



PRESERVING + PROTECTING VEGETATION DURING CONSTRUCTION

Preserving native vegetation on your property during construction is a smart and cost-effective alternative to completely clearing your land and having to start a new landscape from scratch after construction.

Vegetation adds significant value to your home. Healthy, mature trees not only enhance the look of your landscape, but research shows they improve property value as well. Energy conservation, habitat protection, carbon sequestration, air quality improvement, and stormwater management are essential services provided by trees. [Research by the USDA Forest Service indicates that for every \$1 spent on urban trees, \$2.60 in benefits is returned.^{1]}

In areas of heavy rainfall like Pierce County, native trees and vegetation provide a critical service by helping to manage stormwater runoff. Vegetation captures rain on leaf surfaces, allowing it to evaporate or drip slowly to the ground. Root systems help filter out pollutants by cleaning water as it soaks through the soil. This filtered water recharges aquifers or local streams, impacting our drinking water wells and water quality. Native plants help stabilize the soil, especially on slopes and marine bluffs where erosion is common.

When native vegetation is removed, stormwater can become an expensive problem. It takes decades to grow new trees that provide the same benefit as existing mature trees. Why waste the time and expense to recreate a landscape—and stormwater management system—that already exists? Preserve and protect as much native vegetation on your property as possible.



If you are starting new construction and haven't yet cleared your parcel, don't allow someone to convince you that the property needs to be completely cleared in order to build. Logging and clearing an entire parcel is a traditional approach to development. It is the most beneficial strategy for the developer, but the most problematic and expensive approach for the property owner. After construction, the builders move on to their next job. You remain to live with any leftover damage—and you pay to fix it.

Take control of your investment and your land. Determine a reasonable construction footprint with your contractor before starting work. Don't allow builders or their subcontractors to expand beyond this area without consulting you. The following basic guidelines will help you protect the vegetation and trees on your property during construction so they continue to work for you well into the future.



¹ Oregon State University Extension, *Tree Protection on Construction and Development Sites: A Best Management Practices Guidebook for the Pacific Northwest*, Publication EM 8994 (Oregon State University, 2009), 1.



HOW CAN VEGETATION BE DAMAGED DURING CONSTRUCTION?

- Construction vehicles drive over plants or park on tree roots, compacting soil and crushing roots.
- Roots are smothered when excess soil or materials are stockpiled on them.
- Roots are damaged during digging and trenching.
- Trees suffer from a change in exposure to the elements. When surrounding trees are removed, exposed trees becomes vulnerable to sunscald, blow-down, or ice loading.
- Construction equipment injures above-ground portions of the tree by breaking branches, tearing the bark, or wounding the trunk.

TIPS TO PROTECT VEGETATION DURING CONSTRUCTION

The best way to protect your property is to identify, mark, and temporarily fence vegetation before construction begins and to maintain protection throughout the project. Begin with the goal to retain as many trees and shrubs as possible on the project site; this will provide the greatest long-term benefit to your property.

