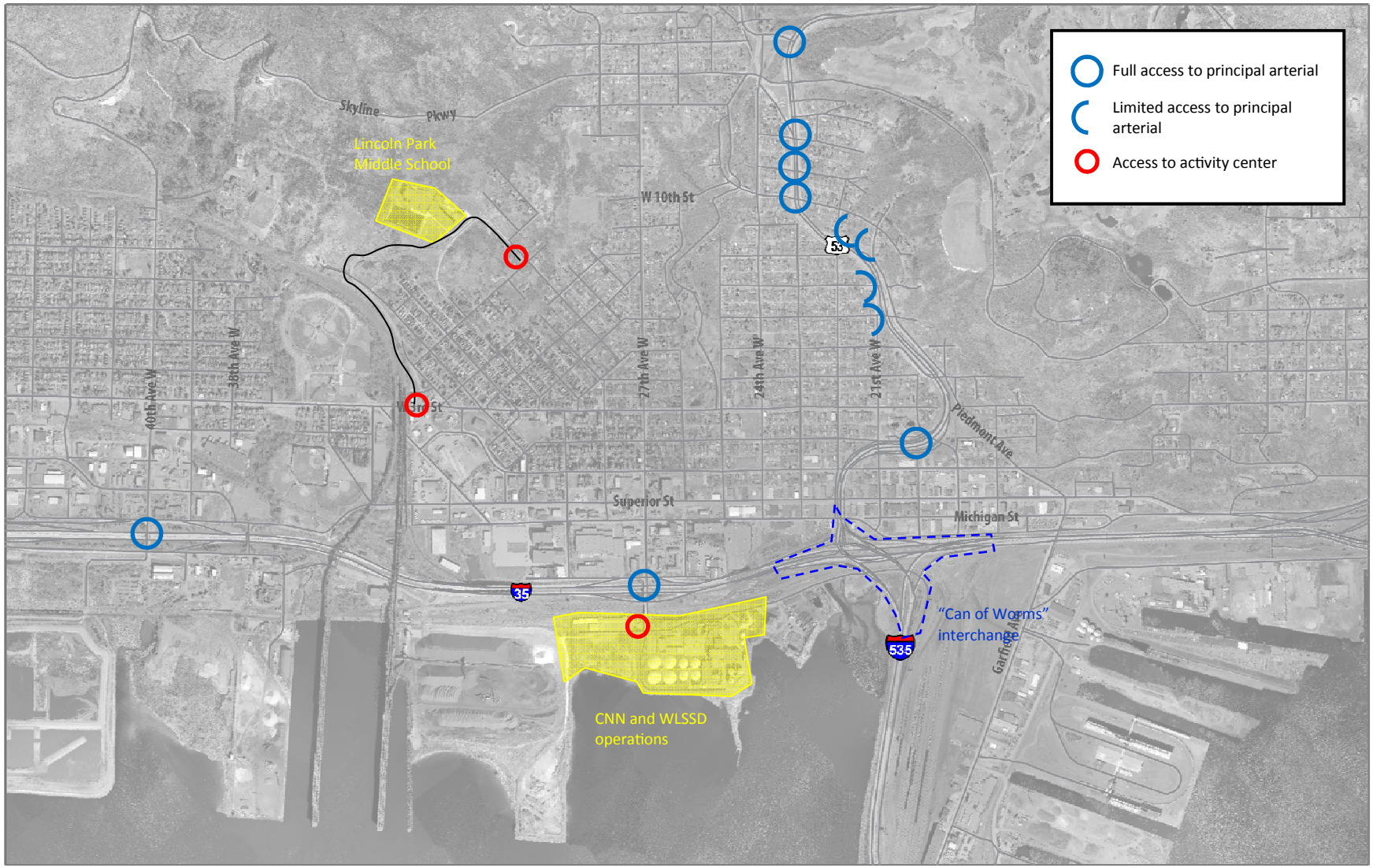
There are also several direct connections to US 53 in the northern portion of the neighborhood. These provide efficient connections to the residential areas atop the hill. Map 4.6 identifies the full- and partial-accesses to this facility, as well the ramp connections to I-35.

*Access to Major Activity Centers:*

Map 4.5 also identifies Network connections to two important centers of activity in the neighborhood: the Lincoln Park Middle school and the Western Lakes Sanitary Sewer District (WLSSD) facilities. Of all the major activity centers in the study area, these two generate the most traffic on a daily basis and both could benefit from improved access.

The middle school was relocated to a new building atop the hillside in 2012. The school is no longer centrally located in the neighborhood, and because of topography and other physical impediments it presents access challenges to other parts in the neighborhood. In particular, the residential areas to the northeast could benefit from a connecting route to W 10th Street and 27th Avenue W (see Map 4.7 on page 38). This would also facilitate efficient travel between US 53 and the school. Unfortunately, the topography and lack of other developments in the area make such a connection impractical, if not entirely unfeasible.

The WLSSD facilities receive and process sewage and solid waste,




**Map 4.6 | Roadway access to regional arterials and key activity centers with access concerns**

An assessment of roadway access in the Lincoln Park neighborhood found that access is good both internally and externally to the neighborhood. There are sufficient opportunities to directly access I-35 and US 53. However, access to two key activity centers - the middle school and the CNN and WLSSD operations - could be improved.


**Map 4.7 | Potential connection between Anson Ave and W 10th St**

The dotted red line above signifies a potential road connection between Anson Ave and W 10th Street to create a more direct access to the new middle school from US Highway 53.


