

DMC TRANSPORTATION & INFRASTRUCTURE PROGRAM INTEGRATED TRANSIT STUDIES



INTEGRATED TRANSIT STUDIES **Executive Summary**

Prepared for:

Destination Medical Center Corporation

City of Rochester, Minnesota

DMC Transportation & Infrastructure Program



DMC TRANSPORTATION
INFRASTRUCTURE
PROGRAM MANAGEMENT

Prepared by:



June 20, 2018

City Project No. J8618 Parking Study
J8620 City Loop Study
J8621 Transit Circulator Study
J8622 Transportation Management Authority Study
J8623 Street Use & Operations Study

This report is one of five Integrated Transit Studies (ITS) Reports and an Executive Summary that were prepared for the Destination Medical Center Corporation (DMCC) and the City of Rochester, Minnesota. The ITS reports were accepted by the DMCC on June 28, 2018 ([Resolution No. 69-2018](#)) and by the City of Rochester on July 2, 2018 ([Resolution 237-18](#)).

The Integrated Transit Studies are comprised of the following reports:

- Executive Summary
- Transit Circulator Study Report
- Parking & Transportation Management Authority (TMA) Study Report
- City Loop Study Report
- Street Use & Complete Streets Study Report
- Street Operations Study Report

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SECTION 1: WHY WHERE INTEGRATED TRANSIT STUDIES COMPLETED?

INTRODUCTION

The City of Rochester is the largest community in Olmsted County in southeast Minnesota, with a population of over 114,000 people.¹ The city is built upon a strong downtown core, anchored by the Mayo Medical Center and its affiliated hospitals, a number of public facilities including the Mayo Civic Center and Rochester Public Library, and a significant hospitality industry serving Mayo Clinic as well as numerous other visitors to the city. Mayo Clinic is the largest employer in Minnesota with over 35,000 employees in Rochester, including 30,000 workers in the downtown.

In 2013, Mayo Clinic, the City of Rochester, Olmsted

County and other community stakeholders, brought forward a Destination Medical Center (DMC) proposal to secure Rochester's and Minnesota's future as a global medical destination. In June 2013, the DMC Act was signed into law and the City, County, DMC Economic Development Agency (EDA), Mayo Clinic, and Destination Medical Center Corporation (DMCC) initiated work on the DMC Development Plan. The Development Plan serves as a framework to guide the implementation of the DMC Initiative and outlines the long-term vision and planning for the Project.

The DMC Development Plan provides a strong vision for Rochester to develop a vibrant urban core



A vision for significant commercial development, signature streets, and public spaces in the Heart of the City area of downtown Rochester.

Source: DMC Development Plan

¹ U.S. Census Bureau, 2016 American Community Survey 1-Year Estimate.

that enhances economic opportunity for the local community, region, and State. The Plan sets out five goals:

1. Create a comprehensive strategic plan with a compelling vision for Rochester as a global medical destination.
2. Leverage DMC public investment to attract more than \$5 billion in private investment.
3. Create approximately 35,000 new jobs that include strategies to support the growth of existing enterprises, attract new business to the market, and attract, retain and foster development of a highly skilled workforce.

4. Generate approximately \$7.5 to \$8.0 billion in new net tax revenue over 35 years.
5. Achieve the highest quality patient, companion, visitor, employee, and resident experience, now and in the future.

The transportation element of the DMC Plan outlines investment concepts to improve access to downtown and improve circulation within downtown for residents, workers, and visitors on transit, foot, and by bicycle. Transportation principles that were first identified in the Rochester Downtown Master Plan, and reinforced by the DMC Plan, inform the strategy of pursuing improvements to parking, transit, streets, active transportation, wayfinding, and regional commuter service.



Source: DMC Development Plan

The principles established to guide future DMC transportation actions and investment are:

- Make it easy, affordable, and convenient for people from Southeast Minnesota and around the World to get to downtown Rochester
- Bring 30 percent of the workforce to downtown Rochester on transit by 2035
- Create a “park-once” downtown environment connected by a frequent downtown circulator
- Build shared-parking prioritized for economic development
- Create world-class streets designed for people
- Create an exceptional place for healthy, human-powered transportation
- Form a downtown Rochester Access Authority
- Invest in sustainable transportation infrastructure and programs that reduce the city's ecological footprint
- Use DMC funding to leverage public and private transportation infrastructure funding
- Establish and maintain a transportation network that is accessible and inclusive to people of all ages, abilities, and states of wellness



Source: DMC Development Plan

FROM A VISION TO IMPLEMENTABLE PROJECTS

The DMC Development Plan was a visionary document, based on a high-level assessment of conceptual needs and feasibility. Following completion of the plan, the DMCC and City of Rochester determined that further technical study and refinement of the transportation vision was a high priority in order to provide more detailed guidance on how the City and its partners would address the transportation needs of the district. The framework for this technical study envisioned four study elements to be integrated through a coordinated planning effort to insure the findings from each study were jointly considered across each realm of work. The four study elements included:

- Transit Circulator Study
- Street Use and Operations Study
- Parking and Travel Demand Management Study
- City Loop Study

The purpose of these studies is to refine work completed in the DMC visioning process at a level of detail needed to generate public acceptance for the proposed solutions and support funding of the proposed projects. Specifically, the studies were asked to examine the feasibility of proposed improvements in the context of limited right of way availability, the cost-effectiveness of the proposed approach to delivering these improvements, and the degree of public acceptance for the improvements.

The studies were also to be conducted in an integrated framework – that is, to assess how infrastructure improvements in each of these areas could create a cohesive transportation network built on a variety of modes of travel – car, transit,

bike and on foot – that would accomplish the goals identified in the DMC Development Plan.

INTEGRATED TRANSIT STUDIES SCOPE

The **Transit Circulator Study** assesses the transit system concepts identified in the DMC Plan following specific steps to ensure eligibility for federal funding, including completion of a federally-compliant alternatives analysis of transit circulator modes and routes, operational assessment of changes to regional and local transit services; and benefit/cost and impact assessments.

The **Street Use and Operations Study** considers street space reallocation to determine if the proposed mix of traffic changes, pedestrian facilities, and mixed-traffic operations identified in the DMC Plan is feasible to provide balanced vehicular, transit, and pedestrian and bike accommodations.

The **Parking and Travel Demand Management Study** is critical to the success of the multi-modal visions for the DMC District. It focuses on the location and management of district parking, which is tied to successful deployment of the Circulator, as well as how parking demand can be minimized through measures that encourage and incentivize reduced private vehicle demand.

The **City Loop study** identifies a signature placemaking and livability feature that knitted together all the DMC districts. The City Loop study verified concepts and methods to be applied to the downtown roadway network to promote the non-motorized movement of people, along with defining key routes for pedestrian facilities.

The purpose of this Executive Summary is to provide an overview of the key findings of these studies. Technical reports are available for each of these studies which provide greater detail

SECTION 2: WHAT ARE THE PREFERRED SOLUTIONS?

By 2040 the number of people in downtown Rochester will grow with significant increases in the number of workers, visitors (including medical patients and convention/event traffic) and residents moving about the district. With this growth in activity will come a significant growth in travel; if current travel choices remain unchanged the level of vehicle traffic in downtown is expected to grow by over 60%, resulting in significant peak period traffic congestion and demand for over 16,000 additional parking spaces downtown, over 50% above current parking supply. Limited ability to expand street right of ways to accommodate increased traffic levels, a desire to minimize the amount of investment and land that could be used for productive economic use for developing high cost urban parking, and an existing transit network that does not have the capacity to effectively capture a larger portion of increased travel demand indicate the need to consider alternative solutions. Accepting a significant level of vehicular traffic growth is inconsistent with the core intent of DMC development which is to create streets and districts

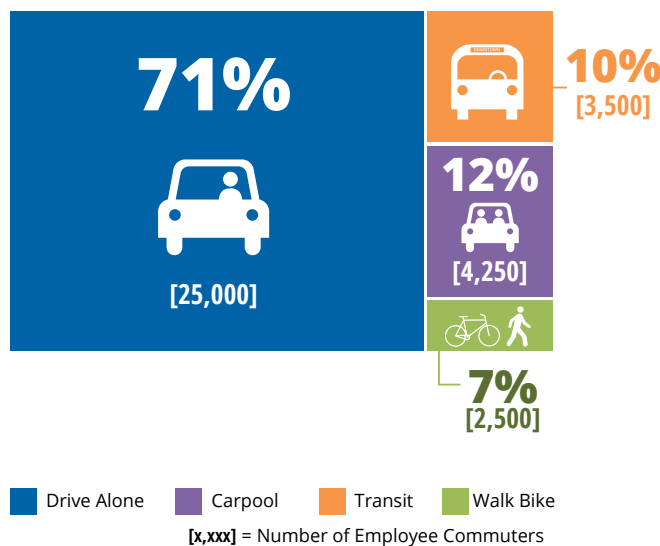
that are attractive to developers and the daily users. Peer studies shows that quality urban streets that are walkable, connected, and served by high-quality transit can help to catalyze economic and community activity. Successful downtown districts in cities rated as having a high quality of life have in common a high-quality downtown that functions as the city's cultural and economic heart.

In Section 2, a recommended set of multi-modal transportation investments to address these needs are presented. A review of the Integrated Transit Studies process and scenario analysis used to develop these recommendations can be found in Section 3.

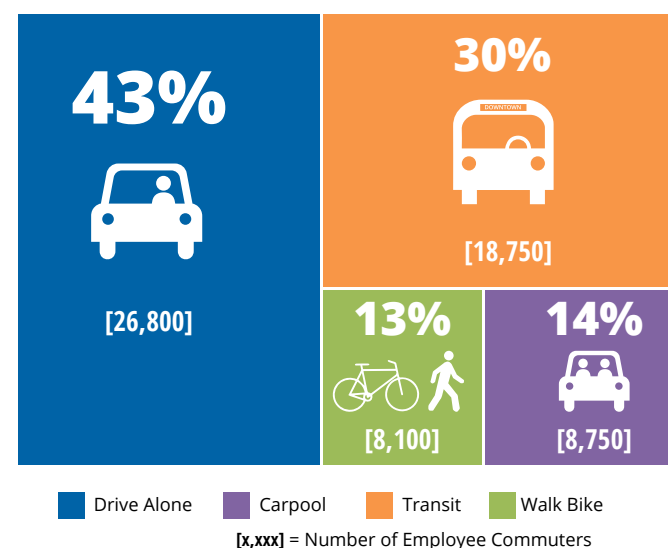
The preferred solutions and strategies that have been identified will support four main outcomes that are key to achieving the economic, livability and sustainability outcomes identified in the DMC Development Plan. These include:

- Achieve a reduction in single occupant vehicles commuting into the District of

COMMUTER MODE OF TRAVEL TODAY



COMMUTER MODE OF TRAVEL: 2035 TARGET



approximately 60% through a combination of infrastructure and policies, programs and incentives to shift commuter behavior. Key measures in a multi-pronged strategy to achieve this trip reduction goal include:

- » Higher frequency, higher quality urban transit services and expanded regional commuter bus services;
 - » An expanded park and ride system with more available parking outside of downtown linked to the central business district with high quality express transit.
 - » A 100 to 200% increase in downtown area housing to provide more opportunity for workers to live near where they work
 - » A downtown circulator service that supports a “Park Once” philosophy with service to parking at the periphery of downtown.
 - » A robust program of travel services or incentives for commuters that make alternative travel options an easy choice.
- Create potential catalysts for new development by providing **leading public investments** that will organize and incent private sector investment, to ensure Destination Medical Center private investment is focused in DMC District
 - Invest in a multi-modal transportation system that will support creation of a dense, diverse, 24-hour downtown neighborhood that provides benefit to existing businesses and has the ability to attract new businesses with high-quality urban amenities based on a development vision that at its core is pedestrian oriented to support increased trip making by transit, walking and biking within an attractive urban environment.

- Support a “Park Once” environment that focuses on convenient parking for patients and customers, emphasizing shared use of parking resources to reduce excess parking development by private developers while using pricing and easily accessible information on parking availability to manage demand.

LAND USE AND DEVELOPMENT CHARACTER

While the Integrated Transit Studies did not specifically address land use and the importance of the character of downtown development in achieving DMC Development Plan goals, parallel efforts in these areas are an acknowledged strategy to support mode shift goals. The Primary Transit Network, a system of arterial Bus Rapid Transit (BRT) corridors moving through downtown as articulated in the City’s recently adopted Comprehensive Plan as well as the vision for increasing residential land uses downtown, will support housing and commercial densities that encourage and facilitate greater transit ridership, biking and walking. EDA planning efforts for Heart of the City, Discovery Square, and Discovery Walk also support densities, developments and street design that encourage greater walking through the downtown area and support the DMC Development Plan’s mode shift goals.

UNDERSTANDING TRANSPORTATION MARKETS

The Preferred Solutions also acknowledge that individuals traveling to downtown Rochester are doing so for differing reasons, at different times of the day, and stay for differing amounts of time; they also acknowledge that those who regularly travel to downtown for work, and remain downtown for longer periods of time may have the ability to be more flexible with their travel patterns than patients and visitors who may have limited mobility or be unfamiliar with the area. To achieve the DMC Development Plan goal of achieving the highest

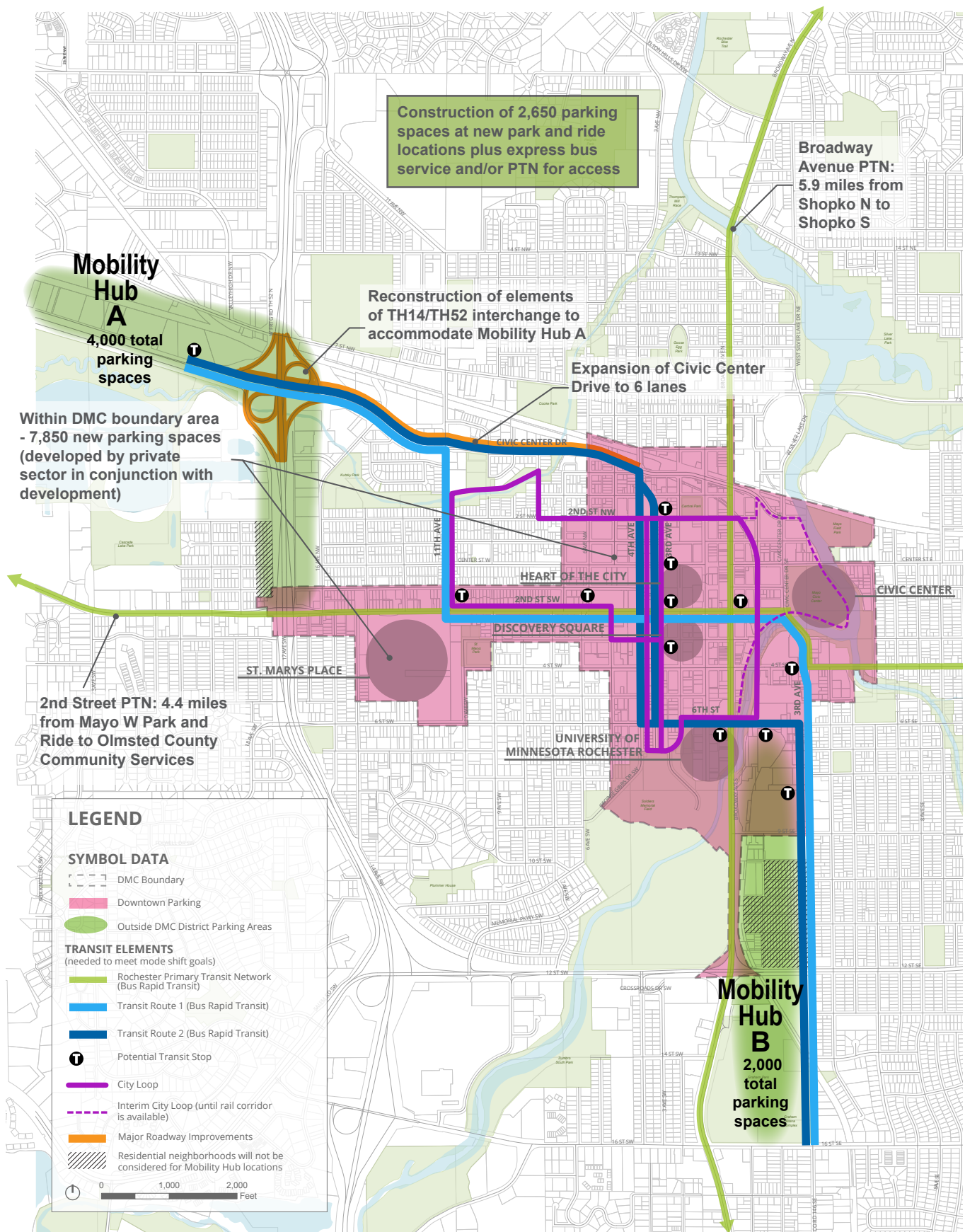


Figure 1: Preferred Solutions

quality patient, companion and visitor experience, priority for easily identifiable and understood transportation options has been given to these markets.

PREFERRED SOLUTIONS AND STRATEGIES

The ITS transportation investment framework reflects major changes transpiring in Rochester over the next 20 years, including:

- Intense land use development in the downtown area, with concentrated employment growth particularly in districts influenced by the major presence of the Mayo Clinic
- Rise of downtown as a residential neighborhood
- Increased demand for downtown access
- Changing travel behavior, consumption preferences, and essential living infrastructure

The ITS transportation investment framework builds on and refines these key tenants of the DMC Development Plan:

- A greater emphasis on land use patterns that encourage short trips
- An effort to make walking and bicycling safe, comfortable, and enjoyable
- Street networks that effectively balance the use of modes to optimize movement of people, not cars, and facilitate movement of goods
- Transit systems that link people to jobs, provide high quality service throughout the day, and are accessible to users of all ages and abilities
- Accommodation for all users, including those with mobility impairments, disabilities, and

other special needs, and which enables residents and visitors of to be active, recreate, and exercise outdoors while being part of a vibrant neighborhood

Based on the findings from the four Integrated Transit Studies, the following recommendations were identified as the Preferred Solutions that should be advanced for further development.

Travel Demand Management

Travel demand management activities provide the underlying foundation for the desired reduction in single-occupancy vehicle travel in downtown. The Integrated Transit Studies worked with downtown business owners and the Mayo Clinic to outline an approach to reducing employee single-occupancy vehicle trips through education and incentive-based activities. Continued coordination and cooperation between these employers and the City of Rochester will be needed to encourage a change in travel behaviors that support DMC Development Plan goals. Key travel demand management strategies and activities recommended by the study include the following and are highlighted in Figure 2:

- **Parking Policies** such as expanding carpool parking incentives, moving from monthly to daily parking charges or providing services people need at transit or park and ride hubs can be used to encourage drivers to try other travel options
- **Small Scale Infrastructure Improvements** such as including walking times with wayfinding and encouraging employers and developers to provide facilities such as showers, lockers and secure bicycle storage can encourage use of alternative modes
- **Active Transportation Programs** are strategies such as subsidizing bike share memberships or using incentives to get people to try alternative commuting modes

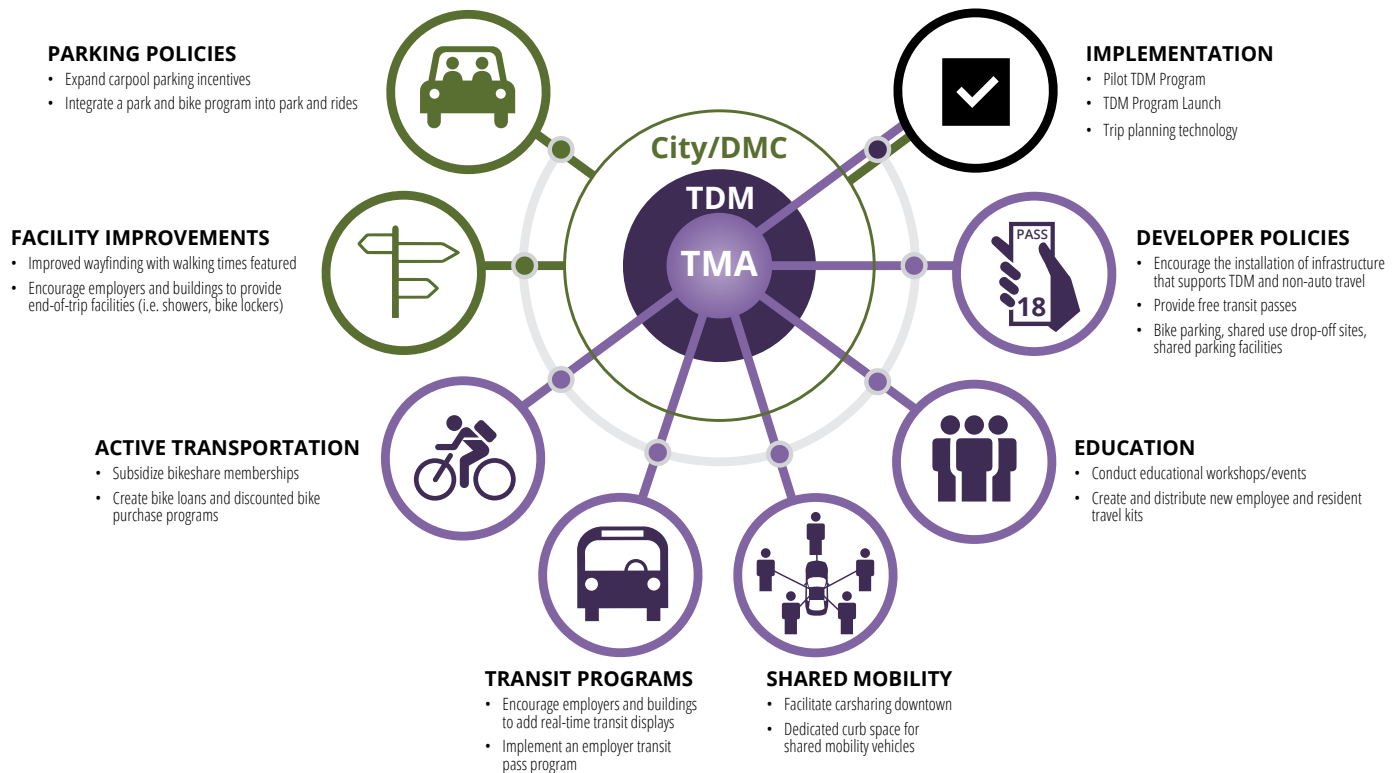


Figure 2: Travel Demand Management

- **Transit Measures** such as having “real time” transit displays in buildings and creating an on-site transit pass program have been successful in attracting more commuters to transit
- **Shared Mobility** is a growing area of travel services that uses information technology as a platform for accessing services such as car sharing
- **Education Programs** are an important element of successful travel demand management programs; the goal is to increase awareness of available travel options and how to use them
- **Developer TDM Policies** encourage the incorporation of infrastructure such as carshare parking, bus stop improvements

or information kiosks and services such as on-site transit pass programs as part of new development

Transportation Management Association: Employer-Based / Employee Focused Services

A Transportation Management Association will be established to provide services, programs, and incentives to businesses, organizations and employees in the downtown area as a means to attract commuters to consider alternative travel modes to work.

Coordination & Integration of TDM Services with Mayo Clinic Employee Transportation Services

The Transportation Management Association should work closely with the Mayo Clinic to explore opportunities for proactively integrating programs and services of the TMA with the services already provided by Mayo’s Transportation Services staff in

an effort to more aggressively manage employee parking and commute patterns consistent with the goals of the DMC Development Plan. As an employer supporting over half of all employment in the downtown, Mayo, in cooperation with the TMA, has an opportunity to significantly shape peak period travel dynamics in the DMC area.

