Appendix E

Roadway Guidelines

This appendix contains information found in Chapters 10 and 14 of ROCOG's LRTP 2045. While not typically part of an MTP, partner agencies requested the inclusion of particular text, tables, and figures from these chapters that they find valuable for the design and maintenance of roadways until this information is incorporated into other plans or design documents. The maps and tables have not been updated since they were adopted in September 2020.

To assist these users, all tables and figures retain the title numbers found in LRTP 2045.

E.1. LRTP 2040 Chapter 10 information

E.1.1 System development guidelines

Table 10-2 provides general system development guidance in terms of the density of primary and secondary roads needed to adequately serve different types of land use environments. These guidelines are important in areas undergoing a transition in development density, such as from rural to urbanizing, since they imply a denser network of major streets in urban development areas as opposed to rural development areas.

Table 10-2: General Road Network Spacing Guidelines

Land Use Environment	Major High Speed & High Capacity Roads	Primary Through Roads	Secondary Through Roads	Local Streets
Rural Areas	6 to 12 miles	4+ miles	1 to 2 miles	As needed to provide land access
Suburban Areas	3 to 6 miles	1 to 2 miles	1/2 to 1 mile	As needed to provide land access
Developing Areas	2 to 3 miles	1/2 to 1 mile	1/4 to 1/2 mile	As needed to provide land access
Core Urban Areas	2 to 3 miles	1/4 to 1/2 mile	1/8 to 1/4 mile	As needed to provide land access

This intensification of the roadway grid implies that existing rural roads, which may have been functioning as secondary travel corridors, will need to transition to a primary corridor as areas urbanize. New corridors may need to be preserved in future growth areas where no road corridor currently exists. Application of these guidelines occurs in both the long-range planning process as well as the development planning process as specific land use changes are considered.

In addition to these general spacing guidelines, additional system development principles are identified for specific facility types. These include:

- **Roads built as freeways/expressways**
  - Frontage or backage roads should be provided in conjunction with all new commercial or industrial development and where possible in areas undergoing development and where possible in areas undergoing redevelopment along freeway or expressway corridors.
  - Supporting arterial or collector routes consistent with the spacing suggested for secondary through roads in Table 10-2 should be developed parallel to freeways and expressways to serve as reliever routes that will

keep short and medium length local trips off the major road system and help distribute traffic to and from the designated access points along the limited access freeway or expressway facility.

- **Arterials**
  - Lack of continuity in the arterial street system will tend to place burdens on adjacent collector streets resulting in unintended travel on local thoroughfares and neighborhood streets. Efforts should be made to create continuous arterial street corridors ending at connections with similar or higher-level streets.
  - Arterial roadways should go around, rather than through, residential neighborhoods. Residential neighborhoods will typically cover an area of about ½ mile in diameter with 500-750 households. Since 500 households can be expected to generate about 5000 trips per day, street patterns developed to minimize flows to an acceptable level on interior local streets with residential frontage (around 1000 vehicles per day) suggests there needs to be about 5 local street connections for a neighborhood to disperse traffic to major streets through a combination of residential collector and local streets. Local collector streets should intersect arterials or higher order streets at a relatively uniform spacing of one-half to one-quarter mile in order that good progression can be maintained on the arterial network if future signalization is required.
- **Collectors**
  - Collector streets are designed to distribute traffic within a commercial district or employment area or across several adjoining neighborhoods within an area of city. Continuity through a district or neighborhood and connectivity with adjacent lands should be provided to address the following street network considerations:
    - The collector and local street network should provide sufficient connectivity so that trips to destinations within a mile of origin could be made on the local and collector street system. Without sufficient continuity and connectivity, these trips may be forced onto the arterial street system, robbing capacity from that system for through trips as well as local trips with a start or end outside of the immediate area.
    - Collector streets should provide relatively direct through routes to provide efficient access for bus routes, minimizing indirection of travel and providing adequate accessibility for transit users in the area.
  - The plan assumes that not all collector routes will be pre-defined but instead can be established when the development patterns in an area are defined through a general development plan process.
  - Whereas the arterial street system in developing areas is generally established along what had been the historic one-mile township grid, there should be within the square mile a minimum of one east/west and one north/south collector corridor provided when development at the lowest density levels is proposed. At higher densities, one-third mile spacing of collectors may be needed to provide adequate access.

E.1.2 Roadway classification categories

The 2050 Arterial and Collector classes of roadways are mapped in areas that are outside of a near term urban growth areas but within areas that cities have identified for long term growth beyond the year 2045. Areas where these corridors are mapped largely are found in Post- 2050 growth areas mapped by Rochester, Byron, and Oronoco around their current planned urban service areas. Mapping of these corridors should assist with issues related to the preservation of future corridors if interim or rural development is proposed in an area where long term a major street may be needed to facilitate future urban growth.

E.1.2.1 Interstate and interregional corridors

- Serve inter-city, inter-regional or interstate higher speed travel, with minimal interruption to traffic flows and a high level of continuity to minimize indirection of travel between regional origins and destinations.
- Serve as primary freight routes, handling movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel.
- Examples
  - Interstate 90
  - Trunk Highway 52 north of 1-90
  - Trunk Highway 14 West

E.1.2.2 Strategic arterials

- On a regional basis, strategic arterials supplement the Interstate/Interregional System by providing connections to smaller cities and other important economic activity centers not on the interregional system.
- The major function of strategic arterials is to provide for the mobility of traffic. Service to abutting land is a secondary concern. The speed limit on strategic arterials can range from 30 to 65 mph depending on the land use environment in which they are located, with lower speeds in urban areas.
- By nature of their size, most small urban areas will not generate internal travel warranting an urban strategic arterial network. The strategic arterial system for these small urban areas will largely consist of extensions of rural strategic arterials into and through an area.
- In larger urban areas, strategic arterials are of regional importance, carrying high volumes of higher speed traffic, including through traffic, with limited service to abutting land and design characteristics such as medians and limited traffic signalization to enhance traffic flow.
- Regional examples
  - Trunk Highway 63 North of Rochester
  - Trunk Highway 14 east of TH 52
- Urban examples
  - East and West Circle Drive
  - TH 63 north of TH 52

E.1.2.3 Primary arterials

- Primary arterials provide service to trips of moderate length

at a somewhat lower level of travel mobility than Interregional Corridors or Strategic Arterials. This system distributes travel to smaller geographic areas than the travel sheds typically associated with the higher order systems.

- On a regional basis, primary arterials serve trip lengths characteristic of intra-county service. Travel served will primarily be between significant traffic generators (either individual uses or concentrations of development) or will be part of a collection function routing travel to higher-level routes. Regional primary arterials are roadways generally not of statewide importance but of countywide importance.
- On a regional basis, primary arterials should be spaced at such intervals, consistent with population density, that all developed areas of the county are within a reasonable distance of a primary arterial or higher order highway.
- While primary arterials allow for the integration of both local and regional travel, the majority of traffic on the system is not typically low-speed local access traffic. Arterials should be managed to provide safe and efficient through movement, while providing some access to abutting lands.
- On an urban basis, primary arterials serve to connect major activity centers or sub-areas not served by higher order streets. Major commercial streets will typically be of a primary arterial classification. Arterials are important in providing the “last mile” link for commuters and freight service to major employment areas within cities. Such facilities will typically carry local bus routes and provide important network connectivity and continuity, but ideally should not penetrate identifiable neighborhoods.
- Regional examples
  - CSAH 4
  - CSAH 9
  - CSAH 1
- Urban examples
  - 2nd St SW
  - 4th Ave SW /NW
  - 4th St SE

E.1.2.4 Secondary arterials

- Secondary Arterials are similar in function to primary arterials but carry lower volumes, serving trips of shorter distances and with a higher degree of property access. Corridors will typically be shorter length routes that serve important mobility functions with in urban or regional subareas.
- Secondary arterials will improve the connectivity of the overall network on a localized basis and will typically provide access to a mixture of land uses. In non-residential or higher density residential areas, these routes will be important for truck and transit accessibility. They serve secondary traffic generators such as community business centers, neighborhood shopping centers and multi-family residential areas.
- Regional examples
  - CSAH 15 (Rock Dell/Salem)
  - CSAH 19 (Pleasant Grove)

- CR 142 (Dover to Eyota)
- CR 112 (Oronoco)

- Urban examples
  - 16th St SW /SE
  - 41st St NW

E.1.2.5 Primary collectors

- Primary collector streets typically provide land access and traffic circulation among multiple adjacent residential neighborhoods and within commercial districts and industrial areas. They distribute traffic movements from such areas to the arterial street system and keep local area movements off the major road system. Collectors typically do not accommodate through traffic and are not continuous for any great length.
- In rural areas primary collectors should be spaced at intervals, consistent population density, to collect traffic from local roads and provide service to ensure all properties are within a reasonable distance of a collector or higher order road.
- Primary collectors are predominantly two-lane roads, with at-grade intersections. Individual access for every lot should be discouraged unless lots are of sufficient frontage to provide adequate spacing between driveways. The cross section of a collector street may vary widely depending on the type, scale and density of the adjacent land uses. This type of roadway differs from the arterial system in that:
  - On-street parking is typically permitted.
  - Posted speed limits typically range between 30 and 35 mph.
  - Traffic volumes typically range between 2,000 and 7,000 vehicles.
  - In the central business district, and in other areas of like development and traffic density, the collector system may (and desirably will) complete a grid of streets in combination with arterial streets to form a logical network for traffic circulation.
- Regional examples
  - CR 105 (Kalmar)
  - CSAH 30 (Elmira)
  - CR 117 (Salem/Rochester)
- Urban examples
  - 11th Ave SW in Willow Creek
  - Center St
  - Pinewood Road

E.1.2.6 Commercial/industrial access

- Commercial-Industrial Access Roads are mapped in limited circumstances to recognize the importance of certain roadways to the delivery of freight and goods or as commuter access, serving multiple businesses in areas of commercial or industrial development with significant employment of commercial vehicle traffic.
- Examples
  - Maine St SE between 43th St & St. Bridget's Rd
  - Scott Dr NW between 19th St and 26th St

E.1.2.7 2050 arterials and collectors

- 2050 Arterial and Collector roadways are mapped in areas that are beyond planned urban or suburban growth but with in areas where long term urban or suburban development beyond the horizon of this plan is anticipated. These corridors will ultimately serve a function similar to a Primary Arterial or Collector. Mapping these corridors at this time is for the purpose of providing a policy basis for establishing right of way protection for future major street corridors, which can happen as part of a corridor study or during the land development approval process of local governments.
- Examples
  - 34th St NW between CSAH 3 and CSAH 33
  - 50th Ave NW between CSAH 14 and CSAH 12

E.1.3 Grade separation categories

- **Future interchange:** Planned location of a future interchange, typically found on interstate/interregional highways, providing access between two similar high-level roadways or between an interstate/interregional corridor and a regional or urban major arterial that provides access to the local community. Interchanges typically provide for all movements.
- **Future overpass:** Planned location of a future structure providing continuity for an arterial or primary collector road across an access-controlled interstate/interregional highway in order to provide for local circulation needs but not the interchange of traffic.
- **Grade separation study:** A location where further study of interchange or overpass needs is anticipated
- **Upgrade interchange:** An existing interchange where capacity or safety improvements are needed to improve service provided by the interchange.
- **Existing interchange or overpass:** Existing interchanges or overpasses are locations where a facility is already in place, but no further capacity enhancement of safety measures is anticipated to be needed over the horizon of the plan.
- **Rail crossing:** Locations that have been identified as potential locations where construction of a grade separated rail crossing is anticipated SHOULD rail traffic levels increase so significantly as to cause increased rail/vehicular conflict, crashes, or congestion on a regular basis; given the low level of rail traffic currently seen through Olmsted County, rail crossing locations are considered in this plan as illustrative-only at this time.