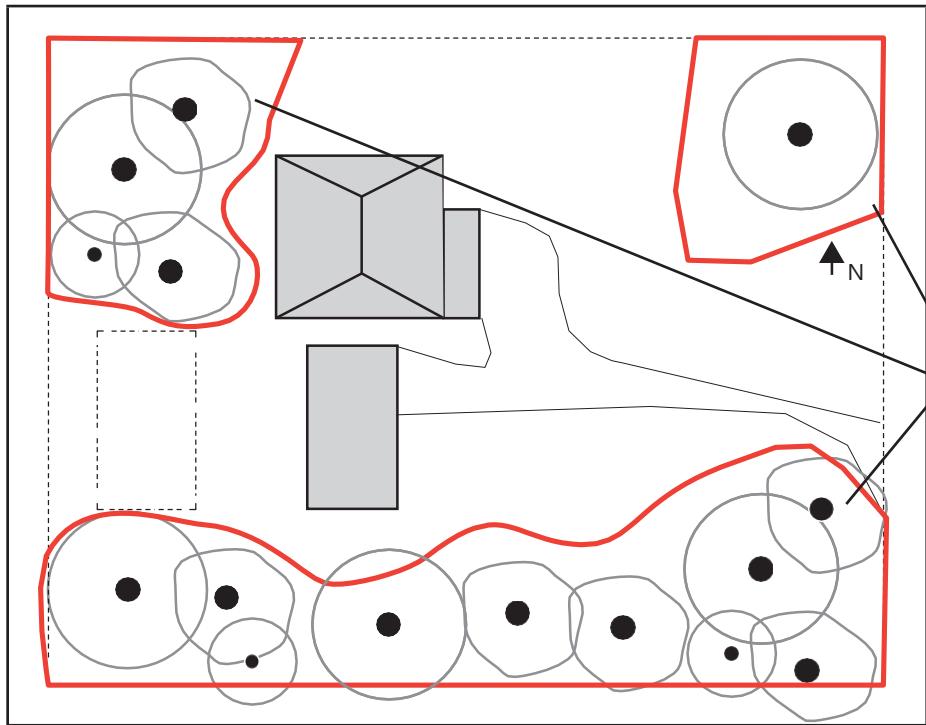
I. MAP YOUR PROPERTY

Determine which areas of trees and vegetation to retain. Map the areas and their protection zones on construction plans. Add language into construction contracts regarding what can/can't be done near trees. Review this guidance with your contractor before work begins so that you can negotiate and make changes at the start (rather than during the construction process). To prevent injury to trees, add a tree damage penalty clause. Contractors are much more likely to respect vegetation preservation clauses if they risk paying fees.

- Consult a Certified Arborist or forester to help identify which trees should be removed or retained. Certified Arborists will also write formal letters detailing their recommendations, which is helpful when you submit construction permits or stormwater plans for your parcel. An arborist can also improve views and light availability with skilled pruning, allowing you to retain more trees.

Aim to keep strong, healthy trees with long life spans. Choose wind-firm trees that are likely to have strong root systems. Keep clusters of existing trees and understory vegetation together whenever possible. Maintain a diversity of species and ages.

- Vegetation to remove: plants located in the footprint of your future structure(s) and in areas needed for equipment movement or material storage. These areas can be quite small if you plan well.
- Remove hazard trees that present a real risk to a structure or to people. When in doubt, consult a certified arborist or forester. Many such trees can be left alone and will provide significant soil stabilization and wildlife habitat benefits. Avoid thinning trees without professional guidance. Thinning stands of forest can leave remaining trees vulnerable to "wind throw" (blow-down during storms). Under natural conditions, neighboring trees help to anchor each other in place with roots and branches.
- Leave the stumps of cut trees in place where possible. Removing them may damage the soil and surrounding trees. The roots will continue to stabilize the ground as they decompose.
- Be familiar with County regulations! Leave unstable slopes vegetated and preserve adequate buffers around critical areas such as marine shorelines, wetlands and streams.



Sample site map with marked "Tree Protection Areas" (thick red line)

II. COMMUNICATE WITH YOUR CONTRACTORS

Once you identify vegetation to protect, it is critical to clearly mark and physically protect the areas (or specific plants) from damage.

Communicate your goals clearly, both verbally and in written contracts.

- Fence and/or tag all the vegetation that borders the construction site. The goal is to clearly indicate the boundaries of areas to be protected. Remember: Temporary fencing is the most effective option.
- Walk the site with all contractors before construction begins, specifically to discuss the fenced areas (or marked trees and vegetation) as well as your intention to protect them.
- Ask all contractors to sign a map/plan/document indicating their understanding of your goals. Make sure they understand they are responsible for their sub-contractors.

- If you are really concerned about particular trees, consider labeling them with the cost associated for damage, and include this information in the contract.
- Working with your contractor, designate where vehicle traffic and material storage is allowed. Identify a specific area for parking vehicles so you avoid unnecessary soil compaction elsewhere.
- For solitary trees that need protection, establish **"Tree Protection Zones."** Tree roots often spread far beyond the canopy. Fragile "feeder roots" concentrate near the soil surface (in the top 18" of soil) which makes them vulnerable to crushing. To protect delicate roots, at a minimum you can mark the **"Critical Root Zone (CRZ)"** of individual trees in construction areas. The CRZ is the area of tree roots that must be protected to keep the tree alive. Install fencing around these zones as directed in the next section.



