8.0 URBAN HIGHWAY DESIGN
(Non-Freeway)

8.1 INTRODUCTION

Designing urban highway projects presents designers with a variety of challenges. Designers must balance the needs of autos, trucks, transit, bicyclists, and pedestrians, while considering highway function, speed, safety, alignment, channelization, right of way, environmental impacts, land use impacts, and roadside culture. Urban highways can take several forms: freeways, expressways, arterials, collectors, and sometimes, local roads. This chapter will focus on urban expressways and arterials. Urban freeway design is discussed in Chapter 6. This chapter will discuss a variety of issues, concerns, and areas for consideration when designing urban highways as well as describing the appropriate design standards. Many of the concepts in this chapter, including expressways, state highway classification system, and highway segment designations, are based on the 1999 Oregon Highway Plan (OHP) Land Use and Transportation policies.

The majority of this chapter will describe the standards that are appropriate for the design of new construction or 4R type projects on different urban highways. These standards are contained in Tables 8-1, through 8-5. The last section of this chapter describes the ODOT 3R Urban Design Standards applicable to urban highways. This chapter discusses urban design elements, such as bicycle and pedestrian elements that are discussed in more detail in other chapters. Chapter 11 provides information on pedestrian and bicycle elements while Chapter 12 provides guidelines for public transportation.

8.2 EXPRESSWAYS

- **General**

Expressways are generally high-speed limited access facilities whose function is to move inter- and intra-urban traffic. Expressways often also serve as major freight corridors and may be located on a designated OHP Freight Route. Private property access is discouraged. Access is normally restricted to at-grade signalized and unsignalized public road intersections or interchanges. In areas where there is no other reasonable access, private approach roads may be allowed. Expressways may have a mixture of at-grade intersections and interchanges. Some expressways may become freeways in the future and therefore should be designed, operated, and managed at the highest level to ensure long-term operations. The transitioning of urban roadways to expressways should take into account the long-term plan for the roadway, which can impact the design of the facility. Table 8-1 provides standards for the design of expressways.

8.2.1 ODOT 4R / NEW URBAN DESIGN STANDARDS - EXPRESSWAYS

- **Design Speed**

  The design speed of an expressway is a critical element for determining the appropriate standard to be applied to a given segment. Expressways are usually high-speed roadways and should be designed appropriately. Most urban expressways should be designed based upon a 55 mph design speed or higher. In more restrictive urban environments, a 50 mph design speed may be more appropriate. A 45 mph design speed may be considered only in highly constrained areas and retrofit situations. Several factors including planned operating speeds, amount of access control, use of at-grade intersections, use of grade separations and topography play major roles in determining the appropriate design speed.

- **Pedestrians**

  Design for and accommodation of pedestrians along expressways is accomplished on a case by case basis. On those expressways that look and function closer to a freeway, pedestrians generally are not accommodated adjacent to the roadway. Pedestrian movements are better accommodated on parallel local roads and streets. In some instances, however, a separate multi-use path may be constructed along expressways. Where multi-use paths are used they should be a minimum of 10 feet wide. Where a multi-use path is parallel and adjacent to a roadway, there should be a 5 foot or greater width separating the path from the edge of roadway.

  On some lower speed expressways, or along expressways in highly urbanized areas, pedestrians may be accommodated adjacent to the roadway. The preferred method is a sidewalk and buffer strip. The buffer strip should be at least 8 feet, but may be as low as 4 feet under constrained conditions. Sidewalks separated by a buffer strip should be 6 feet. Curbside sidewalks should be avoided along expressways. Chapter 11 and the Oregon Bicycle and Pedestrian Plan provide additional guidance to the design of pedestrian facilities in these areas.

- **Shoulders/Bike Lanes**

  Expressways must include an adequate shoulder. The shoulder is necessary for emergency parking, disabled vehicles, and emergency response vehicles. The shoulder also provides significant safety benefits to motorists and bicyclists, as well as improves traffic flow and capacity. A minimum 8 foot right side shoulder shall be used for all design speeds where no roadside barriers are used. This width of shoulder is necessary to help distinguish expressways as a higher order of roadway facility that should ultimately move towards being an access controlled facility and provide an area for disabled vehicles and emergencies.

Where roadside barriers are used such as guardrail, concrete barrier, or bridge rail, the right side shoulder should include an additional 2 foot shy distance from the face of barrier.

In most situations the shoulder can also accommodate bicycle traffic. On some higher speed and volume expressways, bicycle traffic may be better accommodated on a multi-use path. For more information on multi-use paths refer to ODOT's Bicycle and Pedestrian Plan.

- **Parking**

Expressways, by definition, provide a high speed of travel with safety, while providing a low level of accessibility. As such, expressways should not provide on-street parking. On-street parking violates the driver's expectancy for the type of roadway and decreases safety, capacity and efficiency. Parking also negatively impacts bicycle traffic.

- **Access Management**

Access management is critical to retaining the efficiency, safety, and function of an expressway. No private land access is allowed where the property has alternative access. Expressways should discourage private access and focus connections at public roads. In some cases this may require building alternate access to the property or the purchase of access rights. Existing private accesses should be eliminated when possible during project development. Additionally, public road connections that do not meet the spacing standards should be eliminated where possible during project development and in accordance with any adopted access management plans for the highway. If possible, full access rights should be purchased along the length of the expressway with breaks only allowed at public roads that meet the spacing standards contained in Appendix C of the Oregon Highway Plan. Breaks in the access control line should only be given for those roadways that are connected during construction. All other future connections must obtain a grant of access to be connected. (See Section 5.11.3 for more information on the Grant of Access process.) The intent of this access control is to manage the number and locations of vehicular access to the expressway. Where a multi-use pathway is provided along the expressway, connections for bicyclists and pedestrians to the local road system are encouraged where possible. These types of connections should be designed so that motorized vehicles are precluded from using them.

- **Median**

Expressways must include a median treatment. Generally, the preferred design is to use a non-traversable type of median. Non-traversable medians are required on all new urban expressways on new alignment. All other urban expressways should consider construction of a non-traversable median.

The preferred median type for urban expressways is a raised curb median. The raised curb median should be a minimum of 12 feet wide (curb to curb) with two 4 foot left side shoulders. This provides an overall travel lane to travel lane width of 20 feet. Consideration of double left turn lanes may be needed for high volume expressways with appropriate intersection spacing. With 4 foot inside shoulders, the overall median width would be 32 feet travel lane to travel lane. Figure 8-1 shows the different element widths for a double left turn. Even where only single left turn lanes are needed, the 32 foot width allows for future widening and also provides a positive off-set to oncoming traffic (see Figure 8-2 for more information on opposing left turn movements and positive/negative offsets).

Since expressways are, from a functional classification perspective, a higher order facility, the left side shoulder should be held to a higher standard than the normal shy distance for other urban arterials. Where extensive right of way is available, a depressed median could be used. However, depressed medians will generally not be an option within urban environments. Both the raised curb and depressed median options should be considered first as they offer the greatest design flexibility. In areas with right of way restrictions, a concrete barrier should be considered. The concrete barrier is 2 feet wide at the base and requires a 4 foot left side shoulder. Concrete barriers should be avoided in areas where pedestrian crossings or at-grade median openings may be expected. Openings in concrete barriers present many problems including reduced sight distance and the need for impact attenuators, which become another potential object that could be hit. On some expressways, those with a design speed equal to 45 mph, a minimum 10 foot painted median could be used. However, painted medians on expressways are discouraged.

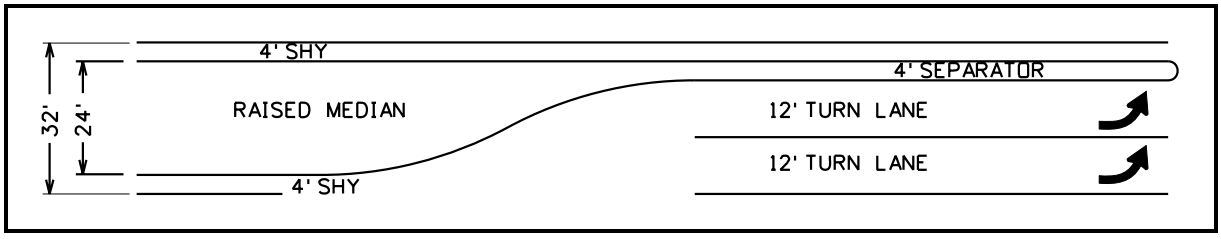


Figure 8-1
Expressway Median Widths and Dual Left Turn Lanes

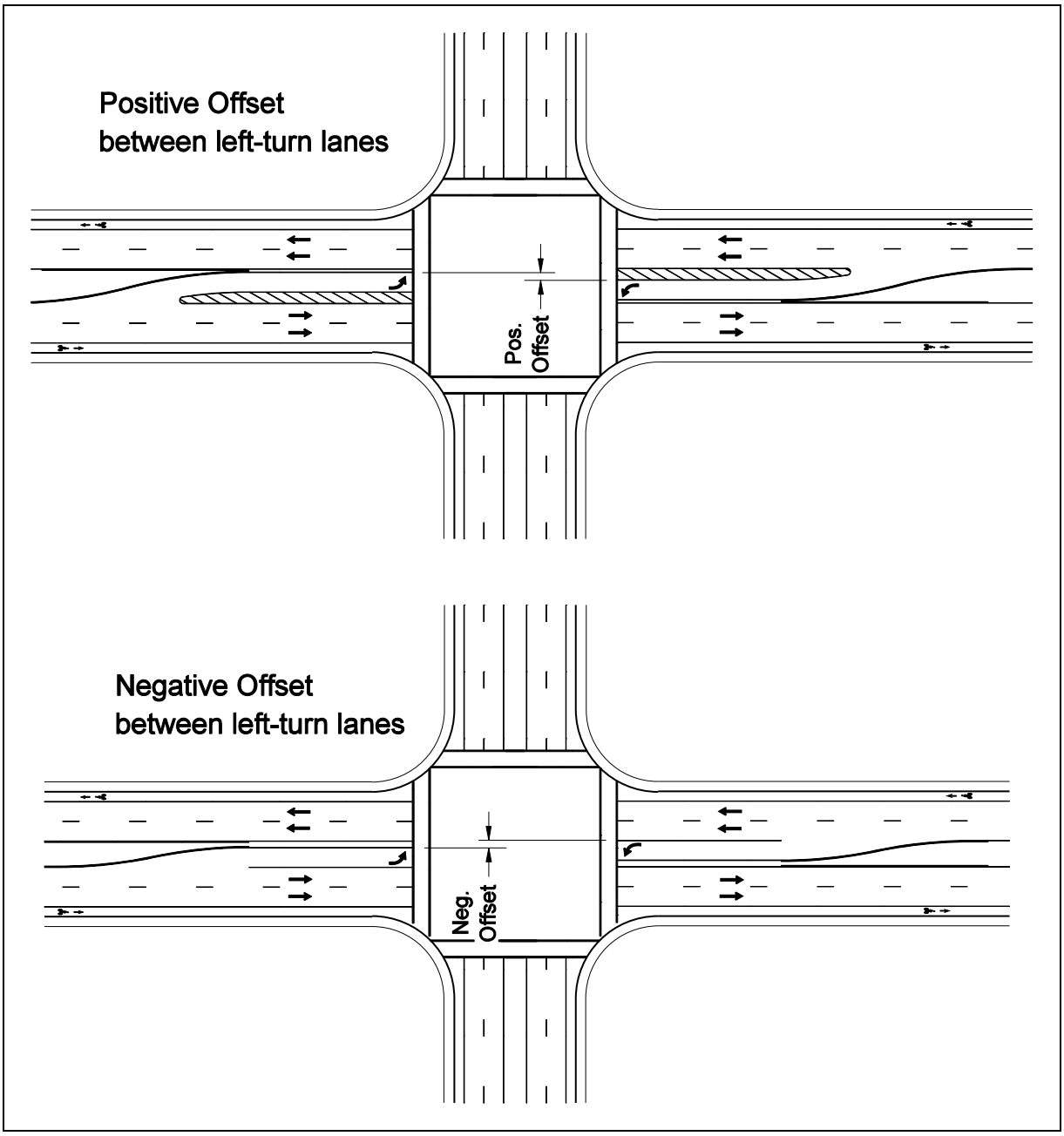


Figure 8-2
Positive and Negative Offset

- **Lane Widths**

  Expressways offer a very high level of mobility and safety. As such lane widths should be held to a high operating standard. All travel lane widths shall be 12 feet on all urban expressways. Where right turn lanes are provided at intersections, they shall be in conformance with Standard Drawing RD225. Left turn lanes shall include a 12 foot lane with a 4 foot traffic separator. For major intersections, dual left turn lanes may be required.

In these instances, the design should follow the recommendations in Figure 9-15. If the traffic separator is a raised curb, a 4 foot shy distance should be provided between the through travel lanes and the curb.