Parking Investment Strategy

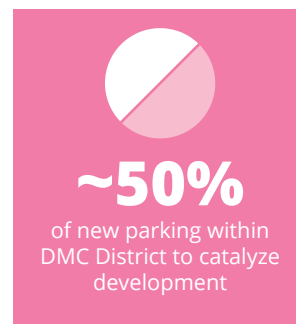
The Preferred Solutions prioritize downtown parking for visitors, customers and short-term downtown guests, rather than private cars of downtown employees that are parked for long periods of the day. Downtown employees living outside of walk/bike range will be served with a robust park and ride system centered on development of multimodal, mixed-use parking centers that are envisioned to provide high-amenity services to make life more convenient.

The Preferred Solutions includes the addition of nearly 8,000 new parking spaces within the DMC district for patients, visitors, retail customers, UMR students and downtown residents. New employee parking would be provided by nearly 3,000 new remote park and ride spaces, and two high-amenity mobility hubs at the periphery of downtown providing a mix of service and retail uses that persons typically frequent, along with convenient transit, bike and pedestrian access to employment destinations (see Figure 3).

The first order strategy for increasing commuter access to the District will be to focus on expansion of park and ride capacity with increased express bus service between those locations and downtown. Supplementing this service with guaranteed access to personal parked vehicles throughout the day for personal emergencies provides the most cost-effective means keeping pace with anticipated employment growth.

Within the district, parking for short term parking customers such as patients, visitors, clients or

patrons will be developed through the effort of private and public entities, with developers expected to provide sufficient parking for customer, visitor or resident needs supplemented by public development of parking to meet priority needs for facilities such as the Mayo Civic Center, the Rochester Library and other local events or attractions. The city will look for opportunities to minimize the development of stand-alone parking facilities that create dead spaces in the downtown urban fabric, and focus on working with developers to incorporate public parking in a scattered site approach as part of mixed use private development that distributes public parking more broadly across the district.



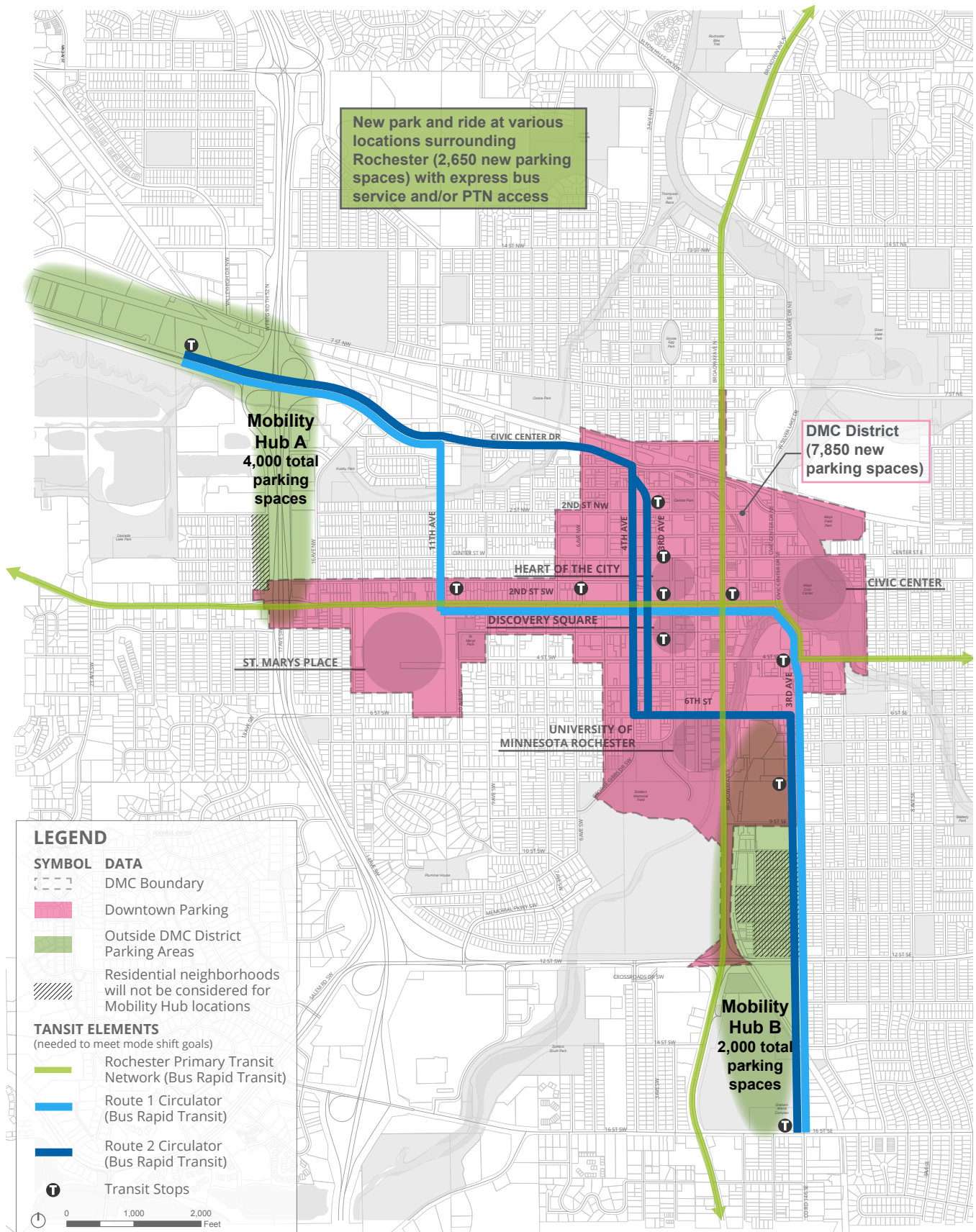


Figure 3: Parking and Transit Implementation

The provision of high amenity services at park and ride sites is facilitated by the development of the Mobility Hub concept. This parking investment strategy reflects an opportunity through public-private partnerships or joint development with private partners to co-locate services people use on a daily basis or to incorporate retail, service or office uses in a mixed use setting where business can benefit from a base of potential customers or clients provided by the commuter parking as well as the convenient access provided by a downtown circulator service. Mobility Hub Areas A and B in particular may provide prime opportunities for mixed use development, while park and ride facilities at sites such as at the Rochester Community and Technical College may be better suited to development of service hubs providing convenience retail services and travel assistance, as illustrated in Figure 4.

Transit Investment Strategy

The Preferred Solutions transit investment strategy

includes four components that will supplement local community fixed route bus service by providing high quality, higher frequency convenient transit service to downtown: A Downtown Bus Rapid Transit Circulator, the Primary Transit Network, park and ride express bus service, and the private regional commuter bus service.

Downtown Bus Rapid Transit Circulator

A BRT Circulator will use vehicles with unique branding, with stations that mimic rail service with level (or near level) boarding, off-board fare collection, real-time passenger information, and other amenities as illustrated in Figure 5 on pages 14-15. BRT is reliable, comfortable, flexible, and more affordable than most other transit options. Its flexibility allows for phasing and potential integration of autonomous transit technology, which is important in this era of rapid technological advances. It is incredibly adaptive and can be tailored to best meet the needs and constraints of a community.

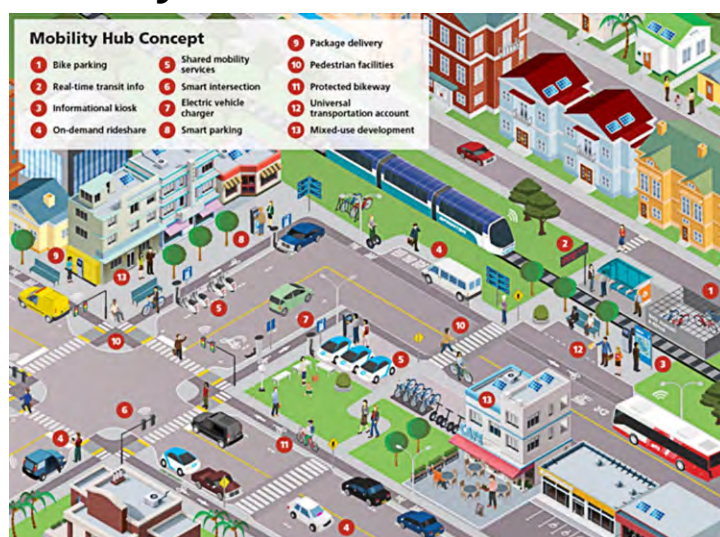


MOBILITY HUB OVERVIEW AND CASE STUDY

Overview

- Mobility hubs are places of connectivity where different modes of travel – walking, biking, transit, and shared mobility – converge and often include a concentrated component of employment, housing, shopping, and/or recreation.
- Mobility hubs are largely focused on addressing “first-mile/last-mile” gaps or connections.
- Including alternative modes and services near concentrations of parking greatly increases awareness and use of the transportation alternatives.

Case Study: Ann Arbor, Michigan – Mobility and Public Services Hub



- Completed in 2012 as part of the city's municipal parking system, the Library Lane parking facility consists of four underground levels of parking and contains over 700 spaces.
- The parking structure's location across the street from the regional transit service's main bus center has placed it at the center of mobility innovation.
- On-site services include a bike-share station, bike parking, and three car-share stalls, all prominently located at the ground level.
- On-street bus-shelters provide connections for express-bus service to Detroit Metro Airport.
- Mobility hub services are complemented by public amenities, including public restrooms, drinking fountains, public seating, and the City's main library at this location.

Mobility hubs are largely focused on addressing “first-mile/last-mile” gaps, particularly related to connections to and from significant transit services - supplemented with car-share, bike-share, and service retail land uses.

Lessons for the DMC



- Incorporating public amenities and civic destinations, can raise the profile of mobility hubs and the services and amenities they offer.
- Mobility hub programming on the site of large parking facilities can increase driver awareness of non-driving options.
- Mobility hub programming and services can expand the area served by municipal parking facilities, by providing on-site first-/last-mile options that generally support a Park-Once environment.

Figure 4: Mobility Hub Concept

BRT FEATURES

STATION DESIGN



Bus stops are upgraded to premium stations with enhanced amenities and information kiosks.

FARE COLLECTION



Off-board fare payment speeds boarding and increases convenience. Police enforcement enhances security.

IDENTITY/BRANDING



A system brand is developed to differentiate BRT transitways from other transit services.

STATION SIZE



Stations and boarding platforms are sized to projected passenger demand and available space.

Figure 5: What is Bus Rapid Transit?

VEHICLE DESIGN



BRT vehicles have a unique look that is distinct from regular local and express service. Vehicles have multiple doors.

BUS RAPID TRANSIT (BRT)

Bus Rapid Transit (BRT) is a transit mode that uses buses and incorporates many of the premium characteristics of light rail transit (LRT). The primary objective of BRT is to provide faster and more frequent transit service and an improved customer experience. Faster service is accomplished by reducing traffic signal and passenger delays and by providing roadway enhancements. An improved passenger experience is achieved through more comfortable vehicles, stations, information technology, and improved service reliability.

BRT is flexible as it can be tailored to best meet the needs and constraints of a community. BRT design can range from a high-end exclusive transitway with substantial stations to a design that operates in mixed-traffic but still offers high-quality transit service and passenger amenities.

BRT provides the same quality of service as rail but at a lower cost. It allows greater flexibility for phasing and integration with autonomous technology.

RUNNINGWAY



Runningway improvements can vary. Ideally, BRT runningways would be exclusive to only transit vehicles; however, in more constrained areas, buses operate in mixed traffic with minor spot improvements.

SIGNAL PRIORITY



Signal priority allows buses additional green time to minimize delay and increase speed.

SERVICE PLANS



BRT:
Every 10 Minutes



Local Bus:
Every 30-60 Minutes

Limited stop service plans respond to corridor demand. Buses would run every 15 minutes or better, 7 days a week.

The proposed transit circulator consists of two BRT routes (see Figure 6). The BRT vehicles using Route 1 will operate primarily in dedicated transit lanes. Much of Route 2 will also use dedicated lanes, although along 3rd and 4th Avenues West the buses will share lanes with cars accessing curb-side businesses and parking or making right turns.

The Route 1 dedicated lanes on 2nd Street may also be used by Rochester Public Transit (RPT) local and express buses and the future Primary Transit Network (PTN) BRT along with Rochester City Line (RCL) regional commuter buses. While RCL buses may travel in the dedicated lanes, patrons will not board and alight at the circulator stations but rather at off-street facilities near key destinations.

The characteristics of the circulator are summarized below.

- Service Frequency: 5 - 7.5 minutes peak period service / 10 - 20 minutes off-peak service

- Service Hours: 5:00 AM - 11:00 PM
- Vehicle: Articulated, low floor bus with real-time passenger information
- Forecasted Daily Ridership (2040): 22,500

Each of the two BRT routes extend approximately 2.9 miles from Mobility Hub Area A through downtown to Mobility Hub Area B. Route 1 as envisioned travels from Area A along Civic Center Drive, turning south on 11th Avenue NW/SW. The route then turns east along 2nd Street SW and continues along 2nd St to 3rd Avenue SE and then south to Mobility Hub B. Route 2 also travels to or from Mobility Hub A on Civic Center Drive but travels further east to 3rd and 4th Avenues West. Inbound travel proceeds on down 4th Avenue NW/SW to 6th Street SW, while outbound travels back to Mobility Hub A, using 3rd Avenue SW/NW. The lines are combined on 6th Street SW, and continue east to 3rd Avenue SE. Route 2 then follows the same alignment as Route 1 to Mobility Hub B.

2 New transit circulator routes
connecting mobility hubs with key employment destinations



12 New BRT Stations
to access PTN and transit circulator

2 New BRT PTN Routes
providing frequent all-day service on 2nd Street and Broadway Avenue

18 Hours of Service
BRT: reliable service every 10 minutes

22,000+
daily rides will be served by the transit Circulator

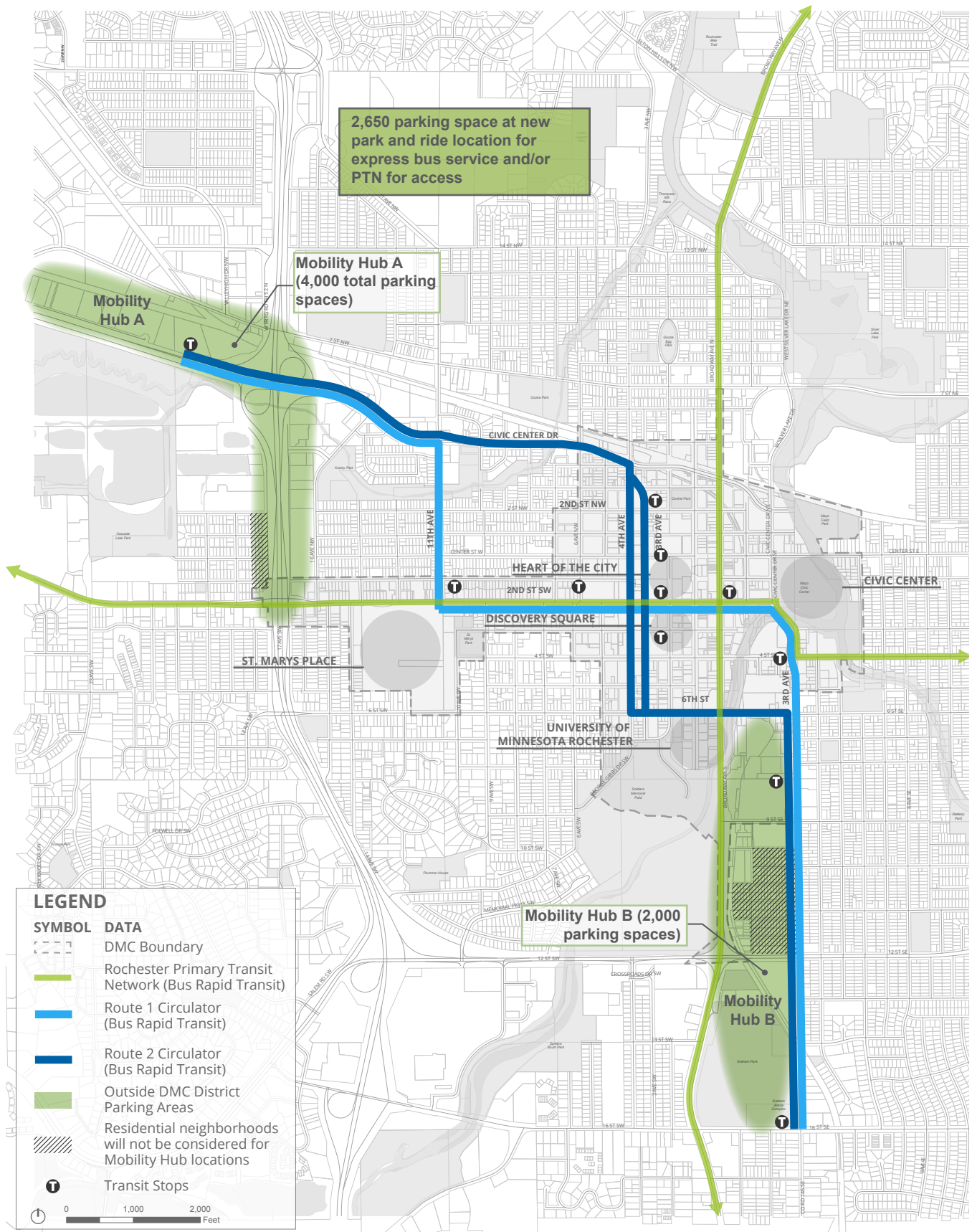


Figure 6: Proposed BRT Routes

The specific design of the BRT Circulator System – including decisions about dedicated transit lanes, whether those lanes should operate at the center or at the curb lane of the street, specific station locations, and station design will be determined in the preliminary engineering phase of this project.

The addition of the second BRT Circulator route offers several service advantages. Downtown commuters have direct circulator access to the Heart of the City subdistrict from Mobility Hub A using Route 2, rather than stopping first at St. Marys on Route 1. Route 2 also provides closer circulator service from both Mobility Hub A and Mobility Hub B parking to work destinations north and south of 2nd Street SW in the downtown core of the DMC District. This results in a shorter walk from the circulator to workplaces along or near the 3rd and 4th Avenue corridors expected to experience significant intensification in use. The north/south orientation of Route 2 also offers more circulator coverage beyond 2nd Street SW for non-commuter trips within downtown, and will connect the proposed University of Minnesota Rochester campus with the downtown area.

The Primary Transit Network

The Primary Transit Network (PTN) is envisioned to be a key initial element of an integrated land use and transportation strategy that blends a system of high frequency, high amenity transit corridors with a mixed use, mixed density land use strategy creating new housing choices and business development opportunities that will provide attractive places for downtown employees to live and supportive retail and service business to thrive. As depicted in Figure 7, the PTN network will provide convenient connections to the DMC District for work, leisure or business, whether it be residents living near the PTN or visitors who may be staying at lodging establishments along the PTN. The PTN network will also provide service to many of the city park and ride facilities that support the economic interests of

the DMC, improving both peak period and mid-day/evening access to park and ride facilities.

Elements of transit service that will be enhanced and optimized by the PTN include:

- A service designed to provide direct, frequent service between major trip generators including the DMC District
- The ability to implement PTN routes and service quickly without significant capital infrastructure investment.
- Service available for at least 16 hours on weekdays and 14 hours on weekends
- Convenient 15 to 20-minute service all day to minimize waits and reduce dependence on the fixed schedule
- A service that is on-time and competitive with the private automobile in connecting key destinations
- Easily accessed and readily available information about the PTN service available through multiple channels that is legible and easy to understand.
- A Service that connects high demand park-and-ride facilities to downtown and other major employers.
- A fare collection system that encourages quick station loading and unloading

The Primary Transit Network would ultimately be served by Bus Rapid Transit that can be phased in over time. Initial efforts can focus on enhancing existing local bus service on PTN corridors with added frequency and improved station amenities consistent with a Bus Rapid Transit vision. As ridership grows as a result of land use intensification and remote parking strategies, full Bus Rapid Transit with branded service, special

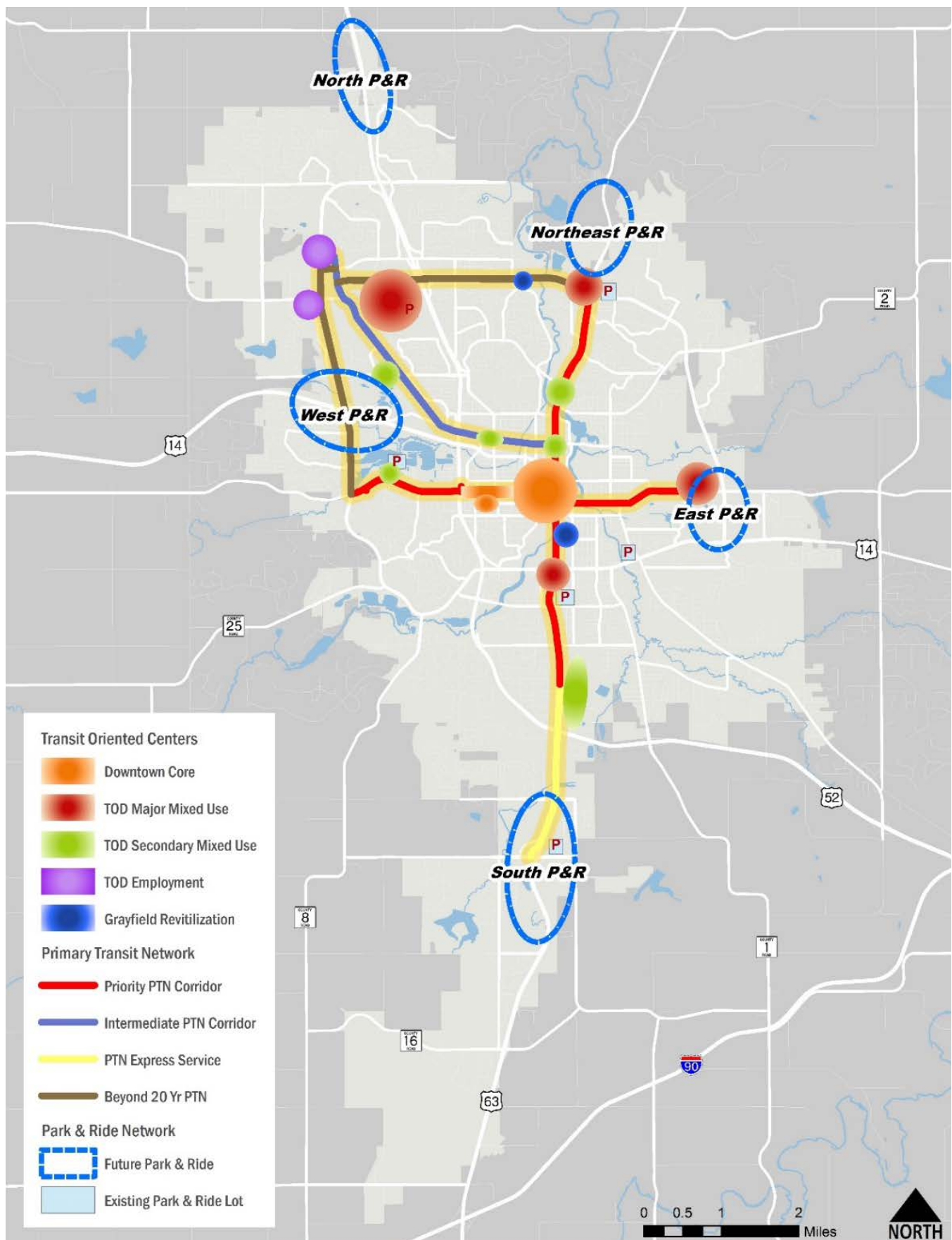


Figure 7: Proposed Primary Transit Network

Source: A Plan to Succeed: 2040 Comprehensive Plan Draft

vehicles, unique stations and traffic advantages can be deployed. Implementation can occur on a corridor by corridor basis as development occurs; the entire network does not need to be deployed at one time to gain benefits.

