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Appendix D: Functional Classification Criteria and Characteristics and Mn/DOT Access Guidance

Functional classification involves determining what function each roadway should perform before determining street widths, speed limits, intersection control or other design features. Functional classification ensures that non-transportation factors, such as land use and development, are taken into account when planning and designing streets and highways.

A major use of functional classification is to determine which routes should be on the Metropolitan Highway System. Functional classification is also used to decide which roads to use for transit service. Once function is established, appropriate or desirable design and operational characteristics can be used as further guidelines for implementation.

Typical functional classification system criteria are presented in Tables D-1, D-3, D-4 and D-6. Typical functional classification system characteristics are shown in Tables D-2, D-5, and D-7. The criteria are intended to be the primary tool for determining the function of a roadway. The characteristics are intended to be guidelines when plans are developed for a given classified route. However, if the characteristics are significantly different for a given highway, they may be used to supplement the criteria in making final decision on the function of that given highway. Generalized Summary of Mn/DOT Access Guidance for the Metropolitan Area is shown in Table D-8.

Within the seven-county metropolitan area the functional classification system consists of four classes of roads: principal arterials (which include all freeways), minor arterials, collector streets and local streets. The Metropolitan Highway System includes all principal arterials and is supplemented by a subgroup of “A” minor arterials. These “A” minor arterials are divided into four subcategories: Augmentors, Relievers, Expanders and Connectors. Principal Arterials and “A” minor arterials are eligible to compete for federal funds.

Principal Arterials

The Metropolitan Highway System is composed of all the principal arterials in the region. Principal arterials consist primarily of Interstate highways and other freeways or expressways, most of them owned and operated by Mn/DOT, with three under the jurisdiction of counties or cities. The emphasis of principal arterials is on mobility rather than land access. Among other functions, they connect the region with other areas in the state and other states. Principal arterials also connect the metro centers to major commercial concentrations. At present, principal arterials connect with other principal arterials, select minor arterials and collectors and some local streets. In the future, new connections to the principal arterials should be limited to other principal arterials and select “A” minor arterials. Principal Arterials provide for the longest trips in the region and express bus service.

Principal arterial spacing varies from 2 to 3 miles in the developed area, from 2 to 6 miles in the developing area--depending on the density of planned development-- and from 6 to 12 miles in the rural area. Where urban level development is planned, spacing of principal arterials or future principal arterials may be 2 to 3 miles. Principal arterials other than interstate freeways provide land access somewhat more frequently than Interstate freeways.

Minor Arterials

The minor arterial system supplements the Metropolitan Highway System in several ways: Minor arterials connect the urban service area to cities and towns inside and outside the region. They interconnect the rural centers in the region to one another and to those just outside the region. Minor arterials provide supplementary connections between the two metro centers and the regional business concentrations. They connect major traffic generators within the central business districts (CBDs) and the regional business concentrations.

In the urban area the emphasis of minor arterials is on mobility as opposed to access, and only concentrations of commercial or industrial land uses should have direct access to them. Minor arterials should connect to principal arterials, other minor arterials and collectors. Connections to some local streets are acceptable. Minor arterials should serve medium-to-short trips. Both local and limited-stop transit use minor arterials.

The spacing of minor arterials in the metro centers and regional business concentrations will vary from one-fourth to three-fourths mile. Typically, in the developed area, minor arterials should be spaced every one-half to one mile. In the developing area, one-to-two-mile spacing is adequate, but to accommodate urban development in the future, one-half to two mile spacing is needed. The criteria and characteristics of minor arterials apply to all minor arterials. The "A" minor arterials are described below and the Criteria of the four types of "A" minor Arterials are described in Table D-3.1.

Collector Streets

The collector system provides connection between neighborhoods and from neighborhoods to minor business concentrations. It also provides supplementary interconnections of major traffic generators within the metro centers and regional business concentrations. Mobility and land access are equally important. Direct land access should primarily be to development concentrations. Collectors connect primarily to minor arterials.

Typically, collectors serve short trips of one to four miles. Local transit uses these streets. Spacing in the metro centers and regional business concentrations may vary from one-eighth to one-half mile. In the developed area, collectors are needed one-fourth to three-fourths mile apart. In the developing area, spacing may range from one-half to one mile and may service existing development, but one-fourth to three-fourth mile spacing may be required in the future.