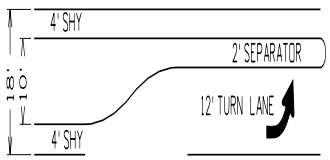
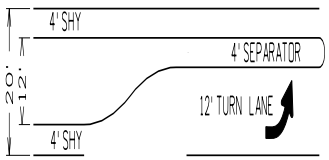
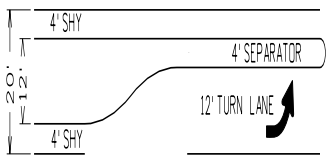
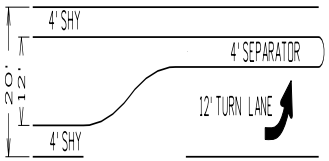
- **Intersections**

Connections to expressways can be either at-grade intersections or grade separated. There are many factors to consider in the design of these types of connections. For more information relating to intersection and interchange design for expressways, refer to Chapter 9.

- **Exceptions**

As with any urban roadway, right of way constraints, cost, terrain, and other constraints may necessitate designing expressways below the standards described above. The appropriate design exception must be obtained to reduce any design element below the standards. Exceptions from these standards must be justified. Expressways should be held to a high standard and therefore exceptions should be minimized. For more information on the design exception process refer to Chapter 13.

Table 8-1
ODOT 4R/New Urban Standards – Expressways

Design Elements	Design Speed			
	45 mph[1]	**50 mph**	**55 mph**	**60 - 70 mph**
Travel Lane	12’	12’	12’	12’
Right Turn Lane	12’ plus shoulder[2]	12’ plus shoulder[2]	12’ plus shoulder[2]	12’ plus shoulder[2]
Left Turn Lane				
Right Side Shoulder	8’	8’	8’	8’
Median Striped Median Raised Curb Median[3] Concrete Barrier Median	10’ 18’ Travel lane to travel lane 10’ (4 lane) 18’ (6 lane)	10’ 20’ Travel lane to travel lane 10’ (4 lane) 18’ (6 lane)	10’ 20’ Travel lane to travel lane 10’ (4 lane) 18’ (6 lane)	10’ 20’ Travel lane to travel lane 10’ (4 lane) 18’ (6 lane)
Continuous Left Turn Lane	N/A[4]	N/A[4]	N/A[4]	N/A[4]
Maximum Superelevation[5]	6%	6%	6%	See Table 5-3
Maximum Degree of Curvature	8°	6°45’	5°15’	See Table 5-3
Maximum Grade	6%	6%	5%	5%
Curbside Sidewalk	8’	Undesirable[6]	Undesirable[6]	Undesirable[6]
Separated Sidewalk	6’[7]	6’[7]	6’[7]	6’[7]
On-street Parking	N/A[8]	N/A[8]	N/A[8]	N/A[8]
Vertical Clearance	17’	17’	17’	17’

[1] The 45 mph design speed should generally only apply to retrofit situations.
[2] Shoulder on curbed and uncurbed sections shall be 3 feet and 4 feet respectively
[3] Minimum raised curb median. Consideration of 6’ raised traffic separator for pedestrian crossing may increase median width.
[4] Continuous turn lanes are not allowed on expressways.
[5] Superelevation at intersections may need modification; see Chapter 9.
[6] Curbside sidewalks are discouraged when design speed is greater than 45 mph.
[7] Pedestrians are not normally accommodated adjacent to expressways. Where separated sidewalks are used, a minimum 8 foot buffer strip should be used.
[8] On-street parking is not allowed on expressways.

8.3 URBAN ARTERIALS

Most state highways through urban areas serve as arterials for that particular community, often as the major or principal arterial. The primary function of arterials is to serve major through traffic movements with a high level of mobility and provide limited land access. Arterials carry the highest traffic volumes and serve the longer internal and external trips as well as intra-area travel between city centers. However, arterials often traverse major city centers such as traditional downtowns, central business districts or regional commercial centers. In addition, due to existing land use and development patterns, arterials often are adjacent to areas of intense auto oriented development. These different land use designations can significantly affect the design of a particular arterial highway. Issues such as pedestrian movement, transit accommodation, bicycles, freight routes, through traffic capacity, as well as the type of land use designation must all be considered when designing urban arterials. ODOT has developed a process to identify special areas along a highway where context sensitive designs are needed. Separate definitions and guidelines have been established and are outlined in this section.

Since arterials can traverse many different types of areas within urban growth boundaries, speed is often a major concern. Transitioning design and operating speeds of an arterial as it enters an urban area on the fringe, to areas of normal urban density, to compact town centers, is often a challenge for a designer. However, these transition areas are often the most critical design consideration for an urban arterial as it travels through an urban area. The designer is encouraged to utilize visual cues such as landscaping, roadside amenities, visual aesthetics, and design elements to help achieve the appropriate speed transitions.

- **Design Speed**

  As discussed above, determining the appropriate design speed is a major concern for urban arterials. The selection of design speed is dependent on many factors that need to be carefully considered. Section 5.1.1 provides information on selecting design speeds that should be reviewed prior to selection of a design speed for a particular project. The following sections provide design speed standards for the different types of urban highways (OHP Highway Segment Designations and Non-Designated Urban Highways).

- **1999 OHP Highway Segment Designations**

  As previously mentioned, arterials can run adjacent to or traverse through many different types of land use areas. The function and desired attributes of the roadway may differ from area to area. The 1999 OHP identifies four types of highway segment designations: Special Transportation Areas (STAs; see Section 8.4), Urban Business Areas (UBAs), Commercial Centers, and Non-Designated Urban Highways. These special highway segment designations express different goals and attributes from the rest of the urban arterial system. Although some urban environments may look similar to one of these special designated areas, they

may not be classified the same. The OHP contains requirements that must be met in order for an area to receive these special designations. The designer needs to coordinate and work with the Region planner and/or Project Leader to identify the location of any special highway segment designations as well as applicable corridor, refinement, or Transportation System Plans (TSPs). These plans will provide valuable information and direction to the designer. Design standards for a specific OHP segment designation shall only be used if the area has received formal approval of the designation by the OTC and be in an acknowledged TSP. The OHP designation should be reviewed for both 3R and 4R projects.

- **Other OHP Special Overlays**

  The OHP also describes other special highway designations that must be considered when designing urban highways, including Freight, Lifeline, and Scenic Byway Routes.

  The Freight Route system carries a significant tonnage of goods and materials within and through the state. These routes are to provide a higher level of service and mobility than other statewide highways. However, other state highways serve significant volumes of truck traffic as well and have been pre-approved for use of interstate size trucks. These routes are identified on Route Map 7 that is published by the ODOT Transportation Permit Unit. Although Route Map 7 includes all highways, it identifies those highways where the use of interstate size trucks are allowed and should accommodate those vehicles in the design. Route Map 7 can be found at http://www.odot.state.or.us/trucking/od/maps.htm, and the OHP Freight Route map is located in Oregon Highway Plan, page 65. Route Map 7 is color coded and identifies where the interstate truck is allowed without permit. Projects on routes identified by either the OHP Freight Map or pre-approved for WB-67 size trucks as shown on Route Map 7 should strongly consider freight needs in the design, particularly intersections. A WB-67 size truck is a single tractor trailer truck with a 67 foot wheelbase; this is currently the largest single tractor trailer approved for travel on Oregon highways without a permit. It is often referred to as the "interstate" design truck. Reducing design standards and through carrying capacity should be discouraged on OHP designated Freight Routes. These Freight Routes will generally be the most important facilities to the local jurisdiction as well as surrounding region and possibly the state. As such, they should maintain a high level of functionality.

  Another designation is the Lifeline Route designation. These routes have been identified as critical connections between areas of the state that may become generally inaccessible during an emergency situation such as earthquakes or flooding. It is critical to keep these facilities operating during such disasters to aid evacuation and relief efforts. This designation will generally not have much effect on the design of a particular highway except for structures that are critical to maintaining accessibility.

  Finally, the OHP establishes a Scenic Byway Policy. Scenic Byways have exceptional scenic value to the state. The OTC must designate a route as a Scenic Byway. The intent of the designation is to ensure that the scenic qualities of the highway are preserved and may be

enhanced by highway designs and projects. The Scenic Byway designation may not impact the design of urban arterials however; the designer should contact the Scenic Byway Program to make sure the Scenic Byway Corridor Management Plan will not affect the urban highway design. Page 68 of the OHP contains a map of Oregon's Scenic Byways.

- **Non-Designated Urban Highways**

  As mentioned previously, the OHP created four special highway segment designations. Non-designated Urban Highways are those highways within urban growth boundaries that are not designated as Interstate Highways, Expressways, STAs, UBAs, or Commercial Centers. The objective of urban highways is to efficiently move through traffic while also meeting the access needs of nearby properties. The urban highway designation is a very broad classification as urban arterials can traverse many different areas and each area has unique attributes that affect the appropriate design. For example, some downtown environments may have a similar look and feel as an STA, but for whatever reason have not been designated as an STA. This type of environment cannot use the STA design standards, but should be treated differently than urban areas with strip development or higher speed urban fringe areas. To assist the designer, this manual breaks this urban highway designation into general categories that do not meet the requirements or intent of the other highway segment designations. These categories are:

  (a) Urban Fringe/Suburban,
  (b) Developed, and
  (c) Traditional Downtowns/Central Business Districts.

  Figure 8-3 illustrates how the OHP Land Use Designations, Special Overlays, and the other urban environments relate to one another.

- **Role of Existing Plans**

  Planning documents such as corridor plans, refinement plans, and regional or local transportation system plans provide valuable guidance to designers. These documents have undergone extensive public involvement to select the type and level of infrastructure improvements that address the identified problems. The designer needs to be aware of and understand the context of the recommendations contained in these planning documents when preparing project designs. The Region Planning Manager should be contacted to help identify and interpret the information in these plans.

  The types of plans discussed above are all plans adopted by local jurisdictions and/or the Oregon Transportation Commission. Therefore, transportation improvement projects must be consistent with these adopted plans. Sometimes ODOT has already agreed to general design parameters through the planning process; design exceptions may already be approved or may need to be obtained. Because pertinent information may not be available in these

planning processes, exceptions to design standards are typically processed during project development and are approved in writing by the Roadway Engineering Manager. Similarly, any traffic control changes such as traffic signals, signing, or striping must have the written approval of the State Traffic Engineer.

Planning documents are often long range, planning land use and infrastructure over 15 and 20 years or more. These long-term plans designate future areas of development. They may designate areas such as UBAs or STAs as future nodes. Designers must ensure the safety of all users when designing projects that travel through these future areas of development. Consideration should be given to long range planning efforts and how those efforts impact the proposed roadway projects. The designer should work with the Project Team, Region Planning Manager, and/or Area Manager to gain a better understanding of the planning efforts and processes completed or underway for a particular area.

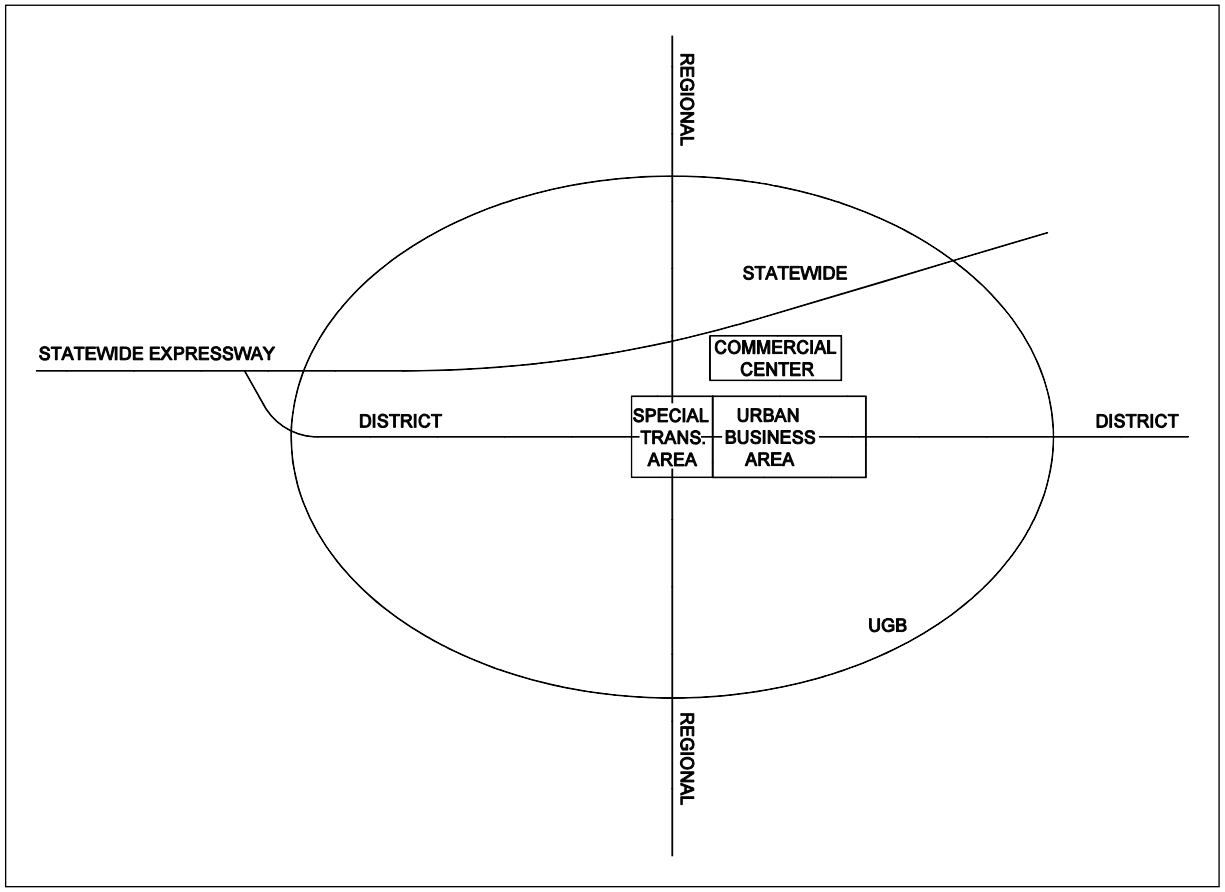


Figure 8-3
OHP Land Use Designation Overlay

- **Other Design Resources**

  Besides the principals and practice of urban design elements located in this chapter, there are other resource materials that provide additional background on urban design features. The designer should also be aware of local agency publications and documents that may have an impact to the project. Some of these publications are:

  - *Main Street…When a Highway Runs Through It: A Handbook for Oregon Communities,* DLCD/ODOT, 1999
  - *Oregon Roadway Design Concepts,* ODOT,
  - *Creating Livable Streets - Street Design Guidelines for 2040*, Metro, 1997
  - *Roadside Design Guide,* AASHTO, 2002
  - *Oregon Bicycle and Pedestrian Plan,* ODOT,1998
  - *Green Streets,* Metro, 2002

  These other resources do not take the place of the design standards contained in this manual but can provide additional guidance, concepts, and strategies for design of urban highways.

- **Transitions**

  One of the most important elements of urban highway design is the transition areas. Transition areas occur when a rural highway enters an urban area, when urban expressways enter slower speed urban centers, or between other different urban environments such as between a UBA and an STA. The types and treatments of transitions will vary depending upon the type of transition.

  A very common type of transition is the transition from a rural high speed highway to an urban highway. In many small communities or rural communities, the length of transition is very short. The main emphasis for a designer in these areas is to try to change the look and feel of the highway segment. This often involves establishing urban design features such as sidewalks, buffer strips, marked crosswalks, landscaping, bike lanes, raised medians, and illumination. Generally these types of features will portray to the motorist that they are entering a changing environment that is urbanized and requires slower speeds and greater attention to pedestrians, bicyclists, and transit vehicles. In some of these transition areas, reducing the cross section may be appropriate, but is only one of many ways to help transition speeds. Changing the roadway culture, including elements outside of the roadway section, can also help to create transition areas. Any modifications of the actual cross section elements should be consistent with the design standards for a particular urban environment (STA, UBA, Developed, Urban Fringe/Suburban areas). Many of these standards are also applicable to transitioning from a high-to-moderate speed urban expressway to other urban environments. The key message to send to motorists is that the culture and function of the highway has changed.

Other types of transitions occur between different urban environments such as between an UBA and an STA, or an Urban Fringe/Suburban area to a UBA, or other combinations. Again, even for these transitions, a message should be sent to the motorist that something is different. For example transition areas entering a UBA might include features such as buffer strips, change of median style, different curb type, landscaping and/or other roadside features, or change of sidewalk style or width. Generally, the land use patterns of these areas, with some minor design features, will be sufficient to establish the message "you are entering a developed business district." In some cases, modifying the cross sectional elements may also be appropriate. These may include reduced shy distances, and/or narrower shoulder/bike lane, lane widths, or median widths. The design should reflect the standard for the specific urban environment as described later in this section.

Transitions to an STA or downtown/central business district type of environment are very important. These areas are often very low speed and controlling operating speeds is important to the success of these areas. A recommended approach to dealing with transitions into STA or downtown environments is the use of a "Gateway" approach. A "Gateway" is essentially a special entry that sends a message to motorists that this is a downtown environment. Features such as curb extensions, on-street parking, wider sidewalks, pedestrian scale lighting, landscaping and/or other roadside features, are good visual cues and can be incorporated into a Gateway concept. Other tools include narrow cross sections, utilizing reduce shoulder, bike lane, median, shy distance, and/or lane widths. Gateways should include a vertical element that helps effect a visual narrowing. There are many different options to help achieve this result. A good source for additional guidance in transitions to downtown environments is the *Main Street Handbook*.

In summary, the goal of transition areas is to affect motorists' perceptions of the area, establish speed expectations, establish the function of the highway, and make motorists aware that something has changed. Designing transition areas is not always easy. Resources are available to help assist with design concepts and strategies for transition areas. These include staff resources from Engineering Services, Bicycle and Pedestrian Program, Traffic Management, and written as *Main Street… When a Highway Runs Through It: A Handbook for Oregon Communities,* DLCD/ODOT; *Oregon Roadway Design Concepts, ODOT*; and Metro's Street Design Guide, *Creating Livable Streets - Street Design Guidelines for 2040*.

8.4 SPECIAL TRANSPORTATION AREAS

8.4.1 GENERAL DESIGN PHILOSOPHY

Special Transportation Areas (STAs) are those areas within urban growth boundaries that by their nature are more densely developed and populated. These areas are usually existing downtowns, central business districts, or community centers. The primary objective of an STA is to provide access to community activities, businesses, and residences, and to accommodate pedestrian, bicycle, and transit movement along and across the highway. Providing and encouraging a well-designed pedestrian, bicycle, and transit friendly environment should be a major goal of the designer in these areas. This generally means that through traffic operations and efficiency may be reduced in order to improve the attractiveness and operations of other modes of travel. Figure 8-4 illustrates a potential STA area.

Figure 8-4
Potential Special Transportation Area (STA)

An STA must be identified within a local comprehensive plan, transportation system plan (TSP), corridor plan, or refinement plan, and adopted by the Oregon Transportation Commission. The designer should work with the Region Planner to verify the limits of the STA that have been described and agreed to through the planning process, and to see that all requirements are met before designing transportation improvements to the standards discussed later in this section. In addition, a management plan may be required prior to using the STA design standards. This management plan should include a discussion between Technical Services and the local jurisdiction relating to various design standards to be used in the particular STA, and the potential trade-offs and ramifications of those standards. The remainder of this chapter provides valuable guidance towards developing appropriate designs for STAs. For more information on

STAs refer to OHP Policy 1B, Land Use and Transportation, and the OHP Implementation Handbook.

STA Characteristics and Attributes

- ✓ *Buildings spaced close together and located adjacent to the street with little or no setback.*
- ✓ *Sidewalks with ample width located adjacent to the highway and the buildings.*
- ✓ *A well-developed parallel and interconnected local roadway network.*
- ✓ *Streets designed for ease of crossing by pedestrians.*
- ✓ *Public road connections that correspond to the existing city block-private driveways are discouraged.*
- ✓ *Adjacent land uses that provide for compact, mixed-use development.*
- ✓ *On street parking and/or shared general purpose parking lots which are located behind or to the side of buildings.*
- ✓ *Well-developed transit, bicycle and pedestrian facilities, including street amenities that support these modes.*
- ✓ *Posted speeds of 25 mph or less.*

Generally in an STA, the accessibility and mobility needs of pedestrians, bicyclists, and transit users outweigh vehicular mobility. This is represented by lower operating standards for STAs than other urban areas (See Section 10.6 for Volume to Capacity [V/C] ratios). In STAs, the highway design needs to consider pedestrian scale. This involves slow traffic speeds, wide sidewalks, narrow and frequent crossings, and traffic buffers. However, the designer must still consider the potential impacts to the safety and operations of all travel modes when improvement projects traverse an area identified as an STA. The need for community access outweighs the considerations of highway mobility except on designated OHP Freight Routes where community accessibility and vehicular mobility needs are balanced.

The design of a highway in an STA needs to reflect the change in land use, bicycle and pedestrian activity, transit, and expected motorist behavior. This can often be accomplished with the use of various measures to calm traffic and improve the appearance of the streetscape. Since slow vehicular speed is often a major objective in STAs, project teams need to develop designs that help control vehicular speeds. This may include the use of traffic calming measures. Traffic calming techniques are covered later in this section. Project Teams need to consider the highway classification as well as other factors, including traffic volume and traffic composition, when designing projects in STAs. There are planning and design tools to help reduce the impacts of reduced roadway standards on auto and truck movements in an STA. One example is the

availability of an alternate route such as a bypass, other state highway, or local arterial that may be able to handle the additional traffic which may be diverted from the STA. In addition, a well-designed local street network may help divert local trips off the highway and increase overall system capacity. Another factor is the availability and frequency of transit. A good transit system could reduce the auto commuter traffic not only within the STA, but on the entire highway. These factors as well as the highway classification must be considered when developing designs within STAs.

8.4.2 ODOT 4R / NEW URBAN DESIGN STANDARDS- SPECIAL TRANSPORTATION AREAS (STAs)

The design standards for STAs have been developed to meet the goals and objectives of STAs, such as providing access to community and business activities, accommodating pedestrian and bicycle movement in downtown areas, and prioritizing the attractiveness and livability of downtowns over the through traffic movements. The standards listed below provide a range of design elements to choose from. Because downtowns vary in nature, not all design elements will be the same. Communities are located in different terrain, vary in culture, vary in traffic volumes and composition, and have different goals and needs. STA designated locations may have some form of a management plan. During the design phase of STAs, the project team should review the STA Management Plan to determine the appropriate design element. The ranges of values should be discussed to determine if the values chosen during the design process are applicable for the specific STA location. The designer, working along with the Project Team should look at each STA independently and apply the STA design standards appropriately. The STA standards provide a range of values to use in design of the roadway typical section, as values for lane width, sidewalk, bike lane/shoulder width, median width, and parking width are variable. The surrounding culture, roadway environment, traffic volume and traffic type all need to be considered in order to select applicable standards for a particular STA.

- **Pedestrian**

  Providing adequate pedestrian facilities in STAs is critical to the vitality of the area. Ample sidewalks of at least 10 feet or more should be provided in these areas. Where right of way is available, wider sidewalks should be considered. A buffer area of some type is strongly recommended in STAs. This may consist of on-street parking or a buffer strip. Where a buffer strip is used, it should be at least 4 feet wide. However, in most of these areas, a buffer strip will not be used as the sidewalk is typically curb-side. Tree wells, planter boxes, or other amenities provide a buffer area between traffic and pedestrians in these areas. Where amenities are used within the sidewalk area, a minimum clear walking path of 6 feet should be provided. The minimum 10 foot sidewalk can include use of a buffer strip of certain width as long as 6 feet of sidewalk (clear walking path) is maintained. For example, the 10 foot minimum sidewalk width can consist of a 4 foot buffer strip of some type and the 6 foot minimum clear walking path sidewalk. The designer may also want to contact the

local agency for short and long term pedestrian needs. STAs should also accommodate transit vehicles. Where transit is expected, bus pullouts and bus stops should conform to the recommendations of Section 12.2.

Pedestrians need to have many safe, well-designed crossings. All public road connections should allow crossings of each leg. The use of curb extensions, channelization islands, and median islands can reduce the crossing distances and improve pedestrian visibility and safety. In some situations, the use of mid-block pedestrian crossings may be viable and could enhance the pedestrian mobility and circulation within the STA. The same techniques used at intersections may be beneficial for mid-block crossings. The Engineering Services Unit can provide additional guidance for designing and locating safe mid-block pedestrian crossings.

- **Shoulders/Bike Lanes**

Shoulders should be provided in STAs. The shoulders provide an additional buffer area for pedestrians, assist with parking maneuvers, provide safer traffic flow, and provide the best accommodations for bicycle traffic. Shoulder/bike lanes of 5 feet should be used in these areas where right of way permits and installation of the shoulder/bike lane will not reduce the sidewalk width below 10 feet. A shoulder/bike lane width of 5 feet will accommodate bicycles travel. The 5 foot shoulder/bike lane width should also be used when the bicycles lane is next to curb and other roadside barriers.

The shoulder/bike lane is normally located adjacent to the right side travel lane. In locations where the roadway consists of a one-way couplet, the left shoulder shall consist of a 1 foot shy distance (in addition to the travel lane width) based upon an STA design speed of 25-30 mph. For other design speeds on one-way couplets, the left side shy distance shall follow Table 5-8. When the left lane on a one-way couplet is up against raised curb that is not continuous, an additional 1 foot of shy distance should be added.

