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Defining Transit Areas of Influence

Abstract: This *Recommended Practice* describes the spatial areas in which transit stops and stations typically have the greatest impact on land use and development and from which there is high potential to generate transit ridership. It provides guidance on delineating these areas for the purposes of influencing decisions about private and public investments and services.

Keywords: area of influence, land use, ridership, urban planning

Summary: Increased walking, biking, and other non-transit trips have multiple benefits, both locally and regionally. This *Recommended Practice* focuses on the area where transit can have the greatest influence on supporting shorter trips and non-auto trips in order to maximize the benefits that accrue to local communities and regions as a whole. By planning collaboratively for these transit areas of influence, transit agencies and local jurisdictions can maximize the benefits of transit investments and help these investments have a positive effect on surrounding communities. This document defines transit modes and uses these transit modes to define typical areas of influence. It then identifies factors that can limit or expand the typical area of influence. Finally, it identifies potential usage of the area of influence in planning and development practice.

Scope and purpose: This document takes into account distinctions between transit modes and station area use patterns and the local conditions that may make a specific area larger or smaller than is typical. This standard should be applied in a manner that is sensitive to the regional and local context. The transit area of influence provides a basis for the following: land use planning and development activities; transit planning activities forecasting ridership from transit-supportive communities, transit access requirements and transit parking needs and quantifying expected vehicle miles traveled (VMT) and resultant greenhouse gas (GHG) emissions; planning, design and engineering of street improvements that favor pedestrian activity and access to transit; and identifying an expected area of real estate value creation and investment activity.

This Recommended Practice represents a common viewpoint of those parties concerned with its provisions, namely, transit operating/planning agencies, manufacturers, consultants, engineers and general interest groups. The application of any standards, practices or guidelines contained herein is voluntary. In some cases, federal and/or state regulations govern portions of a rail transit system's operations. In those cases, the government regulations take precedence over this standard. APTA recognizes that for certain applications, the standards or practices, as implemented by individual transit agencies, may be either more or less restrictive than those given in this document.

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The American Public Transportation Association greatly appreciates the contributions of **Sam Zimbabwe** and **Ellen Greenberg**, who provided the primary effort in the drafting of this Recommended Practice.

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Defining Transit Areas of Influence

1. Introduction

1.1 Urban Design Standards Program goals

The Urban Design Standards Program has four goals:

- Support sustainable communities by integrating transit passenger facilities and service into existing and new neighborhoods, corridors and regions.
- Increase transit ridership by more effectively linking transit service with development.
- Improve transit efficiency by integrating transit service and investments with infrastructure improvements and land development.
- Conserve natural resources by development patterns and communities that require less land for development and reduce the demand for fossil fuels to meet energy needs.

These goals require a holistic approach to planning for land use and transportation at all scales that takes into account current and future needs of communities, weighs fairly the potential tradeoffs for multiple stakeholder groups, and demands that both transit and surrounding communities will strive to be "good neighbors."

1.2 Definition of transit-friendly communities

To achieve these goals, the Urban Design Working Group is charged with the drafting of standards, guidelines, and best practices to articulate the value in the planning and design of transit facilities, and the streets and neighborhoods connected to those facilities, in order to create "transit-friendly communities." Transit-friendly communities are places in which:

- Transit facilities contribute to making a "place," are attractive and functional, and serve as community destinations.
- Access to transit facilities balances the needs of all modes and users to support and encourage pedestrian, bicycle and transit trips.
- The neighborhoods around transit facilities support and encourage a vital mix of activities through existing and new development.
- Transit corridors take advantage of the variety of nearby neighborhoods and destinations to encourage a diversity of places and access modes.
- The transit network connects users to key regional destinations and support the economic health of the region and its communities.

1.3 Urban Design Standards Program principles

The following principles support the creation of transit-friendly communities and the Urban Design Standards Program goals:

- **Accessibility:** All individuals, regardless of physical ability, should be able to easily and safely access transit services without any significant and unavoidable impediments or barriers.
- **Walkability:** All transit riders are pedestrians before and after their transit trip, and should be able to comfortably access transit facilities and surrounding communities on foot.

