

Table of Contents

6.1.0 GENERAL	6-2
6.2.0 CLEAR ZONES	6-2
6.2.1 Reserved for Future Expansion.....	6-2
6.2.2 Reserved for Future Expansion.....	6-2
6.2.3 Transportation Guidelines for Landscaping	6-2
6.3.0 RESERVED FOR FUTURE EXPANSION.....	6-9
6.4.0 FIGURES	6-10

SECTION 6 - CLEAR ZONES AND GUARD FENCES

6.1.0 GENERAL

The purpose of this Section is to provide design criteria for establishing a roadway clear zone and the selection and installation procedures for guard fences.

This Section is applicable for projects or work involving either inch-pound or International System (SI) units. Within the text and accompanying tables, the inch-pound units are given preference followed by SI units shown within parentheses.

6.2.0 CLEAR ZONES

The term "clear zone" is used to describe the generally flat and unobstructed area that is provided beyond the travel lanes. The clear zone may include shoulders.

For urban streets, arterials, collectors and local streets, where curbs are used, available area for clear zones may be limited. A minimum offset distance of eighteen (18) inches (450 mm) should be provided between the face of curb and obstructions such as utility poles, lighting poles and fire hydrants (Local Urban Streets, Horizontal Clearance to Obstructions, Chapter 5 of AASHTO's, "A Policy On Geometric Design of Highways and Streets, 2001"). Greater offsets should be provided when possible to permit curbside parking.

Because most curbs do not have a capability to redirect vehicles, the minimum clear zone distance should be increased as directed by the City Engineer or designated representative commensurate with increases in traffic volumes and vehicle speeds.

6.2.1 Reserved for Future Expansion

6.2.2 Reserved for Future Expansion

6.2.3 Transportation Guidelines for Landscaping

A. Roadsides

Safety shall be the foremost consideration in the placement and selection of plant material in the City's right-of-way. The main focus of this Manual is the prevention of traffic hazards that can be created by the placement of landscaping which restricts the sight distance or creates roadside obstacles. The following addresses acceptable criteria for landscaping and planting on roadsides, within the median, and at intersections. All dimensions specified for trunk diameter and height will include plants at maturity unless it is stated otherwise on the Drawings.

1. Trees with = six (6) Inches (150 mm) Mature Trunk Diameter. The following reflect minimum setback requirements for existing and newly planted trees.

50 MPH (80 KPH) or Greater Design Speed.

- Barrier curbs adjacent to travel lane.

Where there are barrier curbs adjacent to the travel lane, a minimum setback of two (2) feet (600 mm) for existing trees and four (4) feet (1.2 meters) for new trees behind the face of the curb shall be provided as shown in Table 6-1 and illustrated in Figure 6-1, in Section, 6.4.0 of this Manual.

- Shoulder adjacent to travel lane.

Where there are shoulders adjacent to the travel lane, a minimum setback of ten (10) feet (3 meters) for existing trees and eighteen (18) feet (5.4 meters) for new trees from the edge of the travel lane shall be provided as shown in Table 6-1 and illustrated in Figure 6-2, in Section 6.4.0 of this Manual.

**TABLE 6-1
MINIMUM SETBACK REQUIREMENTS FOR
EXISTING AND NEWLY PLANTED TREES**

Design Speed mph (KPH)	Tree Diameter At Maturity	Roadways with Barrier Curb		Roadways with Shoulders*	
		Existing (x)	New (y _t)	Existing (x ₁)	Tree (y ₁)
= 50 (80)	= 6" (150 mm)	2 (200 mm)	4 (1.20 m)	10 (3 m)	18 (5.4 m)
	>6" (150 mm)	6 (1.8 m)	6 (1.8 m) **	30 (9 m)	30 (9 m)
= 45 (72)	= 6" (150 mm)	1.5 (150 mm)	3 (900 mm)	8 (2.4 m)	10 (3 m)
	>6" (150 mm)	4 (1.2 m)	6 (1.8 m) **	18 (5.4 m)	25 (7.5 m)
* Includes roadways with side slope of 6:1 or flatter and average daily traffic volumes of over 6000 vehicles. The values may be adjusted for lower traffic volumes with guidelines presented in Source #2.					
** For sidewalks twelve (12) feet (3.6 m) or greater in width six (6) feet (1.8 m) minimum setback distance may be reduced, when appropriate measures, that are approved by the Professional Engineer or designated representative, are adopted to protect the subgrade and base layer supporting the curb and gutter from tree root growth and water/moisture intrusions.					

