Roadside Safety Landscaping Guidelines

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Roadside Safety Landscaping Guidelines

1 PURPOSE

1.1 GENERAL

These guidelines provide direction for landscaping within highway rights-of-way. They should be used in conjunction with the ODOT Location and Design Manual (LDM), Volumes One, Two and Three and other applicable standards, policies and guidelines. The information provided in this guide is primarily safety-related and is intended for use by designers who already possess a good working knowledge of roadside safety design and landscape design. ODOT’s Vision is to provide a safe and mobile transportation system. Landscape projects, therefore, shall be designed with the safety of the traveling public and maintenance crews as the top priority.

1.2 BACKGROUND

The basis for these guideline stems from the fact that trees are a major cause of injuries and fatalities on the nation’s highways. While it is a Policy within ODOT to increase the amount of aesthetics on the State highway system, and these guidelines tries to encourage that end, it cannot be understated: trees are proven killers when placed by the roadside. The following guidelines follow the principles offered by AASHTO’s Roadside Design Guide. Single vehicle crashes with trees account for 3,000 persons each year nationwide. Trees are not generally a highway element that engineers have control over, except in landscaping projects where the designer can make decisions to reduce the consequences of vehicles leaving the road.

1.3 ADDITIONAL INFORMATION

This guideline is written for primarily the roadside safety aspect of landscaping. However, by necessity, this guideline contains other information for the landscape designer to consider in developing themes, schemes and layouts. But in no way is this information considered to be all inclusive and designer information is available through ODOT's Design Aesthetics initiative and ODOT's Gateway Landscaping Program. Also, non-intrusive plant lists, plants hardiness in the harsh roadway environment, and other assistance may be obtained from ODOT's Landscape Architects. The Standards section in the Office of Roadway Engineering is available for assistance with roadside safety design.

2 GENERAL SAFETY

Trees are potential obstructions by virtue of their size and their location in relation to vehicular traffic. Generally, existing trees with an expected mature size of greater than 4 inches are considered fixed objects. Landscaping elements shall be selected and located to maintain adequate sight distances and clear zone setbacks. These elements shall not interfere with the function of the pavement, shoulders, longitudinal barriers, end treatments, drainage systems, traffic signs, signals, utilities and other highway structures and appurtenances.

3 PLAN REQUIREMENTS

3.1 PRELIMINARY FIELD REVIEW

All landscape projects should involve a preliminary field review prior to the scoping meeting with the consultant/designer and a district/county designee(s) knowledgeable in landscape design and roadside design/safety. At the preliminary field review, conceptual locations available for planting wildflowers, seedlings, trees, shrubs and other landscaping elements should be identified.
3.2 SCOPING

Experience has shown that proper project scoping is invaluable in heading off later misunderstandings between landscaping proponents and highway engineers. Agreeing in advance of the project to require detailed plans, permissible landscape elements, final field reviews, and maintenance agreements are important to providing a beautiful, yet safe roadside landscaping.

3.3 LANDSCAPE PLAN DETAILS

Landscape plan should be concise and easily understood. Plans should be drawn to scale and developed on standard plan and profile sheets. Plans should indicate the following:
- design and legal speeds for the landscaped roadways
- type of adjacent land use (e.g., farmland, commercial, residential, etc.)
- topographic features such as slope limits and slope rates
- contour grading at interchanges is preferred
- locations of all utilities
- location and descriptions of existing landscaped areas
- location of all existing longitudinal barriers, end treatments, impact attenuators, curbs and sidewalks
- location and configuration of ditches and other drainage features
- plant lists (including botanical and common names)
- size and spacing of plants as well as area of occupancy at maturity

Although many landscape designers desire to use “conceptual” layouts, it is imperative for the highway engineer to have as much of the above information as possible in a standard format to make informed decisions on the safety merits of the plan. Omission of such information will only lead to delays, and possibly to denial of otherwise acceptable planting arrangements.

