

Chapter

5

**URBAN & RURAL
FREEWAY
DESIGN**

5.1 INTRODUCTION

This chapter provides standards and guidance for urban and rural freeways on new construction/reconstruction projects. The chapter also provides standards for freeway 3R, 1R, and single function design. The designer must be aware of which standards apply and choose the appropriate standard when dealing with freeways. The practical design strategy plays a role in providing guidance for the designer in project design and development. Whether a freeway project is single function, 1R, 3R, or 4R, sound engineering judgment and decision making is required. The designer, working with the project team should keep project scope, purpose and need, and the practical design "SCOPE" values in mind when making project design decisions.

Freeways are the highest form of arterials and have full access control. The full control of access is needed for prioritizing the need for through traffic over direct access. A freeway's primary function is to provide mobility, high operating speed, and level of service, while land access is limited. Access connections, where deemed necessary, are provided through ramps at grade separated interchanges. The major advantages of access controlled freeways are high capacity, high operating speeds, operational efficiency, lower crash potential, and safety to all highway users.

The major differences between freeways and other arterials include the following elements: grade separations at cross roads and streets; the grade separated cross road connections between the freeway and crossroad are accomplished through exit and entrance ramps; and full control of access. Expressways can be designed with both freeway and non-freeway design elements. The use of jug handle style interchanges and use of right turn channelization is not considered freeway design, but can be used in expressway design. The long term corridor and planning goals should be part of the process in whether or not to design an expressway to freeway standards. (See [Sections 6.2.1](#) and [7.2](#) for additional information on expressways and the decision to design expressways as freeways).

This chapter covers both urban and rural freeways. Due to the complexity of urban situations, the majority of the chapter will be devoted to urban freeway design. However, the overall design concepts apply to both rural and urban freeways.

In addition to the new or reconstruction (4R/New) freeway standards, this chapter includes Freeway 3R, 1R, and Single Function Design Standards. The Freeway 3R Design Standards apply to both urban and rural freeway conditions for preservation or Interstate Maintenance projects. All new freeways or modernization of existing freeways are to use the 4R/New standards.

5.2 ODOT 4R FREEWAY DESIGN STANDARDS

Urban freeways generally have more travel lanes and carry more traffic than rural freeways. Urban freeways can be either depressed, elevated, at ground level, or a combination of the above mentioned. Urban freeways usually have a narrower median than rural freeways due to the high cost of obtaining right-of-way. In addition, urban freeways tend to have more connections than rural freeways but complying with interchange spacing requirements is critical to maintaining a high level of long term freeway operations.

Rural freeways are generally similar in concept to urban freeways, except that the horizontal and vertical alignments are more generous in design. This level of design is normally associated with higher design speeds and greater accessibility to right of way. Due to the nature of the facility, right of way is typically more available and less expensive in a rural setting. This allows for a wider median which improves the safety of the facility. In addition to the increase in safety of a rural freeway, the higher design speeds in a rural setting allow for greater capacity, a higher level of mobility, and potentially a reduced need for multiple lanes. Rural freeways are normally more comfortable from a driver perspective, and generally have lower maintenance costs.

The sections below discuss the different design elements of urban and rural freeways. These different design element standards are listed in [Table 5-2](#).

5.2.1 DESIGN SPEED

In general, the design speed of freeways should be similar to the desired running speed during off peak hours, keeping in mind a reasonable and prudent speed. In some urban areas, with populations under 50,000, the posted freeway speed is 65 mph. In more densely populated urban areas (over 50,000), the posted speed is 55 or 60 mph, or in constrained areas, 50 mph. Because of the different posted speeds the design speed chosen may vary. In many urban areas the amount of available right of way can be restricted and achieving high design speeds can be very costly. In balancing the need for safety and providing a high speed facility with consideration for right of way costs, the design speed for urban freeways shall be a minimum of 50 mph. A 50 mph design speed may only be used in very constrained urban corridors or in mountainous terrain, and the design speed must be consistent with the corridor and meet driver expectancy. On most urban freeway corridors, a design speed of 60 mph can be provided with little additional cost. In situations where the corridor is relatively straight and the character of the roadway and location of interchanges permit a higher design speed, 70 mph should be used.

For rural freeways the design speed is 70 mph, except that in mountainous terrain, a design speed of 50 to 60 mph may be used. The design speed must be consistent with the corridor and meet driver expectancy.

Rural freeways outside of mountainous terrain generally have higher design speeds. Normally right of way is more available in rural locations allowing for more generous horizontal and vertical alignments. These higher design speeds allow for increased volumes and capacity while providing a safe facility and a more comfortable driving environment. Increased capacity leads to improvements to the level of mobility standards and a facility that will operate longer than a lower design speed urban freeway. For all freeway projects, the design speed is to be selected by the Region Roadway Manager in cooperation with Technical Services Roadway staff.

Other sections of this chapter discuss design speed selection for the design of 3R, 1R, and Single Function projects.

5.2.2 ALIGNMENT AND PROFILE

Because of terrain and high design speeds, rural freeways should have very gentle horizontal and vertical alignments. In rural areas, the designer should be able to create a safe and efficient facility while taking into consideration the aesthetic potential of the freeway and surrounding terrain. Most freeways are constructed near ground level and the designer should take advantage of the existing topography to create not only a functional freeway, but also one that looks and drives well and fits into the existing topography. [Table 5-2](#) provides design guidance on horizontal and vertical curvature.

5.2.3 SHOULDERS

The shoulder width of urban and rural freeways is dependent upon the number of lanes of the facility. The right side shoulder for both urban and rural freeways shall be 10 feet. This width allows for emergency parking of vehicles on the right hand shoulder. The left side shoulder is dependent on the number of freeway lanes. When there are two lanes in each direction on the freeway, the left side shoulder shall be a minimum of 6 feet wide. When the freeway consists of three or more lanes in each direction, the left side shoulder shall be a minimum of 10 feet wide. This wide left side shoulder on a multi-lane section allows for vehicles in the left lane to use the left side shoulder in an emergency instead of crossing two lanes of traffic to find refuge in the right side shoulder. Wider shoulders also provide other benefits in addition to emergency parking, such as providing space for incidence response, emergency vehicle travel, maintenance activities and stage construction of future modernization and preservation projects. The standard shoulder widths also apply to bridge shoulder widths.

For interstate freeways, when truck traffic Directional Design Hourly Volume (DDHV) is greater than 250, the right side shoulder shall be increased to 12 feet. For non-interstate freeways, when the truck traffic DDHV is greater than 250, widening the right shoulder to 12 feet should be evaluated.