45 MPH (72 KPH) or Less Design Speed.

- Barrier curbs adjacent to travel lane.

Where there are barrier curbs adjacent to the travel lane, a minimum setback of one and a half (1.5) feet (450 mm) for existing trees and three (3) feet (900 mm) for new trees behind the face of the curb shall be provided as shown in Table 6-1 and illustrated in [Figure 6-1](#), in Section 6.4.0 of this Manual.

- Shoulders adjacent to travel lane.

Where there are shoulders adjacent to the travel lane, a minimum setback of eight (8) feet (2.4 meters) for existing trees and ten (10) feet (3 meters) for new trees from the edge of the travel lane shall be provided as shown in Table 6-1 and illustrated in [Figure 6-2](#), in Section 6.4.0 of this Manual.

- Adjacent to parking lane on local street.

A two (2) foot (600 mm) setback distance behind the face of the curb is required where parking is permitted adjacent to the curb on local streets.

- Sidewalks adjacent to the curb.

Where there are sidewalks adjacent to the curb, no definite setback distance from the sidewalk is required. However, a two (2) foot (600 mm) setback distance is desirable. Trees shall not be allowed in sidewalks less than twelve (12) feet (3.6 m) in width. Whenever possible sidewalks should be routed around trees on public property or private sidewalk easements if provided.

2. Trees With > six (6) Inches (600 mm) Mature Trunk Diameter. The following reflect minimum setback requirements for existing and newly planted trees.

50 MPH (80 KPH) or Greater Design Speed.

- Barrier curbs adjacent to travel lane.

Where there are barrier curbs adjacent to the travel lane, a minimum setback of six (6) feet (1.8 meters) behind the face of the curb shall be provided for both existing and newly planted trees as shown in Table 6-1 and illustrated in [Figure 6-1](#), in Section 6.4.0 of this Manual.

- Shoulders adjacent to travel lane.

Where there are shoulders adjacent to the travel lane, a minimum setback of thirty (30) feet (9 meters) for both existing and newly planted trees from the edge of the travel lane shall be provided as shown in Table 6-1 and illustrated in [Figure 6-2](#), in Section 6.4.0 of this Manual.

- Sidewalks adjacent to the curb.

Where there are sidewalks adjacent to the curb, a minimum setback of six (6) feet (1.8 meters) behind the face of the curb shall be provided. All trees are required to be placed a minimum of two (2) feet (600 mm) from the edge of sidewalk to the ultimate edge of the mature tree. Trees shall not be allowed in sidewalks less than twelve (12) feet (3.6 m) in width. Whenever possible sidewalks should be routed around trees on public property or private sidewalk easements if provided.

When a tree is to be planted in a sidewalk that is twelve (12) feet (3.6 m) or wider, the minimum setback distance may be reduced when appropriate measures, that are approved by the City Engineer or designated representative, are adopted to protect the subgrade and base layer supporting the curb and gutter from tree root growth and water/moisture intrusion from the newly planted tree area. The approval for reduction in the setback distance by the City Engineer or designated representative shall be in writing.

45 MPH (72 KPH) or Less Design Speed.

- Barrier curbs adjacent to travel lane.

Where there are barrier curbs adjacent to the travel lane, a setback of four (4) feet (1.2 meters) for existing trees and six (6) feet (1.8 meters) for newly planted trees behind the face of the curb shall be provided as shown in Table 6-1 and illustrated in Figure 6-2, in Section 6.4.0 of this Manual.

- Shoulders adjacent to travel lane.

Where there are shoulders adjacent to the travel lane, a minimum setback of eighteen (18) feet (5.4 meters) for existing trees and twenty-five (25) feet (7.5 meters) for newly planted trees from the edge of travel lane shall be provided as shown in Table 6-1 and illustrated in Figure 6-2, in Section 6.4.0 of this Manual.

- Sidewalks adjacent to the curb.

Where there are sidewalks adjacent to the curb, a minimum setback of six (6) feet (1.8 meters) behind the face of the curb shall be provided. All trees are required to be placed a minimum of two (2) feet (600 mm) from the edge of sidewalk to the ultimate edge of the mature tree. Trees shall not be allowed in sidewalks less than twelve (12) feet (3.6 m) in width. Whenever possible sidewalks should be routed around trees on public property or private sidewalk easements if provided.

When a tree is to be planted in a sidewalk that is 12 feet (3.6 m) or wider, the minimum setback distance may be reduced when appropriate measures, that are approved by the City Engineer or designated representative, are adopted to protect the subgrade and base layer supporting the curb and gutter from tree root growth and water/moisture

intrusion from the newly planted tree area. The approval for reduction in the setback distance by the City Engineer or designated representative shall be in writing.