3.4 PERMIT APPLICATIONS

Requests for a permit shall include landscape plans as described in Section 3.3 and be directed to the District Deputy Director. A Maintenance & Repair permit application (M&R 505) can be obtained from the District Permit Office. The District should consult the ODOT County Manager before issuing the permit to ensure coordination of different projects scheduled in the same area.

3.5 FINAL FIELD REVIEW

After the plans have been accepted and all permits have been approved, the consultant/designer and a district/county designee(s) knowledgeable in landscape design and roadside design/safety should conduct a final field review.

4 LANDSCAPE DESIGN CONSIDERATIONS

4.1 GENERAL

Landscape design can serve several important functions within the highway environment. In addition to making the roadway more aesthetically pleasing, landscaping can also be used to do the following:
- control erosion
- create a living snow fence
- minimize maintenance requirements and costs
- screen undesirable views
- preserve desirable views
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- shield headlight glare
- preserve/enhance the natural environment
- reduce unwanted noise, and possibly to serve as a substitute for noise barrier at the request of a local community (see Vegetative Screening in lieu of Noise Barrier in Appendix A of this Guideline)

Landscaping projects must be done as a part of a community sponsored comprehensive plan. The plan must be sponsored by the public agency that will also be responsible for maintenance of the landscape features. Landscaping at an interchange should incorporate the entire interchange rather than just individual ramps. Landscaping may be permitted along highway segments if it is sponsored and maintained by a public agency. The goal is to provide a community endorsed, consistent theme along the highway rather than isolated, independent projects. Landscaping that contains advertising or company logos will not be permitted. It is permissible for individual property owners abutting the highway to request a permit to clear, mow, or plant replacement trees along their frontage to improve the visibility from the highway per Standard Procedure 512-001 Vegetation Maintenance Permitting for Visibility of Locations Off the Right-Of-Way.

It is recommended that designer choose plants carefully. Highway plantings used in the roadside environment should be hardy for the Planting Zone, salt sprays, and air pollutants (see Section 6).

Trees are not to encroach on the sights distances, have trunks greater than 4” mature diameter when planted in certain locations, or have canopies that will encroach over the road.

Highway landscaping should result in designs that do not require extensive maintenance. In fact, at the end of the five year maintenance period described in Section 8.1, landscaped areas should not require any more maintenance than the natural roadside. Therefore, plant materials noninvasive to the area should be used whenever practical.

4.2 LANDSCAPING ELEMENTS & FIXED OBJECTS

Landscaping elements may consist of natural as well as manmade features, e.g., groundcovers, flowers, trees, and pavers. Many of these features such as most groundcovers and pavers allow a vehicle to safely pass over them and, therefore, do not pose a significant risk to an errant motorist. However, other features may be considered fixed objects and are, therefore, potential safety hazards. In general, a fixed object is any object that cannot be driven over safely by an errant vehicle. This includes but is not limited to the following:

- individual trees with a trunk caliper (diameter) greater than 4 inches at maturity, trunk caliper is measured at Dead Breast Height (DBH) or 54” up from the ground,
- clusters of smaller caliper trees or shrubs with multiple trunks or groups of small trees planted close together (within 6 feet), where the sum of their calipers at maturity exceeds 4 inches,
- decorative walls,
- rock formations and other free standing objects or fixed objects with a diameter or height greater than 4 inches. Fixed objects shall not be installed within medians or along the roadside within the setback areas specified in Section 5.

4.3 BODIES OF WATER

Bodies of water present unique safety concerns. The department recommends the use of longitudinal barriers to protect naturally occurring ponds located within the setback areas. Ponds/pools and other landscape water features shall not be built within highway rights-of-way. This does not preclude the construction of treatment ponds or water retention basins within the right-of-way when mandated in the environmental process.
4.4 ACCESSORIES

In community gateways and downtown business districts many municipalities seek to install street furniture, pavers, bollards, ornamental lighting, planters and other landscaping features to the design. Features within the lateral offset distances described in Figures 2a-2d are to be crashworthy, as specified in NCHRP Report 350 or MASH. Amenities located beyond the appropriate offset distances shown in this guideline may be allowed. Any feature placed within ODOT’s Right-of-Way is allowed solely at ODOT’s discretion. Landscaping plans that include decorative signs must conform to Section 210-3 of the Traffic Engineering Manual.

