



STAFF REPORT

DATE: June 11, 2019

DISCUSSION

AGENDA ITEM: Street Widths and Parking

SUBMITTED BY: Kristina Handt, City Administrator

BACKGROUND:

At the April work session, council began reviewing street width and parking standards. Some examples from other cities were provided. Council asked for more examples and asked that other departments (public safety, engineering, planning, and public works) weigh in.

2018 Engineering Design Standards for Lake Elmo

Geometric Design, Local Residential Street

- Minimum Street Width (B-B), parking both sides28-feet
- Minimum Street Width (B-B), parking one side (when allowed by City).....24-feet
- Minimum Street Width (B-B), no parking (when allowed by City).....22-feet

ISSUE BEFORE COUNCIL:

Does the Council have any further questions regarding street widths and parking requirements? Should the Engineering Design Standards for Lake Elmo be updated or do they remain appropriate?

PROPOSAL DETAILS/ANALYSIS/OPTIONS:

Engineering staff has gathered the following examples:

City of Woodbury.

Residential: 28 feet F-F, 60-foot R/W. Parking allowed on both sides.

All other roads. In accordance with Roadway Design Principals Report (per detailed Task Force Study).

City Engineer Griffin did speak directly with Woodbury for verification since their Code/Road Design Principals on the website are somewhat confusing. Woodbury does use 28 feet wide roads with parking on both sides. They measure the width from face of curb to face of curb (Lake Elmo uses back of curb to back of curb) so their road is technically 1-foot wider than Lake Elmo. They do not change this standard for medium or higher density land uses. Their Fire Chief supports this width and was part of the task force when they established their standards back in 2010. They believe that this street width is ideal to balance emergency access and controlling speeds on residential streets. They said they receive about 5-6 requests per year from residents to restrict parking along one side, usually around park areas, townhome areas, etc. and that in the last six years they have denied all requests. They rely on the Winter Parking Regulations to allow crews to clear the streets

City of Eagan.

Low Density Residential: 28 feet F-F, 50-foot R/W (no sidewalks). Parking allowed on both sides.

Medium Density Residential: 32 feet F-F, 60-foot R/W. Parking allowed on both sides.

High Density Residential: 36 feet F-F, 60-foot R/W. Parking allowed on both sides.

City of Inver Grove Heights.

Urban Local Streets: 28 feet F-F, 60-foot R/W. Parking allowed on one side only.

Urban Local Streets: 36 feet F-F, 60-foot R/W. Parking allowed on both sides.

City of Eden Prairie.

Residential: 28 feet B-B, 50-foot R/W. Parking allowed on both sides.

Collector: 32 feet B-B, 60-foot R/W. Parking allowed on both sides.

Industrial: 37-52 feet B-B, 70-100 foot R/W. Parking allowed on both sides.

Commercial: 52 feet B-B, 100-foot R/W. Parking allowed on both sides.

City of Oakdale. Street width and pavement section = function of traffic volume and parking demand (Table in Design Stds manual)

Local Residential (0-2,000 ADT): 28 feet F-F, 50-foot R/W. Parking allowed on both sides.

Local Residential (0-2,000 ADT): 24 feet F-F, 44-foot R/W. No Parking.

Local Residential (2,000-3,000 ADT): 32 feet F-F, 60-foot R/W. Parking allowed on both sides.

Local Residential (2,000-3,000 ADT): 28 feet F-F, 50-foot R/W. No Parking.

City of Cottage Grove.

Local Residential Std: 22 feet F-F, 50-60 foot R/W. No Parking.

Local Residential Std: 28 feet F-F, 60-foot R/W. Parking allowed on one sides.

Local Residential Std: 32 feet F-F, 60-foot R/W. Parking allowed on both sides.

City of Victoria.

Residential: 28 feet B-B, 60-foot R/W. Parking allowed on both sides.

City of Maplewood.

Adopted a "Living Streets" Policy that addresses many specific conditions/options (see attached Local Street options PDF).

1. Parking should be provided along one side of the street. Studies have shown that for a typical residential street, making provisions for parking along both sides is excessive, and the parking capacity is underutilized.

2. Sidewalks should be considered along one side of each local street. However the need would be determined based on a context sensitive application. City Code requirements shall be followed where they are more prescriptive than the Living Streets Policy (i.e. requirements for sidewalks on both sides of the street in the Mixed-Use Zoning District).

3. If a sidewalk is not provided, the street pavement width should be wider to accommodate a shared purpose of bikes/pedestrians along the street edge.

4. For streets where a sidewalk is deemed applicable, options could be provided to install sidewalk along one or both sides of the street.

5. Sidewalks would be required if the street abuts or is in the vicinity of a school or park, is identified with a sidewalk in the Comprehensive Plan, or is part of a larger network of pedestrian routes.

Local Residential Option 1: 26 feet F-F, 60 foot R/W. Sidewalk on one-side. Parking allowed on one side. 24 feet F-F may be considered in appropriate context.

Local Residential Option 2: 26 feet F-F, 60 foot R/W. Sidewalk on both sides. Parking allowed on one side.

Local Residential Option 3: 28-30 feet F-F, 60 foot R/W. Additional pavement width for bike lane. Parking allowed on one side.

Local Connector Street. 28 feet F-F, 60 foot R/W. Sidewalk on one or both sides. Parking allowed on one side.

Local Residential: Code language = The roadway width design shall take into account but not be limited to the design speed; desired level of service; average annual daily traffic; heavy commercial average daily traffic; peak hour traffic volume; access requirements; intersection frequency; and design, parking, topography, and available right-of-way.

Local streets shall be 32 feet F-F. The city council may approve 28 feet F-F in special cases when requested.

Cities with 32 feet street widths for local residential.

Stillwater, Maplewood, Savage, Hopkins, Bloomington, Savage.

Note.

- B-B = as measured from back of curb to back of curb. This would be 1-foot narrower than as measured from F-F.
- F-F = as measured from face of curb to face of curb.

Chief Malmquist provided information on fire apparatus access roads which is an optional appendix to the state fire code. City Code Section 151.041 was amended in 2016 to include the adoption of Appendix D: Fire Apparatus Access Roads.

 **§ 151.041 FIRE PREVENTION AND PROTECTION.**

(A) *State fire code adopted.* The Minnesota State Fire Code, as adopted by the Commissioner of Labor and Industry pursuant to M.S. Ch. 299F.011, including all of the amendments, rules and regulations established, and appendix chapters as outlined below, adopted and published from time to time by the Minnesota Commissioner of Public Safety, through its fire marshal division is hereby adopted by reference and incorporated in this section as completely as if set out in full. A person desiring a permit as required by the Minnesota State Fire Code shall submit an application to the Fire Code Official along with any fee required by the city fee schedule.
2017 S-10

(B) *Appendix chapters adopted.* The following appendix chapters as identified in the Minnesota State Fire Code are hereby adopted and incorporated:

- (1) Appendix C: Fire Hydrant Locations and Distribution;
- (2) Appendix D: Fire Apparatus Access Roads;
- (3) Appendix H: Hazardous Materials Management Plan (HMMP) and Hazardous Materials Inventory Statement (HMIS) Instructions;
- (4) Appendix I: Fire Protection Systems—Noncompliant Conditions;
- (5) Appendix K: Fires or Barbeques on Balconies or Patios; and
- (6) Appendix L: Emergency Responder Radio Coverage.

(C) *Use of the terms of the Fire Code.* Wherever the word “jurisdiction” is used in the Minnesota State Fire Code, it shall mean the City of Lake Elmo. Where the term “fire code official” is used in the Minnesota State Fire Code, it shall mean the city’s Building Official.

(D) *Duties and responsibilities of the Fire Code Official.* The Fire Code Official or his or her authorized representative shall have the following duties and responsibilities:

- (1) Enforcement of the provisions of this section;
- (2) May order the establishment of fire lanes on public or private property as may be necessary in order to ensure that the travel of fire equipment is not be impeded or interfered with, and that access to fire hydrants and buildings is not blocked off. When a fire lane has been ordered to be established, it shall be marked by a sign bearing the words “No Parking - Fire Lane” or a similar message. If the sign is in private property, it shall be erected and maintained by the property owner at the property owner’s expense. Such sign must be installed within 30 days after notification by the Fire Code Official that a fire lane must be established. Thereafter, no person shall park a vehicle or otherwise occupy or obstruct the fire lane; and

(3) Keeping on file with the city all statutes and regulations applicable to this section.
2017 S-10

(E) *Fire inspections.* In order to ensure the health, safety, and public welfare, the city will inspect existing facilities in accordance with established policy. A fire service fee will be charged in accordance with the city’s fee schedule for new construction, additions and alterations where a building permit is required.

(F) *Lock boxes*. Lock boxes are required on all new commercial structures in the city. They shall meet the following requirements:

(1) The lock box must be mounted in an easily accessible location near the main entrance of the structure or as otherwise approved in writing by the Fire Chief;

(2) The lock box must contain all keys necessary to gain access to the commercial structure as well as access to interior areas of the structure; and

(3) The Fire Chief must be contacted when access to a lock box is requested by the property owner in order to change keys for various building locks.

(G) *Hazardous material list*. With respect to commercial properties, the property owner must provide the Fire Chief with the following information related to hazardous materials and chemicals on the property. This information must be updated annually and when shipments of new or seasonal hazardous materials or chemicals are received on the property.

(1) A list of all hazardous materials and chemicals stored in the structure(s) and on the property;

(2) A drawing to scale which provides the quantities of the materials and chemicals; and

(3) A material data sheet for each hazardous material or chemical.

(Ord. 97-118, passed 4-1-2003; Am. Ord. 08-147, passed 7-19-2016) Penalty, see § [10.99](#)

FISCAL IMPACT:

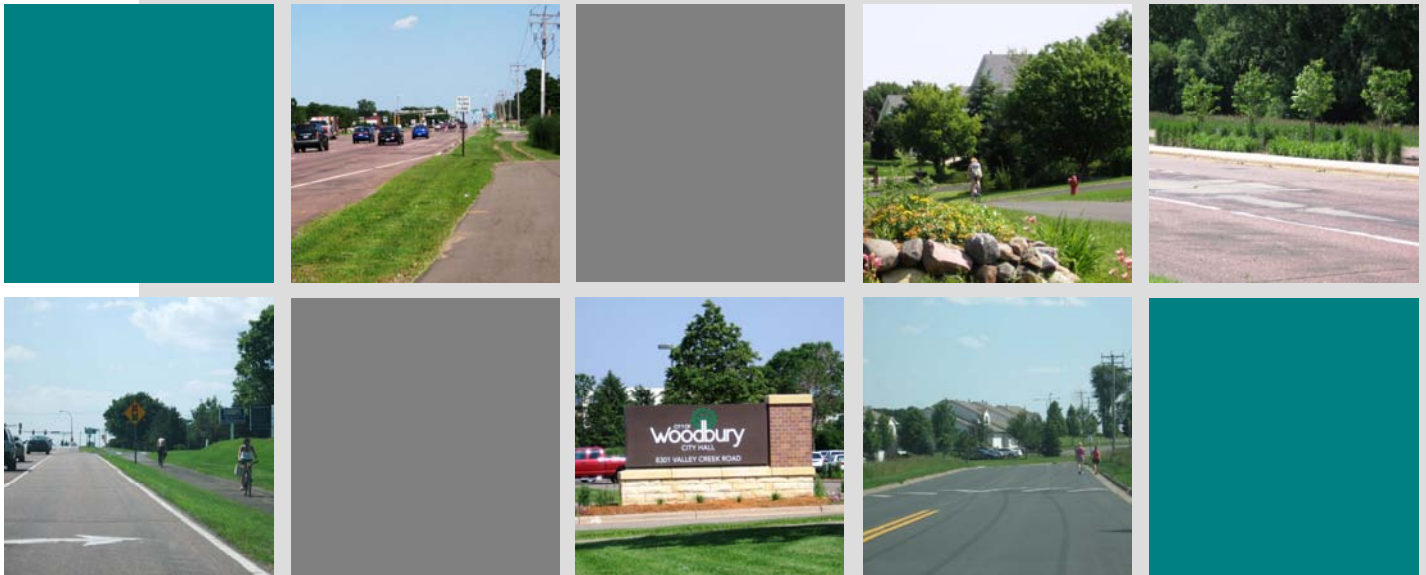
As noted previously, increasing residential street widths increases the cost of maintenance (seal coating, mill and overlay, reconstruction, etc.) and impact storm water runoff and collection which comes with increased costs.

ATTACHMENTS:

- Woodbury Road Design Principals
- Maplewood Living Streets Policy
- Fire Apparatus Access Roads

REPORT AND RECOMMENDATIONS

ROADWAY CORRIDOR
DESIGN PRINCIPLES
TASK FORCE REPORT



“First we shape our public spaces, and then our public spaces shape us.” - Winston Churchill

City of Woodbury, Minnesota

July 2009
Project No. 13949.000



ACKNOWLEDGMENTS

The contributions of the following to the Task Force are acknowledged and appreciated:

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2. Table A-1: Decision Matrix for Selecting Corridor Designs with Dedicated Turn Lanes
3. Technical Memorandum 1: Definition of Speed Related to Roadways
4. Pros and Cons of Capping Corridors
5. City-wide Corridor Map
6. Corridor Design Guidelines

I. EXECUTIVE SUMMARY

This Report presents the work and recommendations of Woodbury’s Roadway Corridor Design Principles Task Force (DPTF). Many of the recommendations have been incorporated into the City’s 2030 Transportation Plan and Comprehensive Plan.

In an effort to better align roadway corridor design and construction practices with the City’s values and emphasis on all users and stakeholders, an interdisciplinary task force of City staff from the Community Development, Public Works, Parks, and Public Safety Departments, as well as the City’s Administrator and Sustainability Coordinator was formed. The Roadway Corridor DPTF report was developed as a result of over two years of work by this group.

The Task Force sought to balance four significant goals in roadway corridor design. Traditionally, roadway design has been based on the twin principles of safety and mobility. As Woodbury has continued to mature and seek a leadership role in areas of quality of life, those two principles alone are insufficient to capture all the aspects that today’s roadway design needs to encompass. After extensive discussions with the Design Principles Task Force, it became clear that two more principles besides safety and mobility need to be added - sustainability and livability. Therefore, the City’s more complete list of design principles is as follows:

- Mobility
- Safety
- Sustainability
- Livability



The Task Force’s discussions utilized principles from the Context Sensitive Solutions (CSS) approach that is increasingly utilized by transportation authorities. The CSS approach and guidelines are described in detail in the Transportation Chapter of the City’s Comprehensive Plan.

The Task Force developed twelve design templates for the City’s roadway corridors, and recommendations regarding the elements of the templates and how to use them in corridor design. The Task Force compared the proposed templates to the City’s existing roadway design standards, and found that the proposed templates provide a better balance among the four design principles.

The approach used differed in significant ways from traditional approaches to roadway design, including the following:

- The smallest size corridor necessary to meet functional requirements and to accommodate projected traffic will be the starting point for roadway design on City, County, and State projects;
- As a design feature, four-lane undivided roadways have been replaced with a 3-lane design with center turn lane, which functions as well for mobility but reduces the pavement area. Three lane sections also typically have many fewer crashes when compared to four-lane undivided roadways. The City should study whether or not existing four-lane undivided sections could be converted to 3-lane sections;
- Minimizing the crossing width for pedestrians to the degree possible;
- Including flexibility in the designs to add transit or other alternatives in the future; and
- Including pedestrian and bicycle facilities and landscape elements as integral components of each of the roadway templates, but not necessarily including on-street bicycle lanes. On-street bicycle lanes and bicycle routes will be evaluated on a case by case basis on City roads as part of the preliminary engineering report.

This Report presents the conclusions of the DPTF, the proposed roadway corridor templates, an updated plant schedule for corridors, and a variety of supporting materials that provide detail on the Task Force process and conclusions.

II. INTRODUCTION AND INITIATION OF THE TASK FORCE

The City of Woodbury updated its 2030 Transportation Plan in –2008, with formal approvals expected from the Metropolitan Council in late 2009. As a part of this effort, the City created an interdisciplinary Roadway Corridor Design Principles Task Force (DPTF) to work concurrently with the Technical Advisory Panel (TAP) for the Transportation Plan update. The DPTF included staff from the City’s Engineering and Public Works Department, Community Development Department, Parks and Recreation Department, Public Safety Department, the City Administrator, and Sustainability Coordinator.

The DPTF met numerous times during 2007 and 2008, and completed the following:

- Reviewed engineering, environmental, aesthetic, and other roadway corridor design criteria, and determined that four criteria should be used to develop design templates for roadway corridors in Woodbury - mobility, safety, sustainability, and livability.
- Completed design templates for roadway corridors within the City that would address the City’s goals and criteria. The templates include recommendations for roadway elements, bicycle and pedestrian elements, landscaping, and right-of-way requirements.
- Completed additional recommendations for the design of new roadway corridors or redesign of existing corridors.

The Task Force presented the templates and its recommendations to the City’s Sustainability Committee, the TAP for the Transportation Plan update, Comprehensive Plan Task Force, and the City Council. The final recommendations and templates are referenced in the City’s 2030 Transportation and Comprehensive Plan.