3. Side Slopes.

On roadways with shoulders having side slopes of five (5) to one (1) or steeper, no tree shall be planted or allowed to remain within the recommended clear zone as shown in Table 6-2 and illustrated in Figure 6-3, in Section 6.4.0 of this Manual. The recommended distances may be adjusted if the trees are located in the ditch or if the average daily traffic volume of the roadway is less than six thousand (6000). These adjustments shall be made using the guidelines presented in AASHTO, Guide for Selecting, Locating, and Designing Traffic Barriers, 1977.

4. Clearance Height.

A minimum clearance height of eight (8) feet (2.4 meters) above the street level must be provided and maintained for all existing and newly planted trees if adjacent to a sidewalk. However, if the limbs of trees overhang the curb line or edge of travel lane of any street, a minimum clearance height of fourteen (14) feet (4.2 meters) is required.

TABLE 6-2 RECOMMENDED LATERAL CLEARANCE ON CUT AND FILL SECTIONS *

Design Speed Mph (KPH)	Fill Section Side Slope (b/a)			Cut Section Side Slope (b/a)		
	5:1	4:1	3:1 & Steeper	5:1	4:1	3:1 & Steeper
<45 (80)	18 (5.4 m)	19 (5.7 m)	20 (3 m)	16 (4.8 m)	16 (4.8 m)	16 (4.8 m)
55 (88.5)	24 (7.2 m)	30 (9 m)	56 (16.8 m)	19 (5.7 m)	18 (5.4 m)	17 (5.1m)
65 (105)	37(11.1 m)	45(13.5 m)	100 (30 m)	27 (8.1 m)	22 (6.6 m)	20 (6m)
*These values may be adjusted for roadways with less then 6000 daily traffic volumes with guidelines presented in the Source below.						
Source: Based on AASHTO – Guide for Selecting, Locating, and Designing Traffic Barriers.						

5. Curve Section of Roadways with Shoulder.

The setback requirements for landscaping on roadways with shoulders should be increased on the outside of curves as shown in Figure 6-4, in Section 6.4.0 of this Manual. The required setback varies with the design speed as presented in the AASHTO, Guide for Selecting, Locating, and Designing Traffic Barriers, 1977.

- 45 mph (72 KPH) or Less Design Speed.

Where the horizontal curve of the roadway through lanes is designed with a 45 mph (72 KPH) or less design speed, the setback distance should be increased from a point one hundred fifty (150) feet (45 meters) beyond the Point of Curvature (PC) to a point one hundred fifty (150) feet (45 meters) beyond the Point of Tangency (PT) using the formula shown in Figure 6-4, in Section 6.4.0 of this Manual.

- 50 mph (80 KPH) or Greater Design Speed.

Where the horizontal curve of the roadway through lanes is designed with a 50 mph (80 KPH) or greater design speed, the setback distance should be increased from a point two hundred eighty (280) feet (84 meters) beyond the PC to a point two hundred eighty (280) feet (84 meters) beyond the PT using the formula shown in Figure 6-4, in Section 6.4.0 of this Manual.

- ? On curves, the sight distance requirements presented in Section 1.3.1C.6. of this Manual must be maintained. Only low growing shrubs not greater than two (2) feet (600 mm) in height or small plants shall be considered in areas where horizontal sight distance is a factor.

B. Median

1. Lateral Landscaping Placement Requirements.

All planting (existing and new trees) in the median shall comply with the same lateral placement requirements as set forth in Section 6.2.3A. of this Manual.

2. Longitudinal Landscaping Placement Requirements.

All plantings, except ground covers with no more than twelve (12) inches (300 mm) in height, shall be located greater than seventy-five (75) feet (22.5 meters) from the end of the median nose as shown in Figure 6-5, in Section 6.4.0 of this Manual.

Ground covers with no more than twelve (12) inches (300 mm) in height and trees with a mature trunk diameter of six (6) inches (150 mm) or less is recommended in the area from a point seventy-five (75) feet (22.5 meters) to one hundred fifty (150) feet (45 meters) from the nose of the median (see Figure 6-5, in Section 6.4.0 of this Manual). All trees shall be maintained to provide an eight (8) foot (2.4 meters) minimum foliage clearance height. A minimum fifteen (15) feet (4.5 meters)

spacing (center-to-center) shall be provided for all trees.