4.5 IRRIGATION SYSTEMS

Many lavish plantings are doomed to die unless maintenance is provided. Some communities protect their investment by installing irrigation systems. Irrigation systems cannot be a hazard to the motorist. Systems cannot have hazardous stub heights (4” diameter max.), exposed pipes or meters in the specified offset distance. Nor should the spray be directed to the roadway, nor is ponding or sheet flow permitted on the traveled way. In all cases, maintenance and repair of irrigation systems will be the responsibility of the project sponsor.

5 PLACEMENT FOR SAFE ROADSIDE DESIGN

5.1 ROADSIDE GRADING

Since operational safety can be affected by the landscape, a continuous length of the highway must be visible to the driver (sight distance) and a lateral run out area (clear zone) must be traversable and free of physical obstructions.

Clear zones provide areas for drivers of errant vehicles to regain control after running off the road. Although minimum setbacks for large trees and other fixed objects are prescribed in the following sections, consideration should be given to providing additional clearance where practical. Setback distances are measured to the face of the fixed object from the traveled edge line of the adjacent roadway. For facilities with curb and gutter, setback distances are measured from the face of curb to the face of the object. Bike lane and parking lane widths may be included in the setback distance. For trees, this measurement shall be taken to the face of the trunk 2 feet above the ground line.

Large trees and shrubs may be planted within the setback limits specified in this guide where the likelihood of an impact by an errant vehicle is negligible; for example, on cut slopes above a retaining wall or behind existing longitudinal barrier. See LDM, Volume One, Section 307 for details on the following types of grading, Section 600 for clear zone criteria, and Section 201 for details on required sight distances.

5.1.1 Safety Graded Sections

Safety grading is the shaping of the roadside using 6:1 or flatter slopes within the clear zone area and 3:1 or flatter foreslopes with traversable ditches beyond the clear zone. Safety grading is used primarily on Interstate, other freeways and expressways. Trees and large shrubs shall not be planted within 50 feet of the edge of the traveled way on safety graded sections. Low maintenance flowers, ground covers and other plants 18 inches or less in height at maturity may be located within this setback area as long as adequate sight distance is provided. See LDM, Volume One, Figure 307-1 for Safety Grading.
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Trees and other plants taller than 18 inches may be located beyond this setback distance with the following restrictions:
- These plants shall not be located within a ditch or on a backslope within 20 feet of the ditch flowline.

5.1.2 Clear Zone Graded Sections

Clear zone grading is the shaping of the roadside using 4:1 or flatter foreslopes and traversable ditches within the clear zone area. 3:1 traversable foreslopes may be used but are not considered part of the clear zone. Clear zone grading is used primarily on high speed undivided rural facilities.

Trees and large shrubs shall not be planted within 30 feet of the edge of the traveled way on clear zone graded sections. Low maintenance flowers, ground covers and other plants 18 inches or less in height at maturity may be located within this setback area as long as adequate sight distance is provided. See LDM, Volume One, Figure 307-3 for Clear Zone Grading.

Trees and other plants taller than 18 inches may be located beyond this setback distance with the following restrictions:
- These plants shall not be located on foreslopes
- These plants shall not be located within a ditch or on a backslope within 10 feet of the ditch flowline

5.1.3 Common Graded Sections

Common grading is the shaping of the roadside using 3:1 or flatter foreslopes and normal ditches. It is used primarily on undivided facilities where the conditions for using clear zone or safety grading do not exist.

