

CHAPTER 5 CROSS SECTION ELEMENTS

5.1 PAVEMENT TYPICAL SECTIONS

Roadway typical sections are developed for each different roadway type within the project. Before the design process begins, the actual typical section widths, slopes, and other geometric controls to be used will be determined.

5.1.1 Pavement Type Determination & Structural Design

[EDSM II.2.1.11](#) and [EDSM II.2.1.12](#) discuss the steps required to determine the pavement type and structural design required for a project. The project manager requests that the Pavement and Geotechnical Design Section prepare the pavement structural design. Additional information concerning asphalt concrete types is provided in the [Asphalt Pavement Design Policy](#). Alternate pavement types may be required based on the size of the project.

5.1.2 Subgrade Considerations

As part of the pavement structural design, the depth and type of treatment to the subgrade directly below the base course will usually be as recommended by the Pavement and Geotechnical Design Section or as requested by the District during the plan-in-hand inspection. Also, the condition of the existing ground should be observed during the plan-in-hand inspection to determine if undercutting, mucking, lime treatment, or some other type of treatment will be required prior to placing the new embankment. If treatment is required, soil borings will provide information on the depth of treatment that is necessary.

5.1.3 Drainage of Pavement Section

The presence of water under and within the roadway pavement section is extremely detrimental to the structural capacity and life expectancy of the pavement. [EDSM II.2.1.8](#) provides guidance on the usage of drainage layers and shoulder drainage systems that help remove trapped water. In addition to the EDSM, [shoulder underdrain details](#) should be referred to on the usage of shoulder drainage systems.

Another method that may be used to remove water within the roadway pavement section is daylighting the base course ([Figure 5-01](#)).

To help prevent water from entering the pavement structure from beneath, the desirable depth that roadside ditches should be set below the lowest part of the base course is 2 ft. Refer to the [Hydraulics Manual](#) for guidance on establishing the proposed roadway grade.

5.2 TYPICAL SECTION GEOMETRICS

As noted in Chapter 2, Section 2.1.1, DOTD shall follow AASHTO guidelines in the development of design guidelines. DOTD has produced minimum design guidelines for freeways, arterials, collectors, and local roads that meet these requirements. These guidelines provide preferred and acceptable values to be used for both urban and rural roadways at various design speeds and traffic volumes. Shown on the typical sections are the values for lane widths, shoulder widths, cross slopes, side slopes, horizontal clearances (clear zones/lateral offset), right-of-way widths, superelevation, etc. Design values chosen for the typical section will be documented in the design report.

It should be noted that when a project is proposed to be located along an existing roadway, the geometric design elements for the project must often transition to match the existing roadway conditions at either end of the project. This situation is common on spot improvements, such as a bridge replacement, intersection improvement project, or when widening from a two-lane roadway to multi-lane roadway. These relatively short, transitional areas require special design consideration since both the horizontal and vertical elements of the roadway must transition from the existing condition to the proposed improvements. Refer to the guidance provided in Chapter 4 of this manual to determine appropriate transition lengths. Recognizing that projects have well-defined physical and financial limits, and due to the impracticality of improving all geometric design elements within these short transitional areas, design exceptions are not to be required for those transitional geometric design elements that do not meet the requirements of the minimum design guidelines. These transitional areas of the project should be clearly labeled in the plan set. At a minimum, these areas are to be dimensioned on the appropriate plan & profile sheet(s) and properly noted on the corresponding typical section sheet(s).

5.2.1 Travel Lanes

Travel lane widths are as noted in the [DOTD Minimum Design Guidelines](#).

On higher-class roadways, the pavement section may be extended beyond the edge of travel lane to provide additional structural stability at the edge of the travel lane. This is typically done when the pavement structure of the shoulder is less than that of the travel lane. The pavement width extension is primarily done on four-lane divided highways and it is accomplished by extending the pavement section for the outside lane 3 ft into the shoulder ([Figure 5-02](#)). The Pavement and Geotechnical Design Section should be consulted to determine if the pavement width extension is warranted.

The typical normal crown pavement cross slope adopted by DOTD for travel lanes in a tangent section is 2.5% ([Figure 5-03a](#)).

