ROCHESTER COMPREHENSIVE PLAN 2040

Travel Patterns and Link Analysis

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Table of Contents

Table of Figures

Introduction

This memo provides an assessment of travel patterns on Rochester roads. It describes the functional classification of Rochester roads, a description of demand based on current travel patterns, an assessment of roadway street network performance, a summary of crash data, and a description of freight corridors and air travel. Key findings from the memo are provided below.

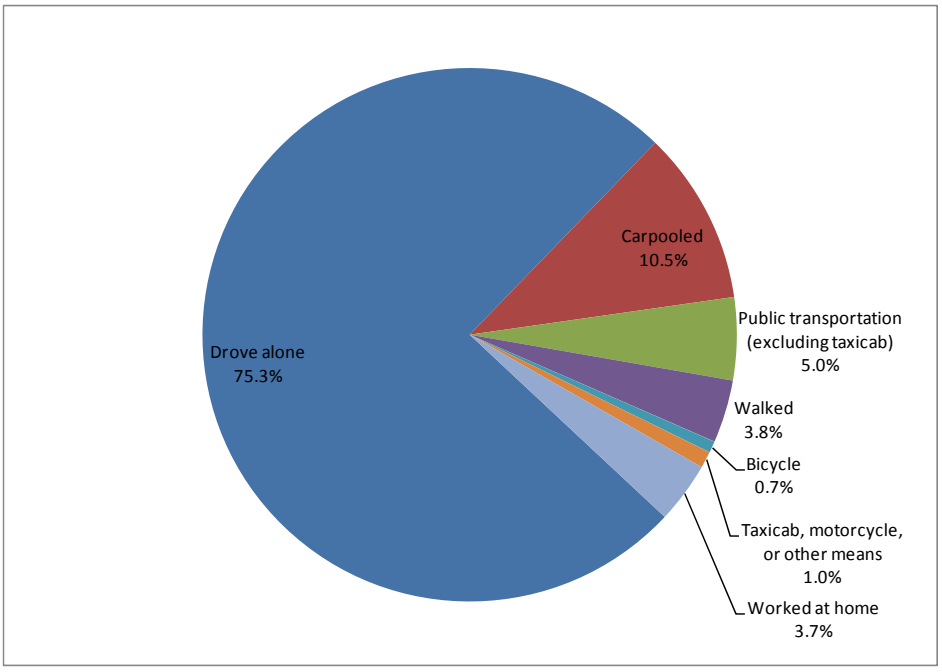
Summary of Key Findings

- **A significant share (40%) of home based work trips are destined to downtown worksites, creating a heavy radial travel flow in and out of the CBD during peak periods.** Other major concentrations of work sites are found along the Hwy 52 north corridor, West Circle Drive north of 19th Street NW, and the Apache Mall area. Many home-based work trips destined for downtown originate in northwest Rochester.
- **Non-work trip patterns reflect a variety of destinations, with shorter trip distances.** Corridors like Broadway that provide key access to commercial centers exhibit high travel demand. The high share of shorter trips both signal that people trip chain for their daily non-work trip needs and that there is potential to substitute some of the shorter motor vehicle trips with transit, walking, or biking.
- **Crash frequency increases with land use intensity and traffic volumes.** Over the past 5 years, collisions involving motor vehicles, pedestrians and bicycles have been focused along arterials where land use access is in highest demand. Downtown corridors like Broadway, 2nd Street SW/SE, and 4th Avenue NW/SW exhibited the highest pedestrian demand and greatest concentration of collisions in the city. The top five high crash corridors include Broadway from East Circle (Hwy 22) to Hwy 52; 2nd St from W Silver Lake Dr to Hwy 52; West Silver Lake Dr NE/ 3rd Ave from Broadway to 20th SE; Center St; and 4th St SW/SE.
- **Arterial and freeway congestion is limited to select corridors.** Most streets exhibit no congestion (using the vehicle per lane per day metric). However, given the urbanizing nature of the city, there are opportunities to improve the person carrying capacity of corridors and increase tolerance for congestion. Moderate congestion is experienced on Broadway Avenue in the vicinity of 12th Street South, along US 14 across the south side of the downtown area, and along West Circle Drive, particularly near US 14 and Hwy 52 interchanges.
- **Through freight movement is accommodated on higher order roadways, with local streets serving deliveries.** Major freight corridors in Rochester are primarily focused on highways, as well as peripheral arterials such as West Circle Drive NW, East Circle Drive NE, and Marion Road SE. However, many internal streets that provide direct delivery access to downtown also serve as key access routes for people taking transit, walking, and bicycling. It is important to ensure these routes can comfortably accommodate all users.

How Do People in Rochester Travel Today?

Figure 1 below identifies how people in Rochester typically get to work, according to the US Census Bureau's American Community Survey (ACS). Approximately 75% of trips are drive alone, over 10% are via carpool, 5% are on public transportation, 4% are walking and 1% are on bicycle. It should be noted that ACS asks respondents to report their most common means of transportation taken to work, meaning travel on modes that residents use sometimes (e.g., biking in good weather) goes unreported. Additionally, the journey to work is only one of a large number of trip purposes. In 2013, a national study found that work trips accounted for just 15.6% of all trips and 27.8% of vehicle miles of travel.[1] It is for this reason that the ACS journey to work question generally underestimates the amount of walking and bicycling activity in a community. A more detailed look at spatial travel patterns is provided later in this memo.

Figure 1 – Primary Means of Transportation to Work



Source: American Community Survey 2009-2013, Table S0801

[1] American Association of State Highway and Transportation Officials. Commuting in America 2013, Brief 2: The Role of Commuting in Overall Travel. Accessed online: http://traveltrends.transportation.org/Documents/B2_CIA_Role%20Overall%20Travel_web_2.pdf

What Influences Travel Patterns and Traffic Conditions in Rochester?

Travel patterns to, from and within the City of Rochester are reflective of the unique employment, development, and regional centrality that characterizes the city. The greatest concentration of employment and economic activity in the city and the Southeast Minnesota region is located in downtown Rochester. With rolling hills, the Zumbro River and adjoining creeks, and open spaces, the city's unique geography constrains where development can occur and impacts travel patterns. Travel patterns also reflect available mobility options, which impacts access to resident and employee goods and services as well as the ability of streets to support the social, economic, environmental, and recreational functions of the public realm.

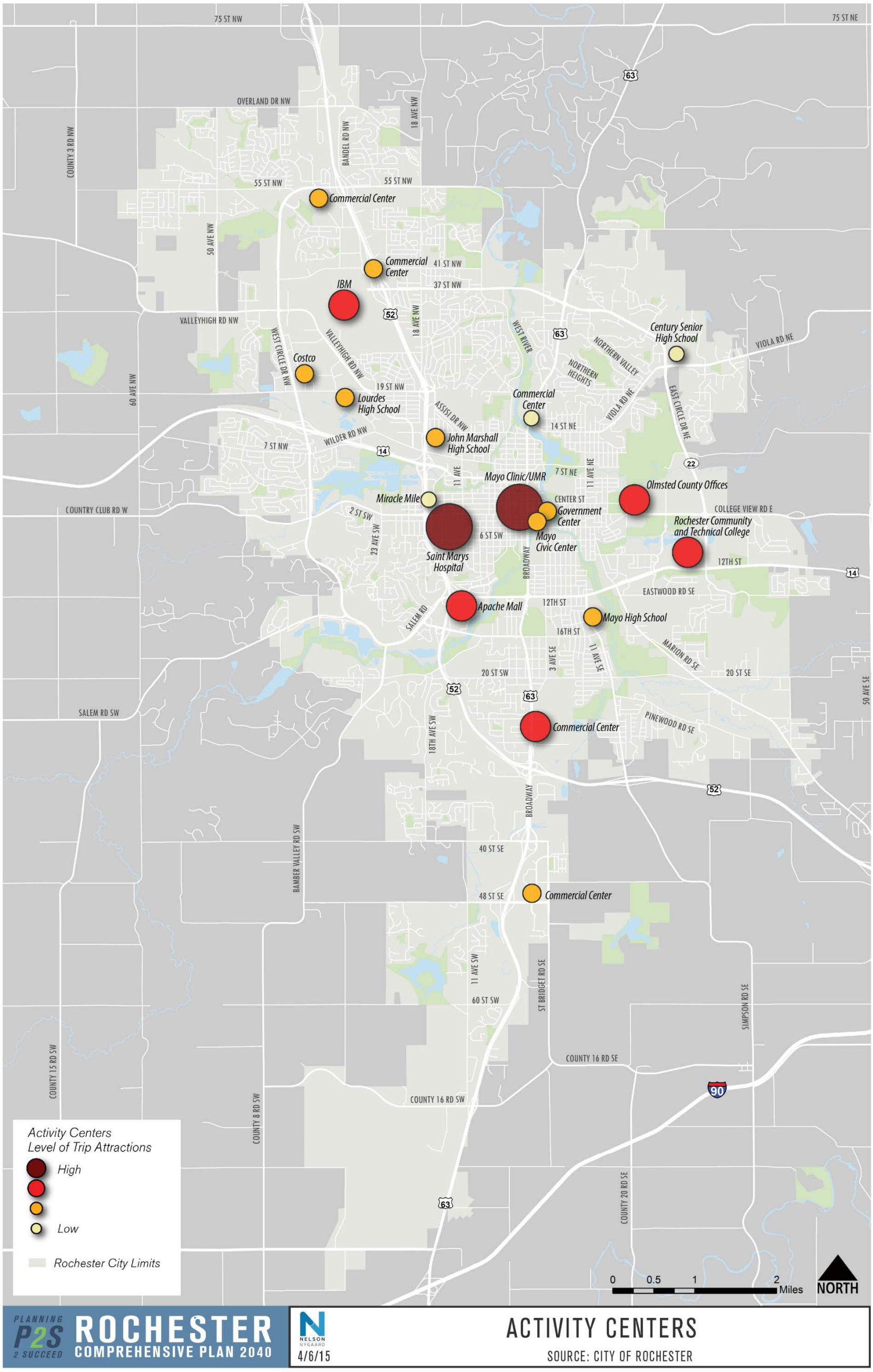
2nd Street SW in front of Saint Marys Hospital carries a high volume of traffic in the AM and PM peak periods.