For new construction, auxiliary and climbing lanes on the freeway should have the same shoulder and lane width as standard freeway shoulders. Typically the right side shoulder width should be 10 feet, with a minimum 8' shoulder required, excluding shy distance requirements. Where truck traffic DDHV is greater than 250 or there is a roadside barrier, a 12 foot shoulder should be considered. In retrofit situations, such as operational and safety projects or adding auxiliary and climbing lanes to a preservation project, an attempt should be made to achieve new construction shoulder width (minimum 8'). When right side roadside barriers are used, the normal right side shoulder width shall be increased to provide a 2 foot "E" offset or "shy" distance. When a roadside barrier is used on the left side shoulder of 10 feet or more in width, the left side shoulder shall also provide the 2 foot "E" distance. Exceptions to the 2 foot "E" widening may be approved by the State Traffic-Roadway Engineer when the additional shoulder widening is not practical.

5.2.4 LANE WIDTHS AND CROSS SLOPE

Due to the high speed, high volume traffic, the width of interstate vehicles, and the need to provide for safe facilities, the travel lane width for both urban and rural freeways shall be 12 feet. A design exception is required for lanes less than 12 feet.

The cross slope for four lane (two lanes in each direction) urban and rural freeways is 2%. When an urban or rural freeway consists of three or more lanes in each direction, the cross slope shall be increased to 2.5% for the outside lanes and is applicable to the outside shoulder cross slope. The two inside lanes shall retain a cross slope of 2%. At locations where curb is introduced (typically urban areas), the shoulder cross slope shall be increased to 5%. At locations where the curb is intermittent, increasing the shoulder cross slope to 5% should be analyzed on a case by case basis. [Figure 5-1](#) and [Figure 5-2](#) indicate the proper cross slope and standards for the different width freeway sections. These figures also provide information and design details on cut and fill slopes, safety slopes, and separated grades.

5.2.5 CURBS

Vertical faced barrier curbs shall not be used on urban or rural freeways. When curbs are to be used on freeway sections the curb shall be a low profile mountable curb. The Oregon Standard Drawings 700 series provides information on curb type.

5.2.6 SUPERELEVATION

The superelevation for urban and rural freeways shall be based upon open road conditions and will follow the standard superelevation rates shown in [Table 3-2](#). When snow and ice conditions prevail, consideration should be given to using a maximum superelevation rate of 8%. Use of the 8% superelevation requires a design exception (See [Section 3.3.1](#)).

5.2.7 GRADES

Generally grades on urban and rural freeways are very similar. In urban and mountainous areas, increased grades are allowed due to terrain. Care should be taken in urban areas to minimize the use of steep grades due to the close spacing of interchanges and the multiple speed changes needed in an urban area. In an urban environment, the driver must process large amounts of information in short periods of time. Steep grades make it more difficult for lane changes and other maneuvers to be made. The maximum grade for rural flat, rural rolling, rural mountainous or urban freeways are 3%, 4%, and 5% respectively (See [Table 5-2](#)). In urban areas that have right-of-way constraints or in mountainous terrain, grades may be 1% steeper than those outlined in [Table 5-3](#) with the use of a design exception.

5.2.8 VERTICAL CLEARANCE

The vertical bridge clearance on all High Routes shall be 17' 4". Additional height may be needed to provide 17'-4" clearance if future overlays are anticipated. All urban and rural Interstate Freeways are designated High Routes, and therefore, shall have a minimum vertical clearance of 17' 4". The vertical clearance of all urban and rural non-Interstate freeways will depend on the freeway being designated as a; High Route, National Highway System (NHS) route (not on High Routes), or non-NHS (not on High Routes). The minimum vertical clearance for NHS (not on High Routes) is 17' 0" and 16'0" for non-NHS (not High Routes). The designation of the facility (High Route, NHS, non-NHS, etc.) is critical in determining the minimum vertical clearance requirement and should be verified prior to determining the vertical clearance requirement. The vertical clearance shall be from the top of the pavement to the bottom of the structure and includes the entire roadway width including the usable shoulder width. See [Section 4.5.1](#) for specific details on vertical clearance requirements and communication efforts with the Motor Carrier Transportation Division (MCTD) and other stakeholders. Any proposed decrease in vertical clearance in new construction, regardless of the vertical clearance standard, requires consultation with MCTD.

The clearance requirements for transmission and communication lines vary considerably and must comply with the National Electrical Safety Code. Clearance information should be obtained from the Utilities Engineer.

The vertical clearance for sign trusses, cantilever sign supports, and through-truss structures shall be a minimum of 18 feet and a maximum of 19' because of their lesser resistance to impacts. The vertical clearance for pedestrian overpasses shall be 17'-4" (does not include buffer for future overlays).

The minimum railroad clearance to be provided on crossings shall conform to OAR 741 and as shown in [Figure 4-8](#). Additional clearance may be required and should be determined individually for each crossing. Information regarding clearances shall be obtained from the Railroad Liaison. For vertical clearance requirements on Local Agency jurisdiction roadways, see [Section 4.5.1.1](#).

5.2.9 MEDIANS

Freeway medians provide a separation between the travel ways of opposing traffic. Medians provide a sense of security and convenience to the operators of motor vehicles. The wider the median the more comfortable the driver becomes with the facility. The width of urban and rural freeway medians is dependent upon available right of way. Because urban freeways have high speed and high volume traffic, the median should be as wide and flat as possible. A wider median on an urban freeway can provide for future transit, rail, HOV (high occupancy vehicles), HOT (high occupancy toll), maintenance, construction staging, mitigation, or travel lanes. Many times the width of medians is restricted due to the highly developed and expensive right of way.

For urban freeways the minimum median width for a freeway with two lanes in each direction and a concrete barrier is 18 feet between edge of travel lanes. This allows for 6 foot shoulders, a 2 foot "E" distance, and a nominal 2 foot concrete barrier width. For urban freeways with three or more lanes in each direction and a concrete barrier, the median shall be 26 feet wide between edge of travel lanes. This distance allows for 10 foot shoulders, a 2 foot "E" distance, and a nominal 2 foot concrete barrier width. The designer should be considering future needs of the facility when dealing with minimum median designs, particularly accommodating future lanes or transit.

The desirable median width in an urban and rural area is 76 feet (inside edge of travel lane to inside edge of travel lane). This allows for a median that has the flexibility of allowing additional lanes in the future. In areas where the right of way is inexpensive the edge of travel lane to edge of travel lane distance should be increased to 126 feet.

Median widths ranging from 76 to 126 feet (inside edge of travel lane to inside edge of travel lane) are very common for rural freeways. The median width allows for future widening, grading of a earth median (slopes shall be 6:1 or flatter), or drainage facilities. In areas of steep topography, the use of a wide median allows for the designer to use independent profiles and proper sideslopes. In rural locations, where terrain prohibits the use of the rural median standard, the urban median width (18'/26') can be considered and evaluated. Use of the urban median standard in a rural freeway setting requires a design exception.

At freeway cloverleaf ramp terminals, there may be instances where some form of raised median placed between the exit and entrance ramps may be appropriate to reduce the potential for crossover crashes. See [Figure 9-24](#) in [Chapter 9](#) for detail on ramp median treatments.