5.2.2 Shoulders

The typical shoulder cross-slope adopted by DOTD for two-lane, two-way tangent roadways is 5% ([Figure 5-03a](#)). This can vary depending on project specifics. For

instance, projects with a shoulder width of 4 ft or less should have a shoulder cross slope that matches that of the roadway cross slope. On four-lane divided highways, the cross slope on the median shoulder in tangent sections is controlled by the cross-over crown restrictions in Section 5.3, thus restricting the value to 4.5% ([Figure 5-03b](#)). Similarly, the outside shoulder cross slopes (the convex side of the curve) on superelevated roadways will be controlled by the cross-over crown restrictions. As a result, the slope will depend on the superelevation rate ([Figure 5-04](#)). When superelevation rates are equal to or less than the shoulder cross slope found in the normal crown section, the inside shoulder will maintain the cross slope found in the normal crown section through the superelevated section. When superelevation rates are greater than the shoulder cross slope found in the normal crown section, the inside shoulder cross slope will be the same as the superelevation rate. For additional discussion of superelevation, see Chapter 4, Section 4.6.

On most rural highways, shoulder rumble strips are used to alert motorists that they have strayed from the travel lane. For guidance on the use of rumble strips, refer to the [rumble strip details](#).

5.2.3 Clear Zone Requirements

A roadside recovery area, or clear zone, should be provided beyond the edge of travel lane and should be free of any non-traversable or fixed objects. This requirement is known as the clear roadside concept. The clear zone should be as wide as practical to allow the majority of vehicles that leave the roadway to recover. As detailed in the [DOTD Minimum Design Guidelines](#), clear zone requirements are applicable to all freeways and rural roadways. Refer to the AASHTO Roadside Design Guide for further information regarding clear zones.

If signs, lighting, traffic signal supports and/or other appurtenances are required, breakaway posts shall be considered. However, due to their size, weight, and location, breakaway traffic signal supports may pose more hazards to the road users than an impact and may not be an appropriate application. For further information regarding traffic signal supports located in the clear zone, refer to the [Rigid Traffic Signal Supports within the Clear Zone](#) memorandum.

Guardrail or other safety measures may be required in certain locations to shield formidable obstacles that may be present. Safety requirements at bridge ends are one example of these locations and are further discussed in Section 5.8. The AASHTO Roadside Design Guide and the [DOTD Minimum Design Guidelines](#) provide guidance on lateral offset requirements and detailed guidance on the selection, location, and design of traffic barriers.

5.2.4 Roadside Slopes

[DOTD Minimum Design Guidelines](#) specify preferred and acceptable side slope values that may be used on a project. The designer should strive to provide the preferred slope, if applicable, but slopes as steep as the acceptable are permitted. Use of side slopes steeper than the acceptable value will require design exceptions.

When 6:1 fore slopes are used on roadways where the fill height exceeds 8 ft, the 6:1 fore slope is typically carried through the clear zone only. From that point, a 4:1 fore slope is used until it intercepts the existing ground or proposed ditch grade. This will help to minimize embankment and right-of-way requirements.

Side slopes of lateral ditches and ditch blocks along with embankment slopes for side roads and driveways within the right-of-way limits should provide the same reasonable opportunity for vehicle recovery as the main roadway fore slopes. Therefore, side slopes of these sections shall not be steeper than the fore slopes of the main roadway. 6:1 maximum slopes are desirable for these sections and 10:1 slopes are preferred for median ditch blocks on multi-lane highways.

5.3 PAVEMENT CROWNS

1. One-way Tangent Crown: A one-way tangent crown slopes downward from left to right as viewed by the driver ([Figure 5-05](#)). It is used for all roadways providing one-way traffic, except as noted in the following paragraphs.
2. Two-way Tangent Crown: A two-way tangent crown has a high point in the middle of the roadway and slopes downward toward both edges. It is used for all roadways providing two-way traffic ([Figure 5-06](#)). For undivided multi-lane highways, the pavement is sloped downward and away from the median centerline.
3. Two-way Tangent Crown Converted to One-way Use: When an existing roadway with a two-way tangent crown is converted from two-way to one-way use, the existing crown shape can remain.
4. Cross-over Crown Break: The cross-over crown break between main lanes is limited to an algebraic difference of 5%. This applies at the break point of a two-way tangent crown. The algebraic difference between the main roadway cross slope and shoulder cross slope should not exceed 7%.