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NOTE: Pedestrians are defined as "people who travel on foot or who use assistive devices, such as wheelchairs, for mobility" (Federal Highway Administration, *Designing Sidewalks and Trails for Access*, 1999)

- **Mix of uses:** Access to a range of uses, services, and amenities are necessary to support transit and community vitality.
- **Connectivity:** Transit needs to be part of a network of travel options that allow riders to meet everyday needs, both locally and within the region.
- **Density:** Riders depend on a concentration of activity and intensity in close proximity to transit facilities.
- **Adaptability:** Transit facilities should include flexibility to respond to changing demand and conditions while still investing in long-lasting materials and infrastructure.
- **Accessibility:** All individuals, regardless of physical ability, should be able to easily and safely access transit services without any significant and unavoidable impediments or barriers.
- **Comfort:** Transit facilities and the surrounding communities should be pleasant, inviting places that encourage use of available services.
- **Safety:** Transit facilities and the surrounding communities should provide for users' physical safety by addressing points of conflict and safety for riders using all access modes.
- **Security:** Transit facilities and surrounding communities should utilize crime prevention through environmental design (CPTED) techniques to address the security of all users.
- **Legibility:** Transit facilities and communities should be understandable to users and should help users orient themselves.
- **Quality:** Transit facilities and surrounding communities should be built with lasting materials and craft that reflect the scale of investment and design context.
- **Economy:** Transit facilities and surrounding communities should be built and maintained with consideration of economic sustainability, accounting for life-cycle costs.
- **Partnerships:** Multiple stakeholders should be engaged and public, private and community partnerships should be identified for the planning, design, construction and ongoing maintenance of transit facilities and surrounding communities.

2. Characteristics of transport modes

An essential factor in defining transit's area of influence is the transport mode, including factors such as right-of-way and stop and station spacing. Transport modes can be defined by the speed and reliability of service. Transit technologies (BRT, LRT, heavy rail, etc.) can fit more than one category of transport mode, depending on the design and level of investment. A single route or transit line may incorporate characteristics of more than one transport mode.

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Table 1 defines the fundamental differences among transport modes.

TABLE 1
Transport Modes[1]

Mode	Right-of-Way Characteristics	Level of Investment in Transit Facilities	Typical Stop/ Station Spacing	Vehicle Speed	Service Reliability[2]	Typical Transit Technology
Local street transit	Operates in mixed-flow with automobile traffic.	Minimal infrastructure investments	1/8 to 1/4 mile (depends on block size)	Low (in traffic)	Low (in traffic)	Local bus, streetcar
Rapid street transit	Operates in mixed-flow with automobile traffic, sometimes with partially dedicated or shared lanes.	Some investment (shelters, signage, etc)	1/5 to 1/3 mile	Low (in traffic) to moderate (in dedicated lanes)	Low (in traffic) to moderate (in dedicated lanes)	Rapid or express bus, streetcar
Semirapid transit	Operates in dedicated right-of-way with regular crossings.	Moderate to heavy investment (platforms, shelters, lighting, etc)	1/3 to 2/3 mile	Moderate	High	BRT, LRT
Regional transit	Operates in dedicated right-of-way with limited crossings.	Moderate to heavy investments (platforms, shelters, lighting, etc)	3/4 to 3 mile	High	High	BRT, LRT, commuter rail
Rapid transit	Operates in dedicated right-of-way with grade separation.	Heavy investment (stations/protected waiting areas)	1/3 to 1 1/3 mile	High	High	Heavy rail

1. Adapted from Vuchic, Vukan, *Urban Transit: Systems and Technologies,* p. 76, 2007. The characteristics listed here are intended to be descriptive of existing service types, and do not constitute a recommended practice.

2. Though service reliability can vary substantially based on local conditions, vehicles operating in exclusive right-of-way with limited grade crossings typically have greater reliability than those operating in mixed traffic.