**Map 4.8 | Potential improved connection between Lower Michigan St and Courtland St**

The dotted red line above signifies the potential to create a street connection between Courtland Ave and Lower Michigan St as part of a future redesign and reconstruction of the "Can of Worms" interchange.

which require the arrival and departure of heavy trucks on a regular and frequent basis. WLSSD staff has reported that the site receives more than 100 heavy trucks on a daily basis. Most are garbage trucks, but semi-trailer trucks also regularly deliver and haul away chemicals and other materials.

At present, there is only one formal access to WLSSD and adjacent operations: the 27th Avenue W bridge across I-35. Emergency vehicles can also access these sites from an informal, unpaved access off of Lower Michigan Street, but this cannot be used by regular traffic traveling to and from the site. Staff at WLSSD have reported concerns about the lack of a secondary access in the event of an incident, as well as concerns about the slopes of the existing access during icy, winter conditions.

*The "Can of Worms":*

The Can of Worms interchange (I-35/I-535/US 53) is a large elevated structure made up of 20 separate bridges. Its design not only facilitates the efficient movement of over 60,000 vehicles per day, but it allows for unimpeded travel on local arterials and collectors beneath its raised decks. The design, therefore, also helps to maintain connection between the CBD and the rest of the neighborhood.

Most of the bridges within the Can of Worms interchange will be 60 years old by 2030 and likely need to be replaced by then. MnDOT has begun to explore design options for the interchange, some of which involve a redesign that would replace the raised bridges with a grand, at-grade intersection. Such a design could result in substantial savings in public investment.

Although none of the design options have been officially selected as of yet, it is important to recognize that any redesign will have impacts on traffic patterns in the neighborhood, for better or worse. An at-grade design would be transformative to the neighborhood –

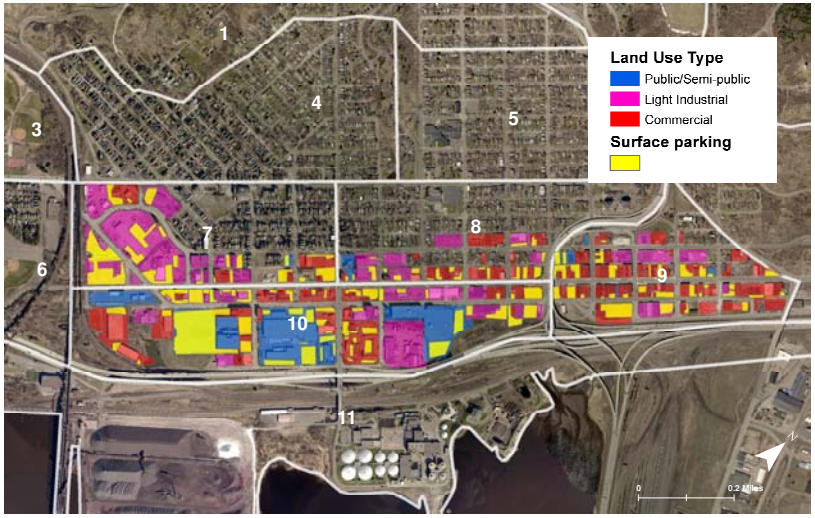
potentially having the effect of isolating certain sub-areas of the neighborhood from others.

It is recognized that a reconstruction of the Can of Worms offers opportunities for altering the alignments of roads, or even creating new connections. The previously mentioned improvement that could be made to the W 3rd Street/Piedmont Avenue connection and a secondary access to WLSSD could potentially both be addressed in a different redesign of the interchange (see Map 4.8 on the previous page).

*Access to Parking:*

Spaces for vehicle parking – both public and private - are abundant throughout the Lincoln Park neighborhood. For instance, a comparison of surface parking to commercial, industrial, and public/ semi-public uses within the high employment zone identified in Chapter 3 showed there is approximately 1 acre of space available for parking for every 4 acres of land being used. And, as Map 4.9 shows, this space is distributed fairly evenly throughout the area. While much of it is privately held and not formalized as designated parking spaces, its abundance presents many opportunities to meet customer and employee parking demand in the area.

Nevertheless, parking is generally cited as an issue of priority to different stakeholders, and a few specific areas of concern were the focus of discussion during the course of this study. First, concerns were expressed about insufficient parking in the CBD, which echoes the concerns heard during a 2002 assessment of transportation issues in the neighborhood. At that time, an extensive study of the available spaces in and their usage was conducted. The results indicated there were, in fact, ample parking opportunities within ½ block of almost all areas in the CBD.




Source: MIC (2015)

**Map 4.9 | Location of off-street surface parking space in the business areas of the Lincoln Park neighborhood.**

There is an abundance of surface lots on both public and private property that are either available, or could be made available for vehicle parking.


Image source: MIC (2015)

**Figure 4.3 | On-street parking on Superior Street between Garfield Ave and 18th Ave - Weekday, midmorning.**

A site observation during midmorning on Thursday, August 21st 2014 showed an abundance of on-street parking along Superior Street east o of 21st Ave W.


Image source: MIC (2014)

**Figure 4.4 | Underutilized off-street parking space underneath US Highway 53.**

There is more than 40,000 square feet of surface parking below the raised sections of US Highway 53. As was observed on Thursday, August 21, 2014, this space is generally underutilized.

Image source: Google Earth, modified by MIC (2014)

**Figure 4.5 | Location of the renovated Esmond building.**

It is hoped that the renovation of the Esmond Building will revitalize the residential and commercial potential of the site. This could, however, bring more demand for parking where there is limited parking available.

Image source: Google Earth (2014)

**Figure 4.6 | On-street parking demand along 27th Avenue W.**

There are a number of residences along 27th Avenue W above W 6th St that do not have off-street parking available to them.