The maximum 5% break also applies to the difference between the roadway cross slope and an intersecting roadway grade where the intersecting road is at a stop condition. Where the intersection will be signalized or may be signalized in the future, the intersection should be designed using a maximum break of 2.5%. Additional discussion of intersection design can be found in Chapter 6 of this manual.

5.4 VERTICAL CLEARANCE

5.4.1 Roadway

Vertical clearances shown in the [DOTD Minimum Design Guidelines](#) apply to a structure over a roadway. The point on the roadway where the critical clearance occurs will vary, depending on the cross slope and longitudinal grade of both the under-passing and over-passing roadways or other structures.

When plans are prepared for overpass structures, the Bridge Design Section is responsible for ensuring that minimum clearances are provided. For reconstruction beneath an existing bridge that is to remain, the designer is responsible for ensuring that minimum clearances are provided.

5.4.2 Railroads

See the [Bridge Design & Evaluation Manual](#) for guidance on railroad vertical clearance.

5.4.3 Waterways

The Bridge Design Section determines the vertical clearance required over waterways. This clearance is dependent on the type of navigation the waterway carries. Others involved in this determination are the Coast Guard, U.S. Army Corps of Engineers, waterway users and port authorities.

5.4.4 Airways

Whenever a project is within 2 miles of an airport, coordination with FAA may be necessary. FHWA and the Aviation Division should be notified as soon as possible in the design process that a project is within 2 miles of the airport in question. FHWA procedures should be followed for coordination with the FAA. The following links provide further guidance regarding roadway projects near airports:

- [Vertical Clearances – Highway Development and Coordination with Other Agencies](#) (FHWA)
- [Obstruction Evaluation/Airport Airspace Analysis](#) (FAA)
- [Coordination With The Federal Highway Administration](#) (FAA)

5.5 CURBS

The type and location of curbs affects driver behavior as well as the safety and utility of a highway. Curbs serve any or all of the following purposes:

- drainage control
- pavement edge delineation
- right-of-way reduction
- aesthetics
- delineation of pedestrian walkways
- reduction of maintenance operations
- assistance in orderly roadside development

Typical shapes and dimensions for curbs are shown in [Figure 5-07](#).

Curbs are typically used on low-speed roadways and their use on high-speed roadways is discouraged.

Curbs mentioned in this section do not apply to roundabouts. See Chapter 6 for guidance on curbs used in the design of roundabouts.

5.5.1 Location Relative to Travel Lanes, Guardrail, etc.

For a normal roadway section with curb, the curb is offset from the through travel lane as shown in [Figure 5-07](#). When used to delineate divisional islands, like those commonly placed at intersections, the curb should be offset from the travel lane as discussed in Section 5.5.6. Additional discussion on the location of curbs is contained in Chapters 4 and 9 of the AASHTO Green Book.

The relationship of curb-to-guardrail is critical. If the curb is not located properly, the guardrail will not function as intended. Chapter 5 of the AASHTO Roadside Design Guide discusses the location of curb with respect to the face of the guardrail.

5.5.2 Types

1. Mountable or Barrier: Curb shapes are generally classified as either mountable (also known as sloping) or barrier (also known as vertical). The typical mountable curb has a flat sloping face and is 1 ft wide by 4 in. high. The typical barrier curb has a steep face and is 6 in. wide by 6 in. high.

Generally, barrier curb is used when sidewalks are provided adjacent to the curb and in the curb return of turnouts to intersecting streets. Also, if a municipality requests that provisions be made for future sidewalks, barrier curb may be used. Any other use of barrier curb requires a design waiver from the Road Design Engineer Administrator.

2. Concrete or Asphalt: Portland cement concrete is used for most curbs. Asphalt curbs are limited primarily to median curbs on overlay projects.