Image from Nelson\Nygaard

Outside of the dense street grid of Rochester's downtown and established inner neighborhoods like Slatterly Park, Kutzky Park and historic Pill Hill, the city has seen growth in lower density residential neighborhoods. Rochester has expanded its boundaries and slowly accommodated infill commercial development and large lot residential, interspersed with low to medium-density multi-family housing. The major trip attractors in the city, illustrated in Figure 2, demonstrate the centrality of downtown as well as the connection between major commercial nodes and the radial street network linkages to the historic downtown core. The majority of trips are generated from the Mayo Clinic's various downtown facilities including the Gonda Building, Methodist Hospital, and Saint Marys Hospital. Outside of downtown, trip attractors are focused around the city's numerous commercial centers including Apache Mall and Northbrook Shopping Center.

The city's transportation infrastructure reflects historic development patterns, with implications on mode choice and traffic conditions. Lot sizes are larger, densities are generally lower, and streets have been designed primarily for moving automobiles. The city has a renowned off-street trail network and a respectable citywide transit commute mode share (6.5%, according to the 2013 American Community Survey), but these gains in multimodal infrastructure and travel behavior will be challenged by future regional and citywide growth, largely spurred by Destination Medical Center investments. Increasing numbers of commuters to Rochester will create pressure on roads and downtown parking. On the other hand, the Millennial Generation (born between 1981 and 2000) as well as future residents and employees likely represent an increasing demand for diverse transportation choices. The Rochester Downtown Master Plan, adopted in 2012, set goals to become a less automobile-oriented city and rely more on transit, bicycling, walking to meet daily needs.

Figure 2 – Activity Centers



Highway Network

People moving through and to points within Rochester have access to five highway facilities—Interstate 90, US Highways 14, 52, and 63, and Minnesota State Highway 30. Rochester's highway network provides a mixture of citywide through-mobility as well as regional connectivity linking the city directly to Minneapolis, St. Paul, La Crosse, Mankato, and Albert Lea. Much like its peers, Rochester's highway network largely skirts the center of the city, providing downtown access but preserving the tight grid of internal street connections. US 52 carries the most daily trips in the region, with between 59,000 and 81,000 daily automobile trips along the city's most urban highway segments. US 52 is a critical roadway that facilitates access for the substantial demand to reach employment destinations. It provides the primary automobile route to the Mayo Clinic via 2nd Street SW and Civic Center Drive NW. Broadway Avenue serves as a key north-south highway link primarily serving through trips to points north and south of downtown. Minnesota Department of Transportation (MnDOT) recently transferred this four lane highway connection to local jurisdiction control. Based on plans developed during the DMC Development Master Plan, Broadway Avenue is envisioned to be reinstated as Rochester's traditional Main Street corridor accommodating north-south auto demand while enhancing access and crossing for people on foot.

Major Travel Corridors

Rochester's roadway network includes 507 centerline miles, including the regional highway facilities. The majority of the network (approximately 70%) is dedicated to local neighborhood streets, while collectors, arterials, and highways cover the remaining roadway mileage (approximately 30% of the total) in the city. Rochester's street network is constrained by natural and manmade features, including the Zumbro River, major hills to the west and north of downtown, and the railroad corridor on the north edge of downtown. Street network design in neighborhoods surrounding downtown leads to heavy reliance on arterial and collector thoroughfares for connectivity, as these are the only route options that connect to major destinations and cross rail corridors, traverse water, and bypass major topographic features.

Figure 3 illustrates Rochester's street network and underscores the importance of a key set of thoroughfare corridors. The map also displays the travel lane allocation on each major corridor. Sixty-four percent of major travel corridors consist of two travel lanes (one in each direction) and 33% have four travel lanes (two in each direction). Only 2% of Rochester's street network has over four lanes.

Streets primarily tasked to move regional traffic and freight include US 52, Broadway Avenue (US 63), US Highway 14, and West Circle Drive NW/Salem Road. Other minor arterials like 55th Street NW and 3rd Avenue SE provide connections to local streets and can carry significant volumes. Streets classified for more intensive use, such as arterials, are intended to provide mobility and move large volumes of traffic through and within the City. To achieve this goal, these streets typically have higher posted speeds and more travel lanes, require vehicles to stop at few locations, and have limited side streets and driveways. Corridors such as Broadway, 2nd Street SW, 3rd Avenue SE, 4th Street SE, and the 3rd/4th Avenue SW/NW couplet are the key direct routes to and through downtown. Transit and active transportation demand into downtown is focused on these major thoroughfares due to a lack of network options. Some major

thoroughfares are relatively narrow streets with competing multimodal demands, but limited available space for expanding the right-of-way.

Outside of downtown, the traditional grid shifts to a less connected 'loop-and-lollipop' style of residential local streets and collectors that connect to limited access arterials such as 37th Street NW and East Circle Drive NE. These arterials facilitate regional connectivity and transportation system capacity to outlying neighborhoods, but eventually link to the same limited number of inner travel corridors that pass through Rochester's downtown core. This "bottlenecking" effect points to one of Rochester's central transportation challenges. Demand for downtown access will continue to grow as the impacts of DMC investments are realized.

Rochester's Roadway Classifications

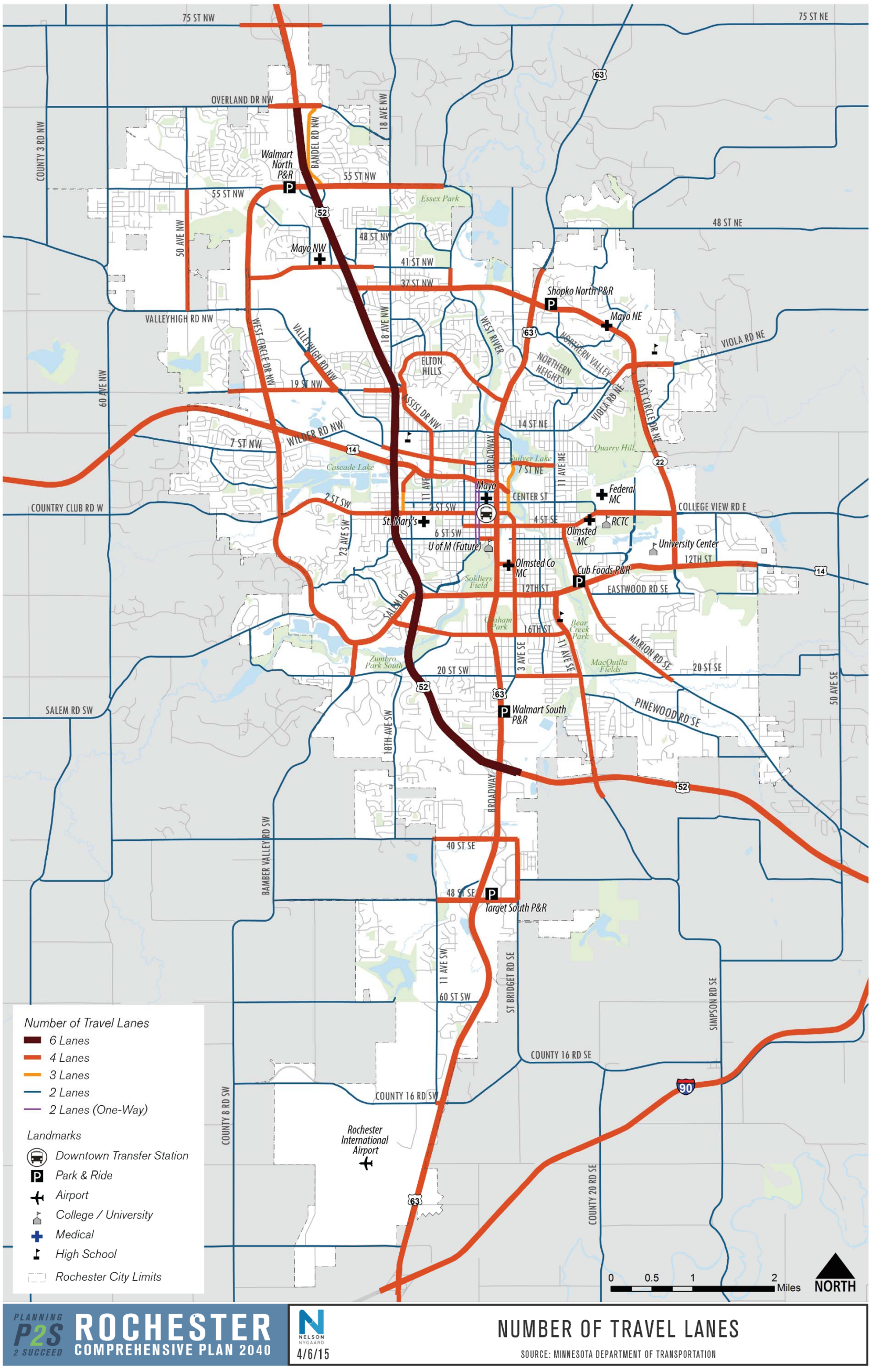
The ROCOG 2040 Long Range Transportation Plan classifies streets in the region based on intended function and character. This "functional classification", illustrated in Figure 4 and described in Figure 5 (with original plan language), serves as a general street network plan and designates each streets' role for different types of travel markets. The classification not only identifies the purpose of the street, but it can be used to apply design standards like lane widths and criteria such as driveway spacing and access requirements. The classification also identifies which roadways are eligible for funding under different federal and MnDOT programs.

Although local streets are not included in the city's functional classification system, they are the most prevalent street type in Rochester. These streets provide low speed and low volume access to residential neighborhoods, but also represent pedestrian and bicycle connections to major destination and off-street multi-use paths. These streets are typically designed to encourage lower speeds and may have numerous intersections that require vehicles to stop.

How many people can a lane move?

