

# Appendix H

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**NOTE: Appendix Information is for Reference Only. Contact Local Entity Engineer for Current Information.**

Fort Collins  
Multimodal Transportation  
Level of Service Manual

**City of Fort Collins  
Multimodal Transportation  
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March 28, 1997



City of Fort Collins Transportation Master Plan

# Multimodal Transportation Level of Service Manual

Goals, Objectives and Standards

## Part I. Adequate Public Facilities Plan

### Goals, Objectives and Standards

Level of Service (LOS) standards do not exist as stand-alone measures, but are part of a system of goals, objectives and standards. They are interpreted by the public and by elected decision makers in the context of current and future issues, trends, conditions, expectations, and perceptions and they require a system of measurement.

LOS standards are an important form of municipal "policy" and are based on the City of Fort Collins "Community Vision and Goals 2015," the "City Structure Plan" and the "City Plan Principles and Policies" documents developed as part of the City Plan process. LOS standards provide a means of testing the City's plan for future land uses (as represented in the Structure Plan) against the City's goals for transportation and for overall quality of life.

The LOS standards also provide a means of applying the City's goals in the development review process.

The general principle and specific policies that give rise to the Adequate Public Facilities (APF) requirement are found in the City's Principles and Policies.

The provisions dealing with adequate public facilities and the Principles from the Transportation section are reprinted below:

**PRINCIPLE GM-5: The provision of adequate public facilities and the phasing of infrastructure improvements will be important considerations in the timing and location of development.**

**Policy GM-5.1 Phasing of Development.** The provision of public facilities and services will be utilized to direct development in desired directions, according to the following considerations:

- Development will only be permitted where it can be adequately served by critical public facilities and services such as water, sewer, police, transportation, schools, fire, storm water management, and parks.
- New roads and other City services shall not be extended to serve development outside the designated Urban Growth Area (Stage 1). Moreover, the City shall not enter into any agreements with other jurisdictions to jointly fund or construct infrastructure improvements or provide services that might foster growth outside of the Urban Growth Area (Stage 1). These policies will not preclude the City from working with other jurisdictions to provide services and facilities which benefit the entire community such as regional trails, open space and parks.
- Development which occurs within the Urban Growth Area (Stage 1) shall have at least one-sixth of its boundary area contiguous with existing urban development.
- Preferential consideration will be given to the extension and augmentation of public services and facilities to accommodate infill and redevelopment before new growth areas are prepared for development.



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- The City will review applications for the creation of new special service agencies and the expansion of existing special service agencies for conformance with these *City Plan Principles and Policies*.
- The City will work with Larimer County to develop plans and policies for public services and facilities required for new and existing development located in unincorporated areas of the City's Urban Growth Area, with special consideration to those subareas and neighborhoods where more detailed planning will follow the adoption of these *City Plan Principles and Policies*.
- The City should charge additional fees to non-city residents who utilize City services.

**PRINCIPLE T-1:** The physical organization of the city will be supported by a framework of transportation alternatives that maximizes access and mobility throughout the city, while reducing dependence upon the private automobile.

**PRINCIPLE T-2:** Mass transit will be an integral part of the city's overall transportation system.

**PRINCIPLE T-3:** Transportation Demand Management will be a critical component in the City's overall transportation system.

**PRINCIPLE T-4:** Bicycling will serve as a viable alternative to automobile use for all trip purposes.

**PRINCIPLE T-5:** The City will acknowledge pedestrian travel as a viable transportation mode and elevate it in importance to be in balance with all other modes. Direct pedestrian connections will be provided and encouraged from place of residence to transit, schools, activity centers, work and public facilities.

**PRINCIPLE T-6:** Street crossings will be developed to be safe, comfortable, and attractive.

**PRINCIPLE T-7:** The City will encourage the development of comfortable and attractive pedestrian facilities and settings to create an interesting pedestrian network.

**PRINCIPLE T-8:** The City shall develop secure pedestrian settings by developing a well-lit inhabited pedestrian network and by mitigating the impacts of vehicles.

**PRINCIPLE T-9:** Private automobiles will continue to be an important means of transportation.

**PRINCIPLE T-10:** The City will participate in a coordinated, regional approach to transportation planning.



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Goals, Objectives and Standards

The "Adequate Public Facilities" principle is intended to ensure that adequate transportation infrastructure and services required to meet the needs and demands created by new development will be provided by the time the development is occupied (that is, concurrently).

The purpose of these Level of Service standards is to provide a definition of "adequate" -- for each mode of travel.

## General Methodology

Historically, LOS standards were applied only to roadways and only in engineering. Their primary purpose was to facilitate the design of specific roadway improvement projects based on forecast demand. Now, however, LOS standards also serve as performance planning and measurement systems. The City of Fort Collins has chosen to develop performance-based LOS standards and to do so for all modes.

Evaluating LOS standards for purposes of determining their adequacy under City policy requires more than an evaluation of specific transportation facilities. Roadways that are of adequate width and design must also be adequately connected into the larger street grid. Bicycle and pedestrian facilities, too, must be connected into the City's grid of bicycle and pedestrian facilities.

Applying LOS standards to specific sidewalks, for example, would ignore the issue of whether the sidewalk in question is connected to the rest of the pedestrian network. Similarly, proximity to service and connectivity to the larger city-wide grid are important issues for all modes and are included in the LOS standards.

In the case of public transit, the "bricks and mortar" physical infrastructure approach used to evaluate the other modes is not adequate to the task. Transit performance is determined, not only by what is built, but also by the amount and type of operations that are

provided (hours of service, frequency of service, and so forth). Also, as with the bicycle and pedestrian modes, the proximity of transit service becomes an issue to be addressed by LOS standards.

For each non-auto travel mode -- bicycle, pedestrian and public transit -- the LOS standards do not require forecasts of user volumes or demand. Instead, they are designed to ensure ubiquitous availability of adequate bicycle and pedestrian facilities, and transit service.

In the case of roadways, however, estimating future LOS conditions requires predicting future traffic levels. In other words, forecasting future roadway LOS involves forecasting both supply and demand.

## Coordination With Other Plans

On the following two pages are tables listing the City's goals, objectives and standards from which the proposed LOS standards have been derived. The tables are divided into four modes of travel: public transit, pedestrian, bicycle and motor vehicle.

City of Fort Collins documents relied upon in preparing LOS Standards for the modes included:

- Fort Collins Congestion Management Plan;
- Community Vision and Goals 2015 ;
- City Structure Plan;
- City Plan Principles and Policies;
- Fort Collins Bicycle Program Plan;
- Residential Street Standards;
- Transit Development Plan 1996-2002; and,
- Fort Collins Pedestrian Plan.



