

Replacing Plants in the Landscape Maintenance Zone



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When should I replace a plant in the Landscape Maintenance Zone?

Removal of all dead vegetation that is part of the landscape design should be carried out as soon as dead plants are noted, or at the notification of the Engineer.

All dead plants must be replaced within four weeks after notification from the Engineer. If Contractor does not complete the replacement on time, the work will be done by others at Contractor's expense.

Contractors are responsible for removing and replacing all dead trees, ground cover or shrubs.



Who is responsible for paying for the replacements?

Contractors are responsible for the cost of the plants and the labor if it is determined that the cause of plant death was due to:

- ▶ Attacks by pests and/or diseases that can be controlled with normal maintenance approved products.
- ▶ Lack of water due to failure of an irrigation system under your care.
- ▶ Incorrect management practices.
- ▶ Maintenance negligence as determined by the Engineer.
- ▶ Invasive species competition.
- ▶ **If the Contractor can show that the cause of death of desired vegetation was not due to any of the above reasons, the State will furnish a similar plant. The Contractor will be responsible for replanting and follow-up maintenance.**

Cases where the State pays for labor and materials:

- ▶ Damage due to vehicle accidents.
- ▶ Abnormal storms (winds over 50 mph, floods, fire and drought).
- ▶ Vandalism.

Plants damaged by vehicles or vandalism shall be replaced within four weeks of notification from the Engineer and cost of replacement vegetation, including labor, shall be paid on a "cost plus" basis by the State through the "Miscellaneous Work" section of the contract.

HDOT employee's role for the replacement of dead vegetation:

- ▶ In most rural areas where the vegetation is maintained by HDOT, it is the responsibility of the State vegetation maintenance crew to inform the Engineer who will determine if the vegetation will naturally regenerate or need to be replaced.



What guidelines should I follow when replacing vegetation?

Follow the guidelines listed below when replacing plants within the Landscape Maintenance Zone:

- ▶ Replace a plant with the same species or with an appropriate non-invasive or native alternative, with a similar mature spread and height as determined by the Engineer. For assistance with proper selection, contact the Highways Division, Design Branch.
 - After plant selection at the plant nursery or location of purchase, plants will be inspected by the Engineer before and after delivery to the project.
- ▶ The Engineer will tag trees only with consecutively numbered plastic tamper-resistant self-locking seals. Seals may be obtained from the Design Branch. Seals shall remain on trees and only be removed by the Engineer. Plants not conforming to the Contract requirements will be rejected.
- ▶ All plants shall be replaced within four weeks of removal.
- ▶ All replaced plants should be irrigated and otherwise maintained during a six- to nine-month period of establishment.
- ▶ All replaced plants will be maintained on the same schedule and in the same manner as all other existing plants under your care.
- ▶ Provide additional care until established.

Eco

Be a good steward. Always replace a plant with a non-invasive or native alternative that is ecologically and culturally appropriate for that location.





What are the best management practices for planting trees and shrubs?

Plant selection

It is important to select good quality plant material for these reasons:

- ▶ Higher survival rate after planting.
- ▶ Longer lifetime in the landscape.
- ▶ Shorter establishment time needed.
- ▶ Less likelihood of structural failure due to structural defects.

Remember

Replacement plants must be the same species, naturally occurring at the site, or a non-invasive or native alternative with a similar mature spread and height.



Quality characteristics to look for:

Root ball



A well-formed root ball.



Don't select trees with girdling roots.



Root collar at top of root ball

- ▶ Healthy, well-formed structure:
 - **Tall root balls** help keep deeper roots moist after planting.
 - **Wide and shallow root balls** are better for poorly drained and compacted soils, but dry out quicker in well-drained soils.
- ▶ No girdling roots or roots with a black color.
- ▶ Root collar at or near top of root ball and clearly visible above finish grade.
- ▶ Root ball size in proportion to caliper and height of trunk.
 - Larger root balls are better than smaller ones.

Trunk structure

Choose trees properly pruned in the nursery to have good structure:

- ▶ Single, straight trunk.
- ▶ Good branch arrangement.
 - Branches less than 2/3 trunk diameter.
 - Main branches well spaced.
- ▶ No signs of previous injury or broken branches.
- ▶ No signs of disease or insects.
- ▶ Healthy dark green leaves.

Tree size at planting

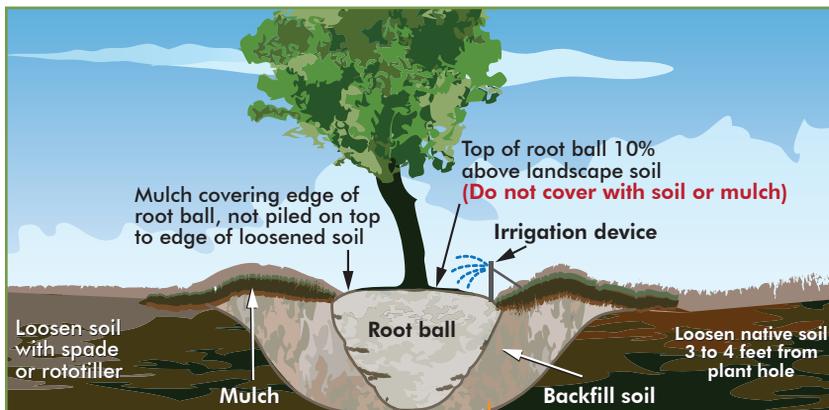
Unless plenty of water can be supplied on a regular basis, it is better to plant smaller trees.