3. Transit area of influence

There are three types of spatial areas covered by this standard:

- **Core station area:** The area around a transit stop or station within which land use and urban design features have a primary influence on transit ridership, and pedestrian access will generate a very significant portion of transit trips to and from the stop or station.
- **Primary catchment area:** The area within which land use and urban design features and the ease and directness of access to the stop or station both have a substantial impact transit ridership, and pedestrian access will generate a significant portion of transit trips to and from the stop or station.
- **Secondary catchment area:** The area around a transit stop or station within which ease and directness of access to the stop or station has the greatest influence on transit ridership, and within the majority of all trips utilizing the stop or station are generated. Within this area, bike, feeder transit, and auto are the primary access modes to and from the stop or station.

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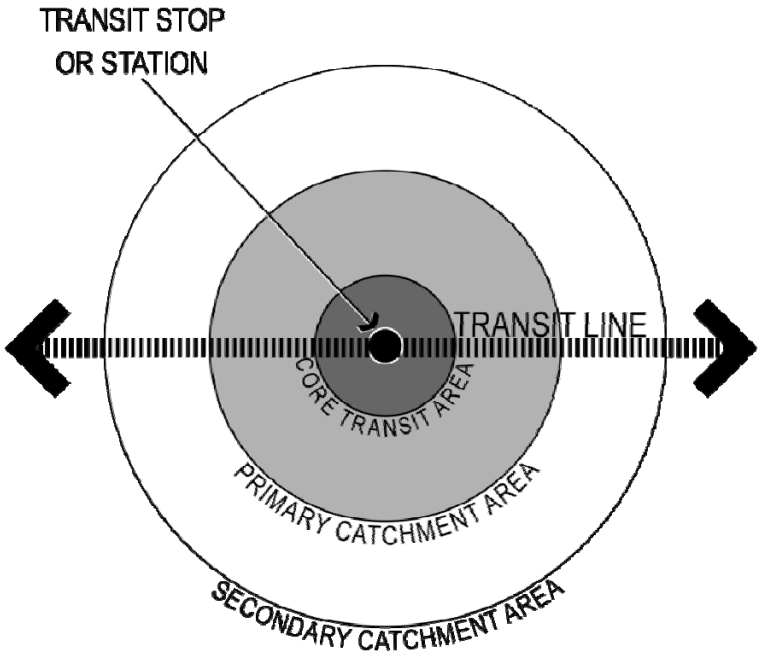
These areas form generally concentric areas around the transit stop or station. The area values in Section 3.2 are baselines from which to understand the area of influence. In specific local contexts, these values may need to be calibrated to observed local behavior, and their application in practice will depend on factors defined in the Section 4.

Figure 1 illustrates the basic concept of the concentric areas of influence.

FIGURE 1
Diagram of Typical Areas of Influence



3.1 Application and context

Transit agencies, local jurisdictions, regional agencies, and developers should use this Recommended Practice as a methodology for determining the area of transit influence in a given location or throughout a transit system. The guidance contained in this Recommended Practice is not proscriptive, and the typical areas described in **Table 2** should be utilized with an understanding of the surrounding context.

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Once this assessment has been completed, **Table 4** identifies some best practice responses for applying the transit area of influence to planning and implementation of development and infrastructure projects. These best practices may be addressed in greater detail in other Urban Design Standards, and these are referenced when appropriate.

TABLE 4
Implementation Response Applications

Application	Core Transit Area	Primary Catchment Area	Secondary Catchment Area
Planning focus	Station design and access planning.	Station-area land use and transportation network planning.	Community-wide transportation and land use planning.
Development parking policy	No required parking requirements or parking maximums applied to private developments and park-and-ride facilities.	Reduced parking requirements and "unbundling" of parking from development.	Parking management and shared parking arrangements.
Development density	Concentration of highest density development	Density greater than the community average	More compact development patterns than community average
Ground floor uses	Active ground floor uses such as retail along pedestrian access routes and in immediate proximity to transit station or stop.	Focus active ground floor uses on primary pedestrian corridors	Focus active ground floor uses along primary transportation routes and at key nodes
Civic/open space	Human-scale active plazas that facilitate access to transit with elements that support intermodal activity	Network of active and passive open spaces to meet community and transit access needs	Network of large and small open spaces that link to regional open space system
Street design	Highly walkable streets throughout the area with priority on pedestrian and mobility device access.	Focus on direct pedestrian, bicycle, and transit access routes with priority on pedestrian and mobility device access.	Focus on direct access routes with focus on bicycle and feeder transit access.