5.5.3 Types of Curb Construction

1. Integral: For concrete pavements, integral curb is preferred to curb and gutter because of economy in initial construction and maintenance. With this method, the concrete curb is poured when the concrete slab for the roadway is still in a plastic state. This creates an integral bond between the roadway and the curb. An alternate, and less desirable, method of construction is to place dowel bars in the plastic concrete of the roadway slab. Later, when the pavement has cured, the curb is poured so that the dowel bars hold the curb firmly in place on the roadway. Although not truly integral with the pavement, this curb is commonly referred to as integral curb. Refer to [standard plan CP-01](#) for more information regarding integral curb construction.

2. **Curb and Gutter:** Concrete curb and gutter ([Figure 5-07](#)), is generally used with asphalt concrete pavement. Under this method, both the curb and the gutter are poured together, but not at the same time as the roadway pavement. The most common width for both mountable and barrier types is 2 ft ([Figure 5-07](#)). Where curb and gutter is placed adjacent to concrete pavement, dowel bars should be used to connect the curb and gutter to the adjacent pavement. This prevents separation of the curb and gutter from the edge of the pavement. The use of curb and gutter adjacent to concrete pavement is often needed for phased construction of roundabouts.
3. **Plain:** Plain concrete curb ([Figure 5-08](#)) is typically used in small quantities adjacent to an existing pavement, driveway or parking area. While this curb requires a relatively large amount of concrete for stability, it is usually preferred over curb and gutter because of the savings in labor required for forming and finishing.
4. **Extruded:** This method is commonly used for combination curb and gutter and asphalt curbs. Extruded curb is placed by machine with no forms required.

5.5.4 Curb Detail at Driveways

1. **Mountable Curb:** The standard 4 in. high mountable curb is reduced to 2 in. in height across the full width of the driveway, including radii or flares. Persons applying for a permit to build a driveway after completion of the project have the option of connecting the driveway flush with the top of the existing curb or reconstructing the curb. Refer to [standard plan DW-01](#) for more information regarding mountable curb.
2. **Barrier Curb:** When barrier curb is used, it is reduced in height at driveway locations by a method similar to that used for mountable curb.
3. **Curbed Driveways:** Driveways are curbed only for the conditions described below:
 - a. **Replacement of Existing:** If the existing driveway is curbed, it will be replaced with a curbed driveway. For a single driveway that is curbed, both sides of the driveway will be curbed.
 - b. **Adjacent to Curbed Island:** When a curbed island is used outside of the roadway, the opposite edges of the driveways shall also be curbed.
4. **Curbed Islands:** Curbed islands in conjunction with driveways are used only for the conditions described below:
 - a. **Replacement of Existing:** An existing curbed island should be replaced.
 - b. **Service Stations:** If a pump island at a service station is less than 10 ft from the right-of-way line, it is advisable to place a curbed island with a line of barrier curb running along the right-of-way line ([Figure 5-08](#)). This is to prevent vehicles from being served on highway right-of-way.
 - c. **Continuously Paved Area:** If continuous pavement is located adjacent to the highway right-of-way where more than one driveway is required, an island should be placed between driveways to control access.

- d. Access Control: Curbed islands may be placed in other areas as recommended by the plan-in-hand party if it appears that access control will be a problem. For example, a curbed island could be placed to prevent vehicles from parking on the highway right-of-way.

5.5.5 Curb Detail at Turnouts

In curbed areas, barrier curbs shall be used in the radius of turnouts to intersecting roadways.

5.5.6 Raised Median Noses

To prevent vehicles from breaking the curb in the nose of raised median, a monolithic section of curb and median pavement should be constructed ([Figure 5-09](#)).

5.5.7 Curbed Islands

Curbed islands, including splitter islands, help control and direct the movement of traffic by reducing excess pavement areas. In urban locations, mountable curb is typically used in conjunction with striping to delineate the island. In rural locations where higher speeds are likely, islands are typically delineated with mountable curb.

[Figure 5-10](#) and [Figure 5-11](#) show island design details for pavements with and without shoulders, respectively. The island size is typically as follows:

- Small: Area 50 ft² to 100 ft² with sides in excess of 12 ft to 15 ft
- Large: Area in excess of 100 ft² (used at isolated intersections on high-speed highways)

Curbed islands shall be offset the width of the shoulder. Where the roadway is curbed, islands shall be offset a minimum of 2 ft from the edge of the travel lane. Refer to Chapter 9 of the AASHTO Green Book for more information regarding curbed islands.