5.2.9.1 FREEWAY MEDIAN BARRIER WARRANT

For warranting median barrier on Interstate freeways and Non-Interstate freeways use the following:

1. Any open median 60 feet in width or less shall be closed with an appropriate barrier. The median width is measured between the inside fog lines of opposing directions of traffic.
2. For open medians wider than 60 feet and at specific site with history of median penetration, apply the historic evidence identifying median cross-over potential as outlined in Section 2.6 of the ODOT Highway Safety Program Guide, which is managed by the Traffic Engineering Services Unit.

For Non-Interstate freeway medians, the placement of barriers in open medians 60 feet or less is only required for 4R projects. 3R projects are not required to place barriers in non-Interstate freeway open medians 60 feet or less, although consideration of closing those remaining locations should be given.

There are five barrier systems appropriate for use in the medians of freeways in Oregon. They are listed below. The minimum median widths listed in [Table 5-1](#) are to be used as the minimum median width needed in order to use a specific barrier type. Standard median widths are covered in [Section 5.2.9](#). Refer to [Section 4.6](#) for concrete barrier guidance and AASHTO's Roadside Design Guide for barrier deflection.

Table 5-1: Median Barrier Systems

Barrier Type	Test Level	TL 3 Tested Deflection	Minimum Median Width	Comments
42-inch F-Shape Precast Concrete Barrier	4	30 inches (unanchored)	8'-4"	Anchored deflection estimated to be 0 - 6 inches. Requires asphalt pad for placement.
Modified Thrie-Beam for Medians	4	20 inches	8'-4"	Installed system approximately 42 inches wide
High Tension/ Low Maintenance Cable Barrier	3, 4	Variable 6 - 9 feet	30 feet	Only system that can be placed on a 1:6 slope. Easy to maintain. Consider using TL 4 if trucks are a known problem.
32-inch F-Shape Concrete Barrier	3	30 inches	8'-4"	
Metal Median Guardrail	3	24 inches	24 feet	

Median barrier should be installed on a transverse slope of 1:10 or flatter. In medians wider than 30 feet it is preferred to use cable barrier placed near the center of the median. If placed away from the center, ensure that there is enough room for deflection to the closer side. For help in determining how to install barrier in a variable median see Sections 5.6 and 6.6 of "AASHTO's Roadside Design Guide - 2011"

5.2.10 CLEAR ZONE

General information on clear zone is covered in [Chapter 4](#) - Cross Section Elements. Of specific importance for both rural and urban freeways is the safety slope located at the back of curb or from edge of travel lane. In order to provide a recommended ditch section, the 1:6 rock front slope and ditch section must be followed by a 1:4 back slope for a minimum of 10 feet. A variable back slope can then be used. This type of safety slope is also required for urban freeways with ditch sections or curb. Typically, an urban freeway has a curbed section that is followed by 2% slope for 4 feet. The 2% slope must then be followed by a 1:4 or flatter back safety slope for a minimum of 10 feet. The back slope adjacent to the 1:4 safety slope can then be varied. This urban treatment will meet the recommended ditch section requirements of the "Roadside Design Guide - 2011". These standards should also be followed when designing center medians. In a curbed median section a 4 foot (2%) slope shall be followed by the 1:4 back safety slope.

5.2.11 SAFETY REST AREAS

Safety rest areas are an important portion of the freeway system. A safety rest area's primary function is the reduction of crashes on the freeway by providing a safe off-the-road location for drivers to sleep, rest, change drivers, and check vehicle loads or minor vehicle problems. Rest areas also provide a location for state agencies and tourism groups to communicate with the motoring public, providing maps, possibly road and weather information, and other motorist services.

The design of rest areas will vary depending upon location and need. Some rest areas are quite large while other rest areas only serve a few vehicles and are more of a wayside than rest area. The Roadway Unit of Traffic-Roadway Section should be contacted concerning the design of rest areas.

Rest areas located on the freeway system are to be designed with exit and entrance ramps. The exit and entrance ramps should be designed in the same manner as interchanges. Because rest areas accommodate large numbers of trucks, the design should consider the use of exit and entrance ramps that better accommodate trucks. [Figure 9-12](#) in [Chapter 9](#) and [Figure J-26](#) in [Appendix J](#) provide deceleration guidelines when trucks are to be accommodated.

As mentioned above, rest areas have different functions. One of those functions is providing travel information at the rest areas. At times the rest area may be closed for a period of time. This has an impact on the travel information provider. In cases where the rest area requires

remodeling or repair, the designer should see that tourist information facilities are kept in service if possible or look at ways of minimizing the closure time.

5.2.12 EMERGENCY/TRUCK ESCAPE RAMPS

Rural highways are often located in steep terrain. In some sections, long continuous grades may be the only reasonable design option. Where long continuous down grades are present or being considered, the designer should investigate the need for emergency/truck escape ramps. Generally, truck escape ramps are only needed where long descending grades exist. Section 3.4.5 of AASHTO's "A Policy on Geometric Design of Streets and Highway - 2011", has additional design guidance on escape ramps.

5.2.13 TRUCK WEIGH STATIONS

On freight routes and other major highways, truck weigh stations may be necessary. The Motor Carrier Transportation Branch should be consulted when a weigh station is being impacted or considered. Appropriate acceleration and deceleration lanes are to be provided for truck weigh station locations. The station should also be set back from the highway to provide separation from high speed traffic and stopped trucks. Truck weigh stations may also be located at non-freeway locations. Due to location and type of facility, the design of non-freeway weigh stations will vary. For freeway and non-freeway weigh station design, contact the Roadway Engineering Unit of the Traffic-Roadway Section.

5.2.14 CHAIN-UP AND BRAKE CHECK AREAS

Chain-up areas are used to allow drivers of trucks or other vehicles to install and remove chains in areas where there is inclement weather. Chain-up areas are typically located at the base of a sustained grades and where there is a demonstrated need. Chain-up areas are typically located adjacent to the mainline, where the shoulder can be easily widened. Brake check areas are typically located just prior to long descending grades. The width of chain up and brake check areas should be at least 20 feet wide (including the existing shoulder width). Exit and entrance tapers for chain up and brake check areas should be 20:1 and 25:1 respectively. The length of chain-up and brake check areas will vary depending on the location and truck volumes.

**Table 5-2: ODOT 4R/New Freeway Design Standards Minimums
For New Construction and Reconstruction**

For All Facilities With Freeway Functional Classifications Including Non-Interstate

Design Feature	Terrain			
	Flat	Rolling	Mountain & Urban	
Design Speed (mph)	70	70	50 ¹	60
Lane Width ^{2,3} (ft.)	12	12	12	12
Degree of curvature (Max.)	3° 15'	3° 15'	8° 30'	5° 00'
Maximum Grade % ⁴	3	4	5	5
Stopping Sight Distances Desirable SSD ⁵ (ft)	730	730	425	570
Median Width (Min/Des) Four Lane (ft.) Six Lane (ft.)	18 / 76 26 / 76	18 / 76 26 / 76	18 / 76 26 / 76	18 / 76 26 / 76
Divided Lane Sections	See Figure 5-2 for details			
Shoulder Width ⁶ (ft.)	10	10	10	10
	(Inside Shoulder 6 feet on 4 lane highways) (Inside Shoulder 10 feet on 6 lane highways)			
Vertical Clearance (ft.) Non-Interstate Hwy. (ft.) Interstate Fwy. (ft.)	See Section 4.5.1	See Section 4.5.1	See Section 4.5.1	See Section 4.5.1
Number of Lanes	Determined by traffic analysis			

¹ A 50 mph design speed may only be used in very constrained urban corridors or in mountainous terrain, and the design speed must be consistent with the corridor and meet driver expectancy.