Investments in the PTN will support transit-oriented development around planned corridors, helping to reduce the impacts of new development on traffic congestion and reinforcing shifts to transit and active modes of transportation. PTN investments also convey permanence of the infrastructure investment to the development community to encourage investment in compact, walkable, transit-supportive neighborhoods.

The endpoints of these corridors become prime locations for remote park and ride lots serving downtown employment; development of these park and ride facilities are critical in addressing the strategies of reducing downtown congestion, transitioning downtown parking to patients and visitors, and accomplishing the mode shift goals identified in the DMC Development Plan. This combination of a convenient high-quality transit service connecting active neighborhood centers with downtown will reduce auto-dependency and could aid in meeting part of affordable workforce housing need by providing housing choice(s) that offer ability to reduce household transportation costs.

Park and Ride Express Bus Service

Park and Ride locations outside of the downtown area will continue to be served by express bus service as the size and locations of these parking areas are expanded per discussion above. Service schedules, downtown stop locations, and routes will continue to be expanded and modified as needed.

Regional Commuter Bus Service

Privately operated commuter buses serving employees commuting to downtown from communities outside of Rochester are envisioned

to significantly expand their ridership as downtown employment expands. Currently these buses serve limited locations in downtown and are stored on downtown streets during the work day. Off-street storage and end-of-day boarding location options are being explored and are being finalized as the Integrated Transit Studies conclude.

Streets Investment Strategy

The Preferred Solutions includes a street network improvement strategy that reflects multiple types of streets balancing local travel needs with the character of existing or planned land use adjacent to each street corridor. The framework for the investment strategy assigns a typology (Figure 8) to each DMC District street including:

- Streets that cater to pedestrian movement and amenities while also accommodating automobiles such as 1st Ave S.W. (Main Streets).
- Curbless streets with cohesive paving materials that allow for flexible usage, ultimately catering to pedestrians and bicyclists (Pedestrian-only and Shared Streets).
- Streets that do not prioritize one mode over another, but strive to accommodate a variety of modes (Multimodal Streets).
- Streets with design elements and modal priorities that are transit-oriented, while also being pedestrian-friendly (Transit Priority Streets).
- Streets that accommodate high volumes of vehicles while still providing facilities for other modes (Mobility Streets).
- Streets that are designed for low volumes of slow moving traffic and are comfortable and inviting for play and leisure uses. (Neighborhood Streets).

Potential significant street investments include expansion of Civic Center Drive to 6-lanes north of downtown, modification of the TH 14/TH 52 interchange to improve operations and facilitate efficient transit service, reconstruction of 4th Street SW between 1st Avenue and 6th Avenue SW, 2nd Street SW between 11th Avenue and 16th Avenue SW, North and South Broadway Avenue, and 3rd Street SW, as well as intersection improvements where needed to improve traffic flow and pedestrian safety. The street investment strategy also reflects development of a network of on-street bicycle facilities incorporating different levels of designated, protected and buffered bike lanes to provide connectivity from destinations within the district to the city's network of river shared use paths and to a provide network of bicycle routes that provide continuity across and through the district.

Active Transportation Investment Strategy

The DMC Development Plan emphasized encouraging more active transportation through improvements to the quality of the downtown environment as well as investment in pedestrian and bicycle facilities. The Plan specifically identified the City Loop as a key element of the plan, based on Indianapolis' Cultural Trail (see "Indianapolis Cultural Trail Case Study" on page 24), to support active transportation as well as economic development. The Preferred Solutions coming from the Integrated Transit Studies further refined the concept of the City Loop as well as improving the overall bike network into and through downtown.

City Loop

The City Loop (Figure 10) is a world-class separated pedestrian and bicycle trail envisioned in the DMC Development Plan as an active transportation facility connecting the sub-areas of the DMC District. It incorporates a high amenity, safe multi-modal off-street trail linking key destinations within the DMC district, closing gaps in the City's trail network across

the downtown area, and attracting tourists and developers to the DMC district. The trail will serve patients (providing opportunities to relax outdoors between appointments) and employees (providing opportunities for healthy activity during the work day) as well as residents and families. This facility will incorporate small pocket parks to provide areas of respite, emphasize easy wayfinding for out-of-town visitors, accessibility for users of all physical abilities, and year-round maintenance for use in all seasons. Additional branding efforts should be considered to appropriately convey the importance of this facility.

Bikeway Network

As noted in the discussion of the Street Investment strategy, the Preferred Solutions refine and modify the City's adopted bikeway network plan by providing an updated framework for the development of an all ages and abilities network that connects to other existing and planned bikeways, addressing the current "gap" in bike network continuity through and across downtown while enhancing connectivity to key destination and residential neighborhoods in downtown (Figure 11). Vehicle trips may continue to grow, so in defining this network attention was given to not reducing vehicle travel lanes as part of this recommendation. This recommendation calls for designated bicycle lanes on certain streets as part of increasing safe access for bicyclists to and within the DMC district.

The investment strategy identifies bicycle portal improvements (Figure 12) on key streets that are important for providing downtown bicycle access from residential neighborhoods abutting the downtown area. The portal improvements consist of recommendations intended to enhance safety at key intersections or along constrained sections such as bridge crossings that are important for bicycle access to downtown.

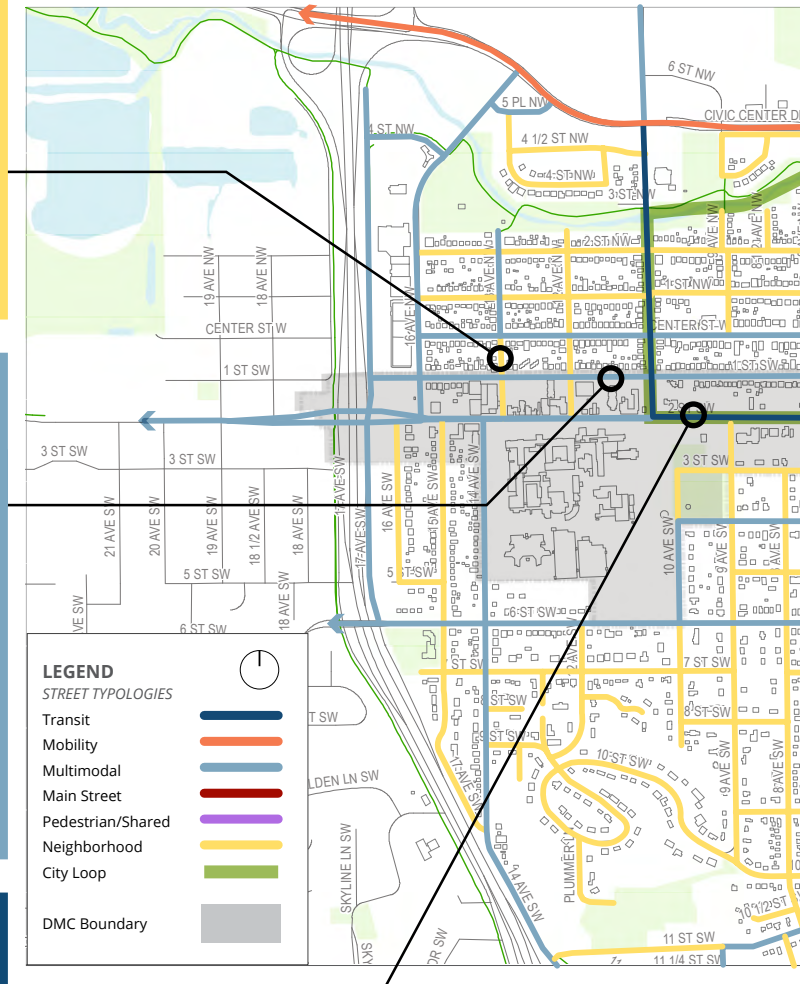
Neighborhood Streets: Streets are designed for low volumes of slow moving traffic and are comfortable and inviting for play and leisure uses.



Multimodal Streets: Design features do not prioritize one mode over another, but strive to accommodate a variety of modes.

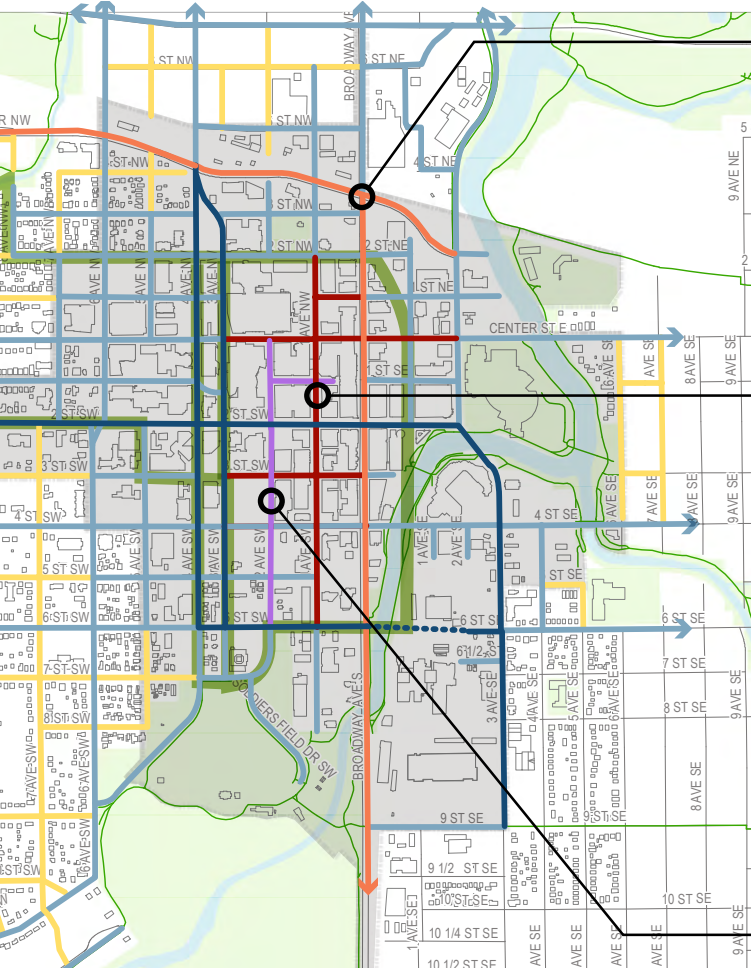


Transit Priority Streets: Design elements and modal priorities are transit-oriented, while also being pedestrian-friendly.



Street types set priorities for movement of people, not just vehicles, and ensures that transit, cyclist and pedestrians are all provided safe and convenient access to and circulation through downtown. - Downtown Rochester Master Plan, 2010

Figure 8: DMC Street Types: Preferred Solutions



Mobility Streets: Design features accommodate high volumes of vehicles while still providing facilities for other modes.



Main Streets: Streets cater to pedestrian movement and amenities while also accommodating automobiles.



Pedestrian-only & Shared Streets: The curbsless design and cohesive paving materials allow for flexible usage ultimately catering to pedestrians and bicyclists.



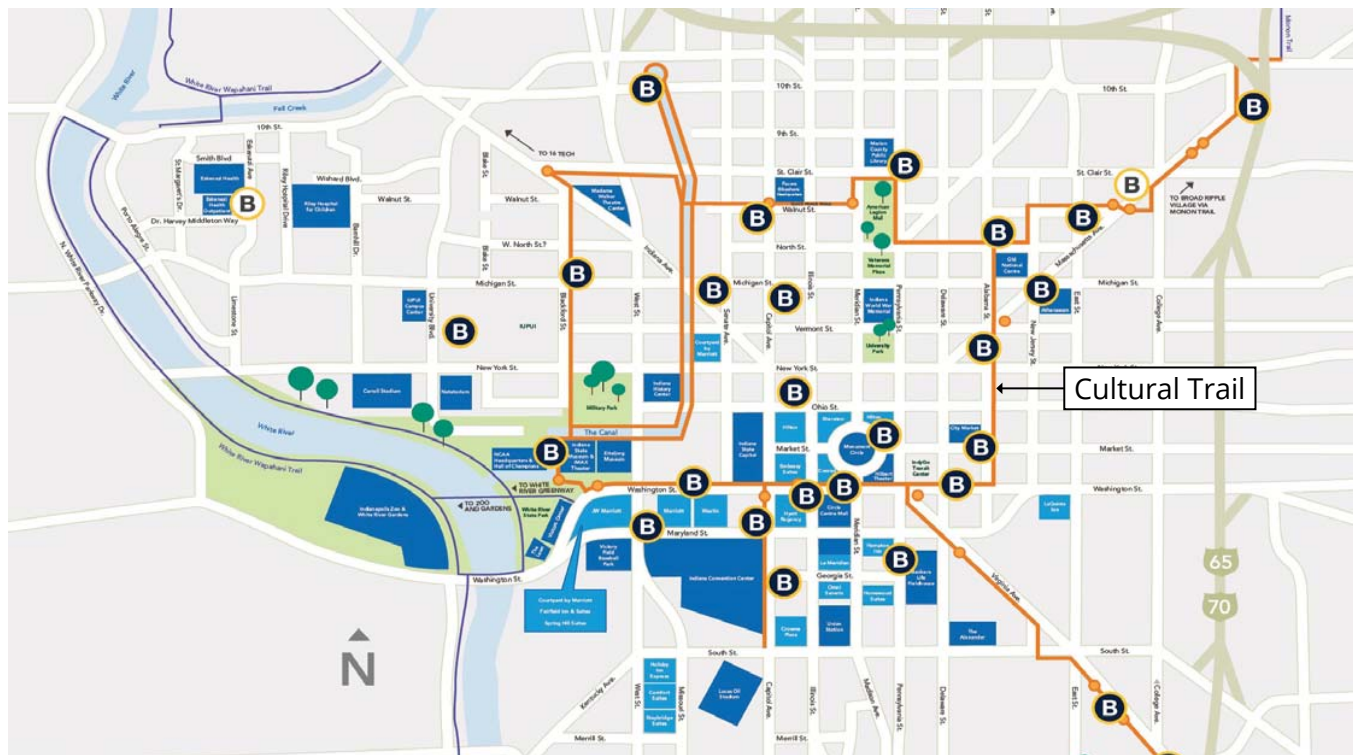


Figure 9: Indianapolis Cultural Trail Case Study



The Cultural Trail is an 8-mile bike trail in and around downtown Indianapolis, IN with extensive streetscape, identity, and wayfinding elements. Called “the biggest and boldest step by any American City”^{*} the Cultural Trail investment put Indianapolis on the map for its focus on stylish paving features for bicyclists and pedestrians, and \$2 million allocation on public art.

The Cultural Trail was created through a public-private partnership. Trail construction was funded by:

- Private and philanthropic support (44%)
- Federal transportation grants (56%)
- No City of Indianapolis funds were used

Key findings from a 2015 Cultural Trail study:^{}**

- Cultural Trail is having measurable economic impact
 - Property values adjacent the trail have increased
 - Increased revenues and customers for adjacent businesses
- Visitors to Indianapolis are attracted to the Cultural Trail
 - 17% of surveyed users were from outside the Indianapolis Metro Area
- Primary reason for use: 1.) Exercise recreation 2.) Commuting to work
- Cultural Trail increases sense of safety and community
- Trail usage exceeds most other Indianapolis trails

^{*} Project for Public Spaces

^{**} Performed by the Indiana University Public Policy Institute

The Rochester City Loop has the opportunity to improve access to active transportation while at the same time capitalize on the economic benefits that these high end facilities often provide.

The map illustrates the proposed City Loop Alignment for the bikeway network in Downtown Portland, Oregon. The alignment is shown as a solid purple line, with dashed purple lines indicating interim and final loop configurations. Key features include:

- DMC Boundary:** Shaded light blue area.
- Bikeway Portal Improvements:** Indicated by purple dashed circles.
- Key Downtown Destinations:** Marked with orange circles, including St. Mary's Hospital Campus, Heart of the City, UMR, Library, Civic Center, City Hall, Discovery Square, UMR/TACA, Soldiers Field Memorial Field, and Grant Park.
- Existing Bikeway:** Shown as solid green lines.
- Planned Bikeway:** Shown as dashed green lines.
- City Loop Alignment:** Shown as solid purple lines.
- Interim City Loop:** Shown as dashed purple lines.
- Final City Loop:** Shown as solid purple lines.

The map also shows major streets, parks (e.g., Cascade Lake Park, Kutzky Park, Cooke Park, East Park, Homestead Park), and a scale bar indicating distances up to 1 mile.



The City Loop runs through the Kutzky Park neighborhood as it connects Kutzky Park with 2nd St. SW and St. Marys Place.



This City Loop segment transforms a portion of the existing park trail running along the north side of Cascade Creek into a branded, high amenity dual walking and cycling facility.

26 |



2nd Street NW - West Facing:

The western portion of the City Loop's 2nd Street NW segment travels through the Kutzky Park neighborhood as it provides connections between the DMC's Heart of the City District, Kutzky Park and the Cascade Lake trail loop west of HWY 52.



3rd Avenue SW - North Facing:

As the City Loop travels along 3rd Avenue it runs through the DMC's Heart of the City and Discovery Square districts and connects Mayo Clinic facilities to landscaped open spaces, including Central Park to the north and Soldier's Field to the south.

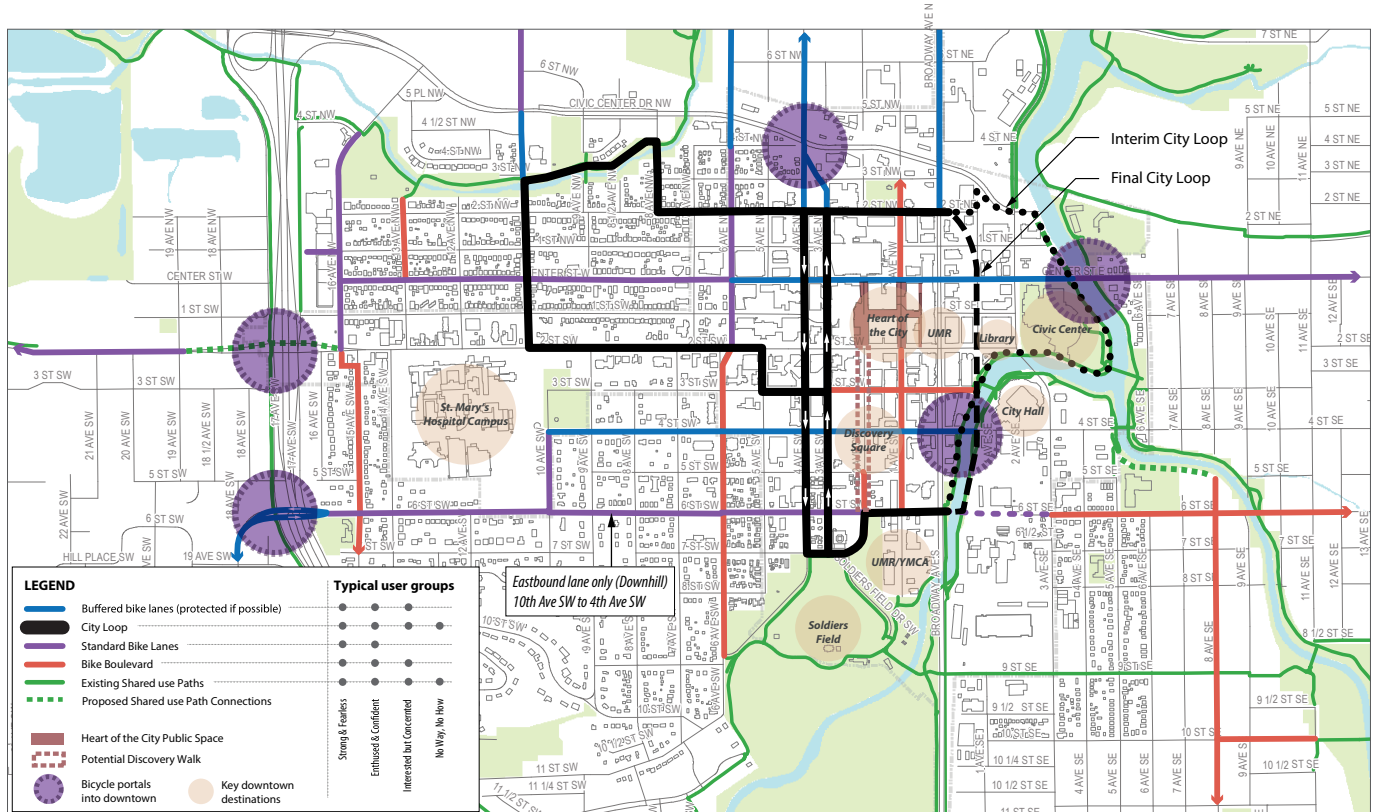


6th Street SW - West Facing:

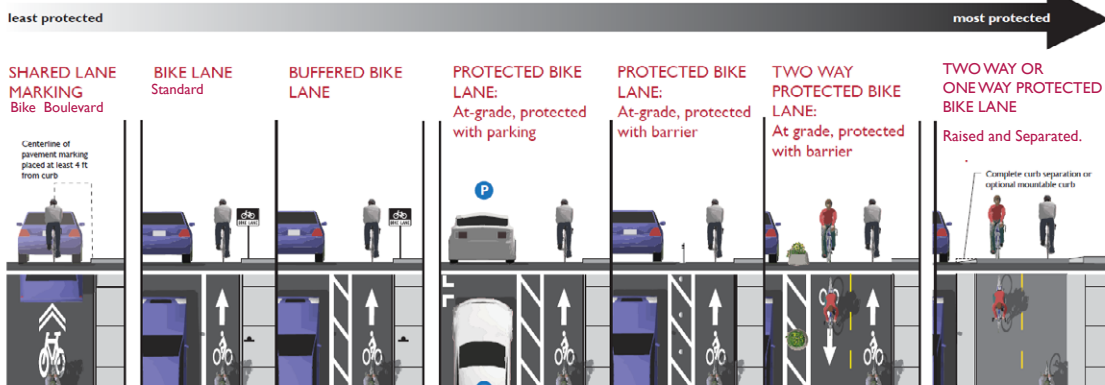
The 6th St. SW segment provides access to Soldier's Field park and trail facilities, the proposed University of Minnesota's Rochester campus expansion and existing Zumbro River trails.

A BICYCLE NETWORK FOR ALL AGES AND ABILITIES

The bikeway network will connect bicyclists to downtown Rochester safely and comfortably from the City's established shared use path network and other existing and planned bikeways outside of downtown. Both north-south and east-west bikeways through downtown will provide access to major downtown destinations.



BIKEWAY FACILITY CONTINUUM

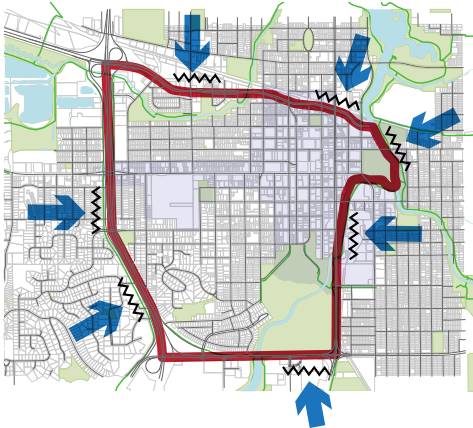


Higher degrees of user separation result in more comfortable facilities accessible to a broader category of people interested in bicycling.