3.2 Typical area radii by transport mode

Table 2 defines the typical areas by transport mode. This typical radius can form the baseline for planning and implementation in all land use contexts, and assumes the following conditions:

- Station or stop infrastructure that does not create access barriers to and from the surrounding community.
- Absence of non-transit barriers, such as freeways or gated communities that impede direct connections to the transit stop or station.
- Relatively flat topography.
- Reasonably connected gridded or grid-like street network that allows for direct routes to and from the transit stop, with a complete and connected pedestrian facility network.
- 20 minute headways for transit service.

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In this context, a typical adult would be able to walk half a mile in roughly 10 minutes. These typical area radii can be expanded or contracted based on these and other factors as described in Sections 4.1 and 4.2.

TABLE 2
Typical Area Radius by Transport Mode

	Local Street Transit	Rapid Street Transit	Semirapid Transit	Regional Transit	Rapid Transit
Core station area	not applicable	1/8 mile	1/4 mile	1/4 mile	1/3 mile
Primary catchment area	1/8 mile	1/4 mile	1/2 mile	1/2 mile	2/3 mile
Secondary catchment area	1/2 mile	1 mile	2 miles	5 miles	3 miles

4. Limits and expansions on the transit area of influence

4.1 Limiting factors

Based on conditions at an individual stop or station, the typical area radius may be contracted based on a number of factors that impede access or contribute to a low quality pedestrian environment. These limits on the TOD area should be analyzed with respect to the guidance provided in **Table 2**. In some cases, factors can be mitigated or remedied to reach the baseline areas outlined in the previous section. **Table 3** outlines how factors can contribute to the limits on the transit area of influence. **Figure 2** shows how the limits to areas of influence can alter the typical shape and dimensions of the areas defined in **Table 2**.

4.2 Expanding factors

Expansions to the TOD area should be analyzed with respect to the baseline guidance provided in Section 3.1. Starting with the baseline guidance, factors expanding the transit area of influence should be analyzed. In some cases, factors can be fostered or improved to build on the baseline areas defined in the **Table 2**. **Table 3** outlines how factors can contribute to the expansion of the transit area of influence. **Figure 3** shows how the expansions to areas of influence can be understood.

4.3 Modifications to the typical transit area of influence

Table 3 outlines a list of factors that can limit or expand the typical area of influence.

TABLE 3
Factors That Limit or Expand the Typical Transit Area of Influence

Factor	Limit of Area of Influence	Expansion of Area of Influence
Station infrastructure	Impediments to direct access to the station or stop (such as large surface parking lots or major bus intermodal facilities).	Integration of station or stop into surrounding community with direct access (such as connecting pathways or at-grade stations).
Physical barriers	Freeways or inhospitable land uses — such as warehouses, or gated subdivisions.	Not applicable. The baseline conditions assume a lack of physical barriers.
Street connectivity	Low intersection density, disconnected streets and cul-de-sacs.	Connected street networks with frequent intersections and direct pedestrian paths

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TABLE 3
Factors That Limit or Expand the Typical Transit Area of Influence