# Multimodal Transportation Level of Service Manual

Goals, Objectives and Standards

Goal	Objective	LOS Standard	Design & Operations Standards*
<p><b>Pedestrian</b></p> <ul style="list-style-type: none"> <li>A safe, comfortable, attractive and secure pedestrian environment.</li> <li>A pedestrian network which is well-connected and directly linked to schools, neighborhoods, parks, activity centers and other destination areas.</li> <li>Pedestrian facilities which provide universal access to all users, including children, the mobility impaired, and elders.</li> <li>Regular maintenance of pedestrian facilities.</li> <li>An urban form which promotes pedestrian activity.</li> </ul>	<ul style="list-style-type: none"> <li>Revise local statutes and codes to increase pedestrian safety and security by 1998.</li> <li>Achieve a level of funding for the pedestrian program which is in proportion to mode share.</li> <li>Place a high funding priority on pedestrian facilities needed to achieve minimum pedestrian LOS requirements for school walking areas, parks and recreation facilities, transit corridors, and activity areas.</li> <li>Achieve active and continuing involvement by the pedestrian community in the development and implementation of pedestrian policies and facilities.</li> <li>Ensure that all pedestrian facilities are designed and constructed according to new standards.</li> </ul>	<ul style="list-style-type: none"> <li>Pedestrian LOS will be evaluated according to prevailing or forecast conditions within a 1/4 mile sphere of influence. This is to be measured as 1,320' along a straight line radius "as the crow flies" in all directions from the site.</li> <li>LOS requirements are based on ease of street crossings, sidewalk continuity, directness of travel, amenities, and security and will be evaluated according to type of adjacent land use.</li> </ul>	<ul style="list-style-type: none"> <li>Residential streets: 4.5' wide sidewalks with a 6' landscaped parkway, <i>except</i> for rural residential streets, which do not require sidewalks, and 36' residential infill streets, which do not require landscaped parkways.</li> <li>Connector streets: 4.5' sidewalks and a 6' landscaped parkway.</li> <li>Collector streets: 5' sidewalks and an 8' landscaped parkway.</li> <li>Industrial/Commercial Local streets: 5' sidewalks, and a 6' landscaped parkway.</li> <li>Arterials &lt;35,000 ADT: 6' sidewalks and a 10' landscaped parkway; arterials &gt; 35,000 ADT: 7' sidewalks and a 10' landscaped parkway.</li> </ul>
<p><b>Automobile</b></p> <ul style="list-style-type: none"> <li>A transportation system which provides both access and mobility and which minimizes automobile dependence.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that the rate of growth in vehicle miles traveled (VMT) does not exceed the rate of growth in population.</li> </ul>	<ul style="list-style-type: none"> <li>Automobile LOS will be evaluated using the latest version of the Highway Capacity Manual and will reflect street classification and adjacent land use.</li> <li>When LOS falls below identified levels in Mixed Use Districts, mitigation will be required in order to ensure a high degree of accessibility through alternative modes.</li> </ul>	<ul style="list-style-type: none"> <li>12' travel lanes will be required for all arterial streets and for collectors without parking.</li> <li>11' travel lanes will be required for all other streets, except for connectors and residential streets.</li> <li>Residential local streets will have a width of 30' for streets with parking on both sides of the street or 24' for streets with parking on one side of the street.</li> <li>Residential alleys will be 12-20' wide.</li> <li>A continuous median will be required on all arterial and major arterial streets.</li> </ul>

\* Note: exceptions to standards may occur in constrained corridors.

# Multimodal Transportation Level of Service Manual

## Goals, Objectives and Standards

Goal	Objective	LOS Standards	Design & Operations Standards *
<ul style="list-style-type: none"> <li>A safe, convenient, continuous and well-connected bicycle system which provides access to major destination areas and activity centers.</li> <li>A bicycle system which provides links to the regional system.</li> </ul>	<ul style="list-style-type: none"> <li>Achieve a continuous system by the year 2015.</li> <li>Double the percentage of daily resident person trips made by bicycle from 7% in 1995 to 14% in 2015.</li> <li>Reduce the bicycle accident rate by 10% by 2015.</li> </ul>	<ul style="list-style-type: none"> <li>Bicycle level of service (LOS) will be evaluated according to facility and area-based requirements.</li> <li>Area LOS requirements are based on connectivity to North-South and East-West corridors.</li> </ul>	<ul style="list-style-type: none"> <li>8' bicycle lanes are required on all arterial streets and on collectors without parking.</li> <li>A 6' bicycle lane is required on collector streets with parking.</li> <li>An 11' shared bicycle and parking lane or a 6' bicycle lane is required on commercial local streets.</li> <li>Industrial/Commercial Local streets require an 11' shared bicycle and parking lane or a 6' bicycle lane.</li> <li>An 8' foot bicycle and pedestrian path connection will be required to make neighborhood connections where streets are not required or feasible.</li> </ul>
<ul style="list-style-type: none"> <li>A well-connected intermodal transportation system.</li> <li>Frequent, reliable and accessible transit service.</li> <li>Transit service oriented around activity centers.</li> <li>Comfortable transit service.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that 70% of the city has access to transit service (1/4 mile walk).</li> <li>Double the size of existing service by the year 2002.</li> <li>Increase the area served, frequency of service and hours of operation by 2002.</li> <li>Increase ridership to 2,000,000 annual trips by 2002.</li> <li>Reduce transfer wait times.</li> </ul>	<ul style="list-style-type: none"> <li>Transit LOS will be evaluated based on hours of weekday service, weekday frequency of service, travel time factor and peak load factor.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure transit travel times are no greater than 2.5 times competing automobile travel times.</li> <li>Weekday headways will be reduced to at least 30 minutes in all corridors by 2002 and to no more than 20 minutes in all corridors and to 15 minutes in mixed-use and commercial corridors by 2015.</li> <li>Peak load factor will be less than 1.2.</li> <li>Transit stops will be located 1,000 to 1,400 feet apart in high-use areas and 2,000 feet apart in low-use areas.</li> </ul>
<p>* Note: exceptions to standards may occur in constrained corridors.</p>			

# Multimodal Transportation Level of Service Manual

Public Transit LOS

## Public Transit LOS

Transit LOS standards take into account route service characteristics and land use characteristics of the areas served. Figure 1 relies in part on standards developed in the City's Transit Development Plan. The service level standards are intended for use in evaluating service planned by the year 2015.

The transit LOS rating for an area is based on how many of the four service standards are met. The minimum condition is higher in mixed use centers and commercial corridors. The level of route service is graded higher if the transit routes run within a quarter-mile of the area being evaluated. Routes more than a half-mile away cannot be considered in arriving at transit LOS.

The minimum requirements for transit level of service are (by 2015):

- At least 70% of the land area of Fort Collins outside of Mixed Use Centers and Commercial Corridors shall be served by transit at no less than LOS D.
- For Mixed Use Centers and Commercial Corridors, the minimum level of service for adequacy is LOS B.

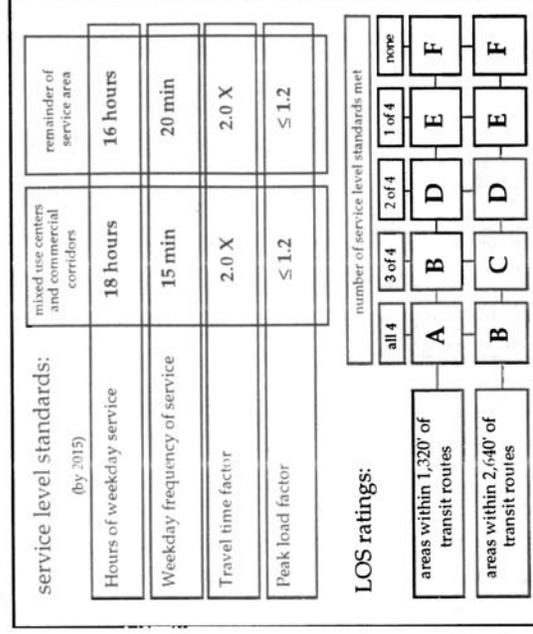
Definitions of terms used in Figure 1 are as follows:

**Hours of Weekday Service** -- The weekday hours of service on the applicable route, measured from the first scheduled stop to the last.