In the area beyond one hundred fifty (150) feet (45 meters) from the nose of the median, any planting shall be allowed as long as the minimum sight distance requirements are provided. Although not required, maintaining an eight (8) foot (2.4 meters) or greater clearance height is desirable.

C. Intersection.

No landscaping of any type shall obstruct vision within the sight triangle as defined by the shaded area in Figure 6-6, in Section 6.4.0 of this Manual. The criteria for a sight triangle is presented in Section 1.3.1C.6. of this Manual. These requirements will apply to any material from a height of two (2) feet (600 mm) to a clearance height of eight (8) feet (2.4 meters) above the top of curb, including, but not limited to full grown trees, full-grown shrubs, fences, structures, any signs except traffic control signs, etc.

D. General Requirements

The following requirements will apply to all landscaping within the right-of-way along roadsides, median and intersection.

1. Railroad Crossing.

Only low growing shrubs no greater than a height of two (2) feet (600 mm) and small trees are recommended within two hundred fifty (250) feet (75 meters) of a railroad crossing to assure adequate sight visibility.

2. School Crossing.

Only small trees and low growing shrubs no greater than two (2) feet (600 mm) in height are recommended within one hundred fifty (150) feet (45 meters) of a school crossing to assure pedestrian safety by not restricting the sight visibility of motorists.

3. Traffic Control Devices.

No vegetation from a height of seven (7) feet (2.1 meters) to a height of fourteen (14) feet (4.2 meters) is recommended within twenty-five (25) feet (7.5 meters) of any existing or proposed traffic signal, regulatory or warning signs, or other traffic control devices.

4. Right-of-Way.

Where limited right-of-way or the necessity for planting would result in less clearance, all factors in a specific area should be weighed to decide if a special exception is justified. Such an exception must be approved by the Director of the Transportation Services Department or his designee.

E. General Note.

Any landscaping that is not in compliance with the requirements stated in this criteria or has been planted without an approved License Agreement

from the City shall be removed by the sponsoring organization or individual at their cost. The required License Agreement may be obtained from the City's Legal Department and approved by City Council.

F. Maintenance Requirements

1. The adjacent property owner(s) or civic organization will be expected to maintain the landscaping located between curb or edge of pavement and the property line. The adjacent property owner or civic organization shall also be responsible for trimming tree limbs from trees located on private property, which cause an obstruction of the right-of-way.
2. The City reserves the right to prune or remove any vegetation, at the cost of the sponsoring organization or individual, as determined necessary for visibility and ease of maintenance.