III. TASK FORCE MISSION AND OBJECTIVES

The mission of the Roadway Corridor Design Principles Task Force was to provide design guidance for the City's roadway corridors - particularly collector and arterial corridors, "neighborhood collectors" and "commercial collectors". The City recently completed an update of the design template for local streets. Based on early discussions, the Task Force determined that it would focus on the following:

- The Task Force would develop "design templates" for each of the roadway corridor types expected within the community by 2030. Template elements that were considered included:
 - Medians
 - Shoulders
 - Driving lanes
 - Turn lanes
 - Trails and sidewalks
 - Transit lanes
 - Boulevards
 - Utility areas
 - Landscaping
- The corridors would be multi-modal: accommodating travel by auto, bicycles, pedestrians, and transit. The corridors should be designed to maximize landscaping opportunities to soften and mitigate "hardscape" impacts of a roadway system. The corridors may need to accommodate future transportation technologies as well. The corridors would incorporate the City's proposed Corridor Design Guidelines for landscaping.
- The Task Force's discussions utilized principles from the Context Sensitive Solutions (CSS) approach that is increasingly utilized by transportation authorities. These principles include an interdisciplinary team approach to planning and design; attention to community values and qualities including environment, scenic, aesthetic, and natural resources as well as safety and mobility; and objective evaluation of a full range of alternatives. The CSS approach and guidelines are described in detail in the Transportation Chapter of the City's Comprehensive Plan.
- The Task Force would balance several factors in developing the design templates for the corridors:
 - Mobility
 - Safety
 - Sustainability
 - Livability



The Task Force developed informal definitions of each of these factors, which are summarized as follows:

- *Mobility*: the ability to move traffic efficiently, easy route finding, good alternatives available; low congestion.
- *Safety*: avoid crashes and injuries for all corridor users and consider the safety of motorists who inadvertently leave the roadway.
- *Sustainability*: Woodbury’s City Council has identified sustainability as a critical success factor for the community. The City’s Comprehensive Plan states that “The degree that a transportation system is sustainable is determined by its ability to simultaneously accomplish the following objectives:
 - Optimize the transportation system to meet the current and future transportation needs of users of the system in a safe, effective, and economically efficient manner;
 - Provide and promote alternative modes of travel;
 - Minimize the consumption of natural resources;
 - Minimize environmental, economic, and social impacts;
 - Promote active and healthy lifestyles; and
 - Support socially cohesive neighborhoods and an economically vibrant community.
- *Livability*: sensitivity to context; impacts to surrounding land uses; minimize noise; focus on aesthetics, quality design; roadway function as community gateway and experience; roadway function as a connector of neighborhoods for motorists, pedestrians, and bicyclists alike; maximizes opportunities for landscape elements.



The

Task Force developed definitions and designs for two new types of roadway corridors within the community - “neighborhood collectors” and “commercial collectors.”

- “Neighborhood collectors” are roadways that normally have a functional classification of “local”, but serve to collect and distribute other residential and road traffic to the collector and arterial system.
- “Commercial collectors” are roadways that may have functional classification of “local” or “collector.” These roadways are in commercial districts and used exclusively to provide access to/from commercial businesses.

The Task Force philosophy is very similar to the philosophy embraced by the National Complete Streets Coalition. More than 50 jurisdictions in the United States, including states to small towns, have adopted the Complete Streets policies. These policies emphasize that a complete street is a roadway designed for multiple users - drivers, bicyclists, transit, and pedestrians of all ages and abilities. The concept focuses on changing the design and decision-making process so that all users are considered during the planning, design, building, and operation of all roadways. Mn/DOT is currently working on a feasibility report for Complete Streets in the State of Minnesota, with delivery expected to the legislature in late 2009. Marc Briese, the City’s Transportation Engineer, sits on the Technical Advisory Panel for the feasibility report.

The Task Force also noted that some issues related to transportation corridors in Woodbury would be addressed by others working on the Transportation Plan. These issues were referred to others:

- Transit - the DPTF included space within some of the templates for potential future transit facilities. Needs and options for transit and potential City roles in providing transit are considered in the Transportation Plan.
- County and State-managed corridors - the DPTF determined that it will develop design templates that best meet the City’s vision for the future. The City will discuss the proposed templates with Washington County and Mn/DOT, and work toward a consensus on solutions for design and management of these corridors.

- Parks and Trails System - the DPTF templates include trails on both sides of the road and bicycle lanes within many of the corridors; however, the City's Parks and Trails Commission will recommend the overall trail system for the City. Consistent with the City's Transportation Plan, it is a goal to provide pathways on both sides of all new major roadways. Paths on both sides should be considered as part of rehabilitation or reconstruction projects if adequate right of way is available and the trail would fit into the context of the existing neighborhood. On-street bicycle lanes and bicycle routes will be evaluated on a case by case basis on City roads as part of the preliminary engineering report. Issues such as lighting of bicycle trails were also referred to the Parks and Trails Commission.

Early DPTF discussions noted that current roadway designs seem to be based largely on maintaining optimum automobile speeds and mobility. The Task Force expressed a strong desire to balance sustainability and livability factors with mobility and safety, to consider the needs of all corridor users, and to accommodate and encourage a variety of transportation options, from bicycles to new and future technologies.



Halstead Trail (east-west) and Rosemill Lane (north-south)

IV. ROADWAY CORRIDOR DESIGN TEMPLATES

The Task Force developed twelve design templates for roadway corridors in Woodbury. The templates are listed on Table 1. A citywide map identify the corridors is included as Appendix 5.

Table 1: Roadway Corridor Design Templates

Template	Description	Right-of-way	Number of Lanes	Median Width (feet)	Target Operating Speed (mph)
A1	Highest traffic volume corridor adjacent to commercial areas near Interstates; dual left turn lanes where warranted.	180	6	6-30	45
A2	Highest traffic volume corridor adjacent to commercial areas near Interstates; capacity to expand to 6 lanes; dual left turn lanes where warranted	180	4	6-30	45
B1	High traffic volume corridor	150	4	8-20	40
B2	High traffic volume corridor; dual left turn lanes where warranted	150	4	6-30	40
C1	Medium traffic volume corridor with 3 lanes (with center two-way left turn lane) and exclusive right turn lanes at intersections - primary C corridor type	120	3	None	35-40
C2	Medium traffic volume corridor with 3 lanes (with center two-way left turn lane) and exclusive right turn lanes at intersections - secondary C corridor type	120	3	None	35-40
D1	Neighborhood collector	88	2	None	30-35
D2	Neighborhood collector with exclusive right turn lanes	88	2	None	30-35
E1	Commercial land use corridor - 3 lanes (with center two-way left turn lane)	112	3	None	30
E2	Commercial land use corridor - 3 lanes (with center two-way left turn lane) and dedicated right turn lanes at intersections	112	3	None	30
E3	Commercial land use corridor - 5 lanes (with center two-way left turn lane) and dedicated right turn lanes at intersections	136	5	None	30
E4	Commercial land use corridor - 5 lanes (with center two-way left turn lane) and dedicated right turn lanes at intersections	136	5	None	30
STL-8	28-foot wide residential road with sidewalk on one or two sides	60	2	None	<30

DPTF recommendations regarding selection of the templates include the following:

- The smallest size corridor needed to meet functional requirements and projected traffic levels will be the starting point for roadway design. The DPTF recommended limiting the width of roadway corridors to those identified in the templates to minimize separation from and impacts to surrounding land uses, and minimize the pavement area that pedestrians need to cross.
- Classification of roadways into various templates will be performed based on roadway functional classification and traffic volumes. Roadways designated “arterials” could be A or B templates. Roadways designated “collectors” could be designed with any of the template types except “A” types, depending on traffic volumes on the roadway itself, and the roadways that it intersects. The D templates are designed as “neighborhood collector” corridors. The E templates were developed for use in corridors dominated by commercial land uses with high driveway density.
- The Task Force developed the design templates specifically for traditional signalized and stop-controlled intersections. However, roundabouts may be appropriate in certain locations and have become an acceptable tool in the engineering community. The City will evaluate appropriate roadway and intersection geometry based on current and projected traffic volumes and patterns, and based on adjacent land uses. Roundabouts have been shown to have many advantages over traditional signalized intersections when designed correctly and applied at appropriate locations. Some benefits include reduced vehicle delay and gas consumption, less pollution and noise impacts, reduced crash severity, and less pavement. In cases where roundabouts are determined to be the best form of intersection traffic control, right-of-way needs and impacts at intersections will need to be re-evaluated. The Series 500 reports from the National Cooperative Highway Research Program (NCHRP) categorize roundabouts as a proven strategy, effective at reducing crashes.
- The City should evaluate options to use roundabouts at intersections at an early stage in the planning and design process, to determine if a roundabout would result in equal or better intersection function and reduce right-of-way requirements. Part of this investigation needs to be consideration of adjacent intersections and how the roundabout(s) fit into the entire corridor.
- Intersection characteristics will influence the need for turn lanes or specific elements of roundabout design.
- The A1 corridor is an alternate form of the A2 corridor, where it may be needed in commercial areas, generally within one mile of Interstates. The additional lane included in template A1 could be utilized as a transit lane or additional driving lane.
- The B2 corridor provides an option for dual left turn lanes where needed on high volume roadways.

- The C1 and D1 corridors will be used most frequently within the Medium and Low Volume classifications, respectively. The C2 and D2 options will only be selected when turn lanes are required to maintain the function of roadways that intersect with these roadway corridors. Table A-1, included in the Appendix, presents the criteria that can be used to determine needs for selection of templates with multiple turn lane configurations for non-roundabout intersections.
- The D corridor is designed to function as a “neighborhood collector”. The DPTF recommended increased use of “neighborhood collector” roadways in the future, to improve interconnectivity between the City’s neighborhoods, and to relieve pressure and congestion on the B and C corridor types. The roles of the D corridor are the following:
 - Serve as a connecting street within neighborhoods.
 - Serve as an inter-neighborhood connector, and an alternative to B or C corridors.
 - Provide inter- and intra-neighborhood connecting routes for bicycles. The D corridors could become a network of bicycle commuting routes within the City.
 - Provide a potential route for local transit services, such as shuttles.
 - The D corridors will likely be designated as State Aid roadways and would therefore be required to meet State Aid minimum design standards.
- The “commercial corridor” E templates are designed to be used in corridors that are dominated by commercial and retail land uses. Important elements of these corridors are as follows:
 - E1 and E2 templates (3-lane sections) will be used for the majority of “commercial collectors”. E3 and E4 will be used where there is a high amount of retail adjacent to the corridor with high volumes of traffic, requiring an additional lane in each direction. E1 and E2 will be the standard, with analysis required to warrant the E3 or E4 design.
 - The use of the E1 or E2 design may impact the design of driveways - specifically the required width and turning radii, when compared to the majority of existing roadway sections in commercial corridors, which are 4-lane sections. Trucks turning right into a driveway would be doing so from a position closer to the curb with the 3-lane section. In a 4-lane section, trucks would make a right turn from the inside through lane, cutting across the outside through lane. Trucks turning right are likely to use the two-way left turn lane on the 3-lane sections as though it were a through lane, and therefore conflicts with opposing traffic are unlikely.

- The ADT's (Average Daily Traffic) for the proposed corridors are likely to be in the following ranges:
 - Highest Volume corridors (ADT >25,000)
 - High Volume corridors (ADT 15,000-25,000)
 - Medium Volume corridors (ADT between 5,000 and 15,000)
 - Low Volume corridors (ADT <5,000)

- The DPTF affirmed that the width for new and replacement residential roadways will be 28 feet. Sidewalks, boulevards, and landscaping will be standard elements of all these roadway corridor designs. ("Replacement" applies to roadway reconstruction, and not to mill and overlay improvements.) A width of 26 feet is acceptable for roadways that terminate in a cul-de-sac. The 26-foot and 28-foot corridor widths are consistent with the policies of the City's Surface Water Management Plan.

V. LANDSCAPE DESIGN GUIDELINES FOR CORRIDORS

The City completed a set of Corridor Design Guidelines (Kimley-Horn Associates and HNTB) in 2007 that provide guidance for landscape design along its roadway corridors. Approval of the DPTF report is intended to include approval of the 2007 Corridor Design Guidelines as well. It includes design recommendations for the following:

- Landscaping of medians, boulevards and city entrances
- Median pavements and landscape containment systems
- Retaining walls, special curbs, and median maintenance access methods
- Traffic signals, street lighting, and special pedestrian area lighting

The DPTF discussed the Corridor Design Guidelines in relation to the corridor templates it developed. **The DPTF modified the Guidelines in the following ways:**

- Expanded the plant palette to include additional tree species for planting in the corridors
- Removed ash species from the list of tree species, due to the threat of Emerald Ash Bore to this species
- Modified the planting designs to fit the new corridor templates. The corridor templates A1-E4 included in this report modify the templates on pages 21, 23, 30, 31 and 34 of the Corridor Design Guidelines report.
- Recognized that the issue of irrigating medians on the Primary City Entry Corridors is an area that requires continued discussion. The City will continue to explore the use of seed mixtures that require minimal or no irrigation. References to sod may also include the use of seed mixtures. The City will continue to discuss implementation and appropriate use of irrigation systems in medians.
- Recommended that if discrepancies exist between the DPTF Templates and the Corridor Design Guidelines for street widths or other dimensions, the DPTF Templates will govern.
- Determined that the modified Corridor Design Guidelines would be approved as a part of this Report. A copy is included as Appendix 6.



The planting palette that the City will use as a starting point in the design of its roadway corridors is shown on Table 2 below. The planting designs are illustrated on the corridor templates. Table 2 replaces the Design Palette table on page 7 of the Corridor Design Guidelines report.

- The DPTF discussed the location of landscaping in relation to the utility locations. The group indicated that the proximity of the landscaping to utilities may require landscaping removal for unplanned maintenance activities, such as a watermain break. The group recognized that this may occur, but determined that the benefit of including landscaping throughout the corridor outweighs potential negatives associated with necessary tree removal and replanting if required for utility maintenance.
- It is necessary to place plantings to allow for sanitary sewer jetter trucks to access manholes located in the boulevard areas.

Table 2: Plant Schedule for Corridors

Common Name	Botanical Name	Size	Root	Spacing	Notes
Canopy Species Trees - Boulevard or Median					
Swamp White Oak	<i>Quercus bicolor</i>	2"	Cont or B-	25-55'	Single Stem
Imperial Honeylocust	<i>Gleditsia triacanthos inermis</i>	2"	Cont or B-	25'	Single Stem
Autumn Blaze Maple	<i>Acer x Fremanii 'Jeffersred'</i>	2"	Cont or B-	25'	Single Stem
Kentucky Coffeetree	<i>Gymnocladus dioicus</i>	2"	Cont or B-	25'	Single Stem
White Oak	<i>Quercus alba</i>	2"	Cont or B-	25-55'	Single Stem

Common Name	Botanical Name	Size	Root	Spacing	Notes
Canopy Species Trees - Boulevard (limited Salt Tolerance)					
Eastern Pin Oak*	Quercus palustris	2"	Cont or B-	25-55'	Single Stem
Northern Pin Oak*	Quercus ellipsoidalis	2"	Cont or B-	25-55'	Single Stem
Basswood	Tilia Americana, T. 'Frontyard', or T. 'Redmoond'	2"	Cont or B-	25-55'	Single Stem
American Elm	Ulmus Americana 'Accolade', 'Cathedral', Or 'Discovery'	2"	Cont or B-	25-55'	
Ornamental (Smaller) Trees					
Japanese Tree Lilac	Syringa reticulata 'Ivory Silk'	2"	Cont or B-	8' o.c.	
Other materials					
Blue Oat Grass	Helictotrichon sempervirens	#1	Container	18" o.c.	
Karl Foerster Feather Reed Grass	Calamagrostis acutiflora 'Karl Foerster'	#1	Container	24" o.c.	
Daylily Mix (50/50 Blend)	Hemerocallis 'Happy Returns'/'Pardon Me'	#1	Container	15" o.c.	
Viola Klose Salvia	Salvia sp 'Viola Klose'	#1	Container	15" o.c.	
Big Sky Sunrise Coneflower	Echinacea 'Big Sky Sunrise'	#1	Container	18" o.c.	
Kippenberg Aster	Aster sp 'Kippenberg'	#1	Container	24" o.c.	

VI. CORRIDOR DESIGN PROCESS

The Task Force discussed a wide range of issues related to the design of the roadway corridor templates. A more complete description of these discussions is included in the Meeting Summaries of the Task Force meetings. A summary of the recommendations includes the following:

A. Corridor Design Process

- The roadway design templates will be used as the starting point for design of new roadways or redesign and reconstruction of existing roadways. While changes to the designs may be incorporated to meet individual site or project needs, these will be viewed as similar to requesting a “variance” from the City’s code, and will require a specific rationale for the change from the adopted templates.
- The City views its templates as the preferred design for all roadway corridors in the community, including County and State as well as City corridors. The City will work with the County and State to discuss differences in design standards for roadway corridors.
- The smallest size roadway needed to meet functional requirements and projected traffic volumes will be the starting point for roadway design to minimize separation between neighborhoods, minimize impacts to surrounding land uses, and minimize the pavement area that pedestrians need to cross.
- The corridor (right-of-way) width will be selected based on the ultimate projected traffic volumes and full build-out of the corridor. The Task Force recommends limiting the width of corridors as discussed in this section.

B. Reconstruction of Existing Roadway Corridors

- The roadway design templates and guidelines will be the starting point for the design of major reconstruction projects in existing roadway corridors, including roadway width, landscaping requirements and other corridor design elements.
- The City will identify the existing corridors that are priorities for bicycle lanes and bicycle routes, and work to incorporate these into priority corridors, and other corridors as right-of-way allows.
- Design decisions will be made on a case-by-case basis when adequate right-of-way does not exist to design the corridor to meet the standards in the design templates.

C. Capping the Corridor Size

- The Task Force recommended capping corridor widths at the right-of-way sizes recommended in this Report. Members recognized this may affect mobility on some roadways in the future, and that historically the City has expanded roadways in response to the high value residents place on mobility and safety. However, Task Force members agreed that roadway widths and driver mobility need to be balanced with other community values and goals. Capping corridor widths may also encourage wider use of transit, bicycles, travel demand management strategies, and other alternative transportation modes that will help to maintain mobility and safety, and reduce demand for additional traffic lanes. The pros and cons that were considered by the DPTF for capping corridor widths are included in the Appendix.
- Dual left turn lanes will be used only in exceptional circumstances when needed to assure adequate roadway function.

D. City-wide Corridor Map

A map is included as Appendix 5 that labels roadway corridors based on the A-E template classifications.