**Weekday Frequency of Service** -- Peak period headway.

**Travel Time Factor** -- Portal-to-portal bus travel time divided by auto travel time. Auto is measured using average speed in peak hour via the most direct route on arterials and collectors and includes time

Figure 1. Public Transit LOS -- Standards and Ratings



to park and walk. Transit is measured along the bus route using peak hour speed, including walk, transfer, and expected wait times.

**Peak Load Factor** -- Calculated by dividing the number of passengers on board at the peak time of day by the available seats.

Mixed use centers and commercial corridors are designated on the City's Structure Plan.

# Multimodal Transportation Level of Service Manual

Pedestrian LOS

## Pedestrian LOS

Five level of service standards specific to pedestrian facilities are utilized to address pedestrian needs and land use considerations. These standards are briefly described below and are defined in more detail in Appendix A.

**Directness** -- Directness is defined as the walking distance to destinations including transit stops, schools, parks, commercial employment, or activity areas. A grid street pattern with sidewalks on-site or within/adjacent to existing public right of way typifies the ideal system, however "off-road" multi-use paths may also be considered if practical to provide more direct pedestrian routes.

Measurement of directness is the ratio of the Actual (existing or proposed) distance to such destinations by way of pedestrian sidewalk or pathway divided by Minimum north/south and east/west right angle distance characterized by the grid street pattern (the A/M ratio).

**Continuity** -- Continuity is defined as the completeness of the sidewalk/walkway system with avoidance of gaps. Levels of service range from an A/B, where the pedestrian corridor is integrated within the activities along the corridor, to a C, where continuous stretches of sidewalks with variable widths and design elements, to D/E, where there are breaches in the pedestrian network, to F, which indicates large gaps in the network.

**Street Crossings** -- Each of the four types of street crossings is assigned an LOS rating.

**Signalized Intersections:** LOS elements include grade separation, number of lanes to cross, signal indication, well marked crosswalks, lighting, raised median width, visibility, curb ramps, pedestrian buttons, convenience, comfort and security.

**Unsignalized Intersection Crossing the Major Street:** LOS elements include grade separation, number of lanes to cross, well-marked crosswalks, lighting, raised median width, visibility, and curb ramps.

**Unsignalized Intersection Crossing the Minor Street:** LOS elements include well-marked crosswalks, lighting, and curb ramps.

**Mid-block Crossing:** LOS elements include grade separation, number of lanes to cross, strength of crosswalk presence, well marked crosswalks, lighting, raised median width, curb ramps, pedestrian signals, convenience, comfort and security.

**Visual Interest and Amenity** -- To promote pedestrian activity and use of transit, the pedestrian system should be esthetically compatible with local architecture and should include amenities to serve pedestrians. The attractiveness of the pedestrian network can range from visually appealing and compatible with local architecture, including environmental enhancements (such as pedestrian street lighting, fountains, and benches) to an experience of discomfort and intimidation, associated with absence of amenities and incompatible architectural design.

**Security** -- Pedestrians require a sense of security, through visual line of sight with others, separation from motor vehicles and bicycles, and adequate lighting levels. The highest level of service is in an environment with high pedestrian and police presence, clear lines of sight, and good lighting levels. The lowest is where the streetscape is totally intimidating with major breaches in pedestrian visibility from the street, adjacent land uses, and activities. For details regarding sight distance and lighting requirements, refer to the City of Fort Collins' street design standards and codes.

# Multimodal Transportation Level of Service Manual

Pedestrian LOS

While there are design standards for all types of pedestrian facilities, acceptable level of service thresholds for purposes of concurrency will vary by the type of activity area.

The five types of areas are as follows:

**Pedestrian District** -- This area includes the existing Fort Collins downtown, the CSU area, and a future activity center in the northwest portion of the city which has been designated on the Fort Collins City Structure Plan.

There are numerous locations within the City that do not currently meet the minimum level of service standards. Because of limited funding, improvements will be prioritized toward routes to schools, parks, transit, and activity areas with the objective of bringing the entire city into compliance with the LOS standards by 2015.

To prevent an increase in the backlog, new developments, both public and private, as well as major street improvements and redevelopment, must meet these minimum pedestrian level of service standards.

A map (from the City's Pedestrian Plan) is provided in Appendix A showing the location of existing and future pedestrian districts.

The five pedestrian environment factors were developed as part of the Pedestrian Plan and the LOS letter grades are described in detail in Appendix A.

**Activity Corridor/Center** -- These include the commercial corridors of North and South College Avenue as well as areas within a quarter-mile (1,320') radius around neighborhood and community retail centers. They are designated on the map in Appendix A.

**Transit Corridor** -- These include all areas within a quarter-mile (1,320') of existing transit routes and transit routes to be initiated by 2015.

**School Walking Area** -- These include all areas within a mile (5,280') radius around existing public schools (K - 12) and around sites officially designated by the School District for future public schools.

**Other** -- This category includes all locations not falling within one of the four previous areas.

Figure 2 displays minimum conditions required to achieve the LOS standards.

**Figure 2**  
Pedestrian Level of Service by Location Area Type

area type	directness	continuity	street crossings	visual interest & amenities	security
pedestrian district	A	A	B	A	A
activity center/corridor	B	B	B	B	B
transit corridor	B	B	B	C	B
school walk area	B	B	B	C	B
other	C	C	C	C	C

# Multimodal Transportation Level of Service Manual

Bicycle LOS

## Bicycle LOS

Bicycle LOS standards are based on connectivity to various bike facilities in connecting corridors. For purposes of this analysis, bicycle corridors may contain one of three types of facilities:

**On-Street Lanes** -- These are striped exclusive-use bicycle lanes within the flow-lines of public streets.

**Off-Street Paths** -- These are multi-use paths or exclusive-use bicycle paths that are separate from public streets. They may be on public or private land, but must be open for public use to be considered in LOS evaluation.

**On-Street Route** -- These are low-volume local streets which the City has designated as Bicycle Routes and which are signed as such. Bicycles share the travel lanes with motor vehicles.

It is the City's policy that on-street lanes provide safer and more direct connectivity than off-street multi-use paths. For that reason, higher ratings are assigned to areas connected to on-street lanes.

The overall approach to bicycle LOS is based on the fact that the City's bike grid will steadily approach completion. In the future, it will be possible, once access to the grid is achieved, to travel safely by bicycle directly to any other area that has access to the grid. Thus the issue of connectivity has become paramount.

Figure 3 shows the minimum LOS standards for the bicycle system.

"Directly connected" means the site is penetrated by the bicycle facility; or the bicycle facility runs immediately adjacent to the property and is not separated from it by any significant barriers; or the bicycle facility runs perpendicular to the property edge and is readily accessible from the property with no significant barriers.

Bicycle facilities which are not consistent with the City's minimum design standards will be not considered in evaluating bicycle LOS.

