The City of Fort Collins Master Transportation Plan provides level of service (LOS) standards for each travel mode including motor vehicle, public transit, bicycle, and pedestrian. The objectives of these LOS standards guide public and private planning for mobility and accessibility in all transportation modes.

In preparing the Pedestrian LOS standards and methodology, it became evident that pedestrian measures such as pedestrian density and flow rate as defined by the Highway Capacity Manual were inappropriate for Fort Collins, Colorado, a medium-size urban area. Therefore a planning LOS set of procedures was developed to evaluate existing conditions and proposed public and private projects.

It should be further noted that the determination of the methodologies is but half of the LOS analysis procedure. LOS targets or standards were also defined for different areas within the City.

**Level of Service Measurements**
As an outgrowth of the pedestrian problem definition, a pedestrian facility-specific LOS measurement procedure was established for each of five problem areas. These definitions are presented in the Pedestrian Level of Service Chart. The five problem areas for which LOS procedures were developed are as follows:

- Directness
- Continuity
- Street Crossings
- Visual Interest and Amenity
- Security
Directness
*Measurement of the walking trip length.*

The measure of directness is simply how well an environment provides direct pedestrian connections to destinations such as transit stops, schools, parks, commercial areas, or activity areas. The grid street pattern typifies the ideal system where one can go north or south, or east or west to easily get to one’s destination. The common curvilinear residential subdivision which may have cul-de-sacs that back onto a commercial center, transit stop, school, or park might be physically proximate to a potential pedestrian destination, however, often require a circuitous route which deters pedestrians trips.

The directness LOS measure is based on a ratio of the actual distance from a trip origin to trip destination divided by the minimum distance (as the crow flies) between those two points. Actual destination is further defined by either existing conditions or the proposed public/private development.

To measure the directness LOS requires selecting one or two trip origin locations in a smaller development and up to five or six representative trip origin locations in a larger development. Trip destinations are then identified.

Trip destinations are those locations to which pedestrians may walk, such as transit stops, schools, parks, trails, and commercial areas. These destinations should be within approximately one-quarter mile, but could be greater (e.g., junior high schools and high schools have a one-mile and one and one half-mile walking distance, respectively). If no pedestrian destinations are within the immediate study area, the directness LOS is not applicable. Connections to arterials that could eventually support transit should be evaluated.

If the directness LOS is defined by the grid system, the minimum distance is the measurement from a representative trip origin to destination by the north/south axis.

The actual distance is either the existing distance to walk from an origin to destination, or the distance if the development was constructed.

The actual/minimum ratio and level of service table is as follows:

<table>
<thead>
<tr>
<th>LEVEL OF SERVICE</th>
<th>ACTUAL DISTANCE/MEASURED DISTANCE RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&lt; 1.2</td>
</tr>
<tr>
<td>B</td>
<td>1.2 - 1.4</td>
</tr>
<tr>
<td>C</td>
<td>1.4 - 1.6</td>
</tr>
<tr>
<td>D</td>
<td>1.6 - 1.8</td>
</tr>
<tr>
<td>E</td>
<td>1.8 - 2.0</td>
</tr>
<tr>
<td>F</td>
<td>&gt; 2.0</td>
</tr>
</tbody>
</table>

An actual/minimum (A/M) ratio of less than 1.2 is considered an A, whereas an A/M ratio of 2.0+ would be considered a F. An A/M ratio of below 1.0 could be achieved with the introduction of a diagonal street. Ideally, development proposals should be self-mitigated to achieve acceptable LOS standards prior to submittal to the City.

Continuity
*Measurement of the completeness of the sidewalk system.*

A continuous pedestrian system from origin to destination is critical for pedestrian mobility. Continuity is a measure of both the physical consistency and type of pedestrian sidewalk, and the visual connection from one block to the next.

LOS A is achieved when the pedestrian sidewalk appears as a single entity with a major activity area or public open space.