A parking study of similar complexity was not feasible within the constraints of this study, though observations with respect to parking were continuously made during repeated visits to the neighborhood at various times of the day and week. An abundance of parking spaces were noted in nearly every observation. This was true of on-street parking opportunities, such as along Superior St (see Figure 4.3 on the previous page). Furthermore, there is an abundance of free public parking beneath the overpass of US 53 north of W 1st Street, as well as along 22nd Avenue W (Figure 4.4).

One very specific area of concern in the CBD is near in the vicinity of Superior Street & 20th Avenue W. There is the potential need for more parking spaces associated with the city's Housing and Redevelopment Authority's (HRA) revitalization of the Esmond Building at Superior Street & 20th Avenue W (Figure 4.5). The reinvestment in residential units there, as well as new effort to bring commercial ventures in at the street level may lead to increased demand for parking in the immediate vicinity of the building, and there is no long-term parking for residents of the building.

Parking is also a potential issue along 27th Avenue W between W 3rd Street and W 9th Street. There are a lot of residences along the avenue, many that do not have off-street parking. So, many of those residences rely on the avenue for parking their vehicles (Figure 4.6).

There are also few cross-street connections on the eastern side of the avenue, which further limits parking options in the area.

27th Avenue W is narrow: 24 feet from curb to curb. With 8 feet reserved for parking, there is only 16 feet left available for travel lanes. That width is below what is allowed by State Aid standards. Upon reconstruction, the parking will likely need to be removed, or the roadway widened. The latter alternative presents problems, since many of the residences sit close to the street and to widen the

roadway would mean bringing the roadway close to the homes, and even taking away many of the off-street parking spaces that currently do exist.

## Travel Demand & Mobility

Travel demand for the roadway network in Lincoln Park is measured in terms of the daily number of miles traveled per vehicle, per day (DVMT). For 2012, the most recent year of count data available at the time of the study, the estimated total DVMT within the study area was 211,400 miles of travel per day.

### *Trends in travel demand:*

Table 4.3 below shows the neighborhood's road miles classified by their function, as well as the estimated change in total DVMT in the neighborhood between the years 2000 and 2012. The data show the MnDOT-managed routes (I-35 and US 53) accounting for 68% of the DVMT in the area, yet only represent around 18% of the lane miles. Conversely, the county– and city-owned streets (which include the minor arterials and collector routes) accounts for 32% of the traffic in the area, but makes up 82% of the network. This relationship suggests that at least 36% of DVMT (32% subtracted from 68%) in Lincoln Park is traffic just passing through the neighborhood on the interstate or US 53.

**Table 4.3: | Roadway miles in and daily vehicle miles traveled (DVMT) - Lincoln Park neighborhood - *years 2000 and 2012***

| Functional Class | Linear Miles | Lane Miles | DVMT | | Change | % Change |
|---|---|---|---|---|---|---|
| | | | 2000 | 2012 | | |
| Interstate | 2.2 | 8.8 | 94,328 | 94,565 | 237 | *0.3%* |
| Principal Arterial | 2.5 | 10.0 | 30,658 | 49,248 | 18,590 | *60.6%* |
| Minor Arterial | 4.1 | 9.1 | 24,194 | 27,606 | 3,412 | *14.1%* |
| Collector | 10.8 | 24.3 | 39,955 | 29,660 | -10,295 | *-25.8%* |
| Local Roads* | 26.1 | 52.2 | 13,018 | 10,348 | -2,670 | *-25.8%* |
| *Total* | **45.7** | **104.4** | **202,153** | **211,427** | **9,274** | ***23.4%*** |

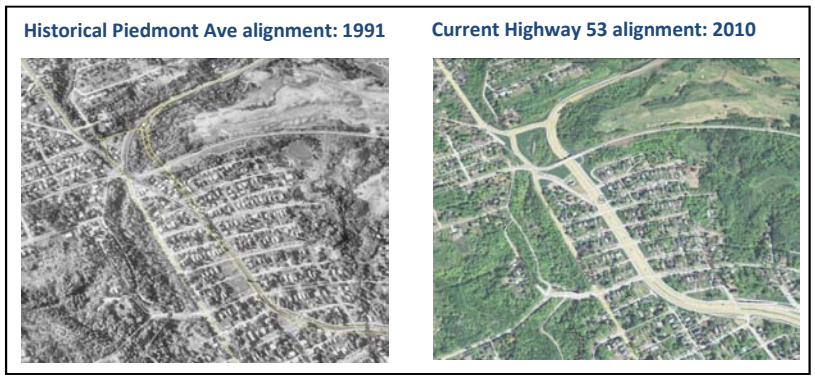
*Data source:* MnDOT Traffic Forecasting & Analysis (2015); MIC estimates (2015).

* DVMT for local roads was based on estimated average daily traffic (AADT) ranges from 250 - 1,000 vehicles per day.

The demand for automobile travel in the Lincoln Park neighborhood appears to have increased over the past decade by about 9,000 DVMT (~23%). Yet, that increase occurred primarily on US 53, which was expanded from a 3-lane roadway to a 4-lane, access-controlled expressway in 2003 (see Figure 4.7 below). This change created greater capacity for faster travel between I-35 and the Miller Hill Mall area, which is a major gateway to the growing community of Hermantown, Minnesota. This would appear to explain the higher rate of growth in traffic along that corridor.

In contrast, most of the local street network experienced the reverse pattern - a 25% loss in travel demand during that same period on average. A clear exception to this was 40th Avenue W, which turns into Haines Road above Skyline Parkway and also heads up to the Miller Hill Mall area. These patterns of increased/decreased demand are shown in Map 4.10 on the following page.