² Auxiliary lane width shall be 12 feet

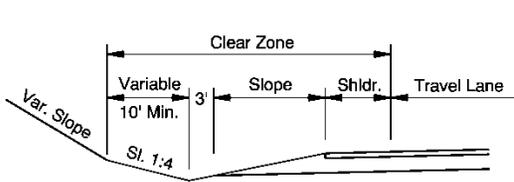
³ When determining four lane median width, consideration should be given to future six lane expansion

⁴ With the use of a design exception, grades may be 1% steeper than the values shown in urban areas that have right-of-way constraints or in mountainous terrain.

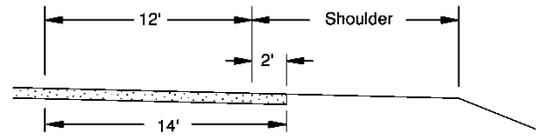
⁵ Refer to AASHTO's "A Policy on Geometric Design of Highways and Streets-2011", Chapter 3 for information on the effects of grades on stopping sight distance.

⁶ Auxiliary lane shoulder typical width is 10 feet, 8' minimum.

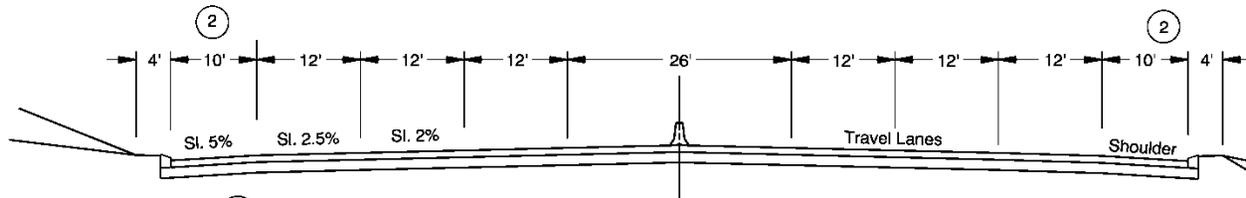
STANDARD URBAN FREEWAY SECTION



① Use 1:4 Safety Slope At Bottom Of 1:2 Slope



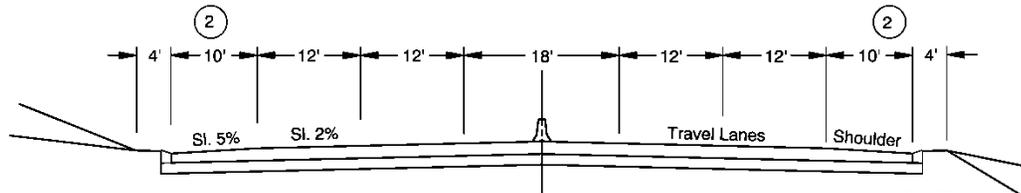
Where Concrete Pavement is used for Travel Lanes, Outside Lane shall be constructed 14' in width. The Shoulder Stripe is located 2' in from edge of concrete and total Shoulder Width is measured from stripe.



② 12' where trucks exceed 250 DDHV

See Table "A" For Slopes

SIX LANE SECTION



② 12' where trucks exceed 250 DDHV

See Table "A" For Slopes

FOUR LANE SECTION

TABLE "A"
FREEWAYS
SIDE SLOPES (CUT & FILL)

0 To 5'	Max 1:6
5' To 10'	1:4
10' To 15'	1:3
Over 15'	1:2 (See ①)

The above slopes are a guide. Flatter slopes to be used where additional cost is minor. In solid rock, slopes are to be determined by type of material and approved by the Design Engineer. Also check clear zone standards.

NOTES:

1. Shoulders adjacent to curbs and medians to be full depth surfacing.
2. Curbs on Freeways shall be mountable.
3. Acceleration and deceleration lanes to be 12' with shoulders reduced to 6'.
4. See Freeway Multiple-Lane Section for roadbed section without curb.

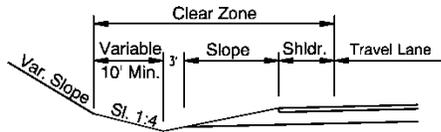
STATE OF OREGON
DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING UNIT

**STANDARD
URBAN FREEWAY SECTION**

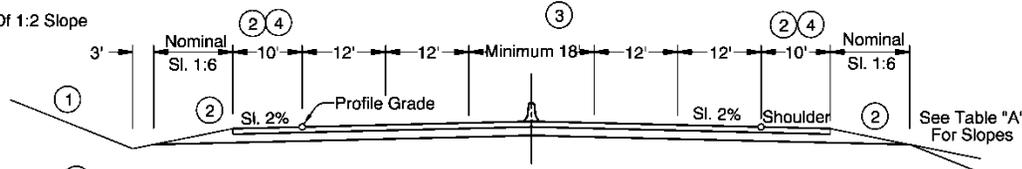
HIGHWAY DESIGN MANUAL

Figure 5-1: Standard Urban Freeway Section (Includes Non-Interstate Facilities)

STANDARD FREEWAY SECTION



① Use 1:4 Safety Slope At Bottom Of 1:2 Slope



② Where Roadside Barriers Are Utilized An Additional 2' Is To Be Paved And The Rock Slope Is To Be Steepened As Necessary. (See Standard Drg. Nos. RD420, RD425, or RD430)

③ See Fig. 5-1, "Standard Urban Freeway Section"

④ 12' where trucks exceed 250 DDHV

TABLE "A"
FREEWAYS
SIDE SLOPES (CUT & FILL)

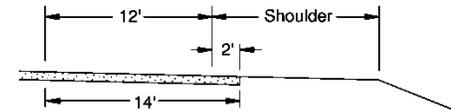
0 To 5'	Max 1:6
5' To 10'	1:4
10' To 15'	1:3
Over 15'	1:2 (See ①)

The above slopes are a guide. Flatter slopes to be used where additional cost is minor. In solid rock, slopes are to be determined by type of material and approved by the Design Engineer. Also check clear zone standards.