VII. BOULDEVARDS AND MEDIANS

- DPTF members agreed that green areas such as boulevards and medians are important components of corridor design. However, they noted that these areas do not provide high-quality green space as parks and other open spaces in the City do. The widths proposed for these green areas in the templates balance needs for aesthetics and function with the need to keep the total width of the corridor as narrow as possible.
- DPTF members noted comments that the proposed boulevard widths near intersections provide limited space for snow storage. The DPTF recommended that boulevards have a minimum width of 13 feet to allow for snow storage. The total right-of-way near intersections on some corridors will need to be expanded in some areas to allow for the snow storage area. Trails will be located outside the snow storage area except near intersections, where the trails will be brought close to the intersection at crossings.
- The majority of corridors will not be designed with irrigated boulevards or medians. These elements will be considered in high priority corridors, as defined in the Corridor Design Guidelines.
- Utilities – the templates include 5' easement areas for utilities. These are the proposed locations for private utilities. Adequate space is available to place the public utilities outside the roadway.



VIII. BICYCLE LANES, PEDESTRIAN LANES, AND TRAILS

- 7-foot wide “utilitarian” bicycle lanes are recommended on the roadway on some corridor templates. “Utilitarian” lanes are defined here as those used for purposeful trips such as commuting, shopping or serious exercise, to distinguish them from bicycle trails primarily used for recreation. This includes a 5’ bicycle area and 2’ curb. This designated bicycle lane will primarily function as a commuter or purposeful bicycle travel lane. While current commuter bicycling within Woodbury is limited, the DPTF included the lanes to encourage and accommodate future use.
- On-street bicycle lanes and bicycle routes will be evaluated on a case by case basis on City roads as part of the preliminary engineering report.
- The DPTF recommends that the shoulder area required by Washington County on County roadway corridors function as a bicycle lane. The City will work with the County on potential signage or markings for the bicycle lanes.
- The DPTF discussed the pros and cons of adding the utilitarian bicycle lanes within the roadway area at length. Inclusion of bicycle lanes within the roadway does add some pavement area and creates a wider right-of-way. However, the lane will function to encourage trips by bicycle, and allows the City to set roadway speed limits on city-owned roadways (Minn. Statutes 160.263). The lane also provides safety benefits associated with shoulders (a break down area and safe pull-over area for police).
- When bicycle lanes are included within the roadways, the trail widths are reduced to 8’ (templates A and B). When no lanes are included, the trail widths are 10’ (templates C and D). Bicyclists can also use the edge of the street on C and D corridors, where traffic speeds will be lower.
- On new or existing roadways, the need for bicycle lanes on the roadway will be evaluated on a case-by-case basis as part of preliminary engineering activities, considering the space available in the right-of-way and existing or proposed trails in the area. On-road bicycle lanes may be a higher priority near transit facilities. The City will complete a bicycle lane evaluation, (similar to the evaluation completed for roundabouts) using an interdisciplinary staff team, to determine the need for bicycle lanes on the roadway.
- Signs identifying some roadways as “bicycle routes” may be used when space is not available to accommodate full-size bike lanes, but where bicycle trips are encouraged. An interdisciplinary staff group will map the “bicycle route” system for the City. The group will consider specific destinations to be included in the system, and current gaps in the City’s trail system.

- DPTF members recommended that existing “neighborhood collector” streets be marked on both sides with pedestrian areas approximately 5’ wide, where sidewalks are not currently available. This could be done with a strong “edge” line at the edge of drive lanes, striping, or other markings. (Examples of these streets include Eagle Valley Drive and Bailey Ridge Drive.) The City’s Public Safety Department recommends prohibition of parking on the streets that receive white edgeline treatment. The City will determine the specific locations for striping.
- Signage and or striping may also be included on designated bicycle corridors. The signs will alert drivers to “share the road” with bicycles.



*Eagle Valley Drive. Image from the Metropolitan Design Center Image Bank
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- Woodbury staff discussed the guidelines for bicycle lane design with Mn/DOT staff. Mn/DOT provides some general guidelines but no standards for bicycle lane design on State Aid roadways. The City will continue to work with Mn/DOT and others on this issue.
- Break-down lane – the 7-foot bicycle lane included on some of the templates will also function as a “break down” lane for cars and a safe pull-over area for police.

IX. COMPARISON OF PROPOSED TEMPLATES TO THE CITY'S CURRENT STANDARDS

The Task Force compared the new recommended templates to the City's existing design standards for roadway corridors. The City has existing standards for the B and C corridor types, but not for the A, D, and E types.

Overall, using the new design templates will result in the following:

- Reduced roadway corridor size. The C and D corridors will be the most frequently utilized corridor types in the City. These corridors have a narrower "footprint" than those currently used for roadways with the same function in the City. While corridor templates A or B have the same or larger "footprint", they will be used less frequently within the City.
- Some corridors have a reduced paved surface area over current corridor designs, others do not. The corridors that are likely to be most frequently used in the City are those with reduced surface area in comparison to current designs.
- Inclusion of more transportation options - utilitarian bicycle lanes, trails, and an optional "transit" lane in the A corridor option.
- Inclusion of an explicit area for utilities in the templates.

Comparisons by corridor type include the following:

Corridor A

The City did not have a template that applies to these roads. These are largely county and state roads, and are designed and managed to meet county and state standards.

Corridor B

- Current design: 150' right-of-way, no shoulder, 10' paths both sides, two 13' lanes, two 14' lanes. Total paved surface = 74'. At intersections, four lanes of approach (left, thru, thru, right). Total paved surface = 98'
- Proposed: 150' right-of-way, 7' bicycle lane each side, 8' paths each side, two 14' lanes, two 12' lanes. Total paved surface = 82' (could be 80' using 1' reaction on inside lanes). At intersections four or five lanes of approach (depending on need for dual left).
- Summary: proposed yields same right-of-way, 6' or 8' additional paved surface for proposed. At intersections, 3' or 15' additional paved surface, depending on need for dual left turn lane.

Corridor C

- Current design:
 - 4-lane undivided: 130' right-of-way. Two 14' lanes, two 12' lanes, 10' paths on both sides. Total pavement surface = 72'. At intersections, three lanes of approach (right, thru, thru/left), total paved surface = 84'
 - 3-lane section with center two-way left turn lanes: 120' right-of-way. Three 14' lanes, 10' paths on both sides. Total paved surface = 62'. At intersections three lanes of approach (left, thru, right), total paved surface = 74' or 76'
- Proposed: 120' right-of-way. Two 12' lanes, one 14' lane, two 7' bicycle lanes, 8' paths on each side. Total pavement surface = 68'. At intersections, total paved surface = 68'. When three lanes are required at intersections (left, thru, right), total paved surface = 75'
- Summary: right-of-way the same or 10' less for proposed, depending on 3- or 4-lane current section. 6' additional paved surface midblock for proposed. Essentially same paved surface at intersections.

Corridor D

- Current design: 106' minimum right-of-way, plus 20' drainage and utility easement. Two 14' or 16' lanes, 10' paths on both sides. Total pavement surface = 48' – 52'. At intersections, two lanes of approach (left and thru/right or left/thru and right), paved surface = 60' - 62'.
- Proposed: 88' right-of-way. Two 13' lanes, 10' path on one side and 5' sidewalk on opposite side. Total paved surface = 36'.
- Summary: proposed requires 18' less right-of-way, only one path on proposed, 5'9' less paved surface.

Corridor E

- The “commercial corridor” E templates are designed to be used in corridors that are dominated by commercial and retail land uses. Important elements of these corridors are as follows:
 - E1 and E2 templates (3-lane sections) will be used for the majority of “commercial collectors”. E3 and E4 will be used where there is a high amount of retail adjacent to the corridor with high volumes of traffic, requiring an additional lane in each direction. E1 and E2 will be the standard, with analysis required to warrant the E3 or E4 design.

- The use of the E1 or E2 design may impact the design of driveways - specifically the required width and turning radii, when compared to the majority of existing roadway sections in commercial corridors, which are 4-lane sections. Trucks turning right into a driveway would be doing so from a position closer to the curb with the 3-lane section. In a 4-lane section, trucks would make a right turn from the inside through lane, cutting across the outside through lane. Trucks turning right are likely to use the two-way left turn lane on the 3-lane sections as though it were a through lane, and therefore conflicts with opposing traffic are unlikely.

The Task Force concluded that the proposed designs provide a better balance among mobility, safety, sustainability, and livability than the current design standards.



Near Interlachen Parkway, near Promenade Lane. Image from the Metropolitan Design Center Image Bank. © Regents of the University of Minnesota. All rights reserved. Used with permission.

X. APPENDICES

1. Proposed and Current Roadway Corridor Design Templates:
Design Templates A1, A2, B1, B2, C1, C2, D1, D2, E1, E2, E3, E4, STL-8
2. Table A-1: Decision Matrix for Selecting Corridor Designs with Dedicated Turn Lanes
3. Technical Memorandum 1: Definition of Speed Related to Roadways
4. Pros and Cons of Capping Corridors
5. City-wide Corridor Map
6. Corridor Design Guidelines

APPENDIX 1

Proposed and Current Roadway Corridor Design Templates:
Design Templates A1, A2, B1, B2, C1, C2, D1, D2, E1, E2, E3, E4, STL-8

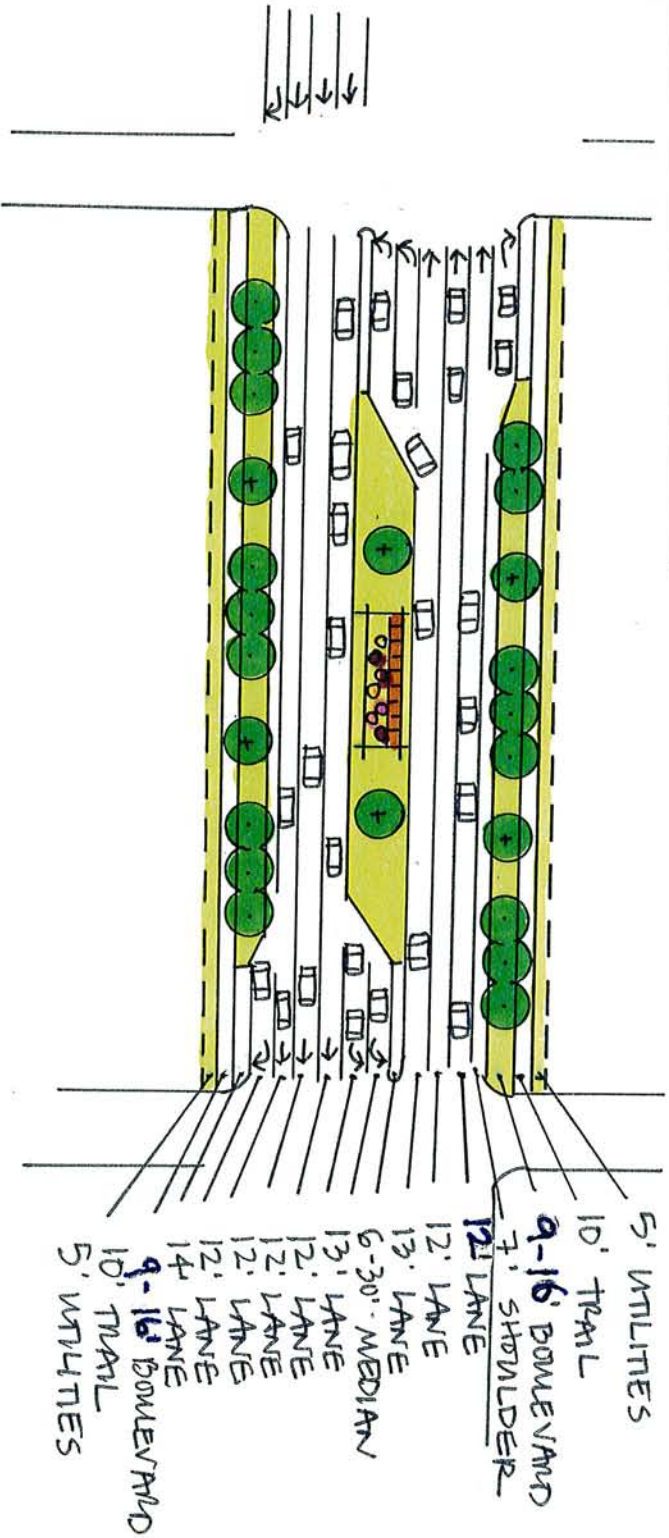
A1 Corridor – Highest Volume

Note: public utilities generally to be installed as follows:

- Water: under roadside edge of pathway
- Sanitary sewer: under roadside edge of other pathway
- Storm sewer: along curb line

Private utilities under trails and into 5' utilities area.

- Highest volume corridor
- Use on corridors near Interstates
- Adjacent to Commercial Lane Uses
- 180 feet right-of-way



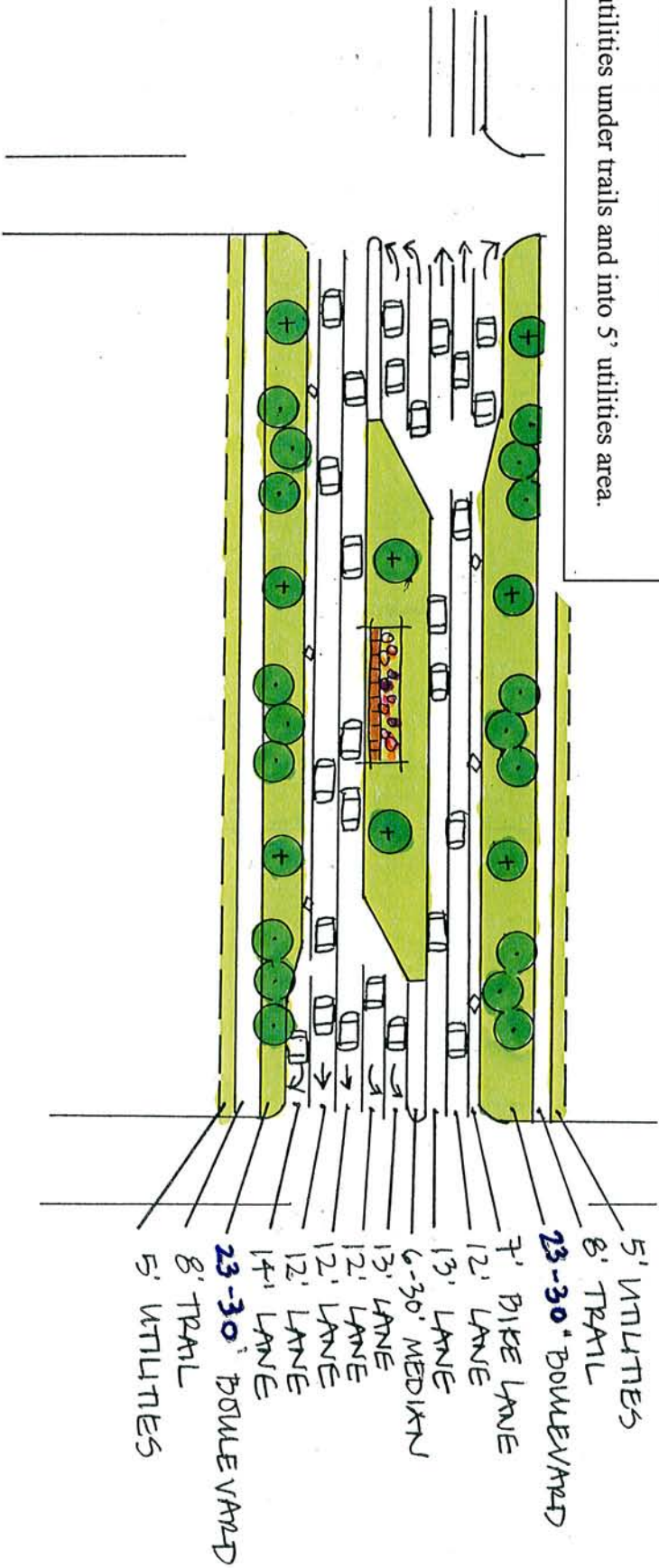
A2 Corridor – Highest Volume

Note: public utilities generally to be installed as follows:

- Water: under roadside edge of pathway
- Sanitary sewer: under roadside edge of other pathway
- Storm sewer: along curb line

Private utilities under trails and into 5' utilities area.

- Highest volume corridor
- Use near Interstates and adjacent to commercial land uses
- Has capacity to expand to 6-lane section
- On-street bicycle lanes to be evaluated in preliminary engineering
- 180 feet right-of-way



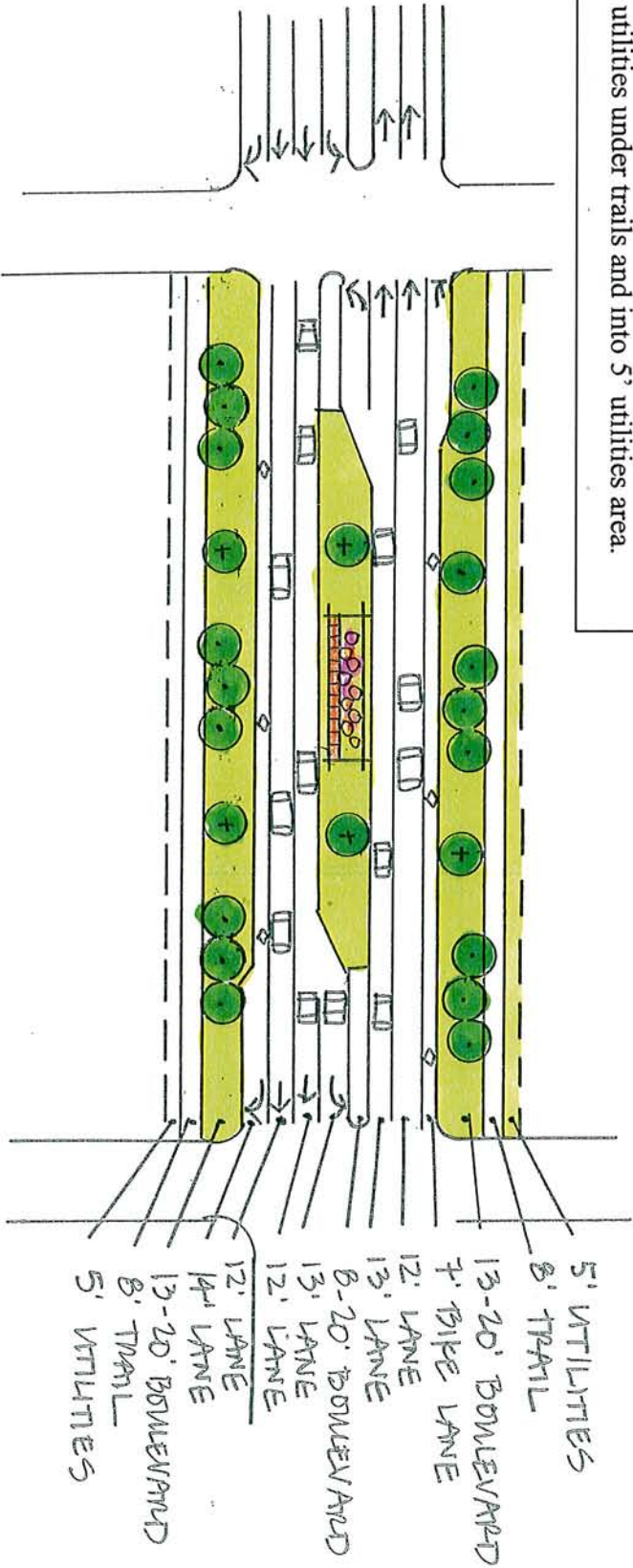
B1 Corridor – High Volume

Note: public utilities generally to be installed as follows:

- Water: under roadside edge of pathway
- Sanitary sewer: under roadside edge of other pathway
- Storm sewer: along curb line

Private utilities under trails and into 5' utilities area.