Different classes of roadways are designed to handle varying levels of traffic, and serve a spectrum of access and through movement functions. For example, a free-flowing highway lane on US 52 can move around 2,000 vehicles per hour, while a lane on an arterial street like Broadway can move only about 600-700 vehicles per hour. This is due in large part to the need to move traffic on cross-streets through at-grade intersections, driveway access and the natural tendency for vehicles to limit travel speed on narrower streets. The primary benefit of highways is not capacity but speed – they are particularly useful for moving people long distances quickly and typically cannot achieve the other potential roles of a street—such as business access, economic and social exchange, and placemaking. Rochester's street system must ultimately balance the need to move people through the city with providing safe access to the city's various destinations.

Figure 3 – Street Network by Number of Travel Lanes



Lane numbers shown above represent the average lane number across long segments. Actual lane allocation varies.

Figure 4 – Street Classifications

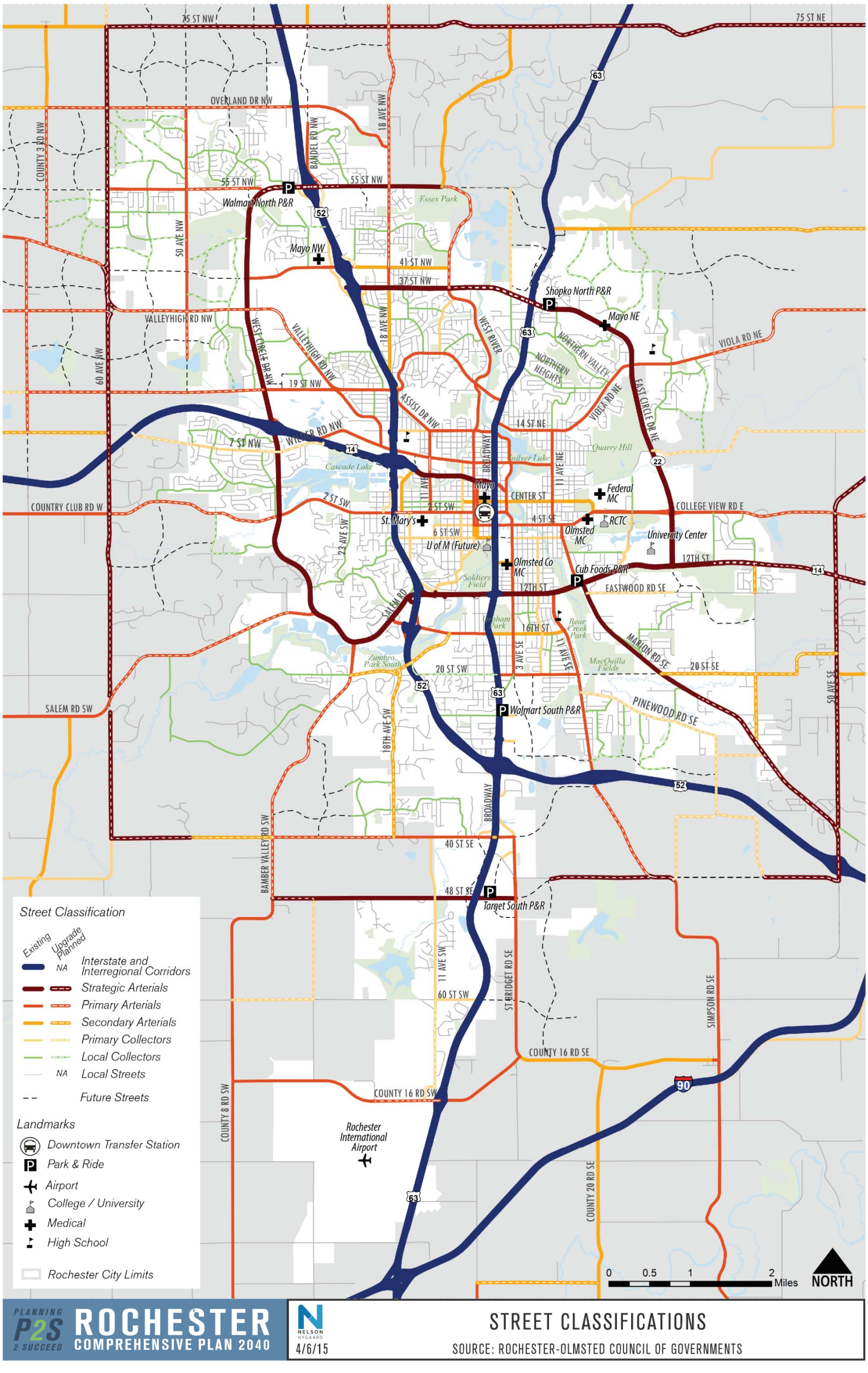


Figure 5 – Functional Classification of Rochester Streets

Classification	Description	Examples
Interstate and Interregional Corridors	Serve inter-city, inter-regional, or interstate travel at higher speeds with a high level of continuity to minimize indirection of travel between regional origins and destinations. Serve as primary freight routes, handling movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel.	Interstate 90 US 52 north of Interstate 90
Strategic Arterials	On a regional basis, Strategic Arterials supplement the Interstate/Interregional Corridors by providing connections to smaller cities and other important economic activity centers not on the interregional system. The major function of Strategic Arterials is to provide for the mobility of traffic. Service to abutting land is a secondary concern. The speed limit on Strategic Arterials can range from 30 to 65 mph depending on the land use environment in which they are located. By nature of their size, most small urban areas will not generate internal travel warranting an urban Strategic Arterial network. The Strategic Arterial system for these small urban areas will largely consist of extensions of rural strategic arterials into and through an area. In larger urban areas, Strategic Arterials are of regional importance, carrying high volumes of higher speed traffic, including through traffic, with limited service to abutting land and design characteristics such as medians and limited traffic signalization to enhance traffic flow.	East and West Circle Drive 12th Street SE
Primary Arterials	Primary Arterials provide service to trips of moderate length at a somewhat lower level of travel mobility than Interregional Corridors or Strategic Arterials. This system distributes travel to smaller geographic areas than the travel sheds typically associated with the higher order systems. On a regional basis, Primary Arterials serve trip lengths characteristic of intra-county service. Travel served will primarily be between significant traffic generators (either individual uses or concentrations of development) or will be part of a collection function routing travel to higher level routes. Regional Primary Arterials are roadways generally not of statewide importance but of countywide importance. On a regional basis, Primary Arterials should be spaced at such intervals, consistent with population density, that all developed areas of the county are within a reasonable distance of a primary arterial or higher order highway. While Primary Arterials allow for the integration of both local and regional travel, the majority of traffic on the system is not typically low speed local access traffic. Arterials should be managed to provide safe and efficient through movement, while providing some access to abutting lands. On an urban basis, Primary Arterials serve to connect major activity centers of sub-areas not served by higher order streets. Major commercial streets will typically be of a Primary Arterial classification. Arterials are important in providing the “last mile” ling for commuters and freight service to major employment areas within cities. Such facilities will typically carry local bus routes and provide important network connectivity and continuity, but ideally should not penetrate identifiable neighborhoods.	2nd Street SW 4th Avenue SW/NW 19th Street NW
Secondary	Secondary Arterials are similar in function to Primary Arterials but carry lower volumes, serving trips of shorter distances and with a higher degree	18th Avenue SW

Classification	Description	Examples
Arterials	of property access. Corridors will typically be shorter length routes that serve important mobility functions within urban or regional subareas. Secondary Arterials will improve the connectivity of the overall network on a localized basis and will typically provide access to a mixture of land uses. In non-residential or higher density residential areas, these routes will be important for truck and transit accessibility. They serve secondary traffic generators such as community business centers, neighborhood shopping centers, and multi-family residential areas.	41st Street NW
Primary Collectors	Primary Collector streets typically provide land access and traffic circulation among multiple adjacent residential neighborhoods and within commercial districts and industrial areas. They distribute traffic movements from such areas to the arterial street system and keep local area movements off the major road system. Collectors typically do not accommodate through traffic and are not continuous for any great length. In rural areas, Primary Collectors should be spaced at intervals, consistent with population density, to collect traffic from local roads and bring all developed areas within a reasonable distance of a collector or higher order road. Primary collectors are predominantly two lane roads, with at-grade intersections. Individual access for every lot should be discouraged unless lots are of sufficient frontage to provide adequate spacing between driveways. The cross section of a collector street may vary widely depending on the type, scale, and density of the adjacent land uses. This type of roadway differs from the arterial system in that: • On-street parking is typically permitted • Posted speed limits typically range between 30-35 mph • Traffic volumes typically range between 2,000 and 7,000 vehicles per day In the central business district, and in other areas of like development and traffic density, the collector system may (and desirably will) include a grid of streets which forms a logical entity for traffic circulation.	6th Street SW Pinewood Road SE
Local Collectors	Local Collectors will primarily serve residential areas, serving to connect adjacent neighborhoods, to deliver residential traffic to neighborhood activity centers and to deliver traffic from local streets to the higher order street network. At the level of local collectors, individual access for every lot is compatible with the function of the street and the street should operate at lower speeds, incorporating as necessary traffic management features to minimize travel speed. While local collectors are designed to discourage through traffic, it is with the understanding that traffic generated in adjacent neighborhoods is not considered through traffic where these neighbor hoods are not divided by a higher order street. Long segments of the continuous local collector streets are not compatible with functional design of the street network. Long Continuous collectors will encourage through traffic, essentially turning them into secondary arterials. Ideally, collectors should be no longer than ½ to ¾ miles without the introduction of discontinuity into the route.	31st Street/12th Avenue SW 20th Street SW

Source: ROCOG 2040 Long Range Transportation Plan (2010)

Existing Travel Demand

This analysis reviews current regional travel demand patterns using the Rochester-Olmsted Council of Governments (ROCOG) travel demand model. Reviewing current origin-destination pairs identifies major travel movements in the Rochester area. Investigating travel demand patterns and trends as they relate to the existing multimodal transportation networks also helps identify corridors with significant demand that could support improved transit services or other multimodal corridor enhancements.