Plantings shall be located at least 4 feet behind the ditch line in cut sections and 2 feet outside the shoulder break in fill sections. See LDM, Volume One, Figure 307-4 for Common Grading.

5.1.4 Barrier Graded Sections

Barrier grading typically utilizes 2:1 foreslopes and normal ditches. It is usually provided when barrier is required for slope protection.

An ideal location for large trees and shrubs is behind existing longitudinal barriers, provided the landscape designer allows for a maintenance access. The lateral offset to these plants shall be 15 feet measured from the face of a w-beam barrier to allow the barrier to deflect to its design deflection in an accident, but to also allow maintenance vehicles to navigate on the back side of the barrier. Other types of barriers have different deflection limits. Barriers shall not be installed solely to permit the use of large trees or other potentially hazardous landscaping elements along the roadside. See LDM, Volume One, Figure 307-4 for Barrier Grading.

5.1.5 Gating End Terminals

Advances in the performance of guardrail end terminals and impact attenuators (crash cushions) have dramatically increased the safety of the traveling motorist. Many of these systems are designed to be "gating" (or "non-redirective") in certain types of impacts. Gating terminals function successfully by allowing approaching vehicles to pass through (or "gate") the very end of the end terminal. Impacting vehicles are only slightly impeded by the interaction with the terminal, and possibly still are traveling at a high speed. Thus, no fixed objects are allowed in a runout area that is defined by FHWA to be a minimum of 20 feet wide behind and perpendicular to the rail and 75 feet long beyond the terminal parallel to the rail. Figure 1 shows the permitted landscaping offset needed to protect this runout area behind gating terminals.
If the landscaping designer does not know which treatment is used at the end of a guardrail run, for the purpose of the landscaping plan it will be considered to be gating. All associated runout areas will remain free of fixed objects.

### 5.2 URBAN DESIGN

Roadside Grading section (5.1) generally deals with high speed rural roadways. Municipalities may desire to landscape gateways into their communities, which is often a state highway or an interchange that leads to an arterial. The highway facilities in these gateways are often roadways with lower speeds than found on the rural state system. These roads may be lower speed, divided or not, or curbed or not. The following discussion gives highway engineers and landscape designer’s additional guidelines for placement of large trees, small trees and foliage in urban areas. Other landscaping features, such as lighting, stones, boulders, bollards, or water ponds, etc. are to meet guidelines listed elsewhere.

Refer to the Figures 2 through 4 for treatment in curb sections and/or medians. Curbing is considered mountable, a vertical 4-inch curb (or even 6 inches or more) is not going to stop a vehicle. Large trees are considered to be non-frangible and have a final (mature) trunk diameter of 4 inches or greater. The sum of the individual trunk dimensions of multi-stemmed tree are considered as one object over a 6-foot vehicle width. Setbacks in curbed sections are from the front face of the curb unless bike lanes or full-time parking lanes are present. Since urban tree locations have considerably less offset than high speed facilities, vertical clearance becomes an issue. All trees, especially those planted close to a curb will have their canopies clipped by trucks in the lane adjacent to the trees. Plant trees to ensure their mature canopy will not infringe on this area.

See Figures 2a-2b, 600-3, 600-4 for these design conditions (valid only in urban type areas):

### 5.3 HIGHWAY DESIGN ELEMENTS

Certain highway features provide a special opportunity for communities to express themselves through landscaping. Interchanges and intersections are ideal locations, although they do require special attention by designers.

#### 5.3.1 Interchanges

Interchanges provide an opportunity for establishing and/or preserving attractive landscapes along our highways. Because an interchange often serves as a major focal point, both from the highway and from the cross road, the major components should be coordinated to achieve an overall design that is aesthetically pleasing. Major components of an interchange include: structural design, texture and detailing, railings, lighting, contour grading and plant material.