**Figure 3. Bicycle LOS Standards**

connectivity required for levels of service:

A	directly connected to both North-South and East-West on-street lanes
B	directly connected to both North-South and East-West corridors at least one of which is a set of on-street lanes
C	directly connected to either a North-South or an East-West corridor which is a set of on-street lanes
D	directly connected to either a North-South or an East-West corridor which is an off-street path
E	indirectly connected via an on-street unstriped route along a low volume local street to one or more of the above within 1/4 mile
F	no direct or indirect connections to either North-South or East-West corridors

minimum LOS

base city-wide minimum level:	C
public school sites:	A
recreation sites:	B
community/neighborhood commercial centers:	B



# Multimodal Transportation Level of Service Manual

Motor Vehicle LOS

## Motor Vehicle LOS

Over the past two decades, sophisticated formulas and routines for measuring arterial roadway LOS have been developed. These take into account such details as intersection design, signal timing and frequency of connecting driveways. Unfortunately, such variables cannot be reliably forecast twenty-five years into the future.

Instead, forecasts of future roadway LOS must rely on a simpler approach which compares predicted volume to predicted capacity. These "volume to capacity" (V/C) ratios are then used to determine the LOS letter grade rating (A through F). The means for predicting future roadway V/C or LOS levels is the MINUTP traffic model maintained by the City's transportation staff and the regional North Front Range Transportation & Air Quality Planning Council.

(Note: for purposes of completing a "Transportation Impact Study" for specific proposed development projects, a method of measuring roadway LOS is required which involves applying Highway Capacity Manual procedures and LOS definitions.)

Prior to adoption in early 1995 of the Congestion Management Plan, the City had an objective of maintaining at least LOS D on all arterial roadways.

The City's Congestion Management Plan (CMP) changed that approach, addressing motor vehicle LOS as follows:

*"This objective (LOS D) is unachievable for the core area of the city; all of the scenarios examined by the Committee predicted some of the arterial systems would fall below this level. LOS D is also not an adequate basis for roadway system planning because it has a tendency to direct capacity investments to where they are not appropriate . . ."*



*"LOS objectives for the roadway system should be defined in a manner that differentiates between the type of urban development being served. Standards for vehicular circulation within densely developed areas such as the core city and other activity centers should be set to favor access over mobility. Standards for radial routes to suburban areas and for through routes should be set to reflect the importance of community-wide mobility." (Chapter 8, p. 70)*

The City's motor vehicle LOS standards have been designed to reflect the type of area being served (based on the City Structure Plan) and the City's system of functional classification of roads. This will allow the City to manage investments in motor vehicle capacity and efficiency in a manner that supports its land use plan.

The City of Fort Collins functional classification system recognizes four broad categories of roadway. (Only arterials and collectors are shown on the City's adopted Master Streets Plan map.)

The four classifications are defined below:

### **ARTERIAL**

*(includes: Major Arterials, Arterials, and Minor Arterials)*

One or more of the following conditions may apply:

- provides direct service to major center(s) of activity;
- provides continuity and length for crosstown trips;
- connects to at least one other arterial; and,
- may carry high levels of traffic (>3,500 vpd).

# Multimodal Transportation Level of Service Manual

Motor Vehicle LOS

## COLLECTOR

*(includes: Collectors With and Without Parking)*

One or more of the following conditions may apply:

- connects local streets with arterial streets;
- continuity and length may be less than one mile;
- some commercial activity may be present in the corridor; and,
- may carry moderate levels of traffic (2,500 - 3,500 vpd).

## CONNECTOR

*(includes: Connectors only )*

One or more of the following conditions may apply:

- connects local streets to collector(s) or arterial(s);
- gathers traffic from throughout a residential district;
- continuity and length may be less than one mile;
- connects adjacent residential districts; and,
- may carry traffic of 1,000 - 2,000 vpd.

## LOCAL

*(includes: Commercial Local, Industrial Local, Residential Local, Narrow Residential Local, and Rural Residential Local)*

One or more of the following conditions may apply:

- provides access to property;
- continuity with the street network may occur only at one end;
- facility length may be less than one mile;
- may connect to connector(s) or collector(s); and,
- carries low levels of traffic (< 1,000 vpd, except up to 2,500 vpd for commercial and industrial local streets).

(Note: the City's street design standards provide more detail on physical characteristics of streets by functional classification.)

The street system provides both mobility (the ability to get across town) and access (the ability to get to a specific location). It is important to balance these competing demands, and it is important that LOS standards adopted for motor vehicles reflect this balance. Where arterials and collectors pass through built-up commercial areas (e.g., downtown) they may become congested in the future and there will be no way to build roadway improvement projects to eliminate such congestion.

Successful destination areas usually reach levels of motor vehicle traffic that cannot be handled at high levels of service. This occurs because the "people-holding" capacity of successful commercial areas eventually exceeds the traffic capacity of the roadways that serve them. At such locations, alternative means of getting around (especially walking, but also including transit and bicycling) become important.

To the extent that arterial and collector roadways transect successful destination areas, they will become less effective for purposes of achieving long distance mobility. At this point, the "access" function becomes more important to the public than "mobility." In Fort Collins, these conditions are anticipated for "commercial corridors" and within "mixed use districts." The motor vehicle LOS standards shown in Figure 4 on the next page reflect this fact.

The LOS standards in Figure 4 recognize five levels of roadways and four categories of land use (from the City Structure Plan):

- commercial corridors (e.g., College Avenue);
- mixed use districts (e.g., downtown, campus);
- low density mixed residential areas; and,
- all other land uses.



# Multimodal Transportation Level of Service Manual

Motor Vehicle LOS

Local streets present special issues. Their primary function is local access, and in many cases the principal issue is not capacity, but rather the impacts of traffic on adjacent properties.

Local streets are not included in Figure 4 and are not included in the evaluation of the "adequate public facilities" performance of the City Structure Plan and the Master Street Plan. The City has developed a special "Neighborhood Transportation Impact Analysis" process to address issues related to local street performance.

In addition to the recognition of the special situations anticipated along commercial corridors and within mixed use districts, the City has identified two circumstances for special treatment: "Constrained Corridors" and "Backlogged Facilities."

These are defined as follows:

**Constrained Corridors** -- These are segments of the street network which are physically constrained from further widening or major reconstruction. The constraint may be caused by the proximity of buildings (e.g., along College in Downtown Fort Collins) or by environmental conditions (e.g., the presence of a wetland or riparian corridor).

**Backlogged Facilities** -- These are roadway segments which currently operate below the LOS standards in Figure 4. These roadways are normally adjacent to developed properties and are not expected to be improved by future development.

Both Constrained Corridors and Backlogged Facilities will be identified on a city map. These special circumstances will warrant special treatment in the development review process described in Part II of this Manual.

Figure 4. Motor Vehicle LOS Standards

roadway functional classification	land use (from structure plan)			
	Commercial Corridors	Mixed Use Districts	Low Density Mixed Residential	All Other Areas
Major Arterial	E	E*	D	D
Arterial	E	E*	D	D
Minor Arterial	E	E*	C	D
Collector	D	D*	C	D
Connector	D	C*	B	C

\* Corridors within mixed use districts may fall below the LOS level indicated. In such cases, the City will provide for mitigation of congestion through alternatives to motor vehicle travel.