Local Streets

Local streets connect blocks and land parcels. The primary emphasis is on land access. In most cases, local streets connect to other local streets and collectors. In some cases, they connect to minor arterials. Local streets serve short trips at low speeds. In the urban area, local streets could be spaced as close as 300 feet, while in the rural area, one-mile spacing may be adequate.

Figure D-1: Functional Classification System Criteria for Principal Arterials

Criterion	Freeway Principal Arterial		Other Principal Arterial	
	Urban	Rural	Urban	Rural
Place Connections	Interconnect the metro centers and regional business concentrations, important transportation terminals and large institutional facilities within the MUSA.	Connect the MUSA with urban areas and major cities in Minnesota and other states.	Interconnect the metro centers and regional business concentrations, important transportation terminals and large institutional facilities within the MUSA.	Connect the MUSA with major cities in Minnesota and other states.
Spacing	Developed Planning Area: 2-3 miles Developing Planning Area: Spacing should vary in relation to density of travelshed development, 2-6 miles.	Rural Planning Area: 6-12 miles. Closer spacing may be required to connect portions of Urban Planning Areas to each other or to Rural Centers.	Developed Planning Area: 2-3 miles. Developing Planning Area: Spacing should vary in relation to density of development, 2-6 miles.	Rural Planning Areas: 6-12 miles. Closer spacing may be required to connect portions of Rural Planning Areas to each other or to Rural Centers.
Management	Maintain at least 40-mph average speed during peak-traffic periods.	Retain ability to meet urban speed objective if and when area urbanizes.	Maintain at least 40-mph average speed during peak- traffic periods.	Retain ability to meet urban speed objective if and when area urbanizes.
System Connections and Access Spacing*	To other Interstate freeways, other principal arterials and selected "A" minor arterials. Connections between principal arterials should be of a design type that does not require vehicles to stop. Access at distances of 1-2 miles.	To other Interstate freeways, principal arterials, and selected "A" minor arterials. Access at distances of 2-6 miles.	To Interstate freeways, other principal arterials, and selected "A" minor arterials. Connections between principal arterials should be of a design type that does not require vehicles to stop. Intersections should be limited to 1-2 miles.	To Interstate freeways, other principal arterials, and selected "A" minor arterials. Intersections should be limited to 2 miles or more.
Trip-Making Service	Trips greater than 8 miles with at least 5 continuous miles on principal arterials. Express transit trips.		Trips greater than 8 miles with at least 5 continuous miles on principal arterials. Express transit trips.	
Mobility vs. Land Access*	Emphasis is placed on mobility rather than land access. No direct land access should be allowed.	Emphasis is placed on mobility rather than land access. No direct land access should be allowed.	Greater emphasis is placed on mobility than on land access. Little or no direct land access within the urban area.	Greater emphasis is placed on mobility than on land access. Little or no direct land access.

*The key objective is stated under "Management" heading in this table.

Table D-2: Functional Classification System Characteristics for Principal Arterials

Characteristics	Freeway Principal Arterial		Other Principal Arterial	
	Urban	Rural	Urban	Rural
System Mileage	Suggested limits for Interstate and other principal arterials at 5-10% of system.	Suggested limits for Interstate and other principal arterials at 2-4% of system.	See "Freeway."	See "Freeway."
Percent of Vehicle Miles Traveled	Suggested limits for Interstate and other principal arterials at 40-65% of system.	Suggested limits for Interstate and other principal arterials at 30-55% of system.	See "Freeway."	See "Freeway."
Intersections	Grade separated.	Grade separated.	Grade separated desirable. At a minimum, high-capacity controlled at-grade intersections.	High-capacity controlled at-grade intersections.
Parking	None.	None.	None.	None.
Large Trucks	No restrictions.	No restrictions.	No restrictions.	No restrictions.
Management Tools	Ramp metering, preferential treatment for transit, interchange spacing.	Interchange spacing.	Ramp metering, preferential treatment for transit, access control, median barriers, traffic signal progression, staging of reconstruction, intersection spacing.	Access control, intersection spacing.
Vehicles Carried	25,000-200,000	5,000-50,000	15,000-100,000	2,500 - 25,000
Posted Speed Limit	45-55 mph	55-65 mph	40-50 mph	Legal limit
Right-of-Way	300 feet	300 feet	100 - 300 feet	100 - 300 Feet
Transit Accommodations	Priority access and movement for transit in peak periods where needed.	None.	Priority access and movement for transit in peak periods where possible and needed.	None.