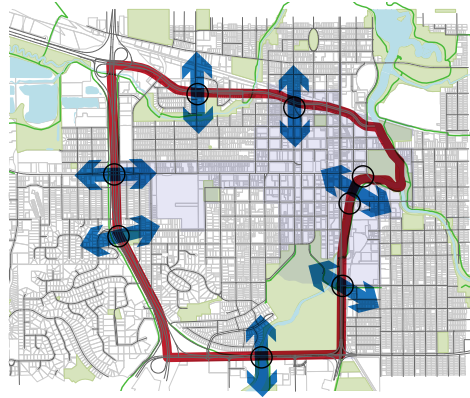
Figure 11: Bicycle Network and Facility Continuum

BICYCLE PORTALS IMPROVE DOWNTOWN ACCESS

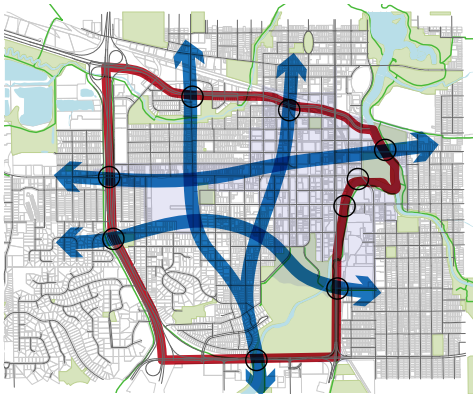
Major roadways and Zumbro River are a significant barrier (red line) that limit access to downtown.



Downtown Rochester is ringed by significant barriers that inhibit bicycle and pedestrian connectivity into and through downtown from surrounding areas.



Access to downtown is limited to a set of portals (entryways) that cross the barriers created by high volume, high speed roads, and the Zumbro River.



Connecting portals (entryways) with high quality pedestrian and bicycle corridors will enhance access into and across downtown.

Bicycle portal improvements reduce access barriers and enhance safety for bicyclists and pedestrians entering and moving across the DMC District.

Figure 12: Bikeway Portals and Downtown Connectivity

Implementation of the Preferred Solutions Strategies

Implementing the Preferred Solutions identified above will require an organized approach to sequencing the improvements in response to funding as well as transportation needs in step with downtown growth. An implementation program will be prepared with the following elements:

DMC Transportation Implementation Plan:

The plan will identify the anticipated phasing, sequencing and cost magnitude of each Preferred Solution element, including the additional planning, funding and engineering phases needed prior to construction. The Plan will be organized in 5-year increments with completion of all Preferred Solutions strategies by 2035.

DMC Transportation Implementation Schedule:

A robust scheduling and cash flow tool that will identify the time and funding needed to complete each of the Preferred Solutions strategies so that these activities can be coordinated with funding availability and other downtown construction activities.

DMC Transportation Annual Report and CIP

Submittal: The DMC Transportation Implementation Plan and Schedule will be revisited annually through this annual report, tracking key development and transportation operations measures to determine when improvements are warranted, reporting on the previous year's accomplishments, and providing recommendations to be included in the annual Capital Improvements Program (CIP) process.

Ongoing Coordination with other DMC and City Strategies

While the Preferred Solutions provide greater detail than was provided in the Transportation Section of the DMC Development Plan, several elements of the Preferred Solutions, will require further study before final decisions can be documented in official mapping or otherwise adopted into appropriate City plans. The most significant of these include:

- Final Mobility Hub locations
- Park and Ride expansion plans
- Final BRT Circulator routing in response to Mobility Hub locations
- BRT Circulator guideway and station design

In addition, transportation investments will need to be coordinated with the design and construction of other DMC projects including Heart of the City, Discovery Square, Discovery Walk and St. Marys Place among others.

SECTION 3: HOW WERE SOLUTIONS AND STRATEGIES ARRIVED AT

EXISTING CONDITIONS IN DOWNTOWN

Economy and Employment

The primary economic driver for the greater Rochester-Olmsted area, as well as for the DMC, is Mayo Clinic. Within the DMC district, Mayo Clinic employs about 30,000 people, 76 percent of the total employment in the district.² Approximately 39,900 people work in the DMC district, which is about 38 percent of the 105,000 people who work in the City of Rochester.

Around two-thirds of all workers in the DMC district area live within the city limits. These workers, along with a small share of workers who commute from outside the City of Rochester to the district, live within 10 miles of where they work. This is significant as it means that transit and active transportation may be viable alternatives for a significant share of the downtown employment population.

Transportation System

The transportation system in Rochester is multifaceted and includes streets, transit service, bicycle and pedestrian infrastructure that are largely provided by the public sector. Another major element of the transportation infrastructure is parking, which is provided through a mixture of public and private sector parties.

Streets

The configuration of the existing street system funnels most travelers in and out of downtown Rochester on a handful of streets. These streets, which can be thought of as portals into downtown, have a limited amount of traffic capacity and

some— the portals from TH 52 (Civic Center Drive, 2nd Street SW, and 6th Street SW) – have very little remaining capacity in the AM and PM peak periods.³ This means that without changes in travel behavior including a shift in mode choice by those traveling to downtown during the peak periods will result in future development leading to more vehicle trips than can be physically accommodated by the existing portals. As shown in Figure 13, most of the portals with available capacity are on local streets (Silver Lake Drive, 4th Avenue NW, East Center Street that do not provide direct access to the heavier traffic demands created by TH 14 or TH 52.

Portal Capacity limits the number of additional commuter vehicles that can enter the downtown core in the morning and evening rush hours. The results of the portal capacity analysis point to the need to limit the growth of single-occupancy vehicles entering or exiting the district during peak periods by encouraging a shift toward other modes of transportation and expansion of parking opportunities to areas outside of the district.

Current and future portal capacity play a significant factor in determining where and by what mode new employees and visitors will access the DMC District. The results of the portal capacity analysis point to the need for a shift away from single-occupancy vehicles toward other modes of transportation, and were used to inform the parking, transit, biking, and walking alternatives and strategies developed in the four Integrated Transit Studies.

² Data from the Bureau of Labor Statistics & Bureau of Economic Analysis

³ A portal capacity analysis determined the total volume of vehicles that can enter and exit downtown Rochester during peak periods. Analysis was based on 2016 traffic volumes collected in October-November 2016.

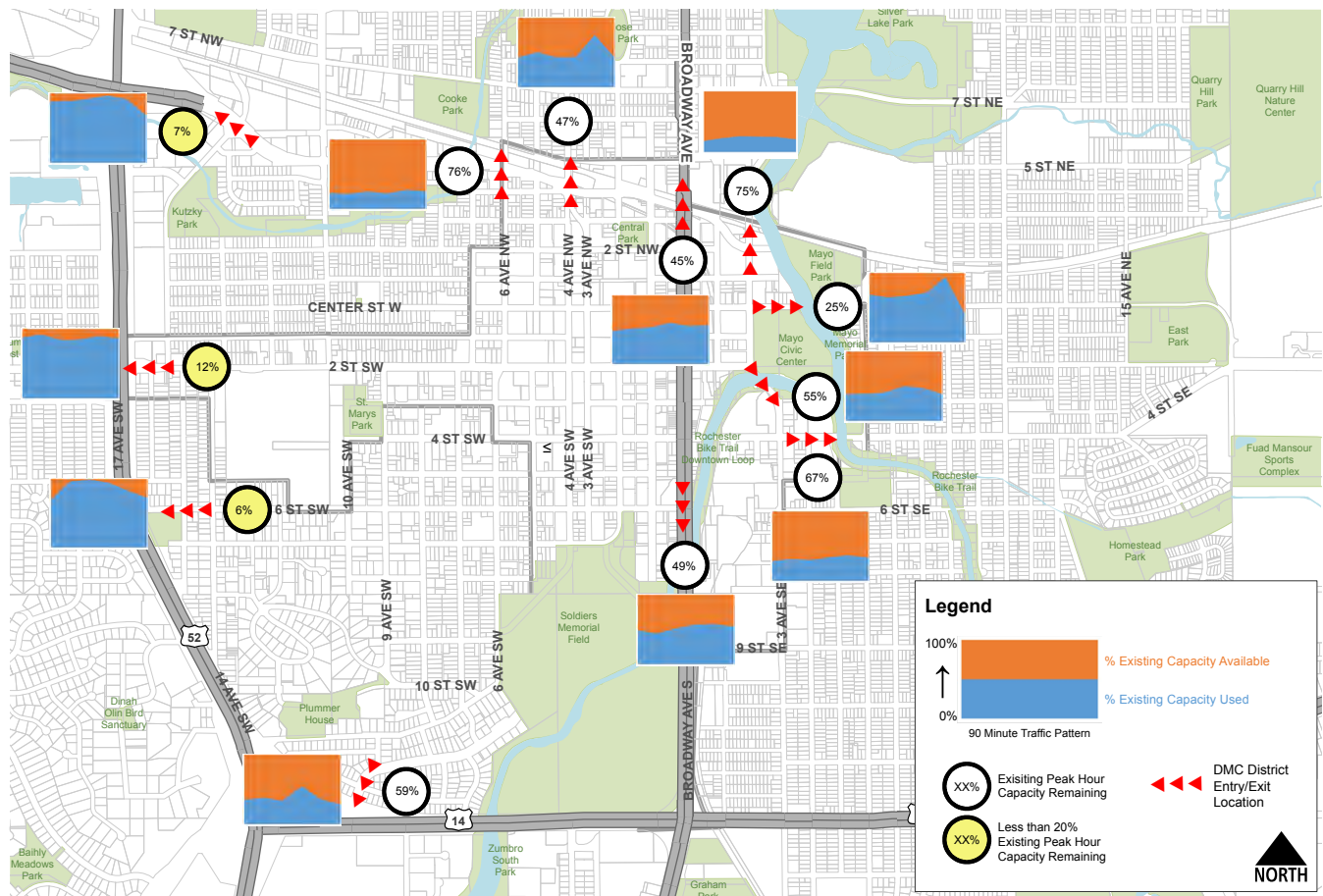


Figure 13: Downtown Portal Capacity

Transit Service

Existing transit service in downtown includes a mix of service types—local bus, regional express commuter bus, Mayo Clinic shuttles, and private shuttles—catering to several different user groups. In some cases, the different services are not well integrated since many overlap along similar corridors, operate with similar schedules, serve similar markets, and may compete for ridership.

The City of Rochester has sustained a 10 percent transit mode share for commute trips destined to downtown, which is relatively high compared to other cities of its size. This above average transit

mode share is largely the result of the city and the Mayo Clinic maintaining effective programs and policies that reduce auto dependency, including parking demand management (including constraints on commuter parking supply) and subsidized transit passes. The current family of transit services provide a foundation to leverage and build upon to address the travel demand needs that will be created by future development growth in the district.

The following summarizes each of the different transit service providers currently in operation in the City of Rochester.

Local Bus Service

Rochester Public Transit (RPT) provides local bus transit service within the City of Rochester. Owned and operated by the City of Rochester, the service offers riders 14- to 18-hour service seven days a week, generally offering 20- to 30-minute service in the peak periods and 30- to 60-minute service in off peak periods.

RPT service is designed as a “radial” network, where most routes begin and end at the downtown transit center. The downtown transit center is an on-street facility centered at the intersection of 2nd Avenue and 2nd Street SW. The transit network and downtown transit center are oriented to primarily serve the commuter market traveling to and from downtown Rochester. Much of the RPT service operating through downtown Rochester “pulses”, with buses arriving downtown at similar times to align with commuters’ work shifts and facilitate transfers, which creates a high concentration of bus vehicles in downtown at certain times during each hour.

In addition to local fixed route service, RPT offers a series of direct express bus connections from park-and-ride lots throughout the city to downtown.⁴ Total parking capacity at the park-and-ride locations

amounts to approximately 2,200 parking stalls designated for RPT riders. On average, three of the lots are at capacity and two have demand exceeding lot capacity (see Table 1). This high utilization of approximately 1,600 vehicles per day is largely attributable to the cost of parking in downtown Rochester, the relative shortage of employee parking in downtown, and the provision of frequent, direct transit connections to the downtown transit center.

In addition to city park and ride lots, MnDOT District 6, in cooperation with small cities throughout the region, has established a series of park and ride lots along state highways that are used primarily as carpool nodes and in some instances, as regional commuter bus service pick-up points.

Mayo Clinic Shuttle

Shuttle buses operated by the Mayo Clinic circulate during peak shift-change periods to move employees to and from Mayo shuttle parking lots. Mayo also operates a service that provides shuttle service for employees and patients between the downtown Mayo campus and St. Marys Hospital campus on 2nd Street SW to accommodate the daily demand of Mayo’s staff and about 3,500 patients per day between those sites.

Table 1: Existing RPT Park-and-Ride Lots

Park-and-Ride Lot	Parking Capacity	Parking Stalls Occupied	Utilization (%)	RPT Route Served
NE – Hwy 63 N at Shopko N	160	321	201	1, 1D, 1N
S – Hwy 63 S at Target S	190	222	117	6M, 7N, 15D
SE – Hwy 14 E at Cub Foods	50	48	96	3N, 4D, 17
NW – Hwy 52 N at IBM	667	662	99	12M, 12N, 18D
S – Broadway Ave S at the Olmsted Co Fairgrounds	368	212	92	6D, 6M, 7N
E – RCTC	746	152	20	3, 3N
	2,181	1,617	74	

Source: - Rochester Public Transit, November 2016 - 2015 Draft RPT Transit Development Plan
- City Parking Operations – June 2018

⁴ The survey results from the 2015 Draft RPT Transit Development Plan indicate that more than 80 percent of respondents do not transfer to a second bus to reach their destination.

Regional and Commuter Transit Services

Rochester City Lines (RCL) is a privately owned and operated regional commuter express service that provides long distance transit services from cities around Rochester to downtown Rochester. RCL operates a total of 102 daily one-way trips serving 40 surrounding communities with two stops in downtown Rochester, at St. Marys Hospital and RPT Transit Center on 2nd Street SW. These regional services are critical options for downtown employees. In the year 2013/2014⁵, RCL carried roughly 2,100 passengers per average weekday. A share of this fleet uses curb space on local streets in the downtown area as the layover location for buses throughout the day.

Parking

While some commuters use Rochester Public Transit or regional commuter buses to reach downtown, parking facilities in downtown Rochester are currently used predominately by commuters driving alone. Though there is adequate roadway and parking capacity during off-peak hours, available visitor and patient parking could be absorbed by commuters if current trends continue and there is no change in parking and transportation infrastructure.

There are approximately 26,000 parking spaces in Downtown Rochester distributed between a mix of parking structures, surface parking lots, and on-street parking spaces. Parking utilization is very high among all user groups, particularly among workers, with peak utilization rates during peak times in mid-morning and mid-day. The distribution of parking spaces by type of user are shown in Table 2.

According to an in-depth assessment completed by the project team, the City of Rochester’s Transit and Parking program is one of the best integrated and managed transit and parking programs in the country. Transit and parking in many cities are often managed by separate divisions that, many times, function at cross-purposes. In Rochester, there is an effective “vertically integrated” structure in place whereby all aspects of parking management are consolidated into one operational entity and operated jointly with the public transit system. The City of Rochester’s Transit and Parking program is also structured as a parking enterprise fund (PEF) with revenues from on-street, off-street, and enforcement all funneled into back into the parking system to support maintenance, operations and construction needs.

Table 2: Parking Spaces in Downtown

Parking Type	Number of Parking Spaces in Downtown Rochester
Public on-street parking	1,222
Public off-street parking	2,926
Mayo employee parking downtown	10,448
Contract non-Mayo employee parking downtown in city ramps or lots	1,396
Mayo patient parking	2,874
Private, on-street spaces reserved for business patrons or employees	7
Private, off-street spaces reserved for business patrons or employees	7,225

5 Source: City of Rochester Comprehensive Plan; 2016 Mayo Medical Center Master Plan

Active Transportation Network

The City of Rochester has an established bicycling network of off-street paved shared use paths completed by a limited system of on-street bicycle lanes, striped shoulders and signed bicycle routes. The backbone of the City's shared use path network are facilities constructed along the various streams and creeks in the city, connecting many local neighborhoods to the periphery of downtown. Network development is guided by the Rochester Area Bicycle Master Plan (2012).⁶

In 2017, Nice Ride Minnesota, a privately operated bikeshare program, offered two bikeshare stations at:

- People's Food Co-op (519 1st Avenue SW)
- Peace Plaza Visitor Kiosk (1st Avenue SW and 1st Street SW)

The bikeshare system operated from Mondays to Fridays (closed weekends) and was not operational during the winter. The bikeshare program was geared towards recreation trips and visitors to the City of Rochester.



6 See: <https://www.co.olmsted.mn.us/planning/trnsprtng/bpac/bikemasterplan2011/Documents/ExecSumm20111109.pdf>

Currently there are around 600 designated bicycle parking spaces in downtown Rochester, with additional parking spaces being added as new development occurs in the district. All municipally-owned parking ramps include space devoted to bike parking, and an initial set of five bicycle repair stations have been installed at strategic locations downtown and along the trail network to aid cyclists.

There is also a network of subway (below grade) and skyway (above grade) indoor pedestrian systems within downtown Rochester. These systems tie together over 20 blocks of the Mayo Medical Campus with the Central Business District, Mayo Civic Center and downtown parking ramps to provide weather-protected pedestrian travel between major destinations uninterrupted by vehicular traffic.

Travel Demand Management (TDM)

The Mayo Clinic operates many traditional TDM program elements in-house, working with the City of Rochester to offer various alternative travel options to its workforce. Among the key elements of the Mayo program include:

- **Staggered Work Shifts:** The Mayo Clinic spreads out employee start times which help alleviate peak period, localized traffic congestion.
- **Carpool:** The Mayo Clinic encourages carpooling to decrease employee parking demand. Incentives include preferential on-site parking at the Baldwin Ramp (downtown location) and the ability to use the Guaranteed Ride Home program.
- **Guaranteed Ride Home Program:** The Mayo Clinic provides a Guaranteed Ride Home (GRH) Program for employees enrolled in the

bus pass program or who carpool, vanpool, bike, or walk to work. The program allows employees to take a free taxi ride home for family emergency purposes or due to illness. Employees asked to work beyond their scheduled time may use this service as well. This service may be used up to four times per year by an employee.

- **Transit Pass Discounts:** RPT offers a 10 percent transit pass discount to all employers that commit to purchasing passes for 10 percent or more of their workforce. The Mayo Clinic supports a robust transit pass program, subsidizing up to \$80 per employee per month. This subsidy fully covers the monthly cost of an RPT transit pass. For Rochester City Lines (RCL) regional commuter routes, employees must pay the difference between the \$80 subsidy and the cost of their RCL pass. To qualify for an annual transit pass, employees must purchase two monthly passes before the Mayo Clinic purchases an annual pass for the employee.
- **Private Route Sponsorships:** Mayo also provides route sponsorships for night service on certain RPT routes and express park and ride service in the urban area and increased frequency of service to remote city park and ride sites during peak morning and afternoon periods. Mayo also sponsors daily park and ride locations/services.

The Mayo Clinic has been recognized over multiple years as one of the ***Best Workplaces for Commuters***® by the Center for Urban Transportation Research for its exceptional work in assisting and supporting employees who choose alternative travel options for commuting.

ANTICIPATING AND PLANNING FOR GROWTH

Land Use and Development

The City of Rochester anticipates a significant growth over the next 25 years of approximately 50,000 people, 50,000 jobs, and 23,000 housing units projected to be added by 2040. Over half of the approximately 50,000 jobs – 27,000 to be specific – are expected to occur within the DMC District (See Tables 3 and 4 below). This level of growth will have significant impacts on land use patterns within the DMC District as well as on its transportation needs.

The intensity of development and resulting trip generation would increase traffic well above the current roadway network capacity if primarily

occurring in single occupancy vehicles, creating severely congested conditions. With the increase in employees, patients, residents, UMR students, the demand and need for improved alternative transportation options becomes crucial.

A critical aspect of the future success of the DMC highlighted in the DMC Plan is the need to create an urban live-work environment that will be attractive to younger members of the workforce to support Mayo Clinic's future growth, new bio-med-tech businesses, and supporting operations. These future workers (and others) are interested in having a range of options across a wide spectrum of needs including housing, retail and entertainment, arts and culture, educational opportunities, and personal

Table 3: Estimated Population Growth

	2015 Estimate	2040 Projection	Estimated Growth
Olmsted County Population	151,436 ¹	215,200 ⁴	63,764
City of Rochester Population	112,225 ¹	164,630 ⁴	52,405
DMC Area Population	4,780 ²	10,715 ⁵	5,935
U MR enrollment	400 ³	4,500 ³	4,100

¹Census Bureau estimate, July 2015

²Rochester-Olmsted Council of Governments estimate based on land use and household size

³University of Minnesota – Rochester

⁴Rochester-Olmsted Council of Governments projection, May 2014

⁵Rochester-Olmsted Council of Governments projection based on future land use and household size

Table 4: Estimated Employment Growth

	2015 Estimate	2040 Projection	Estimated Growth
Olmsted County	116,455 ¹	165,900 ⁴	49,445
Rochester	105,000 ²	152,600 ⁵	47,600
DMC	37,000 ³	64,000 ⁵	27,000

¹Bureau of Economic Analysis 2015

²Rochester-Olmsted Council of Governments estimate using On the Map 2014 data

³Rochester-Olmsted Council of Governments estimate using LEHD 2014 data

⁴Rochester-Olmsted Council of Governments projection 2013

⁵Rochester-Olmsted Council of Governments estimate 2016

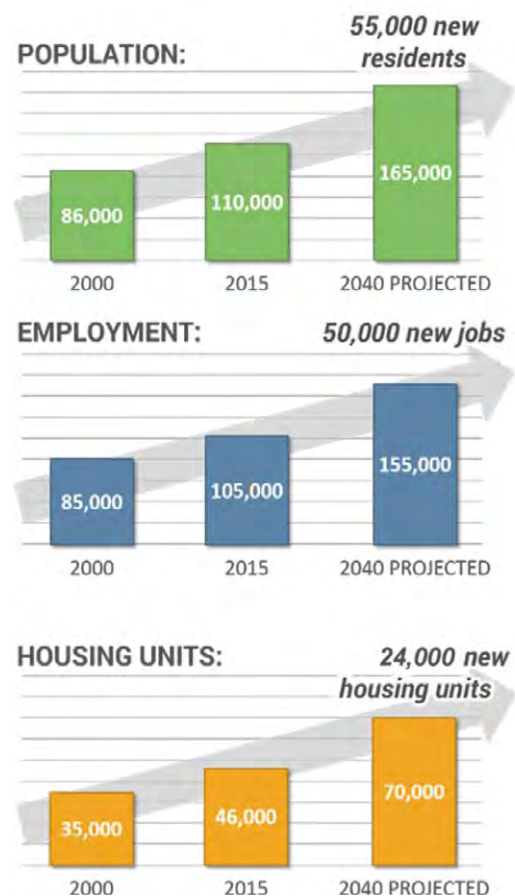
health and wellness activities. To accomplish this will require the efforts of many parties to create an attractive urban core.