E.1.4 Land use context categories

The concept of land use context is used in this plan as a factor in determining the proper class of street planning guidelines to apply regarding management of roads and highways. It is based on the premise that corridors may pass through multiple land use areas, ranging from rural to dense urban conditions. By tying functional designation not only to roadway function but also the surrounding land use environment, design and operational guidelines can be tailored to the character of the surrounding area through which the roadways pass.

E.1.4.1 Rural

Rural land use is a medium to large size, occasionally or sparsely settled area predominantly composed of agricultural or other resource-dependent uses. Very limited, scattered single lot development of housing or small commercial uses may be permitted and areas of native use such as forests and waterways are found throughout.

Major roads are typically higher speed with limited access, serving longer travel to regional destinations, with access provided via a widely spaced paved or gravel road grid.

E.1.4.2 Rural Town

A Rural Town is a small, lightly developed area located at the intersection of two rural roads, typically in an unincorporated or very small community. Uses can be mixed but they are primarily residential with small commercial or industrial uses housed in buildings of small (1-2 story) size with moderate setbacks.

Rural Towns are generally served by a primary state or county highway “main street” that service predominantly regional traffic and provide connection for local residents to other cities and towns in the region.

E.1.4.3 Suburban

Suburban development areas consist of large-lot residential development at low densities with limited commercial and industrial use on scattered sites. Uses of a rural nature such as crop production, animal husbandry, and mineral extraction operations may be found in these areas but are not expected to be long term or permanent uses.

Development is reliant on vehicle travel with primary travel service provided by the regional network of state or county highways. Local access is predominantly provided by a network of paved or gravel township roads.

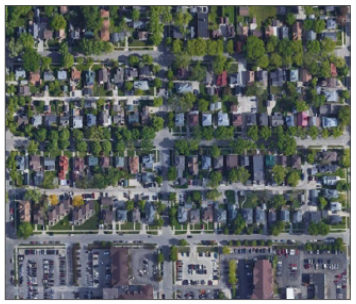
E.1.4.4 Rochester CBD

The Rochester CBD serves the highest intensity and greatest diversity of uses found in the planning area including multi-unit residential, commercial, office, civic, entertainment and institutional uses.

Block patterns are regular served by a grid street network, with buildings close to the street. This area has the greatest level of multi-modal connectivity, with a fully developed pedestrian system and the highest level of access to transit found in the planning area.

Because of its development density and diversity of uses, this land-use pattern generates a high prevalence of non-motorized trips, including walking, transit, and bicycling. Traffic of all types is expected to be medium to high volume. While the need for mobility through these areas does exist, it is far exceeded by the need for internal circulation within the zone. Vehicle parking is typically in structures.

E.1.4.5 Rochester Core



The Rochester Core consists primarily of long-established residential neighborhoods incorporating a variety of moderate density housing located within walking distance of the Rochester CBD. Small retail and service businesses are found at scattered locations along collector or arterial streets. Development is generally compact with an interconnected grid of streets and sidewalks.

Access to transit is good, as many city routes connecting the CBD to the greater urban area traverse the core area. Strategic arterial highways that serve as gateways to the CBD do penetrate this area and generally feature continuous, auto-oriented commercial frontage at a scale of 1-2 story buildings with off-street parking provided.

E.1.4.6 Rochester Urban Area

Lands in the Rochester Urban Area account for the largest share in the urbanized area and contain a wide variety of moderate to low intensity residential and non-residential use of moderate size (1-3 story). The majority of residential use is composed of single-family neighborhoods featuring limited areas organized around a historic grid street pattern and most areas organized around the more typical curvilinear street pattern common to post-World War II development.

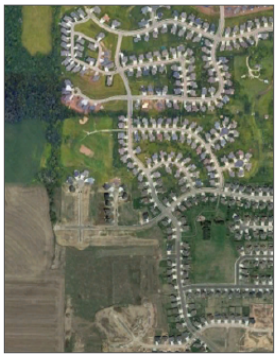
Non-residential use is found scattered throughout the area, generally located along major regional or urban arterial street corridors or in business districts situated at locations with good access to the major highway network. Mixed use development is limited, mostly composed of multi-family rental housing located near (but not integrated with) non-residential land use. Most predominant land uses (residential, commercial, industrial) are isolated and buffered from other use types.

Transit service is more limited in these areas, and typical distances between residential origins and non-residential destinations makes pedestrian travel less attractive. On-street parking is more common, particularly in residential and small-scale business areas, and access from main roads is typically limited and moderately spaced.

E.1.4.7 Rochester Urban Edge

The Rochester Urban Edge is an area of low intensity development, with a relatively low diversity of uses, similar in current character to the Rural area classification but unique in that it's proximate to the Rochester urban service area and could be served with municipal sewer and water services in the future with relative ease. The Urban Edge is intended to serve

as reserve for future urban expansion within and beyond the 25-year horizon of this plan; the ability to extend urban services into this area would be expected to materialize under normal conditions in a 10 to 30-year timeframe.



Travel in this area will be predominantly auto-oriented in the near term and over time will transition from more of a rural-style travel environment to an urban-style travel environment as expansion occurs. Use of strategies aimed at protecting lands from development that may be needed for future right-of-way is important in these areas.

E.1.4.8 Small City Core

While smaller and less dense than the Rochester urban zones, the Small City Core is similarly characterized by a high diversity of use types, including, office, retail, civic, and cultural facilities, with structures typical of late 19th to early 20th century mid- to low-rise development oriented toward the street with minimal setbacks. Parking is often provided on-street along the main thoroughfare, with additional parking at the rear of the building accessible by alleys or other minor streets.

As in Rural Towns, the “Main Street” in the core is often a state or county highway that serves both local trips as well as longer regional pass-through trips. While the need for mobility through these areas exists, it is somewhat exceeded by the need for internal circulation within the zone.

E.1.4.9 Small City Urban Area

The Small City Urban Area is characterized predominantly by residential neighborhoods, sometimes mixed with retail, restaurant, office or institutional uses such as local schools.

Block sizes are regular and, depending on distance from the core, will transition from more of a historic grid layout closer to the core to a more contemporary curvilinear layout in newer areas. Small establishments sometimes occupy principal corners in the older areas. Primarily, however, commercial and business establishments will be located along major streets, often state or county highway corridors, in a strip pattern or pods of development with good access to the major street network.

E.1.4.10 Small City Urban Edge

The Small City Urban Edge is a transitional area where future urban growth is expected but where current use is more representative of what is seen in rural areas, with rural style agricultural use still predominating along with infrequent, scattered residential or commercial use. These areas are expected to transition over time to urban style development as expansion occurs and access to urban services becomes available over a 10 to 30-year period.

Figure 10-5: Functional Designation System Plan (ROCOG Planning Area)

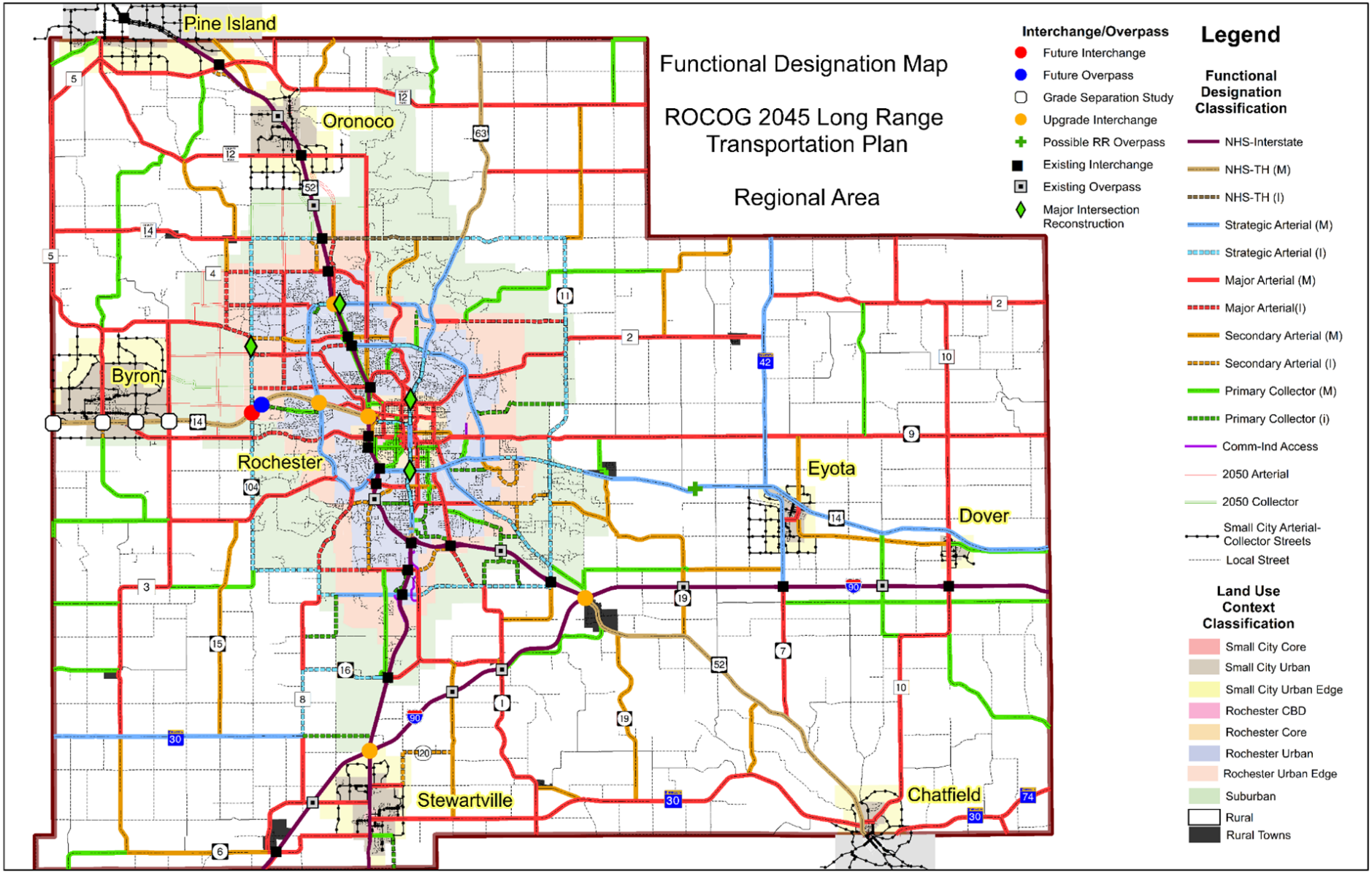
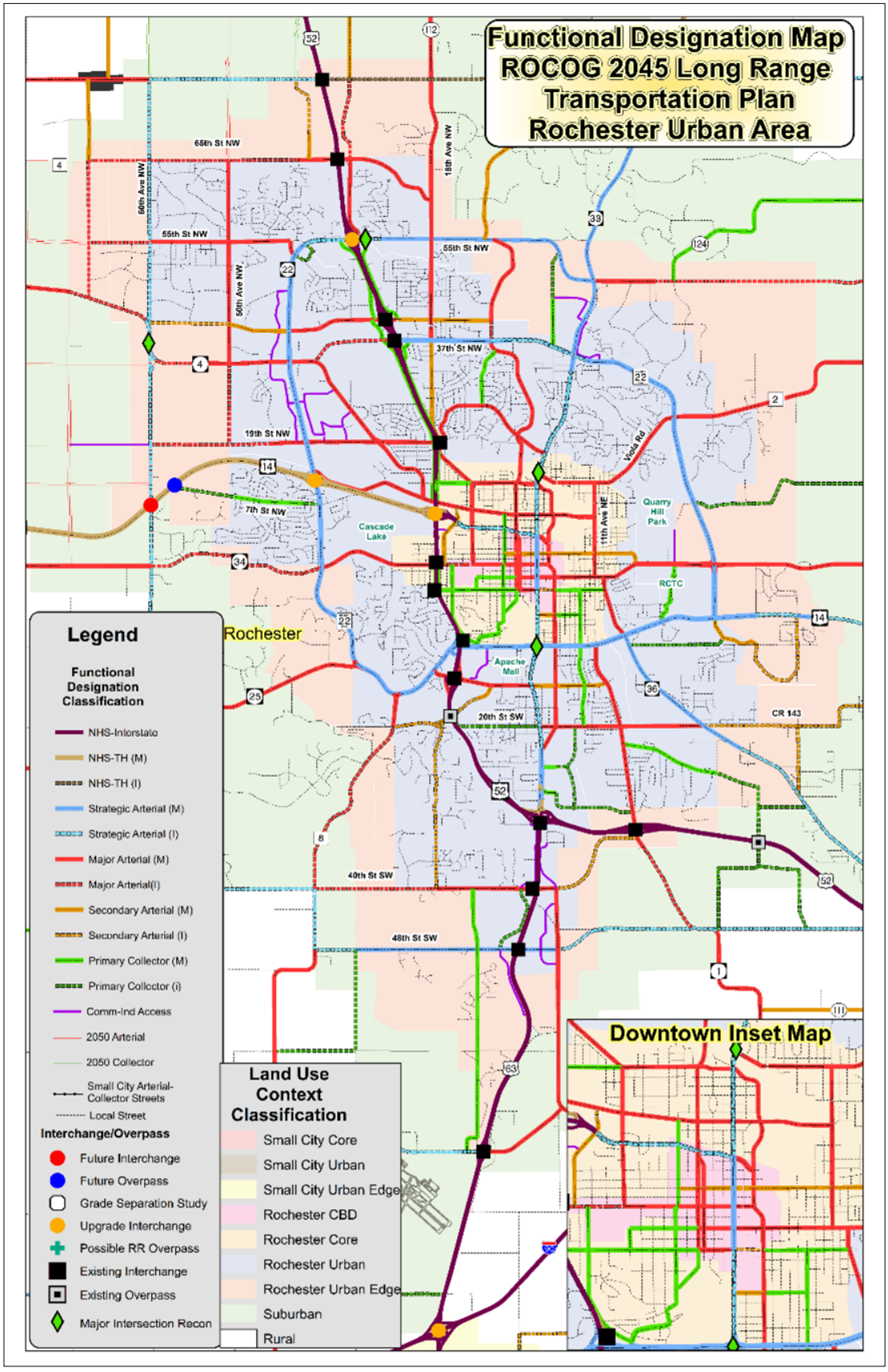