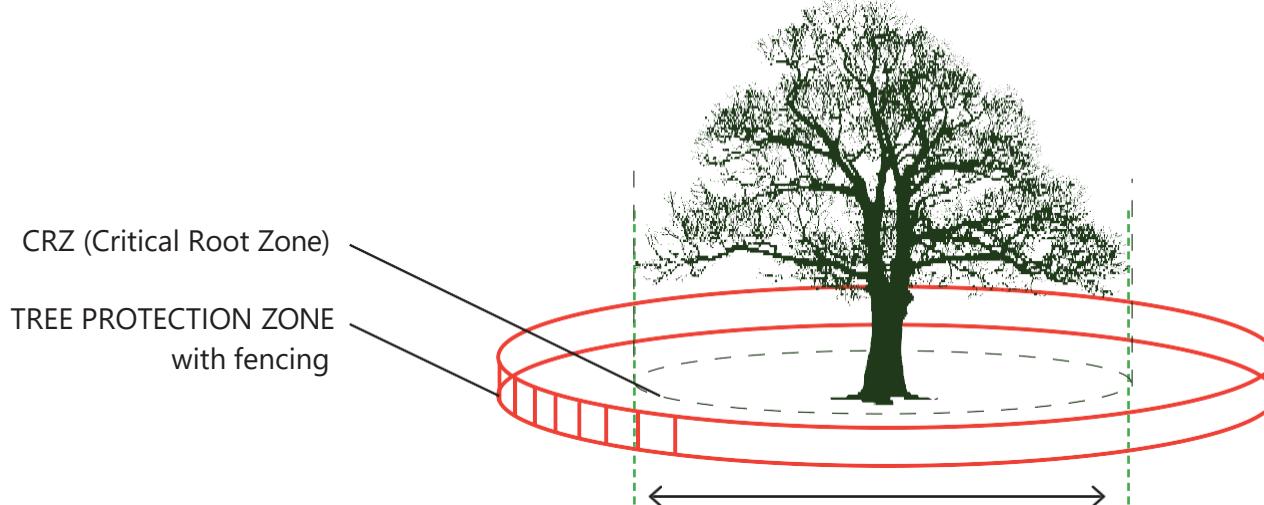
TOOLS: HOW MUCH SPACE DO TREES

The best form of protection is a physical barrier made from high-visibility construction fencing or temporary chain-link. Fencing should be installed around important forested areas and around the “**Critical Root Zones**” (CRZ) of individual trees.

The **CRZ** distance in the box below indicates the distance measured **from the tree trunk out on each side** (~ the radius).

The **Tree Protection Area** indicates the overall diameter of the protective circle that you create around your tree, with additional distance added for good measure.

Trunk Diameter	CRITICAL ROOT ZONE (CRZ) (distance to measure out from tree trunk, in each direction)	TREE PROTECTION AREA (TPA) Fencing Diameter
2 inches	2 feet	4+ feet
6 inches	6 feet	13+ feet
20 inches	20 feet	42+ feet
46 inches	46 feet	96+ feet



Place fencing at the dripline (or CRZ) at a minimum. Better still, extend the Tree Protection Zone beyond...

Define the CRITICAL ROOT ZONE (CRZ) of a tree:

1. Determine the stem diameter at chest height, approximately 4 1/2 feet above the ground. [Measure the circumference of the trunk and divide this number by 3.14 to get the diameter].
2. For every inch of trunk diameter, add 1 foot of distance from the trunk. For example, a 12 inch diameter tree needs a minimum of 12 feet of protection from the trunk in every direction.

This protective area covers the CRITICAL ROOT ZONE - the minimum distance to keep the tree healthy. All construction activities must remain OUTSIDE of this zone to ensure tree health. Ideally, double this area and place protective fences as far out from the tree trunk(s) as possible.