Generally, a minimum 50-foot setback (from the edge of traveled way) within a loop ramp is considered an appropriate sight distance setback for trees and shrubs with mature heights above 18 inches. Figures 5 and 6 provides details for landscape plantings at cloverleaf and diamond interchanges. For interchanges, all plantings shall provide ramp and collector-distributor road sight distances equal to or greater than those required by the design speed criteria in the LDM, Volume One, and Section 201.

#### 5.3.2 Intersections

A driver attempting to enter a through road must be able to see traffic at a distance along the intersecting road in order to safely enter the intersection. The required intersection sight distance varies with the speed of the traffic on the main highway. LDM, Volume One, Section 201.3 provides standards for various intersection sight distance conditions. The triangular setback areas shown in Figure 7 are based
on these principles. No plantings above 18 inches shall be permitted within these setback areas. This figure shows a tangent condition; a graphical solution is required when the through road is curved.

In general, an offset of 50 feet on the inside of a curve with a degree of curvature of 2 degrees or greater should be provided to ensure adequate horizontal sight distances.

5.4 ADDITIONAL PLANTING CONSTRAINTS

Accident Locations - Offset distances greater than the minimum setbacks should be considered at locations with a history of run-off-the-road crashes.

Agriculture - Plants shall not obstruct, shade, or cause harm to crops planted in adjacent farm fields. When wind breaks and living snow fences are proposed adjacent to agricultural use properties, permission to plant should be obtained from the property owner.

Billboards - Plants shall not obstruct the view of billboards. However, naturalized trees blocking billboards should be cut only with permission of the district. This work shall be done by permit using a certified arborist.

Businesses - Trees, shrubs and wildflowers should be planted to blend in with the natural environment.

Canopy Obstruction - Trees and shrubs shall be offset far enough from the edge of the traveled way to prevent damage to vehicle windshields or interference with overhead utilities and signals.

Ditches - No planting other than seeding shall occur within ditches.
Irrigation Systems - Irrigation systems should be designed to minimize overspray onto the traveled way. The systems should be located so that the potential for damage to and from vehicles is prevented.

Scenic Views - Materials should be selected and placed to preserve desirable scenic views along the roadside.

Sight Distance - Proposed plants shall not restrict the horizontal and vertical sight distance of the roadway. Although the minimum setbacks provided in these guidelines were selected to ensure adequate sight distances, this should be field-verified and the setbacks shall be increased where necessary. In cases where an existing facility does not already provide adequate sight distance because of geometric restrictions, no further reduction of the sight distance shall be allowed.

Slopes - Evergreen and deciduous seedlings are the preferred vegetation; mature trees may be used when required for mitigation. Wildflower and native grasses (Construction and Material Specification (CMS) 870, Seed Mixtures Table) may be used with District Deputy Director approval.

Snow Fence - Only evergreens may be planted as living snow fence. Multiple rows shall be staggered. A general rule of thumb is that snow will be deposited on the leeward side of a snow fence over a distance approximately equal to the height of the snow fence. Care should be taken to ensure that the snow fence is planted far enough from the edge of the pavement to prevent snow from being deposited onto the roadway. (Also see Windbreak.)


6 PLANT MATERIAL
Designers who desire to obtain a list of acceptable plants, several planting lists are available through ODOT Central Office, or certain ODOT District Offices.

**6.1 NATIVE OR NON-INFRINGEMENT PLANTS**

All plant material shall be disease and pest free. A copy of the nursery inspection should be made available upon request.

**6.1.1 Wildflowers**

Wildflower sites should be composed of Ohio native perennial forbs and grasses. Other mixtures should be approved by the District Deputy Director, or designated employee. Wildflower areas should be designated as _No Mow._ See CMS Item 659.09 for available species acceptable for planting on the Right-of-Way.

**6.1.2 Seedlings**

Both Deciduous and Evergreen Seedlings should be salt tolerant and planted area should be signed as "No Mow."