To support the projected employment growth in the district a market study was done for the DMC Plan that predicts a need for an additional 2,200 to 3,100 units of for-sale and for-rent housing in a range of housing prices and types in the district. In turn, new employment in the DMC Development District at major employers and new households create a greater demand for a variety of retail, service and leisure businesses in the district. Preliminary estimates of retail demand from 2015 to 2039 range from 206,000 to 348,000 square feet, including entertainment space such as a cultural arts center. The supply of hotel rooms in the downtown submarket is expected to grow as well. The DMC Development Plan estimates seven hotels with approximately 1,300 rooms will enter the downtown market before 2034.

Multi-family residential units are expected to increase by 168 percent; medical space is expected to increase by 66 percent; and the planned UMR campus will drastically increase educational uses. This level of growth will have significant impacts on the city's land use, transportation, neighborhoods, infrastructure, natural resources, municipal facilities and services, health, and budget. Rochester's daytime population swells to nearly 160,000 most weekdays, with approximately 50,000 workers and visitors currently commuting into the city. The increased intensity of development and trip generation would increase traffic well above the current roadway network capacity, creating severely congested conditions. With the increase in visitors (assumed to generate nearly 6 - 7 million annual trips), residents, and UMR students, the demand and need for improved transit options becomes crucial.

Table 5 details the anticipated land use projections for the CBD and 2nd Street SW corridor area in the DMC Development District. As shown, multi-family, educational, and medical uses will all substantially increase by 2040 in downtown Rochester. These future uses in downtown will be the foundation of economic development in the DMC district by creating tax-producing land use opportunities for the City and business owners.

The City of Rochester realized that, unless mitigated, this growth will result in approximately 30,000 additional commuter trips to downtown. A daytime downtown population expected to grow from 50,000 to 70,000 persons currently to over 100,000 in the future cannot be accommodated with the current street and parking infrastructure. While streets could be expanded, and more parking



Source: Planning 2 Succeed 2040, Draft Comprehensive Plan

spaces built, these actions depress opportunities for economic and real estate development and create poor-quality environments for people, actions that are contrary to the DMC goals.

To mitigate the transportation effects of growth, a greater proportion of downtown travelers must use transit, walking, and biking to reach their downtown destinations and travel between destinations once there. Identifying strategies to attract these travelers to transit, walking, and biking requires planning and investment.

Streets Vehicular Traffic

Broadway, 2nd Street SW, 3rd and 4th Avenues SW/NW, 6th Street SW, and Civic Center Drive serve as the primary conduits for moving vehicles in and out of downtown and are the “portals” for vehicular traffic arriving from major highways along the southern and western edges of the city. Shifts

from reliance on single occupancy vehicles to other modes will utilize street infrastructure more efficiently and avoid disruptive expansion of streets to provide necessary peak hour capacity.

Bicycling and Walking

The role of streets is far more diverse than simply moving people in cars and freight in trucks. Streets provide access to destinations within the District, mobility through the District, places that facilitate economic and social exchange, patient and visitor repose and exploration, and recreation. Streets also function as storage facilities and sites for stormwater infiltration, utilities, auto parking, and bus layovers. Street design can facilitate multiple functions along the length of the street.

Improvements including upgrading sidewalks to be compliant with the Americans with Disabilities Act (ADA), enhancing pedestrian safety, and improving bikeways and bike support facilities must

Table 5: Projected Land Use

Land Use	Base Land Use (2010)			Projected Land Use (2040)		
	Central Business District (CBD)	2nd Street NW	DMC District	CBD	2nd Street SW	DMC District
Single Family (units)	63	498	561	79	498	
Multi-family ² (units)	962	1,241	2,203	3,430	2,488	
Commercial/Retail (1,000 sq. ft.)	689.9	1,001.30	1,691.00	1,333.90	1,034.30	
Industrial (1,000 sq. ft.)	497	--	497	476	40	
Office (1,000 sq. ft.)	1,486.90	112.5	1,599.00	1,669.00	368.9	
Education ³ (students)	866	--	866	4,856	--	
Hotels (rooms)	2,438	1,110	3,548	3,724	1,110	
Hospital ⁴ (1,000 sq. ft.)	7,061.80	6,477.50	13,539.00	12,118.00	10,385.00	
Bio Tech (1,000 sq. ft.)	--	--	--	1,020.00	--	1,020.00

¹ Source: DMC Integrated Studies Baseline Assumptions Memo (Rochester-Olmsted Council of Governments (ROCOG))

² Includes senior housing residents

³ Includes the future UMR expansion

⁴ Includes all Mayo Facilities

occur to enable a shift away from driving alone to and within downtown. Street investments will facilitate successful implementation of the DMC Development Plan by improving downtown access for bicyclists and pedestrians, ensuring mobility within downtown, and increasing land availability for office and commercial development.

Transit

The City of Rochester DMC Plan identified the need for an aggressive increase in transit mode share, capturing 23 to 30 percent of all downtown commuters on transit. High quality, high capacity transit service that is convenient and reliable is necessary to attract downtown commuters from their cars and reduce vehicular demand on the local street network. This investment will facilitate successful implementation of the DMC Development Plan by maintaining downtown access and ensuring mobility within downtown and increasing land values for office and commercial development.

The DMC Plan identified that the share of transit trips relative to total trips will need to nearly triple over the next 20 years to maintain acceptable levels of street traffic and not require significant growth in off-street parking downtown. Projected transit ridership for both local and regional trips will need to increase between 150 and 275 percent to achieve the commuter transit mode share goal of 23 to 30 percent. This growth in transit will require substantial increases in service and vehicles, which will require fleet and facility expansions and improvements to provide more capacity, ensure effective operations, and provide improved amenities for the passenger.

Parking

Much of the existing parking in downtown Rochester is provided to meet peak demand for a single user, the commuting employee, who parks their car at the start of the work shift and likely does not move it throughout the day. Shared use of private parking facilities (a concept which makes best use of the existing parking supply from an economic standpoint by facilitating utilization of spaces by multiple visitors throughout the course of the day and night) does not exist downtown. If access by downtown workers continues to be accommodated by providing parking for users who utilize a single parking space for the full duration of a work shift, the DMC Plan estimated that 80 acres of surface parking (equivalent to seven city blocks of nine-story parking structures) would be needed in the future, as shown in Figure 14.

Provision of parking to meet this type of demand would use a significant amount of land that could be put to productive economic use in the DMC district, in addition to the cost to construct, operate, and maintain parking at an estimated \$35,000 to \$45,000 per stall. Managing the parking supply in downtown Rochester is highly dependent on increases in transit investment and optimization of services within the DMC district. Without proper management of the parking supply in downtown, traffic congestion will increase, and the amount of area devoted to parking will increase significantly as street and parking supply for both workers and visitors, patients, tourists, and shoppers compete for utilization of the same limited street and land area resources.

Looking ahead, the Integrated Transit Studies estimated future parking needs based on a general continuation of trends in parking demand seen today in the District adjusted for increased transit use and a higher share of downtown residents. Table 6 shows a breakdown of the future estimated parking demand for 2040 by user type.

Table 6: Future Parking Demand

User Type	Parking Demand
Mayo Patient/Visitors	1,700
Downtown Visitors	2,400
UMR Students	400
Downtown Residents	3,300
Mayo Employees	6,500
Non-Mayo Employees	2,200
Total	16,500

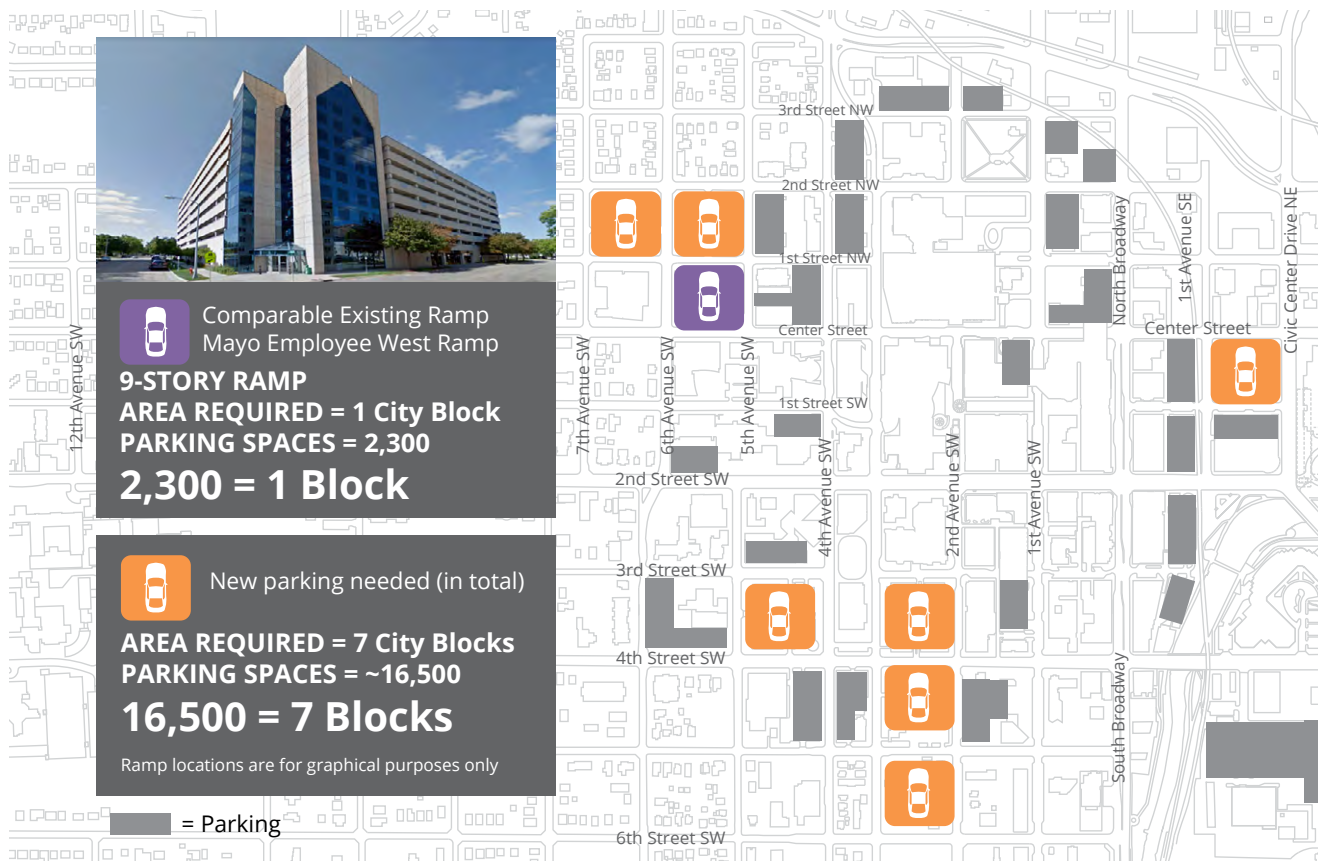


Figure 14: Estimate of Future New Parking Demand

ASSESSMENT OF PREVIOUS DOWNTOWN PLANS

ITS Teams began by assessing the transportation options identified in the DMC Development Plan as well as the Downtown Master Plan. Each study team identified options for consideration as discussed below.

The DMC Development Plan focuses upon six unique sub districts illustrated in Figure 15: Heart of the City, Discovery Square, Downtown Waterfront, Central Station, St. Marys Place and the UMR/Recreation area. The Plan proposes to link these individual districts using a tram system which primarily runs east and west along 2nd Street SW and north and south along 1st and 3rd Avenues NW/SW as shown in the map below. In addition, the Plan also includes an inter-modal transit center at the north end of the district west of North Broadway, identified as Central Station. These transit elements described in the DMC Development Plan provided the starting point for

the development of the detailed transit options described in the study teams' reports.

Transportation is a major area of investment and early actions and investments will play a crucial role in ensuring development and economic growth is accommodated in a manner that creates a sense of place and with maximum economic return.

The intense growth expected in downtown Rochester will place more demand on downtown streets which are the most significant public space in downtown. Streets should move workers, visitors, residents, goods and shoppers around downtown comfortably via a variety of transport modes including by foot, bicycle, and transit. World-class streets are often noted for their superior pedestrian and bicycle-oriented design features rather than their efficiency of moving automobiles. High-quality pedestrian and bicycle amenities are increasingly sought after in urban downtown environments and the future streets of downtown Rochester will need to be highly walkable and bicycle friendly.

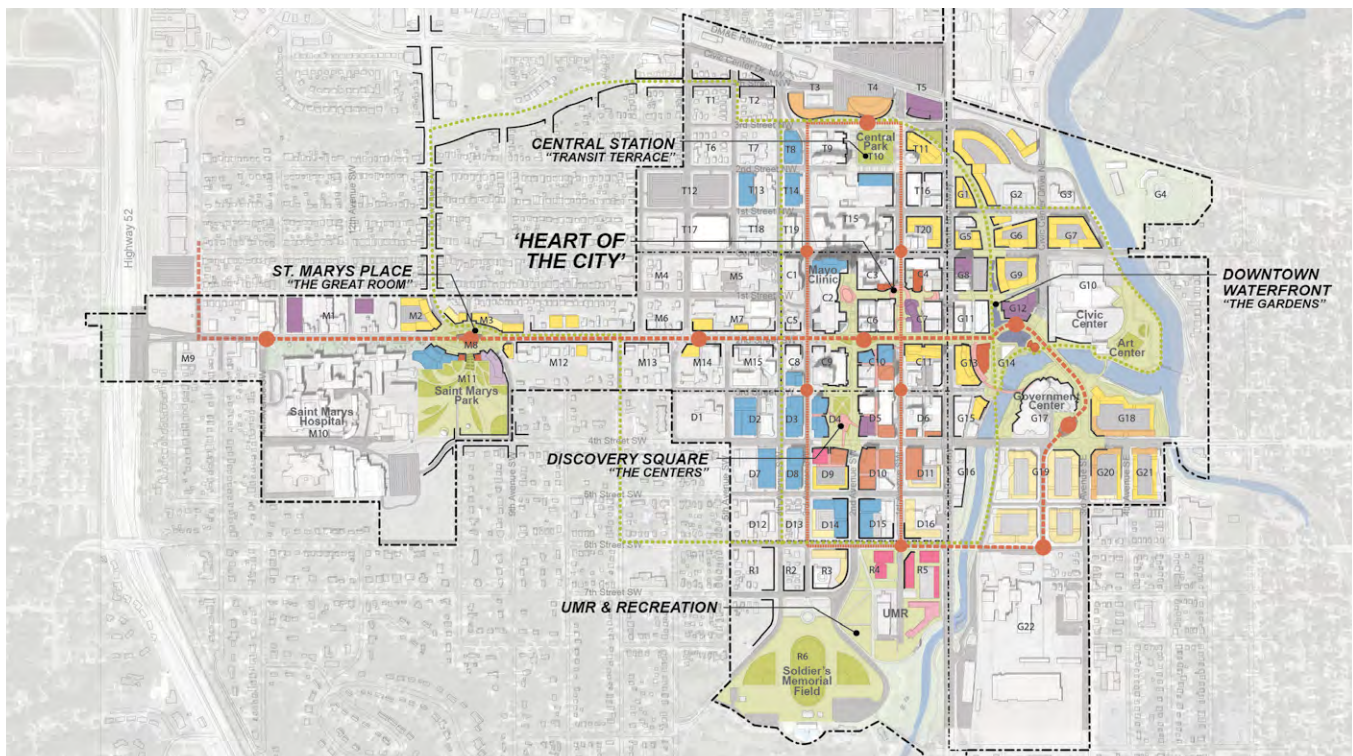


Figure 15: DMC Master Plan

Source: DMC Development Plan

The DMC Development Plan travel demand growth will also require a substantial increase in parking supply if current commuter travel habits continue as they are today. Meeting this increased commuter parking demand would reinforce existing travel habits, bringing more cars into downtown and requiring conversion of additional downtown land to parking use.

Providing opportunity for active transportation whether for recreation or utilitarian purposes is one of the easiest ways to reduce the prevalence of obesity and overweight, diabetes, cardiovascular and mental health, among other risk factors and health concerns. The City Loop presents a unique opportunity for the City of Rochester to achieve its aspiration to become “America’s City for Health.” Not only will Rochester be known for its world-class medical facilities and services, but also for its exemplary active transportation facilities that promote physical activity and overall wellness for city residents, employees, and visitors. The DMC City Loop will offer a safe and comfortable separated facility for active transportation users of all ages and abilities and will be a destination location within the city.

INTEGRATED TRANSIT STUDIES: INITIAL OPTIONS

Travel Demand Management

As part of the process of developing the DMC Plan, a Travel Demand Management (TDM) strategy was created to identify strategies and tools to reduce the number of vehicle trips associated with intensified land uses and to minimize parking demand. TDM is a collection of strategies designed to reduce roadway congestion and demand for single occupancy vehicle travel while redistributing travel demand to alternative travel modes, times,

and routes. In other words, TDM manages how people travel to, from and within the downtown.

Building off this, the Integrated Transit Studies (ITS) plan development process included the following steps:

1. a review of existing and planned conditions and transportation services that will affect travel to, from, and within the DMC district and City of Rochester and TDM programs and efforts;
2. identification of best TDM practices from select cities across the U.S.;
3. stakeholder interviews and an employer survey;
4. development of a draft TDM Plan;
5. stakeholder review; and
6. development of a final plan.

TDM strategies identified as being of most interest included: parking policies, small-scale infrastructure improvements, active transportation programs, bus programs, shared mobility, education, developer-focused policies, implementation.

The success of the recommended programs, incentives, and infrastructure improvements will be dependent on the implementation of a strong TDM delivery structure and associated educational efforts through a Transportation Management Association.

Transportation Management Association

A Transportation Management Association, or TMA, is a partnership between public and private sector employers and stakeholders with a mandate

to address transportation concerns within the community it serves. A TMA generally provides programs and services to encourage and support commuters to choose more sustainable commute modes such as carpooling, transit, walking, cycling and telework.

A Transportation Management Association Feasibility Study was completed in 2017 and determined that a TMA is feasible to coordinate the delivery of TDM services within the city of Rochester. The study recommended that a Rochester Transportation Management Association (TMA) should provide commute options programming to downtown Rochester employers and property managers and contribute to the trip reduction goals of the Destination Medical Center (DMC) plan. Several meetings with a stakeholder committee and subsequent advisory committee determined a set of initial goals for the TMA.

The goals established for the Rochester TMA are as follows:

- 1. Governance:** Create a sustainable organization to deliver TDM programming
- 2. Infrastructure/Programming:** Encourage a seamless transportation system for Rochester commuters
- 3. Communications:** Create Awareness of transportation options and the TMA
- 4. Recruitment:** Encourage TMA participation from all employment sectors
- 5. Behavior Change:** Measurably reduce Single Occupant Vehicle (SOV) travel in downtown Rochester at peak hours

An employer survey was conducted in January 2017 to obtain input from Rochester employers regarding the transportation issues that affect their worksites and employees, their interest in potential strategies

and programs to reduce negative transportation impacts, and interest in participating in a TMA or similar organization. The resulting TMA workplan identifies the objectives and key metrics for each of these goals and recommends initial activities and tactics required to achieve them. The workplan also identifies delivery timelines and proposed budget allocation.

Transit Circulation

The DMC Development Plan recommended a tram as the primary component of a transit system moving passengers within downtown and providing connections to other local and regional transit services.

The routing of the circulator in the initial DMC Development Plan was determined to no longer be viable due to land use changes and portal capacity constraints restricting access to parking opportunities identified in the DMC Development Plan. Therefore the Transit Circulation Study re-evaluated transit markets, modes, routes and profiles to assess the best transit circulator options.

Transit Markets

Three potential transit circulator markets were identified: The Mayo Clinic Shuttle route (St. Marys Hospital campus to the downtown Mayo Clinic campus); peripheral and remote parking connections to downtown; and intra-downtown travel, such as from the lodging district north of St. Marys to the Central Business District, that was beyond walking distance

A broad range of transit modes, technologies, and route options were developed and evaluated at a qualitative level based on their ability to serve the three DMC travel markets. The suitability of a transit mode depends largely upon its capacity to serve the volume of potential ridership during peak periods, the physical and operational requirements of the mode, and the financial resources available for construction and daily operation.

Modes

Moving Sidewalks: These are escalators that move horizontally but not vertically. They are widely used within airport terminals such as Minneapolis-St. Paul (MSP) to provide a continuous, although relatively slow service for short distances of less than one-half mile. They are generally best suited for a weather-protected environment such as a tunnel. Its relatively slow operating speed also limits this mode's applicability for long distances.

Bus Rapid Transit (BRT): An enhanced bus service that typically includes distinctly branded buses and stations, level vehicle boarding at stations, off-board fare payment, real-time information, and traffic signal priority. The buses can be either standard length or articulated to carry additional passengers. BRT can operate in exclusive or shared travel lanes. The bus stops are generally spaced further apart than with typical bus routes to reduce dwell time and improve travel speeds.

Tram: A rail technology that generally operates in exclusive or shared traffic lanes, similar to BRT. Trams typically include the BRT characteristics identified above, such as traffic signal priority, level boarding, and wider spacing between stops than traditional bus service. The vehicles are longer than traditional buses, usually the length of an articulated bus or longer. Trams can operate in exclusive or shared traffic lanes, making surface streets the most cost-effective location option for these modes. They can also operate in a tunnel or on an elevated guideway but are usually used at the surface level to reduce cost and optimize access.

Automated Guideway Transit (AGT): AGT Systems, typically referred to as Monorails, fall within a transit category that are frequently found in large airports connecting different terminals, parking facilities and car rental destinations. The vehicles travel rapidly between stops along an exclusive guideway that is either elevated

or underground. AGT vehicles do not require operators, potentially reducing operating costs.

Personal Rapid Transit (PRT): An operating concept based on small transit vehicles that provide riders with customized direct station-to-station travel that bypasses stops at intermediate locations. A full system would use elevated guideways to provide a network of service across a large geographic area. The vehicles do not require drivers, which potentially reduces operating costs. PRT technology is primarily a concept at this time, with limited actual application. While there are several companies that are advancing the technology, there is no demonstrated track record of reliability, capital, or operating costs for an urban PRT passenger service.

Magnetic Levitation: A transit technology that propels inert vehicles using a magnetic field incorporated into an exclusive guideway. This technology can achieve extremely high speeds, making it particularly suitable for inter-city travel. The Shanghai examples pictured below is relatively short at 18 miles. There are limited applications internationally, none of which are in the United States. This option must be grade-separated. The technology may be better suited for long trips such as travel between Minneapolis and Rochester, rather than within downtown Rochester.

Autonomous Vehicle (AV): Transit applications are currently in development; major corporations such as Google, Mercedes Benz, Microsoft, and General Motors are rapidly advancing the technology and a number of companies are using demonstration vehicles to test applications in urban areas. Autonomous vehicles can operate in shared or exclusive travel lanes on the surface, below, or above grade. Like PRT, direct station to station service would be a key advantage of this technology. Unlike PRT and AGT, a unique guideway is not required as the vehicles can operate on city streets.



Moving Sidewalks



Bus Rapid Transit



Tram



Personal Rapid Transit (PRT)



Magnetic Levitation



Autonomous Vehicle (AV)



Automated Guideway Transit (AGT)

After a preliminary screen process of the modes, two of the transit modes, the PRT and Magnetic Levitation, were eliminated from further consideration based upon the limited demonstration of technical maturity and operating requirements. After further study, the AGT option was discarded as it was significantly higher in cost and did not provide any significant advantage over autonomous vehicles in the elevated options.

Routes and Profiles

A range of route options were developed to address the three DMC travel markets as well as opportunities to serve potential peripheral parking locations (see next section). The routes were also considered at different profiles: surface (at-grade), subterranean (tunnel), or elevated.