- **Parking**

On-street parking is often a necessary component for maintaining a functioning and economically viable-downtown area. Businesses are generally close to the sidewalk with limited off-street parking opportunities. The decision to include on-street parking in these areas should consider the highway classification and function, availability of parallel roadways, adequacy of side street parking and other parking strategies, safety, and maintaining the economic vitality of the downtown area. Generally, on-street parking should be included with roadway designs for these types of areas whenever possible. On-street parking also increases the potential for conflict between bicyclists and motor vehicles. Through these areas, bicyclists need room to operate and maneuver for opening car doors, mirrors of motor vehicles, and vehicles exiting parking spaces. Where on-street parking is deemed appropriate, the combined on-street parking and bicycle travel width shall be 12 feet (7 feet for parking and 5 feet for bicycle accommodation).

Note: Only parallel parking is allowed on state highways. Any other type requires an exception.

- **Diagonal Parking**

Diagonal parking is generally not permitted on state highways and should be avoided. However, communities designated and approved by the OTC as an STA may have situations where diagonal parking may be considered. The Roadway Engineering Manager and State Traffic Engineer must jointly approve the installation of diagonal parking. In order to receive this approval, the following criteria must be met:

1. Diagonal parking is only allowed in an approved and designated STA.
2. A parking utilization study must be completed documenting the need for additional parking opportunities in the STA. The study should be in compliance with the ITE guidelines for parking studies and show an existing utilization factor of 85% or greater.
3. The community must demonstrate that the parking demand can't be met by increasing side street parking opportunities or developing off-street shared parking areas.
4. The highway must have a posted speed of 25 mph or less.
5. The Average Daily Traffic (ADT) on the highway should be less than 6,000 vehicles. On multi-lane couplets, the ADT should be less than 6,000 vehicles per direction.
6. The available right of way must be sufficient to provide standard cross section features. A distance of 33 feet is desirable from the curb line to the centerline stripe of the highway. A minimum 10 foot sidewalk is desirable in STAs. Sidewalk widths should not be reduced below the minimum standard to install diagonal parking.
7. Bike lanes should only be striped where sufficient room exists to allow a shy distance to the bike lane and travel lane.

Diagonal parking should only be installed where the above criteria are met and space is available to accommodate all users, including bicycles. Travel lane, bike lane, and parking widths should not be compromised in order to install diagonal parking. The formal approval process will ensure that the conditions above have been met and documented. The decision to approve diagonal parking should only be made where the diagonal parking is justified, found to be reasonably safe, and does not detract from providing a high level of pedestrian design and accommodation. STAs are meant to be very pedestrian and alternative mode friendly; diagonal parking should not reduce these features.

- **Medians**

A median is the area of a roadway or highway that separates opposing directions of travel. Medians can either be traversable or non-traversable. A median can be raised curbed or simply a painted stripe.

The use of medians in STAs may or may not be needed. Medians in STAs are generally only located at spot locations to address left turn needs. A left turn bay should be provided at intersections wherever significant left turning volumes are allowed. However, left turns from a through lane, especially within multi-lane sections, may be acceptable in some situations. Generally, raised curb medians are not appropriate in these areas, unless they are needed to improve pedestrian crossing opportunities and general mobility. The use of highway medians in these areas should consider the classification of the highway, function of the highway, availability of other routes or parallel roadways, economic vitality of the area, impact to pedestrian crossings and mobility, and safety for all travel modes. Median widths should range between 12 – 14 feet (not including required shy distance) depending on the traffic volumes, right of way constraints, and other urban elements for both Continuous Two Way Left Turn Lanes (CTWLTLs) and raised curb. CTWLTLs should be avoided and should only be used where several continuous intersections are in need of left turn channelization. An additional shy distance is required where a raised curb median is used. Section 5.5 provides more detailed median design information. Table 5-8 provides the required left side shy distances.

Installation of medians in STAs can impact pedestrian crossings. Where medians are required to maintain acceptable traffic flow and safety, the designer needs to evaluate options that reduce the impact to pedestrian crossing and safety. The width of median used should take into consideration the pedestrians needs as well as the roadway needs. When medians are not needed for turn moves but are needed for pedestrian crossings, the width of the pedestrian crossing median should be 6 feet and preferably 8 feet. In tightly constrained areas a 4 foot median could be used. These options may include curb extensions, mid-block crossings, pedestrian refuges, or other treatments. Whether or not medians are used, improved pedestrian crossings should be goal in urban environments.

- **Access Management**

Access management goals and objectives should be followed within these types of areas. Access management will help to improve the capacity and safety of vehicular traffic, but will also improve pedestrian safety and mobility. Private land access should be discouraged in favor of frequent connections to public roadways. The access management spacing standards for Special Transportation Areas are contained in Appendix C of the Oregon Highway Plan.

Generally, the purchase of access rights from adjacent properties is not appropriate for STAs. The best approach for managing access in these areas is through the planning and permit processes.

- **Lane Widths**

  Functional class, purpose of the highway, volume and nature of traffic, pedestrian mobility and accessibility goals, and available right of way should determine the width of travel lanes within STAs. The width of all lanes should be evaluated collectively. Lane widths in STAs will vary from 10 to 12 feet. The 10 foot lane width may be used in highly restricted areas where there is little or no truck traffic. Little or no truck traffic is considered less than 100 (ADT) four axle or larger trucks in the design year. 11 foot lane widths are generally adequate to accommodate medium to high traffic volumes including trucks. A 12 foot lane width is most desirable on major highways carrying large volumes of truck and recreational vehicle traffic and is encouraged where practical. Listed below are the requirements for STA lane widths on the NHS.

  - Minimum lane widths on NHS routes shall be 11 feet
  - On all other non-NHS routes:
    - 10 foot minimum lane width is allowed for locations where the design year truck volume (ADT) is less than 100 four axle or larger trucks

  The use of narrower lanes can impact the safety and crash potential in downtown areas. For example, trucks and some recreational vehicles are 10.5 feet wide, mirror to mirror. This vehicle width not only has an impact on travel lane width, but also parking lane width, bicycle accommodation, and pedestrian design. All of the roadway elements need to be taken into consideration when designing STAs.

  Where left side travel lanes (one-way couplets) are adjacent to curbs, the appropriate shy distance from Table 5-8 must be added to the standard travel lane width. For design speeds of 25 – 30 mph, the shy distance is 1 foot.

- **Traffic Calming**

  Traffic Calming is a set of techniques which are used to reduce vehicular travel speeds and provide for safe and pleasant conditions for motorists, bicyclists, pedestrians, and residents. Listed below are a number of traffic calming techniques. Each roadway section through an STA is typically unique to itself. The traffic calming elements below may not apply to every situation. The Project Team and project development process should determine which traffic calming techniques should be applied for each project. The document, *Main Street… When a Highway Runs Through It: A Handbook for Oregon Communities*, provides complementary traffic calming information to the Highway Design Manual surrounding STA and other downtown type areas located on State Highways.

- **Curb Extensions**

  Curb extensions, also known as "bulb-outs," are good tools to help reduce the pedestrian crossing distances in areas with on-street parking. Curb extensions also increase pedestrian visibility, help control vehicular speeds, enhance transit, and give a "downtown look" to an urban area. Curb extensions also provide a narrowing or pinch point feel to the roadway at intersections.

  The curb extensions still must be designed to accommodate the appropriate design vehicle. However, due to the speed, traffic characteristics, and importance of alternative modes in these areas, the level of accommodation (see Section 9.1.1) of large vehicles should be minimal.

  Generally, curb extensions should be constructed to the full width of the on-street parking. However, the curbside lane should be at least 14 feet wide from the lane line to the curb, excluding the parking width. This width allows for both vehicle and bicycle passage. Each curb extension design is different. The curb extension should not block bicycle lanes. Figures 12-2 and 12-3 contain several design concepts for consideration. Special consideration is required in many situations for addressing drainage in conjunction with curb extensions, especially in retrofit situations.

- **On-Street Parking**

  Discussed earlier in this section, on-street parking is typically an element of STAs. On-street parking provides friction between the driver and the downtown environment and has potential for reducing speeds. The parked vehicles also provide a buffer between the traffic and pedestrians. An area of concern for designing on-street parking is that it also can reduce the visibility of pedestrians and vehicles.

- **Trees and Landscaping**

  Besides providing an STA with a more inviting and visually pleasing effect, landscaping, especially trees, can be a traffic calming technique. Trees provide a vertical element, much in the same way as adjacent buildings, which has an impact on the vehicle driver. A row of trees gives the appearance to the driver that the roadway is narrower and calms traffic. Trees and other landscaping features need to be located in the appropriate location so that sight distance, especially at intersections, is not compromised.

- **Raised Medians**

  As discussed earlier in this section, the need for installing a raised median in an STA should be determined by the Project Team and project development process. The inclusion of a median has multiple traffic calming effects. If wide enough the median provides a refuge for pedestrians crossing the street. Medians also can be aesthetically pleasing. Medians provide friction between the median and the motor vehicle driver, which may help in calming traffic speed. If landscaped medians are used, those plants used should below enough so that they do not obstruct visibility and spaced far enough apart to allow for pedestrian passage.

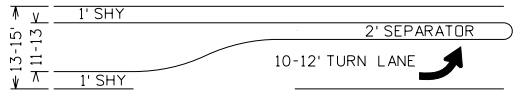
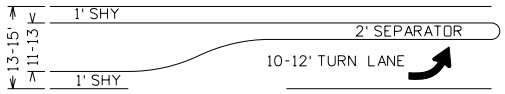
- **Other Traffic Calming Elements**

  The vertical element is another tool used for traffic calming. Although not part of the roadway design elements, tall buildings adjacent to the highway can help to calm traffic by creating a feeling of enclosure and providing friction between the driver and the downtown environment. Other vertical features that can help to calm traffic include pedestrian scale lighting, hanging baskets, and raised planters.

- **Exceptions in STAs**

  Areas within STAs often have very constrained right of way sections due to the existing built environment. Since right of way acquisition is usually difficult, expensive and often undesirable from a historic perspective within these land use areas, it is often minimized or avoided. In addition, project design goals may include elements striving to minimize the pavement cross section to enhance pedestrian circulation and crossing opportunities. Often these types of goals are important elements towards maintaining or improving the sense of place or livability of a community. The design standards listed above should provide the flexibility to accomplish the goals of enhanced pedestrian accommodation and livable communities. Every project is different and should be evaluated on a case by case basis. Each individual project may have a different priority. Any reduction in the design elements given herein will require a design exception. As previously noted, the design standards for STAs are similar to AASHTO'S *"A Policy on Geometric Design of Highways and Streets-2001"* requirements. Reduction in design standards below AASHTO minimums will require substantial documentation.

Table 8-2
ODOT 4R/New Urban Standards – STAs

Design Elements	Design Speed	
	25 mph[1]	**30 mph**
Travel Lane	10’-12’[2]	10’-12’[2]
Right Turn Lane	10’-12’ plus 1’ shoulder	10’-12’ plus 1’ shoulder
Left Turn Lane		
Right Side Shoulder/Bike Lane	5’[3]	5’[3]
Left Side Shy Distance[4]	1’	1’
Median Striped Median (Turn Lane) Raised Curb Median	 12’-14’ 13’-15’ Travel lane to travel lane	 12’-14’ 13’-15’ Travel lane to travel lane
Maximum Superelevation	4%	4%
Maximum Degree of Curve	28°	19°
Maximum Grade	8%	8%
Curbside Sidewalk	10’	10’
Separated Sidewalk[5]	8’	8’
On-street Parking	7’-12’[6]	7’-12’[6]
Vertical Clearance	17’	17’

[1] 25 mph design speed is only appropriate for local road classification.
[2] 10 foot lanes may be used in highly restricted areas where there is little or no truck traffic. Little or no truck traffic is described as less than 100 (ADT) four axle or larger trucks in the design year.
11 foot lanes are preferred for STAs and are the **minimum lane width for STAs on a NHS route.**
12 foot lanes can be used where higher speeds and high truck volumes exits.
[3] 5 foot minimum if next to curb, parking, or roadside barriers. 5 foot striped bike lane.
[4] Left side shy distance is applicable in one-way couplet situations and sections with raised median
[5] Separated sidewalks are generally not used in these areas. Where they are used a buffer strip of 4 feet to 6 feet should be used.
[6] 7 feet with striped bike lane. 12 feet for combined bicycle travel and parking width.

8.5 URBAN BUSINESS AREAS

8.5.1 GENERAL

Urban Business Areas (UBAs), are those areas within urban growth boundaries where commercial activity is located along the highway and where vehicular accessibility is important to economic vitality. UBAs may also be designated where future areas of commercial activity are planned for through a comprehensive plan. UBAs may be located on Statewide, Regional, or District level highways, but are not allowed along Expressways. The primary objective of the state highway in an UBA is to maintain existing traffic speeds while balancing the access needs of abutting properties with the need to move through traffic. Traffic speeds within an UBA are 35 mph or less (posted speeds of 35 mph or less). As with STAs, UBAs must also be designated through a corridor plan or local jurisdictional transportation system plan and must be agreed to by both ODOT (OTC) and the local jurisdiction. Figure 8-5 illustrates a potential Urban Business Area.