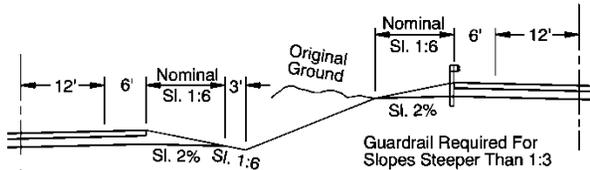
MULTIPLE - LANE SECTION

NOTES:

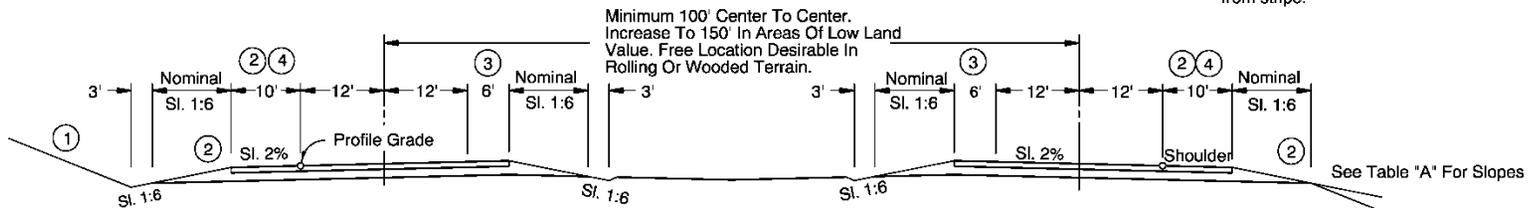
- Acceleration And Deceleration Lanes To Be 12' With Shoulder Reduced To 6' Except On Freeway To Freeway Connections, Use Full Shoulders.
- Median Widths Shown Hereon Are Desirable Minimums In Flat Terrain. Narrower Widths Or Combinations May Be Used In Urban Areas And Rugged Terrain On Approval Of The State Traffic-Roadway Engineer.



Where Concrete Pavement is used for Travel Lanes, Outside Lane shall be constructed 14' in width. The Shoulder Stripe is located 2' in from edge of concrete and total Shoulder Width is measured from stripe.



DIVIDED - LANE SECTION SEPARATED GRADES



② Where Roadside Barriers Are Utilized An Additional 2' Is To Be Paved And The Rock Slope Is To Be Steepened As Necessary. (See Standard Drg. Nos. RD420, RD425, or RD430)

Normal Median Slope 1:20. May Be Varied To Maximum 1:10 Where Required For Longitudinal Drainage.

③ Use 10' On 3 Lanes (Or More) Each Direction

④ 12' where trucks exceed 250 DDHV

DIVIDED - LANE SECTION

Figure 5-2: Standard Freeway Section (Includes Non-Interstate Facilities)

5.3 ODOT 3R FREEWAY DESIGN STANDARDS

When a project on the freeway system has been classified as 3R, the standards outlined below apply. The development of a freeway 3R project should also be responsive to the considerations given in [Section 5.2](#) concerning purpose, applicability, scope, determination, and design process. The standards for those specific listed elements are based on the 2005 AASHTO publication, “A Policy on Design Standards-Interstate System”, which provides guidelines for work on the Interstate system. The following standards are considered as allowable minimums. For those design elements not specifically addressed below, the guidelines in AASHTO’s *A Policy on Geometric Design of Streets and Highways - 2011* are to be followed. 3R projects that include specific horizontal and vertical curve corrections are to use ODOT 4R standards for those curve correction design elements. In addition to these standards, Interstate Maintenance Design Features in [Table 5-4](#) are to be incorporated into all interstate freeway 3R projects. The “Have To” list is the recommended minimum treatment for the listed project elements. The “Like To” list includes treatments for elements which should be considered when economically feasible, i.e. minimal extra cost, or funds available from sources other than the Preservation Program.

Technical Resources have been identified for a number of the project elements. These resources should be utilized by the Project Team to aid in determining if a “Like To” measure is warranted, cost-effective and fundable or if a design exception should be sought to do less than the “Have To” requirements. Design exceptions should be identified as soon as possible (typically during project scoping) and the appropriate design exception request officially submitted for approval as soon as all pertinent information can be determined and analyzed. Design exceptions are covered in [Chapter 14](#).

5.3.1 DESIGN SPEED

The design speed for freeway 3R projects will generally be the posted speed, but consideration of context, environment and existing features resulting in the selection of other than the posted speed as the design speed should be given. See [Section 2.5](#) for additional information on design speed and design speed selection. The intent of 3R project is to preserve the existing system by resurfacing or rehabilitating the roadway, extend the service life of the facility, and consider safety enhancements. General federal guidance notes that the geometric design should be consistent with speeds implied by the driver by the posted or regulatory speed. With the design speed being equal to the posted speed, drivers will be able to operate at the posted speed without exceeding the safe design speed of the facility. See [Chapter 2](#) for additional information on design speed selection.

5.3.2 SIGHT DISTANCE

Stopping Sight distance shall be those values established in AASHTO's "A Policy on Geometric Design of Streets and Highway - 2011" for the selected design speed. See [Section 3.2](#) for sight distance information.

5.3.3 CURVATURE AND SUPERELEVATION

Horizontal alignment, superelvation, and superelevation transition shall meet the minimum standards outlined in AASHTO's "A Policy on Geometric Design of Streets and Highways – 2011". Existing non-spiraled alignments are allowed as long as AASTHO transition design control requirements (tangent-to-curve transition) are met. As previously discussed [Section 5.2](#), ODOT 4R standards are to be used for horizontal and vertical curve corrections.

5.3.4 LANE WIDTH

All traffic lanes for are 3R freeway projects shall be 12' wide. AASHTO standards for lane width may be used on Local Agency jurisdiction roads.

5.3.5 SHOULDERS

On the left side of traffic on a four lane section, the standard shoulder width is 4 feet. On six or more lane sections a 10 foot paved width shall be provided.

The designer should be aware of snow zone locations where there is a shoulder break and an overlay is being placed. There is potential for pavement removal by the snow plows cutting into the pavement in the shoulder break areas. The designer should work with the Project Team to discuss the need for additional leveling quantities to bring the shoulder slope up to match the existing slope of the travel lanes.

5.3.6 MEDIANS

Medians in rural areas having level or rolling topography shall be at least 36 feet wide. Medians in urban and mountainous areas shall be at least 10 feet wide. Consideration should be given to decking median openings between parallel bridges when the opening is less than 30 feet wide. Due to terrain constraints many of the rural freeways were originally constructed with an urban median width of 8 to 10 feet. For those locations in rural and urban areas that have an existing median width of 8 to 10 feet, a design exception will not be required.

5.3.7 GRADES

5.3.7.1 MAXIMUM GRADES

Grade shall correlate with [Table 5-3](#) shown following:

Table 5-3: Maximum Gradient

Type of Terrain	Design Speed (mph)				
	50	55	60	65	70
	Grades (%)				
Level	4	4	3	3	3
Rolling	5	5	4	4	4
Mountainous	6	6	6	5	5

Grades 1% steeper than the value shown may be used for extreme cases in urban areas where development precludes the use of flatter grades and for one way downgrades, except in mountainous terrain.