Table D-3: Functional Classification System Criteria for Minor Arterials

Criterion	Minor Arterial (“A” or “B”)	
	Urban	Rural
Place Connections	Provide supplementary connections to metro centers and regional business concentrations within the MUSA. Provide interconnection of major traffic generators within the metro centers and regional business concentrations.	Connect the MUSA with cities and towns in Minnesota outside the Twin Cities region. Interconnect rural growth centers inside the Twin Cities region and comparable places near the Twin Cities region.
Spacing	Metro centers and regional business concentrations: 1/4-3/4 mile. Developed area: 1/2-1 mile. Developing area: 1-2 miles.	Rural Areas: As needed, in conjunction with the major collectors, provide adequate interconnection of places identified in “Place Connections” criterion.
System Connections	To most Interstate freeways and other principal arterials, other minor arterials and collectors and some local streets.	To most Interstate freeways and other principal arterials, other minor arterials and collectors, and some local streets.
Trip-Making Service	Medium-to-short trips (2-6 miles depending on development density) at moderate speeds. Longer trips accessing the principal arterial network. Local and limited-stop transit trips.	
Management	Maintain the following minimum average speed during peak-traffic periods: Metro centers and regional business concentrations - 15 mph. Fully developed area - 20 mph. Developing area - 30 mph.	Retain ability to meet urban speed objective if and when area urbanizes.
Mobility vs. Land Access*	Emphasis on mobility rather than on land access. Direct land access within the MUSA restricted to concentrations of commercial/ industrial land uses.	Emphasis on mobility rather than on land access.

*The key objective is stated under “Management” heading in this table.

Table D-4: Additional Criteria for “A” Minor Arterials

Criteria	“A” Minor Arterial Categories			
	Relievers	Augmentors	Expanders	Connectors
Use	Provide direct relief for traffic on Metropolitan Highway Principal Arterials	Augment the Principal Arterial System within the I-494/I-694 Beltway	Provide connection between developing areas outside the beltway, connect principal arterials	Provide connection between rural town centers in the rural area
Location	Developed and developing areas within the MUSA and post-2030 long-term service area (LTSA)	Within the I-494 / I-694 Beltway	Outside the I-494 / I-694 Beltway within the MUSA or post-2030 long-term service area (LTSA)	In or near the seven county area, one end may be in the urban area
Trip Length	Medium length Trips less than 8 miles	Medium to long trips	Medium to long trips	Medium to long trips
Problem Addressed	Relief of parallel congested Principal Arterials	Serve Principal Arterial function where PAs don't exist	Accommodate added urban development	Improve the safety and directness of routes without continuous lane adds
Existing System	400 miles	200 miles	650 miles	680 miles

Table D-5: Functional Classification System Characteristics for Minor Arterials

Characteristics	Minor Arterial (“A” or “B”)	
	Urban	Rural
System Mileage	Suggested limits for principal arterials and minor arterials at 15-25% of system.	Suggested limits for principal arterials and minor arterials at 6-12% of system
Percent of Vehicle Miles Traveled	Suggested limits for principal arterials and minor arterials at 65-80% of system.	Suggested limits for principal arterials and minor arterials at 45-75% of system.
Intersections	Traffic signals and cross-street stops.	Cross-street stops.
Parking	Restricted as necessary.	Restricted as necessary.
Large Trucks	Restricted as necessary.	Restricted as necessary.
Management Tools	Traffic signal progression and spacing, land access management/control, preferential treatment for transit.	Land access management/control.
Vehicles Carried Daily	5,000-30,000	1,000-10,000
Posted Speed Limit	35-45 mph	Legal limit
Right-of-Way	60-150 feet	60-150 feet
Transit Accommodations	Preferential treatment where needed.	None.