**Figure 4.7: | US Highway 53 - before and after**

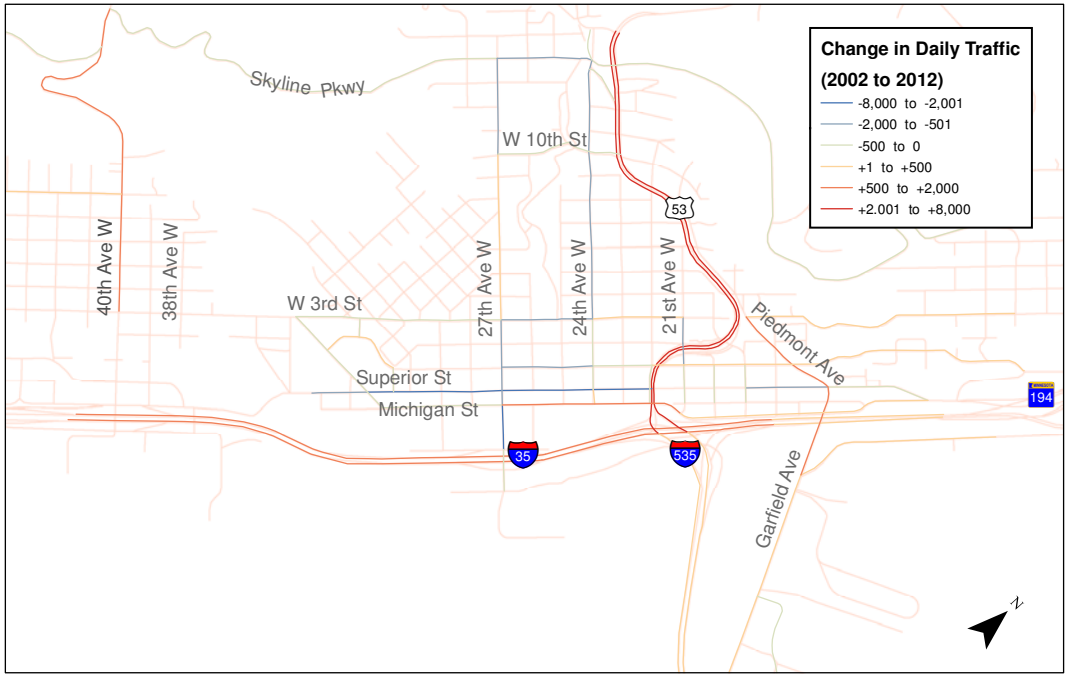



Source of images: Google Earth (2015).

**Map 4.10 |**

### Change in annual average daily traffic (AADT): years 1992 to 2012

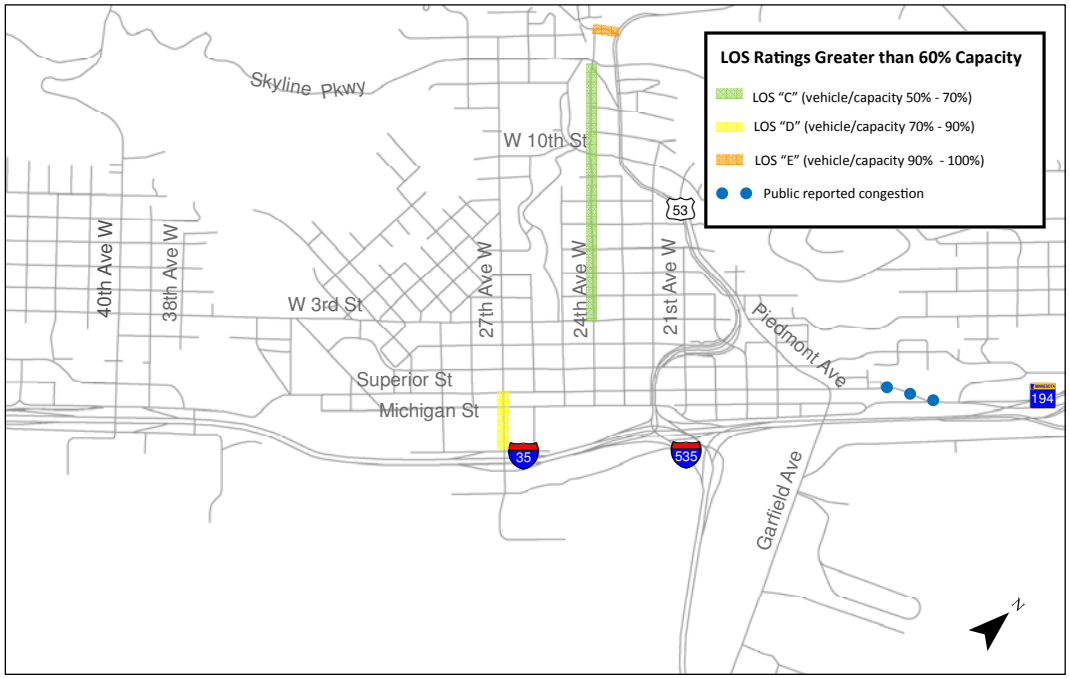
The Lincoln Park neighborhood has experienced a decrease in the daily vehicle miles traveled over the past decade. When looking strictly at AADT count data, it can be seen that I-35 and STH 53 increased in daily traffic, while daily traffic declined on much of the neighborhood streets.




**Map 4.11 |**

### Locations of poor level of service (LOS) - PM peak hour of traffic (year 2015)

The MIC area travel-demand model uses existing AADT data and network characteristics to run scenarios of peak travel-demand over the entire Duluth-Superior road network. The model has indicated that, under current levels of demand, one network segment within the Lincoln Park neighborhood is experiencing poor LOS at the heaviest traveled hour of the day (PM peak hour). Site observations indicate this level of traffic is very short-lived (less than 10 minutes).



*Demand modeling and Level of Service (LOS)*

Computer applications have been used to model travel demand in the Duluth-Superior metro. The modeling software estimates demand according to the location and combination of different socioeconomic variables (household income, age, employment, etc.) for the entire Duluth-Superior metropolitan region. It then compares the estimated demand to the segment characteristics of the existing road network.