5.3.8 VERTICAL CLEARANCE

The 3R vertical clearance for freeways is to comply with the overall system management goal to maintain current system mobility and not lose any effective usage of the system during preservation activities. 3R freeway projects shall have:

1. No reduction in existing vertical height clearance below the Minimum Vertical Clearance standards outlined in [Section 4.5.1](#). Reduction in current vertical clearance which results in a vertical clearance at or above the minimum vertical clearance requires notification of Motor Carrier Transportation Division (MCTD).
2. No reduction in vertical clearance if the existing vertical height clearance is below the Minimum Vertical Clearance standards outlined in [Section 4.5.1](#). Consultation with MCTD is required.

3R projects that do not meet the vertical clearance standards will need to apply for a design exception and will require consultation with MCTD. As with the 4R vertical clearance requirements, communication and coordination with MCTD and stakeholders is critical to ensure an understanding of the system requirements. Vertical clearance for pedestrian overpasses shall follow the standards above.

The vertical clearance to sign trusses and cantilever sign structures shall be a minimum of 18

feet. The vertical clearance from the deck to the cross bracing on through truss structures shall also be a minimum of 18 feet. For vertical clearance requirements on Local Agency jurisdiction roadways, see [Section 4.5.1.1](#)

5.3.9 STRUCTURE CROSS SECTION

The width of all bridges, including grade separation structures, measured between rails, parapets, or barriers shall equal the full paved width of the approach roadways. The approach roadway includes the paved width of usable shoulders. **Long bridges, defined as bridges having an overall length of 200 feet or more**, may have a lesser width. Such bridges shall be analyzed individually. On long bridges, offsets to parapet, rail, or barrier shall be at least 3.5 feet measured from the edge of the nearest traffic lane on both the left and the right sides.

Narrow structures should be considered for widening to full shoulder on major rehabilitation projects; in particular, on those projects where the design life after rehabilitation is expected to be 20 to 30 years. Each structure should be looked at individually to determine whether widening is appropriate. For example, it may not be appropriate to widen a narrow, long structure or a structure that is 2 feet short of being able to accommodate full shoulders.

5.3.10 BRIDGES TO REMAIN IN PLACE

Mainline bridges on the Interstate system may remain in place if, as a minimum, they meet the following values. The bridge cross section consists of 12 foot lanes, 10 foot shoulder on the right, and a 3.5 foot shoulder on the left. For long bridges, the offset to the face of parapet or bridge rail on both the left and the right side is 3.5 feet measured from the edge of the nearest traveled lane. Bridge railing shall meet or be upgraded to current standards.

5.3.11 TUNNELS

The vertical clearance for tunnels shall be at least 16 feet. Any reduction in vertical clearance for tunnels shall require a design exception and consultation with MCTD. Maintaining the existing vertical clearance for tunnels on all 3R Freeway projects requires notification of MCTD. The desirable width for tunnels is at least 44 feet. This width consists of two 12 foot lanes, a 10 foot right shoulder, a 5 foot left shoulder, and a 2.5 foot safety walk on each side. However, because of the high cost, a reduced tunnel width can be accepted, but it must be at least 30 feet wide, including at least a 1.5 foot safety walk on both sides.

Table 5-4: Interstate Maintenance Design Features

Project Element	Corrective Measure		Technical Resource
	"Have To"	"Like To"	
Guardrail	<ul style="list-style-type: none"> All terminal ends shall meet NCHRP Report 230 criteria. Transitions shall be provided at bridge connections (as per PDLT). All non-standard (not meeting NCHRP Report 230) guardrail shall be replaced to current standards. All guardrail shall be replaced or adjusted if the minimum 18.5 inch height to the center bolt doesn't exist. Removal of guardrail and replacement with concrete barrier where minimum offsets are not met for bridge column protection. 		Roadway Section
Concrete Barrier	<ul style="list-style-type: none"> All tongue and groove concrete barrier without earth support behind the barrier shall be replaced All concrete barrier shall meet NCHRP Report 230 criteria or be replaced. 		Roadway Section
Concrete Barrier Height	<ul style="list-style-type: none"> All barrier in which the proposed finish grade exceeds the 3" vertical lip (reveal) of the barrier shall be replaced or reset. All median barrier in which the proposed finish grade exceeds the 3" vertical lip (reveal) shall be replaced with the current acceptable barrier. All shoulder barrier in which the proposed finish grade exceeds the 3" vertical lip (reveal) shall be replaced with the current acceptable barrier if there are severe consequences at specific locations associated with penetration of the barrier by a heavy vehicle. 		Roadway Section

Project Element	Corrective Measure		Technical Resource
	"Have To"	"Like To"	
Interchange Ramps	Ramp surfacing to the ramp termini.		
Roadside Obstacles	<ul style="list-style-type: none"> • Cost effective removal or shielding of rock outcroppings, trees, concrete structures higher than 4", utility poles, non-breakaway sign and light poles and other potential hazards within the clear zone. 		Roadway Section
Bridges	<ul style="list-style-type: none"> • Refer to IM-Bridge Funding (rev 5-30-01) document. 	Bridge painting, widening, deck replacement, scour protection and seismic retrofit.	Bridge Section
Delineators	<ul style="list-style-type: none"> • Install missing delineators. • Replace damaged delineators. 		
Fencing	<ul style="list-style-type: none"> • Replace damaged or rotting fencing. 	Fill in incomplete sections	
Attenuators	<ul style="list-style-type: none"> • Replace damaged or non-standard attenuators. • Adjust attenuators as needed. • Install attenuators if warranted. 		
Rumble Strips	<ul style="list-style-type: none"> • Install on rural portions as per ODOT Rumble Strip Standards and Policies. 		
Pavement Life			Pavement Unit
Striping	<ul style="list-style-type: none"> • High volume, Urban areas would have all durable lines • Mountainous sections with lots of curves would have all durable lines • Flat tangent sections will have durable skip lines only 		Region Traffic
Drainage			Fish Program Manager & Hydraulics Unit
Signal Loops			Traffic Section

5.4 ODOT 1R FREEWAY DESIGN PROJECTS

5.4.1 GENERAL

The ODOT 1-R project category has direct correlation to the ODOT Practical Design Policy. The primary intent of a 1R project is to preserve the existing pavement before it deteriorates to a condition where extensive reconstruction would be necessary in order to rehabilitate the roadway section. Projects under the 1R category consist primarily of paving the existing roadway surface and generally deferring other improvements to future 4R, 3R, specific safety, or single function projects. When project programming and funding are being determined, the ODOT Practical Design Policy can be employed in deciding if a particular preservation project should be in the 1R category or if there is enough value being added to the highway system or corridor for the additional cost if the project is placed in the 3R category that would trigger additional improvements. Safety considerations outlined in the 1R guidance should also be part of the process in determining the appropriateness of a project being selected for 1R.