## Part II. LOS Standards for Development Review

The LOS standards set forth in Part I of this Manual form the basis for planning the future location and intensity of land uses in Fort Collins as embodied in the City Structure Plan.

The LOS standards define "acceptable" relationships between future land development patterns and transportation demand in terms of overall service levels by the year 2015. A number of specific strategies will be required to achieve city-wide transportation adequacy. Among these is evaluating the level of service of each of the transportation modes as part of the development review process.

The document which outlines the process for evaluation of proposed new development in terms of transportation LOS standards is the "Transportation Impact Study Guidelines" which is available from the City's development review staff.

Part II of this Manual provides detailed guidance on comparing the existing LOS condition for each of the modes with the minimum standards, and for forecasting future LOS conditions once development occurs.



# Multimodal Transportation Level of Service Manual

LOS Standards for Development Review - Public Transit

## Public Transit LOS Standards for Development Review

Evaluation of public transit LOS shall be based on Figure 1 of this Manual.

All development sites within the City shall be evaluated with respect to the level of transit service serving the site as outlined in the **Transportation Impact Study Guidelines** and this Manual, and shall be based on the City's long range transit service plan. (Appendix B provides a map of the routes and service levels planned for 2015.)

Although each proposed new development within the City will require a transit analysis as part of a Transportation Impact Study at the time of development review, *development that is in conformance with the Structure Plan and Zoning Map will not be precluded from proceeding by virtue of failing to meet the transit level of service test for adequate public facilities.*

For sites outside of Mixed Use Centers and Commercial Corridors, the minimum level of public transit service is **Level of Service D** or better based on the City's long range transit service plan. (See Appendix B.)

For sites within Mixed Use Centers and Commercial Corridors, the minimum level of public transit service is **Level of Service B** or better based on the City's long range transit service plan. (See Appendix B.)

A site may be graded as "served" by public transit only if the transit route utilizes a street that lies within one-half mile (2,640') of the proposed development site.

Site evaluation pursuant to Figure 1 of service frequency, hours of weekday service and route location are to be based on planned service characteristics in 2015 (shown in Appendix B).

For purposes of development review, the "travel time factor" shall be calculated to four specific destinations:

- the CSU Campus Transit Center
- Foothills Fashion Mall (north entrance)
- Fort Collins High School (main entrance)
- Downtown Fort Collins (corner of Mountain and College) .

Travel speed will be based on an average bus speed of twelve miles per hour. Travel time components within the existing TransFort system, wait times, and resulting differentials shall be based on **current data** (not forecast data) provided by the TransFort Manager.

The "peak load factor" calculation shall be based on **current data** (not forecast data) provided by the TransFort Manager. For all future routes not currently in existence, the peak load factor shall be presumed to be 1.0.

Project applicants should request transit service data from TransFort prior to submitting their Transportation Impact Study. An appropriate time to request this data is at the Initial Scoping Meeting called for in the **Transportation Impact Study Guidelines**.

# Multimodal Transportation Level of Service Manual

LOS Standards for Development Review - Pedestrian

## Pedestrian LOS Standards for Development Review

Development approval will not be granted for projects which would fail to meet minimum LOS standards for pedestrian facilities at the time of issuance of any building permit.

Figure 6 (on page 18) provides a worksheet which shall be used to compare actual pedestrian conditions with the minimum standard and, if applicable, with a future condition once improvements have been made.

Applicants should follow this step-by-step process for evaluating pedestrian LOS:

**Step 1.** Determine whether the project is located within one or more of the five types of location areas: pedestrian district, activity corridor/center, transit corridor, school walking area, or other area. These are defined below. The identification of location area type forms the basis for determining minimum LOS standards.

• “pedestrian district” -- This area includes the existing Fort Collins downtown, the CSU area, and a future activity center in the northwest portion of the city which has been designated on the Fort Collins City Structure Plan. A map (from the City’s Pedestrian Plan) is provided in Appendix A showing the location of existing and future pedestrian districts.

• “activity corridor/center” -- These include the commercial corridors of North and South College Avenue and areas within a quarter-mile (1,320’) radius around neighborhood and community retail centers. They are designated on the map in Appendix A.

• “transit corridor” -- These include all areas within a quarter-mile (1,320’) of existing transit routes and transit routes to be initiated within seven years.

• “school walking area” -- These include all areas within a mile (5,280’) radius around existing public schools (K-12) and around sites designated by the School District for future public schools.

• “other” -- This category includes all locations not falling within one of the four previous areas.

**Step 2.** Using Figure 5 (on page 17), determine the applicable LOS minimum standards for the project based on its location relative to the area types. If the project site is located in more than one area type, the type with the higher LOS standards shall be used.

**Step 3.** Identify all “destination areas” located within a quarter-mile (1,320’) of outside edges of the project site. Six types of destinations should be identified:

• “recreation sites” -- These include public parks, sports facilities, public tennis courts and other sites where the public would be expected to go to participate in physical recreation and sports activities.

• “residential areas” -- These include any concentration of at least ten dwelling units that may reasonably be regarded as a contiguous neighborhood or which are part of a single subdivision.

• “institutional sites” -- These include all churches, public schools, and public buildings which regularly receive the public for public business.

# Multimodal Transportation Level of Service Manual

LOS Standards for Development Review - Pedestrian

- "office buildings" -- These include all commercial office buildings, office parks, and office-type employment campuses with building area of at least 25,000 square feet.
- "commercial sites" -- These include any retail space of at least 15,000 square feet including shopping centers, strip shopping areas, and shopping malls.
- "industrial sites" -- These include all other non-residential sites of at least 50,000 square feet of building space utilized for manufacturing, assembly, shipping or warehousing activities.

List all applicable destination areas in the boxes provided at the left side of the worksheet along with their addresses. Show the destination area classification of each in the second column. Space for up to four destination areas is provided in the worksheet. If more than four sites are identified, use additional copies of the worksheet.

**Step 4.** Based on Figure 5 above, fill in the applicable minimum LOS standards in the boxes for each destination area identified (the minimum standard is based on the location of the project site, identified in Step 1 above, so the entries in the "minimum" boxes will be the same for all destination areas).

**Step 5.** Based on actual documented field measurement, show the actual LOS condition for the areas between the nearest publicly-accessible edge of the project site and each of the destination areas in the worksheet. In the "proposed" row of boxes, show the LOS conditions that would result from any pedestrian improvements proposed as part of project development.

The worksheet in Figure 6 will form the basis for City review of development proposals. Agreement should be reached at the Initial Scoping Meeting concerning which of the location area types will apply to the project site for which the Transportation Impact Study is being prepared, and concerning which destination areas should be included in the worksheet.

If applicable, developers may meet pedestrian LOS standards by voluntarily providing off-site improvements to achieve minimum conditions. Such off-site improvements, however, are not exactions imposed by the City but rather are voluntary actions taken by the developer, at its sole option, to accelerate the achievement of adequate public facilities on the project site. The costs of such off-site improvements shall not be credited by the City against any financial obligations for which the developer may otherwise be responsible (such as Street Overizing or Transportation Impact Fee). Appendix A provides descriptions of the standards (column headings in Figure 5) and conditions to be utilized in assignment of letter grades.