Figure 8-5
Potential Urban Business Area (UBA)

UBA Characteristics and Attributes

- ✓ Businesses and buildings clustered in centers or nodes for new development and where possible as redevelopment occurs
- ✓ Consolidated access for new development and where possible as redevelopment occurs.
- ✓ Removal of impediments to inter-parcel circulation
- ✓ Intersections designed to address the needs of pedestrians and bicyclists.
- ✓ Bicycle lanes, sidewalks, crosswalks, or other bicycle/pedestrian accommodations to address safe and accessible pedestrian movement along, across and within the commercial area.
- ✓ Provisions for good traffic progression.
- ✓ Efficient parallel local street system where arterials and collectors connect to the state highway.
- ✓ Provision of transit stops including van/bus stops, transportation demand management or other transit where available.
- ✓ Speeds of 35 miles per hour or less (posted).

The design focus of a UBA is on designing or redesigning the commercial area so that traffic can circulate within the area rather than having to use the highway to get from place to place. This focus of inter-parcel circulation makes the existing development safer for both the motorist and pedestrian as well as improves the highway mobility. The key to designing a UBA is to maintain existing traffic speeds for through traffic while balancing the needs for accessibility to adjacent properties. Finding the balance of accessibility and mobility is the challenge for the designer on projects within UBAs. Accessibility in this case does not refer to the number of approaches but to the ease and safety of property access. Accessibility can still be obtained with shared approaches, inter-parcel circulation, and local street systems. The other concept in this goal is the term "balance". Balance does not mean that the level of accessibility must be equal to the amount of mobility. The design of state highways within this land use designation should strive for an appropriate balance of accessibility with inter-community mobility. Therefore, the amount of accessibility is dependent upon the highway classification, speed, roadside culture, and overall system structure. The designer's role will be to work with the Region Planner and local jurisdiction to use design techniques to maintain existing traffic speeds on the highway while designing for access, traffic progression, and safety features that also ensure the continued economic viability of the area.

8.5.2 ODOT 4R / NEW URBAN DESIGN STANDARDS - URBAN BUSINESS AREAS (UBAs)

- **Pedestrian**

  State highways within this land use area need to accommodate pedestrians on sidewalks. The preferred method is to separate the sidewalk from the highway utilizing a buffer strip. Sidewalks should be a minimum of 6 feet wide in these areas. The width of the buffer strip can be varied depending upon the type of landscaping features to be used. Typically, a buffer strip of 3 feet to 6 feet is adequate for most situations. If a buffer strip cannot be provided and the sidewalk is designed curbside, the designer is encouraged to increase sidewalk width to 8 feet in order to provide a more pedestrian friendly environment. When transit vehicles are expected or planned to be using the highway, transit stops should utilize a bus pullout to minimize impact to through traffic. Refer to Chapters 11 and 12 for more information on pedestrian and transit design.

  Providing adequate and properly designed pedestrian crossings are a goal in UBAs. At signalized intersections, all legs should remain open for pedestrian crossings. Raised curb medians should be considered to help facilitate mid-block pedestrian crossings. Intersection designs should consider the impacts turn lanes have to pedestrian crossings. The use of channelization islands should be considered to shorten crossing distances.

- **Shoulders/Bike Lanes**

  Shoulders must be provided in these areas. Typically a shoulder width of 6 feet is adequate for most traffic volume and speed conditions within these areas. As with all shoulders, they are meant to accommodate bicycle traffic as well. Due to the urban nature of these areas, bicycle traffic should be expected and therefore reasonably accommodated.

  The shoulder/bike lane is normally located adjacent to the right side travel lane. In locations where the roadway consists of a one-way couplet, the left shoulder shall consist of a shy distance (in addition to the travel lane width) based upon the UBA's design speed (see Table 8-3). For other design speeds on one-way couplets, the left side shy distance shall follow Table 5-8. When the left lane on a one-way couplet is up against raised curb that is not continuous, an additional 1 foot of shy distance shall be required.

- **Parking**

  Most UBAs are not appropriate for on-street parking due to the higher traffic speeds, traffic volumes, and typical development patterns. In most UBAs, buildings are clustered in nodes or centers with limited access to the highway and parking located within the node. These types of businesses and land uses generally would not benefit from on-street parking. A major function of highways within these areas is to provide good vehicular mobility. On-

street parking reduces capacity and efficiency, and may decrease safety in UBAs. Therefore, on-street parking should not be considered on state highways within this land use area.

- **Medians**

  All multi-lane state highways within this land use area, regardless of classification, shall use a median treatment. A median is the area of a roadway or highway that separates opposing directions of travel. Medians can either be traversable or non-traversable. A median can be raised curbed or simply a painted stripe. The preferred treatment is a non-traversable raised curb median and shall be designed and constructed for all new multi-lane highways constructed on completely new alignments.

  In addition, a raised curb median should be considered for:

  (a) All multi-lane highways with a forecasted volume of 28,000 vehicles a day or greater within the 20-year planning horizon.
  (b) Modernization of multi-lane highways which are:
      i) Statewide (NHS) Highways;
      ii) Regional Highways where design speeds are greater than 45 mph.
  (c) Modernization or preservation of multi-lane highways with an annual accident rate greater than the average statewide rate for the same classification.

  A Continuous Two Way Left Turn Lane (CTWLTL) can be used on two-lane highways or any multi-lane highway where a non-traversable median is deemed inappropriate. Even where a CTWLTL is the preferred median choice, consideration of sections of raised curb medians may be appropriate to control turn movements at signalized intersections or to provide pedestrian crossing opportunities. See Section 5.5 and the Oregon Highway Plan Median Policy for more information on median design and location. Table 5-8 provides the required left side shy distances.

- **Access Management**

  Mobility generally is still a high priority in UBAs. As such, access management is an important tool that can help to maintain the mobility and safety of the highway. The access management spacing standards are contained in Appendix C of the OHP. They indicate that Statewide (NHS) Highways should be held to a higher standard than Regional or District level highways. However, access management is also important for preserving the functionality of Regional and District level highways. The following guidelines should be used if possible when developing access management plans or designs:

  1. Priority should be given for connections to public roads over private land access.
  2. directed to public road connections and/or frontage roads.

3. Private drives, when alternatives do not exist, should be shared between multiple properties where practical.
4. Private drives on opposite sides of the highway should be located across from each other where practical, particularly in conjunction with a CTWLTL.

Generally, access rights are not to be purchased from adjacent properties within this land use area. Under some conditions, such as protection around interchange ramp terminals or critical intersections, the purchase of access rights would be justified. For more information on access management objectives, guidelines, and tools refer to Section 5.11. For information on access management spacing standards, refer to the Access Management Rule, Oregon Administrative Rule (OAR) Chapter 734, Division 51.

- **Lane Widths**

Maintaining a high level of safety and mobility is still important in UBAs. Traffic volumes and speeds are generally moderate. Travel lanes need to be designed to move traffic in a safe and reasonably efficient manner. The width of all lanes should be evaluated collectively. Therefore travel lanes shall be 12 feet for all Statewide (NHS) Highways and those highways identified as Freight Routes either by the OHP or highways pre-approved for WB-67 interstate vehicles size trucks according to Route Map 7. This size truck has a 67 foot wheelbase and is referred to as the interstate size truck. It is the largest single tractor trailer truck allowed on Oregon Highways without a permit. Route Map 7 is color coded and identifies where the interstate truck is allowed without permit. For all other highways the travel lane width shall also be 12 feet unless:

(a) The design speed of the highway is 35 mph or less; and
(b) Truck volumes in the design year are less than 250 four axle or larger trucks per day.

Highways that meet both of the above thresholds may utilize an 11 foot lane without acquiring an exception.

- **Exceptions**

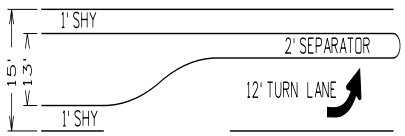
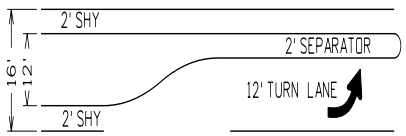
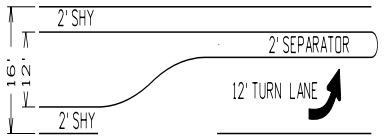
Due to the built environment in UBAs, project designs often must work with constrained right of way sections or other obstacles that do not allow use of the desired cross section. Since right of way acquisition is often difficult and expensive in these built up environments, it is often minimized or avoided. When confronted with cross section constraints, the designer should follow the rationale below. Again, the information below is not in any specific order and is intended to provide the designer with a listed of design elements that may be considered for reduction in constrained areas. Those design elements requiring design exceptions are noted.

- Consideration of reducing the sidewalk width to 5 feet as long as a roadside buffer area is included in the design. *This option should be avoided when pedestrian circulation is an identified project goal.* Design exception required.
- Consideration of reducing the shoulder/bike lane to 5 feet. Design exception required.
- Consideration of reducing or eliminating the roadside buffer area between the curb line and sidewalk. If a minimum 3 foot buffer cannot be achieved, then the sidewalk should be designed as curbside, with a width of 6 feet. *This option should be avoided when pedestrian circulation is an identified project goal.*
- Consideration of reducing the median width. If the design incorporates a raised median, the left side shy distance could be reduced. A minimum shy distance of 1 foot shall be used for raised curb medians. If the design includes a Continuous Two Way Left Turn Lane, the width can be reduced to 13 feet when design speeds are less than 45 mph and 14 feet when design speeds are 45 mph or more. A design exception is required for a 13 foot left turn lane.
- If the constraint is located at an intersection, reconsider the need for right turn lanes. If right turn lanes are critical to the operation of the intersection, consider reducing the overall turn lane width to 12 feet. Design exception required.
- Consideration of reducing the travel lane widths. The minimum travel lane width shall be 11 feet on all classifications of highways within this land use area. Design exception required.

The above priorities are based upon the premise that the major objectives of highways in UBAs are to balance accessibility and mobility while maintaining the safety of all roadway users. Reducing cross section elements from standards is discouraged. The standards reflect the priority of objectives for highways in these areas. Every reasonable attempt should be made to acquire the necessary right of way or mitigate for topographical constraints. If cross section reductions are needed, all reductions will require an exception. Refer to Chapter 13 for more information on the exception process.

NOTE: Some of the above reduction techniques (as noted) require the appropriate Design Exception approval from the Roadway Engineering Manager.

Table 8-3
ODOT 4R/New Urban Standards – UBAs

Design Elements	Design Speed			
	30 mph	35 mph	40 mph	45 mph
Travel Lane	12’[1]	12’[1]		12’
Right Turn Lane	12’ plus shoulder[2]	12’ plus shoulder[2]		12’ plus shoulder[2]
Left Turn Lane				
Right Side Shoulder/Bike Lane	6’	6’		6’
Left Side Shy Distance[3]	1’	2’		2’
Median Striped Median(Multi-Lane) Continuous Left Turn Lane Raised Curb Median	 2’ 14’ 15’ Travel lane to travel lane	 2’ 14’ 16’ Travel lane to travel lane		 2’ 14’ 16’ Travel lane to travel lane
Maximum Superelevation[4]	4%	4%		6%
Maximum Degree of Curvature	19°	13°30’	10°00’	8°
Maximum Grade	8%	7%		6%
Curbside Sidewalk	6’[5]	6’[5]		6’[5]
Separated Sidewalk[6]	6’	6’		6’
On-street Parking	Undesirable[7]	Undesirable[7]		Undesirable[7]
Vertical Clearance	17’	17’		17’

[1] An 11 foot lane may be used if the highway is not a Statewide Highway or a Freight Route and carries less than 250 four axle or larger trucks per day in the design year.
[2] Shoulder on curbed and uncurbed sections shall be 3 feet and 4 feet respectively.
[3] Left side shy distance is applicable in one-way couplet situations and sections with raised medians.
[4] Superelevation at intersections may need modification, see Chapter 9.
[5] If signs, mailboxes, or other appurtenances in the sidewalk become numerous, the sidewalk should be widened to 8 feet.
[6] A buffer strip between 4 feet and 8 feet should be used with a separated sidewalk.
[7] On-street parking is undesirable and generally not allowed in UBAs.

8.6 COMMERCIAL CENTERS

8.6.1 GENERAL

Commercial Centers are those areas where large commercial developments are located in a clustered setting with limited access to the state highway. A Commercial Center designation may apply to an existing or future center of commercial activity that generally has 400,000 square feet or more of gross leasable area or public buildings. Commercial Centers generally are intended to serve the local community, but many centers provide a regional draw. Buildings in a Commercial Center are generally clustered with limited direct access to the state highway. They include a high level of regional accessibility and connections to local road networks. Commercial Centers must be designated within a transportation system plan (TSP), comprehensive plan, or corridor plan where one exists as a specific commercial activity node. The purpose of state highways within Commercial Centers is to maintain through traffic mobility in accordance with its function. The state highway and supporting road network must accommodate all travel modes and provide accessibility and circulation to pedestrian, bicycle, and transit users where appropriate. Figure 8-6 illustrates a potential Commercial Center.