6.3.0 RESERVED FOR FUTURE EXPANSION

6.4.0 FIGURES

Figure 6-1 Roadway with Barrier Curb

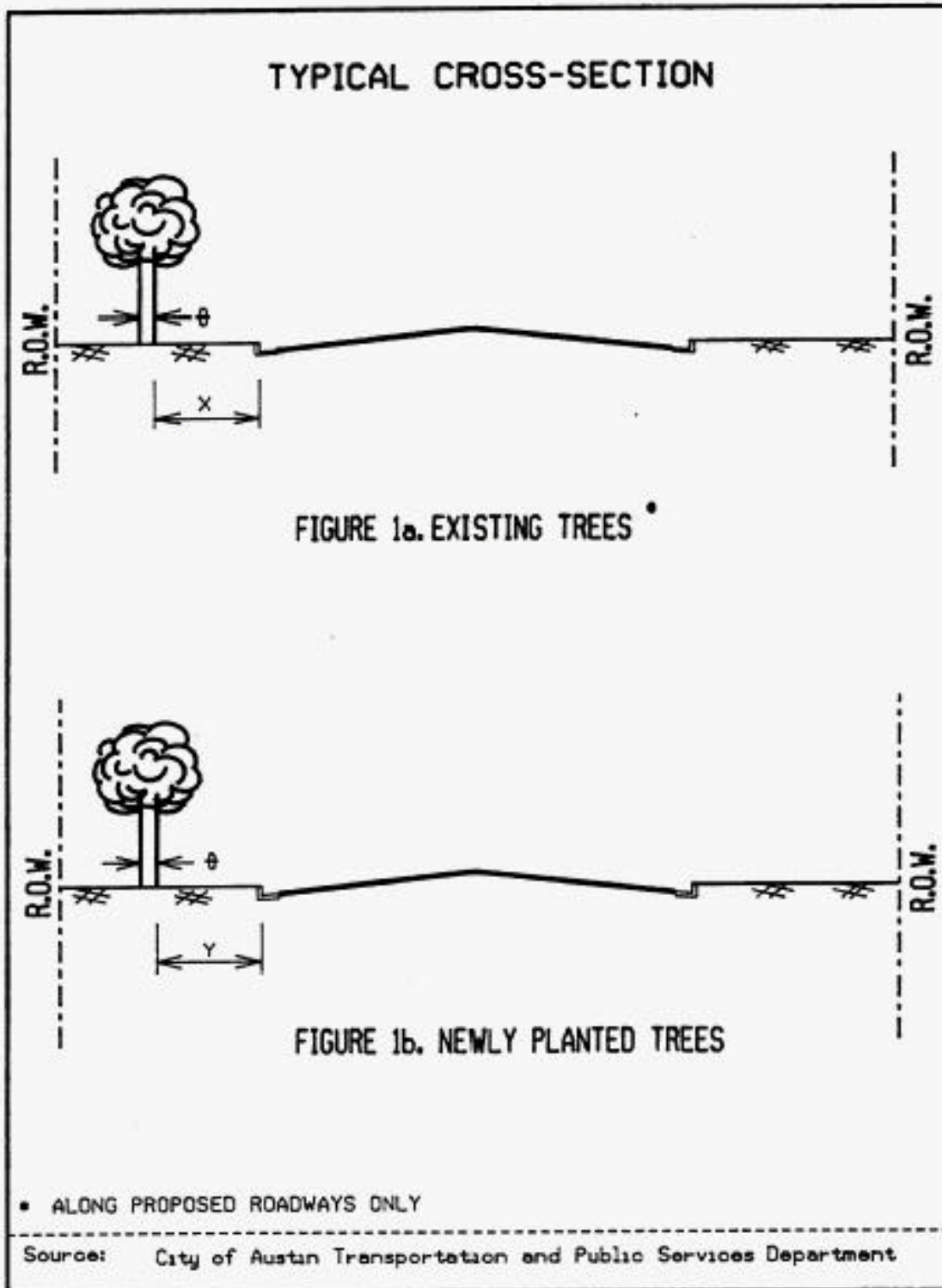