**Figure 5**  
Minimum Pedestrian Level of Service

	pedestrian district	directness	continuity	street crossings	visual interest & amenities	security
activity center/corridor	A	B	B	B	A	A
transit corridor	B	B	B	B	B	B
school/walk area	B	B	B	B	C	B
other	C	C	C	C	C	C

# Multimodal Transportation Level of Service Manual

LOS Standards for Development Review - Pedestrian

Figure 6. Pedestrian LOS Worksheet

project location classification:		(enter as many as apply)																					
1	description of applicable destination area within 1,320' including address	destination area classification (see text)	level of service (minimum based on project location classification)									security											
			directness	continuity	street crossings	visual interest & amenities	minimum	actual	proposed	minimum	actual		proposed										
2																							
3																							
4																							

# Multimodal Transportation Level of Service Manual

LOS Standards for Development Review - Bicycle

## Bicycle LOS Standards for Development Review

Development approval will not be granted for projects which will not meet two LOS standards by the time the project is to be occupied:

The project must be directly connected to the greater Fort Collins bicycle grid at no less than LOS C as defined in Figure 3.

The project must be directly connected to all priority destinations located within a quarter mile (1,320') of any edge of the project boundaries.

Priority destinations include all "priority destination areas" located within a quarter-mile (1,320') of outside edges of the project site. Three types of destinations should be identified:

"public school sites" -- These include any existing public schools (K-12) as well as any sites designated by the School District for future public schools.

- "recreation sites" -- These include public parks, sports facilities, public tennis courts and other sites where the public would be expected to go to participate in physical recreation and sports activities.

"community and neighborhood commercial centers" -- These are designated on the City Structure Plan map and are shown on the pedestrian map in Appendix A.

Figure 7 provides a worksheet which is to be used to compare actual bicycle connectivity conditions with the minimum standard and, if applicable, with a future condition once improvements have been made.

The worksheet in Figure 7 will form the basis for City review of development proposals. Agreement should be reached at the Initial Scoping Meeting concerning which destination areas should be included in the worksheet. The applicant should evaluate the base LOS condition at the top part of the worksheet and evaluate connections to all applicable destination areas in the rows provided. If there are more than four destination areas, additional copies of the worksheet may be utilized.

If applicable, developers may meet bicycle LOS standards by voluntarily providing off-site improvements to achieve minimum conditions. Such off-site improvements, however, are not exactions imposed by the City but rather are voluntary actions taken by the developer, at its sole option, to accelerate the attainment of minimum LOS conditions for the project site. The costs of such off-site improvements shall not be credited by the City against any financial obligations for which the developer may otherwise be responsible (such as Street Oversizing or Transportation Impact Fee).

"Directly connected" shall mean the project site is penetrated by the bicycle facility; or the bicycle facility runs immediately adjacent to the property and is not separated from it by any significant barriers; or the bicycle facility runs perpendicular to the property edge and is readily accessible from the property with no significant barriers.

Bicycle facilities which are not consistent with the City's minimum design standards shall not be considered in arriving at bicycle LOS using the worksheet in Figure 7.

Explanation of the letter grades for bicycle LOS are found in Figure 3 on page 10 of this Manual.





## Motor Vehicle LOS Standards for Development Review

The facility-based motor vehicle LOS standards shown in Figure 4 represent city-wide level of service standards. They are based on "volume/capacity" calculations prepared in connection with traffic modeling of future land uses and roadway networks.

In development review, projects will be evaluated based on a detailed analysis of intersections and links in a manner consistent with the 1985 Highway Capacity Manual. The procedure and requirements for this analysis are described in detail in the Transportation Impact Study Guidelines. They are summarized here.

### *Transportation Impact Study Guidelines*

The Transportation Impact Analysis will determine if a proposed development project will create any significant impacts at the study intersections and on roadways surrounding the project site. In order to determine this, peak hour levels of service at each of the study intersections will be evaluated for each of the following scenarios:

- existing conditions;
- existing conditions plus site generated traffic;
- short range conditions (3 - 5 years); and,
- long range conditions (10 - 15 years).

The level of service evaluation for each of these traffic scenarios should include estimates of the percentage distribution of person trips among the modes of travel.

Motor vehicle LOS analysis should be conducted for intersections located within one-half mile of the project site. The City Traffic Engineer may require analysis of additional intersections. The City has established LOS D as the general

standard for signalized arterial intersections. The standard for arterial intersections on commercial corridors and within activity centers is LOS E. (Arterial intersections are the intersection of an arterial roadway with another arterial or a collector.)

Figure 8 below provides intersection LOS standards for use in development review. Development projects which will generate traffic causing intersections to fall below these standards will be regarded as "significantly impacting a study intersection." In these cases, mitigation measures must be evaluated in cooperation with the City as outlined in the Transportation Impact Study Guidelines.

The City has also identified certain corridors and roadways as either "constrained" or "backlogged" (see page 12 for definitions of these terms). Projects which significantly impact such corridors and facilities will also be required to provide appropriate mitigation.

Figure 8. Motor Vehicle LOS -- Study Intersections

intersection type	land use (from structure plan)			
	Commercial Corridors	Mixed Use Districts	Low Density Mixed Residential	All Other Areas
Signalized Intersections	D	E*	D	D
Stop Sign Control (arterial/local)	N/A	E*	E*	E
Stop Sign Control (collector/local)	N/A	C	C	C

\* Intersections falling below LOS E will require identification of specific strategies for mitigation of congestion through alternatives to motor vehicle travel.

# Multimodal Transportation Level of Service Manual

LOS Standards for Development Review - Motor Vehicle

## *Relationship to Street Oversizing Fee*

(For a detailed explanation of the Street Oversizing Fee, see Section 24-111 to 24-121 of the Fort Collins City Code, or contact the City's Director of Engineering).

Street oversizing fees are collected prior to the issuance of building permits. These fees are coordinated with the City's overall Transportation Level of Service standards and with its capital improvements planning.

Proposed developments which would not meet Motor Vehicle LOS standards without additional investment in roadway infrastructure must be evaluated in light of the City's Street Oversizing Fee provisions. For such projects, the relationships between LOS standards and the Street Oversizing Fee Program, including the anticipated sharing of costs for roadway investments and the timing of such improvements, should be established as part of early review and should be explicitly addressed at the Initial Scoping Meeting.

In some instances, the City will participate through the street oversizing program in funding the street improvements to be constructed in connection with the development. This will be determined on a case-by-case basis according to the criteria in City Code Section 24-111 to 24-121.

In all cases, however, the developer will be expected to pay the City's street oversizing fee and all other applicable fees as required by City ordinances.