- High volume corridor
- On-street bicycle lanes to be evaluated in preliminary engineering
- 150 feet right-of-way



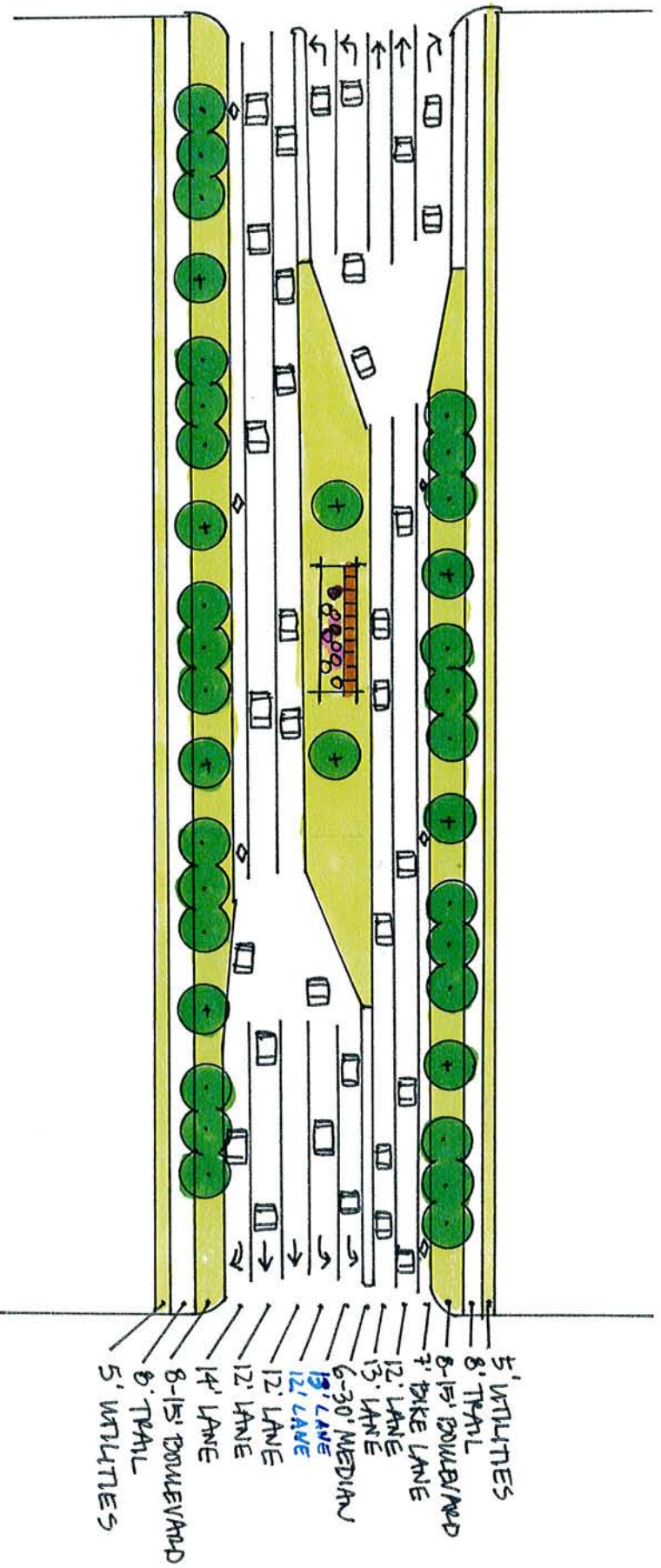
B2 Corridor – High Volume

Note: public utilities generally to be installed as follows:

- Water: under roadside edge of pathway
- Sanitary sewer: under roadside edge of other pathway
- Storm sewer: along curb line

Private utilities under trails and into 5' utilities area.

- High volume corridor
- Dual left turn lanes included where needed
- On-street bicycle lanes to be evaluated in preliminary engineering
- 150 feet right-of-way



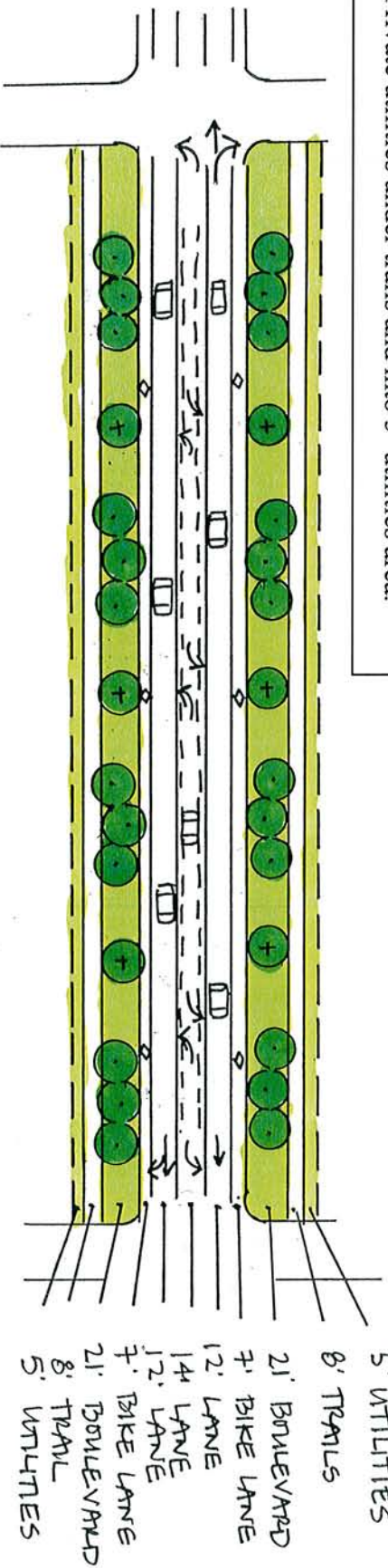
C1 Corridor – Medium Volume

Note: public utilities generally to be installed as follows:

- Water: under roadside edge of pathway
- Sanitary sewer: under roadside edge of other pathway
- Storm sewer: along curb line

Private utilities under trails and into 5' utilities area.

- Typical template for medium volume corridor
- Includes two-way left turn lanes, may be raised median with dedicated left turn lanes if access spacing allows, generally no dedicated right turn lanes
- On-street bicycle lanes to be evaluated in preliminary engineering
- 120 feet right-of-way



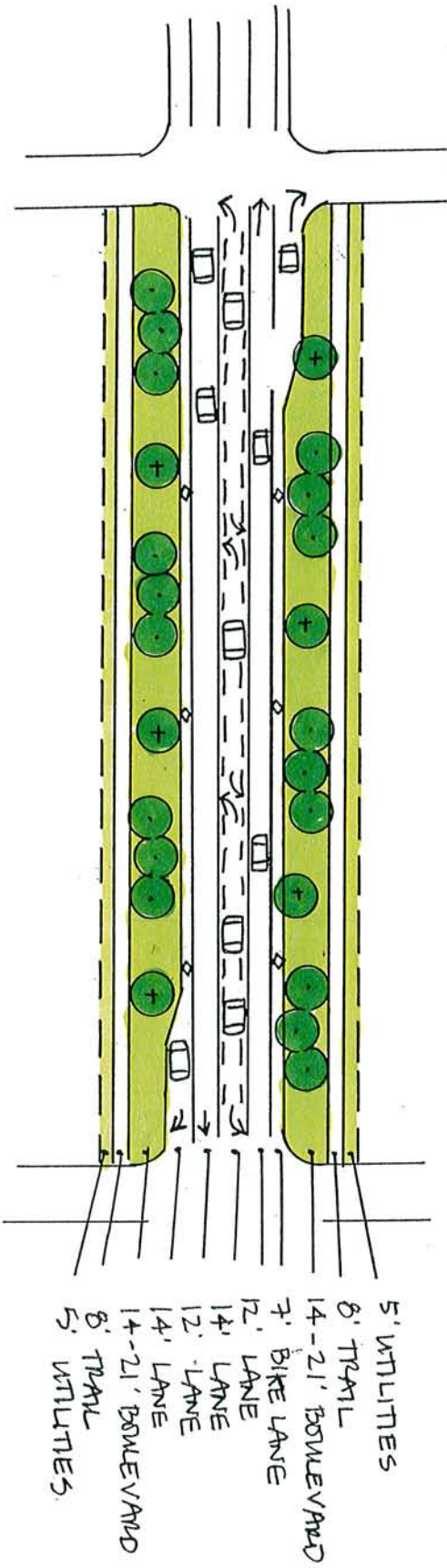
C2 Corridor – Medium Volume

Note: public utilities generally to be installed as follows:

- Water: under roadside edge of pathway
- Sanitary sewer: under roadside edge of other pathway
- Storm sewer: along curb line

Private utilities under trails and into 5' utilities area.

- Use in place of C1 only when this roadway intersects with higher volume roadway and requires right turn lanes
- On-street bicycle lanes to be evaluated in preliminary engineering
- 120 feet right-of-way



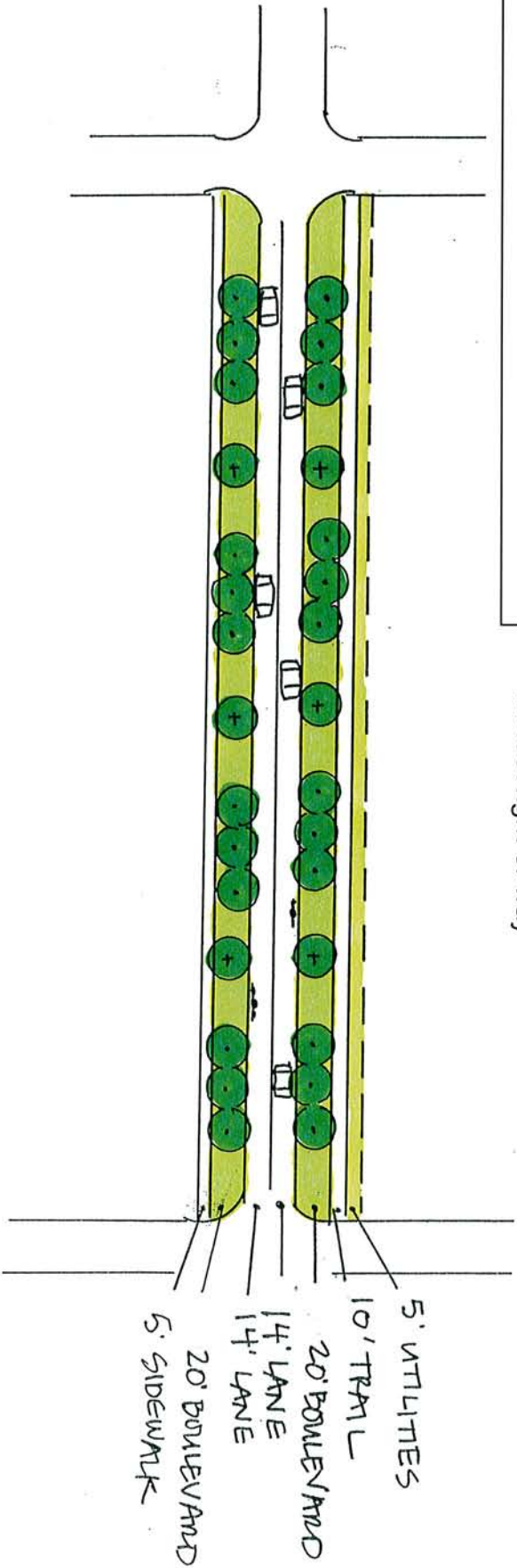
D1 Corridor – Neighborhood Collector

Note: public utilities generally to be installed as follows:

- Water: under roadside edge of pathway
- Sanitary sewer: under roadside edge of other pathway
- Storm sewer: along curb line

Private utilities under trails and into 5' utilities area.

- Provides connections within and among neighborhoods
- Little or no driveway access
- No parking
- Bicycles on street or trail
- Landscaped boulevards to calm traffic
- Curvilinear when possible
- Will be designed to control travel speed
- 88 feet right-of-way



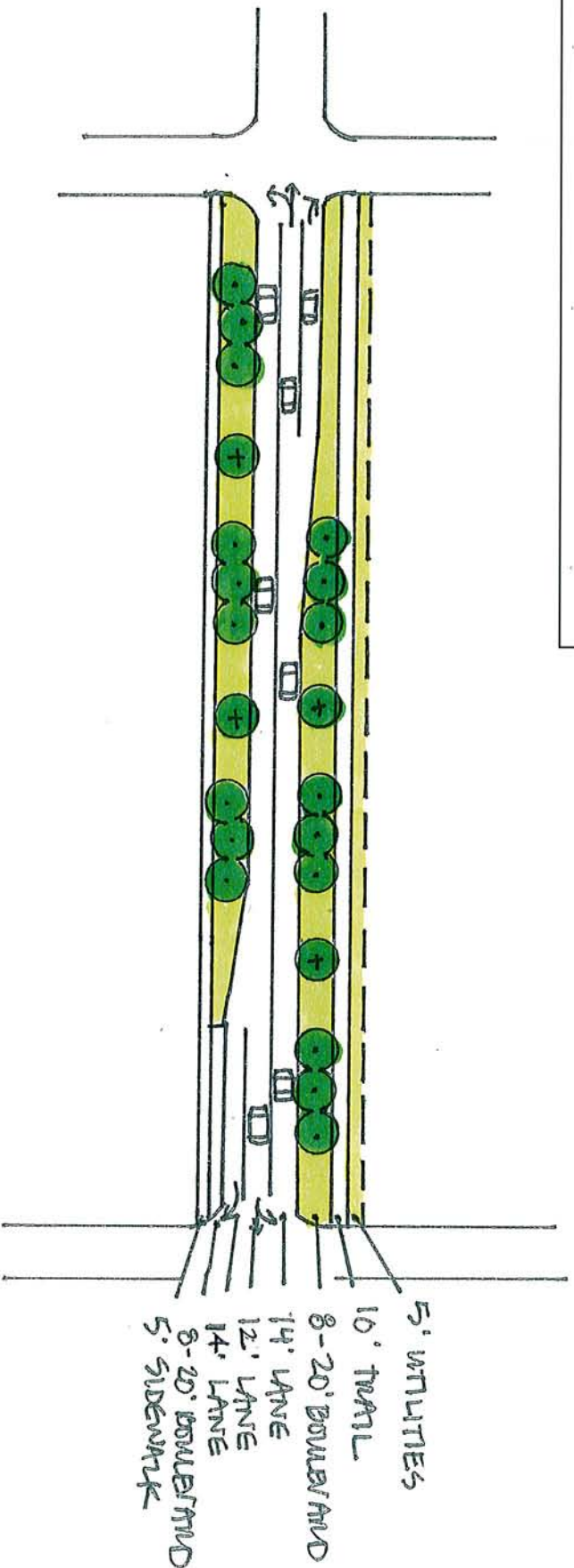
D2 Corridor – Neighborhood Collector

Note: public utilities generally to be installed as follows:

- Water: under roadside edge of pathway
- Sanitary sewer: under roadside edge of other pathway
- Storm sewer: along curb line

Private utilities under trails and into 5' utilities area.