FIGURE 8-6 COMMERCIAL CENTER

Commercial Center Characteristics and Attributes

- ✓ Clustered, large-scale development with generally 400,000 square feet or more of gross leasable area or public buildings.
- ✓ Commercial or mixed commercial, retail and office activities that may also include multi-family residential and public uses.
- ✓ A high level of regional accessibility.
- ✓ Clustered buildings with consolidated access to the state highway rather than developed along the highway with multiple accesses.
- ✓ The center has convenient internal circulation including provisions for pedestrians and bicyclists. These include bicycle lanes, sidewalks, crosswalks, or other bicycle/pedestrian accommodations to address safe and accessible pedestrian movement along, across and within the commercial center.
- ✓ Provisions of transit stops including van/bus stops, transportation demand management or other transit where available.
- ✓ Connections to the local road network.

8.6.2 ODOT 4R/NEW URBAN DESIGN STANDARDS - COMMERCIAL CENTERS (CCs)

There are no specific Highway Design Standards for Commercial Centers. Commercial Centers may be located in a variety of areas and establishing a single design standard is not practical. The design of state highways around Commercial Centers should be consistent with the classification and function of the highway, speed, traffic volumes, proximity to interchanges, and the surrounding area. Generally these areas should be designed to the standards for either UBAs or for Urban Fringe/Suburban Areas, whichever best describes the surrounding area. If the Commercial Center is adjacent to an interchange, the design should minimize the impacts to the interchange area and the freeway, expressway, or Statewide Highway, and meet the appropriate interchange access management spacing standards as applicable. The spacing standards are contained in Appendix C of the Oregon Highway Plan.

8.7 NON-DESIGNATED URBAN HIGHWAYS

As mentioned earlier, the Oregon Highway Plan established an Urban highway segment for urban environments outside of Interstate Highways, Expressways, STAs, UBAs, and Commercial Centers. The urban highway designation applies to highway segments not otherwise designated. Urban highways traverse many different types of land use areas, from urban fringe and suburban to developed areas and traditional downtowns. In addition, some urban environments will not meet the requirements for receiving the other land use designations, but will still look similar. The designer still needs guidance for dealing with these situations. To help guide design decisions to reflect the appropriate design for a given urban environment along highways, three additional categories are used. These categories are not found in the OHP. They are:

(a) Urban Fringe/Suburban
(b) Developed
(c) Traditional Downtowns/Central Business Districts.

8.7.1 URBAN FRINGE/SUBURBAN

- **General**

  Urban Fringe/Suburban areas are those sections between the Urban Growth Boundary and the more developed areas. These areas are characterized by their longer public road spacing as compared to the more urban developed area of the community, sparser roadside development, and higher speeds. The major function of arterials in this land use area is to provide for a high level of traffic mobility at moderate to high speeds. Highways in these areas also provide the transition from rural to urban environment. Traffic congestion is held to low to moderate levels and private land access should be minimized. Where alternative access exists, an approach to the highway should be allowed only if all the criteria in OAR 734-051-0080 (Access Management Rule) are met. Figure 8-7 illustrates an example of an Urban Fringe/Suburban area.

Figure 8-7
Urban Fringe/Suburban Area

8.7.1.1 ODOT 4R/NEW URBAN DESIGN STANDARDS- URBAN FRINGE/SUBURBAN

- **Pedestrian**

  State highways within this land use area need to accommodate pedestrians on sidewalks. The preferred method is to separate the sidewalk from the highway utilizing a buffer area. Sidewalks should be a minimum of 6 feet wide in these areas. The width of the buffer area will be variable depending upon right of way and landscaping needs. Due to the higher traffic speeds found in these locations, the buffer area should be at least 6 feet wide. In locations where a buffer strip cannot be obtained, the designer is encourages to increase the sidewalk width to 8 feet in order to provide a more pedestrian friendly environment. When transit vehicles are expected or planned to be using the highway, transit stops should utilize a

bus pullout to minimize impact to through traffic. For additional information on Pedestrian and Transit Design see Chapters 11 and 12.

Pedestrian accessibility in these areas is often not a major function of the state highway. However, the design of the highway should still consider the opportunities for pedestrians to cross the highway and connecting roadways. Signalized intersections should have all legs open for pedestrian crossings. The use of a raised curb median can help facilitate mid-block pedestrian crossings.

- **Shoulders/Bike Lanes**

Shoulders significantly improve the safety and operations of urban arterials. Since arterials in urban fringe/suburban areas are to provide a high level of mobility, and safety is a principal goal of any project, shoulders are required. Due to the higher speeds generally found in these areas, shoulder widths of 6 feet are generally required. On some higher volume (above 12,000 ADT for two-lane and 28,000 ADT for multi-lane) and higher speed highways (design speed above 40 mph) a shoulder of 8 feet is required.

Shoulders also provide an area for bicycle use. The shoulder in these areas may or may not be striped as a bike lane. Regardless, the dimensions above will provide for adequate and safe movement of bicycle traffic.

- **Parking**

Mobility is a major function of the highway in these areas. On-street parking should generally not be allowed because of the higher traffic speeds and low density of roadside development. Additionally, on-street parking reduces the capacity, efficiency, and safety of the highway, within this highway segment designation.

- **Medians**

All classifications of multi-lane highways (i.e. Statewide, Regional, District) within this land use area should be considered for a non-traversable median. Strong consideration should be given to installing a non-traversable median during all preservation or modernization work on existing roadways. A non-traversable median is the preferred median type for all multi-lane highways within this highway segment designation.

All new multi-lane highways constructed on new alignments shall include a non-traversable median. The preferred type is the raised curb design, due to the ease of channelization transitions. Raised curb medians in these areas can also significantly improve pedestrian crossing opportunities by providing a crossing refuge. Table 5-8 provides the required left side shy distances. Continuous Two Way Left Turn Lanes (CTWLTLs) may be acceptable

for two lane highways. However, CTWLTLs should be avoided on multi-lane highways in this land use area due to the induced pressure for local land access and development. For more discussion related to median design see Section 5.5.

- **Access Management**

  On all State Highways in this land use area, access management objectives and spacing standards should be followed. OAR Chapter 734, Division 51 should be referenced where deviations from spacing standards are necessary. Priority should be given for connections to public roads rather than private land access. The preference is for private approaches to be directed to public road connections and/or frontage roads. Private drives, when alternatives do not exist, should be shared between multiple properties where practical. In some instances, the access rights may need to be acquired from adjacent properties to limit access to public road connections only. However, acquisition of access rights will generally only be reserved for Statewide Highways or for interchange access management areas within this land use type. For more information on access management objectives, guidelines, refer to Section 5.11 and Appendix C of the Oregon Highway Plan, and OAR Chapter 734, Division 51.

- **Lane Widths**

  Mobility is a major objective of highways within these areas, and travel lane widths should reflect this objective. In addition, travel speeds are typically medium to high. The width of all lanes should be evaluated collectively. Therefore, through travel lanes on all highways shall be 12 feet wide. This lane width is necessary to accommodate larger vehicles safely. Trucks and recreational vehicles are larger than normal passenger cars and require more space for operation. Where right or left turn lanes are required, they should be in conformance with Figures 9-6 and 9-7 (Standard Drawing RD 225).

- **Exceptions**

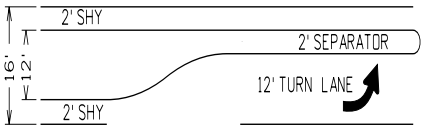
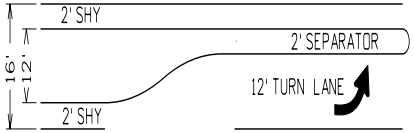
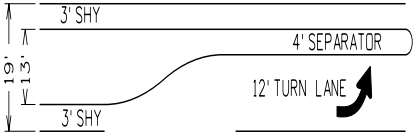
  Some projects may have constrained right of way sections or other obstacles that do not allow project designs to use the desired cross section. However, this is generally not true for sections in Urban Fringe/Suburban Areas as they are more sparsely developed and buildings are typically set back. Constraints will generally be caused by topography. When confronted with cross section constraints, the designer should follow the rationale and discussions below. The information below is not in any specific order and is intended to provide the designer with a listed of design elements that may be considered for reduction in constrained areas. Those design elements requiring design exceptions are noted.

- Consideration of reducing the sidewalk width to 5 feet as long as a roadside buffer area is included in the design. Design exception required.
- Consideration of reducing the shoulder/bike lane to 5 feet. Design exception required.
- Consideration of reducing or eliminating the roadside buffer area between the curb line and sidewalk. If a minimum 3 foot buffer cannot be achieved, then the sidewalk should be designed as curbside with 6 foot width.
- Consideration of reducing the median width. If the design incorporates a raised median, the left side shy distance could be reduced. A minimum shy distance of 1 foot and 2 foot shall be used for raised curb and concrete barrier medians respectively. If the design includes a Continuous Two Way Left Turn Lane, the width can be reduced to 13 feet for design speeds of 45 mph or less and 14 feet for design speeds of 50 mph or more. Design exception required.
- If the constraint is located at an intersection, reconsider the need for right turn lanes. If right turn lanes are critical to the operation of the intersection, consider reducing the right turn lane width to 13 feet. Design exception required.
- Consideration of reducing the travel lane widths. The minimum travel lane width shall be 11 feet on all classifications of highways within this land use area. Design exception required.

The above priorities are based upon the premise that the major objectives of highways in Urban Fringe/Suburban Areas are the safety and mobility of traffic. Reducing cross section elements from standards is discouraged. The standards reflect the priority of objectives for highways in these areas. Every reasonable attempt should be made to acquire the necessary right of way or mitigate for topographical constraints. If cross section reductions are needed, all reductions will require either an exception or concurrence. Refer to Chapter 13 for more information on the exception process.

NOTE: Some of the above reduction techniques (as noted) require the appropriate Design Exception approval from the Roadway Engineering Manager.

Table 8-4
ODOT 4R/New Urban Standards – Urban Fringe/Suburban Area

Design Elements	Design Speed				
	35 mph	40 mph	45 mph	50 mph	55 mph
Travel Lane	12’		12’	12’	
Right Turn Lane	12’ plus shoulder[1]		12’ plus shoulder[1]	12’ plus shoulder[1]	
Left Turn Lane					
Right Side Shoulder	6’		6’	8’	
Concrete Barrier Median	Undesirable[2]		Undesirable[2]	8’[2]	
Median Striped (Multi-Lane) Continuous Left Turn Lane Raised Curb Median	 2’ 14’ 16’ Travel lane to travel lane		 2’ 14’ 16’ Travel lane to travel lane	 4’ 16’ 19’ Travel lane to travel lane	
Maximum Superelevation[3]	4%		6%	6%	
Maximum Degree of Curvature	13°30’	10°00’	8°	6°45’	5°15’
Maximum Grade	7%		6%	6%	5%
Curbside Sidewalk	6’[4]		6’[4]	6’[4]	
Separated Sidewalk[5]	6’		6’	6’	
On-street Parking	N/A		N/A	N/A	
Vertical Clearance	17’		17’	17’	

[1] Shoulder on curbed and uncurbed sections shall be 3 feet and 4 feet respectively.
[2] Concrete median barriers are generally discouraged on urban arterials.
[3] Superelevation at intersections may need modification, see Chapter 9.
[4] If signs, mailboxes, or other appurtenances in the sidewalk become numerous, the sidewalk should be widened to 8 feet.
[5] A buffer strip of 4 feet to 8 feet is required with a separated sidewalk.

8.7.2 DEVELOPED

- **General**

Developed areas are those areas where most of the adjacent roadside is developed at urban intensities and only a few parcels are vacant. These areas are sometimes referred to as 'strip development' areas, but may also include a mixture of industrial/warehouse and residential uses. Typical through traffic speeds are slow to moderate where land uses are intense or moderate. Where land uses are less intense, speeds are often higher. These areas are very similar in nature to Urban Business Areas (UBAs) discussed earlier in this chapter, but do not meet the criteria and intent of a UBA. Mobility of traffic is generally more important in these areas than property access. The amount of accessibility is dependent upon the highway classification, speed, roadside culture, and overall system structure.

8.7.2.1 ODOT 4R/NEW URBAN DESIGN STANDARDS - DEVELOPED

Generally, the design of state highways in this area should follow the standards and guidelines for UBAs. However, the access management standards for Developed areas are different than UBAs. Developed areas that are not designated as UBAs must adhere to the "Urban Other" standard for the appropriate highway classification. The access management standards are contained in Appendix C of the Oregon Highway Plan.