Parking

Providing employee parking downtown at the same rate as today (roughly 70 percent of employees have parking available in the district) will increase congestion on the downtown street network, create undesirable conditions for pedestrians who will

be subject to more traffic conflict at intersections and parking access points, and will use valuable downtown real estate for unproductive economic uses.

Using a parking demand model developed as part of this study, various scenarios related to the eventual build-out and modification of the DMC District were analyzed under four transportation scenarios. These scenarios were all based on a fundamental assumption suggested by the parking demand model that 16,500 net new parking stalls beyond the 26,000 parking stalls already provided today would be needed to serve future growth. The scenarios were differentiated by how those new stalls would be allocated to different user types and placed in different locations.

Peripheral Parking Site Options

Given the limited amount of portal capacity available during peak travel demands as well as the significant amount of additional parking demand that would be generated by additional growth downtown, it was determined that parking within



Minneapolis' ABC Ramp System at the edge of downtown near Target Center and Target field is an example of a peripheral parking approach – away from employment center.

the district should largely be reserved for Mayo patients, retail customers, event attendees, visitors and residents. Very low-turnover parking for users such as workers is better served in locations outside the downtown core.

Six areas near the edges of downtown as shown in Figure 16 were identified to determine if they could physically accommodate up to 6000 spaces for employee parking with adequate accessibility

from roadways during peak periods, while providing opportunities for employees to walk, bike or ride transit to their employment destinations.

All six areas were determined to be feasible from an access standpoint with capacity to accommodate a minimum of 1,000 vehicles. In total, all six areas could accommodate more than 27,000 vehicles, more than the amount of employee parking needed.



Figure 16: Parking Site Analysis

Mobility Hubs

To create a high-quality commuter experience, expand transportation choices, and enhance economic development opportunities, the parking study team recommended that any peripheral parking site should be developed as a mobility hub to enhance the service provided by these facilities. Expanding the concept of a large parking structure, mobility hubs would include comfortable waiting areas for transit boarding, vendor kiosks for convenience items (e.g., coffee, dry cleaning) and potentially co-location of service or retail development (e.g., day care, small grocery, etc.). In addition, mobility hubs can provide access to other transportation modes and amenities in addition to transit – such as car share, bike share, or electric vehicle charging stations– and good connections to walking and biking facilities. Figure 4 illustrates many of the components typically found in mobility hubs.

Street Use and Complete Streets

The 2010 Downtown Rochester Master Plan was the first city adopted plan addressing street typologies. The plan stated, *“Proposed Master Plan street type set priorities for movement of people, not just vehicles, and ensures that transit, cyclists and pedestrians are all provided safe and convenient access to and circulation through downtown.”* Two subsequent street typologies were developed as part of the 2014 DMC Development Plan and the 2017 DMC District Design Guidelines. Updated typologies developed as a part of this study are intended to update, simplify, and clarify the previous typologies. They emphasize various combinations of travel lanes, on street parking, bike facilities, sidewalks and streetscape improvements that reflect the character of land uses along the street, such as slower streets and wider sidewalks in areas emphasizing pedestrian and retail activity, or more travel lanes for streets where the emphasis is on moving larger amounts of vehicles. Streets were classified into six types based on their target users, design features,

and desired amenities depending on the relative utilization expected from people traveling by biking, walking, transit, or private vehicle. Then general design standards were defined for each street type. In general, streets located downtown should have more pedestrian and bicycle amenities than streets outside downtown because they serve more dense development and are expected to have more pedestrian and bicyclists.

Bicycle Network

Assessment of potential bicycle network options began with assessment of the opportunities extending Rochester’s extensive bikeway network into and through downtown Rochester. While the DMC District is well-suited to be a high-quality bicycling community with an established grid of streets with suitable vehicle volumes and speed, a series of barriers at the edge of downtown challenge bicycle riders for all but strong and confident bicyclists (approximately 10 percent of the population). With the goal of creating a bicycle network into downtown that would be safe and comfortable for a much broader range of bicyclists, options to overcome these barriers and identify paths through downtown where street right of way allowed for separated bike facilities and safe intersections crossings were identified.

City Loop

The City Loop route assessment and refinements process began with a detailed review of the initial route description in the DMC Development Plan. A spatial analysis examined ADA parameters as well as physical constraints such as street widths, presence of street trees, street constrictions due to traffic operations or design issues and parking. Existing and proposed land use patterns, connectivity to key destinations and ability to connect to existing trail facilities were also considered.

Figure 17 illustrates the preferred design cross section for incorporating the City Loop facility into a street corridor. Approximately 30 feet would be needed to accommodate space for cyclists, pedestrians, buffer areas, street tree and possible stormwater management feature. This design can be adjusted to fit into a narrower dimension where constraints exist, down to a minimum of approximately 20 feet.

Three alternative route options were developed integrating various transit and parking options (Figure 18). The three options differ the most in the northwest and northeast quadrants of the DMC District. While all scenarios run through Kutzky Park, connections to the park and length of the Kutzky Park segment vary.

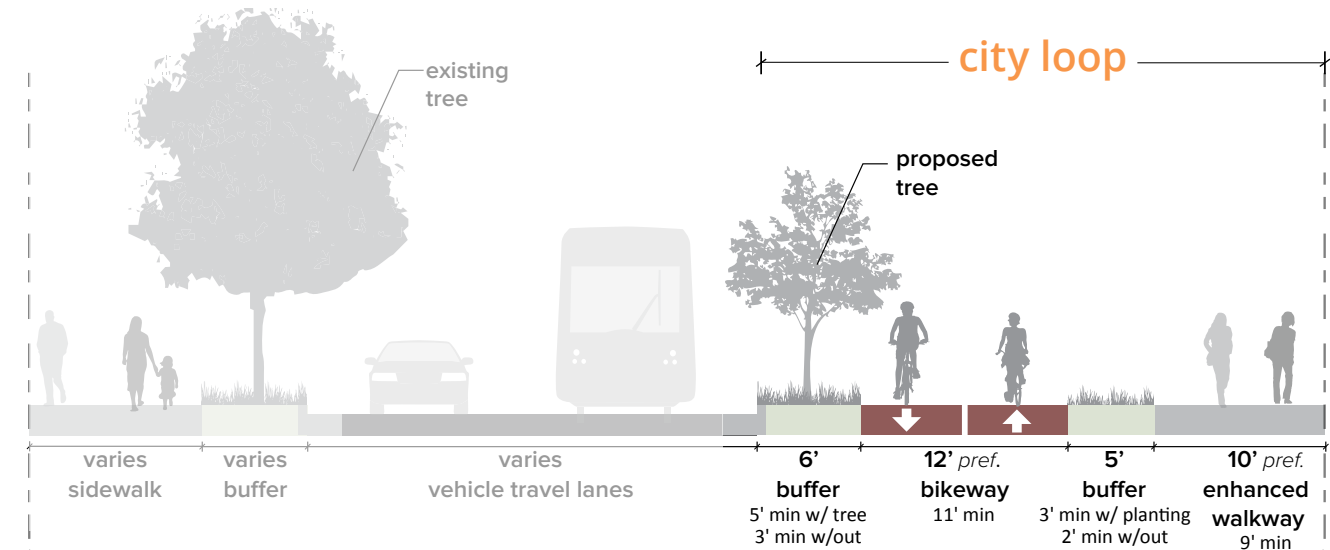


Figure 17: Preferred Design Cross Section

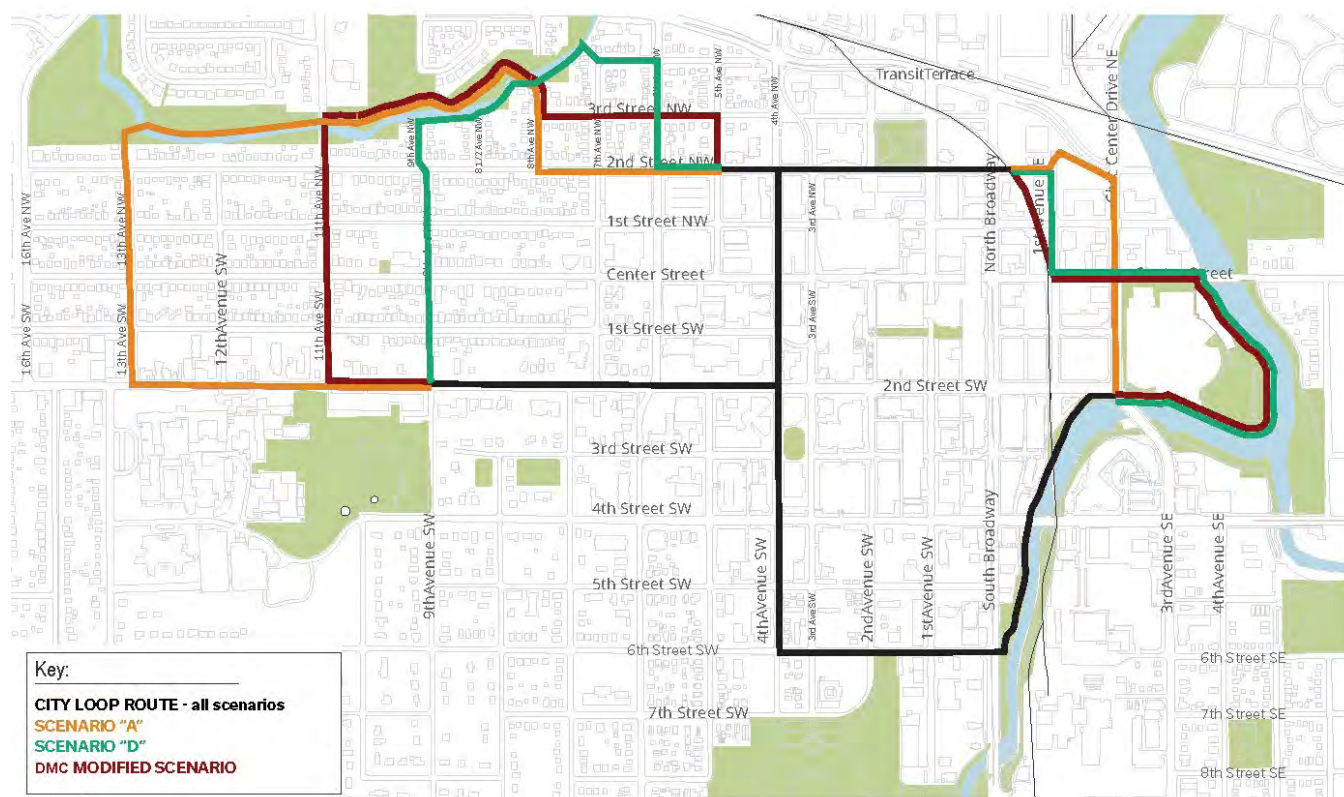


Figure 18: Map of Three Alternative City Loop Routes

SCENARIO ANALYSIS

Initial Scenarios

Following identification of potential options for each of the key infrastructure elements – transit, parking, City Loop, and streets – the potential outcomes for the combinations of these elements were tested through scenario analysis.

Scenarios were used to answer questions such as “What happens if...we combine A with B?” “What happens if ...transit is here – where does the City Loop need to be?” “What happens if...parking is here – how do we connect bike and pedestrian routes?”

City staff in consultation with study team members identified a total of seven scenarios for evaluation at various points of the study process. Analysis began with an initial set of five scenarios:

- DMC modified scenario
- Scenario A
- Scenario B
- Scenario C
- Scenario D

DMC Modified (Figure 19) is a variation of the arrangement of transportation elements in the DMC Development Plan, modified to accommodate development that had occurred near the intersection of Civic Center Drive and First Avenue SW subsequent to adoption of the DMC Plan. Modifications were also made to the City Loop route to ensure it would comply with the Americans with Disabilities Act (ADA). This scenario included an at-grade transit system using a rail-based Tram vehicle running on a “figure 8” shaped route.

- Provides both east-west and north-south circulator travel routes
- Provides access to all major destinations within DMC district
- Tram vehicles have high passenger capacity but require overhead power systems which would have visual impacts
- An at-grade option (street level) is more cost-effective than elevated or subterranean options
- Regional bus hub immediately north of downtown

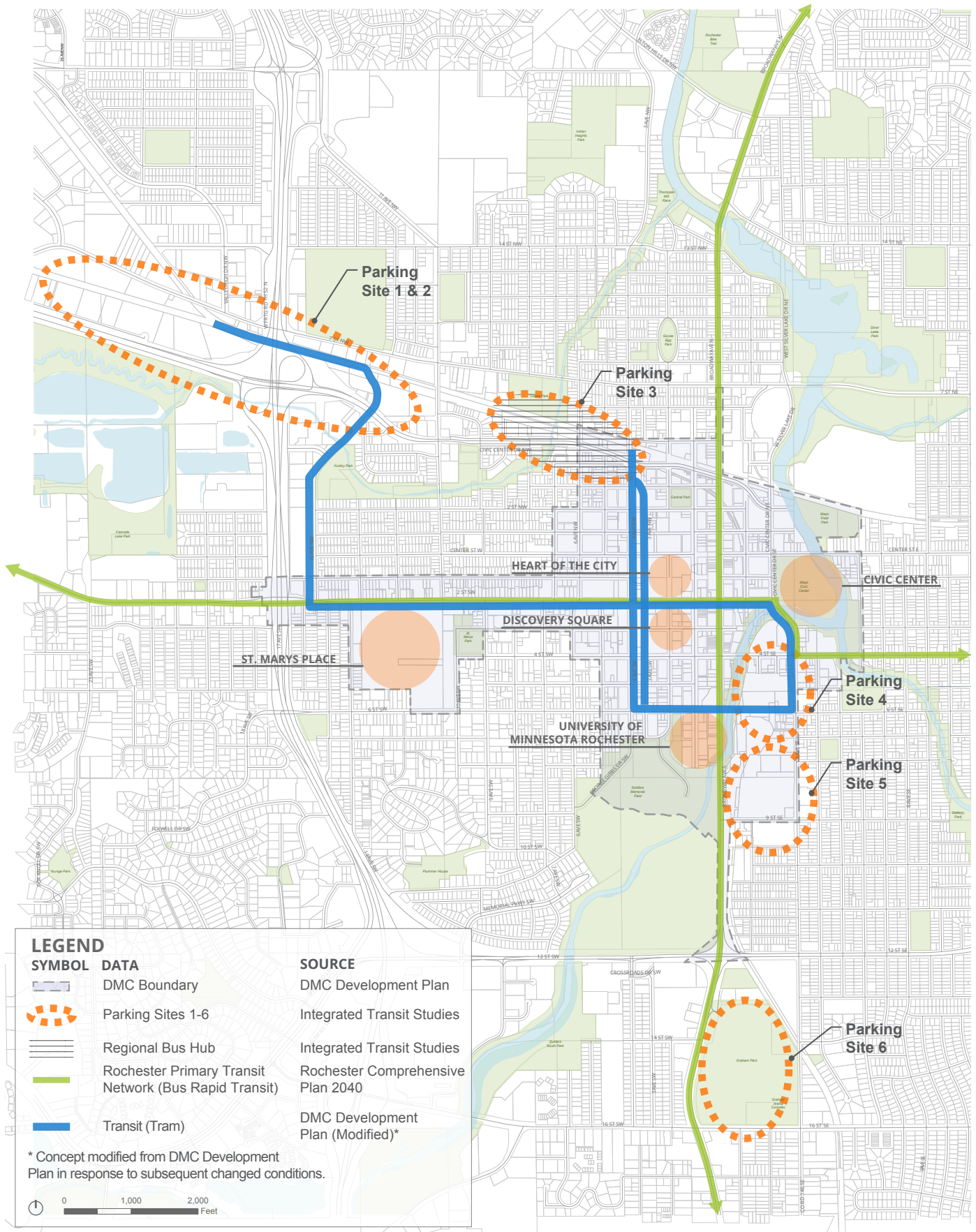
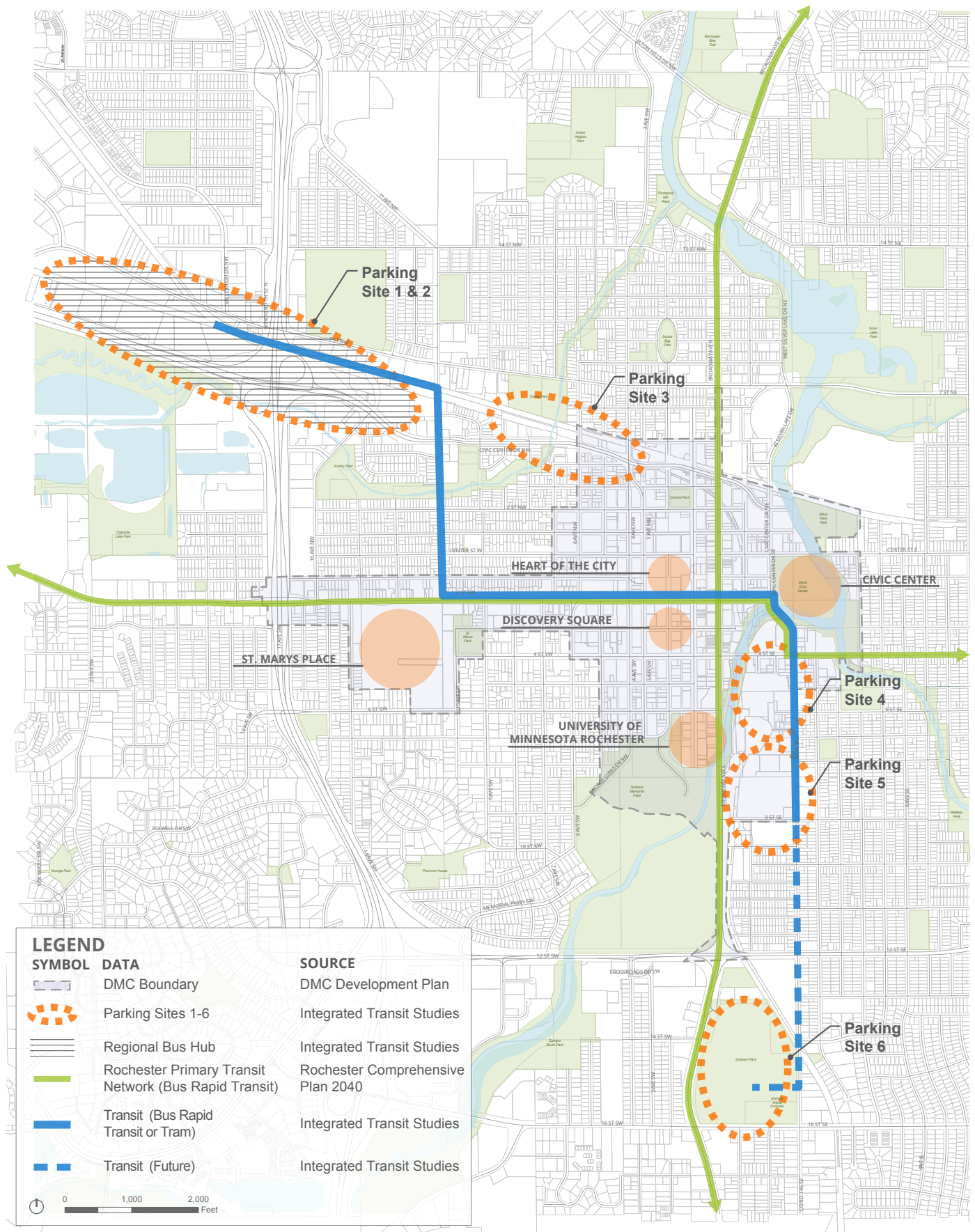


Figure 19: DMC Modified Scenario



Scenario A (Figure 20) – a scenario testing an at-grade transit circulator profile between the St. Marys and Gonda campuses utilizing a north-south Bus Rapid Transit route along 3rd/4th Avenue West one-way pair, with corresponding peripheral parking locations northwest and southeast of the district, and a City Loop route whose western extent runs along the 9th Avenue west alignment between Kutzky Park and 2nd Street SW.

- Provides only an east-west circulator option on 2nd Street SW
- Can connect commuters to multiple remote and peripheral parking locations
- North-south alignment of the circulator along 11th Avenue avoids area of heavy street congestion west of St. Marys along 2nd Street in the area between 14th Avenue and the TH 52
- At-grade option (street level) is more cost-effective than elevated and subterranean options
- Regional bus hub located at northwest peripheral parking site near the TH 52/14 interchange