The ODOT 1R project standard will apply to Preservation projects that are limited to a single lift non-structural overlay or inlay. Many of the safety items that have traditionally been addressed in 3R projects can be more effectively dealt with in a statewide strategic program. For example, establishing a prioritized program for upgrading guardrail to current standards along a highway corridor instead of upgrading between specific project limits. A program of this nature has the ability to better utilize funding to target higher need locations for safety item improvements rather than only making safety item improvements based on paving projects. However, the replacement of safety items such as guardrail, guardrail terminals, concrete barrier, impact attenuators, and signs may be included in the 1R project category when necessary if funding other than Preservation funds are used and the added work will not delay the scheduled bid date. Any safety features that are impacted by the proposed resurfacing must be adjusted or replaced by the 1R project. Existing safety features cannot be degraded to a level below the existing condition as a result of the paving project.

5.4.2 RESURFACING (1R) PROJECT STANDARDS

These are projects that extend the pavement life of existing highways. Missing ADA ramps must be installed and ADA ramps that do not meet the 1991 standard must be upgraded to the current standard on all 1R projects except chip seals. Other safety enhancements are not required to be included; however, safety features may be added to 1R projects where other (non-preservation) funding is available. Any existing safety features that are impacted by the proposed resurfacing must be adjusted or replaced, thus necessitating some work in addition to paving. Also, since 1R projects will generally not address safety, pedestrian and/or bicycle concerns, in no case shall safety, pedestrian and/or bicycle conditions (ramp terminals) be

degraded. Also, on facilities where the 1R standard is applied, it is intended that all safety features be inventoried and the applicable safety feature information is added to designated safety feature databases, and that the safety feature is addressed based on system priorities in stand alone projects or other STIP projects. When scoping 1R projects, the safety feature databases are used to identify opportunities to add safety enhancements with other (non-preservation) funding. Following is an outline for the ODOT Resurfacing 1R project standard. While the criteria primarily relate to the paving treatment and the ability to pave without degrading existing conditions, there may be corridors where analysis of the crash history indicates that a full 3R project is warranted. Therefore projects are screened for 1R eligibility from a safety perspective as well.

5.4.2.1 CRITERIA TO APPLY THE 1R STANDARD

A. 1R PROJECT REQUIREMENTS

1. A paving project is initially designated 1R based on the appropriate paving treatment – a single lift overlay or inlay. (There is no formal requirement for pavement design life for an individual project; however, since the 1R treatment is location specific, it is expected that an 8 year pavement life will be the goal of the program).
 - Pavement Services is the final authority regarding the pavement design.
2. Where less than approximately 5% of a project (based on lane miles paved) includes more than a single lift non-structural overlay or inlay, the project may be designated 1R.
3. Where up to approximately 25% of a project (based on lane miles paved) includes more than a single lift non-structural overlay or inlay, the project may be designated 1R; however, this requires the approval of a design exception.
4. Where more than approximately 25% of a project (based on lane miles paved) includes more than a single lift non-structural overlay or inlay, the project must be designated 3R
 - As an exception to this is rule, a grind and inlay plus an overlay may also be considered for development under the 1R standard; however, this would be uncommon and requires the approval of a design exception.
5. Where the appropriate course of action is not clear based on the percentages noted above, include Technical Services Roadway staff in the discussion.
6. The safety assessment may indicate that a paving project is best developed under the 3R standard (see below).
7. Chip seals are 1R projects and subject to the requirements of the 1R standard, including the roadside inventory. Chip seals do not require ADA work.

8. The 1R Pavements and Region Roadway Managers Approval Form must be completed, signed, and submitted to Technical Services Roadway staff prior to the completion of project scoping.
 - a. Pavement Services Unit will be the technical resource for screening projects for 1R eligibility from a pavement design perspective (single lift treatment); identifying treatments or providing pavement design recommendations and reports.
 - b. The Region Roadway Manager will be responsible for screening projects for 1R eligibility from a safety features perspective.
9. Work does not degrade safety or bicycle/pedestrian facilities
10. Work does not reduce curb exposure below 4 inches.
11. Work does not result in a cross-slope in excess of 8%.
12. Work does not adversely affect drainage.
13. Work does not result in an algebraic difference greater than 11% at ADA ramps.
14. 1R project work typically does not change the existing striping. Modifying existing striping requires a design exception and shall consider ORS 366.215 impact.
15. All projects that include resurfacing (except for chip seals) shall install curb ramps where applicable.
16. All projects that include resurfacing (except for chip seals) shall bring curb ramps up to current standards; except, if a ramp meets the 1991 standard as a minimum, upgrading the ramp may be deferred.
17. Ramps that have been rendered nonfunctional over time from excessive settlement, degradation, or by subsequent overlays must be upgraded to current standards.
18. The following items of work are required in addition to paving where applicable.
 - a. Replacement of striping and delineation.
 - b. Gravel shoulders will match the paved surface elevation.
 - c. Replacement of signal loops if impacted
 - d. Replacement of rumble strips if impacted.
 - e. Adjust existing features that are affected by resurfacing
 - Safety features (Guardrail, Barrier, etc.)
 - Monuments
 - Catch basins

- Manholes

19. 1R projects in urban areas also require coordination with local projects with separate funding. For example, it is undesirable to finish paving and then shortly thereafter cut into the pavement for a culvert, sewage, drainage, utility or other type of project.
20. The 1R standard does not require addressing non-related substandard features of the roadway with a design exception request. However, the steps and processes required for the Vertical Clearance and Traffic Mobility Standards still apply and must still be followed (See [Section 4.5](#)).
21. All 1R projects will complete a Roadside Inventory to ensure that all substandard safety features are documented and asset management databases appropriately updated.

B. SCOPING REQUIREMENTS

In order to ensure the intent of the program is met in addressing pavement and safety needs, adequate advance information is needed to assure adequate statewide decisions are made.

1. **FACS-STIP tool** - Download existing roadside inventory at time of scoping
 - a. Identify pre-230 elements. Funds should be requested from the 1R Safety Features Upgrade Program or other funding sources as early in the process as possible. Replacement of pre-230 elements should be added to the 1R project if additional funds are available.
 - b. Identify any corners that must be upgraded for ADA
 - c. Drive through project and note any obvious safety issues not included in the existing inventory
2. **Safety Assessment**
 - a. The Safety Assessment is a formal review process established in each region to ensure the identification of any safety concerns where a 1R project is planned. It provides a basis for the Region Roadway Manager to sign the Roadway Managers Approval Form indicating it is appropriate to apply the 1R standard from a safety standpoint.
 - b. The Safety Assessment serves two key purposes: First, it needs to ensure that the safety issues are not best addressed through a 3R project rather than a 1R project; that analysis will review whether a crash hotspot exists in the project limits (e.g. a SPIS site) and whether the crash frequency and severity is such that a 3R project should be considered. Second, if the decision is made that the safety issues are not significant, it is important that the analysis examine safety treatments that avoid reducing safety and examine low cost safety treatments

that are practical considering the roadway and roadside character with these locations and treatments expected to come from the systematic safety plans.