The following trip types are used to evaluate travel demand:

- **Home-based work (HBW) trips:** Person vehicle trips taken to commute from home to employment locations.
- **Non-work trips:** All other person vehicle trips taken for non-work purposes such as shopping, medical, recreational, and personal trips, among others.

Figure 6 and Figure 7 illustrate the top 100 Rochester home-based work and non-work trip origin-destination pairs in 2010. A large share of the most common home-based work trip destinations are focused on the downtown core and St. Mary's Hospital. Most trips are originating from the northwest, north, and southeast of downtown.

The northwest Rochester district produces and attracts more trips than any other part of the city. This area includes major employers along the US 52 corridor, such as IBM. The district is also home to several large commercial and retail developments.

Current non-work trips are more corridor-focused; a high concentration of travel demand exists along the southern Broadway corridor, along Highway 63, and 2nd Street SW. Additional non-work travel demand is focused on downtown Rochester and in north Rochester near Highway 52. Also of note, most non-work trip are short in nature suggesting that either people make many shopping trips close to home (representing opportunities for using active transportation) or that people do a significant amount of trip chaining (making multiple stops while traveling from the trip origin to the final destination).

Non-work trips are centered on destinations like Apache Mall and other major commercial centers along the Broadway corridor.

Image from Nelson\Nygaard

Figure 6 – Top 100 Home-Based Work Origin-Destination Pairs in Rochester (2010)

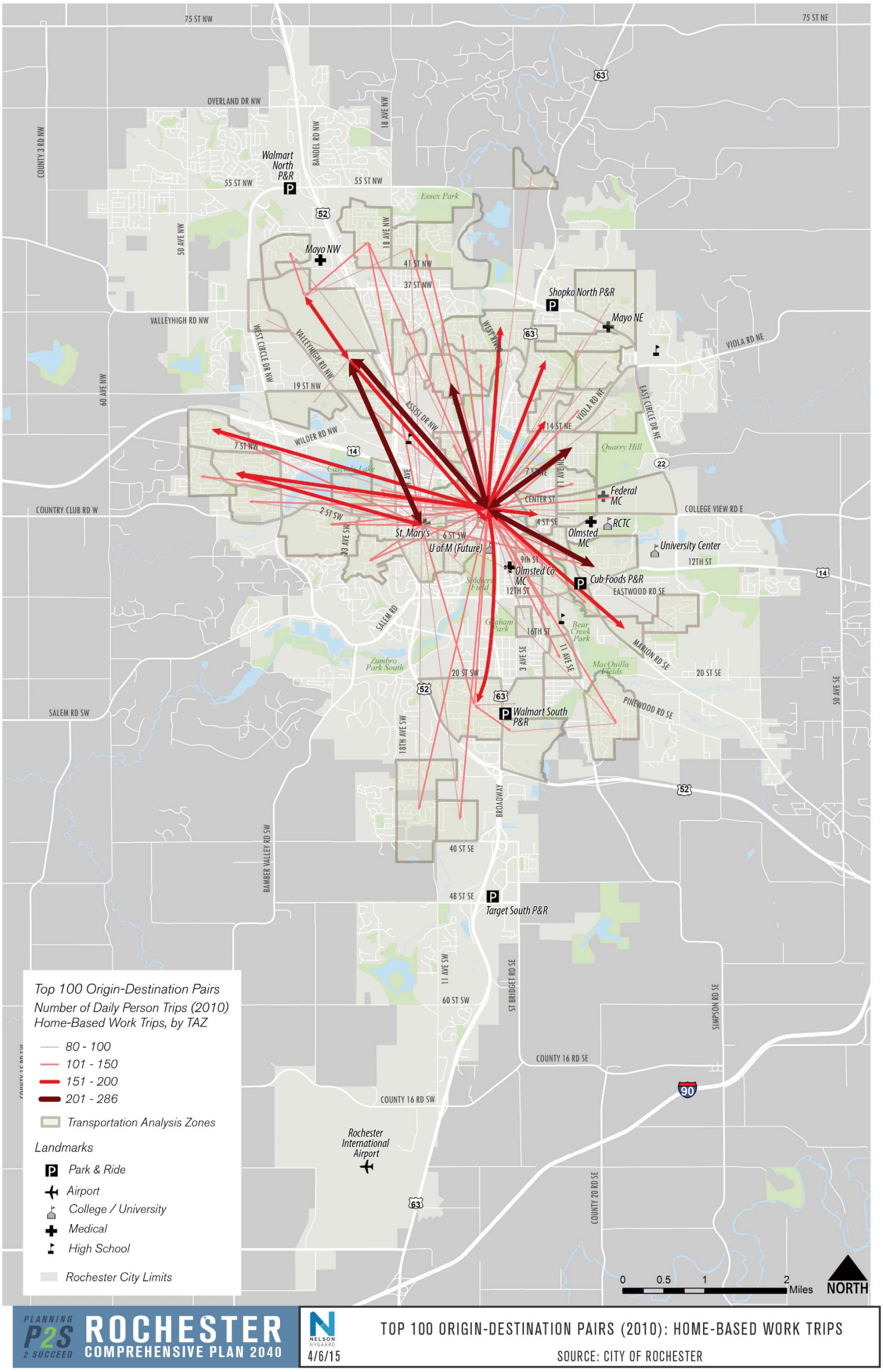
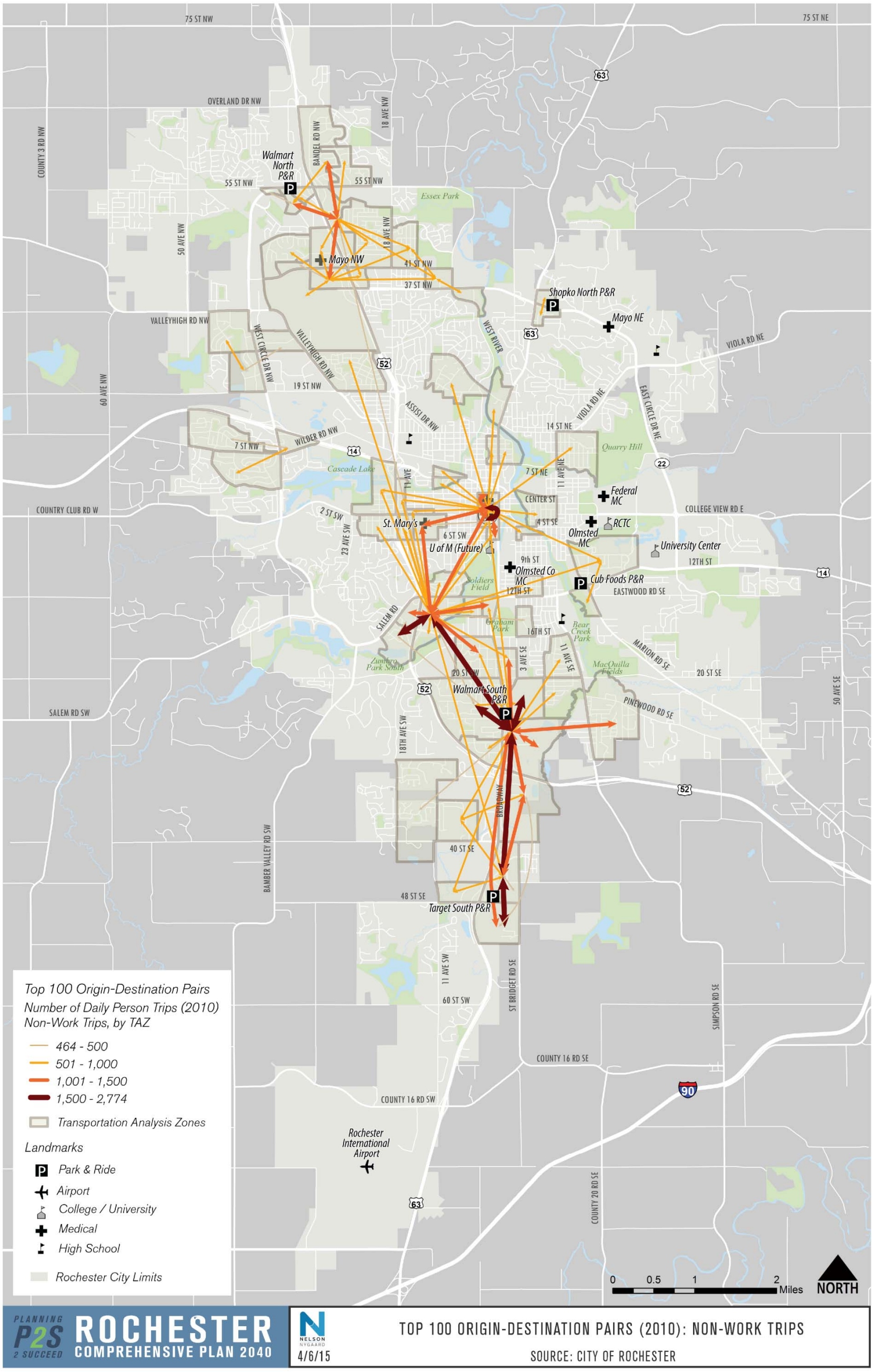


Figure 7 – Top 100 Non-Work Origin-Destination Pairs in Rochester (2010)



How Does Rochester's Street Network Perform?

While geography and the confluence of travel corridors into downtown Rochester create minor delays during peak travel periods, Rochester generally experiences favorable automobile travel conditions. The City of Rochester applies vehicles per lane per day (VPDPL) thresholds to identify congestion. Volume/capacity (v/c) ratio and intersection level of service (LOS) are other traditional indicators of the quality of automobile travel on a road typically used to determine roadway network performance.

Figure 8 presents criteria for rating congestion levels on freeways and arterials in Rochester. Congestion levels in Rochester are calculated by dividing the most current MnDOT Average Annual Daily Traffic (AADT) by the imputed number of lanes to establish the VPDPL. Figure 9 shows the congestion level of each roadway based on the rating criteria. All freeways in the region had VPDPL less than 15,000 and were classified as 'Conditions not congested.' Most arterial roadways also fell into this category. Some arterial segments of US 14, CSAH 22, Broadway, and Civic Center Drive show moderate to severe congestion under existing conditions, which may require multimodal intersection upgrades depending on the level of intersection LOS along streets with varying functional classifications. For example, the Central Business District's LOS peak period threshold is between a LOS D and LOS E, while all other roadways in the urban core of the city have a peak period threshold of LOS C or LOS D.