Figure 6-2 Roadway with Shoulder

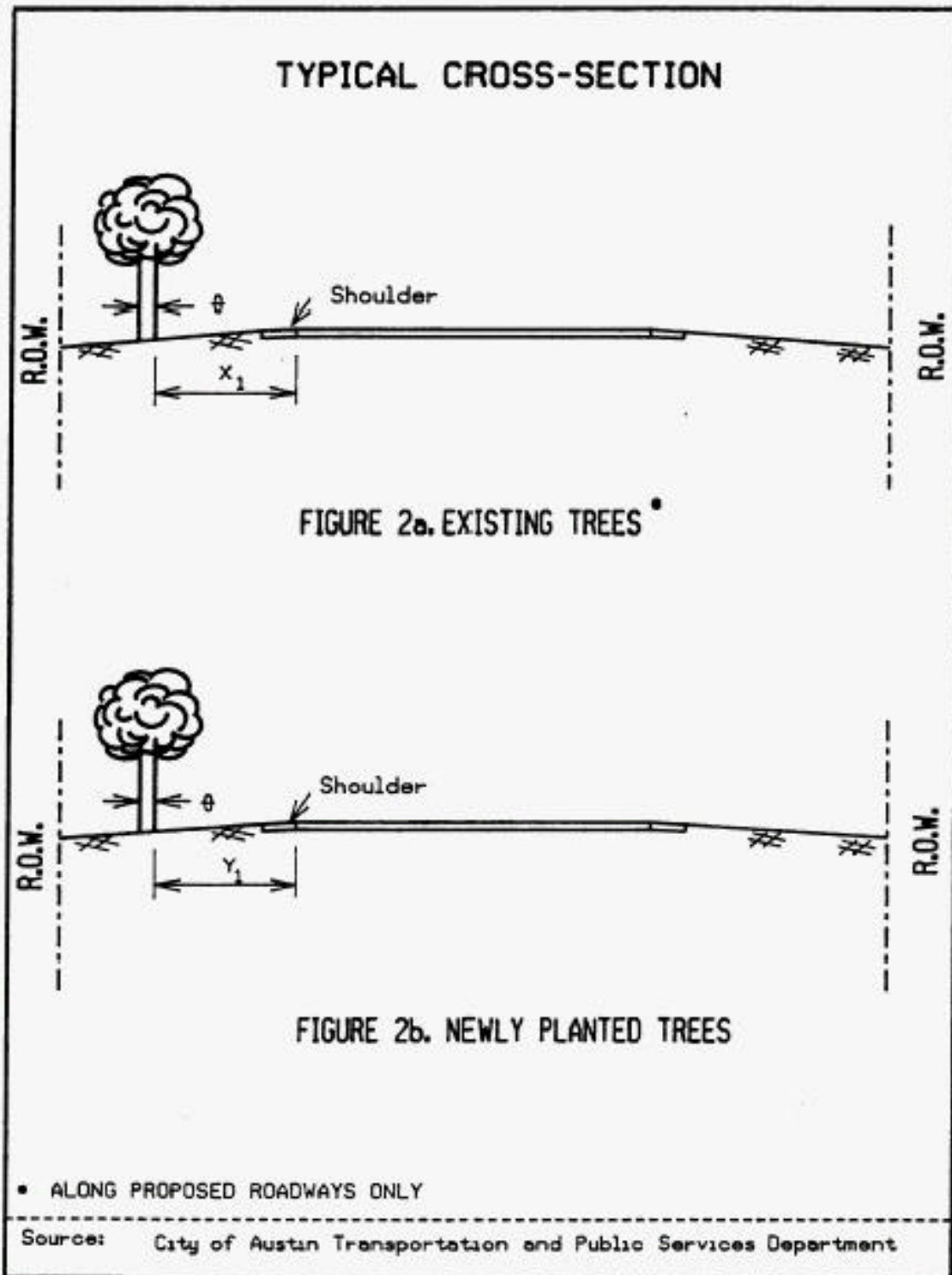


Figure 6-3 Roadway with Side Slopes

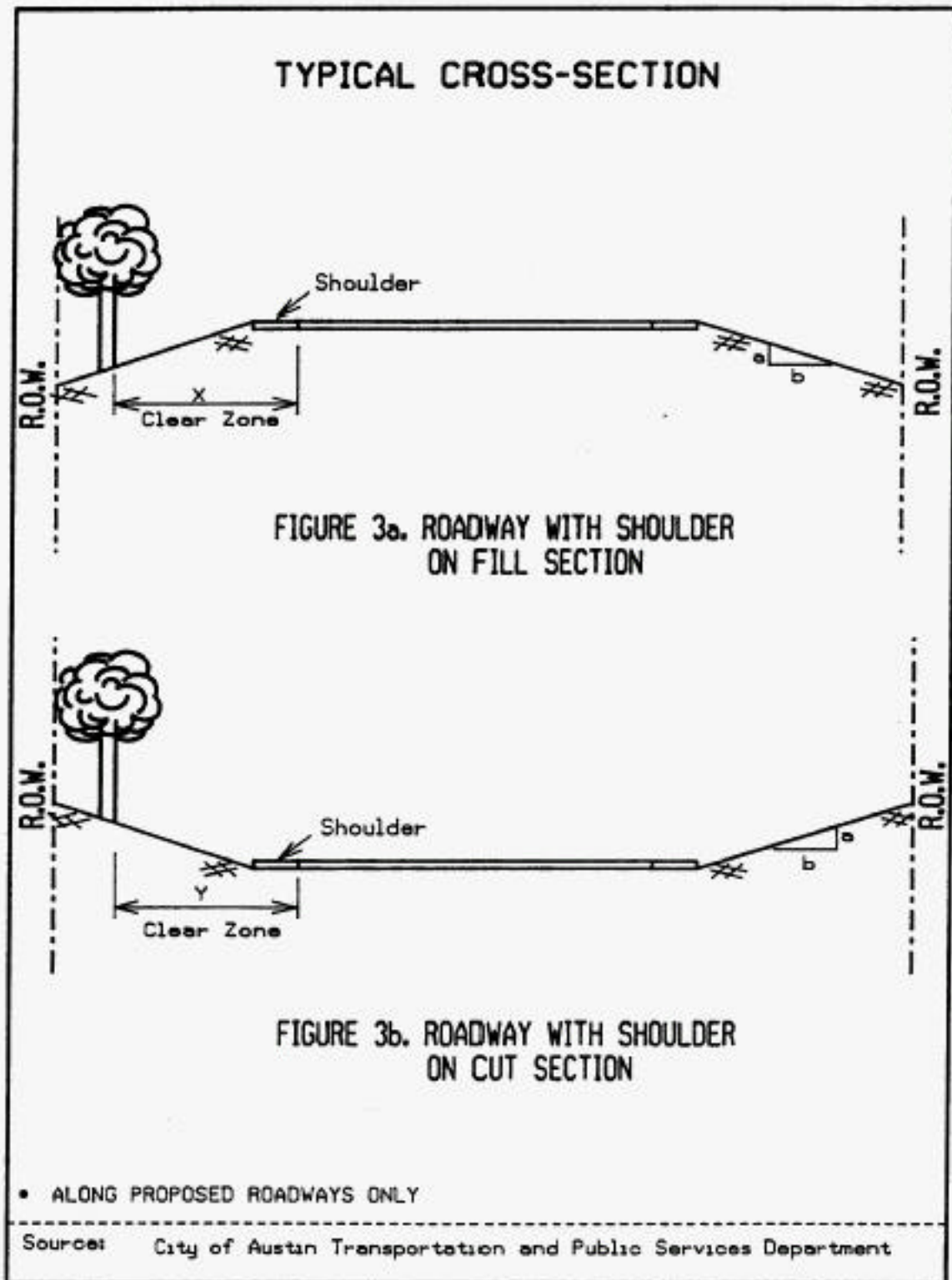