LOS B provides a quality continuous stretch of pedestrian networks which are physically separated with landscaped parkways.

LOS C provides for a continuous pedestrian network on both sides of the streets; however, these sidewalks may not be built to current standards.

LOS D reflects areas where there may not be sidewalks on both sides of the
Street or there are breaches in the system.

LOS E reflects areas where there are significant breaks in the system.

LOS F is a complete breakdown in the pedestrian flow where each pedestrian selects a different route because no pedestrian network exists.

**Street Crossings**
*Measurement of the pedestrian safety in crossing a street.*

If one cannot safely cross a street to get to one’s destination, there is little likelihood that a change in mode from the automobile will take place. Because street crossings place the pedestrian in the middle of the street involving both the pedestrian and automobile driver, the measurement of a street crossing becomes very complex. Achieving a high LOS for street crossings requires significant investment.

**Signal Indication**
Signal heads are easily visible to the pedestrian and the motorist.

**Lighting Levels**
Intersection and crosswalks are well lit so that the pedestrian is visible at night.

**Pedestrian Signal Indication**
Some signals have the walk phase automatically set for each cycle. This is desirable for all activity areas, as it states the importance of the pedestrian. An alternative is the pedestrian button, where the pedestrian presses the button, waits for the cycle to repeat, and gets the walk phase. The third type of signal does not have any walk phase. For an actuated signal this type of pedestrian indication is unacceptable, since the only way a pedestrian gets a green light is when an automobile on the side street activates the cycle.

**Pedestrian Character**
Signs, striping, and roadway character strongly suggest the presence of a pedestrian crossing.

**Sight Distance**
Unobstructed view between the motorist and the pedestrian. This can be a particular problem when a vehicle driver intends to make a left turn under the permissive left turn phase and has
### Fort Collins: Pedestrian Levels of Service