Figure 8 – Urban Traffic Congestion Thresholds

Facility Type	Conditions not congested	Moderate congestion	Heavy congestion	Severe congestion	Extreme congestion
Freeway	<15,000 VPDPL	15,000-17,500 VPDPL	17,500-20,000 VPDPL	20,000-25,000 VPDPL	>25,000 VPDPL
Arterial	<5,500 VPDPL	5,500-7,000 VPDPL	7,000-8,500 VPDPL	8,500-10,000 VPDPL	>10,000 VPDPL

Source: ROCOG Long Range Transportation Plan, August 2010

Relaxing LOS thresholds

Many cities with thriving downtowns and commercial corridors consider peak hour congestion levels that do not allow for free-flowing travel not only acceptable, but indicative of a strong local economy. Efforts to minimize congestion can make streets larger and less human-scaled and affect the vitality of local stores and businesses. On the other hand, allowing some level of peak hour congestion encourages travelers to consider other travel modes, including transit, bicycling, and walking which are attractive options for travel within Rochester given exceptionally high parking demand in downtown. Shifting passengers to other modes makes effective use of existing infrastructure and can be much more cost effective than expensive roadway capacity expansion projects designed to mitigate conditions that only occur during one or two hours of the day. Given the cost required to continue adding roadway capacity, cities around the nation

broadly support lower cost mobility and access investments that both improve the person throughput of streets but also improve the quality of service for people walking, bicycling and taking transit. Addressing quality of service factors like enhancing the transit and pedestrian experiences also aligns with broader community goals to improve residents' quality of life and leverage transportation investments to support a vibrant and diverse economy. The transit and non-motorized transportation existing conditions analyses summarize the results of alternative system performance indicators such as transit service frequency, pedestrian environmental quality, and bikeway coverage, among others.

To supplement the VPDPL analysis, raw MnDOT traffic volumes are mapped on Figure 10 to show which streets carry the greatest traffic loads in the city.[2] Traffic volumes on Rochester streets are generally lower as compared to urban areas of similar size. Broadway and Civic Center Drive NW are two of the city's two highest trafficked non-highway streets, accommodating 27,000 and 30,000 vehicles per day (vpd), respectively. Other major traffic streets include West Circle Drive (23,000 vpd), 37th Street NW (24,800 vpd), 12th Street SW/SE (22,800 vpd), and 2nd Street SW (21,200 vpd).

Civic Center Drive NW is a primary access route to downtown Rochester and feeds into Civic Center Drive SE (pictured above). Traffic disperses into downtown's north-south streets which limits the traffic volume on Civic Center Drive SE.

Image from Nelson\Nygaard

[2] Most of the counts (336 out of 411) in the Rochester area were taken in 2010. The remaining counts were taken in 2012 and 2013, with 64 and 11 locations, respectively.

Figure 9 – Vehicles Per Day Per Lane

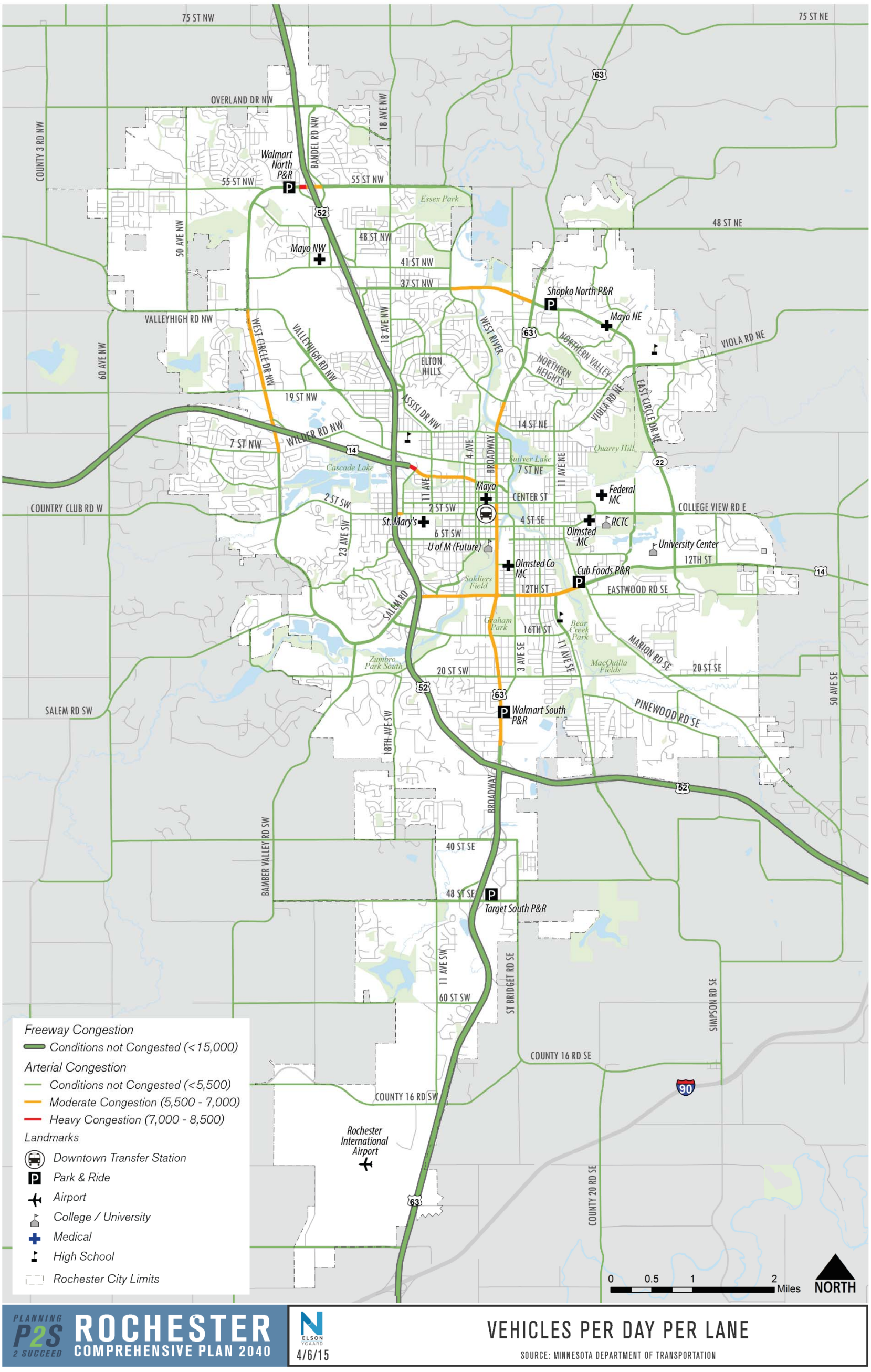
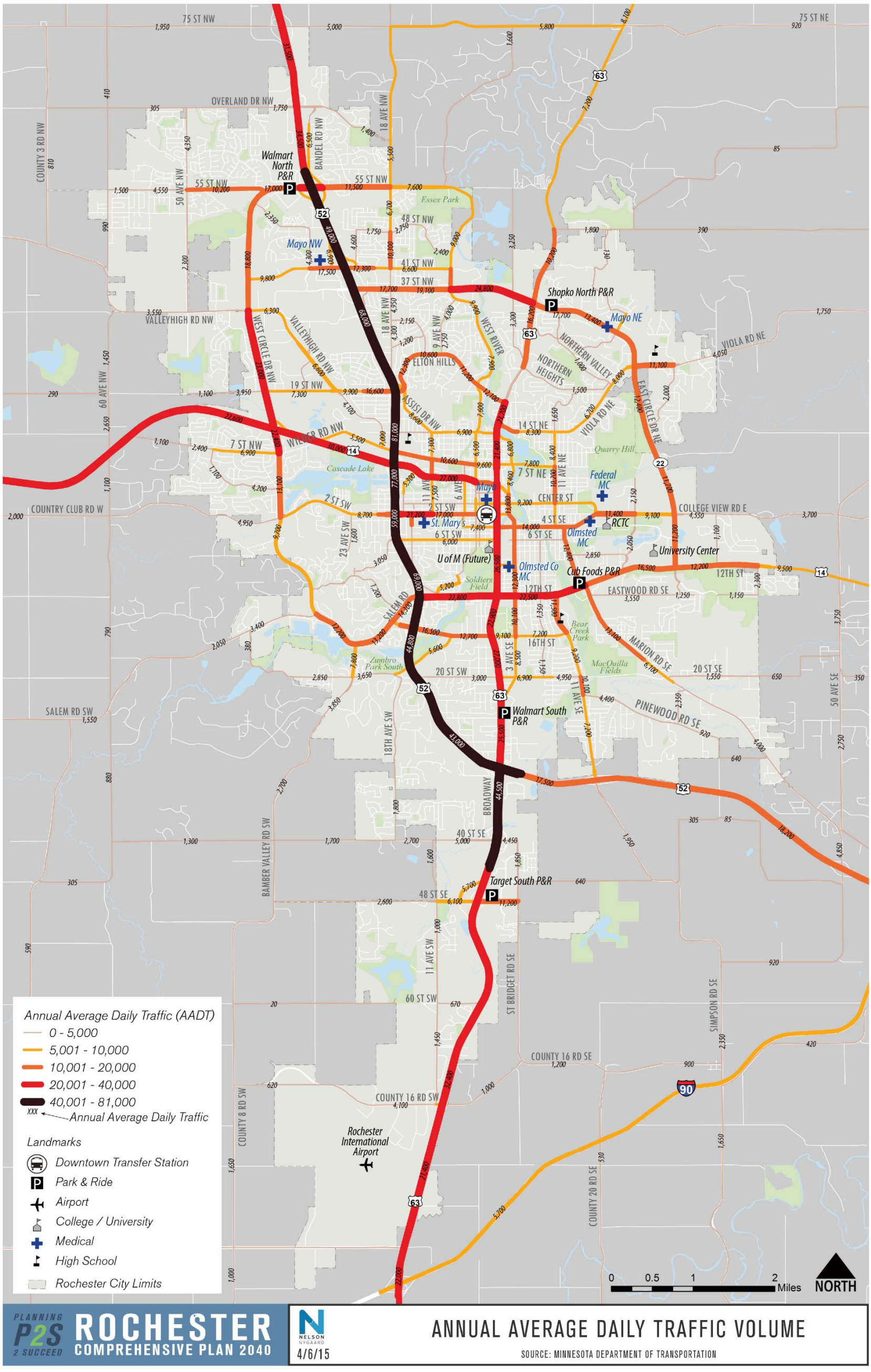


Figure 10 – Auto Traffic Volumes



How Safe are Rochester Streets?