The outputs of the modeling have identified a few road segments within or adjacent to the Lincoln Park study area with the potential for recurring traffic congestion. Those segments are shown in Map 4.11 on the previous page. A segment of Superior Street between Garfield Avenue and Michigan Street is also shown because it was reported to the MIC during outreach in the neighborhood as also having regular congestion problems.

For this study, traffic congestion is defined for segments as more than 15 minutes of traffic volume in excess of 85% of road's vehicle-to-capacity (V/C) ratio. Table 4.4 shows how the V/C ratio is expressed in terms of LOS.

Modeling was used to calculate V/C ratios under a PM rush-hour scenario, when traffic levels are known to be most concentrated in the neighborhood. Aside from the three segments identified in Map 4.11, however, traffic congestion is virtually non-existent in the neighborhood. A 0.1 mile segment of Piedmont Avenue between 24th Avenue W and US 53 just north of the study area appears to experience the greatest level of congestion (LOS E). That arterial segment is functionally connected to 24th Avenue W, which also has segments with V/C ratios greater than 50%.

| Volume/Capacity | LOS Rating |
|---|---|
| < 30% | A |
| > 30% < 50% | B |
| > 50% < 70% | C |
| > 70% < 90% | D |
| > 90% < 100% | F |
| > 100% | F |

**Table 4.4: | Level of Service (LOS) ratings of traffic congestion for road segments**

*Peak-hour observations:*

Observations were made along these segments in order to verify the models results and assess causal factors. Photos taken during these observations are shown in figures below. It was determined that the segment of Piedmont Avenue (Figure 4.8) does experience congestion during the PM peak due to the volume and speed of traffic on US 53 during the PM rush hour. The vehicles on US 53 are not required to stop at that intersection, and gaps sizeable enough for vehicles to entering the stream become limited during the PM rush. If the traffic on Piedmont Avenue grows significantly in coming years, a traffic signal may need to be installed at the intersection.

Conditions of traffic congestion along 24th Avenue W (Figure 4.9) are less clear. No significant durations of delay were observed during the PM rush hour. It is noted, however, that the width of the

**Figure 4.8 | Congestion on Piedmont Ave during PM peak hour of traffic**

Image source: MIC (2015)

**Figure 4.9 | 24th Ave W at W 3rd St during PM peak hour of traffic**

Image source: MIC (2015)

upper half of the avenue is small. The 33' cross section limits the street to just two thru-lanes. It is conceivable that a combination of this, a steep slope, number of residential cross streets, and a frequent bus line could constrain the free flow of traffic at times, and that these conditions warrant further monitoring into the future.

A segment that was not identified as congested in the model, but reported to the MIC during its stakeholder outreach efforts was the eastbound segment of Superior Street that connects with Lower Michigan Street. Site observations suggest that, even though the eastbound vehicles may have slightly longer-than-average wait times during peak traffic, the intersection is still operating with an acceptable LOS (Figure 4.10).

Lastly, both the demand-model and site observations showed that the segment of 27th Ave W between I-35 and Superior Street is operating at a LOS D during peak hours of traffic (Figure 4.11). It is natural for greater numbers of vehicles to be traveling on through the segment, as it provides a connection to the interstate. But a concentration of auto-oriented businesses also draws a substantial amount of traffic to the area and generate a lot of turning vehicles at various places along the segment. Add to this the fact that two major cross-streets (Superior Street and Michigan Street) intersect the segment less than 160' from each other (a typical block width in the area is double that distance) and conditions for congestion are ripe.

**Figure 4.10 |**

**Superior St at Lower Michigan St during Weekday PM peak traffic**

Image source: MIC (2015)

**Figure 4.11 |**

**27th Ave W between Superior St and Michigan St - PM peak hour of traffic**

Image source: MIC (2015)

### *27th Avenue W – Operations at Superior Street and Michigan Street:*

In addition to the site visits, MIC staff conducted turning - movement counts at the Superior Street and Michigan Street intersections along 27th Avenue W during the morning, noon, and evening peak hours of traffic. Those counts were compared to data collected at the Helm Street intersection by MnDOT in 2009 in order to get a better picture of how these adjacent intersections (see Figure 4.12) function together. The peak hour traffic volumes recorded at these intersections are shown in Figure 4.13.


**Figure 4.12 |**

**Location of high-volume adjacent intersections on 27th Ave W**

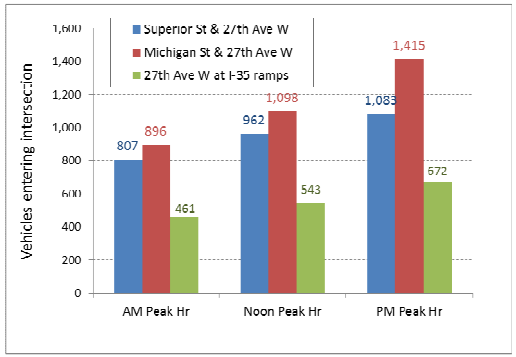



**Figure 4.13 |**

**Comparison of peak periods of traffic - adjacent intersections on 27th Ave W**

The data shows that the Michigan Street intersection during the PM peak facilitates, by far, the most traffic, 367 (35%) more vehicle movements than the Superior Street intersection. Yet, as Figures 4.14 and 4.15 convey, a vast majority of the peak hour traffic is shared between the two intersections, which has the potential to create problems, given the their close physical proximity.