8.7.3 TRADITIONAL DOWNTOWN/CENTRAL BUSINESS DISTRICT

- **General**

Traditional Downtown/Central Business District areas are densely urbanized areas generally characterized by closely spaced buildings fronting sidewalks, shared or on-street parking, and lower traffic speeds typically around 25 mph to 30 mph. Maintaining traffic mobility is still important in these areas, but accessibility for other modes, especially pedestrians, is also important. These areas may look very similar to Special Transportation Areas (STAs) discussed earlier in this chapter, but do not meet the criteria and intent of an STA or have not been designated as an STA by the Oregon Transportation Commission.

8.7.3.1 ODOT 4R/NEW URBAN DESIGN STANDARDS - TRADITIONAL DOWNTOWN/COMMERCIAL BUSINESS DISTRICT

- **Pedestrian**

  Providing adequate pedestrian facilities in these areas is critical to the vitality of the area. Ample sidewalks of at least 10 feet or more should be provided in these areas. Where right of way is available, wider sidewalks should be considered. A buffer area is strongly recommended. This may consist of on-street parking or a buffer strip. Where a buffer strip is used, it should be at least 4 feet wide. However, in most of these areas, a buffer strip will not be used as the sidewalk is typically curb-side. Tree wells, planter boxes, or other amenities provide a buffer area between traffic and pedestrians in these areas. Where amenities are used within the sidewalk area, a minimum clear walking path of 8 feet should be provided. Many of these areas will also accommodate transit vehicles. Where transit is expected, bus pullouts and bus stops should conform to the recommendations of Section 12.2 of the HDM.

  Pedestrians need to have many safe well-designed crossings. All public road connections should allow crossings of each leg. The use of curb extensions, channelization islands, and median islands can reduce the crossing distances and improve pedestrian visibility and safety. In some situations, the use of mid-block pedestrian crossings may be viable and could enhance the pedestrian mobility and circulation within the downtown area. The same techniques used at intersections may be beneficial for mid-block crossings. The Engineering Services Unit can provide additional guidance for designing and locating safe mid-block pedestrian crossings.

- **Shoulders/Bike Lanes**

  Shoulders should be provided in these areas. The shoulders help provide additional buffer area for pedestrians, assist with parking maneuvers, provide safer traffic flow, and provide the best accommodations for bicycle traffic. Shoulder/bike lanes of at least 5 feet should be considered in these areas where right of way permits and installation of the shoulder/bike lane would not reduce the sidewalk width below 10 feet.

  The shoulder/bike lane is normally located adjacent to the right side travel lane. In locations where the roadway consists of a one-way couplet, the left shoulder shall consist of a 1 foot shy distance (in addition to the travel lane width) based upon a design speed of 25-30 mph. For other design speeds on one-way couplets, the left side shy distance shall follow Table 5-8. When the left lane on a one-way couplet is up against raised curb that is not continuous, an additional 1 foot of shy distance shall be required

- **Parking**

  Generally, on-street parking should be included with roadway designs for these types of areas whenever possible. On-street parking is often a necessary component for maintaining a functioning and economically viable downtown area. Businesses are generally close to the sidewalk with limited off-street parking opportunities. The decision to include on-street parking in these areas should consider the highway classification and function, availability of parallel roadways, adequacy of side street parking and other parking strategies, safety, and maintaining the economic vitality of the downtown area. On-street parking increases the potential for conflict between bicyclists and motor vehicles. Through these areas, bicyclists need room to operate and maneuver for opening car doors, mirrors of motor vehicles, and vehicles exiting parking spaces. Where deemed appropriate, the combined on-street parking and bicycle travel width shall be 12 feet.

  Note: Only parallel parking is allowed on state highways. Any other type requires an exception.

- **Medians**

  The use of medians may or may not be needed. A median is often needed to adequately handle left turning traffic. A left turn bay should be provided at intersections wherever significant left turning volumes are allowed. However, left turns from a through lane, especially within multi-lane sections, may be acceptable in some situations. Generally, raised curb medians are not appropriate in these areas, unless they are needed to improve pedestrian crossing opportunities and general mobility. The use of highway medians in these areas should consider the classification of the highway, function of the highway, availability of other routes or parallel roadways, economic vitality of the area, impact to pedestrian crossings and mobility, and safety for all travel modes. Median widths shall be 14 feet for both Continuous Two Way Left Turn Lanes and raised curbs. An additional shy distance is required where a raised curb median is used. Section 5.5 provides more detailed median design information. Table 5-8 provides the required left side shy distances.

  Installation of medians in downtowns and CBDs can impact pedestrian crossings. Where medians are required to maintain acceptable traffic flow and safety, the designer needs to evaluate options that reduce the impact to pedestrian crossing and safety.

- **Access Management**

  Traditional Downtowns/Central Business Districts that have not received the STA designation must meet appropriate access management spacing located in Appendix C of the Oregon Highway Plan. However, since the block spacing typically associated with these types of areas is almost always less than the standard spacing, it means all new requests will require a deviation. New private approaches within these areas should be discouraged. New public roadway connections should be carefully evaluated to determine the safety, capacity, and operational impacts to the state highway system. New connections should not be allowed unless the analysis clearly shows the new connection will not significantly degrade the safety, capacity, and operation of the state highway.

- **Lane Widths**

  The standard lane width for these areas is 12 feet. However, an 11 foot lane may be used in these areas without an exception if all the following conditions are met:

  (a) The highway is not an NHS or OHP Freight Route; and
  (b) Design speed of the highway is 30 mph or less; and
  (c) The highway section carries less than 250 four-axle or larger trucks per day in the design year.

  All other conditions require an exception for reductions to the 12 foot standard. Generally, lane widths should not be allowed below 11 feet even through the exception process.

- **Mobility Standards**

  The final element that is distinguishes these areas from STAs are the mobility standards. Traditional Downtowns/Central Business Districts that are not designated as STAs must adhere to the appropriate mobility standard contained in Section 10.6.

- **Traffic Calming**

  Traffic calming is a set of techniques which are used to reduce vehicular travel speeds and provide for safe and pleasant conditions for motorists, bicyclists, pedestrians, and residents. These traffic calming methods are the same treatments mentioned in the STA design section. The document, *Main Street… When a Highway Runs Through It: A Handbook for Oregon Communities,* provides complementary information to the Highway Design Manual surrounding downtown areas and State Highways.

- **Exceptions**

  Areas within traditional downtowns/CBDs often have very constrained right of way sections due to the built existing environment. Since right of way acquisition is usually difficult, expensive and often undesirable from a historic perspective within these land use areas, it is often minimized or avoided. In addition, project design goals may include elements striving to minimize the pavement cross section to enhance pedestrian circulation and crossing opportunities. Often these types of goals are important elements towards maintaining or improving the sense of place or livability of a community. The design standards should provide the flexibility to accomplish the goals of enhanced pedestrian accommodation and livable communities.

  When confronted with cross section constraints, the designer should follow the rationale below. The information below is not in any specific order and is intended to provide the designer with a listed of design elements that may be considered for reduction in constrained areas. Any reduction in following design elements from those standards given above will require a design exception where noted.

  - Consideration of reducing the shoulder/bicycle lane to 4 feet. Design exception required.
  - Consideration of reducing the combined on-street parking and bicycle lane width to 11 feet. Design exception required.
  - Consideration of reducing the median width. If the design incorporates a raised median, the left side shy distance could be reduced. A minimum shy distance of 1 foot shall be used for raised curb medians. If the design includes a Continuous Two Way Left Turn Lane the width can be reduced to 13 feet. Design exception required.
  - Consideration of reducing the sidewalk width. If the design originally called for very wide sidewalks (greater than 10 feet) consider reducing sidewalk width to 10 feet.
  - Consideration of reducing the through travel lanes. Reduce travel lane widths to 11 feet. Design exception required when not meeting criteria for 11 foot lane usage.
  - Consideration of reducing the width of the sidewalk to 9 feet.
  - Consideration of eliminating on-street parking on one or both sides.
  - Consideration of eliminating left turn lanes. The median width could be reduced significantly, and even eliminated. On multilane sections, a minimum 2 foot striped median should be included to provide some separation of traffic. Where left turn lanes are needed, consider reducing the median width to 12 feet. Design exception required.
  - Consideration of reducing the sidewalk width to 8 feet. In addition, the through travel lanes may be reduced to 10 feet when:
    - Design speed is 25 mph or less, and
    - Truck traffic is routed to alternative roadways and truck traffic in the area is limited to 250 four-axle trucks or larger per day providing only localized service. Design exception required.

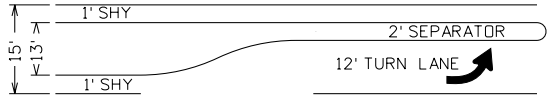
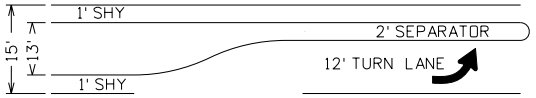
Other considerations:

- If the constraint is at an intersection, reconsider the need for right turn lanes. If right turn lanes are critical to the operation of the intersection, consider reducing the turn lane width to 12 feet. Requires design exception.
- If the constraint is at an intersection, consider eliminating parking at the intersection to obtain the necessary width to accommodate the needed lanes.
- A localized constraint should not be used to dictate the full project design unless necessary.

The above priorities for traditional downtowns/CBDs attempt to hold pedestrian mobility to a higher standard while balancing the needs, mobility, and safety of other users. Reducing cross section elements from standards is discouraged. The standards reflect engineering best practices for highways in these areas. Every attempt should be made to acquire the necessary right of way or mitigate for topographical constraints. If cross section reductions are needed, they will require an exception. Refer to Chapter 13 for more information on the exception process.

NOTE: Some of the above reduction techniques (as noted) require the appropriate Design Exception approval from the Roadway Engineering Manager during either project development or approval and adoption of an STA Management Plan in accordance with the OHP Implementation Handbook

Table 8-5
ODOT 4R/New Urban Standards -Traditional Downtown/Commercial Business District

Design Elements	Design Speed	
	25 mph[1]	**30 mph**
Travel Lane	12'[2]	12'[2]
Right Turn Lane	12' plus 1' shoulder	12' plus 1' shoulder
Left Turn Lane		
Right Side Shoulder/Bike Lane	5'	5'
Left Side Shy Distance[3]	1'	1'
Median Striped Median (Turn Lane) Raised Curb Median	 14' 15' Travel lane to travel lane	 14' 15' Travel lane to travel lane
Maximum Superelevation	4%	4%
Maximum Degree of Curvature	28°	19°
Maximum Grade	8%	8%
Curbside Sidewalk	10'	10'
Separated Sidewalk[4]	8'	8'
On-street Parking	8'[5]	8'[5]
Vertical Clearance	17'	17'

[1] 25 mph design speed is only appropriate for local road classification.
[2] 12 foot standard lane width
11 foot allowed when meeting following criteria:
- Highway is not a NHS or Freight Route, and
- Design speed of the highway is 30 mph or less, and
- The highway section carries less than 250 four axle or larger trucks per day in the design year.

[3] Left side shy distance is applicable in one-way couplet situations and sections with raised medians.
[4] Separated sidewalks are generally not used in these areas; where they are used a buffer strip of 4 feet to 6 feet should be used.
[5] 8 feet with striped bike lane.

8.8 ODOT 3-R URBAN DESIGN STANDARDS (Non-Freeway)

- **General**

Prior sections 8.4 – 8.7 described the ODOT 4R/New Urban Design Standards for various urban highways. This section discusses the appropriate design process and design standards for urban non-freeway projects utilizing ODOT 3R Urban Design Standards. Because urban preservation is generally more involved than rural, a number of processes are combined to develop the ODOT 3-R Urban standards. The ODOT 3-R Urban Design Standards incorporate the Safety Investment Program and Urban Preservation Pavement Strategy. The Urban Preservation Strategy adds design guidance which provides statewide consistency in the urban preservation program.

8.8.1 DESIGN STANDARDS

The following are minimums for lane and shoulder width, with consideration and improvement to horizontal and vertical curvature, bridge width and side slopes as appropriate. A feature not meeting the standards as specifically noted in the following areas: roadway width; bridge width; horizontal curvature (Criteria B); vertical curvature and stopping sight distance; pavement cross slope; superelevation; vertical clearance; ADA; or pavement design life must be upgraded or a design exception must be documented and approved. For more information on these criteria and other safety-conscious design considerations, the designer should become acquainted with '*TRB Special Report #214."*

Once the decision is made to upgrade a roadway feature, the designer should use the "*ODOT Highway Design Manual"*, *AASHTO's "A Policy on Geometric Design of Highways and Streets – 2001"*, the *2002 AASHTO "Roadside Design Guide"* or "*TRB Special Report #214"* whichever gives guidance in the particular area of need. When evaluating intersections, turning radius to facilitate truck movements should also be considered as well as intersection sight distance.