Figure 10-6: Functional Designation System Plan (Rochester Urban Area)



E.1.5 Street character guidelines

Tables 10-7A through 10-7E identify basic street character priorities for the factors of mobility vs. accessibility, modal priority, and target speed. Each factor is rated on a continuum from low to high; the significance of the ratings as applied to early project planning is as described in Table 10-6.

Table 10-6: Description of Street Character Guideline Ratings

Characteristic	Low	Moderate	High
Mobility	Modal ease of movement is limited either by design or level of travel to support economic activity or quality of life goals with connectivity to an area.	Expect to see ease of movement on a travel corridor periodically interrupted by activity level in area or convergence of moderate to high travel demand.	Ability to travel relatively freely along a travel corridor so as to be able to minimize travel time or maximize reliability of travel through the corridor.
Accessibility	Generally, will see less than 5 modal access connections per mile on each side of roadway.	Generally, will see from 5 to 15 modal access connections per mile on each side of roadway.	Generally, will see more than 15 modal access connections per mile on each side of roadway.
Modal Significance	For a given mode expect to see limited use with relatively few origins/destinations generating travel in the area.	Expect to see moderate levels of modal travel but roadway is not critical for meeting mobility or access function.	Roadway is important for mobility or access for a given mode with normal to high use expected.
Target Speed	Typical operating speed is below 35 MPH.	Typical operating speed is between 35 and 45 MPH.	Typical operating speed is above 50 MPH.

Table 10-7A: Street Character Guidelines for National Highway System Non-Freeways

Land Use Context	Mobility/ Accessibility	Modal Significance	Target Speed
Rural	High/Low	High: Veh, Trk Low: Ped, Bike	High
Rural Town	High/Mod	High: Veh, Trk Mod/Low: Ped, Bike	Moderate
Suburban	High/Low	High: Veh, Trk Mod/Low: Ped, Bike	Mod-High
Small City Core Area	Mod/Mod	High: Ped, Veh, Trk Low: Bike	Low
Small City Urban Area	Mod-High/ Mod	High: Veh, Trk Mod: Ped, Bike	Moderate
Small City Edge Area	High/Mod-Low	High: Veh, Trk Mod/Low: Ped, Bike	High
Rochester CBD	NA	NA	NA
Rochester Core	NA	NA	NA
Rochester Urban	NA	NA	NA
Rochester Edge	High/Mod	High: Veh, Trk Mod: Bike Low: Ped	Mod-High

Table 10-7B: Street Character Guidelines for Strategic Arterials

Land Use Context	Mobility/ Accessibility	Modal Significance	Target Speed
Rural	High/Low	High: Veh, Trk Low: Ped, Bike	High
Rural Town	High/Mod	High: Veh, Trk Mod/Low: Ped, Bike	Moderate
Suburban	High/Low	High: Veh, Trk Mod/Low: Ped, Bike	Mod-High
Small City Core Area	NA	NA	NA
Small City Urban Area	Mod-High/ Mod	High: Veh, Trk Mod: Ped, Bike	Mod-High
Small City Edge Area	High/Mod	High: Veh, Trk Mod/Low: Ped, Bike	High
Rochester CBD	Mod-Low/ Mod	High: Transit, Ped, Veh Mod:Trk Low: Bike	Low-Mod
Rochester Core	Mod/Mod	High: Transit, Ped, Veh Mod: Bike, Trk	Low-Mod
Rochester Urban	Mod-High/ Mod-Low	High: Veh,Trk Mod: Transit, Bike, Ped	Moderate
Rochester Edge	High/Low-Mod	High: Veh, Trk Mod: Bike Low: Ped	Mod-High

Table 10-7C: Street Character Guidelines for Major Arterials

Land Use Context	Mobility/ Accessibility	Modal Significance	Target Speed
Rural	High/Mod	High: Veh, Trk Low: Ped, Bike	High
Rural Town	Mod/Mod	High: Veh, Trk Mod/Low: Ped, Bike	Moderate
Suburban	High/Mod	High: Veh, Trk Mod/Low: Ped, Bike	Mod-High
Small City Core Area	Mod-Low/Mod	High: Ped, Veh, Trk Mod: Bike	Moderate
Small City Urban Area	Mod/Mod	High: Ped, Veh, Trk Mod: Bike	Moderate
Small City Edge Area	Mod-High/Mod	High: Veh, Trk Mod/Low: Ped, Bike	Mod-High
Rochester CBD	Mod-Low/Mod-High	High: Transit, Ped, Veh Mod-Low:Trk, Bike	Low
Rochester Core	Mod/Mod-High	High: Ped, Veh Mod: Transit, Bike, Trk	Low
Rochester Urban	Mod-High/Mod	High: Veh, Ped Mod: Transit, Bike, Trk	Moderate
Rochester Edge	High/Low	High: Veh, Trk Mod: Bike Low: Ped	Mod-High

Table 10-7D: Street Character Guidelines for Secondary Arterials

Land Use Context	Mobility/ Accessibility	Modal Significance	Target Speed
Rural	High-Mod/ Mod	High: Veh Mod: Trk Low: Ped, Bike	High
Rural Town	Mod/Mod	High: Veh Mod: Trk, Ped Low: Bike	Moderate
Suburban	Mod/Mod	High: Veh Mod: Trk, Ped, Bike	Mod-High
Small City Core Area	NA	NA	NA
Small City Urban Area	Mod/Mod-High	High: Ped, Veh, Trk Mod: Bike	Moderate
Small City Edge Area	Mod/Mod	High: Veh Mod: Ped, Bike, Trk	Mod-High
Rochester CBD	Low/Mod-High	High: Ped, Bike Mod: Veh Low: Transit, Trk	Low
Rochester Core	Low-Mod/ Mod-High	High: Ped, Bike Mod: Veh Low: Transit, Trk	Low
Rochester Urban	Mod/Mod	High: Veh, Ped, Bike Mod: Transit Low: Trk	Mod-Low
Rochester Edge	Mod-Low/Mod	High: Veh Mod-Low: Bike, Ped	Moderate

Table 10-7E: Street Character Guidelines for Primary Collectors

Land Use Context	Mobility/ Accessibility	Modal Significance	Target Speed
Rural	Mod/Mod	High: Veh Mod: Trk Low: Ped, Bike	Mod-High
Rural Town	Mod/High	High: Veh Mod: Trk, Ped Low: Bike	Moderate
Suburban	Mod/Mod	High: Veh Mod: Trk, Ped, Bike	Moderate
Small City Core Area	Low/High	High: Ped, Veh Mod: Bike, Trk	Low
Small City Urban Area	Mod/Mod-High	High: Ped, Veh Mod: Bike, Trk	Moderate
Small City Edge Area	Mod/Mod	High: Veh Mod: Ped, Bike, Trk	Mod-High
Rochester CBD	Low/High	High: Ped, Bike Mod: Veh Low: Transit, Trk	Low
Rochester Core	Low/High	High: Ped, Bike Mod: Veh Low: Transit, Trk	Low
Rochester Urban	Mod/High	High: Veh, Ped, Bike Mod: Transit Low: Trk	Mod-Low
Rochester Edge	Mod/Mod	High: Veh Mod-Low: Bike, Ped	Mod-Low

E.1.6 Travel lanes

The size of a roadway is strongly influenced by the intensity and type of anticipated travel demand expected in the corridor. It is common practice to size roadways to accommodate the travel demand that is anticipated to occur up to 20-25 years from the time it is constructed. The land use that occurs along a roadway corridor, while not generally responsible for the majority of travel on the roadway, will affect vehicular traffic capacity, travel by pedestrians and bicyclists, and need for on-street parking. The amount of traffic that can be managed on a roadway is dependent upon factors such as the presence of parking, frequency of driveways and intersections, intersection traffic control, and roadway alignment. The data in Table 10-10 presents the approximate Annual Average Daily Traffic volumes that can be accommodated by non-freeway roadways.

Table 10-10: Approximate Volumes for Planning Future Roadway Improvements

Road Type	Standard Management	Enhanced Management*
Two-Lane Road	Up to 12,000 VPD	Up to 15,000 VPD
Three-Lane Road	Up to 18,000 VPD	Up to 22,500 VPD
Four-Lane Road	Up to 24,000 VPD	Up to 30,000 VPD
Five-Lane Road	Up to 35,000 VPD	Up to 43,500 VPD

*** Volumes that can be achieved with adequate road design, access control and other capacity enhancing measures.**

VPD – Vehicles Per Day

The differences between the two columns in Table 10-10 reflect that the traffic a road can accommodate varies and is a function of not only physical features such as intersection frequency and parking, but also operational elements including the level of access management, operating speeds, the relative levels of through traffic and access traffic, and the level of traffic management implemented such as signal coordination and signal timing.