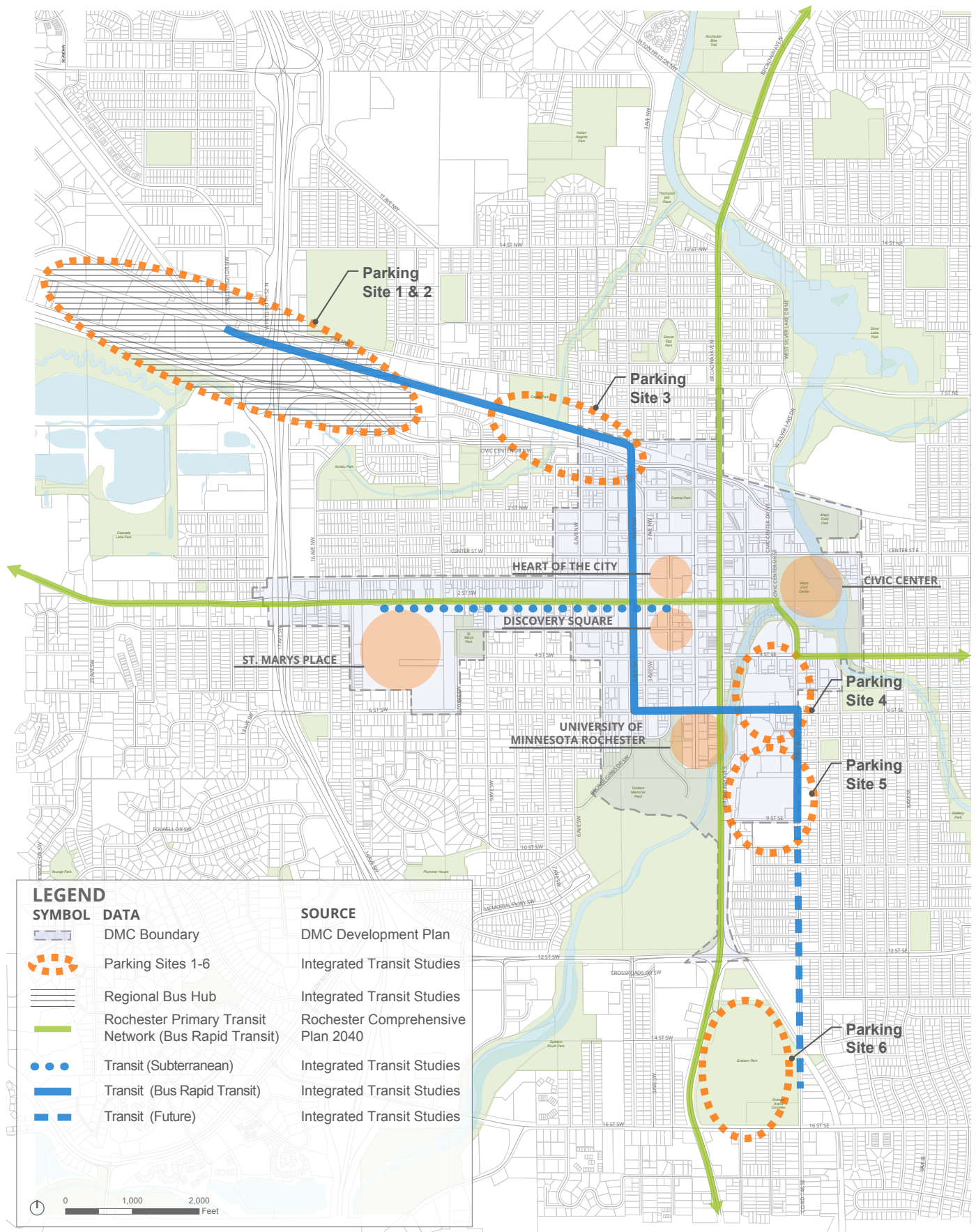
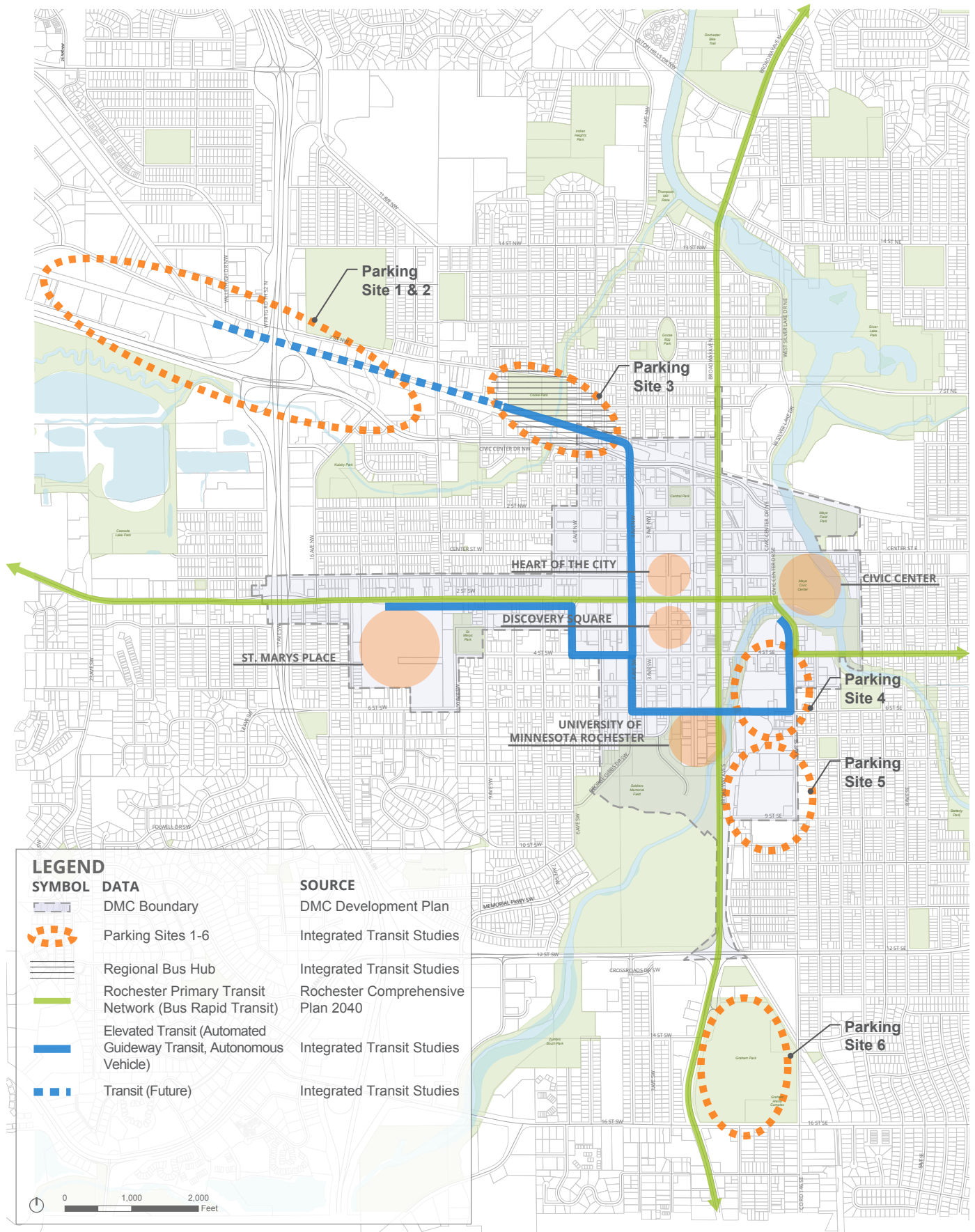


Figure 21: Scenario B

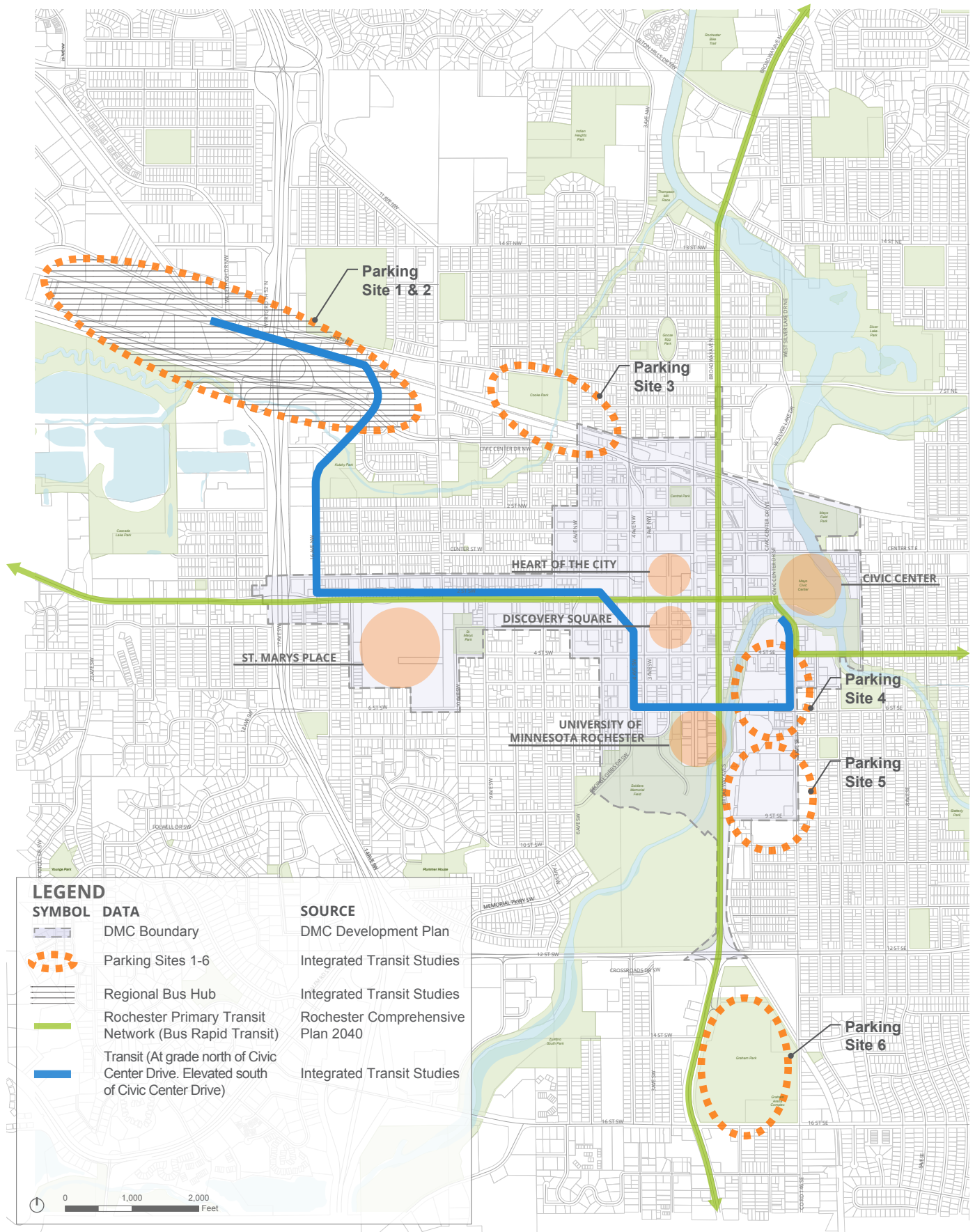
Scenario B (Figure 21)– a scenario testing a below-grade transit profile (tunnel) between the St. Marys and Gonda campuses with an autonomous vehicle mode in addition to a north-south Bus Rapid Transit route with corresponding parking locations.

- Provides north-south option at street level but requires transfer to an underground system to connect to St. Marys Hospital
- Connects commuters at remote and peripheral parking locations via a single circulator route
- Indirect access to St. Mary's for commuters coming from remote or peripheral parking locations
- Subterranean options are costlier to construct
- Regional bus hub would be located in northwest peripheral parking area at TH 52/14 Interchange



Scenario C (Figure 22) – a scenario testing an elevated transit profile utilizing either an automated guideway vehicle (e.g., monorail) or autonomous vehicle in a primarily north-south alignment, with commuter parking primarily oriented to the northwest and a City Loop route whose western extent would be along 11th Avenue between Kutzky Park and 2nd Street SW.

- Provides both east-west and north-south travel options; but more complex service plan
- Two transit routes on an elevated guideway; could have visual impacts due to structure
- Stations would be elevated, making it less convenient for connecting from street level
- Indirect access to St. Marys for commuters coming from northwest remote parking locations
- Minimizes impacts with traffic congestion due to elevated guideway
- Elevated option is costlier to construct
- Regional bus hub immediately north of downtown



Scenario D (Figure 23) – a scenario testing an elevated transit profile utilizing either an automated guideway vehicle (e.g., monorail) or autonomous vehicle in a primarily east-west alignment along 2nd Street SW but which would turn south to 6th Street SW before entering the Central Business District to avoid conflict with the skyway system, with peripheral parking primarily located to the northwest.

- Provides east-west circulator in the 2nd Street corridor but is routed around the core of the downtown Mayo Campus and Central Business District
- Could have significant visual impacts due to elevated structure
- Stations would be elevated, making it less convenient for connecting from street or subway level
- Connects commuters at remote and peripheral parking locations
- Minimizes impacts with traffic congestion due to elevated guideway
- Elevated option is costlier to construct
- Regional bus hub at TH 52/14

These scenarios were then evaluated, and the findings reviewed by City Council, DMC Board, Olmsted County Board, and EDA Board members in a workshop setting. The transit circulator scenarios were examined in the greatest detail as that element had the potential for the greatest impact on final recommendations (see Table 7).

This evaluation workshop resulted in three scenarios being chosen to move forward for further evaluation – DMC Modified (tram), Scenario A (Bus Rapid Transit) and Scenario D (elevated track) utilizing autonomous vehicle technology.

The TAP-1 Scenario was also developed at this time for the purpose of examining the tradeoffs if the circulator and City Loop were not developed and employee parking outside of downtown was limited to park and ride lots served by express buses and the Primary Transit Network identified in the City's draft Comprehensive Plan.

REFINED SCENARIOS

Each of the four recommended scenarios were then further developed and analyzed, including:

- Development of concept-level layouts to assess how they would “fit” in existing right of way and identifying where additional right of way would be needed.
- Development of concept level capital cost to construct as well as projected annual operating expenses.
- Development of preliminary estimates of transit ridership, vehicular traffic levels on streets in the district, bicycle commuters and walking commuters.
- Preliminary identification of natural and cultural resources potentially affected.

The results of this analysis for each of the four retained scenarios are summarized in Figure 24 through Figure 27.

		ADVANCE FOR FURTHER STUDY	ADVANCE FOR FURTHER STUDY		
		MODIFIED DMC TRAM DEDICATED LANES	SCENARIO A (AT-GRADE DEDICATED LANES)		
	SCREENING CRITERIA		BRT	TRAM	
1	MARKET 1: CONNECTIVITY TO PERIPHERAL PARKING	HIGH PARKING ACCESS	HIGH PARKING ACCESS	HIGH PARKING ACCESS	
2	MARKET 2: MAYO CONNECTION	MEDIUM FREQUENCY	HIGH FREQUENCY	MEDIUM FREQUENCY	
3	MARKET 3: DMC INTERNAL CIRCULATION	N/S AND E/W CIRCULATION, HIGH EMPLOYMENT SERVED	E/W CIRCULATION ONLY, HIGH EMPLOYMENT SERVED	E/W CIRCULATION ONLY, HIGH EMPLOYMENT SERVED	
4	POTENTIAL VISUAL, NOISE, HISTORIC BUILDING IMPACTS	POSSIBLE OVERHEAD WIRES ON 2 MAIN STREETS	LIMITED IMPACTS	POSSIBLE OVERHEAD WIRES ON 1 MAIN STREET	
5	ABILITY TO ATTRACT DMC DEVELOPMENT	HIGH QUALITY VERY HIGH INVESTMENT MODE BIAS HIGH	HIGH QUALITY MODERATE INVESTMENT MODE BIAS MEDIUM	HIGH QUALITY HIGH INVESTMENT MODE BIAS HIGH	
6	AT-GRADE RIGHT-OF-WAY REQUIREMENT	ROW ON 2 MAIN STREETS	ROW ON 1 MAIN STREET	ROW ON 1 MAIN STREET	
7	EASE OF ACCESS FROM STREET LEVEL	ON STREET	ON STREET	ON STREET	
8	EASE OF ACCESS FROM SKYWAY/SUBWAY LEVELS	ON STREET	ON STREET	ON STREET	
9	SERVICE SIMPLICITY	EASY TO FIND, USE	EASY TO FIND, USE	EASY TO FIND, USE	
10	SCALABILITY (ABILITY TO VARY CAPACITY/FREQUENCY BY TIME OF DAY)	LESS CAPACITY FLEXIBILITY THAN BRT	HIGH FLEXIBILITY	LESS CAPACITY FLEXIBILITY THAN BRT	
11	ABILITY TO EXTEND SERVICE	EXPENSIVE TO EXTEND	INEXPENSIVE TO EXTEND	EXPENSIVE TO EXTEND	
12	ORDER OF MAGNITUDE CAPITAL COST (MILLIONS \$2016)	\$240-380	\$35-110	\$215-290	
13	OPERATING & MAINTENANCE COST	COMPLEX SYSTEM SUBSTANTIAL STAFFING	MODERATE TECHNOLOGY MODERATES STAFFING	COMPLEX SYSTEM SUBSTANTIAL STAFFING	
14	POTENTIAL FOR PUBLIC FUNDING	HIGH FUNDING NEEDS NUMEROUS PROJECTS FUNDED	MODERATE FUNDING NEEDS NUMEROUS PROJECTS FUNDED	HIGH FUNDING NEEDS NUMEROUS PROJECTS FUNDED	

Table 7: Evaluation of Initial Transit Circulator Scenarios

				ADVANCE FOR FURTHER STUDY	
	SCENARIO B (SUBTERRANEAN AV/AT-GRADE BRT)	SCENARIO C (ELEVATED)		SCENARIO D (AT-GRADE/ELEVATED)	
		AV	AGT	AV	AGT
	GOOD PARKING ACCESS	OK PARKING ACCESS	OK PARKING ACCESS	GOOD PARKING ACCESS	GOOD PARKING ACCESS
	HIGH FREQUENCY	HIGH FREQUENCY, GRADE SEPARATION	LOW FREQUENCY, GRADE SEPARATION	HIGH FREQUENCY, GRADE SEPARATION	HIGH FREQUENCY, GRADE SEPARATION
	N/S AND E/W CIRCULATION AT DIFF GRADES, HIGH EMP	N/S AND E/W CIRCULATION ELEVATED, HIGH EMP	N/S AND E/W CIRCULATION ELEVATED, HIGH EMP	E/W ONLY CIRCULATION, ELEVATED	E/W ONLY CIRCULATION, ELEVATED
	LIMITED IMPACTS	ELEVATED GUIDEWAY	ELEVATED GUIDEWAY	ELEVATED GUIDEWAY	ELEVATED GUIDEWAY
	HIGH QUALITY HIGH INVESTMENT (AV) MODE BIAS MEDIUM	HIGH QUALITY HIGH INVESTMENT MODE BIAS UNTESTED	MODERATE QUALITY HIGH INVESTMENT MODE BIAS HIGH	HIGH QUALITY HIGH INVESTMENT MODE BIAS UNTESTED	HIGH QUALITY VERY HIGH INVESTMENT MODE BIAS HIGH
	ROW ON 1 MAIN STREET	ONLY PIERS	ONLY PIERS	ONLY PIERS	ONLY PIERS
	N/S ON STREET	ALL ELEVATED	ALL ELEVATED	ALL ELEVATED	ALL ELEVATED
	PART SUBTERRANEAN	ALL ELEVATED	ALL ELEVATED	ALL ELEVATED	ALL ELEVATED
	SURFACE EASY, SUBWAY MORE DIFFICULT TO FIND	EASY TO FIND INITIALLY COMPLEX TO USE	EASY TO FIND INITIALLY COMPLEX TO USE	EASY TO FIND INITIALLY COMPLEX TO USE	EASY TO FIND, USE
	HIGH FLEXIBILITY	HIGH FLEXIBILITY	LIMITED ABILITY TO ALTER CAPACITY	HIGH FLEXIBILITY	LESS CAPACITY FLEXIBILITY THAN BRT
	BRT INEXPENSIVE AV EXPENSIVE TO EXTEND	INEXPENSIVE TO EXTEND	VERY EXPENSIVE TO EXTEND	INEXPENSIVE TO EXTEND	VERY EXPENSIVE TO EXTEND
	\$100-180	\$140-230	\$175-345	\$160-260	\$225-450
	MODERATE TECHNOLOGY MODERATE STAFFING	MODERATE TECHNOLOGY LIMITED STAFFING	COMPLEX SYSTEM SUBSTANTIAL STAFFING	MODERATE TECHNOLOGY LIMITED STAFFING	COMPLEX SYSTEM SUBSTANTIAL STAFFING
	MIX OF MODERATE AND HIGH NEEDS FUNDING MIXED	MODERATE/HIGH FUNDING NEEDS LIMITED FUNDING RECORD	VERY HIGH FUNDING NEEDS NO RECENT FUNDING	MODERATE/HIGH FUNDING NEEDS LIMITED FUNDING RECORD	VERY HIGH NEEDS NO RECENT FUNDING

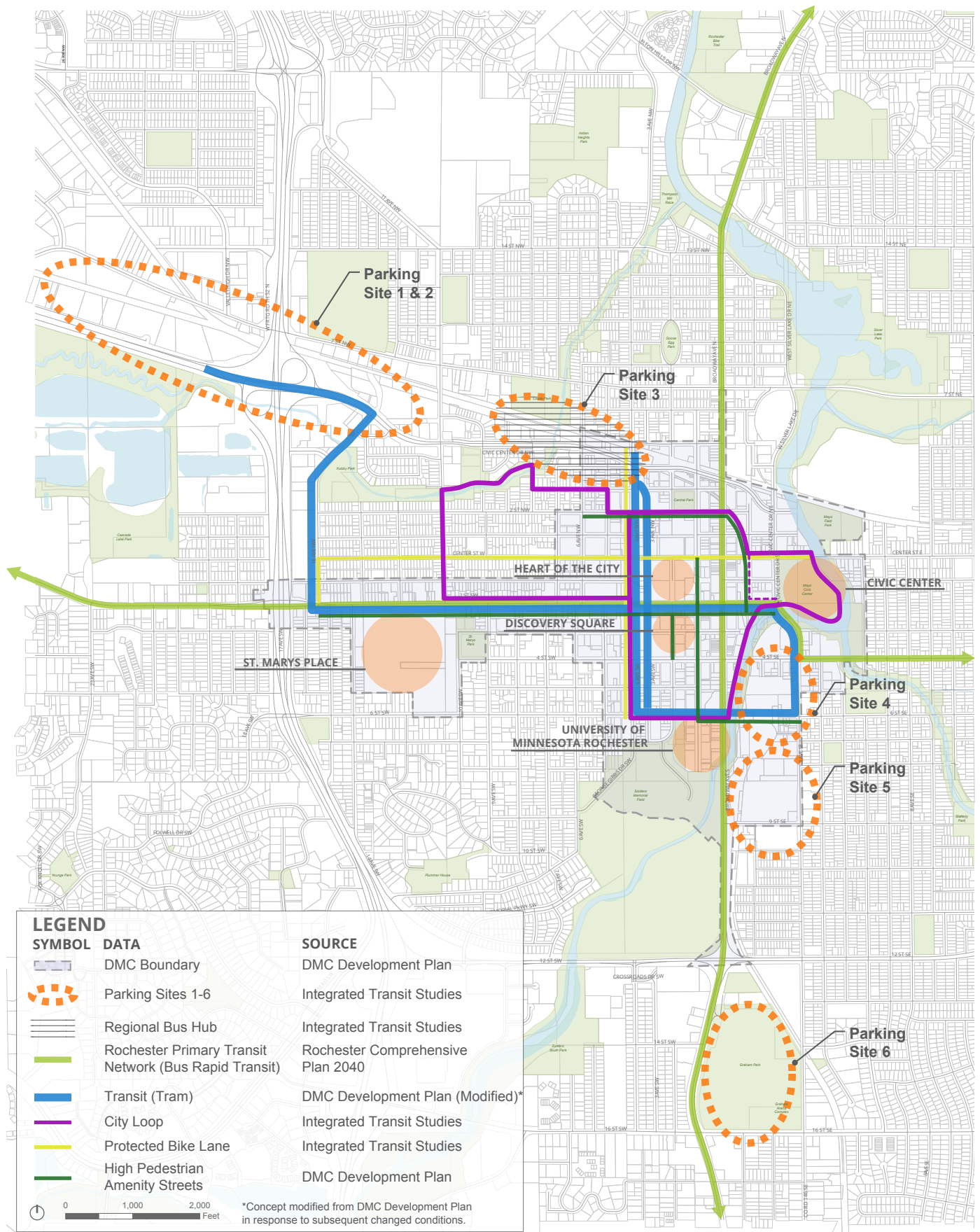


Figure 24: Integrated Transit Studies Refined DMC Modified Scenario

Features of Refined DMC Modified (Figure 24)

Tram Circulator Riders: 28,000

Parking allocation (new)

- 9,000 peripheral parking spaces at sites 1, 3, and 4
- 1,500 new patient/visitor downtown
- 3,000 new spaces at City park and ride sites

Capital Costs: \$842 Million (2017 dollars)

- Transit: \$265 Million (circulator), \$72 Million (expanded local bus service to serve the DMC expansion)
- ROW: TBD
- Streets: \$35 Million
- Parking: \$440 Million
- City Loop: \$30 Million

Annual Operations and Maintenance costs: (2017 dollars)

- Transit: \$3 Million (circulator), \$8 Million (RPT/DMC expand)
- Streets: TBD
- Parking: \$12 Million
- City Loop: \$1.4 Million