- Optional neighborhood collector with right turn lanes as needed for busy intersections; could be modified to provide exclusive left turn lane with shared right/thru
- Will be designed to control travel speed
- Bicycles on street of use trail
- 88 feet right-of-way



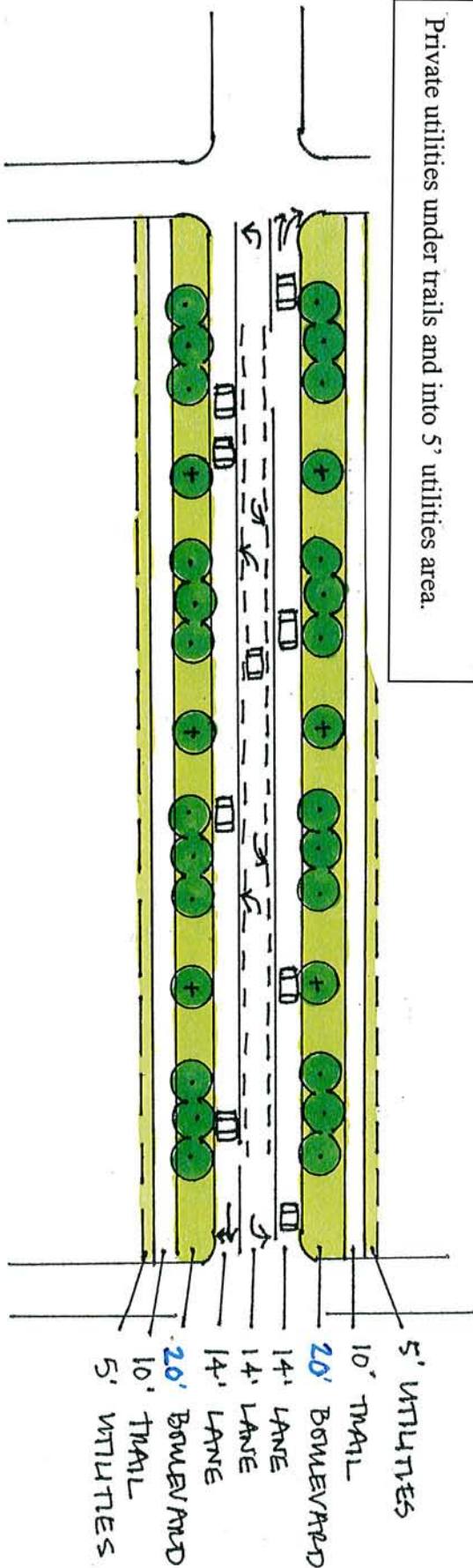
E1 Corridor – Commercial Collector

Note: public utilities generally to be installed as follows:

- Water: under roadside edge of pathway
- Sanitary sewer: under roadside edge of other pathway
- Storm sewer: along curb line

Private utilities under trails and into 5' utilities area.

- Use in majority of commercial land use corridors, with high driveway density
- Bicycles on street or use trail
- 112 feet right-of-way



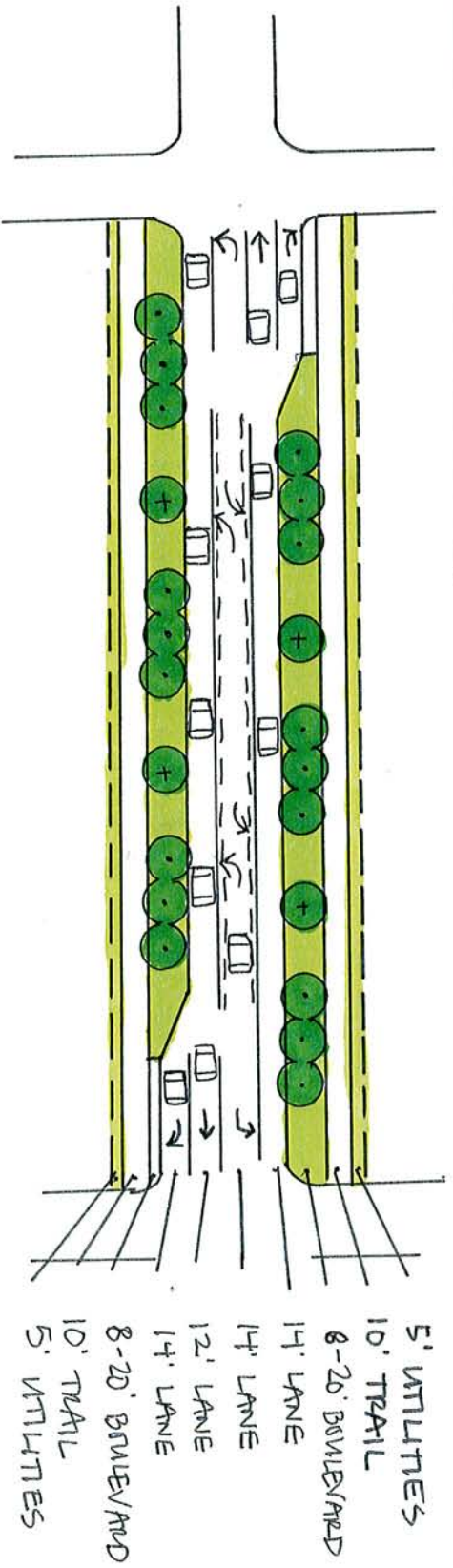
E2 Corridor – Commercial Collector

Note: public utilities generally to be installed as follows:

- Water: under roadside edge of pathway
- Sanitary sewer: under roadside edge of other pathway
- Storm sewer: along curb line

Private utilities under trails and into 5' utilities area.

- Use in majority of commercial land use corridors, with high driveway density
- Bicycles on street or use trail
- Used when exclusive left and right turn lanes are needed
- 112 feet right-of-way



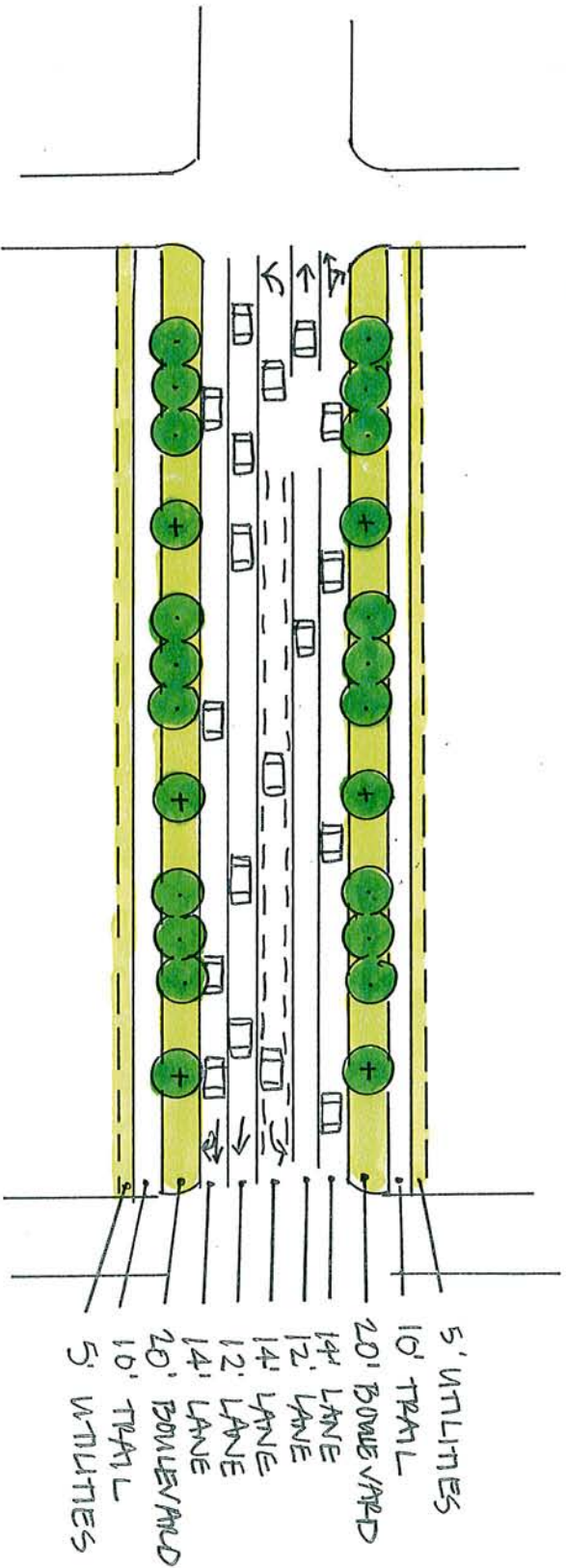
E3 Corridor – Commercial Collector

Note: public utilities generally to be installed as follows:

- Water: under roadside edge of pathway
- Sanitary sewer: under roadside edge of other pathway
- Storm sewer: along curb line

Private utilities under trails and into 5' utilities area.

- Use in majority of commercial land use corridors, with high driveway density and volumes that warrant additional thru lane in each direction
- Bicycles on street or use trail
- 136 feet right-of-way



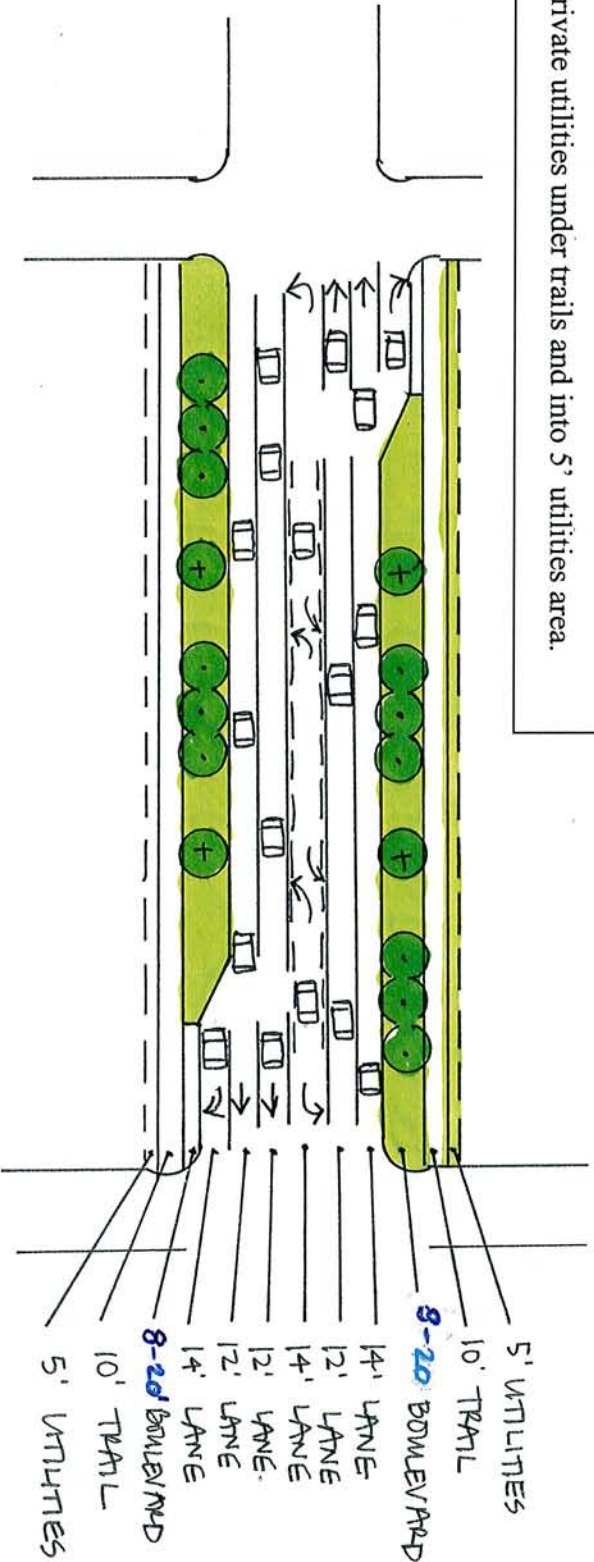
E4 Corridor – Commercial Collector

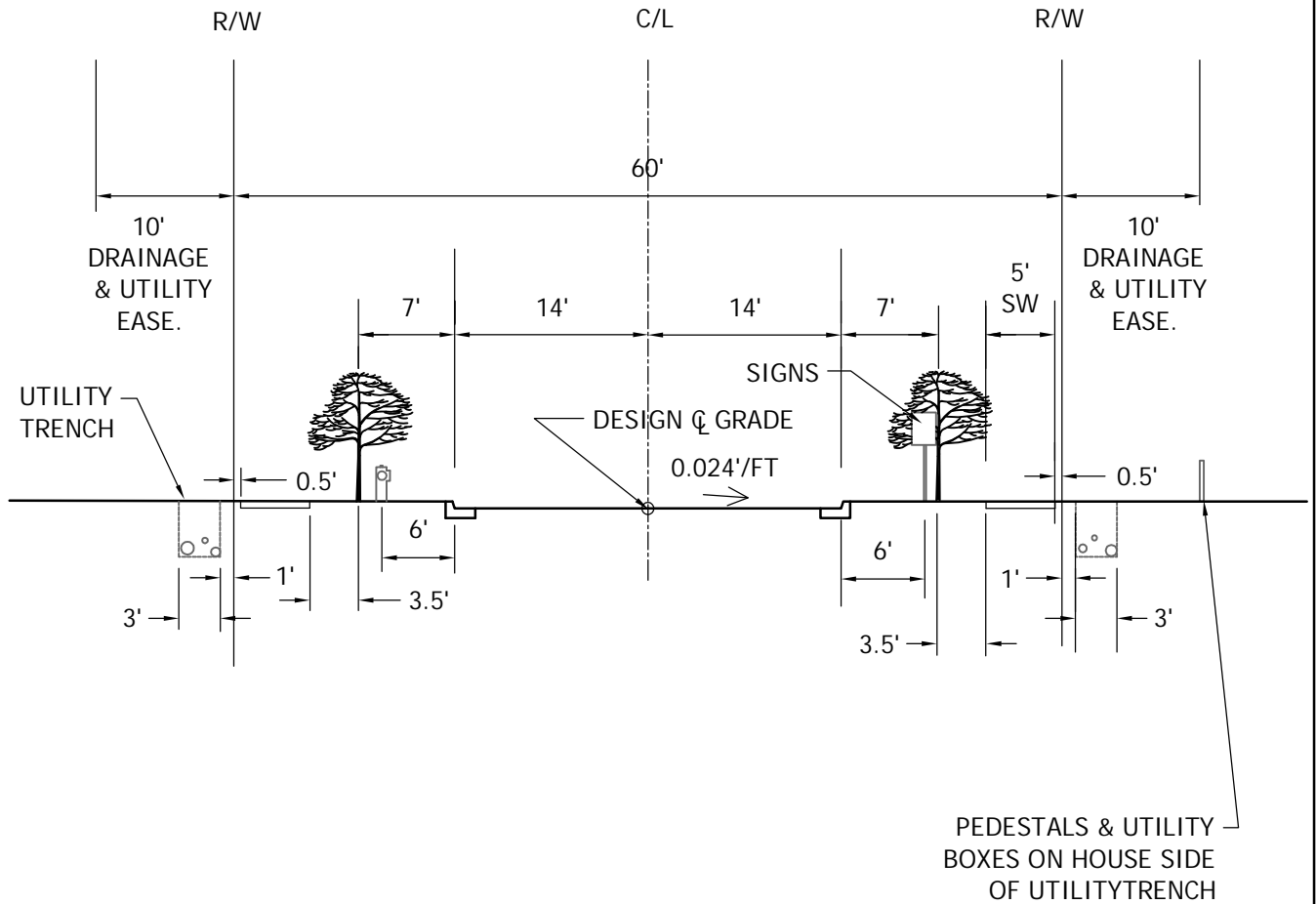
Note: public utilities generally to be installed as follows:

- Water: under roadside edge of pathway
- Sanitary sewer: under roadside edge of other pathway
- Storm sewer: along curb line

Private utilities under trails and into 5' utilities area.

- Use in majority of commercial land use corridors, with high driveway density and volumes that warrant additional thru lane in each direction
- Bicycles on street or use trail
- Used when exclusive left and right turn lanes are needed
- 136 feet right-of-way





PEDESTALS & UTILITY
BOXES ON HOUSE SIDE
OF UTILITY TRENCH

NOTES:

1. WHERE PATHWAYS ARE PROVIDED, INSTEAD OF SIDEWALKS, ADDITIONAL WIDTH MUST BE ADDED TO ACCOMODATE THE PATH AND ALLOW 5' TO THE ROW FOR SNOW STORAGE.
2. IF SIDEWALK IS TO BE ON BOTH SIDES, SIDEWALK SIDE X-SECTION WILL BE SYMETRICAL ABOUT C/L.
3. SEE STANDARD CITY DETAIL PLATE FOR STREET TYPICAL SECTIONS.
4. 2% BOULEVARD CROSS-SLOPE WITHOUT SIDEWALK 5% BOULEVARD CROSS-SLOPE WITH SIDEWALK.
5. SIGNS, HYDRANTS, AND STREET LIGHTS AT 6' BEHIND FACE OF CURB.
6. ALL DIMENSIONS ARE FROM FACE OF CURB.



RESIDENTIAL STREET
PARKING BOTH SIDES
SIDEWALK BOTH SIDES

LAST REVISION:
Sept. 2004

PLATE NO.
STL-8

APPENDIX 2

Table A-1: Decision Matrix for Selecting Corridor Designs with Dedicated Turn Lanes

**Table A-1:
 Decision Matrix for Selecting Corridor Designs with
 Dedicated Turn Lanes**

Corridor Type	Intersecting with Corridor Type			
	A	B	C	D
A	A1 or A2	A1 or A2 B1 or B2	A1 or A2 C1 or C2	A1 or A2 D1, D2 or D3
B	-	B1 or B2	B1 or B2 C1 or C2	B1 D1, D2 or D3
C	-	-	C1 or C2	C1 D1 or D2
D	-	-	-	D1 or D2

Notes: Where multiple designs are listed, traffic volumes will dictate choice.

APPENDIX 3

Technical Memorandum 1: Definition of Speed Related to Roadways



Technical Memorandum

701 Xenia Avenue South, Suite 300
Minneapolis, MN 55416
Phone 763-541-4800
Fax 763-541-1700
www.ws beng.com

To: Corridor Design Principals Task Force **Copy:**

From: Brandi Popenhagen, PE
Jack Forslund, AICP

Date: August 16, 2007 **File:** WSB No. 1696-06

Subject: **Technical Memorandum No. 1:
2030 Woodbury Transportation Plan – Definition of Speed as Related to Roadways**

The purpose of this memorandum is to provide clarification on the various definitions of the word “speed” as used by transportation professionals in our everyday work practices.

Speed is used both as a design criterion to ensure safe design and as a measure to evaluate highway and street performance. When we refer to speed there are several different terms that are used and it is important to understand the definitions of the terms used and the relationship between them. Defined below are three key terms of speed that we use in the transportation profession.

Speed Definitions:

Posted Speed: The posted speed is the speed limit that is posted on signs adjacent to the roadway. In order to be legally enforceable it must comply with statutory requirements.