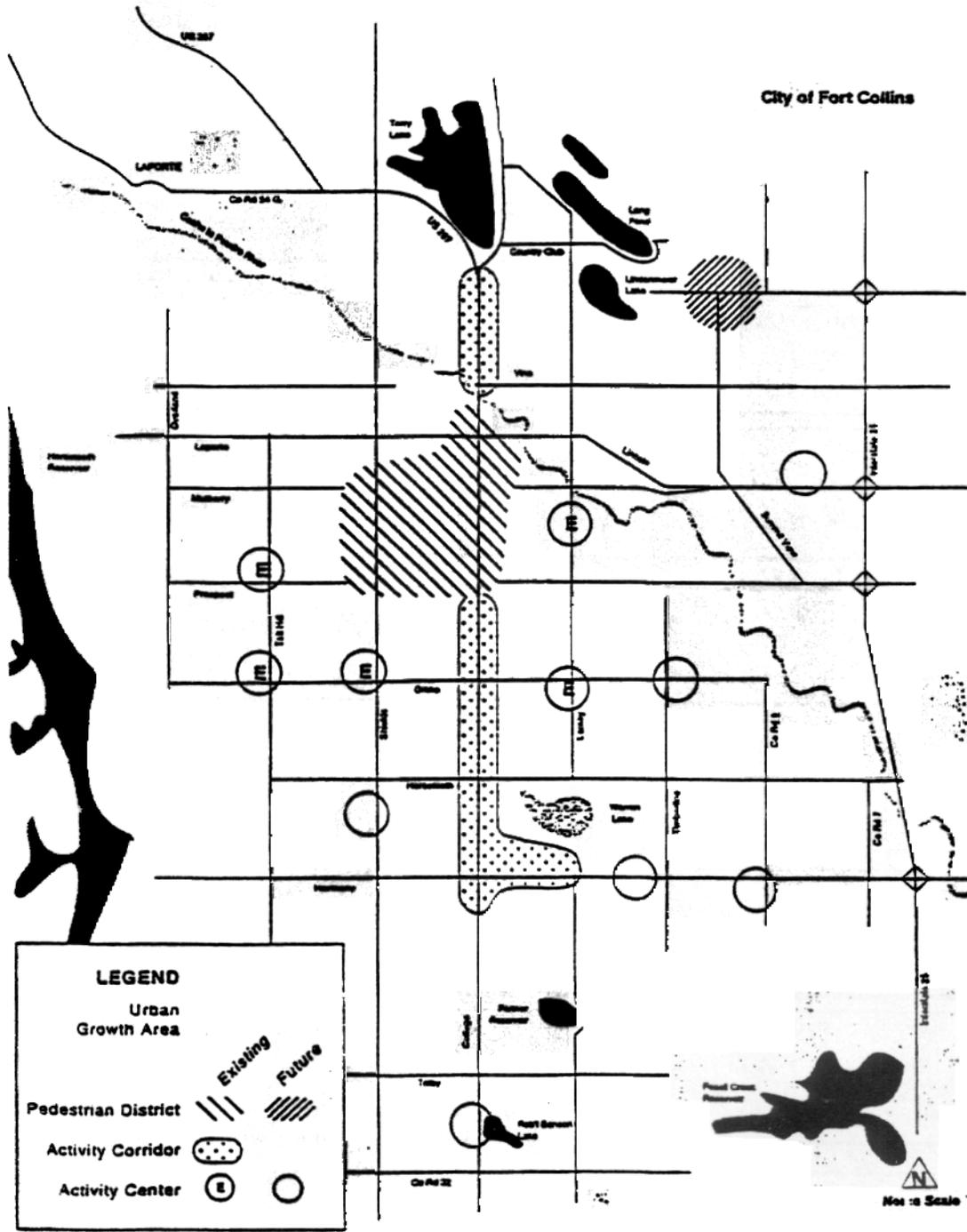
**Appendix A  
Pedestrian Plan**

## Fort Collins Pedestrian Levels of Service

	A	B	C	D	E	F
<b>Directness</b>	Excellent and direct connectivity through full utilization of urban space, streets, transit, activity centers with clear linear visual statements.  (A/M Ratio < 1.2)*	Excellent and direct connectivity with clear linear and visual connection to transit facilities, streets and activities.  (A/M Ratio 1.2 to 1.4)*	Minimum acceptable directness and connectivity standard. Perceptions and urban space are not as connected with the beginnings of discomfort with visual clarity and lack of linearity.  (A/M Ratio 1.4 to 1.6)*	Increasing lack of directness, connectivity and linearity with confusing direction and visual connection to pedestrian destinations.  (A/M Ratio 1.6 to 1.8)*	Poor directness and connectivity. Pedestrians perception to desired destination fails and serves only the person with no other choice.  (A/M Ratio 1.8 to 2.0)*	No directness or connectivity. Total pedestrian disorientation, no linearity and confusing  (A/M Ratio > 2.0)*
<b>Continuity</b>	Pedestrian sidewalk appears as a single entity with a major activity area or public open space.  (A/M Ratio < 1.2)*	Continuous stretches of sidewalks which are physically separated by a landscaped parkway.  (A/M Ratio 1.2 to 1.4)*	Continuous stretches of sidewalks which may have variable widths, with and without landscaped parkways.  (A/M Ratio 1.4 to 1.6)*	Pedestrian corridors are not well connected with several breaches in the pedestrian network.  (A/M Ratio 1.6 to 1.8)*	Significant breaks in continuity.  (A/M Ratio 1.8 to 2.0)*	Complete breakdown in pedestrian traffic flow as different routes as no pedestrian network exists.  (A/M Ratio > 2.0)*
<b>Signals**</b>	3 or fewer lanes to cross; signal has clear vehicular and pedestrian indications; well marked crosswalks; good lighting levels;  standard curb ramps; automatic pedestrian signal phase; amenities, signing, sidewalk, and roadway character strongly suggest the presence of a pedestrian crossing; drivers and pedestrians have unobstructed views of each other.	4 or 5 lanes to cross; signal has clear vehicular and pedestrian indications; well marked crosswalks; good lighting levels; pedestrian refuge area: raised medians at least 6' wide with low plantings or features;  standard curb ramps; automatic pedestrian signal phase; amenities, signing, sidewalk, and roadway character strongly suggest the presence of a pedestrian crossing; drivers and pedestrians have unobstructed views of each other.  Missing 2 elements of A	6 or more lanes to cross; signal has clear vehicular and pedestrian indications; well-marked crosswalks; good lighting levels; pedestrian refuge area: raised median at least 6' wide with low plantings or features;  standard curb ramps; automatic pedestrian signal phase; amenities, signing, sidewalk, and roadway character strongly suggest the presence of a pedestrian crossing; drivers and pedestrians have unobstructed views of each other.  Missing 4 elements of A Missing 2 elements of B	Missing 3 elements of A Missing 4 elements of B Missing 2 elements of C	Missing 6 elements of A Missing 5 elements of B Missing 4 elements of C	Missing 7 elements of A Missing 6 elements of B Missing 5 elements of C
<b>Unsignalized, crossing the major street**</b>	3 or fewer lanes to cross; Well-marked crosswalks; good lighting levels;  standard curb ramps; amenities, signing, sidewalk, and roadway character strongly suggest the presence of a	4 or 5 lanes to cross; Well-marked crosswalks; good lighting levels; pedestrian refuge area: raised median at least 6' wide with low plantings or features;  standard curb ramps; amenities, signing, sidewalk, and roadway character strongly suggest the presence of a	6 or more lanes to cross; Well-marked crosswalks; good lighting levels; pedestrian refuge area: raised median at least 6' wide with low plantings or features;  standard curb ramps; amenities, signing, sidewalk, and roadway character strongly suggest the presence of a	Missing 3 elements of A Missing 2 elements of B Missing 1 element of C	Missing 4 elements of A Missing 3 elements of B Missing 2 elements of C	Missing 5 elements of A Missing 4 elements of B Missing 3 elements of C