In addition to vehicle travel, it is important to consider right-of-way needs for other types of travel as well. Answering the following questions can help ascertain what accommodations will or should be made for various other modes of travel.

- **Land uses:** What pedestrian, bicycle, or transit generators are located along the roadway? Are there large shopping destinations? Large employers?Public facilities? Are there visitor destinations? How might existing land use patterns change based on approved or planned development? Is there a redevelopment plan for the area? What land use changes are planned or anticipated to occur?
- **Travel patterns:** What percentage of the expected vehicular trips are local? Are there unique travel patterns or modes served by the corridor? Will new or emerging transportation services or technologies influence trip-making?
- **Safety data:** How many and what types of crashes are occurring along the roadway?
- **Types of pedestrians:** Are there generators or attractors that would suggest that younger or older pedestrians or other special user groups will be using the roadway (e.g., schools, elderly care facilities, assisted living centers)?
- **Types of bicyclists:** Is the roadway a critical link for the local or regional bicycle network? Does the roadway

connect to or cross trails or bicycle facilities? Are bicyclists using the roadway to access shopping, employment, or recreational destinations?

- **Transit:** What type of transit service exists or is planned for the area? Where are transit stops located? Can pedestrians reach these stops from either side of the street without significant diversion of their trip? Are transit stops accessible using the network of existing bicycle and pedestrian facilities?
- **Freight:** What is the percentage and volume of heavy trucks using the roadway? Are there destinations that require regular access by heavy trucks or other large vehicles? Is the roadway part of a designated freight corridor? Where does loading and unloading occur along the roadway?

E.1.7 Medians

Medians are another element of roadway design that need to be considered when assessing the need for right-of-way. Medians are the center portion of a roadway that separates opposing directions of travel. Medians vary in width and purpose and can be raised with curbs or painted and flush with the pavement. Medians are used to achieve a range of objectives when designing a street, including:

- Reducing traffic conflict at intersections or access connections.
- Separating opposing traffic flows for increased safety.
- Storing left turning and U-turning vehicles at intersections.
- Providing a pedestrian refuge area to improve crossing safety.
- Creating a focal point or identifiable gateway into a community, neighborhood, or district by means such as creating tree canopies over travel lanes, providing space for attractive landscaping or space for lighting and urban design features.

Raised medians should be considered during the construction, reconstruction, and improvement of all multi-lane strategic arterials and major arterials where posted speeds equal or exceed 40 mph. More specifically, medians should be considered where:

- Forecasted average daily traffic is anticipated to be 28,000 vehicles per day during the 20-year planning period; **or**
- The annual vehicular accident rate is greater than the statewide annual average accident rate for similar roadways; **or**
- Pedestrians are unable to safely cross the roadway, as demonstrated by an accident rate that is greater than the statewide annual average accident rate for similar roadways; **and/or**
- Topography and horizontal or vertical roadway alignment result in inadequate left-turn intersection sight distance and it is impractical to relocate or reconstruct the connecting approach road or impractical to reconstruct the highway in order to provide adequate sight distance. Depressed medians are preferred in rural areas and on urban corridors where speed limits will exceed 45 MPH. Medians can serve as an integral part of an access management strategy for a roadway to improve safety and multimodal operational efficiency.

E.1.8 Basic modal accommodations

The principle of basic modal accommodation provides a flexible framework to inform community planning and project development processes, taking into account land use context, road functions, and user needs. The guidance provided in Tables 10-12A through 10-12E provides information to inform planning of a roadway's basic design by helping to define the role of the roadway within the local, city, and regional transportation network as it relates to the needs of various roadway user groups and their expected use of a corridor.

Roadway planning requires an understanding of the function of a roadway within its current and expected future context and the needs of the potential roadway users. The Basic Modal Accommodation Matrices presented in Tables 10-12A through 10-12E assist by identifying a recommended baseline level of improvement for different users considering roadway function and land use context. These recommendations are a starting point to assist in identifying basic travel needs and allocating space to Guidance in the Basic Modal Accommodation Matrix is organized by functional designation and land use context. These tables establish baseline parameters for vehicular, pedestrian, and bikeway needs to ensure that projects are consistently planned with all users in mind.

Consideration of multiple modes of transportation (vehicles, pedestrians, bicyclists, transit vehicles and users, and local delivery needs) in the planning and design of all modes of transportation has been part of federal, state and local policy and practice for decades, although with mixed success. There has been increasing interest in building better approaches, including policy, planning and design processes to assist in "Completing our Streets." Doing so will help to define a balanced range of potential design alternatives for consideration during the early conceptual stage of the design process.

The following section provides a separate discussion of freeways, which are handled as a standalone subset of the larger roadway network given the stricter control of design parameters applied to the freeway design and development process.

Table 10-12A: Basic Modal Accommodations for National Highway System Non Freeway

Land Use Context	Vehicular Thru Lanes	Rare/Low Ped Volume	Medium/High Ped Volume	Skilled/Confident Cyclists	All Age/All Ability Cyclists
Rural	2 lanes	Shared shoulder	NA	Shared shoulder	Trail/path only
Rural Town	2 lanes	Shared shoulder	NA	Shared lane/ shoulder	Shared shoulder/ path
Suburban	2 lanes	Shared shoulder	NA	Shared shoulder	Trail/path only
Small City Core Area	2-4 lanes	Standard sidewalk	Wide(M) to enhanced (H)	Bike lane	Shared path or trail
Small City Urban Area	2-4 lanes	Standard sidewalk	Wide sidewalk	Wide outside lane (WOL)	Shared path or trail
Small City Edge Area	2-4 lanes	Standard shoulder/walk	Standard walk/ path	WOL or shoulder	Shared path or trail
Rochester CBD	NA	NA	NA	NA	NA
Rochester Core	NA	NA	NA	NA	NA
Rochester Urban	NA	NA	NA	NA	NA
Rochester Edge	2-4 lanes	Standard shoulder/walk	Standard walk/ path	Shared shoulder	Shared path or trail

Table 10-12B: Basic Modal Accommodations for Strategic Arterials

Land Use Context	Vehicular Thru Lanes	Rare/Low Ped Volume	Medium/High Ped Volume	Skilled/Confident Cyclists	All Age/All Ability Cyclists
Rural	2 lanes	Shared shoulder	NA	Shared shoulder	Trail/path only
Rural Town	2 lanes	Shared shoulder	NA	Shared lane/ shoulder	Shared shoulder/ path
Suburban	2 lanes	Shared shoulder	NA	Shared shoulder	Trail/path only
Small City Core Area	NA	NA	NA	NA	NA
Small City Urban Area	2 lanes	Standard walk/ path	Standard walk/ path	Shared shoulder	Shared path or trail
Small City Edge Area	2 lanes	Standard shoulder/walk	NA	Shared shoulder	Shared path or trail
Rochester CBD	4-6 lanes	Standard sidewalk	Wide(M) to enhanced (H)	Bike lane	Protected lane or path
Rochester Core	4-6 lanes	Standard sidewalk	Wide sidewalk	Bike lane	Protected lane or path
Rochester Urban	2-4 lanes	Standard walk/ path	Wide walk or path	Shared shoulder	Path or trail
Rochester Edge	2-4 lanes	Standard walk/ path	Wide walk or path	Shared shoulder	Path or trail

Table 10-12C: Basic Modal Accommodations for Major Arterials

Land Use Context	Vehicular Thru Lanes	Rare/Low Ped Volume	Medium/High Ped Volume	Skilled/Confident Cyclists	All Age/All Ability Cyclists
Rural	2 lanes	Shared shoulder	NA	Shared shoulder	Trail/path only
Rural Town	2 lanes	Shared shoulder	NA	Shared lane/ shoulder	Shared shoulder/ path
Suburban	2 lanes	Shared shoulder	NA	Shared shoulder	Trail/path only
Small City Core Area	2-4 lanes	Standard sidewalk	2-4 lanes	Standard sidewalk	Shared path or trail
Small City Urban Area	2-3 lanes	Standard sidewalk	Wide sidewalk	Wide outside lane (WOL)	Shared path or trail
Small City Edge Area	2 lanes	Standard shoulder/walk	Standard walk/ path	WOL or shoulder	Shared path or trail
Rochester CBD	2-4 lanes	Standard sidewalk	Wide(M) to enhanced (H)	Bike lane	Protected lane or path
Rochester Core	2-4 lanes	Standard sidewalk	Wide sidewalk	Bike lane	Protected lane or path
Rochester Urban	2-4 lanes	Standard walk/ path	Wide walk or path	Bike lane	Protected lane or path
Rochester Edge	2-3 lanes	Standard walk/ path	Wide walk or path	Shared shoulder	Path or trail

Table 10-12D: Basic Modal Accommodations for Secondary Arterials

Land Use Context	Vehicular Thru Lanes	Rare/Low Ped Volume	Medium/High Ped Volume	Skilled/Confident Cyclists	All Age/All Ability Cyclists
Rural	2 lanes	Shared shoulder	NA	Shared lane/ shoulder	Trail/path only
Rural Town	2 lanes	Shared shoulder	NA	Shared lane/ shoulder	Shared shoulder/ path
Suburban	2 lanes	Shared shoulder	NA	Shared lane/ shoulder	Trail/path only
Small City Core Area	NA	NA	NA	NA	NA
Small City Urban Area	2 lanes	Standard sidewalk	Wide sidewalk	Shared travel lane	Shared path or trail
Small City Edge Area	2 lanes	Standard shoulder/walk	Standard walk/ path	Wide outside lane (WOL)	Shared path or trail
Rochester CBD	2-4 lanes	Standard sidewalk	Wide(M) to enhanced (H)	Bike lane	Protected lane or path
Rochester Core	2-3 lanes	Standard sidewalk	Wide sidewalk	Bike lane	Protected lane or path
Rochester Urban	2-3 lanes	Standard walk/ path	Wide walk or path	Bike lane	Protected lane or path
Rochester Edge	2 lanes	Standard walk/ path	Wide walk or path	Wide outside lane (WOL)	Path or trail

Table 10-12E: Basic Modal Accommodations for Primary Collectors

Land Use Context	Vehicular Thru Lanes	Rare/Low Ped Volume	Medium/High Ped Volume	Skilled/Confident Cyclists	All Age/All Ability Cyclists
Rural	2 lanes	Shared shoulder	NA	Shared lane/ shoulder	Shared shoulder/ path
Rural Town	2 lanes	Shared shoulder	NA	Shared lane/ shoulder	Shared shoulder/ path
Suburban	2 lanes	Shared shoulder	NA	Shared lane/ shoulder	Shared shoulder/ path
Small City Core Area	2 lanes	Standard sidewalk	Wide(M) to enhanced (H)	Wide outside lane (WOL)	Shared path or trail
Small City Urban Area	2 lanes	Standard sidewalk	Wide sidewalk	Shared travel lane	Shared path or trail
Small City Edge Area	2 lanes	Standard shoulder/walk	Standard walk/ path	Shared travel lane	Shared path or trail
Rochester CBD	2 lanes	Standard sidewalk	Wide(M) to enhanced (H)	Bike lane	Protected lane or path
Rochester Core	2 lanes	Standard sidewalk	Wide sidewalk	Bike lane	Protected lane or path
Rochester Urban	2 lanes	Standard walk/ path	Wide walk or path	Wide outside lane (WOL)	Protected lane or path
Rochester Edge	2 lanes	Standard walk/ path	Wide walk or path	Shared lane	Path or trail

E.1.9 Freeways

Freeways are a very specific type of travel facility that provide the highest level of mobility, providing regional connectivity serving interstate and interregional travel at high speeds with access to adjacent land areas generally provided by interchanges. The use of freeway design is normally limited to cases where the unique nature of a freeway is warranted, such as the Interstate Highway System, or where a significant level of through traffic occurs in conjunction with traffic volumes exceeding 25- 30,000 in a rural area or 40-45,000 in an urban area.