Design Speed: The design speed is the speed that was selected to design the various geometric features (i.e., horizontal and vertical alignment) of the roadway.

Operating Speed: The operating speed is the speed that drivers operate their vehicles during free-flow conditions. The 85th percentile speed (the measured speed that 85 percent of the drivers are traveling at or below) is frequently used as the measure of the operating speed associated with a particular location.

General Driver Speed Considerations

Ideally, the speed that people drive the road under free-flow conditions (operating speed) is consistent with the posted speed for the road and the speed that was used as the basis for design (design speed). Typically, five general conditions will affect the driver’s speed on a roadway or highway according to American Association of State Highway Transportation Officials AASHTO’s “A Policy on Geometric Design of Highways and Streets, 2004”). These five conditions are identified and defined below:

- (1) Physical characteristics of the roadway (determined by design speed),
 - curves
 - roadway width
 - profiles
 - distance to obstructions and/or roadside elements



- (2) Amount of roadside interference,
 - surrounding land use density
 - access density
 - pedestrian and/or bicycle activity
- (3) Weather conditions,
- (4) Presence of other vehicles,
 - congested/not congested
 - safety
- (5) Speed limitations.
 - posted or unposted speed limits
 - traffic control devices (signals, roundabouts, stop signs)

Speed limits are set by Minnesota Statute. Cities do not have the authority to set speed limits other than on selected residential roadways. The following are the statutory speed limits.

- 10 mph on alleys
- 25 mph on residential roadways if adopted by the local road authority
- 30 mph on streets in urban districts or on town roads in a rural residential district
- 65 mph on expressways
- 65 mph on urban interstate highways
- 70 mph on rural interstate highways
- 55 mph on other roads

An “**urban district**” is defined as the territory contiguous to, and including, any street which is built up with structures devoted to business, industry, or dwelling houses situated at intervals of less than 100 feet for a distance of a quarter of a mile or more.

A “**rural residential district**” is defined as the territory contiguous to, and including, any town road within a subdivision or plat of land that is built up with dwelling houses at intervals of less than 300 feet for a distance of one-quarter mile or more.

The Commissioner of Transportation has the authority to set regulatory speed limits if the values above are not appropriate for the highway based on an engineering study and traffic investigation. Many factors are considered in the study, which are defined under the General Driver Speed Considerations (previously described) below.

Physical roadway characteristics (AASHTO General Driver Speed Consideration 1)

- road type and condition
- sufficient length of roadway (1/4 mile minimum)
- sight distances (curve, hill, etc.)
- test drive results

Amount of roadway interference (AASHTO General Driver Speed Consideration 2)

- location and type of access points

Presence of other vehicles (AASHTO General Driver Speed Consideration 4)

- crash history
- traffic volume

Speed limitations (AASHTO General Driver Speed Consideration 5)

- existing traffic control devices

While the above factors are important in setting regulatory speed limits, the **most important factor is a speed study**, which determines actual vehicle operating speed (defined earlier) on the roadway.

Statutory Speed-limits in Other States (Wisconsin)

The legal speed limits and the authority for setting speed limits are different in each state. For example, in Wisconsin the statutory speed limits are the following:

- 25 mph on any highway or service road within the corporate limits of a city or village, other than on highways in outlying districts.
- 35 mph in any outlying district, or any highway in a semi-urban district outside the corporate limits of a city or village.
- 55 mph on other roads
- 65 mph on freeways and expressways

Also in Wisconsin, the authority for setting speed limits that are different than those defined in the statute rests with the local road jurisdiction rather than the state as in Minnesota. The statute still requires an engineering study be completed to determine the appropriate speed and also defines the amount the speed limit can vary from the statute.

Design Speed

Roadway geometric criteria (condition (1)) are based on the **design speed**. The design speed is chosen by the designer based on three general conditions mentioned before and provided below. The designer considers these factors in order to provide a roadway or street design that meets the driver's expectations. In general, driver expectations are to travel at higher speeds on arterials than on collectors, and higher speeds on collectors compared to residential streets. The consideration of driver expectations ideally results in operating speeds that are consistent with the design speed. AASHTO also explains: "except for local streets where speed controls are frequently included intentionally, every effort should be made to use as high a design speed as practical to attain a desired degree of safety, mobility, and efficiency within the constraints of environmental quality, economics, aesthetics, and social or political impacts."

Therefore when selecting the design speed the designer considers the following:

Amount of roadside interference (AASHTO General Driver Speed Consideration 2),

- surrounding land use density
- pedestrian and/or bicycle activity
- proposed or existing access density

Presence of other vehicles (*AASHTO General Driver Speed Consideration 4*)

- existing and forecasted ADT
- existing and desired LOS
- functional classification (arterial vs. local road)
- safety – existing crashes and/or anticipated crash frequency

Speed limitations (*AASHTO General Driver Speed Consideration 5*)

- posted speed (existing and /or future)
- existing and/or proposed traffic control devices (signals, roundabouts, stop signs)

New Construction vs. Reconstruction

When reconstructing existing roadways there are often significant limitations in the application of design restrictions to reduce travel speed. This is particularly true if the existing roadway is relatively flat and straight. Even if the roadway were redesigned for lower speeds (i.e., 30 mph), it still would be likely to operate at much higher travel speeds given the core alignment. With new roads in undeveloped areas, on the other hand, it is generally easier to incorporate design elements that could reduce travel speed.

Federal Guidelines

When a roadway project receives Federal funding for construction/reconstruction it must conform to State Aid Standards. It is not a requirement that the design speed is the same as the posted speed.

Summary

In summary, the purpose of this memo was to provide clarification on the various definitions of “speed” as used by transportation professionals. While the roadway designer selects the appropriate speed to use for design, which in turn determines the physical characteristics of the roadway, the design speed is chosen based on many factors that are outside the control of the designer. Examples may include the project setting and adjacent land use, as well as speed limits that are set by statute. The goal is to select a design speed that will be consistent with the future operating speeds on the roadway and the speed limit.

APPENDIX 4

Pros and Cons of Capping Corridors

**Pros and Cons on Capping Roadway Corridor Size
Woodbury Roadway Corridor Design Principles Task Force
October 5, 2007**

The following is a compilation of comments pro and con received from Task Force members and identified at the Sept. 10 meeting:

Pros for Capping the Size of Roadway Corridors

Flexibility/Mobility issues (from the Pro's viewpoint people and roadway designers provide the flexibility)

- “If you build it, they will come. When we increase capacity, we draw traffic away from more congested routes. It then becomes a never-ending cycle of construction, congestion, construction, congestions, etc. Without a cap, there is no end to it--the roads just keep getting wider.
- Limited roadway corridors can encourage people to drive less, combine trips, walk or bike more, utilize transit if available. Necessity is the mother of invention.
- There are roadways all over the metro that carry more traffic than our roads, but aren't as big as Woodbury's. Development occurred around these corridors before the traffic demand got heavy. Yet they still function. Drivers adapt when they have to.
- If the cap results in unacceptable congestion, then the City needs to build more, smaller roads that can serve as relievers at peak hours. Need some “in between” roads that serve as both neighborhood accesses and a collector function.
- Limitation forces greater creativity

Livability/Sustainability

- We owe it to pedestrians and cyclists to make it 1) not difficult and 2) not dangerous. If we are serious about supporting sustainability there has to be a cap on the roadway size so that the system retains a human scale that can support pedestrian use.
- Limit concrete jungle effect, making Community more livable from a pedestrian perspective
- Congestion can mean lower speeds, less noise, and a more pedestrian-friendly environment.
- Assures that process to balance safety, mobility, livability and sustainability is implemented
 - There are additional capital and maintenance costs associated with maintaining wider roadway corridors and medians. These costs may be even less supportable if the increased width is only needed at peak hours.
 - There are additional environmental impacts from wider corridors (storm water impacts).

- Places city desires and practices ahead of default traffic engineering standards
- Narrower corridors are more context-sensitive (designed with surrounding area in mind). Should plan corridors in the context of the full city plan instead of localized traffic needs.

Other

- Assures current and future adjacent property owners on the extent of improvements

Cons for Capping the Size of Roadway Corridors

Flexibility/Mobility (from the Con's view, the flexibility is in the corridor design)

- Lose flexibility
 - Makes it more expensive and difficult to expand in the future (Super Target example)
 - Limits ability to adjust to changes in standards
 - Need to accommodate future population growth
 - Does not leave future designs and decisions to future decision-makers
 - May not correctly predict or accommodate future technologies (roundabouts, transit). More transportation alternatives require additional infrastructure and potentially more space
 - More difficult to respond to future zoning/land use changes in the surrounding area
 - Limits space for future utilities and landscaping

Livability/Sustainability

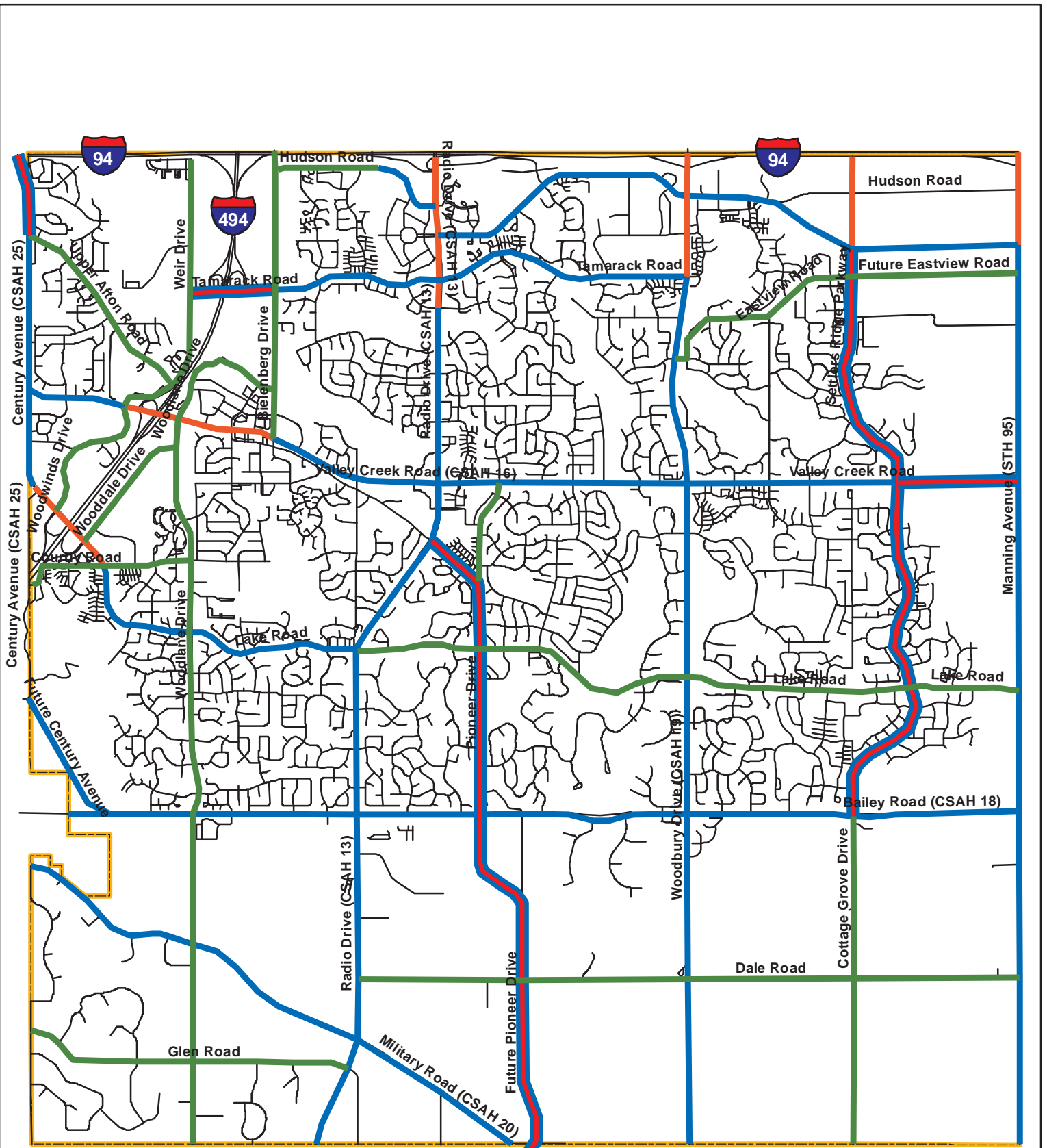
- When a property develops, it is the only time City has developers on the hook for costs of obtaining right of way
- Ignoring or deciding now not to address potential future needs will ensure degraded level of services, delays, additional pollution. This will affect livability for those living adjacent to the roadways and wasted dollars in additional fuel
- Reduction in safety due to congestion and speed differential
- Increased noise due to more frequent starting and stopping
- Negative impact to business due to congestion and disincentive for people to visit area
- Loss of people's time due to increased delay
- Negative impact on local streets – increased traffic, noise, reduced safety – due to diverted traffic

Other

- Difficult to get buy in from Washington County and MnDOT. Many roads under consideration are under the jurisdiction of other agencies.
- The individual motor vehicle is likely to remain a major form of transportation for a long time
- Cost to retrofit, or purchase additional ROW in the future will be much more costly than planning for it now.
- City residents expect the City to solve or prevent congestion problems
- May not meet design criteria required by other regulatory agencies
- May impact ability to receive outside funding from Washington County, Mn/DOT, Federal Highway Administration
- Impact to adjacent properties after they have developed if additional right of way must be acquired in the future

APPENDIX 5

City-wide Corridor Map



- A Corridor
- B Corridor
- C Corridor
- Further Discussion
- City Boundary

Roadway Corridor Design Principles
Corridors A, B, and C



APPENDIX 6

Corridor Design Guidelines

NOTE: Corridor Design Guidelines are not included in the printed or electronic version of the report for file and report size considerations. The Corridor Design Guidelines are saved in the electronic file as Appendix 6 at:

J:\PROJECT\140 Admin - Studies (Traffic) 101 thru 107\107 - Roadway Corridor Design Principles Task Force\Report\Final



3.2 Local Street

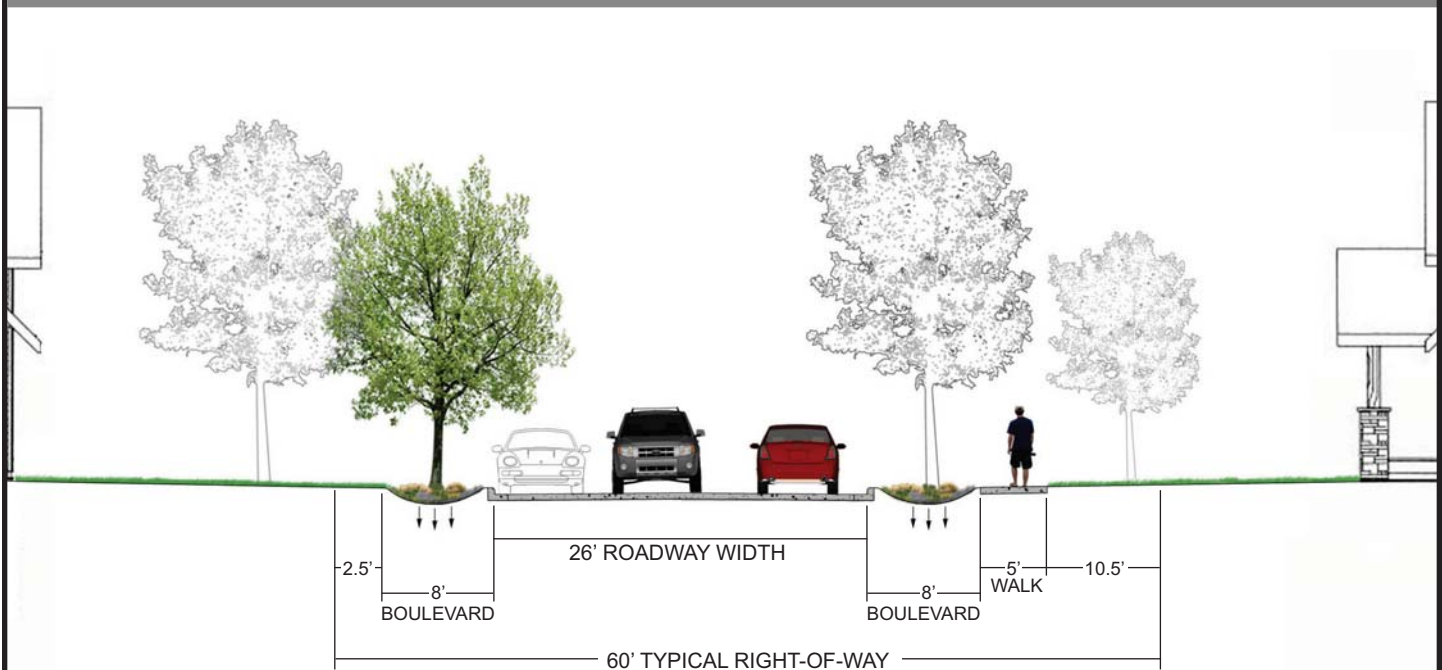
For the Living Streets Policy, the Local Street will be those with a Local Street functional classification.

The Task Force reached consensus on the following aspects regarding Local Streets:

- Parking should be provided along one side of the street. Studies have shown that for a typical residential street, making provisions for parking along both sides is excessive, and the parking capacity is underutilized.
- Sidewalks should be considered along one side of each local street. However the need would be determined based on a context sensitive application. City Code requirements shall be followed where they are more prescriptive than the Living Streets Policy (i.e. requirements for sidewalks on both sides of the street in the Mixed-Use Zoning District).
- If a sidewalk is not provided, the street pavement width should be wider to accommodate a shared purpose of bikes/pedestrians along the street edge.
- For streets where a sidewalk is deemed applicable, options could be provided to install sidewalk along one or both sides of the street.
- Sidewalks would be required if the street abuts or is in the vicinity of a school or park, is identified with a sidewalk in the Comprehensive Plan, or is part of a larger network of pedestrian routes.