- c. The Safety Assessment includes a review of the Department's Roadway Departure Safety Plan, Intersection Safety Plan, forthcoming Pedestrian/Bicycle Safety Plan, and any other systematic safety plan that is developed. The Safety Assessment includes a list of crash hotspots. The safety assessment identifies recommended countermeasures that could be incorporated into the 1R project.
- d. The Safety Assessment identifies funding sources (e.g. Safety funds, Maintenance funds) for additional work and proposes a schedule for safety work considering
 - The extent of the safety work proposed, its staging, and traffic control
 - Contractor and State forces availability
 - The opportunities for bundling like safety work in larger contracts
 - Recommended countermeasures should be added to the 1R project if additional funds are available.
- e. If systemic plans are not current a more detailed analysis will be needed and such a crash history review should cover 3 to 5 years and will include at a minimum:
 - The number and type of crashes
 - The crash severity
 - The crash rate and comparison to the average rate for type of facility
 - Any SPIS sites and ranking
 - The crash analysis should identify crash patterns, contributing factors, and outline potential solutions and remediation
- f. If systemic plans are not current a more detailed countermeasure analysis process will need to be conducted and should consider:
 - The significance of the existing crash pattern
 - The possibility for changes in future traffic and roadway characteristics
- g. Where critical safety issues need to be addressed and other funding is not available, it may be most appropriate to designate the paving project 3R. If critical safety needs are identified and the project is still to be progressed as a 1R project, the safety assessment must directly state the Region Traffic and Safety's support for that approach.
- h. The Region Traffic Engineer signs the safety assessment and provides a copy to the Region Roadway Manager as supporting documentation for signing the 1R Roadway Manager's Approval Form. Technical Services Roadway Staff is also

provided a copy and the Safety Assessment is marked complete on the 1R Tracking Spreadsheet.

C. PROJECT INITIATION REQUIREMENTS

At project initiation, the 1R Roadside Inventory must be completed to verify and update the data in the FAC-STIP tool (see [section 11.1.5](#)). The Safety Assessment must be reviewed and updated if necessary to ensure it is appropriate to continue to develop the project under the 1R Standard.

5.5 ODOT SINGLE FUNCTION (SF) FREEWAY PROJECTS

5.5.1 GENERAL

The specific design standards used for a Single Function Standard project will generally be the same design standards used for a 4R/New Construction project. The difference is that the scope of work is very limited on SF projects, so the SF Standard does not require addressing non-related non-standard features of the roadway. For example, if a guardrail upgrade qualifies as a Single Function project, it will not be necessary to address other non-standard features on the roadway, such as lane and shoulder width, horizontal and vertical alignment, etc.

5.5.2 APPLICATION OF SINGLE FUNCTION (SF) PROJECT STANDARDS

Single Function projects include projects that are within the right of way but do not permanently impact the travel lanes or shoulders of the highway. Generally, projects that only include work outside the edge of pavement will qualify for the SF standard. The SF standard can also be applied to certain maintenance projects such as re-striping projects as long as the final configuration of the travel lanes and shoulders would not be changed in any way. These projects address a specific need. The scope of work is limited to features that are directly impacted as a result of addressing the specific need. For example, an urban freeway overlay project may impact drainage inlet adjustment. In no case shall safety, operations, pedestrian and/or bicycle conditions (ramp terminals) be degraded as a result of a SF project. Each feature constructed in a SF project must be built to the applicable standard for new construction. The SF Standard does not apply to resurfacing projects.

5.6 INTERCHANGE SPACING - ACCESS MANAGEMENT

Access management is one of the most valuable tools ODOT has in preserving the existing transportation system and improving safety. It allows balancing between land access and preserving the movement of traffic in a safe and efficient manner. Expanding growth and needs place heavy demands on the state highway system. The Oregon Highway Plan developed a system to deal with this high access demand while preserving the transportation system.

Interchanges are expensive to build and expensive to upgrade. Therefore, it is critical that they operate as efficiently as possible. Interchange spacing and access control should be an integral part of interchange planning and design. With the high number of vehicles and demand in an urban area, the interchange spacing for urban freeways is less than the spacing for rural interchanges. Minimum interchange spacing for urban areas is 3 miles and for rural areas it is 6 miles (See [Table 5-5](#)). The spacing is generally measured from crossroad to crossroad. See OAR 734, Division 51 for guidance on other Interstate and Non-Interstate freeway interchange spacing.

Existing interchanges that do not meet current standards will not require a design exception, although, moving towards the access managements spacing standards should always be a project consideration. Consideration of design exceptions for interchanges should always include coordination with the Region Access Management Engineer (RAME). This section does not change the requirements of mainline spacing standards and deviations outlined in OAR 734, Division 51. Other access management spacing standards such as the distance between the ramp terminal and the first approach or first full intersection, and the distance between start and end of tapers of adjacent interchanges need to comply with OAR 734, Division 51 spacing standards.

Table 5-5: Interchange Spacing

Access Management Classification	Area	Interchange Spacing
Interstate and Non-Interstate Freeways	Urban	3 miles
	Rural	6 miles

NOTES:

- A design exception is required if interchange spacing standards are not met for new interchanges.
- Distance is measured from crossroad to crossroad

5.6.1 INTERCHANGE AREA ACCESS SPACING

Access spacing in an interchange area can be as important as the interchange spacing itself. Closely spaced accesses adjacent to the ramp terminal can potentially back traffic onto the freeway, interrupt the flow of traffic, and impact the smooth operation of the adjoining facility. Access spacing standards have been developed that are dependent on the type of area adjacent to the freeway interchange. Urban areas have two types of area, fully developed and urban. A fully developed interchange management area occurs when 85 percent or more of the parcels along the developable frontage are developed at urban densities and many have driveways connecting to the crossroad. Fully developed areas are also characterized by slow speeds. Urban interchange management areas are areas within an urban growth boundary that are not fully developed. OAR 734, Division 51 and the OHP provide information and spacing requirements for interchanges and interchange management areas at urban and rural locations.

5.6.2 INTERCHANGE AREA MANAGEMENT PLANS (IAMPS)

An Interchange Area Management Plan (IAMP) is an ODOT long term (20+ years) transportation facility plan that focuses on solutions that manage transportation and land use decisions over a period of time at an interchange. An IAMP is a valuable tool in protecting the long term function and operations of an interchange. IAMPs involve many local and state stakeholders. The purpose of an IAMP includes the following objectives:

- Protect the state and local investment in major facilities;
- Establish the desired function of interchanges;
- Protect the function of interchanges by maximizing the capacity of the interchanges for safe movement from the mainline highway facility;
- Balance the need for efficient interstate and state travel with local use;
- Preserve and improve safety of existing interchanges;
- Provide safe and efficient operation between connecting roadways;
- Adequately protect interchanges from unintended and unexpected development while accommodating planned community development;
- Manage the existing interchange capacity and new capacity provided through improved interchange improvements;
- Establish how future land use and transportation decisions will be coordinated in interchange areas between ODOT and the local governments;
- Minimize impacts to farm and forest lands and other resource lands around rural interchanges in accordance with adopted Statewide Planning Goals;

The ODOT Interchange Area Management Plan Guidelines provide additional information on IAMPs and is maintained by the Planning Unit of ODOT's Transportation and Development Division.