5.5.8 Conditions for Use of Curbs

1. Roadways with Design Speeds Greater Than and Equal to 50 mph: Curbs may be used on these facilities only when in conjunction with shoulders. Where curbs are used, they shall be mountable and offset from the edge of the travel lane the full width of the shoulder. Typically, 4 ft beyond the edge of the inside travel lane and 8 ft beyond the edge of the outside travel lane.
2. Roadways with Design Speeds Less Than and Equal to 45 mph:
 - a. Curbs shall normally be offset a minimum of 1 ft from the edge of the outside travel lane (for drainage purposes).
 - b. When a raised median is used, curbs shall be offset 1 ft from the edge of the inside travel lane.

- c. When sidewalks are located adjacent to the curb, barrier curb shall be used and offset a minimum of 1 ft 6 in. from the edge of the travel lane.

5.6 SIDEWALKS

5.6.1 General

Guidelines for incorporating sidewalks into a construction project are found in the [DOTD Minimum Design Guidelines](#), [EDSM II.2.1.14](#) and the [Complete Streets Policy](#).

5.6.2 Location

The [DOTD Minimum Design Guidelines](#) provide preferred and acceptable values for sidewalk widths and offsets. Sidewalks are typically offset a minimum of 2 ft from the back of curb with a grass strip separating the curb and the sidewalk ([Figure 5-12a](#)). If a sidewalk is placed adjacent to the back of the curb, it must be at least 7 ft wide and a barrier curb will be required ([Figure 5-12b](#)). If they choose to do so, the entity responsible for sidewalk maintenance (including the grass strip, if required), may select a location and width greater than the minimum values.

Provisions for the location of sidewalks in the vicinity of roundabouts can be found in Chapter 6.

5.6.3 Cross Slope

In accordance with the Americans with Disabilities Act (ADA), sidewalk cross slopes will be no greater than 2.0% (positive or negative).

5.6.4 Curb Ramps

In order to comply with the Americans with Disabilities Act (ADA), curb ramps will be included on all projects that contain both sidewalks and curbs. Refer to [standard plan PED-01](#) for more information regarding curb ramps.

5.6.5 Bridges

[EDSM II.3.1.4](#) provides guidance on the placement of sidewalks on bridges in urban areas.

5.7 ROADSIDE BARRIERS

5.7.1 General

Chapters 5 and 6 of the AASHTO Roadside Design Guide provide details on the application and design of various roadside barriers, including guardrail and concrete barriers. Recommendations on the layout and type of roadside barrier to be used are typically obtained from the Bridge Design Section. All other applications are the responsibility of the designer.

5.7.2 Guardrail

The type of guardrail normally specified is W-Beam. The actual construction details and uses are shown in various [standard plans](#) and in the project plans.

5.7.3 Concrete Barrier

Concrete barriers are used along the roadside in some situations, such as pier protection. Other instances of concrete barrier use are in narrow medians to separate opposing lanes of high speed traffic, such as on interstate widening projects. In new installations, a single slope concrete barrier is preferred, in heights specific to the application. For spot or retrofit locations, a project-specific concrete barrier design may be applicable.

In median applications, the concrete barrier consists of a minimum 42 inch tall double-sided single slope shape with a reinforced cast-in-place concrete footing independent of the roadway/shoulder section. The selection of the appropriate concrete median barrier will be included in the project's design report. Justification for concrete median barrier heights greater than 42 inches will be documented in the design report.

Refer to the [Bridge Design & Evaluation Manual](#) and [Bridge Design Technical Memoranda](#) for applications of concrete barriers.

5.7.4 Cable Barrier

Cable barriers consist of steel cables mounted on weak posts and can be used in roadside and median applications. They are classified as either low-tension or high-tension and are available in three cable and four cable configurations. However, the cable barrier specifications only allow a high-tension, four cable configuration. Refer to the [Bridge Design & Evaluation Manual](#) for more information regarding cable barriers.