Design templates showing options 1 through 3 are provided for Local Streets.

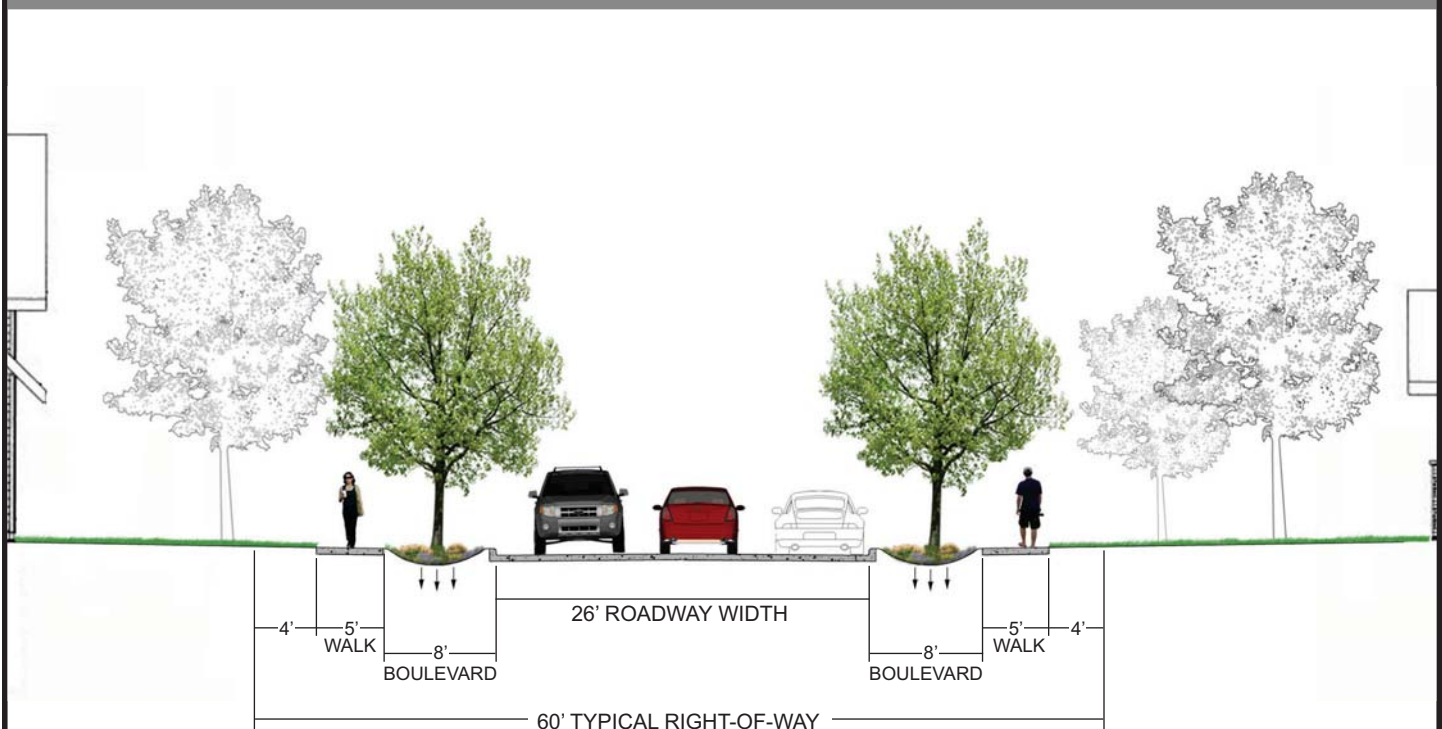
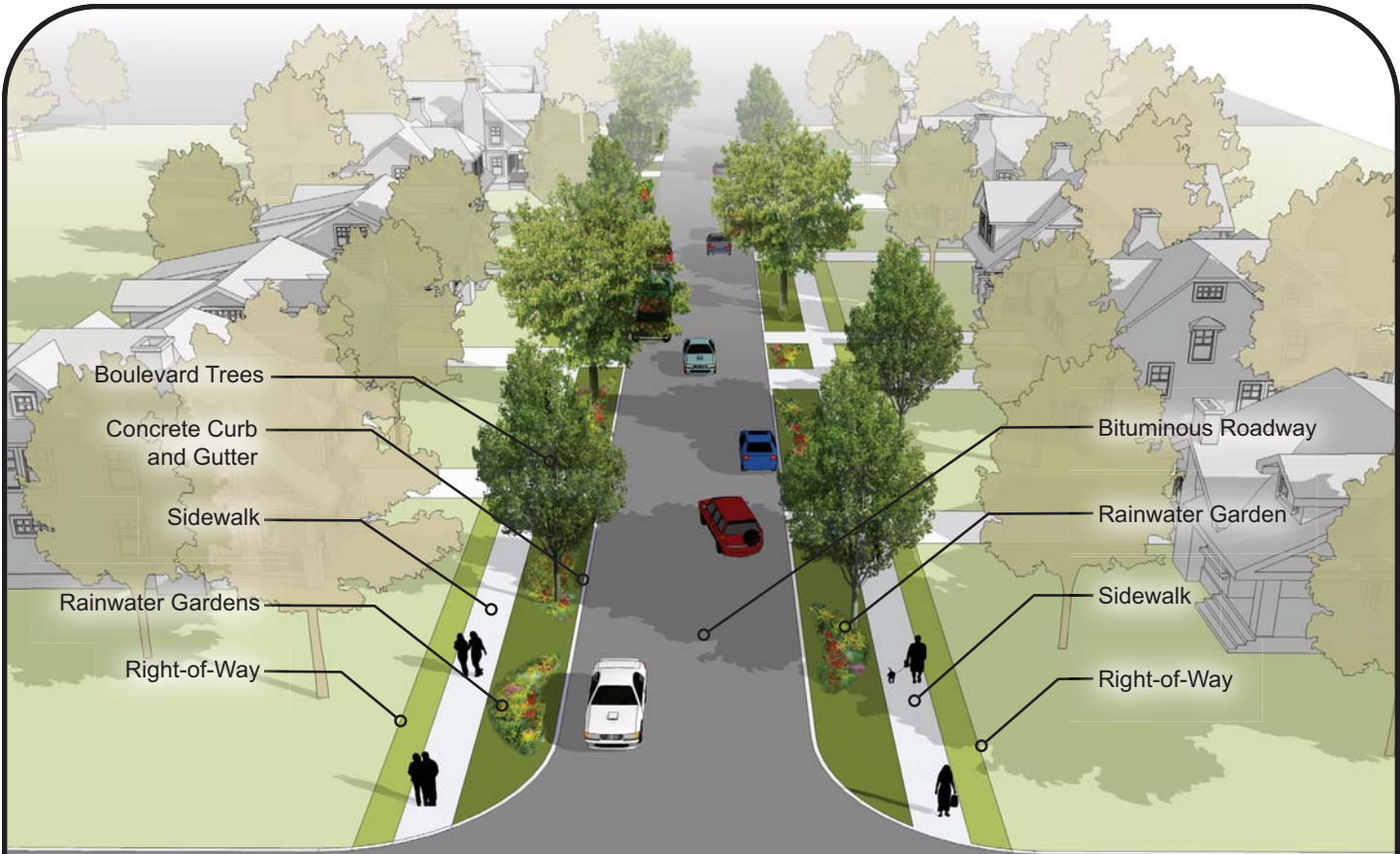




Note: 24' roadway width may be considered in appropriate context

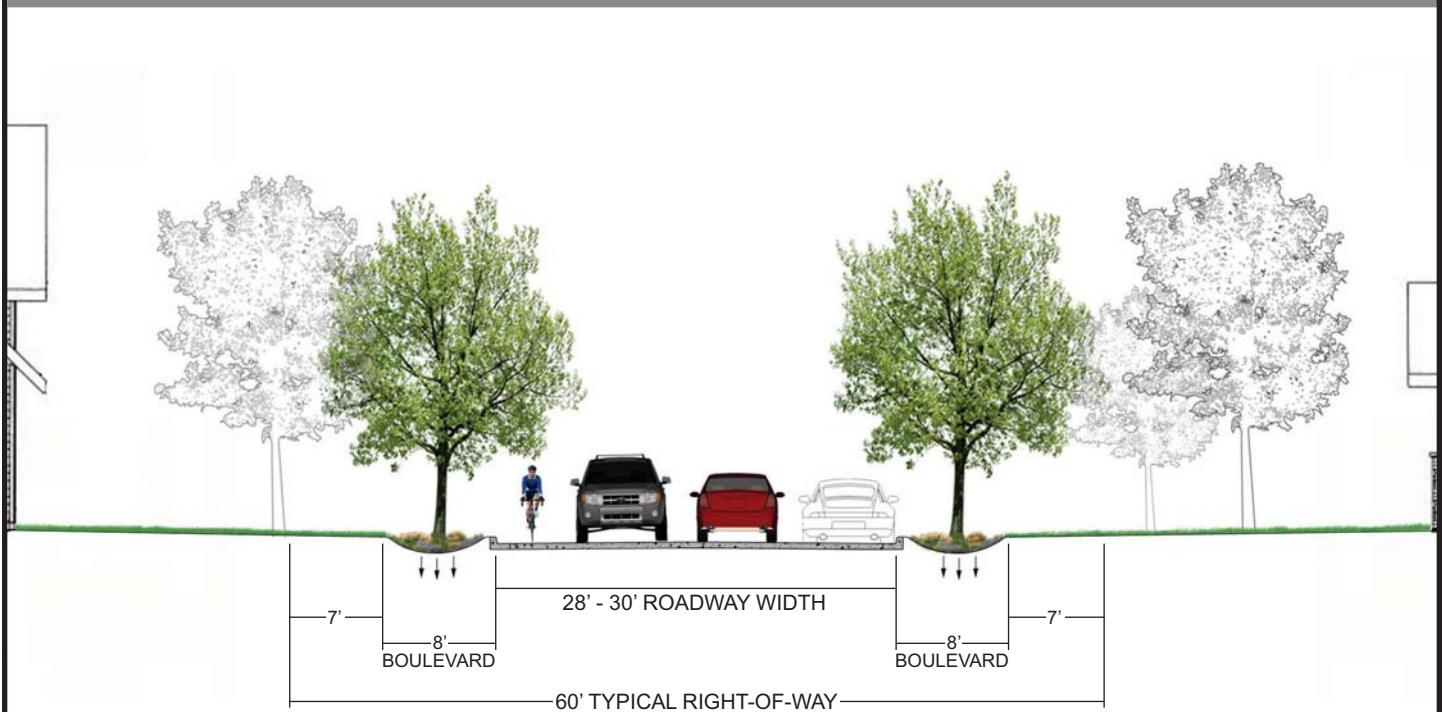
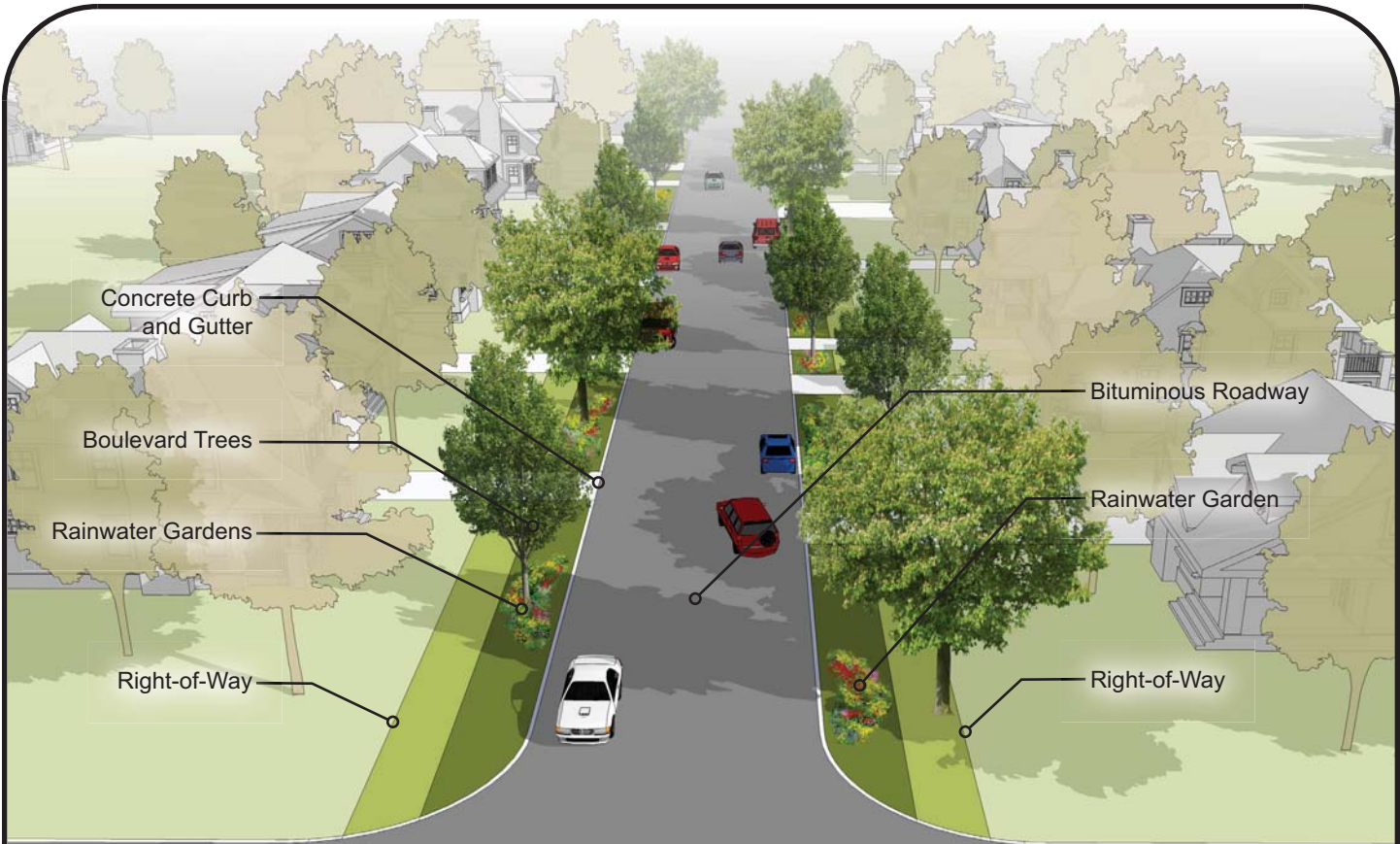
Local Street | Option 1