- **Roadway Widths**

See Table 8-6 for minimum 3-R roadway widths. When preservation type projects involve the installation of left or right turn channelization, the width of the existing approach lanes or those widths given in Table 8-6 shall be used as minimums. These widths also apply in the situation of a re-striping of an existing section of roadway. The widths of the channelized lanes shall conform to those specified in Standard Drawings RD215 RD220, and RD225.

TABLE 8-6
ODOT 3R Urban Design Standards

Highway Feature	Highway Average Daily Traffic (ADT)			
	< 750	**750 - 2000**	**2001 - 4000**	**> 4000**
Travel Lane[1] <10% Trucks[2] >10% Trucks[2]	10’ 10’	10’ 11’	11’ 12’	11’ 12’
Left Turn Lane[3]	12’	13’	14’	14’
Right Side Shoulder[4]	2’	3’	4’	6’
On Street Parking	8’	8’	8’	8’
Left Side Clearance (Shy Distance)[5] posted speed ≤ 35 mph posted speed ≥ 40 mph	1’ 2’	1’ 2’	1’ 2’	1’ 2’
Curbside Sidewalk	6’	6’	6’	6’
Cross Slope (crown)[6]	2%	2%	2%	2%
Maximum Superelevation[7] design speed ≤ 40 mph design speed ≥ 45 mph	4% 6%	4% 6%	4% 6%	4% 6%
Vertical Clearance	16’	16’	16’	16’

[1] A minimum 12 foot travel lane is required on nationally recognized truck routes (see current Route Map 7). A minimum 11 foot lane is required on all NHS Routes.
[2] Trucks are defined as heavy vehicles, single unit configuration or larger (six or more tires).
[3] Left turn lane widths include 2 foot medial separator.
[4] Where a right side shoulder is not used, a right side shy distance from curb or on-street parking is required. This shy distance is 2 feet for posted speeds up to 35 mph and 3 feet for 40 mph and above.
[5] Left side clearance (shy distance) required from curb or on street parking and is only applicable to one way roadways.
[6] See Tables 8-9 and 8-10 for improvement criteria and corrective measures.
[7] Numbers shown are for new design. See Section 8.8, Horizontal Curvature and Superelevation correction.

- **Horizontal Curvature and Superelevation**

Each horizontal curve should be evaluated for design sufficiency compared to the ODOT Urban Standards. Deficient curves should be evaluated against each criteria below to determine what level of corrective action, if any, is appropriate.

Criteria A: Improve horizontal curves by correction of superelevation to conform to ODOT New Construction Standards if the design speed of the existing curve is less than 15 mph below the ODOT New Construction Standards.

Criteria B: Evaluate reconstruction of curvature when the design speed of the existing curve is more than 15 mph below the running speed of approaching vehicles, and the current year ADT is 2000 or greater. (Careful evaluation of the appropriate value to be used for the approach speed of vehicles must be made, taking into account transitioning from tangent alignments to more mountainous curving alignments. The appropriate approach speed for an individual curve is directly dependent on the rest of the alignment approaching the curve, potentially generating an approach speed far less than the 85th percentile for the overall project.)

When curve reconstruction is not justified, appropriate mitigation measures such as those listed in Table 8-9 should be applied.

- **Vertical Curvature and Stopping Sight Distance**

Evaluate reconstruction of crest vertical curves if all of the following criteria are met:

1. The crest hides from view major hazards such as intersections, sharp horizontal curves, or narrow bridges, and
2. The design speed based on the existing Safe Stopping Distance is more than 20 mph below the ODOT Urban Standards, and
3. The current year ADT is greater than 2000.

If reconstruction of the vertical curve is not justified/cost effective, or the curve is not reconstructed to new construction standards, appropriate mitigation measures should be applied (See Table 8-9).

- **Vertical Clearance**

The clear height of structures shall not be degraded to less than 16 feet over the entire roadway width, including the usable width of shoulder. Existing clearances of less than 16 feet but greater than 14 feet shall not be degraded. The clear height shall not be less than 14 feet in any case.

- **Bridge Width**

A decision must be made to retain, widen or replace any bridge within the limits of a Preservation project. Widening vs. replacement should be evaluated to determine the most cost-effective treatment. Consider AASHTO's *"A Policy on Geometric Design of Highways and Streets-2001"* standards for bridges to remain in place, and Table 8-7, whichever is less, for minimum width. Additionally, consideration should be given to the accident history and the cost of widening when determining if widening is cost effective. If the decision is made to replace an existing structure, new construction standards will apply to the bridge replacement portion of the project only, not to the roadway portion.

When a decision is made to retain a bridge, the bridge rail should be evaluated to determine if it can adequately contain and redirect vehicles without snagging, penetrating or vaulting. Consideration should be given to upgrading structurally inadequate or functionally obsolete bridge rail. Consideration should be given to design exceptions for railing upgrades, roadway widths, etc., when the structure is listed on or determined eligible for the National Register of Historic Places. Appropriate traffic control devices should be installed where the clear roadway width on the structure is less than the approach roadway width.

Table 8-7
Minimum Useable Bridge Widths

Design Year Volume (ADT)	Useable Bridge Width
0 – 750	Width of approach lanes
751 – 2000	Width of approach lanes, plus 2 feet
2001 – 4000	Width of approach lanes, plus 4 feet
OVER 4000	Width of approach lanes, plus 6 feet

- **Pavement Design and Cross Slope**

Pavement design for preservation type projects requires a minimum of 8 years of service life.

Appropriate leveling quantities should be included in the project to correct cross slope to 2%. In addition, horizontal curve superelevation meeting the conditions of Criteria A (page 8-48) shall be corrected to ODOT Urban standards.

- **Sideslopes and Clear Zone**

As discussed earlier, a roadside inventory shall be provided on all projects utilizing ODOT 3R Urban design standards. This inventory along with the accident summary and analysis gives the designer the information necessary to make good design decisions regarding safety improvements. Evaluation and improvement considerations of roadside features should be consistent with the following:

1. Flatten sideslopes of 1:3 or steeper at locations where run-off-road accidents are likely to occur (e.g., on the outside of horizontal curves).

2. Retain current slope ratios; do not steepen sideslopes, when widening lanes and shoulders unless warranted by special circumstances, such as flat existing slopes.

3. Remove, relocate or shield isolated roadside obstacles.

4. Remove vertical drop-offs at the edge of pavement after paving.

- **Mandatory Design Features**

The following is a list (Table 8-8) of mandatory design features that must be incorporated into Preservation projects:

Table 8-8
Mandatory Design Features

Geometric Deficiency	Mandatory Corrective Measure
ADA/Sidewalk Ramps	• Ramps shall be added at intersections where absent.
Narrow Bridges/Deficient Rails	• Bridge rail retrofit or new bridge rails, approach guardrail, bridge connections and transitions to current standards unless bridge is scheduled for replacement. • Install Type 3 object markers and post delineators.
Existing Guardrail	• All non-standard terminals within the clear zone shall be upgraded to current standards. • Runs less than 18.5 inches from top of pavement to guardrail post bolt shall be adjusted or replaced to current standards. • Guardrail bridge connections shall be upgraded if appropriate or added if absent.

- **Low-Cost Safety Mitigation Measures**

Table 8-9 is a list of low cost safety measures that should be considered on all projects utilizing ODOT 3R Urban design standards as a minimum to mitigate existing safety deficiencies, and can be used as mitigation in justification for design exceptions.

Table 8-9
Low-Cost Safety Measures

Geometric Deficiency	Low-Cost Safety Measure
Narrow Lanes and/or Shoulders	• Pavement edge lines • Raised pavement markers
Steep Sideslopes/Roadside Obstacles	• Roadside hazard markings • Round ditches • Install guardrail • Remove or relocate obstacle • Slope flattening • Breakaway hardware
Narrow Bridges/Deficient Rails	• Install supplementary signing • Hazard and pavement markings
Sharp Horizontal Curve	• Install supplementary signing • Correct superelevation • Gradual sideslopes • Pavement anti-skid treatment • Obstacle removal or shielding • Install post delineators
Poor Sight Distance at Hill Crest	• Install supplementary signing • Fixed-hazard removal • Driveway relocation • Illumination
Hazardous Intersection	• Install supplementary signing • Signalization • Illumination • Pavement anti-skid treatment • Speed control (traffic calming, visual queues, etc.)

Note: Designers need to exercise engineering judgement based upon engineering principles and practices in selecting appropriate mitigation measures from the above list.

8.8.2 URBAN PRESERVATION STRATEGY

Due to the complexity and cost of urban preservation type projects, the Urban Preservation Strategy has developed a set of criteria for evaluating other design features for possible modifications or improvements. Table 8-10 contains the list of "Have To" and "Like To" corrective measures. The corrective measures listed under the "Have To" column must be addressed on all urban preservation projects. The corrective measures listed under the "Like To" column should be considered where economically feasible (i.e., minimal extra cost or funds available from sources other than Preservation funding). Design exceptions are required for each design feature not meeting the "Have To" corrective measures.

Under some conditions, the "Like To" corrective measures are required as part of an Urban Preservation Project. These conditions include:

- Pavement condition requiring reconstruction, or
- Curb exposure less than 6 inches, or
- Cross slope greater than 8%.

If any of these above conditions are met, design exceptions are required for not meeting the corrective measures from the "Like To" column of Table 8-10.

Urban Preservation projects must meet the design standards and features described above or obtain a design exception, depending upon certain conditions. However, it is often desirable to provide additional improvements in urban environments. Table 8-11 shows other design features that should be considered only if additional funding sources are available other than Preservation and where improvements are cost effective. This optional list is not a requirement for Urban Preservation projects and does not require design exceptions.

Table 8-10
Urban Preservation Design Features

Project Element	Corrective Measure		Technical Resource
	"Have To"	"Like To"	
Pavement Life	15 year minimum (unless life cycle benefit/cost justifies an alternative) for overlays, inlays or appropriate treatment.	15 year minimum life for reconstruction (may be triggered by cross slope, curb exposure or pavement condition).	Pavement Unit
Signal Loops	Adjust or replace as necessary.		Traffic Section
Striping	Redo.	Redo with Durable products as supported by the Statewide & Regional Striping Plans.	Region Traffic
Signing	Replace signs in poor condition (damaged or no longer visible or discernable).	Replace signs not up to current standards	Traffic Section
Utilities (manholes, valves, vaults)	Adjust.		
Drainage	Adjust as necessary to maintain basic system. Address high priority fish culverts identified in Salmon program.	Reroute bridge drains which drain directly into waterway. Address lower priority fish culverts as required.	Fish Prog. Mgr. & Hydraulics Unit
Obstacles behind curbs	Reconstruct curb to re-establish delineation and drainage function if grades & existing R/W permit. Relocate to meet standards where practical.	Meet required clear zone standards for obstacles behind curb. Relocate if necessary.	Roadway Section
Roadside obstacles with demonstrated safety issues	Remove or mitigate.		
ADA/Sidewalk Ramps	Ramps shall be added where absent. Maintain functional ramps at corners. Retrofit ramps.	Meet ADA standards on sidewalks and driveways.	Bicycle and Pedestrian Unit
Vertical Clearances	Maintain existing or minimum vertical clearances.	Meet required vertical clearance.	Bridge Section

Table 8-10 (cont'd)
Urban Preservation Design Features

Project Element	Corrective Measure		Technical Resource
	"Have To"	"Like To"	
Barrier Height	Maintain minimum barrier height.	Meet required standard.	Roadway Section
Existing Guardrail and terminals	Upgrade all guardrail less than 2A. Remove unwarranted guardrail. All blunt ends, including non-flared terminals shall be upgraded to current standards. Runs less than 18.5 inches from top of pavement to guardrail post bolt shall be adjusted or replaced to current standards. Guardrail bridge connections shall be upgraded if appropriate (Type 3 okay) or added if absent.		Roadway Section
Narrow Bridges/Deficient Rails	Bridge rail retrofit or new bridge rails, approach guardrail, bridge connections and transitions to current standards unless bridge is scheduled for replacement. Install Type 3 object markers and post delineators.		Bridge Section
Curb Exposure	4 inch minimum curb exposure for delineation of roadway. Additional exposure may be required for drainage.	Meet required standard.	Roadway Section
Cross Slope	Maintain existing where applicable. Minimize cross slope to meet standards where practical. Maximum cross slope not to exceed 8%.	Meet required standard for superelevation rates and cross slopes.	Roadway Section

The following optional items should be considered, **IF** cost effective **AND** additional funding (other than Preservation funding) is available.

Table 8-11
Additional Urban Design Features

Project Element	Corrective Measure	Technical Resource
Drainage	• Upgrade systems.	Roadway Section
Access Issues	• Driveway relocations/closures.	Region Access Mgr.
Operational Issues	• Modify curb radii to facilitate truck movement. • Islands (replacing, adding or removing). • Install/upgrade traffic control devices.	Roadway Section
Safety Issues	• SPIS site addressed. • Rumble strips, pavement markings, slope flattening, illumination, etc.	
Sidewalk Infill	• If less than 10% missing in length of project.	Bicycle and Pedestrian Unit