Figure 6-4 Clear Zone Adjustment on Curve Sections of Roadways

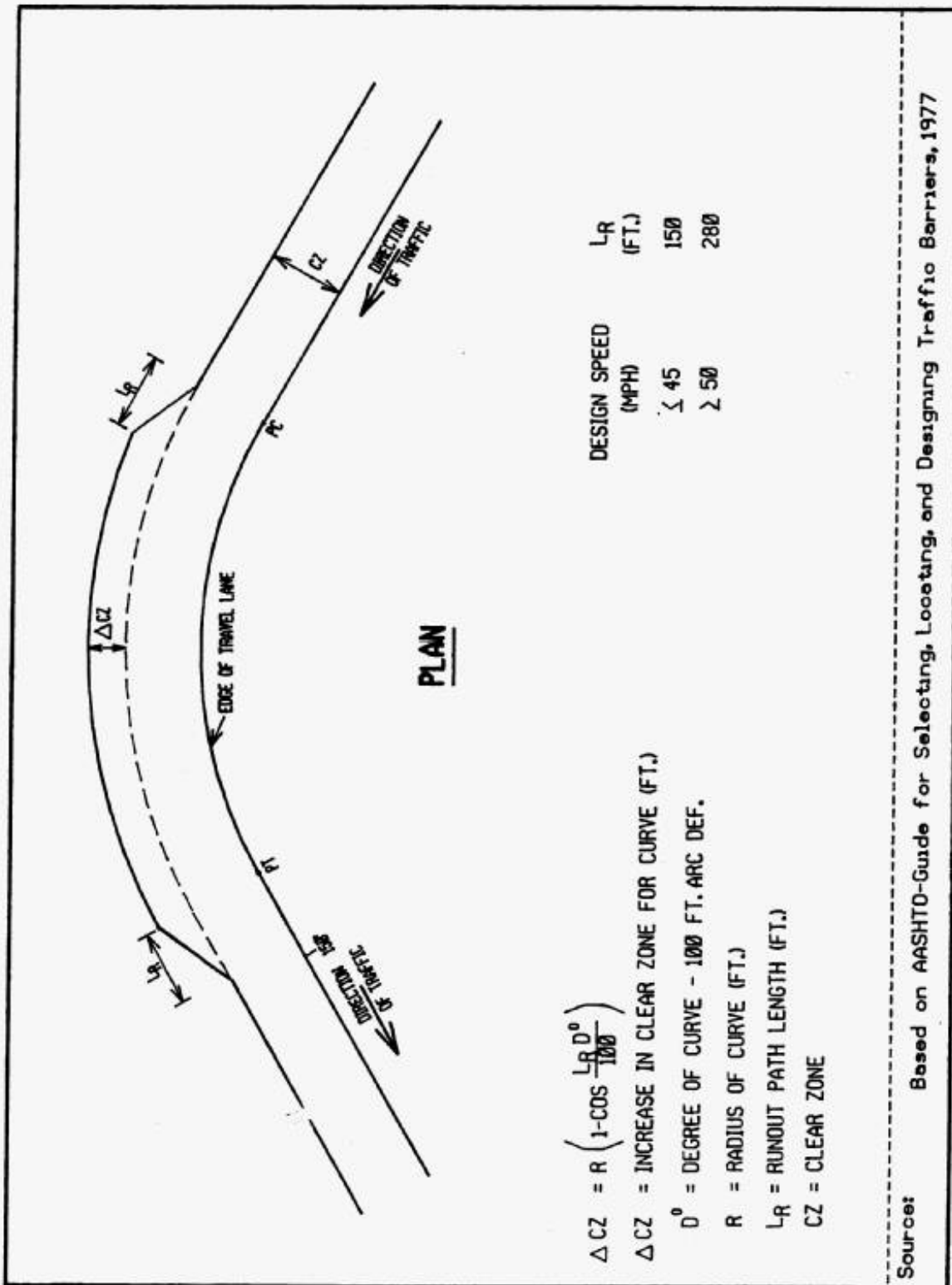


Figure 6-5 Typical Existing and