Planning a freeway project will in most cases involve a federalized development process with in-depth environmental review. The street planning guidance in this chapter is intended for lower class facilities. However, as there are a limited number of corridors (specifically TH 63 south of TH 52 and TH 14 west of TH 52) envisioned to be upgraded to freeways in the future, general street planning principles are provided here for these existing and future freeway corridors:

- High mobility – low accessibility
- Primary modal emphasis: vehicular traffic
- Secondary modal emphasis: transit
- Target speed: Above 60 mph
- Travel lanes: travel lane capacity is approximately 15,000-20,000 AADT per lane
- Median is required
- No pedestrian or bicycle travel
- Accommodation for maximum size freight vehicles required

E.1.10 Right-of-way reservation

Guidelines on minimum right-of-way (ROW) widths for major roadway design classes are identified in Table 10-16. Table 10-16 serves as a starting point for the determination of right-of-way needs, and for many lower volume or lower classification roads will likely provide adequate guidance for planning purposes. For freeways higher classification roads such as strategic arterials and roads carrying volumes > 30,000 AADT, additional consideration should be given to the travel service, sizing, and modal accommodation principles found in this section before a final determination on right-of-way width is made. The reservation of right-of-way for the ultimate width of roadways should be based on long-term needs defined by objectives for mobility, accessibility and community character.

Right-of-way widths will vary depending on the type of stormwater management utilized and values in Table 10-16 are representative of mid-block conditions on relatively flat terrain with two 5’ walkways and, for divided facilities, a 20’ raised or 30’ depressed medians on expressways or a 10’ raised or 20’ depressed median on other roadways.

Additional right-of-way width is recommended where conditions dictate the need for additional area. Common situations where additional right-of-way should be secured include:

- **Steep terrain:** Where topographic conditions such as steep terrain are present, additional right-of-way shall be provided in order to provide an adequate clear zone with safe slope gradients and backslopes constructed at grades that will provide for stability of the slope and ease of maintenance. The width required to provide adequate recovery area and slope stability is related to the design speed of the roadway

Table 10-16: Minimum Right-of-Way Widths

				Midblock Right of Way (1)			
				Swale/Ditch Drainage		Curb & Gutter Drainage	
Design Class	Projected Volumes	Lanes Needed	Type of Median	Flat Terrain	Steep Terrain	Flat Terrain	Steep Terrain
Freeway							
	<70,000	4		200	225	160	180
	<135,000	6		220	240	200	220
Limited Access Expressway							
	2-10,000	2		100	120	NA	NA
	20-40,000	4+LTL	Undivided	120	140	NA	NA
			Raised	140	160	130	150
			Landscaped	180	200	NA	NA
	Over 40,000	6+LTL	Raised	180	200	150	175
			Landscaped	200	220	NA	NA
Other Roads and Streets (2)							
	2-10,000	2		100	120	75	90
	10-20,000	2+LTL		110	130	90	110
	20-30,000	4+LTL	Undivided	120	140	100	120
			Raised	140	160	120	140
	30-40,000	5		140	160	130	150
	Over 40,000	6+LTL	Undivided	160	180		
			Raised	175	200		

Footnotes

(1) Add 10 feet for each Non-Motorized Path

(2) If On-Street Parking is to be permitted, add 6 feet for Parallel Parking Lanes and 12 feet for Angled Parking lanes

and the severity of natural slope conditions. Additional right-of-way needed to address terrain factors will range from 10 to 50 feet on one or both sides of the roadway corridor.

- **Non-motorized paths:** Where jurisdictional bikeway or walkway plans indicate development of a separated path in lieu of a sidewalk for pedestrian and bicycle use, an additional 5 to 15 feet of right-of-way or easement (depending on jurisdictional policy) may be needed to accommodate each path facility.
- **Turn lanes:** On major streets and roads additional width should be acquired for turn lane development in the vicinity of intersections.

E.1.10.1 Right-of-way in urban core areas

When considering land development proposals along fully developed corridors, the mid-block ROW requirements in Table 10-16 generally are not relevant to the consideration of whether additional right-of-way is needed. The most pressing right-of-way need in such corridors may be the ability to acquire an additional 10-12 feet in the proximity of intersections to permit the introduction of turn lanes where none currently exist.

Development proposals on properties located at or near higher volume intersections should be reviewed, keeping in mind there may be a need to introduce turn lane improvements if none exists; a site layout, therefore, should be designed to accommodate an area for such improvement in the future.

E.1.10.2 Rural & suburban roadway reservation corridor

The 2045 Plan recommends a minimum **roadway reservation corridor** be established along all county and state highways in rural and suburban areas with substandard rights-of-way for the purpose of establishing an interim boundary, measured from the centerline of the existing roadway, from which all future building setbacks would be measured. Table 10-17 establishes recommended guidelines for the width of the roadway reservation corridor related to the classification of the roadway. These setbacks will minimize future impacts to private property as a result of road reconstruction, permit adequate width drainage facilities to be constructed, and provide an increased level of public safety by introducing

Table 10-17: Rural and Suburban Roadway Reservation Corridors for Substandard Roads

Roadway Classification	Expressway <10,000 ADT	Expressway >10,000 ADT	Super 2 All	Other Arterials & Collectors <10,000 ADT	Other Arterials & Collectors >10,000 ADT	Local County & State Roads All
Roadway Reservation Corridor Width	50’	60’	55’	50’	55’	50’

greater separation between roadways and structures consistent with modern clear zone and recovery area design requirements.

E.1.10.3 Right-of-way implementation strategies

- **Strategy 1:** ROCOG will encourage its partner agencies to use the Long Range Transportation Plan to provide guidance to landowners, developers, local jurisdictions and public agencies on the expected design characteristics of major roadways throughout the ROCOG planning area.
- **Strategy 2:** ROCOG partner jurisdictions will consult guidelines on recommended right-of-way width for each road classification and apply these as a base for estimating right-of-way needs on new corridors or existing corridors proposed for major upgrade.
- **Strategy 3:** ROCOG partner jurisdictions will consult the guidelines to guide future right-of-way acquisition along existing corridors where adjacent land uses are established but existing right-of-way is substandard. The focus in such cases should be on the need to acquire the minimum right-of-way necessary to meet the functional service needs of the roadway, such as the addition of turn lanes or raised medians in order to provide additional traffic capacity at intersections or improve safety in the corridor.
- **Strategy 4:** When developing major street projects, ROCOG partner agencies should consult the street planning guidance of this chapter and, to the extent possible, incorporate features recommended such as travel lanes, medians, modal accommodation and modal networks, respecting the land use land use context within which a corridor is located.
- **Strategy 5:** ROCOG partner jurisdictions should coordinate with landowners to reserve right-of-way for major street corridors through site planning or general development planning processes. Right-of-way dedication requirements and land acquisition policies should be adopted in land development regulations of local jurisdictions.
- **Strategy 6:** ROCOG partner jurisdictions should consult building setback requirements for major rural or suburban roadways designed to preserve sufficient setback for new structures under a building permit and/or zoning certificate process when no associated subdivision activity is occurring.
- **Strategy 7:** ROCOG will work with partner jurisdictions to identify corridors that would benefit from right-of-way protection activities, such as official mapping, where needed to preserve right-of-way corridors for future transportation system projects. Factors to consider in determining which corridors should be a priority for corridor management are:
  - Has the need to improve the corridor been identified as a priority by the local community or by MnDOT or Olmsted County?
  - How important is the corridor to the local and regional transportation system (i.e., truck route, commuter route, economic development, etc.)?
  - What is the immediacy of land development in the corridor?
  - Are there other opportunities to prevent development on land that would be needed for future right-of-way?
  - What is the risk of foreclosing location options entirely?
  - What is the level of support for the project?

E.1.11 Street & highway network improvement program groups

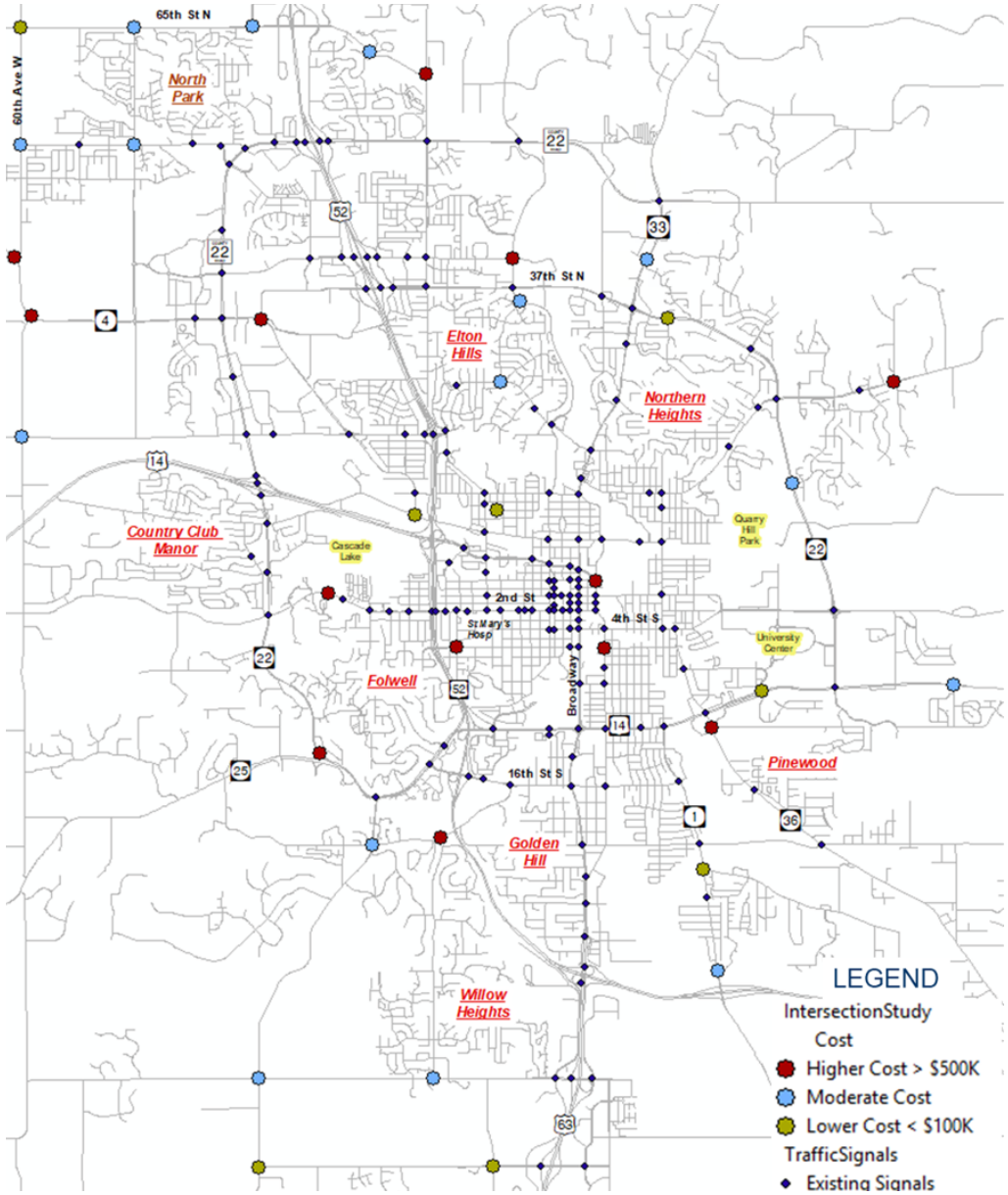
Figure 10-15 highlights corridors identified as part of the 10-Ton Route Improvement Program. A set of criteria were used to identify candidate locations. The criteria utilized were:

- Corridor provides connection to 9/10- ton route in adjacent county
- Corridor volume > 750
- Corridor improves connectivity to State 10-ton network
- Corridor provides improved first mile /last mile service to a rural agricultural/rural business area currently not within 1-2 miles of a 10- ton route
- Corridor helps to create a bypass route for rural heavy commercial traffic around the city of Rochester.