Note: 24' roadway width may be considered in appropriate context





Note: Sidewalk required if street abuts or is in vicinity of a school or park

Local Street | Option 3





3.3 Local Connector Street

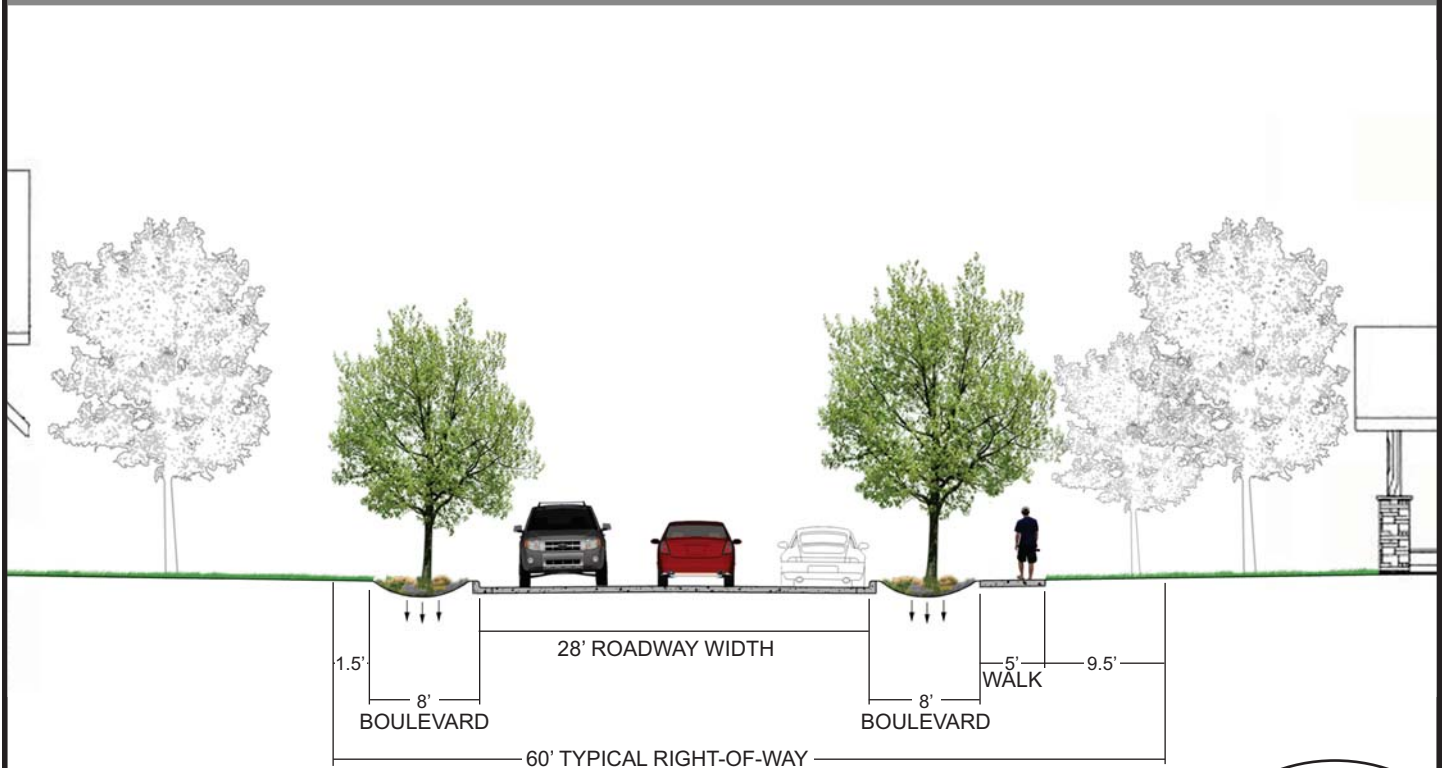
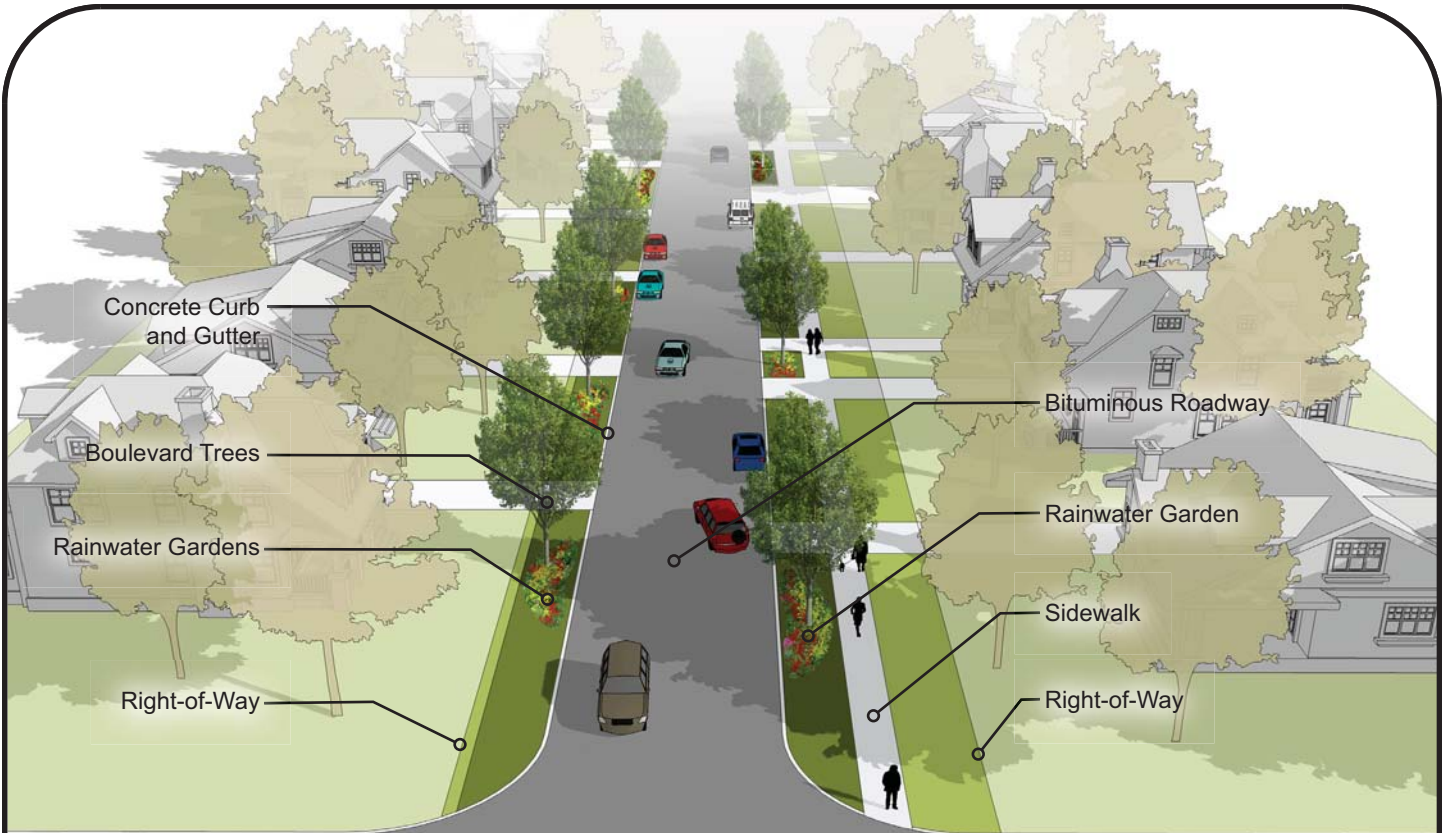
A Local Connector Street will be considered those with a Local Street functional classification, but that have a particular characteristic such as a higher than average volume of vehicular and/or pedestrian traffic, or that connect natural elements. For example, a residential street that funnels traffic between the interior of a neighborhood and the entrance/exit to the neighborhood, or to a nearby street with a Collector or Minor Arterial functional classification. Or a residential street that spans between two streets with sidewalks or trails along them, making it a natural link in the network.

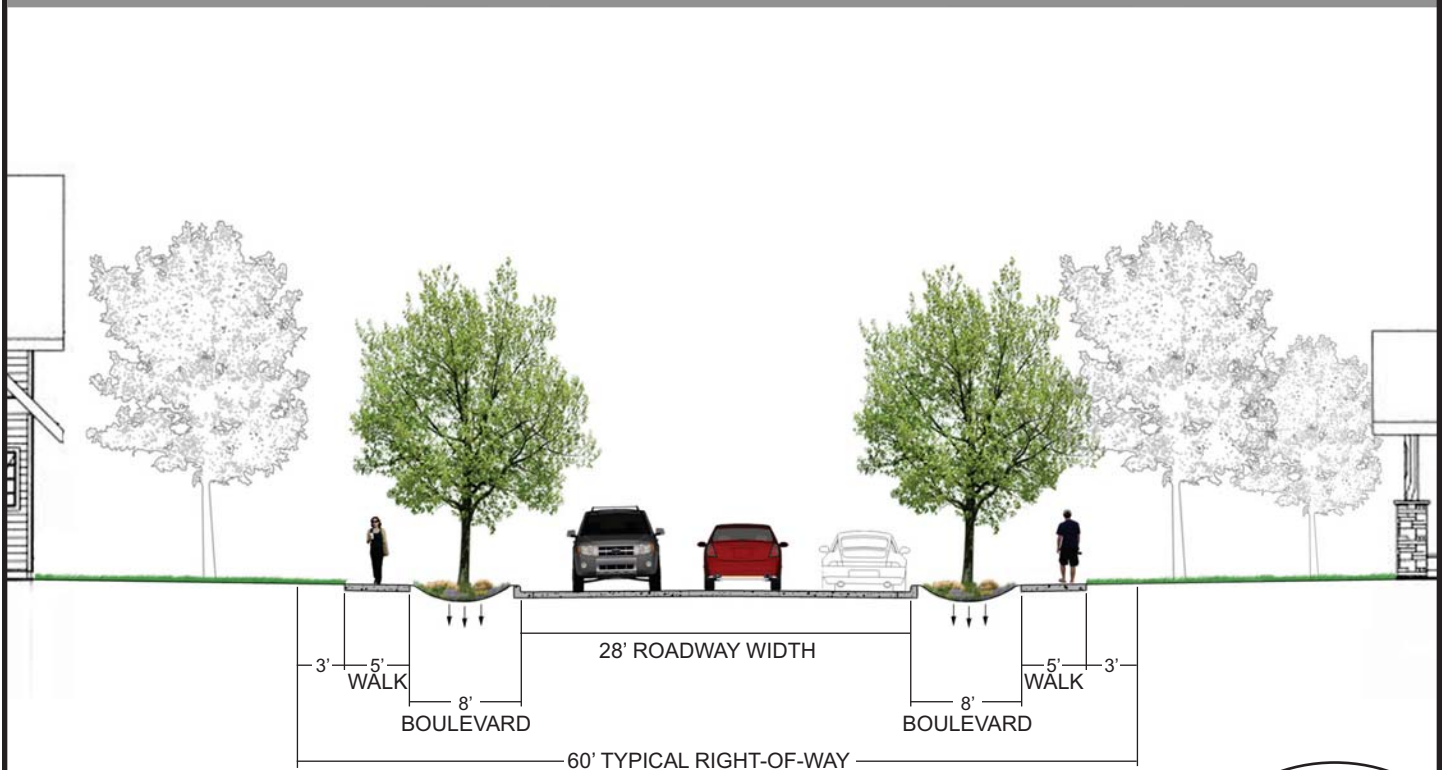
The Task Force reached consensus on the following aspects regarding Local Connector Streets:

- Parking should be provided along one side of the street, for the same reasons cited as the Local Street.
- Sidewalks need to be provided along this type of street, to provide neighborhood connections and to pedestrian facilities along Collectors and Minor Arterials.
- Options could be provided to install sidewalk along one or both sides of the street.

Design templates showing options 1 and 2 are provided for Local Connector Streets.







APPENDIX D

FIRE APPARATUS ACCESS ROADS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION D101 GENERAL

D101.1 Scope. Fire apparatus access roads shall be in accordance with this appendix and all other applicable requirements of the *International Fire Code*.

SECTION D102 REQUIRED ACCESS

D102.1 Access and loading. Facilities, buildings or portions of buildings hereafter constructed shall be accessible to fire department apparatus by way of an *approved* fire apparatus access road with an asphalt, concrete or other *approved* driving surface capable of supporting the imposed load of fire apparatus weighing at least 75,000 pounds (34 050 kg).

SECTION D103 MINIMUM SPECIFICATIONS

D103.1 Access road width with a hydrant. Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet (7925 mm), exclusive of shoulders (see Figure D103.1).

D103.2 Grade. Fire apparatus access roads shall not exceed 10 percent in grade.

Exception: Grades steeper than 10 percent as *approved* by the fire chief.

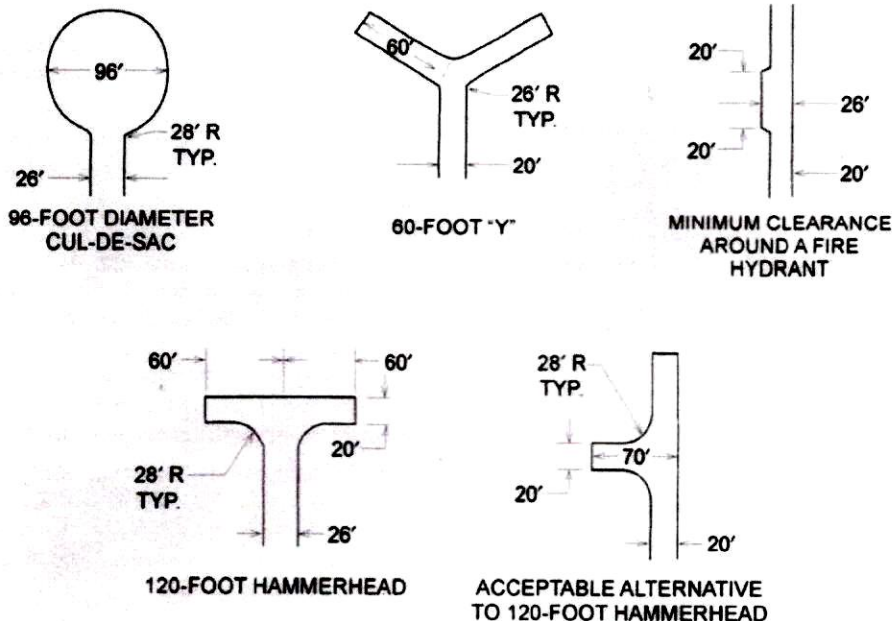
D103.3 Turning radius. The minimum turning radius shall be determined by the *fire code official*.

D103.4 Dead ends. Dead-end fire apparatus access roads in excess of 150 feet (45 720 mm) shall be provided with width and turnaround provisions in accordance with Table D103.4.

**TABLE D103.4
REQUIREMENTS FOR DEAD-END
FIRE APPARATUS ACCESS ROADS**

LENGTH (feet)	WIDTH (feet)	TURNAROUNDS REQUIRED
0-150	20	None required
151-500	20	120-foot Hammerhead, 60-foot "Y" or 96-foot diameter cul-de-sac in accordance with Figure D103.1
501-750	26	120-foot Hammerhead, 60-foot "Y" or 96-foot diameter cul-de-sac in accordance with Figure D103.1
Over 750		Special approval required

For SI: 1 foot = 304.8 mm.



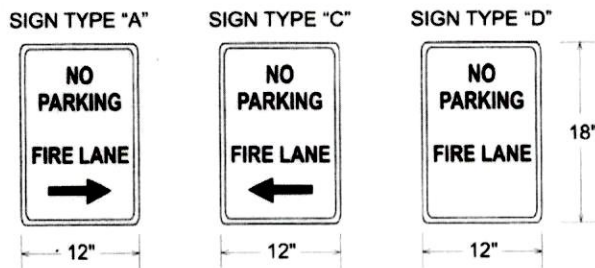
For SI: 1 foot = 304.8 mm.

**FIGURE D103.1
DEAD-END FIRE APPARATUS ACCESS ROAD TURNAROUND**

D103.5 Fire apparatus access road gates. Gates securing the fire apparatus access roads shall comply with all of the following criteria:

1. The minimum gate width shall be 20 feet (6096 mm).
2. Gates shall be of the swinging or sliding type.
3. Construction of gates shall be of materials that allow manual operation by one person.
4. Gate components shall be maintained in an operative condition at all times and replaced or repaired when defective.
5. Electric gates shall be equipped with a means of opening the gate by fire department personnel for emergency access. Emergency opening devices shall be approved by the fire code official.
6. Manual opening gates shall not be locked with a padlock or chain and padlock unless they are capable of being opened by means of forcible entry tools or when a key box containing the key(s) to the lock is installed at the gate location.
7. Locking device specifications shall be submitted for approval by the fire code official.
8. Electric gate operators, where provided, shall be listed in accordance with UL 325.
9. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F2200.

D103.6 Signs. Where required by the fire code official, fire apparatus access roads shall be marked with permanent NO PARKING—FIRE LANE signs complying with Figure D103.6. Signs shall have a minimum dimension of 12 inches (305 mm) wide by 18 inches (457 mm) high and have red letters on a white reflective background. Signs shall be posted on one or both sides of the fire apparatus road as required by Section D103.6.1 or D103.6.2.



**FIGURE D103.6
FIRE LANE SIGNS**

D103.6.1 Roads 20 to 26 feet in width. Fire lane signs as specified in Section D103.6 shall be posted on both sides of fire apparatus access roads that are 20 to 26 feet wide (6096 to 7925 mm).

D103.6.2 Roads more than 26 feet in width. Fire lane signs as specified in Section D103.6 shall be posted on one side of fire apparatus access roads more than 26 feet wide (7925 mm) and less than 32 feet wide (9754 mm).

**SECTION D104
COMMERCIAL AND INDUSTRIAL DEVELOPMENTS**

D104.1 Buildings exceeding three stories or 30 feet in height. Buildings or facilities exceeding 30 feet (9144 mm) or three stories in height shall have at least two means of fire apparatus access for each structure.

D104.2 Buildings exceeding 62,000 square feet in area. Buildings or facilities having a gross building area of more than 62,000 square feet (5760 m²) shall be provided with two separate and approved fire apparatus access roads.

Exception: Projects having a gross building area of up to 124,000 square feet (11 520 m²) that have a single approved fire apparatus access road when all buildings are equipped throughout with approved automatic sprinkler systems.

D104.3 Remoteness. Where two fire apparatus access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the lot or area to be served, measured in a straight line between accesses.

**SECTION D105
AERIAL FIRE APPARATUS ACCESS ROADS**

D105.1 Where required. Where the vertical distance between the grade plane and the highest roof surface exceeds 30 feet (9144 mm), approved aerial fire apparatus access roads shall be provided. For purposes of this section, the highest roof surface shall be determined by measurement to the eave of a pitched roof, the intersection of the roof to the exterior wall, or the top of parapet walls, whichever is greater.

D105.2 Width. Aerial fire apparatus access roads shall have a minimum unobstructed width of 26 feet (7925 mm), exclusive of shoulders, in the immediate vicinity of the building or portion thereof.

D105.3 Proximity to building. At least one of the required access routes meeting this condition shall be located within a minimum of 15 feet (4572 mm) and a maximum of 30 feet (9144 mm) from the building, and shall be positioned parallel to one entire side of the building. The side of the building on which the aerial fire apparatus access road is positioned shall be approved by the fire code official.

D105.4 Obstructions. Overhead utility and power lines shall not be located over the aerial fire apparatus access road or between the aerial fire apparatus road and the building. Other obstructions shall be permitted to be placed with the approval of the fire code official.

SECTION D106**MULTIPLE-FAMILY RESIDENTIAL DEVELOPMENTS**

D106.1 Projects having more than 100 dwelling units. Multiple-family residential projects having more than 100 dwelling units shall be equipped throughout with two separate and approved fire apparatus access roads.

Exception: Projects having up to 200 dwelling units may have a single approved fire apparatus access road when all buildings, including nonresidential occupancies, are equipped throughout with approved automatic sprinkler systems installed in accordance with Section 903.3.1.1 or 903.3.1.2.

D106.2 Projects having more than 200 dwelling units. Multiple-family residential projects having more than 200 dwelling units shall be provided with two separate and approved fire apparatus access roads regardless of whether they are equipped with an approved automatic sprinkler system.

SECTION D107**ONE- OR TWO-FAMILY RESIDENTIAL DEVELOPMENTS**

D107.1 One- or two-family dwelling residential developments. Developments of one- or two-family dwellings where the number of dwelling units exceeds 30 shall be provided with two separate and approved fire apparatus access roads, and shall meet the requirements of Section D104.3.

Exceptions:

1. Where there are more than 30 dwelling units on a single public or private fire apparatus access road and all dwelling units are equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3 of the *International Fire Code*, access from two directions shall not be required.
2. The number of dwelling units on a single fire apparatus access road shall not be increased unless fire apparatus access roads will connect with future development, as determined by the fire code official.

D108**REFERENCED STANDARDS**

ASTM	F2200—05	Standard Specification for Automated Vehicular Gate Construction	D103.5
ICC	IFC—12	International Fire Code	D101.5, D107.1
UL	325—02	Door, Drapery, Gate, Louver, and Window Operators and Systems, with Revisions through February 2006	D103.5