Some "back of the napkin" estimates of signal operations were done using methodology outlined in the 2010 Highway Capacity Manual (HCM 2010), the results of which suggest that current signal operations have the capacity to move existing peak volumes efficiently (Table 4.5 on page 46). However, the queue lengths that can result exceed the actual distance that exists between the two signals. This is illustrated in Figure 4.17 on the following page. Such queue lengths were observed only but a couple of times during the greatest 15 minutes of traffic, but involved semi-trucks and did not cause any backups of significant duration. Yet, traffic jams of longer duration could become an issue with increased traffic in future years.


Image source: MIC (2014)

**Figure 4.14 | Directional counts at Superior St & 27th Ave W - Oct 30, 2014 (4:15 pm to 5:15 pm)**

Counts of vehicles' turning movements during the weekday PM peak hour of traffic show the NW bound (33% of the movements) and the SE bound (32%) legs of the Superior St & 27th Ave W intersection to be the critical lane groups during that period.


Image source: MIC (2014)

**Figure 4.15 | Directional counts at Michigan St & 27th Ave W - Nov 6, 2014 (4:15 pm to 5:15 pm)**

The traffic entering the Michigan St & 27th Ave W intersection during the PM peak hour of traffic was found to be 23% greater than that of the intersection of Superior St & 27th Ave W. The NE bound (36% of the movements) and SE bound (29%) legs of the intersection represent the most critical lane groups during the PM peak.

**Table 4.5 | Vehicle-capacity (V/C) ratios for critical lane groups at the intersections of Superior St & 27th Ave W and Michigan St & 27th Ave W**

The estimated V/C ratios for critical lane groups do not approach 90% (LOS E) at PM peak, indicating that the integrity of the signal operations are not compromised during existing peak traffic levels.

| | Critical lane group | 15 min peak volume | 15 min capacity | Flow ratio | Cycle length* | Lost time + red clearance time | Critical V/C ratio for intersection |
|---|---|---|---|---|---|---|---|
| Superior St & 27th Ave W | NB | 100 | 338 | 0.30 | 120 | 3.5 | 0.58 |
| | WB | 91 | 338 | 0.27 | 120 | 3.5 | |
| Michigan St & 27th Ave W | SB | 121 | 450 | 0.27 | 150 | 3.5 | 0.64 |
| | EB | 80 | 225 | 0.36 | 150 | 3.5 | |

**Table 4.6 | Estimates of operations at 27th Ave W & Michigan St traffic signal.**

| | |
|---|---|
| Signal cycles per hour | 24 cycles |
| Average vehicles/lane/hour* | 178 vehicles |
| Max vehicles/lane/hour** | 264 vehicles |
| Max queue length (at 20' per vehicle) | 220 ft |
| Existing storage limit | 133 ft |
| Estimated current peak queue length | 140 ft |

**Figure 4.16 | PM peak traffic by direction - Intersection of 27th Ave W & Michigan St.**

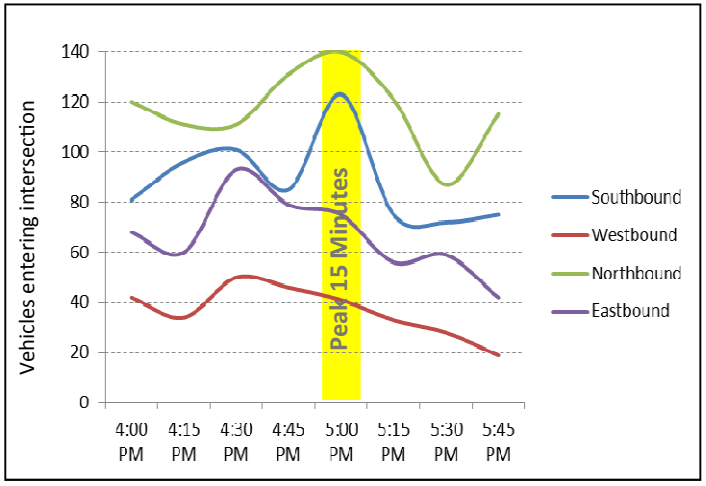



**Figure 4.17 | PM peak queue length for southbound traffic vs. actual storage space - 27th Ave W & Michigan St.**


Image source: MIC (2014)

*Travel demand under future growth scenarios:*

There were not enough resources available to do sophisticated travel demand modeling as part of this study. Without such modeling, it is difficult to say what degree of traffic growth will occur at various locations throughout the Lincoln Park study area. An attempt was made, however, to estimate levels of growth area across the study area as whole using the daily trip estimates of the three growth scenarios established in Chapter 3, as well as regional growth rates from the Duluth-Superior regional travel demand model last run in the Fall of 2014.

For an estimate of internal traffic growth in the neighborhood, the 25 -year growth rates shown in Table 4.7 were generated using the trip estimates and growth scenarios in Chapter 3. Because it is likely that a number of trips would be shared between the households and employment areas, the household trips produced were reduced by 4.3%, which is the portion of Duluth's working population with commute times of less than 5 minutes, according to the Census Bureau's 2009-2013 5 ACS estimates.

While the growth rates shown in Table 4.7 are appropriate for Lincoln Park's internal street network, they are not appropriate for estimating future traffic on I-35 and US 53. Regional growth estimates from the MIC's macro-scale, regional travel demand model were used to derive growth estimates for those roadways, which are shown in Table 4.8 and Figure 4.18 below. Under a high-growth, low -density scenario, there could be 40,500 more miles traveled within Lincoln Park than there are today. And it could be even 10,000 miles more under a high-density growth scenario.