Newly Planted Trees in Median

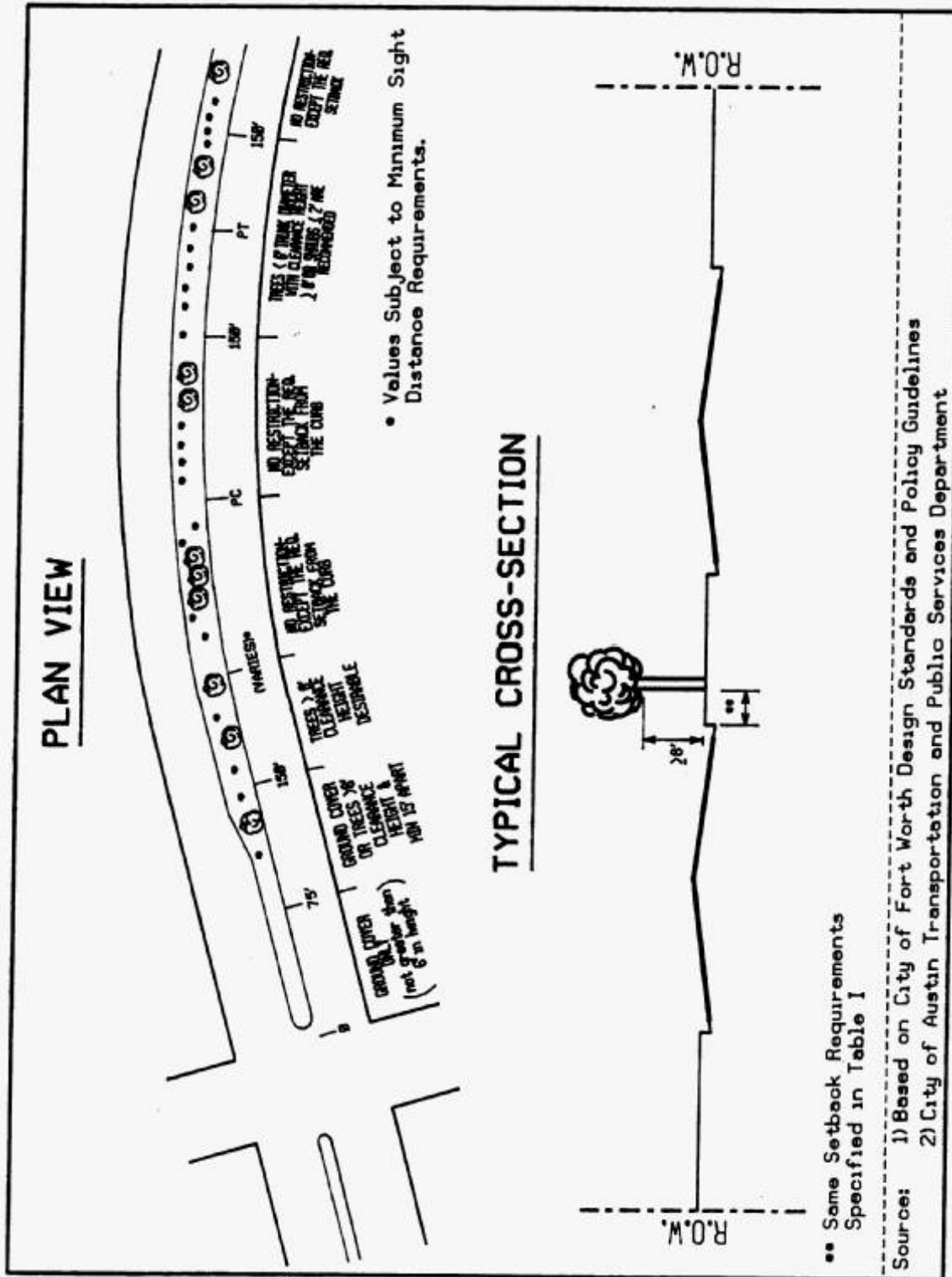


Figure 6-6 Landscape Requirements within Intersectional Sight Triangle