5.8 EMBANKMENT WIDENING FOR GUARDRAIL AT BRIDGES

Guardrail is typically placed at the approach end of bridges to protect vehicles from the blunt end of the bridge railing. It provides a roadside barrier that transitions the rigid bridge railing to a more flexible system for the length required in advance of the bridge end. In some instances, the guardrail also protects vehicles against obstacles behind the bridge rail or areas that do not meet clear zone requirements.

The roadway embankment should be widened at these locations with relatively flat slopes to allow the guardrail to be properly placed and function as designed. The slopes of embankment widening are typically 10:1 maximum, but occasionally are designed to match the shoulder slopes.

To reduce maintenance adjacent to the guardrail and guardrail posts, the embankment widening is typically paved with the same material as that of the roadway. In order for the guardrail to function properly, it is imperative that the pavement not restrict the guardrail posts. Therefore, a “leave-out” area behind the posts is necessary for the guardrail to function as intended.

Details of the embankment widening layout are placed in the plans, normally with the typical section sheets ([Figure 5-13](#)). Refer to the [Bridge Design & Evaluation Manual](#) and the [guardrail standard plans](#) for more information regarding embankment widening.

5.9 MEDIANS

5.9.1 General

Medians are areas provided on roadways that separate opposing lanes of traffic and are classified as either depressed, raised, or flush with the roadway surface. The median width is measured between the edges of the inside travel lanes.

[DOTD Minimum Design Guidelines](#) contain the preferred and acceptable values for median widths on urban and rural roadways. Should a width less than those shown in the guidelines be needed, a design exception may be required. See Chapter 2, Section 2.3 for information concerning design exceptions.

5.9.2 Rural

Due to the high speeds that can be expected, depressed medians are preferred on rural roadways. Some of the benefits of depressed medians are that they provide a recovery area for errant vehicles, reduce cross-median accidents, allow space for auxiliary lanes (left-turn lanes, U-turn lanes, and speed-change lanes), and provide enough width for future widening.

Refer to the AASHTO Green Book for more information regarding medians on rural roadways.

5.9.3 Urban

On urban arterials and collectors, raised and flush medians are preferable as they facilitate the regulation of left-turn movements. Some of the benefits of these medians are reduced travel time, improved capacity, reduced crash frequency (particularly rear-end crashes), and better access management.

Raised medians provide additional benefits to those mentioned above. They provide refuge for pedestrians crossing the roadway and landscaping (if properly maintained) can lead to a more aesthetically pleasing roadway.

Flush medians are most commonly used as two-way left-turn lanes, but their use as such should be limited to three-lane roadways. When using two-way left-turn lanes, the following should be taken into consideration:

- Two-way left-turn lanes do not provide mid-block pedestrian refuge. If pedestrians will be crossing mid-block, the use of a pedestrian refuge island is recommended.
- Two-way left-turn lanes are often used as an access management tool. However, on urban roadways with closely spaced commercial driveways their use may increase rather than control access opportunities. The use of divisional islands or alternative traffic control devices and techniques is recommended in this situation.

Refer to the AASHTO Green Book for more information regarding medians on urban roadways.

5.10 FRONTAGE ROADS

5.10.1 General

Frontage roads provide numerous functions depending on the type of arterial they serve and the character of the surrounding area. They may be used to control access to the arterial, to accommodate adjoining property and to maintain traffic circulation on each side of the arterial. Frontage roads segregate local traffic from the higher speed through traffic and intercept driveways from residences and commercial establishments along the highway. Most existing frontage roads were built along interstate or major arterial routes to provide control of access to the highway and access to property that would otherwise be landlocked.

5.10.2 Functional Classification and Design Guidelines

Each segment of a new frontage road is usually short and traffic volumes are usually low. As a result, most new frontage roads could be classified as collector roads. After the appropriate classification is determined, the corresponding design guidelines are used.

5.11 RIGHT-OF-WAY CONTROLS

5.11.1 General

Establishing right-of-way widths that adequately accommodate construction, utilities, drainage, and proper highway maintenance is an important part of the overall design. A wide right-of-way width permits the construction of gentle slopes resulting in greater safety for motorists and easier, more economical maintenance of the right-of-way.