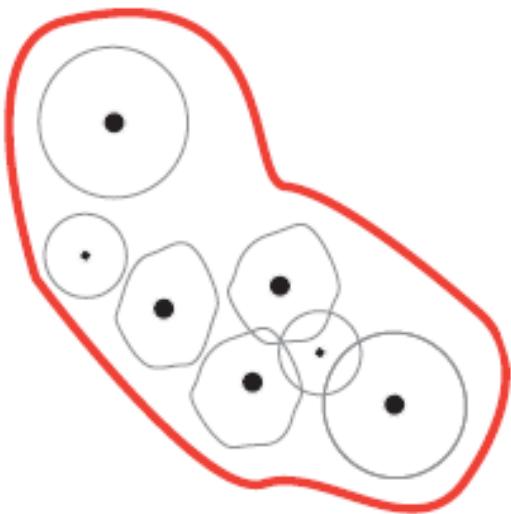
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III. INSTALL BARRIERS (+ MAINTAIN THEM)

It is critical to install protection around vegetation PRIOR to the start of construction.

- Install fencing before construction begins and leave it in place until final inspection.
- Use orange construction fence or brightly marked, high-visible fencing at least 3 feet high. Use metal t-bar stakes or strong wooden stakes. Add clear warning signs to communicate that no stockpiling, equipment traffic, or foot traffic is allowed inside the fenced areas.
- If an important tree is located in an area that will have a lot of construction traffic, fence it as far as possible from the critical root zone and add a 6" layer of wood chips over impacted area of the root zone. Top this with quarry gravel to stabilize a working surface. Place 3/4" plywood or mats on top. Maintain this protective layer throughout construction and remove it carefully when construction finishes.
- Protect the tree trunk and branches from being broken, gouged or damaged. Use a stem wrap to protect branches or the tree trunk wherever they might be exposed to construction injury. Wrap exposed tree parts with 2 inches of plastic orange fencing as padding, then bind 2x4s on the outside. Try to avoid damage to any bark or branches while fixing protective materials to the tree.



Overhead view of a clearly marked Tree Protection Area: Note that fencing is installed around a cluster of trees + shrubs.



Place clear signage on all fencing around Tree Protection Areas. (Include cost if damaged)



FINAL TIPS FOR PROTECTING VEGETATION AT YOUR PROPERTY

- Avoid soil contamination by prohibiting or limiting equipment washing (especially concrete trucks). Do not allow stockpiling of soil or mulch on root zones. Avoid unnecessarily grade changes that involve cutting or filling near trees. Be aware of possible root damage due to grading, tearing or scraping.
- Try to visit the construction site daily. Workers will learn to take your guidance seriously. Take photos throughout construction, especially if damage occurs.
- A rule of thumb distance between an existing tree trunk and new structure is the critical root zone radius plus a minimum of 10 feet.
- Trees generally indicate stress when they have been weakened by damage. This makes them more likely to be injured by future threats, such as insect damage or drought. Signs of decline include stunted growth, dying growing points, thinning foliage, yellow leaves, excessive dead branches, and twigs in the top portion of the tree. If these signs appear, consult an arborist to determine if the stresses are temporary or if the tree needs to be removed and a new one planted.
- Trenching involves excavating ditches for utility lines, foundations, roads, sidewalks, and irrigation. Never allow trenching equipment in the critical root zone. It is possible to weave utility lines under roots using soil augers or other tunneling equipment. Tunnel at least 2 feet below the soil surface. If the utility will travel directly under the tree trunk, tunnel a minimum of 3 feet below the soil surface. Using a pneumatic air excavator allows tunneling under roots but leaves them intact. Careful hand digging is another option. Try to avoid trenching on hot, windy, or dry days. Protect roots by wrapping them in wet burlap. Keep them moist. Try not to leave trenches open for more than an hour or so. Quickly replace the soil and soak with water.
- Avoid cutting roots larger than 4 inches in diameter; they are often important structural roots. If roots must be cut, use a sharp blade (don't rip or tear them). This will help the root to heal cleanly rather than encourage decay and disease
- Avoid grade changes near large, well-established trees. This can cause stability and health problems.
- After construction, take special care of your trees. Mulch, fertilize lightly, irrigate, aerate soil, and prune where necessary. In the absence of adequate rainfall, apply at least 1" of water per week through the hottest months using a deep soaking method.



ADDITIONAL RESOURCES:

- International Society of Arboriculture website: www.isa-arbor.com
- Oregon State University Extension, Publications webpage (look for EM 8994)

ACKNOWLEDGEMENTS

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