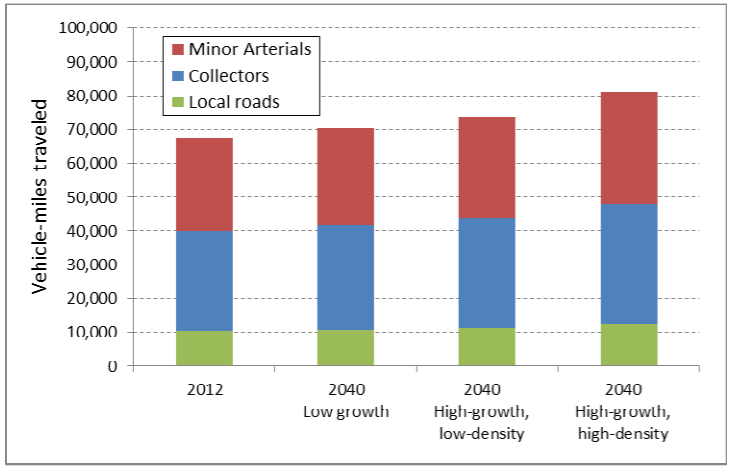
**Table 4.7 | 25-year growth scenarios for trip-demand in Lincoln Park (local street network)**

| Scenario | Growth in household produced trips | Increase in employment produced trips | Traffic growth rate |
|---|---|---|---|
| Low growth | 3.6% | 0.6% | 4.2% |
| High-growth, low-density | 6.3% | 2.8% | 9.1% |
| High-growth, high-density | 11.3% | 8.8% | 20.1% |

**Table 4.8 | 25-year growth scenarios for daily vehicle-miles traveled (DVMT) per functional class in Lincoln Park**

| Functional Class | 2012 | 2040 Low growth | % increase | 2040 High-growth, low-density | % increase | 2040 High-growth, high-density | % increase |
|---|---|---|---|---|---|---|---|
| Interstate | 94,565 | 107,804 | *14.0%* | 121,043 | *28.0%* | 121,043 | *28.0%* |
| Principal Art. | 49,248 | 52,695 | *7.0%* | 57,128 | *16.0%* | 57,128 | *16.0%* |
| Minor Arterial | 27,606 | 28,765 | *4.2%* | 30,118 | *9.1%* | 33,155 | *20.1%* |
| Collector | 29,660 | 30,906 | *4.2%* | 32,359 | *9.1%* | 35,622 | *20.1%* |
| Local Roads | 10,348 | 10,783 | *4.2%* | 11,290 | *9.1%* | 12,428 | *20.1%* |
| Total | 211,427 | 230,953 | *9.2%* | 251,938 | *19.2%* | 259,375 | *22.7%* |

**Figure 4.18 | 25-year growth scenarios for daily vehicle-miles traveled (DVMT) for the local street network in Lincoln Park**



While it is not reasonable to assume that the percent increases in traffic shown in Table 4.8 can be applied equally to every roadway of the same functional classification within the study area, some inferences could be made based on existing patterns. For instance, traffic on 27th Avenue W between I-35 and Superior Street has historically been between 20% and 30% of the AADT on the adjacent segments of I-35. Given this trend, the AADT ranges shown in Table 4.9 could be reasonable to consider for the purposes of planning. Since the PM peak volumes in the neighborhood were found to represent approximately 12% of AADT, this could mean another 1,700 to 1,900 vehicles in that segment during the PM rush hour. Using a similar approach with the Piedmont Avenue & US 53 intersection, as many as 263 more vehicles could be trying to exit Piedmont Avenue during the PM peak, while approximately 400 more vehicles would be moving along US 53 at that time, making suitable gaps in traffic available less frequently.

**Table 4.9 | Ranges of annual average daily traffic (AADT) on 27th Avenue W and Piedmont Avenue under two 2040 growth scenarios.**

| | 2012 | Low Growth Scenario | High Growth Scenario |
|---|---|---|---|
| I-35 at 27th Ave W | 42,500 AADT | 48,500 AADT | 54,400 AADT |
| 27th Ave W: I-35 and Michigan St | 9,000 AADT | 9,700 to 14,535 AADT | 10,800 to 16,320 AADT |
| US Hwy 53 | 10,900 AADT | 11,793 AADT | 13,084 AADT |
| Piedmont Ave at US Hwy 53 | 11,200 AADT | 11,075 to 12,350 AADT | 12,004 to 13,389 AADT |

## Network Condition

A windshield survey of pavement surfaces on the local street network (I-35 and US 53 excluded) was done to identify segments that are in poor condition and in need of improvements (see Figure 4.18). The observed pavement conditions were them cross-referenced against the City of Duluth's Street inventory data and also discussed with City Engineering staff. The results of the survey suggest that as much as 33% of the road pavements are in poor condition (Figure 4.19).

The profile of pavement conditions in Lincoln Park are not unique among the city's neighborhoods, and how the city will continue to fund the growing maintenance needs of its infrastructure is expected to be an ongoing challenge in coming years. As an illustration of this, projects involving full road reconstruction have cost an average of $3.5 million a mile in recent years, while the city's annual budget for street repairs is around $7.5 million/year. At these levels, it would take the city many years to repair the pavements identified as poor, if

**Figure 4.18 | Example of pavement in "poor" condition - 20th Avenue W**

Image source: MIC (2015)

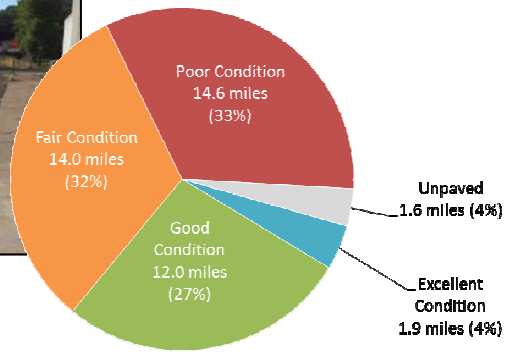



**Figure 4.19 | Pavement condition profile of the local street network in**

Lincoln Park streets were made the only priority streets in the city.