Advantages of planting smaller trees where water is limited:

- ▶ Less time to water and less water required.
- ▶ Significantly faster growth rate.
- ▶ Shorter establishment period.
- ▶ Greater chance for survival.
- ▶ Less expensive to purchase and plant.

Steps for proper planting

A wide and shallow planting hole works best.



**2-3 x width
of root ball**

Illustration of a proper planting hole

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- ▶ Remove plant from container or remove all wrapping if field grown.
 - Do not leave any strings or wires in the root ball.
- ▶ Measure size of root ball – depth and width.
- ▶ Dig planting hole at least twice as wide and a few inches shallower than the depth of root ball.
- ▶ Place tree in hole on firm unloosened soil.
 - Lift tree by supporting the root ball, not by the trunk.
 - Trunk flare should be at least one or two inches above the soil line.
 - In poorly drained soils dig shallower hole. Top of root ball will be even higher above soil line.

Do not cover top of root ball

Bottom of trunk should never be covered with soil or mulch because this may result in the decay of the bark and eventual death of the plant.



- ▶ Add backfill soil and firm around root ball to original soil line.
- ▶ Fertilize only if soil test shows low phosphorus levels.
- ▶ Loosen soil around the edges of planting hole.
 - Spade or rototill to loosen several feet around edge. The more, the better.
 - This allows for new roots to easily grow out of root ball and into native soil.

Watering

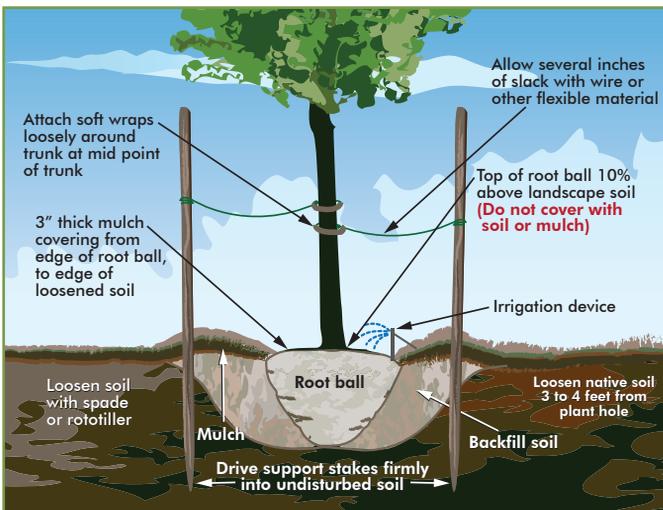
- ▶ Build a circular watering well around the edges of the root ball.
- ▶ Add water directly over the root ball to thoroughly wet the planting hole:
 - 10 to 20 gallons for a five-gallon pot or root ball, more for larger root balls.
- ▶ If irrigation is not available use watering bags, such as Spectrum Products®, TreeGator® drip water bags.

Mulching

- ▶ Cover the walls of the watering well and the loose soil outside the well with a 3-inch thick layer of wood chip mulch.
- ▶ Do not put mulch within 12 inches from the base of the trunk.

Staking

- ▶ Small palm trees and shrubs may not need stake supports.



2-3 x width
of root ball

Illustration of proper staking

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- ▶ Follow instructions for staking in contract documents if available.
- ▶ Drive two support stakes firmly into the ground on either side of tree trunk.
 - Keep stakes at least one foot from trunk to avoid direct contact.
- ▶ Wrap soft non-abrasive straps around trunk and attach to support stakes.
 - Straps should be located no more than half way up the trunk of the tree.
 - Straps should be loose enough to allow for a few inches of movement of the trunk in all directions.
- ▶ Inspect tightness of straps frequently and adjust as necessary.
- ▶ Remove staking as soon as root ball is well anchored in soil and does not move in the soil when the plant is pulled and pushed from side to side.
- ▶ Do not leave the staking in place for more than one year; this develops a two-story structure.



What maintenance is required on newly guy-wired and staked trees?

Trees that have been staked and/or guy wired after installation shall be inspected every four months to reduce potential damage to trunks and branches.

Areas to inspect and correct if not in compliance:

- ▶ Guy wires are secured to ground stakes and tree.
- ▶ Ground stakes are below ground level to prevent trip injuries.
- ▶ Colored tapes are attached to guy wires for visual awareness.

- ▶ Guy wires are at proper tension, not too tight or loose.
- ▶ Wires in garden hoses should be changed to non-abrasive ANSI approved materials for sections in contact with tree branches and trunks.
- ▶ Upright stakes are secured in the ground and not broken or rubbing against the tree trunk.
- ▶ Distance between stakes and tree is sufficient for proper guying.
- ▶ Guying connections to the trunk are secure, without damaging the tree bark or cambium layer.