Factor	Limit of Area of Influence	Expansion of Area of Influence
Pedestrian environment	Poor pedestrian environments with blank ground floor walls, no buffer with automobiles, and unsafe or comfortable or poorly lit pedestrian street crossings. Particularly relevant within the primary catchment area.	Pedestrian environments that include active ground floor commercial uses, high degrees of transparency and architectural interest and detail, and pedestrian lighting. Particularly relevant within the primary catchment area.
Bicycle environment	Poor bicycle environments, including high-speed automobile traffic, limited bicycle facilities, steep topography, poor pavement conditions, lack of secure bicycle storage and/or ability to bring bicycles on transit vehicles. Particularly relevant in the primary and secondary catchment areas.	High-quality bicycle environments, including well-marked, direct and safe bicycle routes, available and secure bicycle parking, and high established bicycle ridership levels. Particularly relevant in the secondary catchment area.
Wayfinding and orientation	Lack of wayfinding signage and difficult orientation.	Wayfinding signage and orientation maps assisting users in their journeys to and from the stop or station. Particularly relevant in the core transit area and the primary catchment area.
Topography	Substantial grade changes limit the distance transit users are willing to walk and bike. Particularly relevant in the core transit area and primary catchment area.	N/A
Safety/perception of safety	Physical safety concerns discourage pedestrian activity and create zones where transit-oriented land use benefits will be reduced.	Good visibility and absence of safety concerns.
Distance from major activity centers	Transit stops or stations located far from major activity centers (greater than 5 miles)	Transit stops or stations located close to or within major activity centers enhances the benefits of transit access.
Climate	Climates with extreme temperatures or weather patterns. Particularly relevant in primary catchment area.	Mild and consistent climates. Particularly relevant in primary catchment area.
Trip purpose	Not applicable. The baseline conditions assume a balanced use mix.	Transit stops and stations in housing-rich areas typically have larger primary catchment areas than employment-rich areas. Transit stops and stations in employment-rich areas typically have larger secondary catchment areas than housing-rich areas.
Transit connectivity and regional network	Poor transit connectivity and the lack of a regional network.	Transit stops and stations are part of a connected regional network of intersecting service lines, particularly at locations where two or more lines intersect.
Transit frequency	Low frequencies (less than one transit trip every 20 minutes).	High frequencies (more than one transit trip every 10 minutes).

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TABLE 3

Factors That Limit or Expand the Typical Transit Area of Influence

Factor	Limit of Area of Influence	Expansion of Area of Influence
Transit parking availability	Large amounts of parking at transit stops limit the core transit area and primary catchment area by discouraging trips by pedestrians and bicyclists. Small amounts of parking at transit stops limit the secondary catchment area by reducing automobile accessibility	Small amounts of parking at transit stops expand the core transit area and primary catchment area by encouraging pedestrian and bicycle access. Large amounts of parking at transit stops expand the secondary catchment area by improving automobile access.
Access to retail opportunities	Transit stops or stations in single-use areas without access to stores and retail services.	Transit stations or stops located in close proximity to stores and retail services, particularly those in “main street” mixed-use contexts able to meet a broad range of daily needs.

1. Because transit parking availability has varied impacts on the transit area of influence, decisions about transit parking depends on the context within the regional transit system and public policy objectives.