	amenities, signing, sidewalk, and roadway character strongly suggest the presence of pedestrian crossing; drivers and pedestrians have unobstructed views of each other.	amenities, signing, sidewalk, and roadway character strongly suggest the presence of pedestrian crossing; drivers and pedestrians have unobstructed views of each other.	amenities, signing, sidewalk, and roadway character strongly suggest the presence of pedestrian crossing; drivers and pedestrians have unobstructed views of each other.	Missing 2 elements of A Missing 1 element of B	Missing 3 elements of A	Missing 4 elements of A	Missing 5 elements of A
Unsignalized crossing the minor street**	Well-marked crosswalks; good lighting levels; standard curb ramps; amenities, signing, sidewalk, and roadway character strongly suggest the presence of pedestrian crossing; drivers and pedestrians have unobstructed views of each other.	Missing 1 element of A	Missing 2 elements of A	Missing 2 elements of A	Missing 3 elements of A	Missing 4 elements of A	Missing 5 elements of A
Mid-block major street crossing***	3 or fewer lanes to cross; amenities, signing and sidewalk and roadway character strongly suggest the presence of pedestrian crossing; drivers and pedestrians have unobstructed views of each other.	4 or 5 lanes to cross; Raised median at least 10" wide with low plantings or features; amenities, signing and sidewalk and roadway character strongly suggest the presence of pedestrian crossing; drivers and pedestrians have unobstructed views of each other.	6 or more lanes to cross; Raised median at least 10" wide with low plantings or features; amenities, signing and sidewalk and roadway character strongly suggest the presence of pedestrian crossing; drivers and pedestrians have unobstructed views of each other.	Missing 1 element of B	Missing 3 elements of A Missing 2 elements of B Missing 1 element of C	Missing 4 elements of A Missing 3 elements of B Missing 2 elements of C	Missing 5 elements of A Missing 4 elements of B Missing 3 elements of C
Visual Interest and Amenity	Visually appealing and compatible with local architecture. Generous sidewalk, active building facades, pedestrian lighting, street trees and quality street furniture.	Generous sidewalks, visual clarity, some street furniture and landscaping, no blank street walls.	Functionally operational with less importance to visual interest or amenity.	Design ignores pedestrian with negative mental image.	Comfort and convenience non-existent, design has overlooked needs of users.	Trial discomfort and intimidation.	
Security	Sense of security enhanced by presence of other people using sidewalk and overlooking them from adjacent buildings. Good lighting and clear sight lines.	Good lighting levels and unobstructed lines of sight.	Unobstructed lines of sight.	Sidewalk configuration and parked cars may inhibit vigilance from the street.	Major breaches in pedestrian visibility from street, adjacent land uses and activities.	Streetscape is pedestrian intolerant.	

A/M Ratio: Actual distance between pedestrian origin/destination divided by minimum distance defined by a fifth angle grid street system.  
 A signalized intersection LOS will go up one level of service with a dedicated pedestrian signal phase and/or a colored or textured crosswalk.  
 Unsignalized crossing at intersection of major street (minor arterial to major arterial) and minor street (local, connector and collector).



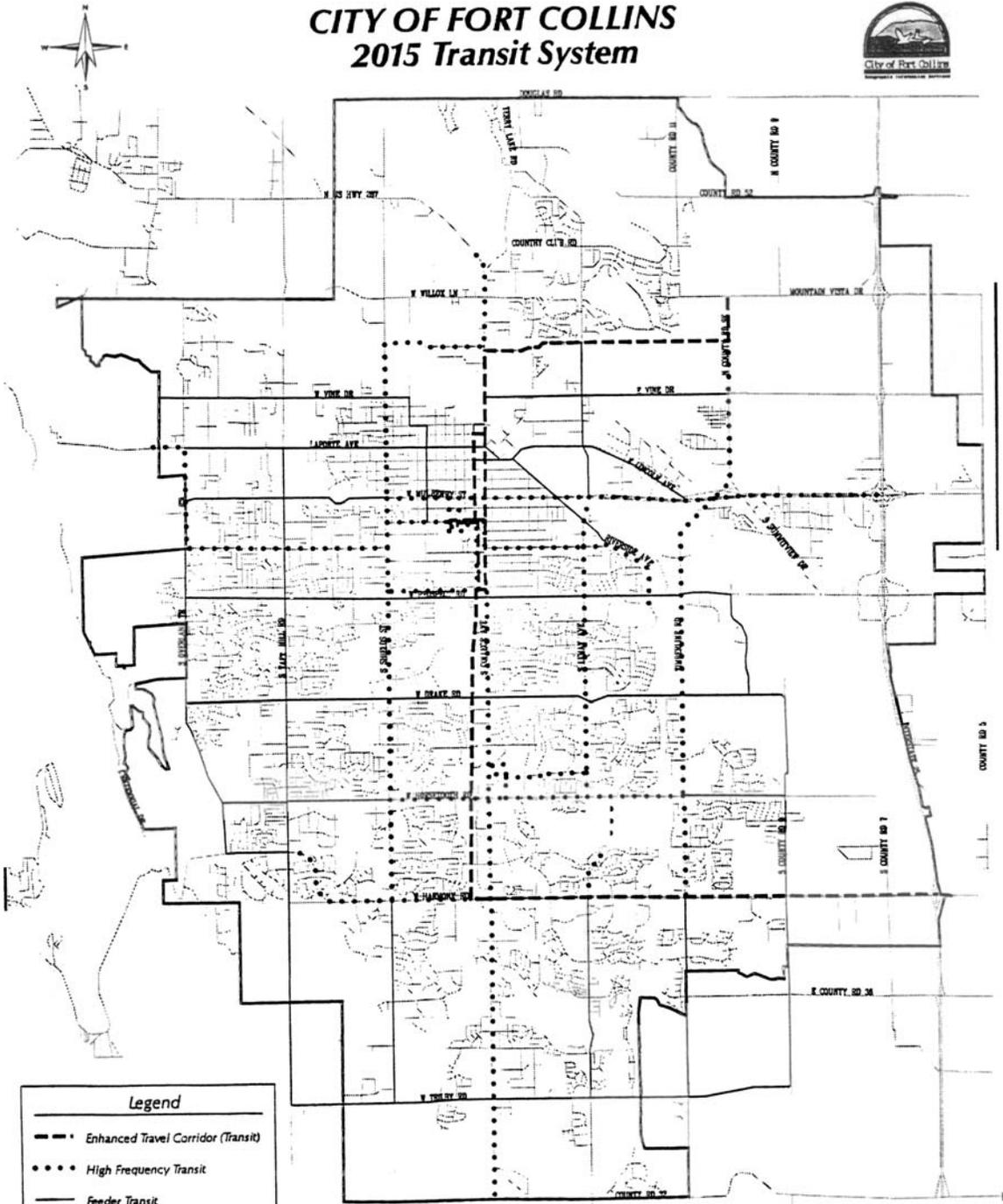
**Appendix B  
Public Transit Plan**

Multimodal Transportation Level of Service Manual

City of Fort Collins Transportation Master Plan



# CITY OF FORT COLLINS 2015 Transit System



**Legend**

- Enhanced Travel Corridor (Transit)
- ..... High Frequency Transit
- Feeder Transit
- Urban Growth Area
- Street Center Lines

Not To Scale  
February 03, 1997