This section provides a snapshot of crashes in Rochester. The following analyses identify the density of crashes involving all transportation modes for the most recent five years for which data are available (2009-2013). Figure 11 also illustrates the location of pedestrian and bicycle crashes, respectively, with the size of each symbol corresponding to the number of crashes. Due to the smaller number of pedestrian and bicycle crashes, the analysis for these modes utilizes 10 years of data to allow for a larger sample size to better illustrate trends.

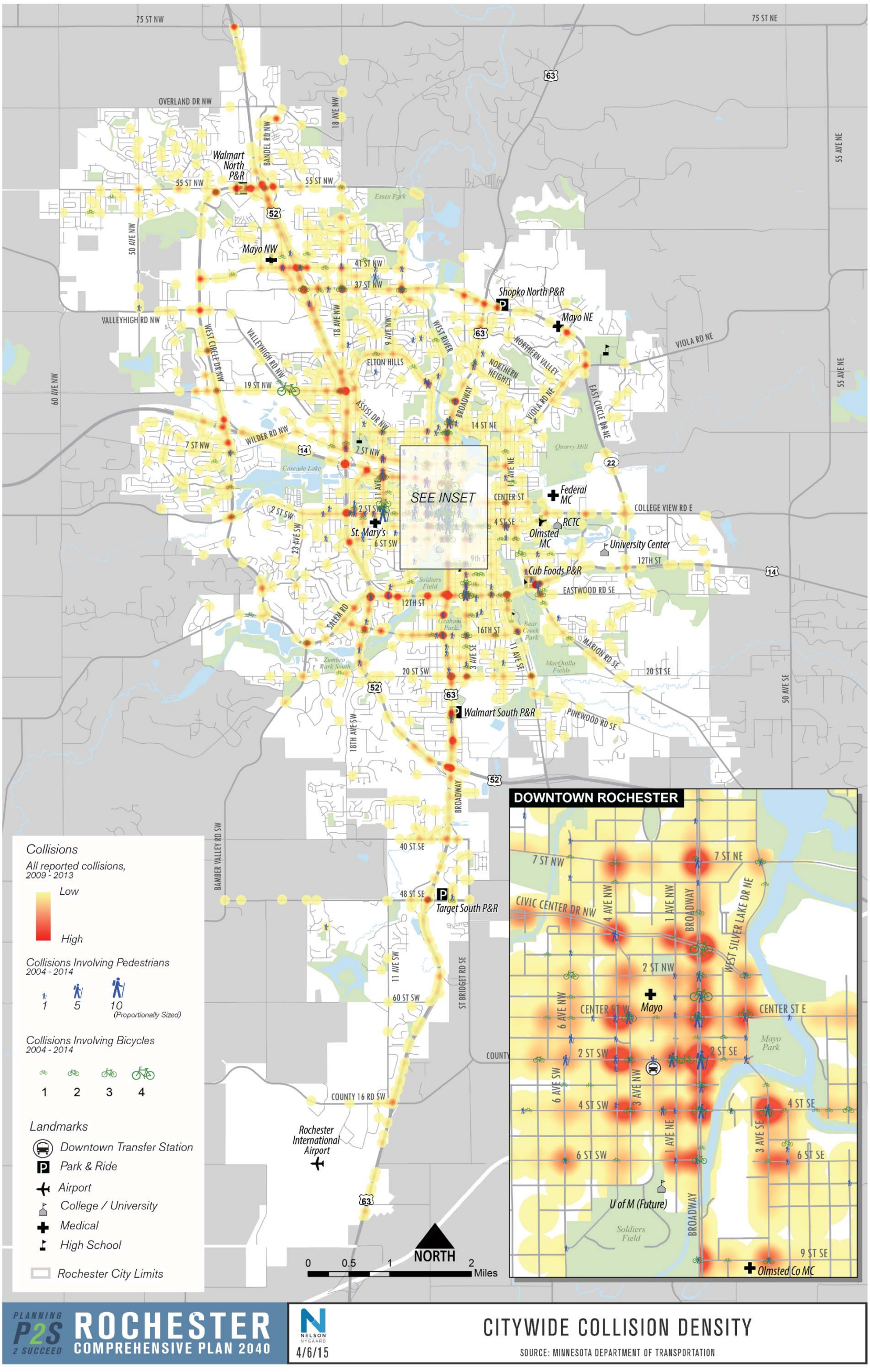
The crash data illustrate a concentration of crashes along a number of corridors, including Broadway / US 63, US 52, West and East Circle Drives, US 14, West Silver Lake Drive NE, Civic Center Drive, 2nd Street SW and 41st Street. Crashes are also concentrated at several downtown intersections, with many of these intersections having a prevalence of crashes involving pedestrians and bicycles as well as motor vehicles. Additional high crash locations for pedestrians and bicycles are identified later in this chapter. Outside of downtown, many of the high crash intersections are on high crash corridors, including those identified above, and are often at the intersection of two major roadways.

As explained in Chapter 12 of the ROCOG 2040 Long Range Plan, the City of Rochester conducts annual reviews to identify locations with five or more crashes per year in order to monitor trends and to assess the need for safety improvements. The city also reviews its roadway system routinely to identify locations for low cost safety improvements. The plan identifies a number of example improvements that have been deployed, such as:

- Battery back-up systems for signals at critical high volume intersections
- LED flashing stop signs at high crash intersections below signal warrant thresholds
- Installation of pedestrian activated flashers at pedestrian crossings
- Driver feedback signs installed in five different school zones
- Neighborhood Traffic Calming Program

The remainder of this section focuses on an analysis of active transportation collisions to illustrate contributing factors of bicycle and pedestrian collisions that may be improved through education, enforcement, or engineering projects. This section is responsive to shifting policy direction to focus on active transportation safety needs.

Figure 11 – Vehicle, Pedestrian and Bicycle Crashes



Pedestrian and Bicycle Crash Analysis

Over the past ten years, 192 pedestrian and 201 bicycle crashes were reported citywide. Pedestrians and bicyclists are considered 'vulnerable roadway users' as they are more likely to sustain an injury compared to motorists. In fact, 63% of pedestrian and 58% of bicycle crashes resulted in a documented injury. The annual frequency of reported injury and fatal crashes involving pedestrians and bicyclists are shown in *Figure 12* and *Figure 13*.[3] The overall number of annual pedestrian and bicycle crashes appears to be trending downward in recent years.

Figure 12 – Pedestrian Crashes by Year and Injury Severity (2004-2013)

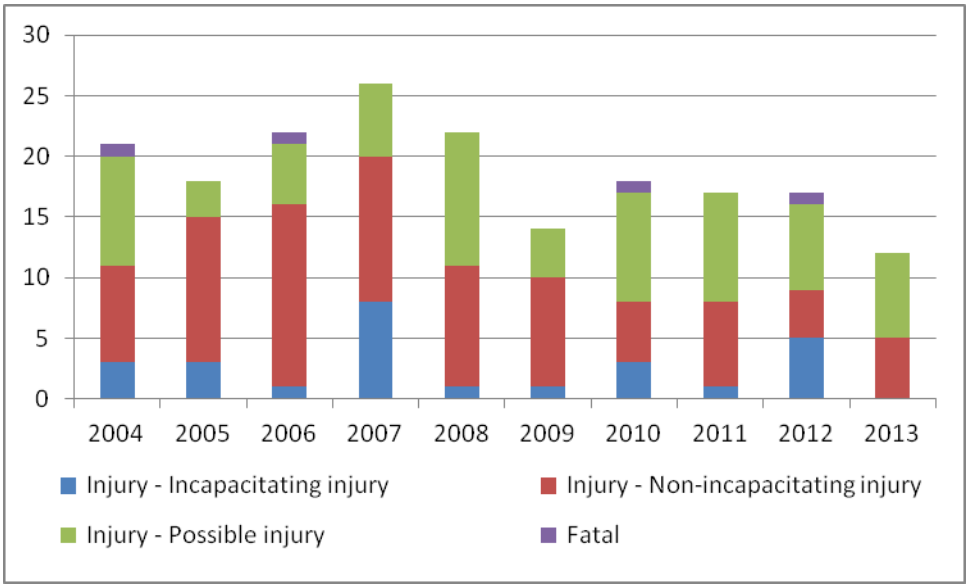
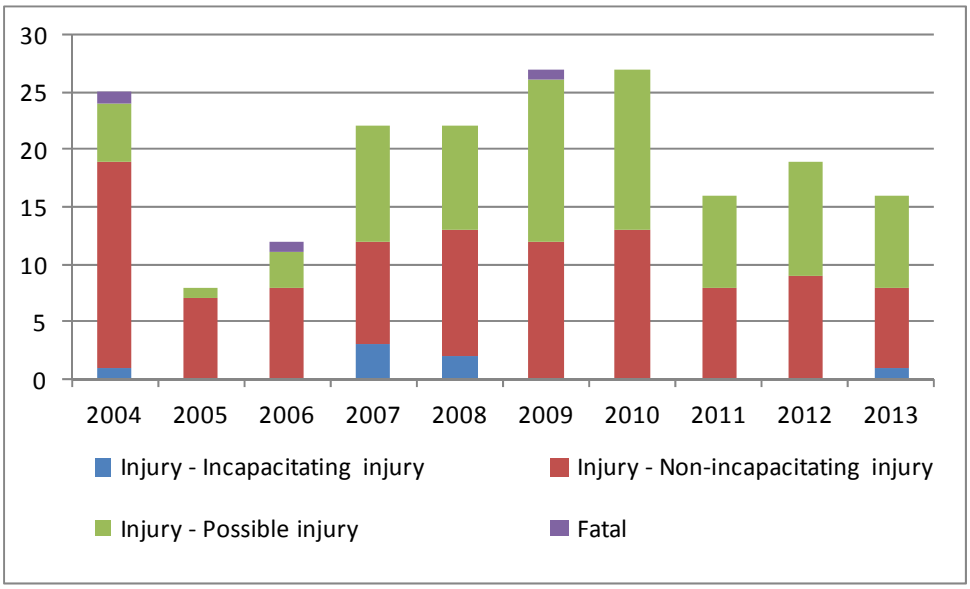