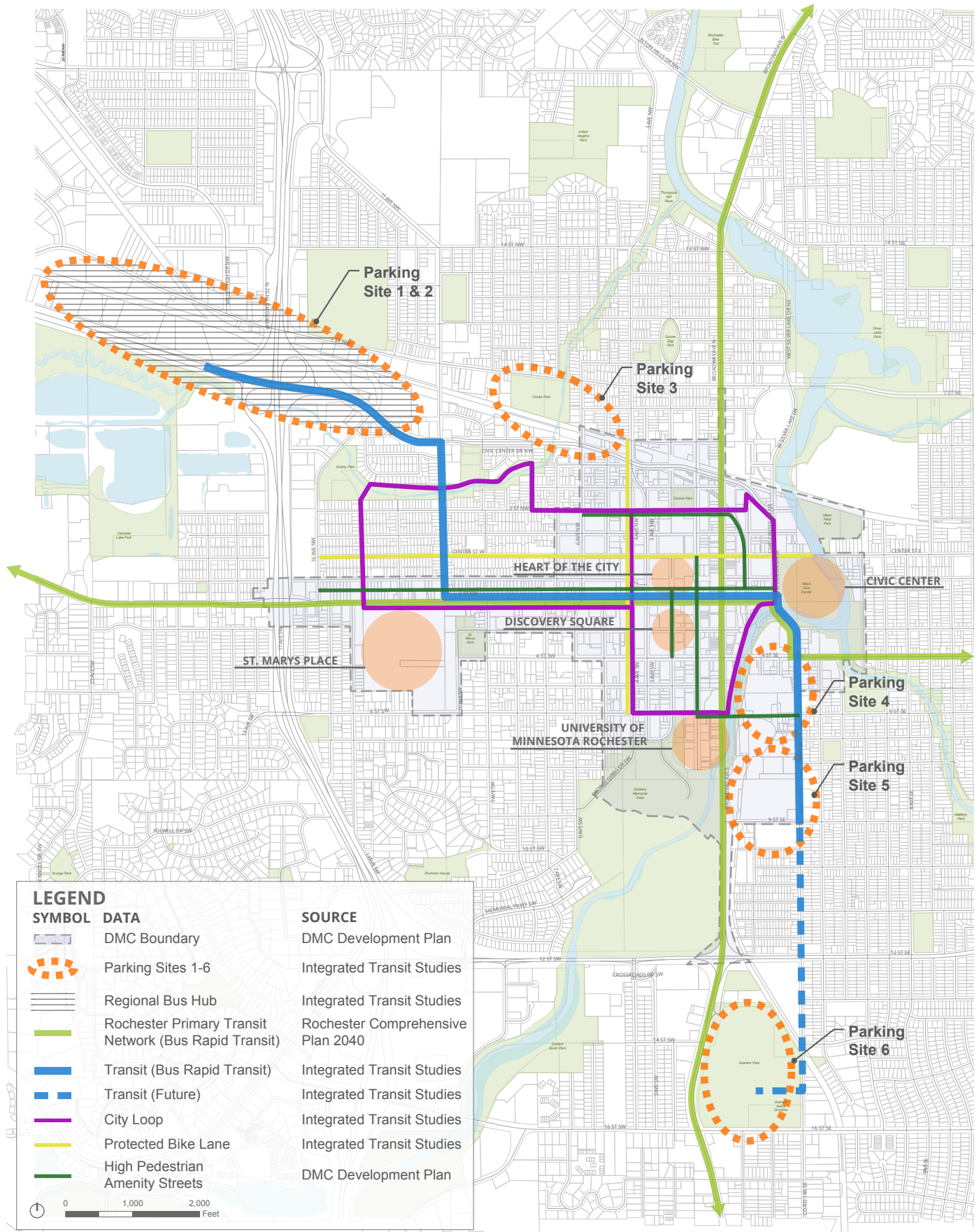


Figure 25: Integrated Transit Studies Refined Scenario A

Features of Refined Scenario A (Figure 25)

BRT circulator riders: 22,000

Parking allocation (new)

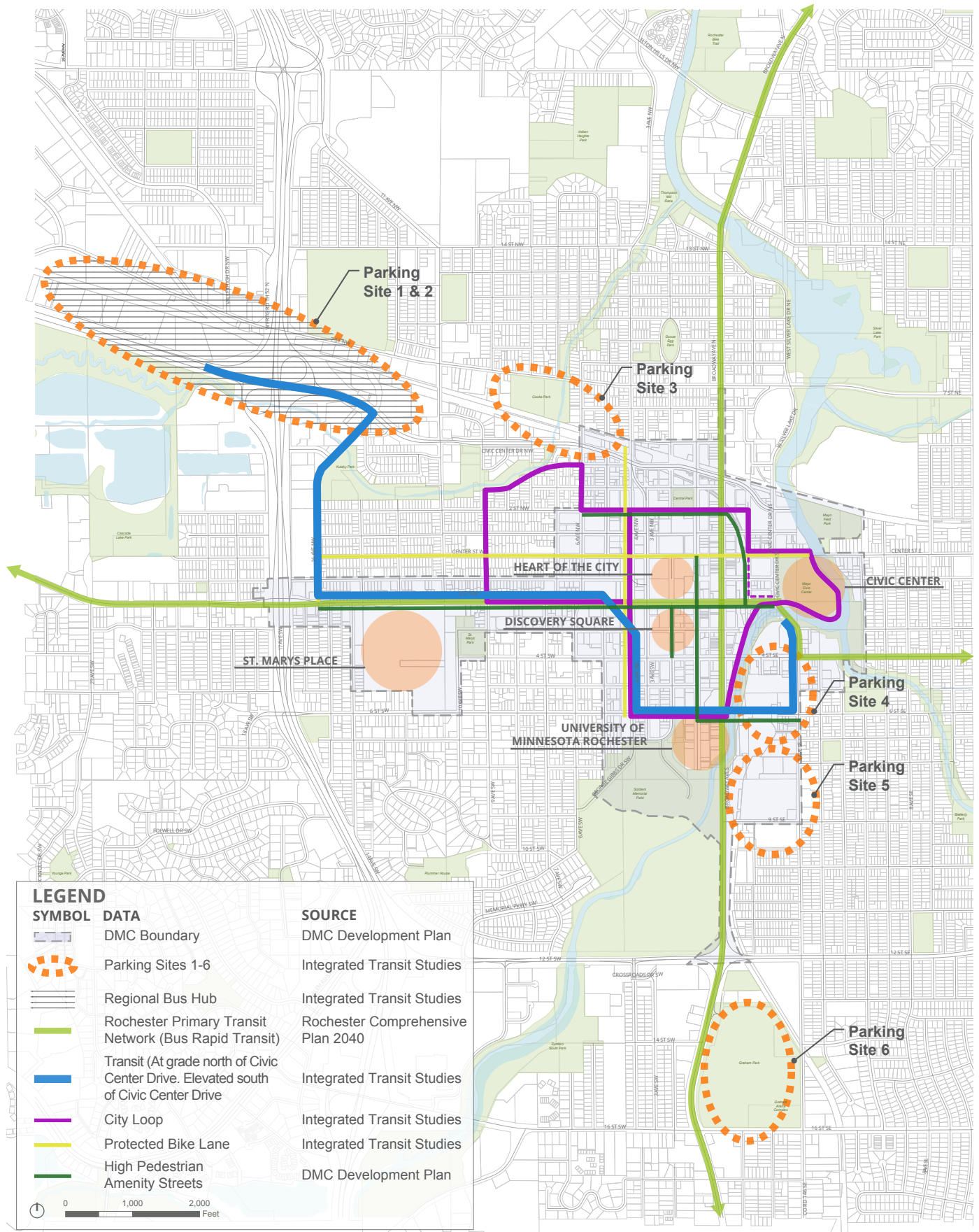
- 9,500 peripheral parking spaces at sites 1, 4, and 5
- 1,500 new patient/visitor downtown
- 2,500 new spaces at City park and ride sites

Capital Costs: \$643 Million (2017 dollars)

- Transit: \$90 Million (circulator), \$73 Million (RPT/DMC expand)
- ROW: TBD
- Streets: \$20 Million
- Parking \$430 Million
- City Loop: \$30 Million

Annual Operations and Maintenance costs: (2017 dollars)

- Transit: \$3 Million (circulator)
- \$9 Million (RPT/DMC expand)
- Streets: TBD
- Parking: \$11.7 Million
- City Loop: \$1.5 Million



Features of Refined Scenario D (Figure 26)

Autonomous Vehicle circulator riders: 26,000

Parking allocation (new)

- 7,000 peripheral parking spaces at sites 1, 4
- 1,500 new patient/visitor downtown
- 5,000 spaces at park and rides

Capital costs: \$1 Billion (2017)

- Transit: \$490 Million (circulator), \$78 Million (RPT/DMC expand)
- ROW: TBD
- Streets: \$25 Million
- Parking \$380 Million
- City Loop: \$27 Million

Annual Operations and Maintenance costs: (2017 dollars)

- Transit: \$3 Million (circulator), \$10 Million (RPT/DMC expand)
- Streets: TBD
- Parking: \$10.1 Million
- City Loop: \$1.3 Million

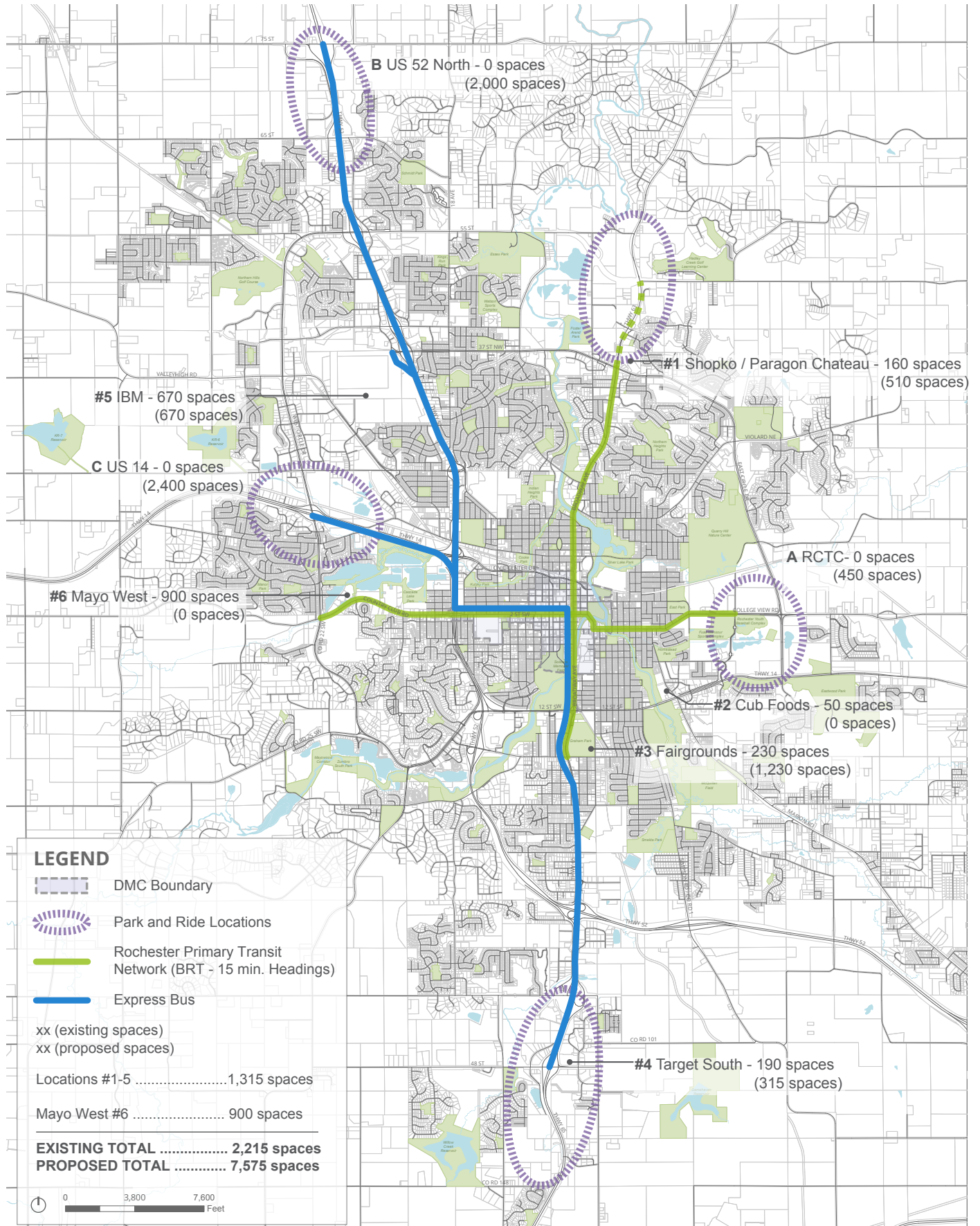


Figure 27: Integrated Transit Studies Transit Alternate Phase 1

Transit Alternative Phase 1/Expanded Local Service and Primary Transit Network (Figure 27)

PTN: 6,000 riders associated with downtown destinations

Regional park and rides: 24,000 served by a combination of express bus and the PTN network

Parking allocation (new)

- No peripheral or remote parking
- 1,500 new patient/visitor spaces downtown
- 12,000 spaces at park and rides

Capital costs: \$385 Million

- Transit: \$100 Million (RPT/DMC expand)
- Streets: \$0
- Parking: \$255 Million
- City Loop: \$30 Million

Annual Operations and Maintenance costs: (2017 dollars)

- Transit: \$15.3 Million (RPT/DMC expand)
- Streets: TBD
- Parking: \$6.2 Million
- City Loop: \$1.4 Million

These results were further discussed with key stakeholders to determine what elements of these refined scenarios were the most viable. The findings were as follows:

- ITS Scenario concepts can accomplish the goal of moving employee parking out of the downtown core, freeing up parking for patients and visitors
- ITS Scenario concepts do create streets that can accommodate significant increases in transit use while enhancing travel for pedestrians and bicyclists, while achieving the mode share goals articulated in the DMC plan
- The City Loop holds potential to be a transformative element for downtown Rochester, catalyzing economic development while improving accessibility for those with limited mobility and providing access to sites that can provide restorative healing opportunities in the downtown area
- Refined Alternative D involving elevated AV is expensive and visually intrusive and does not appear to be a cost-effective solution. However, automated vehicles may be adapted for certain uses in the future in combination with the modes tested in other scenarios
- Refined Alternative A utilizing BRT provides a high-quality service in a cost-effective manner that is flexible and adaptable should future development changes require rethinking of route alignments
- Refined Modified DMC provides high quality circulator service but at a greater cost and without the ability to adapt to route modification needs once investment in fixed infrastructure occurs compared to BRT alternative
- Regional commuter bus service can be accommodated in a number of ways in terms

of options to address disembarking, boarding and bus parking/storage

- The refined scenarios show viability to move employee parking out of downtown, reduce portal pressure and provide economic development opportunities
- Providing reasonable access to Mobility Hub A was determined potentially feasible by MnDOT
- Parking areas can include Mobility Hub or mixed-use development features depending on location that can enhance attraction for employee parking with direct connection to the circulator

Creation of the “Hybrid Scenario”

After evaluating each of the refined scenarios, it was determined that none of these specific scenarios as drafted was an ideal solution. However, the evaluation findings pointed to a potential combination of elements that presented a potential best fit for the City of Rochester.

Transit Circulator

In terms of implementation and construction of the transit mode, Bus Rapid Transit was identified as the most cost-effective option which, if built in a dedicated guideway, would provide similar potential as a development catalyst as a Tram, with the flexibility to adapt to autonomous vehicles as the technology advanced in the future. However, the DMC Modified Scenario provided the greatest advantage in terms of broad accessibility to destinations in the district, but its “figure 8” configuration did not provide optimal service throughout downtown. This alignment was modified by splitting it into two routes which could be phased in terms of construction and would provide greater flexibility in operations frequencies between weekdays/weekends and time of day to better serve rider needs (see Figure 28).

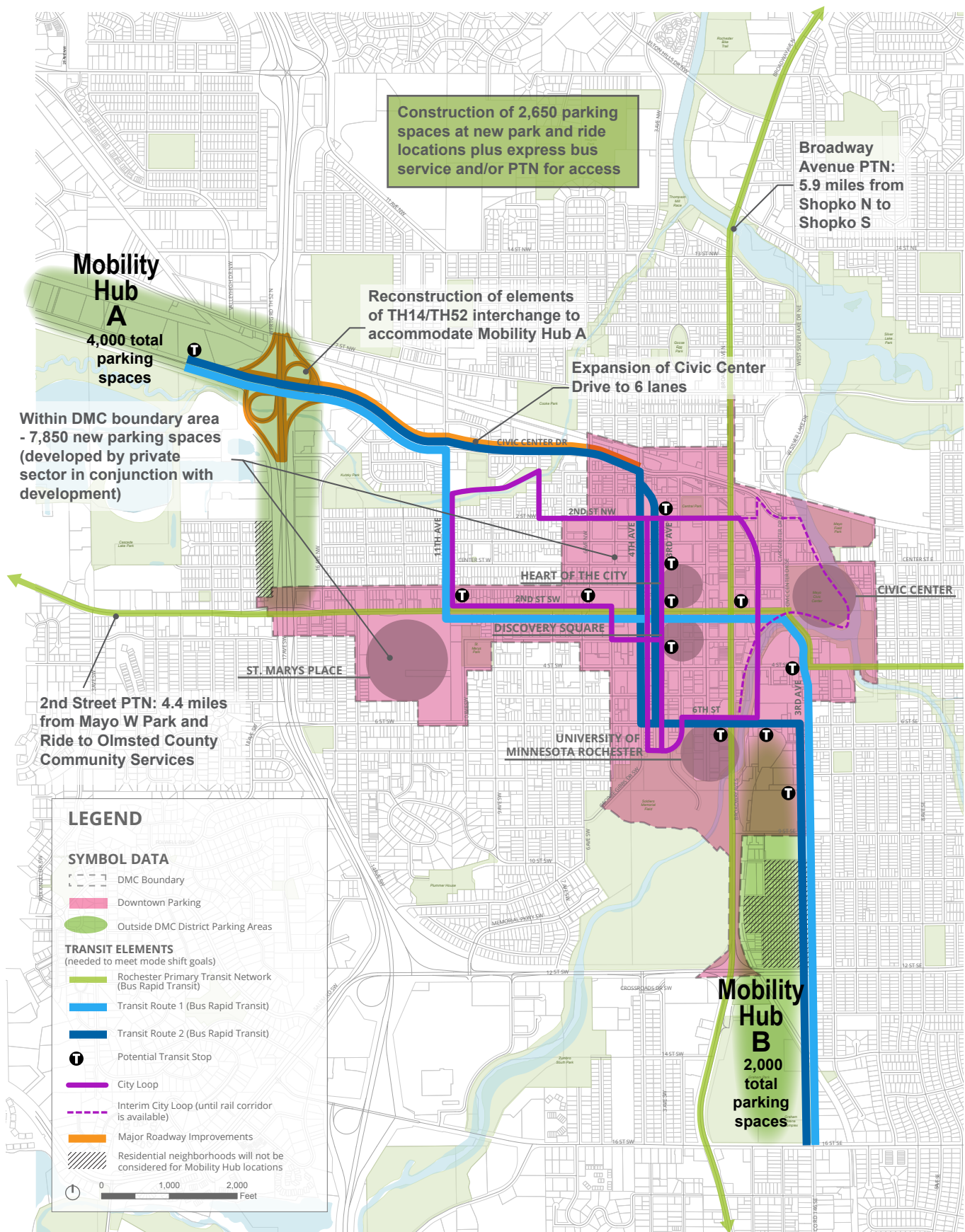


Figure 28: Hybrid Scenario

Figure 28 graphically illustrates the physical components of the Hybrid Scenario. The development of all the scenarios are described in greater detail in the Downtown Transit Circulator study, City Loop planning and concept design study, coordinated Parking and TMA study, and Street Use study.

Parking

Peripheral parking locations were then determined based on the circulator routing emphasizing parking areas northwest and southeast of downtown.

City Loop

Consideration of the transit circulator route, parking locations and detailed field visits to physically verify specific corridor conditions were used to develop the City Loop routing for the hybrid scenario. Additional refinement included delineation of interim route between the future 6th St SE bridge over the Zumbro River and intersection of Broadway Ave N and 2nd St N until the downtown rail spur goes out of service and its right-of-way becomes available. This scenario maximizes connections with existing and future green spaces, access to Mayo Clinic facilities, new mixed use and multifamily housing, existing shared-use paths and planned bikeways.

Street Use and Complete Streets

Street typologies and bike facility routing were adjusted to better integrate with the above elements and provide missing connections in the bicycle and pedestrian networks and reflect planning for the Heart of the City and Discovery Walk signature shared street spaces.

Evaluation of the Hybrid Scenario Against the Previous Scenarios

Following development of Hybrid Scenario, an independent evaluation of this scenario against the others was performed. The findings of this analysis were as follows:

Connected Sub-District: The DMC Development Plan envisions a cohesive set of subdistricts that are connected seamlessly with multiple transportation options. All scenarios provide good connectivity for pedestrians throughout the district. Bicycle connectivity is best in Scenario A, notably for its optimal City Loop alignment for accessing the St. Mary's campus, whereas DMC Modified and the Hybrid only reach the east edge of campus. DMC

Modified and the Hybrid circulator alignments provide good transit connectivity to key destinations in the district.

Catalytic Potential: Transportation investments in the circulator and City Loop will help catalyze commercial, office, and retail development in the DMC area. The analysis indicates that surface running options with higher levels of investment and alignments that are more extensive – the DMC Modified and the Hybrid scenarios show greater potential to catalyze development in the DMC District. BRT when operating in a fixed guideway with high quality stations and branding can equal the catalytic potential of a rail guideway investment.

Quality of Commuter Experience: Employees commuting from within the City of Rochester or regional destinations will travel to park-and-ride areas or peripheral parking locations and then connect via express bus or circulator service to their employment destinations. The quality of this connection is vitally important. Travel time differences between scenarios are not extremely large, but are greatest when considering trip origins to the north and west of the downtown area (up to 7 minutes). The Hybrid had the fastest overall travel times with little difference between the two proposed circulator routes.

District Circulation for Patients, Visitors, Customers, and Employees: Convenient and affordable transit will allow visitors, patients, workers and customers to move between downtown destinations. Shorter headways resulted in faster average trip times between destinations in Scenario D and Scenario A, but the alignments do not serve some key destinations. The Circulator alignments in DMC Modified and the Hybrid, by contrast, serve all downtown destinations with trips ranging from 6 to 15 minutes, including wait and walk times.

Transit Circulator Ridership: The Transit Circulator aims to provide convenient, intuitive, affordable access for visitors, patients, workers, and customers, allowing people of all ages and abilities to park-once and move around the district conveniently. Of the four alternatives, the Hybrid has the highest overall Circulator ridership, serving the most downtown destinations and thus having the most internal (non-commute) trips within downtown.

Increase in Active Transportation for Commuting and District Circulation: Scenarios with more extensive City Loop alignments place more residents, visitors and jobs within proximity to opportunities for walking and bicycling. The Hybrid provides the most access as a result of including 4th Avenue West, which puts more employees within close proximity to the City Loop facility.

Pedestrian Quality and Comfort: The transportation investments associated with each scenario vary in how they will affect the comfort of walking on downtown streets. Designs that increase sidewalk widths, provide buffers from adjacent traffic (landscaping or parking), or reduce conflicts with turning vehicles benefit the walking environment. DMC Modified and the Hybrid provide the highest level of investment in street level infrastructure as part of their similarly extensive alignments on key pedestrian streets.

Capital Cost: Differences between the capital costs for transit and parking associated with each scenario are wider than the operating and maintenance costs. The Hybrid Scenario was found to have the least capital cost.

Operating and Maintenance Costs: The Hybrid scenario was also found to have the lowest operations and maintenance costs.

SUMMARY FOR THE HYBRID SCENARIO

In summary, the hybrid scenario findings were as follows:

- Extensive circulator alignment results in high potential to catalyze development.
- Fastest overall transit travel times for regional and in-city commuter transit trips.
- Circulator serves all downtown destinations with trips ranging from 6 to 15 minutes, including wait and walk times.
- BRT is eligible for FTA funding.
- Extensive circulator and City Loop alignments benefits the quality and comfort of the pedestrian experience on the most key pedestrian streets.
- Low to moderate circulator capital cost relative to the other scenarios.

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DMC Transportation & Infrastructure Program
Integrated Transit Studies
Executive Summary