In the legend of the map the terms categories are defined as follows:

- **High cost intersections** where signalization or use of a roundabout intersection appear to be needed in the future.
- **Moderate cost intersections** where improvements such as turning lanes or enhanced level of intersection warning device installation may be needed.
- **Low cost intersections** where minimum improvements such as improved intersection lighting or signage would likely be sufficient.

Figure 10-15: Intersection Improvement Program Locations



E.2. LRTP 2045 Chapter 14 information

E.2.1 TSMO

These graphics are based on recent work conducted for Rochester's 2018 comprehensive plan update (P2S 2040), the 2018 DMC Integrated Transit Studies, and the ROCOG Plan. In some locations, congestion and safety issues may co-exist, while in other locations only safety issues or congestion are present.

E.2.2 Congestion assessment

Figures 14-3 and 14-4 were developed as part of P2S 2040 and identify existing areas of congestion (Figure 14-3) and projected future areas of congestion (Figure 14-4). Corridors flagged for congestion are identified based on traffic volumes and road geometry and provide only a high-level screening of areas where future study may be warranted.

E.2.3 Primary TSMO infrastructure

Traffic signal systems are critical for managing traffic flow affecting general vehicular traffic, transit service, freight delivery and emergency response. Key components of these systems include the communication and signal equipment, signal interconnectivity, and periodic retiming of signals.

E.2.3.1 Communications

A network of fiber optic cable has been constructed that connects

Figure 14-3: Corridors Currently Experiencing Periodic Congested Travel

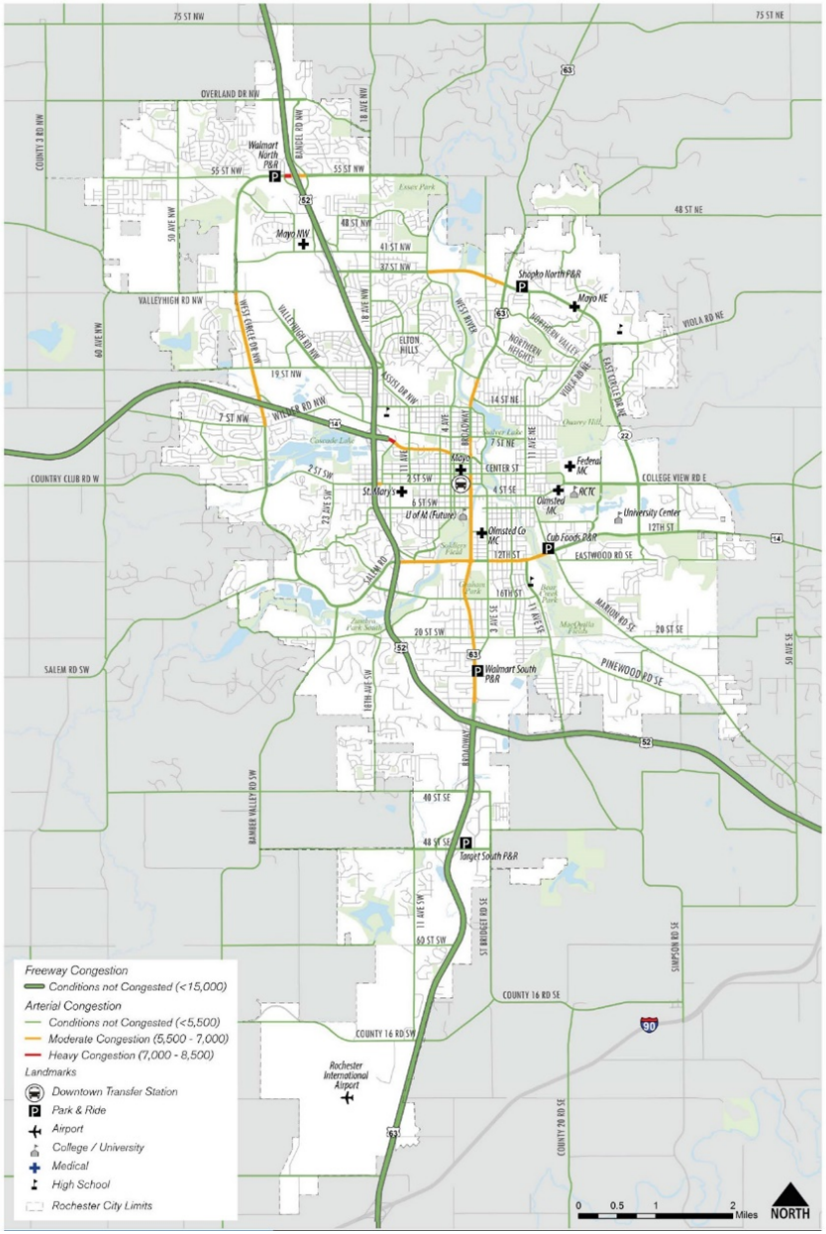
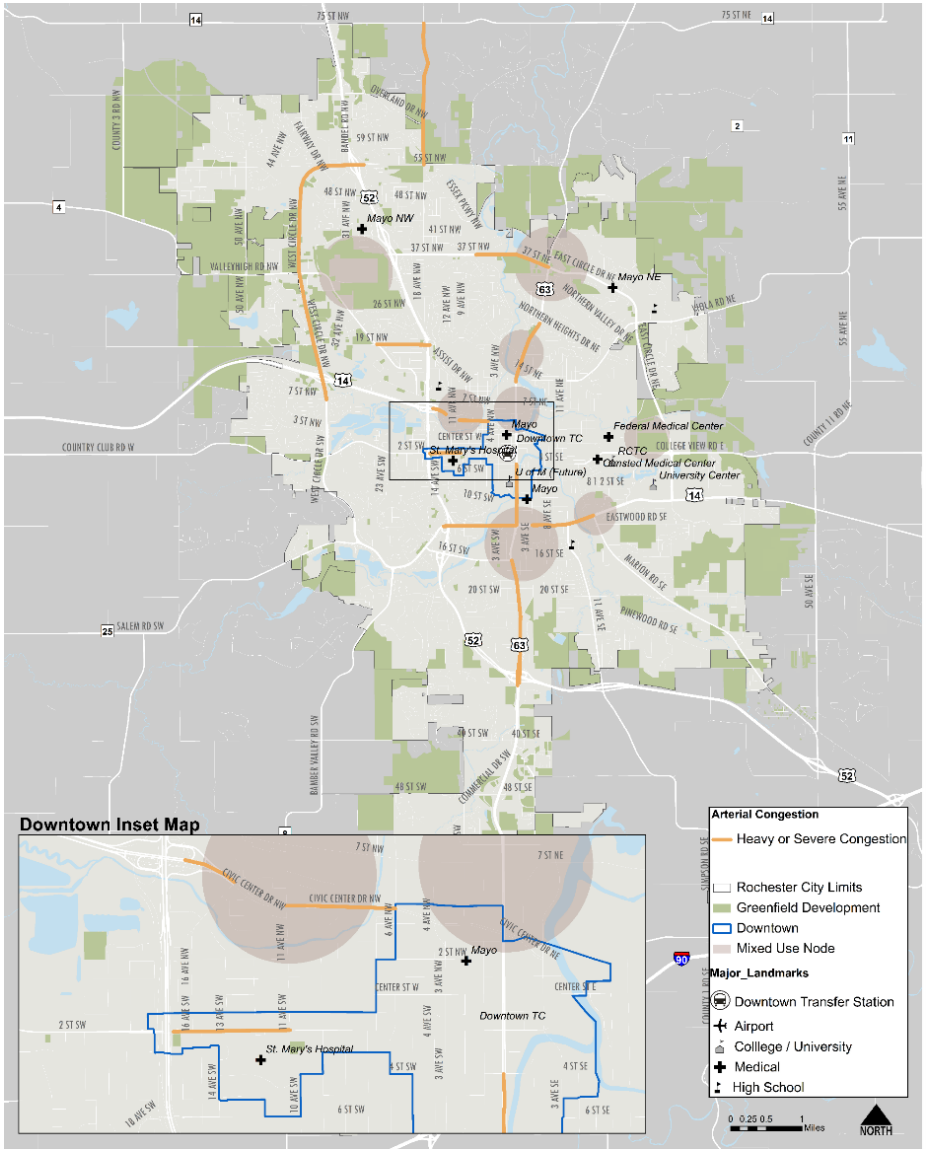


Figure 14-4: Corridors Projected to Experience Congested Travel, 2040 Conditions



most of the signal infrastructure in the urban area. The scope of the current system is illustrated in Figure 14-11.

E.2.3.2 Signal coordination

Figure 14-12 illustrates the arterial corridors in Rochester on which signal coordination has been established. Signal coordination can improve arterial function and discourage speeding on arterials while allowing motorists to make better time.

E.2.4 Policy guidance on access connections

Table 14-5 provides a set of general policy guidelines that establish benchmarks for the connection of driveways or new public roads (whether as part of a public project or private development) to the major street network in the ROCOG Planning Area. An important principle of connection management is to avoid, if possible, the connection of roadways or driveways that have significantly different functions and operating characteristics. For example, regulations should discourage the connection of private driveways to high mobility arterials or expressways.