Evergreen Seedlings may be used to create living snow fences and screenings. Locations include but are not limited to:
- slopes
- erosion prone areas
- interchanges (see Figures 5 and 6)

**6.1.3 Trees and Shrubs**

Site design should use plant materials in a way that is low maintenance, has multi-seasonal interest and looks natural. Approval of locations should be based on safety, aesthetics and maintenance concerns. Typically trees and shrubs may be planted in the spring and fall. However, for optimum growth, trees shall be planted during the months recommended for the individual species.

**6.1.4 Species**

An acceptable list of tree and shrub species is available in the Ohio section of The Roadside Use of Native Plants, FHWA ep-99-014 or the Ohio State University Extension Office’s _The Native Plants of Ohio_ (Bulletin 865, 1998), http://ohioline.osu.edu/b865/. It is preferable that non-invasive species be used. Hybrids and cultivars may be substituted only with permission from the District Deputy Director, or designated employee, when native species are not available.

**6.2 ZONES**

All trees shall be suitable for growth in Ohio Zone 5a or lower (USDA Hardiness Zones). Trees should be from Ohio growers whenever practical.

**6.3 EMERALD ASH BORER INSECT**

Landscape designers should be aware of the infestation of ash trees throughout Northwest Ohio and the efforts of Ohio Department of Agriculture (ODA) to combat this insect, which kill ash trees within three to five years from infestation.

It is recommended to refrain from planting ash trees for the next several years. If a landscaping project is utilizing exiting ash trees in the design, then trees should be monitored for Emerald Ash Borer signs,
which can be found at the ODA website at [www.ohioagriculture.gov/eab](http://www.ohioagriculture.gov/eab). (Some of the signs are "D" shaped exit holes, "S" shaped tunnels beneath the bark, dieback at the tops of the trees, sprouting around the trunk, woodpecker damage, or bark splits.) For more information about the pest, its current status, or ways to assist in early detection, calls the Emerald Ash Borer hotline at 1-888-OHIO-EAB.

**7 PLANTING**

Planting and bracing details are shown on Roadway Standard Construction Drawing LA-1.2.

Planting trees and shrubs too deeply is a persistent problem. To address this problem, the Ohio Nursery and Landscape Association and the ODNR Division of Forestry developed a set of tree planting specifications. This effort, called "Sample Tree Planting Specifications" is included as Appendix B at the end of this Guideline.

**8 MAINTENANCE**

**8.1 GENERAL**

Unless otherwise specified, all maintenance of all plants shall begin upon installation and be arranged by the project sponsor. Plants shall be maintained by the permit holder for at least five years. The Department should inspect the landscape during this time and require maintenance as needed.

Refer to the CMS 651 thru 673 for detailed roadside installation and maintenance requirements. See M&R 632 for mowing specifications.

Maintenance shall include but not be limited to:
- watering, pruning, mowing, and replacement
- weeding, fertilization, mulching
- removal
- litter pick up
- insect control (by a licensed applicator, when required)
- herbicides (by a licensed applicator)

**8.2 WATERING, PRUNING, MOWING, AND REPLACEMENT**

Watering - watering of the new plant material is essential for their survivability, and is the responsibility of the project sponsor.

Pruning - All trees and shrubs shall be maintained and only pruned as necessary to retain their natural shape or remove deadwood. For example, water sprouts (suckers) shall be removed from the base of each species as needed.

Mowing - Trees should be spaced sufficiently far apart and shrubs should be grouped and mulched in beds shaped to avoid excessive mower maneuvering and the need for hand trimming.

Replacement - All dead, dying or diseased plants shall be removed and disposed of in an appropriated manner. Replacement shall be left up to the project sponsor.

**8.3 PLANTING STAKES**
Trees planted with support stakes and guy wires shall have all such appurtenances removed no less than 12 months and no more than 18 months after installation.

8.4 WINTER HAZARDS

Landscaping shall not reduce safety for the traveling public or maintenance crews. Trees and shrubs should be placed in locations and trimmed to a size that does not hinder snow and ice removal. Removal or thinning of trees that shade the pavement creating icy spots should be considered. Some sections of the roadside should be kept open to allow sunlight to aid new tree growth.