<table>
<thead>
<tr>
<th>Directness</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent and direct connectivity through full utilization of urban space, streets, transit, and activity centers with clear line of visual contact.</td>
<td>IAM Ratio &lt;1.0*</td>
<td>IAM Ratio 1.0 to 1.4*</td>
<td>IAM Ratio 1.4 to 1.8*</td>
<td>IAM Ratio 1.8 to 2.0*</td>
<td>IAM Ratio &gt;2.0*</td>
<td>No direct or connectivity. Total pedestrian disorientation, no linearity and confusing.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Continuity</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrian sidewalk appears as a single entity with a major activity area or public open space.</td>
<td>4 or 5 lanes to cross; signal has clear vision and pedestrian indications; well-marked crosswalks; good lighting levels; standard curb ramps; automatic pedestrian signal phases; signed sidewalks; and roadway character strongly suggest the presence of a pedestrian crossing; drivers and pedestrians have unobstructed views of each other.</td>
<td>Missing 5 elements of A</td>
<td>Missing 6 elements of A</td>
<td>Missing 7 elements of A</td>
<td>No direct or connectivity. Total pedestrian disorientation, no linearity and confusing.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Signals**</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 or fewer lanes to cross; signal has clear vision and pedestrian indications; well-marked crosswalks; good lighting levels; standard curb ramps; automatic pedestrian signal phases; signed sidewalks; and roadway character strongly suggest the presence of a pedestrian crossing; drivers and pedestrians have unobstructed views of each other.</td>
<td>4 or 5 lanes to cross; signal has clear vision 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 phases; signed sidewalks; and roadway character strongly suggest the presence of a pedestrian crossing; drivers and pedestrians have unobstructed views of each other.</td>
<td>Missing 5 elements of A</td>
<td>Missing 6 elements of A</td>
<td>Missing 7 elements of A</td>
<td>No direct or connectivity. Total pedestrian disorientation, no linearity and confusing.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unsignalized, crossing the major street**</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well-marked crosswalks; good lighting levels; standard curb ramps; signed sidewalks; and roadway character strongly suggest the presence of a pedestrian crossing; drivers and pedestrians have unobstructed views of each other.</td>
<td>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; signed sidewalks; and roadway character strongly suggest the presence of a pedestrian crossing; drivers and pedestrians have unobstructed views of each other.</td>
<td>Missing 5 elements of A</td>
<td>Missing 6 elements of B</td>
<td>Missing 7 elements of C</td>
<td>No direct or connectivity. Total pedestrian disorientation, no linearity and confusing.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unsignalized, crossing the minor street**</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well-marked crosswalks; good lighting levels; standard curb ramps; signed sidewalks; and roadway character strongly suggest the presence of a pedestrian crossing; drivers and pedestrians have unobstructed views of each other.</td>
<td>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; signed sidewalks; and roadway character strongly suggest the presence of a pedestrian crossing; drivers and pedestrians have unobstructed views of each other.</td>
<td>Missing 5 elements of A</td>
<td>Missing 6 elements of B</td>
<td>Missing 7 elements of C</td>
<td>No direct or connectivity. Total pedestrian disorientation, no linearity and confusing.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mid-block major street crossing**</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signed sidewalks; visual clarity, some street furniture like landscaping, no blank street walls.</td>
<td>4 or 5 lanes to cross; raised median at least 6' wide with low plantings or features; signed sidewalks; and roadway character strongly suggest the presence of a pedestrian crossing; drivers and pedestrians have unobstructed views of each other; well-marked crosswalks; good lighting levels; standard curb ramps; signed sidewalks; and roadway character strongly suggest the presence of a pedestrian crossing; drivers and pedestrians have unobstructed views of each other.</td>
<td>Missing 5 elements of A</td>
<td>Missing 6 elements of B</td>
<td>Missing 7 elements of C</td>
<td>No direct or connectivity. Total pedestrian disorientation, no linearity and confusing.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Visual Interest and Amenity</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usually appealing and compatible with local architecture. Generous sidewalk width; active building frontages; pedestrian lighting, street trees, and quality street furniture.</td>
<td>4 or 5 lanes to cross; raised median at least 6' wide with low plantings or features; signed sidewalks; and roadway character strongly suggest the presence of a pedestrian crossing; drivers and pedestrians have unobstructed views of each other; well-marked crosswalks; good lighting levels; standard curb ramps; signed sidewalks; and roadway character strongly suggest the presence of a pedestrian crossing; drivers and pedestrians have unobstructed views of each other.</td>
<td>Missing 5 elements of A</td>
<td>Missing 6 elements of B</td>
<td>Missing 7 elements of C</td>
<td>No direct or connectivity. Total pedestrian disorientation, no linearity and confusing.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Security</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sense of security enhanced by presence of other people using sidewalks and visibility from adjacent buildings. Good lighting and clear sight lines.</td>
<td>Good lighting levels and unobstructed lines of sight.</td>
<td>Unobstructed lines of sight.</td>
<td>Sidewalk configuration and parked cars may inhibit vigilance from pedestrians.</td>
<td>Major breaches in pedestrian visibility from street, adjacent land uses and activities.</td>
<td>Sterescopic view pedestrian visibility.</td>
<td></td>
</tr>
</tbody>
</table>

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** IAM Ratio: Actual distance between pedestrian origin/destination divided by minimum distance defined by a right 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 intersections of major street (minor arterial to major arterial) and minor street (local, connector and collector).
difficulty seeing around the opposing left-turning vehicle.

**Corner Ramps**
Directional corner ramps are preferred because they notify drivers of intended pedestrian walking direction.

**Street Crossing Types**
*There are four types of street crossings. Each has inherent differences.*

**Signalized Intersections**
Signalized intersections pose major pedestrian crossing problems due to high volumes, turning vehicles, vehicles that stop in the crosswalk, a significant number of lanes to cross, signal indication that is difficult to read or understand, lack of visual connection with automobiles, lack of vehicle driver respect, lack of raised median protection, no corner ramps, and no or inconvenient pedestrian buttons.