These ROCOG guidelines are intended as a planning tool to inform decisions by local or state partners as to recommended policy on access connections, and will be most relevant 1) in the early stages of development review, 2) in early stages of project development projects, and 3) as the policy basis for a more specific access management regulation. Additional considerations related to permitting processes, variance procedures, review procedures and inspection/enforcement

Figure 14-11: Rochester Area Fiber Optic Cable (2020)

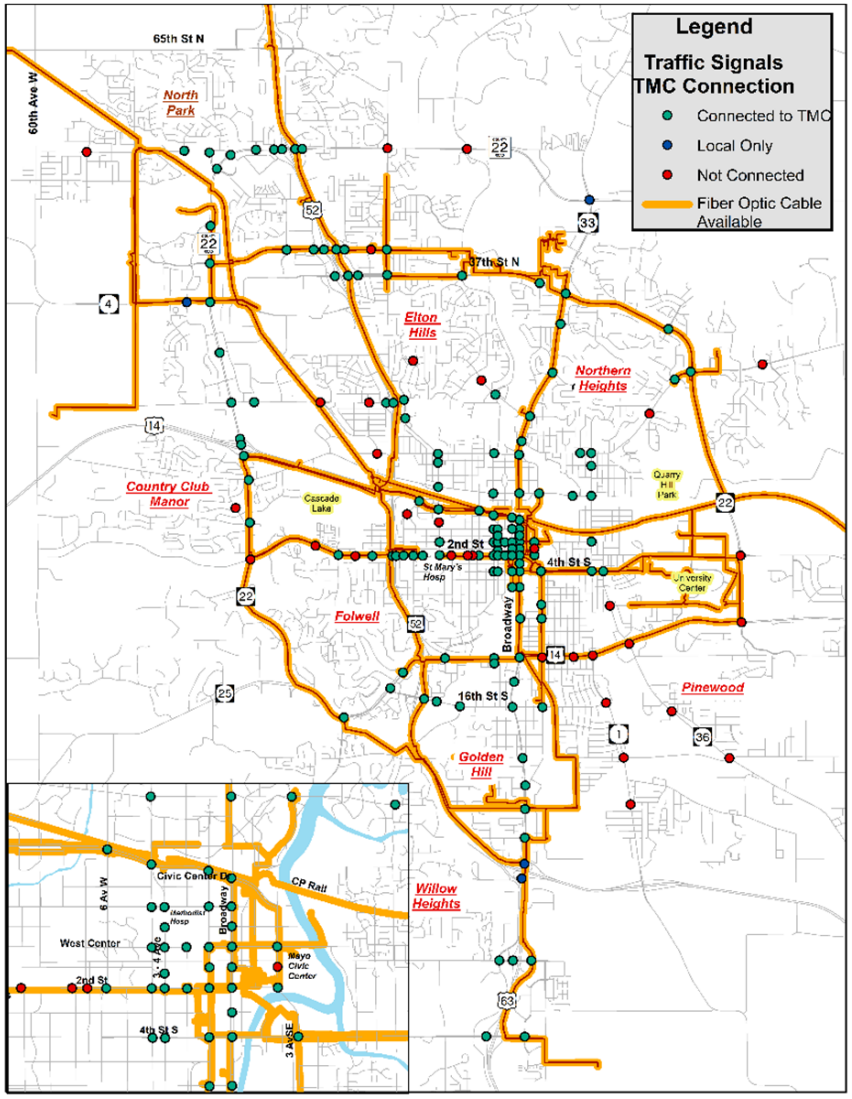


Figure 14-12: Signal Coordination in Rochester (2020)

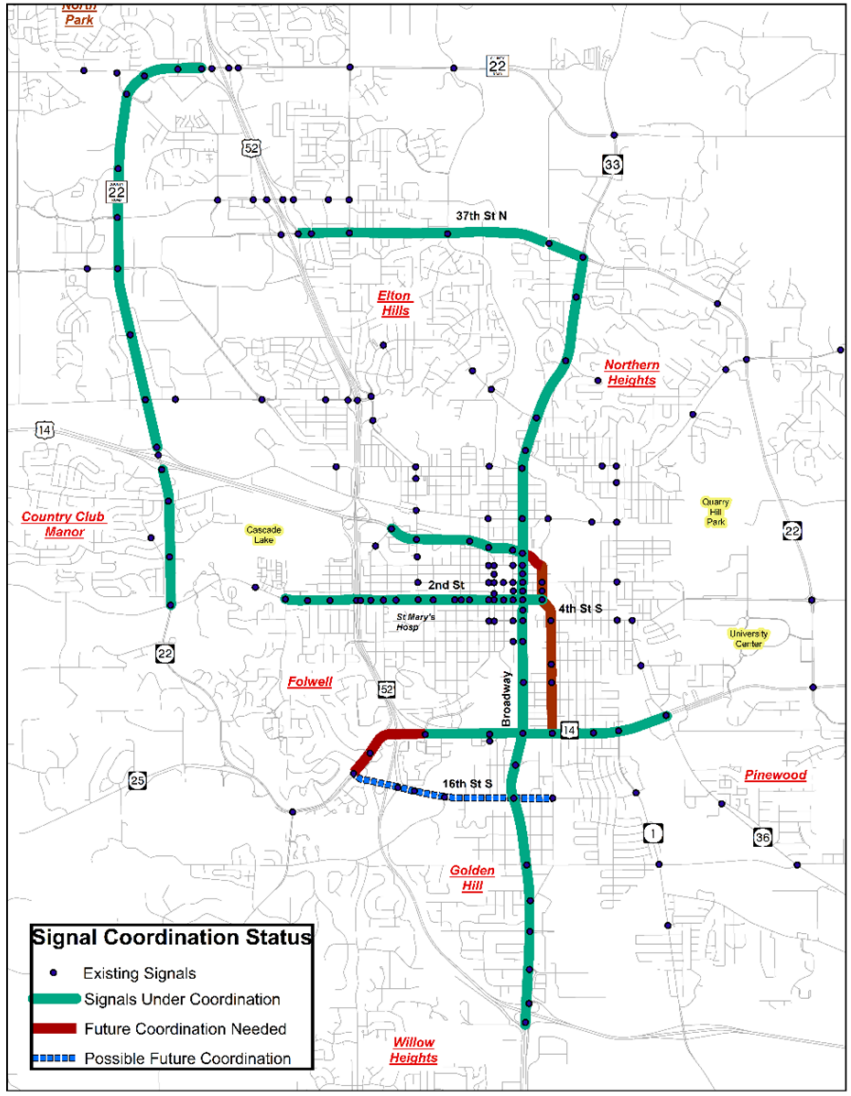


Table 14-5: Recommended Access Connection Policy

Roadway Classification	Major Highways (InT/InR/SA/MA)	Secondary Roads (ScA / PC)	Local Roads (Urban/Developing)	Local Roads (Rural / UIA)	Land Use Overlay Zone	Private Access - High (HV) & Medium Volume (MV)[1]	Private Access - Low Volume (LV) & Minimum Use (MU)[1]
Limited Access Roadways / Median Controlled							
Freeway	Connections Permitted Interchange Preferred; See Table 15-for spacing guidance	Direct Connection Not permitted; Overpass Preferred See Table 15-5 for spacing guidance	Connection Not Permitted	Connection Not Permitted	All	Connection Not Permitted	Connection Not Permitted
Planned Freeway	Connection Permitted; Full Median Opening; See Table 15-5 for recommended spacing; Interim Signals @ future interchange location	Interim Connection permitted; Full Median Opening with reversion to Directional median if safety/congestion problems develop; See Table 15-5 for recommended spacing	No new connections permitted; Existing connections permitted to remain on Interim basis with planning for closure	Reversion of Full Median Opening to Directional median or RI/RO if safety or congestion problems develop	All	Connection not permitted except on interim basis where no feasible alternative access exists	Interim access approval must include planning for closure to occur at time alternate access becomes available or when freeway is built
Expressway	Connection permitted via Full Median opening; Spacing of median openings consistent with Divided Roadway Median Opening Guidelines (Table 15-5) Signal spacing consistent with Table 15-6; Signalization only when warranted	Connection permitted via Full or Directional Median Opening; Spacing of median openings consistent with Table 15-5 Signalization permitted if consistent with guidelines of Table 15-6, otherwise reversion to Directional median if safety/congestion problems develop	Permitted if consistent with Local Street Spacing (Table 15-5) subject to finding that higher order road is not needed; Unsignalized with reversion to Directional Median unless location meets signal spacing guidelines (Table 15-6)	Permitted if consistent with Local Street Spacing (Table 15-5) subject to finding that higher order road is not needed; Signalization must be warranted	All	Generally not permitted; HV may be permitted in lieu of local road connection if consistent with Local Street Spacing (Table 15-5) on one leg of intersection subject to finding public street not needed; Unsignalized with reversion to Directional Median unless location meets signal spacing guidelines	Connections not permitted except on interim basis where no feasible alternative access exists; approval of interim access on planned expressway must include agreement for removal of access when local street system is completed or alternate access becomes available
Limited Access Roadways / Median Controlled (Continued)							
Other Regional Major Arterial	Same as Expressway (See Above)	Connection permitted via Full or Directional Median opening consistent with guidelines of Table 15-5; Signalization permitted if consistent with guidelines in Table 15-6 for signal spacing, otherwise reversion to Directional median if safety/congestion problems develop	Connection permitted subject to Divided Road Median Opening guidelines of Table 15-5 & subject to finding that major road not needed at location, Signalization permitted if consistent with Signal Spacing guidelines (Table 15-6); Reversion to Directional Median if signal not permitted	Not Applicable	All	Connection permitted subject to Divided Road Median Opening guidelines of Table 15-5 and subject to finding that public road not needed at location; Signalization permitted only if consistent with Signal Spacing Guidelines (Table 15-6); otherwise reversion to Directional Median or RIRO; Encourage joint access with adjacent properties	Connection not permitted if alternative access available; If no feasible alternative exists consider joint/shared access; Directional median if consistent with Median Opening spacing guidelines of 15-5, otherwise RI/RO
Other Urban Major Arterial							
Limited Access Roadways / Undivided							
Expressway	Connection permitted- Spacing of connections should be consistent with System Development Guidelines of in Chapter 11 Signalization should be consistent with signal spacing guidelines (Table 15-6)	Connection permitted Spacing of connections should be consistent with System Development Guidelines of Chapter 11 Signalization should be consistent with signal spacing guidelines (Table 15-6)	Connection permitted if consistent with Local Road Spacing Guidelines Table 15-5 Signalization of Local Street connections discouraged unless for School or Fire Station		Rural/UIA	Require access to lower level road if available; Otherwise, one access per parcel subject to road authority spacing for corner clearance/Driveway separation Traffic Signal if warranted and consistent with spacing guidelines (15-6)	Require access to lower level road if available, Otherwise one access per parcel subject to Corner clearance and driveway spacing requirements of local road authority
					All Urban		
Super Two					Rural/UIA		
					All Urban		
Main Street					CBD	Connection permitted subject to Driveway Separation & Corner	New connection not permitted; Require access to lower class street or alley

Roadway Classification	Major Highways (InT/InR/SA/MA)	Secondary Roads (ScA / PC)	Local Roads (Urban/Developing)	Local Roads (Rural / UIA)	Land Use Overlay Zone	Private Access - High (HV) & Medium Volume (MV)[1]	Private Access - Low Volume (LV) & Minimum Use (MU)[1]
						Clearance requirements of local road authority.	
Other Regional Major Arterial					Urban Zones	Connection permitted subject to Driveway Separation & Corner Clearance requirements of local road authority. Signalization if warranted consistent with spacing guidelines (Table 13-5)	Require access to lower level road if available; Otherwise one access per parcel subject to Corner clearance and driveway spacing requirements of local road authority
Other Urban Major Arterial					Urban Zones		
Other Urban Roadways							
Regional Secondary Arterials	Connection permitted Signalization controlled by spacing guidelines for major highway	Connection permitted Subject to consistency with System Development Guidelines of Chapter 11 Signalization only if warranted	Connection permitted Subject to Local Road / Driveway Separation / Corner Clearance requirements of local road authority Traffic Signals discouraged	Connection permitted Subject to Local Road / Driveway Separation / Corner Clearance requirements of local road authority Traffic Signals discouraged	All Urban	Connection permitted Subject to Local Road / Driveway Separation / Corner Clearance requirements of local road authority)	Require access to lower level road if available; Otherwise one access per parcel subject to corner clearance guidelines of local road authority
Urban Secondary Arterials					All Urban		
Regional Primary Collectors					All Urban		One access per parcel subject to minimum driveway spacing / corner clearance requirements of local road authority
Urban Primary Collectors					All Urban		
Other Rural Area Roadways							
Regional Major Arterials	Connection permitted Signalization only when warranted and only on a Major Arterial	Connection permitted Subject to consistency with System Development Guidelines of Chapter 11 Signalization Discouraged	Not Applicable	Connection permitted Subject to Local Road / Driveway Separation / Corner Clearance requirements of local road authority	Rural/UIA	Connection permitted Subject to Local Road / Driveway Separation / Corner Clearance requirements of local road authority)	One access per parcel subject to minimum driveway spacing / corner clearance requirements of local road authority On Reg. Major Arterial if frontage < spacing req. consider joint/shared access. On all roadways require access from lower level road if available
Regional Secondary Arterials					Rural/UIA		
Regional Primary Collectors					Rural/UIA		

FOOTNOTES
(1) Volume Ranges for Private Access Connections: High (HV) > 1500 ADT; Medium (MV) 500-1500 ADT; Low (LV) 50-500 ADT; Minimum Use <50ADT
(2) If Driveway Separation requirements cannot be met use of joint or shared access to obtain spacing should first be investigated to determine feasibility

are needed at the jurisdictional level for a full-fledged access management program. It is important to note that while these guidelines are comprehensive, final spacing of medians and driveways will need to be resolved on an individual basis using accepted engineering and planning principles.