8.5 MAINTANCE OF "NO MOW" AREAS

Naturalized (No Mow) areas can have a "neat" appearance without the removal of trees or shrubs. These areas within ODOT Right-of-Ways are frequently maintained by municipalities. If a community desires to maintain ODOT’s Right-of-Way, an M&R 505 permit is required. Districts offices should also receive a maintenance plan from the community. If maintenance of Right-of-Way areas is done without obtaining the permit, communities can be held liable and be made to perform restitution.
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GATING GUARDRAIL END TERMINALS OFFSETS

FIGURE 1
**FIGURE 2a Urban Landscaping 45 mph or less**

Typical Curbed Section

**CURBED SECTION**

1.5' Min. from Curb Face

4' Min.

From Traveled Edge to Tree or Non-Fragile Fixed Object

16' Vertical Clearance

Bike Lane

Parking Lane

1.5' Min. from Curb Face

**CURBED SECTION**

16' Vertical Clearance

Parking Lane

1.5' Min. from Curb Face

From Curb Face 4' To Tree or Non-Fragile Fixed Object

*6' Min. in high risk areas such as outside of curves*
Typical Uncurbed Section 45 mph or less

**FIGURE 2b Urban Landscaping**

**SHOULDER SECTION**

- **Fill Slope**
- **Cut Slope**
- 16' Vertical Clearance
- 8' From Traveled Edge To Tree or Non-Fragile Fixed Object*
- Ditch 5'

**NOTE:**
WHEN THE WIDTHS OF THE SHOULDERS AND DITCHES DO NOT CONFORM WITH THESE TYPICAL SECTIONS, THE 2' MIN. DISTANCE BEHIND THE DITCH AND 2' MIN. DISTANCE OUTSIDE THE SHOULDER BREAK SHALL GOVERN.

*12' Min. in high risk areas such as outside of curves
GUIDE FOR LANDSCAPE PLANTING AT CLOVERLEAF INTERCHANGES

FIGURE 3
GUIDE FOR LANDSCAPE PLANTING AT DIAMOND INTERCHANGES

FIGURE 4
These distances apply where speeds do not exceed 55 MPH.

Low plantings not to obstruct driver's view permitted in these areas, except on shoulders and ditches.

LANDSCAPING SETBACKS AT INTERSECTIONS

FIGURE 5
# Appendices

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Appendix A

VEGETATIVE SCREENING IN LIEU OF NOISE BARRIER

NOTE: VEGETATION IN LIEU OF A NOISE BARRIER IS INTENDED TO PROVIDE
PSYCHOLOGICAL RELIEF AND IS NOT INTENDED AS A NOISE ABATEMENT MEASURE.
The provided drawing is an example. Alternative planting designs
may be submitted for approval from the ODOT Noise Coordinator.
All plantings must provide 100% opacity year round to a height of 6'
within 3 years of installation.

PLACE EVERGREEN TREES IN AN OFFSET PATTERN WITH ROWS 8’ APART AND 8’ ON
CENTER. PLANT TREES IN SINGLE SPECIES MASSES OF AT LEAST 15 TREES. PLANT
MINIMUM 5’ TALL EVERGREEN TREES FROM THE FOLLOWING LIST: CHAMAECYPARIS
THYOIDES - ATLANTIC WHITE CEDAR, JUNIPERUS VIRGINIANA - EASTERN REDCEDAR,
PICEA ABIES - NORWAY SPRUCE, PICEA PUNGENS - COLORADO SPRUCE,
PINUS NIGRA - AUSTRIAN PINE.