5.11.2 Rural

In hilly terrain, construction limits vary considerably as the roadway passes through cut and fill sections. In this situation, the required right-of-way varies, so it is impractical to use a constant right-of-way width. In flat terrain, it is usually both practical and desirable to establish a minimum right-of-way width that can be used throughout most of the project. Unless some physical feature dictates otherwise, required right-of-way widths should be set at even offsets from the centerline (typically multiples of 5 feet). Transitions in width, where required, should be as long as practical. If frequent breaks in the right-of-way line are required to increase the width, serious consideration should be given to increasing the minimum width for the entire length of the project. For at-grade roadways, the required right-of-way line should be set a minimum of 10 feet beyond the limits of construction. For elevated structures, the required right-of-way line shall be set a minimum of 25' beyond the outermost point of the structure (any deviation from this minimum shall require approval of the Bridge Design Administrator).

If a future project will potentially connect to either end of the proposed project, the required right-of-way line should be extended to the nearest property line beyond the extent of construction. This is done to avoid buying right-of-way from the property owner on two different occasions. In this case, the limits of the project will correspond to the limits of the required right-of-way. However, this may not always be practical.

5.11.3 Urban

In urban areas, right-of-way widths are governed primarily by economic considerations, physical obstructions or environmental considerations. Along any route, development and terrain conditions may vary affecting the availability of right-of-way.

The right-of-way width should be sufficient to accommodate the ultimate planned roadway, including:

- median
- shoulder
- grass strip
- sidewalks
- public utility facilities
- width for necessary outer slopes, except where they are within an obtained easement

It is desirable to set right-of-way in urban areas a minimum of 6 ft to 10 ft beyond the limits of construction to easily relocate utilities. However, property or environmental impacts discussed above may limit the amount of right-of-way that can realistically be acquired. If existing utilities are in conflict within areas of restricted right-of-way, discussions should be held at the plan-in-hand inspection to determine how to adequately accommodate utility relocations.

5.11.4 Special Types of Right-of-Way

1. Construction Servitude: Construction servitude is called for on the plans when an area outside the required right-of-way line is needed only during construction of the project. The most common example of this is for construction of a temporary diversion road. Another example is elevated structures.

A permanent feature shall not be placed in a construction servitude. The decision to obtain permanent right-of-way or construction servitude is made after considering the circumstances of each project.

The property owner is paid a rental fee during the time the construction servitude is needed. Where applicable, the owner is also paid for damages that may be incurred during the construction process, such as for removal of trees or shrubbery.

2. Drainage Servitude: Drainage servitude is required when a new lateral outfall ditch is to be constructed beyond the right-of-way or when an existing lateral outfall ditch is to be improved outside of the right-of-way. Drainage servitude is obtained when construction of these laterals is critical to proper drainage of the project. As with a construction servitude, the property owner is paid for use of the drainage servitude and for damages resulting from construction. However, DOTD reserves the right of permanent access to the lateral ditch for maintenance purposes.
3. Right-of-Entry: In special cases where construction that will become a permanent feature (e.g., driveways or yard drains) terminates beyond the right-of-way line, right-of-entry may be used to access the property. When using right-of-entry, the construction of any items will be for the property owner's benefit and no other compensation will be provided. The District will determine if right-of-entry is the appropriate measure for gaining property access.
4. Control of Access: Control of Access (C of A) is purchased from property owners along major highways such as freeways. No highway access crossing the C of A is allowed and the property owner is compensated for such restrictions. Where C of A is used along a highway, it typically extends down intersecting roadways to enhance traffic flow at the intersection. Chapter 3, Section 3.4 and [EDSM III.1.1.14](#) contain additional discussion of C of A.

5.11.5 Accommodating Utilities

In addition to primarily serving vehicular traffic, right-of-way for streets and highways may accommodate public utility facilities in accordance with state law or municipal ordinance. The use of right-of-way by utilities should cause the least interference with traffic using the roadway. The border area between the roadway and the right-of-way line should be wide

enough to serve several purposes. These include provisions for a buffer space between pedestrians and vehicular traffic (if applicable), subsurface drainage, sidewalk space, and an area for underground and/or aboveground utilities. If existing utilities are in conflict within areas of restricted right-of-way, discussions should be held at the plan-in-hand inspection to determine how to adequately accommodate utility relocations. For safety, utilities are normally located as close to the right-of-way line as feasible. Discussion concerning utility relocation is contained in Chapter 4, Section 4.5.4.