The basis on which the guidelines have been established is by roadway classification and median character. References to other guidelines in the plan inform the connection policies, such as recommended the spacing of median openings, local streets connections or traffic signal spacing. The guidelines do not address the specifics of access design such as grades, sight distance, driveway or roadway widths or vehicle storage needs.

E.2.4.1 Core access management strategies

In applying the access management policy guidance found herein, ROCOG will work with its partner road agencies to apply the policies through the following five core strategies:

- **Strategy 1:** Preserve the integrity of the major street system with an effective program for managing the frequency of access connections along major street corridors. Plan new higher volume connections to existing arterials at locations where the spacing of traffic signals will preserve two-way traffic progression.
- **Strategy 2:** Coordinate access and development during the zoning and platting process. Coordinate zoning and subdivision reviews with staff responsible for access permitting as early as possible in the development permitting process to minimize later issues when access permits applications are filed.
- **Strategy 3:** Include connection and spacing recommendations as part of all corridor management or congestion mitigation plans. Median treatments, road connection priorities and use of signalization should always be a consideration in these plans.
- **Strategy 4:** Use connection and spacing guidelines in rural areas to balance land use objectives with the primary function of major roads as important regional travel corridors.
- **Strategy 5:** Acquire access control rights consistent with the connection and spacing guidelines of this plan or local access management ordinance requirements when purchasing right of way for future major street construction.

E.2.5 Traffic operations planning

A second layer of advanced planning guidance relates to decisions that will have impact on future traffic operations planning related to the placement of traffic signals and control of the median. This guidance will influence efforts to establish signal coordination along a corridor as well as factoring into safety based on management of median openings.

Decisions regarding future signal locations and the nature of median openings should be considered at all levels of planning, including during network plan development and as part of corridor/subarea studies.

Traffic signal spacing should be related to the desired operating speed for the corridor. Signal spacing criteria should take precedence over unsignalized spacing standards in situations where future signalization is likely.

In general, traffic signals should not be installed on high-speed corridors in rural locations. Isolated signals in rural locations are inconsistent with the function and expected performance of the highway. Rural traffic signals are unexpected by the motorist who is unfamiliar with the location, requiring longer than normal time for drivers to react.

E.2.5.1 Median opening and signal spacing guidelines

ROCOG and its partners will use the guidelines in Tables 14-6 and 14-7 as minimum benchmarks for the location and design of major street system connections during network planning as well as corridor or subarea studies. It is important to note that while these guidelines are comprehensive, final spacing of medians and signal installation will need to be resolved on an individual project basis using accepted engineering and planning principles.

Table 14-6 includes spacing guidelines for interchange, median openings, and public street connections to major streets. These spacing guidelines identify minimum separation standards for different types of connections, which will improve safety and traffic flow by reducing the number of conflict points through separation of areas where drivers are entering, existing, weaving, or crossing opposing traffic streams. Spacing standards also should provide adequate sight distance and reaction time for motorists in general.

Table 14-6 includes guidelines for traffic signal spacing on different classes of roadways. Spacing between traffic signals is a strategy employed to preserve Level of Service (LOS) of the roadway segment. Optimum signal spacing will provide for greater signal progression and higher arterial speeds. Long and uniform spacing can more efficiently accommodate varying traffic conditions during peak and off peak and are essential to an effective traffic management program. See Chapter 10 for a description of roadway classification and land use context as used on the Functional Designation Map of this plan.

Table 14-6 includes three subsections establishing guidelines for the spacing of different types of connections to the major roadway network. Table 14- 6(A)provides guidelines for interchange and overpass spacing along freeways and planned freeways. Table 14- 6(B) provides guidelines for the spacing of full and restricted median openings along the various types of divided highways. Table 14-6(C) provides guidelines for the minimum spacing of local public streets along major roadways.

Table 14-7 describes recommended signal spacing for different classifications of roadways and land use environments. Roadway classifications are listed down the left column and land use context zone classifications across the top of the table.

Spacing should be measured from center of intersection to center of intersection, though distances may vary by up to 200 feet without having a significant effect on the ability to establish traffic flow progression (the key goal of this guideline).

Table 14-6: Interchange, Median Opening, Local Public Street Spacing

Interchange and Overpass Spacing

	Land Use Overlay Zone				
Road Classification	**Rural**	**Rochester Developing**	**Rochester Urban/Core**	**Small City Developing**	**Small City Urban/Core**
Freeway Interchange	4-6 mi	1-2 mi	1 mi	2-3 mi	1-2 mi
Freeway Overpass	2-3 mi	1 mi	1 mi	1-2 mi	1 mi

Divided Roadway Median Spacing

	Full Median Opening			Directional Median Opening			Right-In/Right-Out	
Road Classification	**Rural**	**Developing/ Urban**	**Urban Core CBD**	**Rural**	**Developing/ Urban**	**Urban Core CBD**	**Developing/ Urban**	**Urban Core CBD**
Planned Freeway	1 mi	1/2 mi	NA	1/2 mi	1/4 mi	NA	1/8 mi	NA
Expressway	1/2 mi	1/2 mi	1/4 mi	1/4 mi	1/4 mi	1/8 mi	1/8 mi	Local Ordinance
Other Regional Arterial	NA	1/3 mi	1/8 mi	NA	1/8 mi	330 ft	Local Ordinance	Local Ordinance
Other Urban Arterial	NA	1/4 mi	1/8 mi	NA	1/8 mi	330 ft	Local Ordinance	Local Ordinance

Local Public Street Spacing [(1)(2)]

Road Classification	**All Urban Local Street Spacing (ft)**	**Rural Local Street Spacing (ft)**
Interstate/Interregional:	**See MnDOT Access Management Policy for spacing requirements**	
Strategic Arterial	1320	2640
Regional Major Arterial	880	2640
Urban Major Arterial	660	NA
Secondary Arterial	480	1320
Primary Collector	330	1320
Local Collector	X	X

NOTES

(1) Adequate Stopping Sight Distance and Intersection Sight Distance should be provided at all connections points.

(2) Local Streets and Low to High Volume driveways should be aligned with connection points on the opposite side of the roadway or offset a minimum distance as defined in the following table.

Posted Speed	**30 MPH**	**35 MPH**	**40 MPH**	**45 MPH**	**>45 MPH**
Desirable Offset: Local Street or High Volume Driveway Access	300 ft	425 ft	525 ft	630 ft	750 ft
Desirable Offset: Low Volume or Moderate Volume Driveway Access	150 ft	200 ft	250 ft	300 ft	400 ft

Table 14-7: Spacing Guidelines for Signalized Intersections

Note: In practice, signals must also meet warrants for signalization

	Land Use Overlay Zone			
Road Classification	**Rural**	**Urban Edge Areas**	**Urban/Urban Core Areas**	**CBD Areas**
Limited Access Roadways/Median Controlled (1)				
Freeway	NA			
Planned Freeway	Interim only; only if warranted/2 miles	Interim only/1 mile	NA	NA
Expressway	Only if warranted and all other options exhausted / 1 mile	1 mile	1/2 mile - Urban Area 1/4 mile - Urban Core	1/8 mile
Other Regional Major Arterial	NA	1/2 mile	1/4 mile	NA
Other Urban Major Arterial	NA	1/2 mile	1/4 mile	1/8 mile
Limited Access Roadways/Undivided (1)				
Expressway	Only if warranted and all other options exhausted / 2 miles	1 mile 1 mile	1/2 mile NA	1/8 mile NA
Other Regional Major Arterial	1 mile	1/2 mile	1/4 mile	1/8 mile
Other Urban Major Arterial	1 mile	1/2 mile	1/4 mile	1/8 mile

Other Urban Roadways

Regional Secondary Arterials Urban Secondary Arterials Regional Primary Collectors Urban Primary Collectors	Signals spacing at intersections with major roads controlled by major road signal spacing; other locations only where warranted.

Other Rural Area Roadways

Regional Major Arterials	Signals only considered when other options ineffective and signal must be warranted
Regional Secondary Arterials Regional Primary Collectors	Use of traffic signals highly discouraged on regional secondary arterials or primary collectors in rural areas; evaluate other options first

(1) A signalized intersection location may deviate from the ideal location without detailed analysis if within a distance from the preferred location as specified in the table below. Where a proposed distance is offset by a greater distance, an analysis should be conducted demonstrating that minimum bandwidth expectations can be met.

Road Classification	Permissible Offset	Minimum Bandwidth Peak Period	Minimum Bandwidth Off-Peak Period
Interregional	100 ft	50%	50%
Strategic Arterial	150 ft	45%	40%
Major Arterial	200 ft	40%	35%

E.2.5.2 Level of Service (LOS) guidelines

LOS measures the quality of service provided by a roadway facility; that is, the user's perception of how well a transportation service or facility operates. LOS measurement is tied to a rating scale ranging from A (very high level of satisfaction with freely moving traffic) to F (very poor quality with near gridlock conditions).

ROCOG recommends use of the Highway Capacity Manual as the primary methodology for assessing LOS. ROCOG will use and encourage its partners to use Table 14-8 to define the minimum operating conditions that should be maintained for the predominant peak or off-peak direction of traffic flow in planning, project development, and the review of private development proposals. Use of the term "Maintain" means operating conditions are preserved at or above the existing level of service through immediate or future improvements in areas where existing service levels are already below the standards in the table.

Table 14-8: Level of Service Guidelines for ROCOG Area

Subarea Land Use Zone	Land Use Area	Functional Designation (1)	Peak Period LOS	Mid-Day LOS	Existing Substandard LOS
CBD	Rochester	InT/InR/SA	Mid-D	C/D	Maintain
	Rochester	MA/ScA	Mid-D	C/D	
	Rochester	PC/LC	D/E	Mid-D	
Urban Core	Rochester	All roadways	Mid-D	C/D	Maintain
	Small City				
Urban	Small City	All roadways	C/D	B/C	
	Rochester	All roadways	C/D	Mid-C	
Urban Edge	Small City	All roadways	Mid-C	B/C	
	Rochester	All roadways	C/D	Mid-C	
Urban Influence Area	Rochester	All roadways/2035	B/C	Mid-B	
	Rochester	All roadways/2021	Mid-C	B/C	
Rural	All	All roadways	B/C	Mid-B	

(1) All roadways - guideline refers to all classes of roadways
InT/InR/SA - guideline refers to Interstate, Interregional, Strategic Arterials
MA/ScA - guideline refers to Major Arterials, Secondary Arterials
PC - guidelines refers to Primary Collectors