PLACE SHRUBS IN STAGGERED ALTERNATING ROWS WITH PLANTS 3’ ON CENTER,
PLANT SHRUBS IN SINGLE SPECIES MASSES OF A MINIMUM 25 PLANTS. ALTERNATE
EVERGREEN AND DECIDUOUS SHRUB MASSES. PLANT MINIMUM 3’ TALL SHRUBS
FROM THE FOLLOWING LIST: VIBURNUM PRUNIFOLIUM - BLACKHAW VIBURNUM,
ARONIA MELANOCARPA - BLACK CHOKEBERRY, CEANOTHUS AMERICANUS -
NEW JERSEY TEA, JUNIPERUS COMMUNIS - COMMON JUNIPER (CULTIVARS -
'COMPRESSA', 'DEPRESSA', 'HILLS VASEYI' AND OTHERS WITH A SIMILAR HABIT).
Appendix B

SAMPLE TREE PLANTING SPECIFICATIONS

Endorsed by
Ohio Nursery and Landscape Association and ODNR Division of Forestry

Purpose: To increase transplanting success by providing municipalities with the most current and acceptable tree planting procedures. This information, prepared in specification format, will enable communities to convey specific requirements to contractors, developers, and/or volunteers. It contains the fundamental elements necessary to ensure transplanting success, and is intended to be a template that can be expanded to address other project issues.

Endorsement: This information is approved and endorsed by the Ohio Nursery and Landscape Association, and the Ohio Department of Natural Resources Division of Forestry.

Assumptions: All plant material complies with American Standard for Nursery Stock ANZI Z60.1. All plant material has been selected based on site conditions and constraints.

Planting Balled and Burlapped Trees:
- If not readily apparent, locate root flare by removing twine, burlap, and excess soil.
- Dig tree hole at least two times wider than the tree ball, with sides sloped to an unexcavated or firm base. Dig hole to a depth so the located root flare, at the first order lateral root, will be at finished grade.
- Lifting only from the bottom of the root ball, position tree on firm pad so that it is straight and top of root flare is level with the surrounding soil.
- Remove all twine from the root ball. If present, remove and discard at least the top one half of the wire basket. Burlap shall be removed from the top to a point halfway down the root ball and discarded.
- With clean, sharp pruning tools, prune off any secondary/adventitious, girdling, and potential girdling roots.
- Backfill planting hole with existing unamended soil, and thoroughly water.
- Mulch the entire planting surface with composted bark applied no less than two inches (2") deep and no more than three inches (3") deep, leaving three inches (3") adjacent to the tree trunk free of mulch.

Planting Containerized or Grow Bag Trees:
- If not readily apparent, locate root flare by removing excess soil.
- Dig tree hole at least two times wider than the tree ball with sloping sides. Dig hole to a depth so the located root flare, at the first order lateral root, will be at finished grade.
- Create a firm soil mound at the bottom of the planting hole.
- Remove tree from container or grow bag and completely tease apart root system, repositioning any girdling or potentially girdling roots.
- Spread roots over soil mound so that root flare is at finished grade and the tree is straight.
- With clean, sharp pruning tools, prune off any secondary/adventitious, girdling, and potential girdling roots.
- Backfill planting hole with existing unamended soil and thoroughly water.
- Mulch the entire planting surface with composted bark applied no less than two inches (2") deep and no more than three inches (3") deep, leaving three inches (3") adjacent to the tree trunk free of mulch.

Planting Bare Root Trees:
- Dig tree hole at least two times wider than the tree ball with sloping sides. Dig hole to a depth so the located root flare, at the first order lateral root, will be at finished grade.
- Create a firm soil mound at the bottom of the planting hole.
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- Spread roots over soil mound so that root flare is at finished grade and the tree is straight.
- With clean, sharp pruning tools, prune off any secondary/adventitious, girdling, and potential girdling roots.
- Backfill planting hole with existing unamended soil and thoroughly water.
- Mulch the entire planting surface with composted bark applied no less than two inches (2") deep and no more than three inches (3") deep, leaving three inches (3") adjacent to the tree trunk free of mulch.