Figure 13 – Bicycle Crashes by Year and Injury Severity (2004-2013)

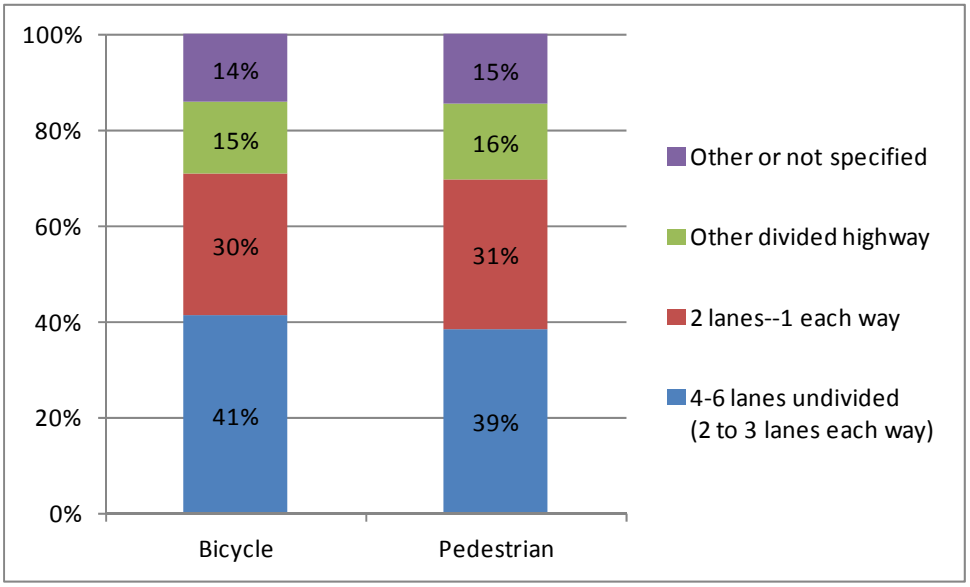


[3] Property damage only crashes – of which there are very few in the data – were eliminated from the severity analysis because they commonly go unreported, sometimes due to limited police resources, and are not a reliable data source.

On what type of roadways are pedestrian and bicycle crashes occurring?

Pedestrian and bicycle crashes are distributed among similar types of roadways. Approximately 40% of the crashes occur on arterials, which account for only 13.5% Rochester's streets, indicating that active transportation collisions are over-represented on arterials. On the other hand, 30% occur on the local or collector roads, which account for 85% of the network.

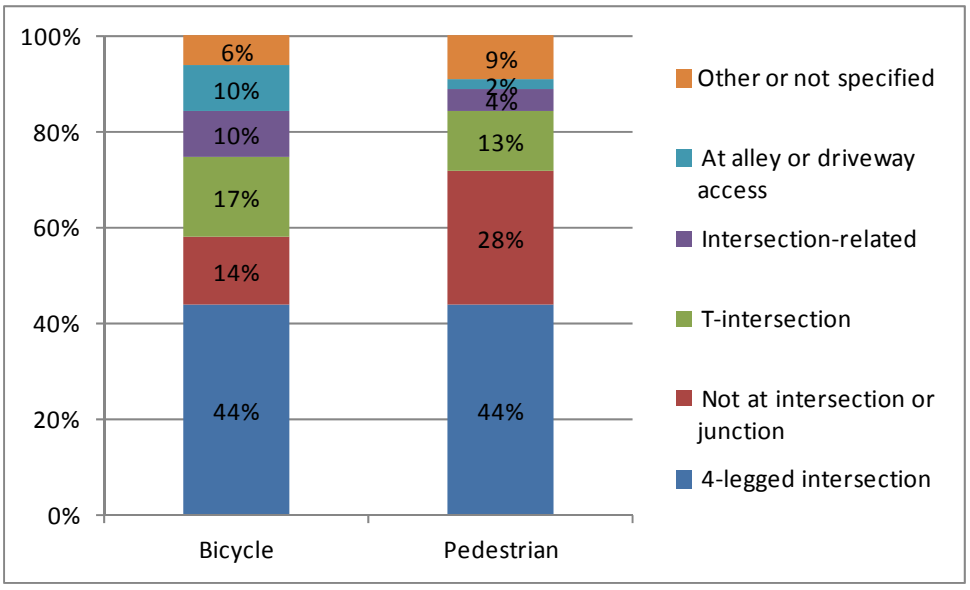
Figure 14 – Pedestrian and Bicycle Crashes by Roadway Type (2004-2013)



Where on the roadway are pedestrian and bicycle crashes occurring?

Approximately 70% of bicycle crashes and 60% of pedestrian crashes took place at 4-legged intersections, T-intersections or were intersection related. Pedestrian crashes were more likely to occur away from an intersection (28%), potentially indicative of crossings at mid-block locations. 10% of bicycle crashes occurred at an alley or driveway access.

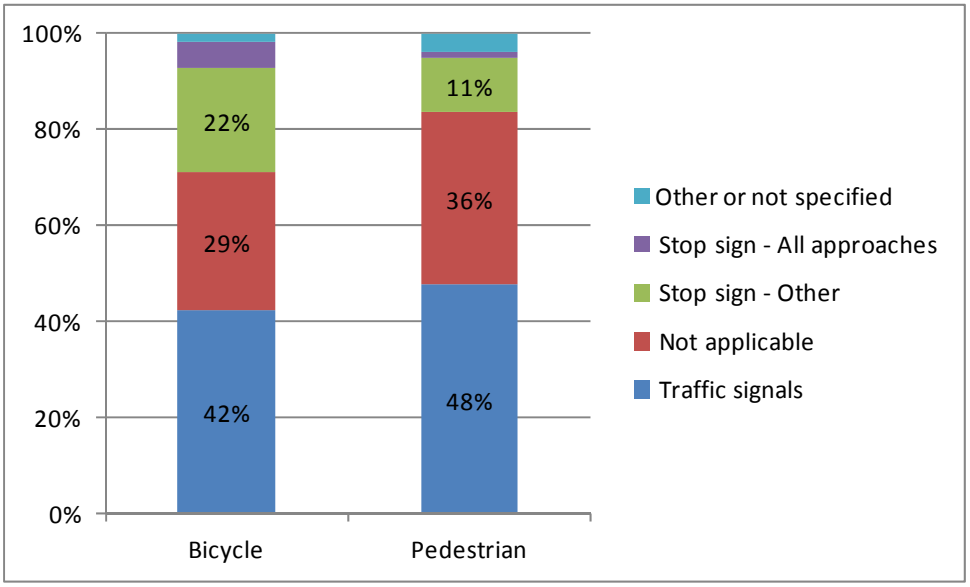
Figure 15 – Pedestrian and Bicycle Crashes by Intersection Type (2004-2013)



What traffic control is present at pedestrian and bicycle crash locations?

Traffic signals were present at 42% of pedestrian crashes and 48% of bicycle crashes. Approximately 1/3 of bicycle and pedestrian crashes occurred at locations without traffic controls or at mid-block locations. Stop sign traffic controls were more prevalent in bicycle crashes (22%) than pedestrian crashes (11%).

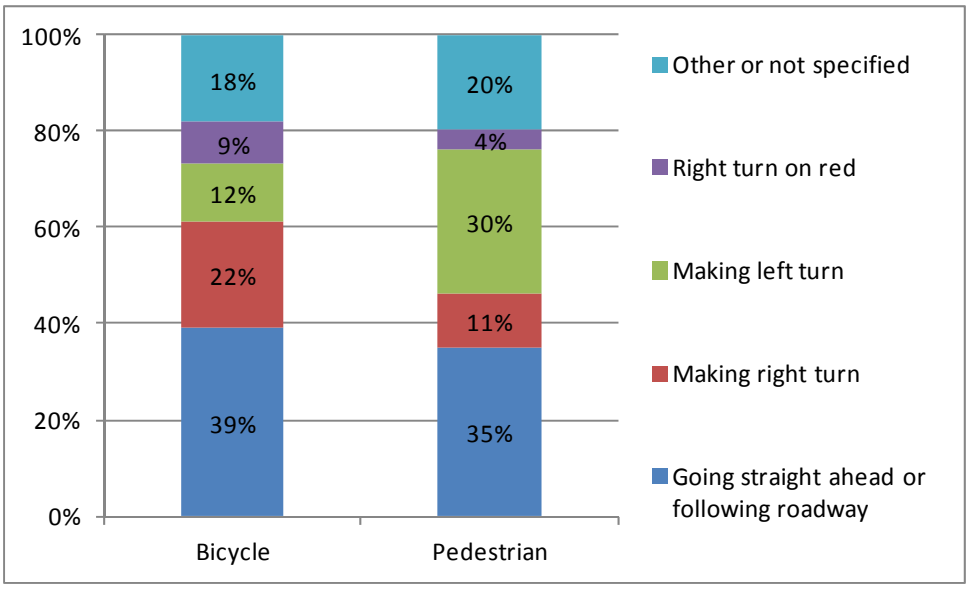
Figure 16 – Pedestrian and Bicycle Crashes by Traffic Control (2004-2013)



What was the vehicle action at pedestrian and bicycle crash locations?