Table D-6: Functional Classification System Criteria for Collectors and Local Streets

Criterion	Collector		Local	
	Urban	Rural	Urban	Rural
Place Connections	Interconnect neighborhoods and minor business concentrations within the MUSA. Provide supplementary interconnection of major generators within the metro centers and regional business concentrations.	Provide supplementary interconnection among rural growth centers inside the Twin Cities region and comparable places near the Twin Cities region.	Interconnect blocks within residential neighborhoods and land parcels within commercial/industrial developments.	
Spacing	Metro centers and regional business concentrations: 1/8 - 1/2 mile. Fully developed area: 1/4 - 3/4 mile. Developing area: 1/2 - 1 mile	Rural Areas: As needed in conjunction with minor arterials, to provide adequate interconnection of places identified in "Place Connections" criterion. In addition, minor collectors should be designated at an average spacing of not less than 4 miles.	As needed to access land uses.	As needed to access land uses.
System Connections	Sometimes to Interstate freeways and other principal arterials. To minor arterials, other collectors and local streets.	To minor arterials, other collectors and local streets.	To a few minor arterials. To collectors and other local streets.	To a few minor arterials. To collectors and local roads.
Trip-Making Service	Short trips (1-4 miles depending on development density) at low-to-moderate speeds. Longer trips accessing the arterial network. Local transit trips.		Short trips (under 2 miles) at low speeds. Longer trips accessing the collector or collector and arterial network.	
Mobility vs. Land Access	Equal emphasis on mobility and land access. Direct land access predominantly to development concentrations.		Emphasis on land access, not on mobility. Direct land access predominantly to residential land uses.	Emphasis on land access, not on mobility. Direct land access predominantly to agricultural land uses.

Table D-7: Functional Classification System Characteristics for Collectors and Local Streets

Characteristics	Collector		Local	
	Urban	Rural	Urban	Rural
System Mileage	Suggested federal limitations: 5-10%.	Suggested federal limitations: 20-25%.	Suggested federal limitations: 65-80%.	Suggested federal limitations: 63-75%
Percent of Vehicle Miles Traveled	Suggested federal limitations: 5-10%.	Suggested federal limitations: 20-35%.	Suggested federal limitations: 10-30%.	Suggested federal limitations: 5-20%.
Intersections	Four-way stops and some traffic signals.	Local street traffic should be required to stop.	As required.	As required.
Parking	Restricted as necessary.	Unrestricted.	Permitted as necessary.	Permitted as necessary.
Large Trucks	Restricted as necessary.	Restricted as necessary.	Permitted as necessary.	Permitted as necessary.
Management Tools	Number of lanes, traffic signal timing, land access management.	Land access management.	Intersection control, cul-de-sacs, diverters.	
Vehicles Carried Daily	1,000-15,000	250-2,500	Less than 1,000	Less than 1,000
Posted Speed Limit	30-40 mph	35-45 mph	Maximum 30 mph	Maximum 30 mph
Right-of-Way	60-100 feet	60-100 feet	50-80 feet	50-80 feet
Transit Accommodations	Cross-sections and geometrics designed for use by regular-route buses.	None.	Normally used as bus routes only in nonresidential areas.	None.

Table D-8: Generalized Summary of Mn/DOT Recommended Public Street Spacing Access in the Twin Cities Metropolitan Area *

	Area or Facility Type	Public Street Spacing		Signal Spacing
		Primary Full-Movement Intersection	Secondary Intersection	
Principal Arterials				
in the Twin Cities Metropolitan Area and Primary Regional Trade Centers (Non-IRCs)	Interstate Freeways	Interchange Access Only		None
	Non-Interstate Freeway	Interchange Access Only		None
	Rural	1 mile	1/2 mile	Only at Primary Intersections
	Urban/Urbanizing	1/2 mile	1/4 mile	Only at Primary Intersections
	Urban Core	300-600 feet, dependent upon block length		1/4 mile
Minor Arterials				
	Rural	1/2 mile	1/4 mile	Only at Primary Intersections
	Urban/Urbanizing	1/4 mile	1/8 mile	Only at Primary Intersections
	Urban Core	300-600 feet, dependent upon block length		
Collectors				
	Rural	1/2 mile	1/4 mile	Only at Primary Intersections
	Urban/Urbanizing	1/8 mile	Not Applicable	1/4 mile
	Urban Core	300-600 feet, dependent upon block length		1/8 mile

* This table is intended to provide a summary of Mn/DOT Access Guidance for the Metropolitan Area. This chart does not reflect all the facets of Mn/DOT guidance. Agencies should work with Mn/DOT, the appropriate county highway authority and the local land use authority when planning new or modified access.