**Unsignalized Intersection Crossing the Major Street**
Problems are similar to signalized intersections with even greater concern for the number of lanes to cross, speed of vehicles, and lack of adequately marked crosswalks with good lighting, raised median, visibility, and corner ramps.

**Unsignalized Intersection Crossing the Minor Street**
The problem at these locations is the vehicle traveling along the arterial turning right or left onto the minor street, while being urged along by a following vehicle.

**Mid-Block Crossing**
Similar to unsignalized major street crossing, including number of lanes to cross, lack of crosswalk presence, lighting, raised median, and corner ramps.

**Street Crossing LOS Measurements**
For each street crossing type, the ideal condition as defined in the Pedestrian LOS Chart assigns the highest LOS to the crossing with the greatest number of design elements with the minimum number of lanes. As pedestrian design elements are added, the LOS improves. As lanes are added, the LOS is lowered.

**Visual Interest and Amenity**
*Measurement of the pedestrian system's attractiveness and features.*

The attractiveness of the pedestrian network can range from visually appealing to appalling. Compatibility with local architecture and enhancements, such as fountains, benches, and lighting improve visual interest of the area for pedestrians.

**Security**
*Measurement of the pedestrians’ sense of security.*

Pedestrians require a sense of security, both through visual line of sight with vehicle drivers and separation from vehicles. Major portions of the city’s sidewalks along arterials are narrow and adjacent to high-volume, high-speed travel lanes. Other sidewalks are intimidating because they are not visible to the motorist and surrounding activities. Pedestrian sidewalks and corridors should also be examined based on lighting levels and sight distance.

**Pedestrian Facilities Plan**
While there is one set of LOS measurements for all pedestrian facilities, acceptable LOS thresholds vary by type of activity area. It would not be logical to require the same LOS standard everywhere. As an example, the needs and
standards for a downtown area which is highly pedestrian-dependent, is significantly different in character and need than an outlying residential area not proximate to schools or transit. Therefore a pedestrian facilities plan should be developed to identify the existing and/or anticipated pedestrian activity areas from which to assign LOS standards. There are five designations defined in this plan:

**Pedestrian Districts**
This area reflects the highest pedestrian environment desired, a location where all LOS standards are A or B. This area would be appropriate for downtown and university areas, which typically have the highest pedestrian activity in a city. This pedestrian district would also reflect proposed activity areas as defined by the city’s comprehensive plan.

**Activity Corridor/Centers**
This area is defined by the primarily commercial corridors. Other areas have a very high automobile dependency. By providing pedestrians linear connections between retail uses and the adjacent residential areas, pedestrian activity along these corridors could be significantly improved. Pedestrians are more likely to walk to areas within one-quarter mile of neighborhoods and retail areas with higher pedestrian LOS.

**School Walking Areas**
These include all routes within a one-mile walking radius of an existing public school and around sites designated for future public schools.

**Transit Corridors**
Areas within one-quarter mile of existing transit and routes identified in the Transit 20 Year Plan.

**Other**
This category includes all locations not falling within one of the four previous areas.
**LOS Thresholds**
The following defines the minimum acceptable standards by Pedestrian Facilities Plan Area. It should be noted that numerous locations within a city will not achieve the minimum LOS. Because of limited funding, improvements should be prioritized toward activity areas, routes to schools, parks, and transit. To cap the current problem, new developments, both public and private, as well as major street improvements and redevelopment, should adhere to the pedestrian LOS standards.

**Applications**
Vehicle, transit, bicycle, and pedestrian LOS analysis is required for all proposed public and private developments and arterial improvements. Street improvements may require pedestrian improvements to facilitate acceptable pedestrian street crossings. Street improvements are unacceptable if they reduce pedestrian LOS below acceptable levels. Private developments may be required to construct off-site pedestrian improvements to achieve acceptable pedestrian LOS, similar to the request to provide off-site mitigations to achieve acceptable automobile LOS.