Left turning vehicles were involved in 30% of pedestrian crashes and12% of bicycle crashes. Right turning vehicles were involved in 11% of pedestrian crashes and 22% of bicycle crashes. Vehicles making a right turn on red accounted for 9% of bicycle crashes and 4% of pedestrian crashes.

Figure 17 – Pedestrian and Bicycle Crashes by Vehicle Action (2004-2013)



High Crash Corridors and Intersections for Pedestrian and Bicycle Crashes

Roads and intersections with the most crashes involving pedestrians and bicyclists over the past ten years are summarized in Figure 18 and Figure 19. High concentrations of crashes for both modes are unsurprisingly found in the downtown area, where land uses and activities generate more walking and bicycling. However, many crashes are also distributed throughout the city. Additional concentrations of pedestrian and bicycle crashes include Hwy 63 and 3rd Ave SE south of downtown, Broadway north of downtown near the Zumbro River, the vicinity of St. Marys, as well as commercial centers such as Miracle Mile and the area near Mayo Family Clinic Northwest along 41st St NW in the vicinity of Hwy 52. This data is likely indicative of the need for better active transportation connections to these types of destinations. There also appear to be concentrations of pedestrian and bicycle crashes near many of the interchanges along Hwy 52.

As indicated in Figure 18, 233 of the 415 reported crashes occurred along 12 corridors. Figure 19 indicates that 93 of the 415 crashes occurred at 17 intersections. Note that there is some overlap in the data in these tables, as the high crash streets include crashes that occurred at both intersection and mid-block locations.

Figure 18 – Pedestrian and Bicycle High Crash Corridors (2004-2013)

Street Segments	Pedestrian Crashes	Bicycle Crashes	Total
Broadway from East Circle (Hwy 22) to Hwy 52	43	35	78
2nd St from W Silver Lake Dr to Hwy 52	19	12	31
West Silver Lake Dr NE/ 3rd Ave from Broadway to 20th SE	15	15	30
Center St	9	8	17
4th St SW/SE	5	11	16
11th Ave SW / NW	8	5	13
Hwy 14	6	6	12
Hwy 22 (West and East Circle)	-	9	9
4th Ave SW/George Gibbs Dr/Memorial Pkwy from 10th St to Hwy 14	9	-	9
7th St NE/NW	-	6	6
6th Ave NW/SW	-	6	6
Hwy 52	6	-	6

Figure 19 – Pedestrian and Bicycle High Crash Intersections (2004-2013)

Intersections	Pedestrian Crashes	Bicycle Crashes	Total
Broadway & 2nd St	9	-	9
Broadway & Center St	6	3	9
Broadway & 4th St	5	3	8
1st Ave SW & 2nd Ave SW	5	3	8
2nd St SW & 11th Ave SW	7	-	7
3rd Ave SE & 12th Ave SE	4	3	7
3rd Ave SE & 4th St SE	4	3	7
3rd Ave & Center St W	4	3	7
Broadway & 14th St NE	4	-	4
Broadway & 1st NE	-	4	4
Valley High Dr NW at 19th St NW	-	4	4
Civic Center Dr & Broadway	-	4	4
Broadway & 6th St SW	-	3	3
Civic Center St SE & Center St E	-	3	3
11th Ave NW & Center St W	-	3	3
3th Ave NW at 6th Ave NW	-	3	3
2nd St SW between Broadway and 1st Ave SW (mid-block)	-	3	3

Freight & Air

Passenger air travel and goods movement by freight trucks, trains, and planes is vital to the economic success of Rochester. The following summarizes freight corridors in Rochester and the existing and planned commercial passenger air service at Rochester International Airport.

Freight corridors

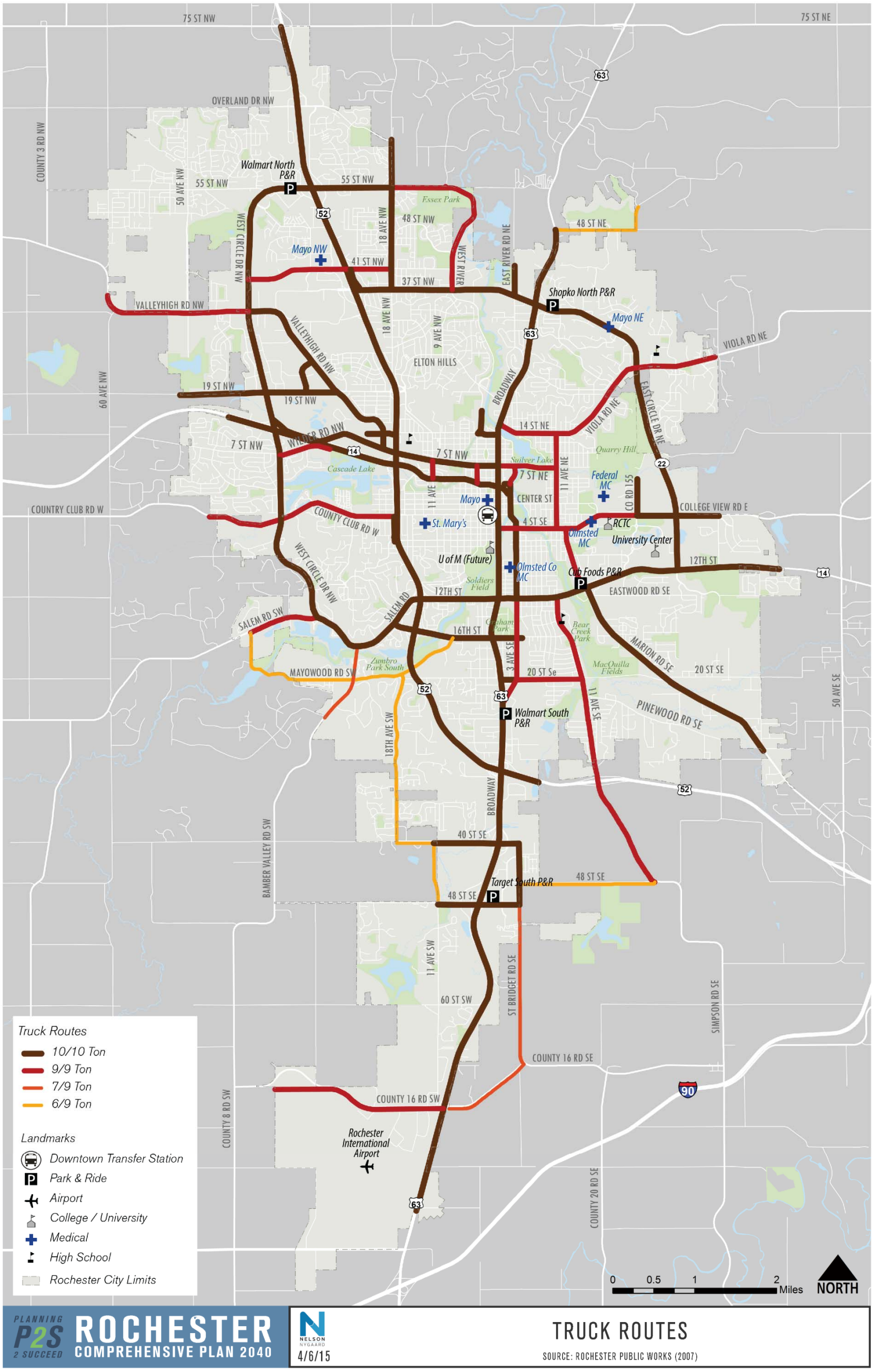
Freight moving through Rochester and local deliveries are vital components of the local and regional economy. A challenge faced by all major cities is to balance freight movement with the needs to foster a safe and livable community. Provision for freight mobility is necessary to ensure timely and reliable delivery of essential goods, but care should be taken not to compromise the safety and economic health of the community.

For freight passing through Rochester, major freight corridors are necessary to expedite the movement of goods and to concentrate heavy vehicle circulation on specific urban streets. As illustrated in Figure 20, the major freight corridors designated in Rochester are focused on highways like US 52, US 14, and US 63, as well as peripheral roadways such as West Circle Drive NW, East Circle Drive NE, and Marion Road SE. These are the roadways that offer the most continuous and reliable throughput with limited intersection traffic control. As the city grows, it will need to balance local needs for freight delivery (e.g., 3rd Avenue SE, 4th Street SE, and Country Club Road SW) in such a way that respects the needs of goods movement, while maintaining safety and comfort for other users.

Broadway provides critical multimodal access to downtown Rochester, but also serves local and regional through-trips for freight and local deliveries.

Image from nelson\Nygaard

Figure 20 – Freight Corridors



Rochester International Airport and its Growth Plans

Located only seven miles south of downtown Rochester, Rochester International Airport (RST) is the most proximate commercial air service hub to the city and the Mayo Clinic. Opening with modest service offerings in 1926, RST now offers air service by American Airlines and Delta Airlines with key connections to Minneapolis/St. Paul, Chicago, and Phoenix, among others. The airport also serves as a regional air freight destination housing cargo services from Fedex Express and AirNet Express.

A market analysis conducted as part of RST's Strategic Plan found significant demand for expanding air service in southeast Minnesota. RST has planned for future expansion, with the ability to accommodate runway extensions or the possibility of a new runway should demand justify it. RST is also in the process of planning a Terminal Replacement Project to enhance the user experience and provide space to serve new carriers. The Strategic Plan guides the growth, types of investments, and access improvements necessary to ensure the airport thrives and provides quality access to Rochester and the SE Minnesota region. Key objectives identified in the Strategic Plan related to airport access include:

- Developing a customer-focused, integrated transportation network connecting the airport to downtown Rochester and southeast Minnesota.
- Pursuing additional hub service, as well as supplemental air service to the Minneapolis-St. Paul International Airport.
- Exploring options for high-quality bus links between RST and downtown Rochester.

Rochester International Airport is the city's closest port of call and is planning expanded operations to better serve the needs of residents and the people that come to visit the city.

Image from Gary Chambers