FIGURE 2

How Factors Can Limit Areas of Influence

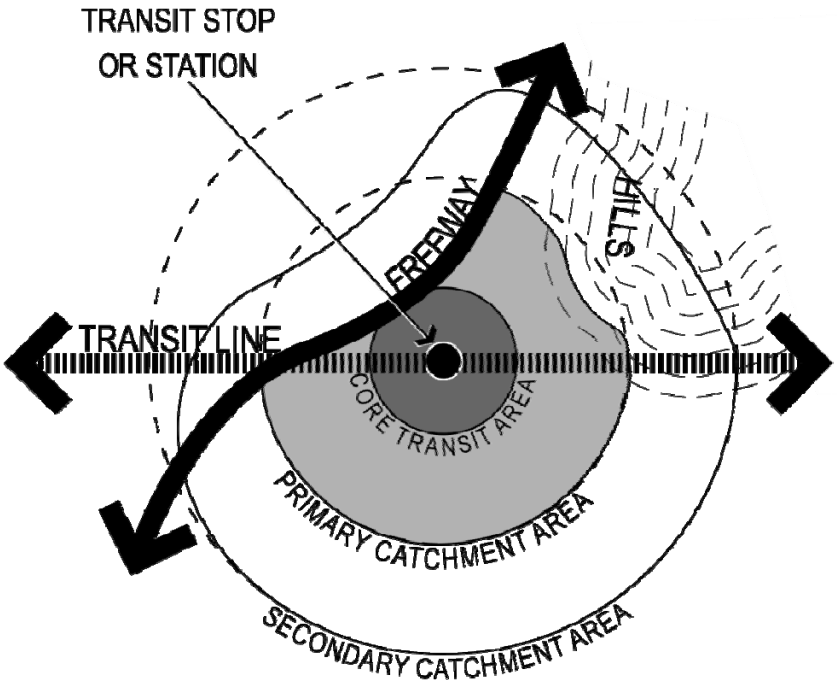

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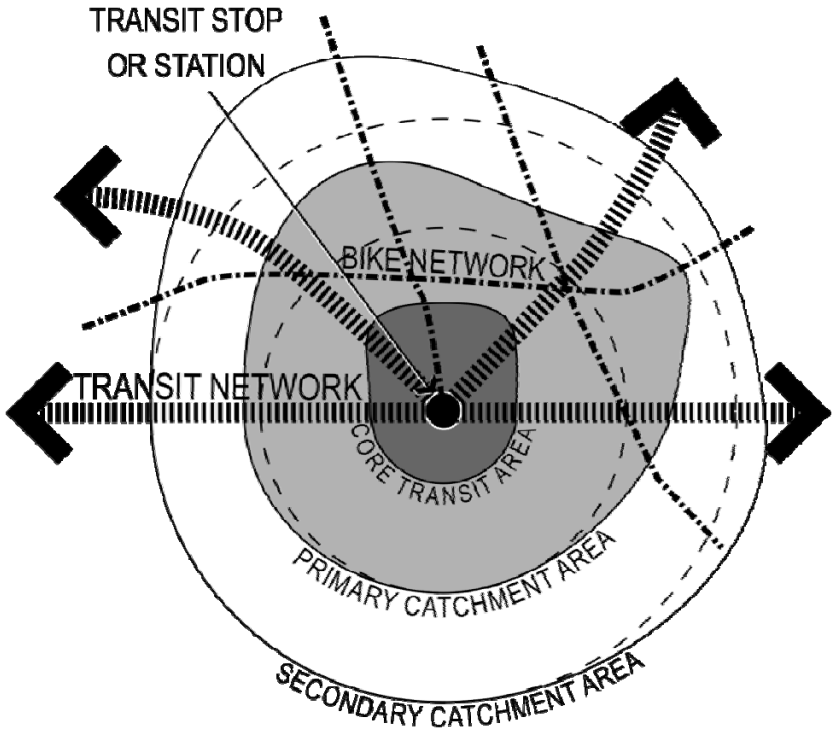
FIGURE 3
How Factors Can Expand Areas of Influence



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Definitions

core station area: The area around a transit stop or station within which the majority of all transit trips generated will access the stop or station by pedestrians. Within this area, land use and urban design features have the greatest influence on transit ridership.

primary catchment area: The area within which the transit stop or station is accessible by an easy walk and where a significant portion of all transit trips generated will access the stop or station by foot. Within this area, land use and urban design features have substantial influence on transit ridership, as does the ease and directness of access to the stop or station. This area is also the general area to be the focus of station area land use and transportation network planning.

secondary catchment area: The area around a transit stop or station that generates the majority of all transit trips utilizing the stop or station. Within this area, bike, feeder transit, and auto are the primary access modes to and from the stop or station. The ease and directness of access to the stop or station has the greatest influence on transit ridership.

transit area of influence: The spatial area in which transit stops and stations typically have the greatest impact on land use and development and from which there is high potential to generate transit ridership: The three areas defined in greater detail in this standard are the following:

transit-supportive development: Development that sustains transit ridership and overall reduction in automobile use by creating environments in which pedestrian and bicycle modes provide attractive and efficient travel options.

Abbreviations and acronyms

BRT	bus rapid transit
CPTED	crime prevention through environmental design
GHG	greenhouse gas
LRT	light rail transit
TCRP	Transit Cooperative Research Program
TOD	transit-oriented development
VMT	vehicle miles traveled

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