Guying should be removed within one year of installation. If guying is necessary after one year, root structure may be damaged or diseased and soil conditions may require alteration.



Wires in garden hoses cause trunk damage



What soil amendment options should I consider at planting?

If soil has good structure and a soil test shows no nutrient deficiencies:

- ▶ No further treatment is necessary.
- ▶ Plant as described in previous section.

If soil is very sandy or heavy compacted clay, or a soil test shows nutrient deficiencies:

- ▶ Correct nutrient deficiencies with addition of slow-release fertilizer applied on top of back fill.
- ▶ High phosphorus and low nitrogen formulation is often best.

Over fertilizing with a highly soluble fertilizer can burn the roots.



For sandy or compacted clay soils:

- ▶ Mix 1/3 volume of compost into the back fill soil.

Benefits of compost added to sandy soil:

- Increased water holding capacity.
- Increased and longer lasting fertility.

Benefits of compost added to compacted clay soil:

- Loosens soil.
- Increased drainage, aeration of roots, root penetration and fertility.

Need for Irrigation:

All newly planted trees and shrubs require a consistent supply of water:

- ▶ New plantings need frequent watering around the area of the root ball. If an irrigation system is used:
 - Make sure adequate water is directed to planting hole.
 - Short daily watering to keep root ball moist.
 - Tree bubblers work best.
 - Relocate bubblers farther away from the tree trunk as the establishment progresses.
- ▶ If no irrigation system in place:
 - Hand water to keep root ball moist every other day until established.
 - Irrigation water bags (gator bags) can be used to store enough water for several days.
 - Water farther out into the loosened soil area as the establishment progresses.



What are the best management practices for planting grasses and other ground covers?

Prepare soil before planting

If the new planting is intended to be a high quality turfgrass in a high visibility area:

- ▶ Get soil analysis.
- ▶ Kill all existing weeds and other unwanted vegetation.

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- Fertilize and irrigate for several weeks before herbicide application. Weeds will be more susceptible to herbicide.
- Cut grass weeds, then spray several applications of glyphosate over a three-week period. Irrigate between applications to flush growth.
- ▶ Add soil amendments as determined by soil test and rototill into top six inches.
- Compost, fertilizer and pH adjustment are main amendments.
- ▶ Level soil surface and allow to settle or roll to firm.
- ▶ The area is now ready for planting.

If the new planting is intended for general roadside or erosion control on slopes:

- ▶ Kill all existing weeds and other unwanted vegetation.
- ▶ Fertilize and irrigate for several weeks before herbicide application. Weeds will be more susceptible to herbicide.
- ▶ Spray 2-3 applications of glyphosate over a three-week period.
- ▶ If no irrigation is present, schedule for rainy season.
- ▶ The area is now ready for planting.

Planting techniques for grasses and ground covers

1. If planting from seed:

- ▶ Hydromulching is the most effective method for planting from seed.
- ▶ Mix seed into hydromulch material and spray onto planting area.

2. If planting from stolons or sprigs:

- ▶ Spread stolons or sprigs over planting area and follow immediately with a hydromulch topdressing.
- ▶ Small pieces of stolons may be able to be spread in hydromulch.

3. If using erosion control planting mats:

- ▶ Planting mats that contain infused seeds are preferred for steep slopes.
- ▶ Anchor the mats to soil to prevent slippage.

Irrigation of new planting

- ▶ Irrigation is a must.
- ▶ Water a couple of times daily to keep hydromulch moist.
- ▶ Check on weekly basis to determine when new growth is well established.
- ▶ Change watering schedule to longer cycle to soak area every three days.

General Best Management Practices

- ▶ Old vegetation that is being replaced should be removed or mulched as appropriate.
- ▶ Native or non-invasive species should be used and should have a similar form to the plantings that died.
- ▶ Replanting should be done within four weeks.
- ▶ Engineer should approve plants for use prior to planting and tag them. Check that roots are not girdling trunk and that root flare is above finish grade.
- ▶ Plants must not be planted too deeply.

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- ▶ Soil amendments are appropriate.
- ▶ Mulch is applied appropriately.
- ▶ Weeds should be removed prior to planting.
- ▶ Adequate irrigation should be done.



Reporting & Inspection

Records should be kept and provided to the Engineer documenting the location, date, species and tag numbers of all plantings. Contractor shall provide unfettered access to the State ROW to any HDOT staff or other personnel authorized by the Engineer to ensure compliance with the standards outlined in this Manual or contract specifications. Your work will be inspected for appropriateness of planting, soil amendments, mulching, weeding and irrigation. See Chapter 14, "Reporting" and Chapter 15, "Inspecting Vegetation Maintenance Work."



In a Nutshell

1. Always replace vegetation with the same species or with an appropriate native or non-invasive alternative.
2. The root collar should be at or near the top of a well-formed root ball and visible above the finish grade.
3. Follow the Manual instructions for proper staking of small trees and shrubs.
4. Remove staking support within one (1) year of installation.
5. Know the BMPs for planting trees, shrubs, grasses and other ground cover.