5.11.6 Expropriation

During the right-of-way acquisition process, there are occasions when the Real Estate Section has difficulty reaching an agreement with property owners on fair compensation for property and damages. During negotiations, the designer may be asked by the Real Estate Section to review the parcel(s) to determine if impacts can be reduced or eliminated.

When negotiations with a property owner fail to obtain the property required to construct a project, the next step to acquire this property is through expropriation. [EDSM II.1.1.2](#) outlines the policy for this action.

5.11.7 Existing Right-of-Way

An effort is made to accurately determine the location of existing right-of-way and property lines before the required right-of-way is set. This is partly done to avoid acquiring unusually small parcels and/or to avoid allowing unusually small parcels to remain. As a first step in the preparation of the right-of-way maps, a base map is prepared. This map includes information obtained from the property survey, detailing the existing right-of-way and property lines throughout the project. When this base map is made available, it should be used in setting the required right-of-way.

5.11.8 Encroachments

If additional right-of-way is required, buildings that encroach on the existing right-of-way are handled the same as other buildings that fall within the required right-of-way. However, if no additional right-of-way is required, the property owner must remove all encroaching buildings, fences, etc. The project manager will send a letter to the Real Estate Section outlining possible encroachments. The Real Estate Section then advises the District Administrator of each property that indeed has encroachments within the existing right-of-way. See [EDSM IV.1.1.9](#) for further information on encroachments.

5.11.9 Disposal of Right-of-Way

[EDSM I.1.1.10](#) and [EDSM I.1.1.19](#) provide guidance on DOTD policy for disposing of right-of-way. If DOTD is disposing of excess right-of-way, the Road Design Section will typically be asked to verify that the property will not be needed for future projects or that the right-of-way disposal would not be detrimental to the operation and maintenance of the existing highway. When a roadway on new alignment renders an existing state route unneeded,

the Road Design Section will request that the Office of Multimodal Planning obtain the necessary agreements to dispose of the abandoned roadway. Typically, the city or parish involved will assume responsibility for the abandoned roadway.

5.12 ROADSIDE CONTROLS

The efficiency and safety of a highway without control of access depend greatly upon the amount and character of roadside interference. Most interference originates in vehicle movements to and from businesses, residences, or other development along the highway. Abutting property owners have rights of access, but DOTD is empowered to regulate and control the location, design, and operation of access driveways and other roadside elements (e.g., mailboxes) in order to minimize interference to the movement of through traffic. Interference resulting from indiscriminate roadside development and uncontrolled driveway connections results in lowered capacity, increased safety hazards, and early highway obsolescence. For more information, driveways are discussed in Chapter 6, Section 6.7 and mailboxes are discussed in [EDSM I.1.1.17](#). Access connections are also discussed in the [Louisiana Administrative Code Title 70, Transportation \(Part I\), Chapter 15](#).

5.13 PARKING LANES

5.13.1 Policy

Generally, parking on arterial highways should be prohibited because on-street parking decreases through capacity, impedes traffic flow, and increases crash potential. At the request of the local governing authority, consideration should be given to the inclusion of parking adjacent to the roadway in special situations if the following conditions are met:

- Parking currently exists adjacent to the roadway.
- Adequate off-street parking facilities are unavailable or unfeasible.
- The subsequent reduction in highway capacity will be insignificant.
- The local governing authority has agreed to pay for the additional costs associated with the parking, such as additional right-of-way, construction costs, etc.

Final approval will be obtained from the Chief Engineer.

5.13.2 Application

When on-street parking is allowed on a roadway, parallel parking is the preferred method. Under certain circumstances, angled parking is allowed. The type of on-street parking selected should depend on the specific function and width of the street, the adjacent land use and traffic volume, as well as existing and anticipated traffic operations. Angled parking presents sight distance problems due to the varying length of vehicles, such as

vans and recreational vehicles. The extra length of these vehicles may also interfere with the traveled way.