With this challenge in mind, an attempt was made to call out a few high-priority segments of roadway based on their functional importance to the network and their connections to other important corridors and activity centers in the neighborhood. Those segments are shown in Map 4.12 on the following page. The rationale for their prioritization is as follows:

- *Wellington Avenue* acts as a secondary access to the Lincoln Park Middle School site. Unlike Lincoln Park Middle School Road, Wellington Avenue is intersected by several other streets and can act as a strategic reliever route in the event that the main entrance to the school becomes impeded or inaccessible.
- *27th Avenue W* is a minor collector up the hill, connecting Skyline Parkway to the neighborhood below W 3rd Street. In addition to providing functional redundancy to 24th Avenue W, the avenue is the only access to a number of residences in the neighborhood.
- *20th Avenue W* is a major collector in the neighborhood's central business district (CBD). It provides a direct connection to Superior Street and the CBD from the US 53 off-ramp.
- *Courtland Street* is the only formalized connection between I-35 and WLSSD. In addition to serving employees and residents accessing WLSSD, the road serves an average of 100 heavy truck trips daily.

Despite the prioritization of the above routes as a result of this study, it is important to emphasize that the City of Duluth's policy has been to prioritize street repairs based on the condition of the utilities underneath them in order to optimize investments. Since it was beyond the scope of this study to analyze the condition of underground utilities, the segments identified in Map 4.12 may or may not be consistent with the city's current capital improvement strategies.

*Seasonal maintenance:*

Another aspect of network condition in the Lincoln Park neighborhood is the seasonal complications from snow accumulation on certain streets. A substantial number of streets in the neighborhood are narrow, while also accommodating on-street parking.

As identified in Chapter 2, input received from neighborhood residents indicates that the combination of snow accumulation and on -street parking can cause issues along 27th Avenue W and along W 4th Street. A review of parking regulations, as well as plowing policies and procedures may reveal ways that conditions on some of these streets in the winter months might be improved with only minor modifications.

## Chapter Conclusion

The existing conditions and estimated future scenarios summarized in this chapter present the following implications with respect to the following three planning perspectives:

*Multi-modal integration:*

A review of the road network in Lincoln Park shows that there is generally sufficient access throughout the neighborhood, with the exception of secondary connections to the middle school and the WLSSD site. Likewise, operational delays are minimal throughout the network. This is the case even with existence of some legacy one-way segments that do not optimize current operations.

Only two locations appear to be concerns regarding existing or impending future congestion: 27th Avenue W between Superior Street and I-35; and Piedmont Avenue between 24th Avenue W and US 53. Planning for future operational improvements at both of these


**M a p 4.12 | Priority pavements identified as being in "poor" condition**

The segments of roadway above were identified as priorities for pavement improvements. Of all the pavements in poor condition, these segments were prioritized according to their functional importance in the local road network.

locations is advised. Such improvements should seek to optimize the mobility and safety of multiple modes of transportation.

Another future event that deserves substantial planning in advance is the impending redesign of the "Can of Worms" interchange. MnDOT has considered a rebuild of the interchange that would replace the elevated bridge structures with an at-grade design. Such a design would greatly alter traffic patterns in the neighborhood, possibly impeding movements between the CBD and the western portion of the neighborhood for multiple modes.

Existing opportunities for motor vehicle parking were determined to be sufficient under current conditions. There also exists ample surface space to expand both public and private parking opportunities in the neighborhood to help address any growing demand.

Parking may present occasional challenges at a couple of locations in the neighborhood. New uses in the renovated Esdmond Building may generate more parking demand around the adjacent blocks, where there is limited off-street parking opportunities. Parking along 27th Avenue W can also present challenges, as several residences north of W 6th Street do not have off-street parking options. Under conditions of accumulating snow, parking can also lead to operational impediments along the narrow avenue.

*Public investment:*

Maintenance of the road network in Lincoln Park will continue to be challenging, as the existing needs are disproportionate to current revenues for street repairs. With this reality in mind, the maintenance needs of those streets that serve important functions in the network should be prioritized. Four such segments have been identified in this study.

The ongoing management of snow also presents a maintenance challenge for the City of Duluth. The city is unable to immediately address every street segment immediately or with equal attention. With that said, greater attention might be strategically given to certain segments with unique circumstances, such as along 27th Avenue W, 24th Avenue W, and Wellington Avenue.

Funding limitations are not a challenge unique to the city. MnDOT has been considering ways to minimize infrastructure costs as it begins planning for a future rebuild of the "Can of Worms" interchange. The two jurisdictions should work to coordinate their the planning for and maintenance of their facilities within Lincoln Park in order to seize opportunities with which to synchronize the timing of network improvements in order to minimize costs.

*Future opportunities:*

A future redesign of the "Can of Worms" interchange presents a window of opportunity to make significant improvements to the road network in Lincoln Park. It is possible that a secondary access to Courtland Street and an improved connection between W 3rd Street and Lower Piedmont Avenue could be created, depending on the design.

Also depending on the design of the future interchange, the parking spaces beneath US 53 could be enhanced to make them more inviting. One particular area that could be especially capitalized on is the space under the overpass along Superior Street, directly adjacent to the CBD. Minor investments in signage, lighting, and other amenities could make this an attractive parking area for those traveling to the CBD for shopping and entertainment opportunities.

Lastly, future traffic conditions within the segment of 27th Avenue W between Superior Street and I-35 may require significant investments in order to maintain an acceptable level of service (LOS). Recognizing

this presents an opportunity for the City of Duluth to do planning well in advance and take several strategic actions over the coming years. This includes opportunities to develop an access management plan to guide Planning and Engineering staff working with developers on future projects on adjacent properties, as well as budgeting for incremental investments in signal upgrades and improved geometrics.