

## **MN/DOT GUIDELINES FOR PROTECTING, SALVAGING AND REPLACING VEGETATION ALONG STATE HIGHWAYS**

Impacts to vegetation resources during and subsequent to highway construction can adversely affect soil erosion, water quality, wildlife, rare and endangered species, noise levels, air quality, visual quality and property values. MN/DOT seeks to first avoid and minimize adverse impacts to valuable vegetation assets and functions and secondly to provide restoration, replacement or mitigation for valuable vegetation assets and functions lost to construction activities. MN/DOT adheres to processes and application of measures consistent with the MN/DOT Highway Project Development Process Handbook (HPDP) Part II, Section D, Subject Guidance: Vegetation; Standard Specifications For Construction Section 2572, Protection and Restoration of Vegetation and the following guidance:

MN/DOT District or consultant design personnel shall examine all construction and reconstruction projects to determine if there are significant tree and other vegetation protection and salvage opportunities. When potentially adverse vegetation impacts are anticipated, the Design Authority shall request a field review by the MN/DOT Forestry Unit of the Office of Environmental Services or a consulting forester or arborist to conduct an inventory and prepare a project Vegetation Management Plan containing specific recommendations for (or against) protection, salvage, timber utilization, hazard tree identification and control and replacement of woody and herbaceous vegetation.

The project inventory and write-up shall address the following vegetation categories outlined in the HPDP Manual.

- Category 1 - Native Vegetation Communities—coniferous or deciduous hardwood forest, savanna, prairie and wetland plant communities
- Category 2 – Landscape Vegetation—boulevard trees; formal and informal landscape plantings whether installed under contract, by communities under permit or agreement or by maintenance forces
- Category 3 – Functional Vegetation—safety delineators, safety buffers, living snow fences, wind-breaks, visual screens, noise abatement buffers, and vegetation stabilizing slopes, channels, stream banks, lake shores and ponds.
- Category 4 – Specimen Vegetation—large or unique trees of high visual quality that cannot be transplanted nor replaced and other displays of vegetation (either planted or naturally occurring that would be extremely difficult to transplant or replace.

### **Protection and Preservation of Vegetation Guidelines**

Removal of trees and other valuable vegetation outside of construction limits shall be eliminated or performed on a selective basis as project conditions indicate. Standard Specification 2572.3A indicates “The Contractor shall protect and preserve: (1) Specimen trees. (2) Threatened and endangered plants, as listed on the Federal and state threatened and endangered species list. (3). Vegetation in the Contract to be preserved. (4) Trees, brush, and natural scenic elements within the

Right of Way and outside the actual limits of clearing and grubbing consistent with 2101.3. (5) Other vegetation the Engineer identifies to be protected and preserved.”

The Vegetation Management Plan shall prescribe reasonable and prudent measures and pay items as described in Standard Specification 2572.3A in order to adequately protect vegetation shown outside the construction limits on the plan. Reasonable and prudent measures include but are not limited to:

1. Place temporary fence prior to other construction activities in order to prevent plant root and crown damage due to vehicle and equipment movement or supply storage. Place tree or prairie protection signs on fence perimeters to create awareness on the part of construction workers and the public.
2. Where necessary, cut tree roots cleanly at the construction limits or as far from the tree as possible using a vibratory plow or approved equal. Prevent roots from drying out by timely watering, immediate backfilling or by applying mulch. Restrict infliction of damage to dormant seasons of plant growth if possible so that shoot expansion and leaf size adjusts to the reduced root system.
3. Water heavily impacted trees thoroughly prior to inflicting damage and thereafter on a semi-weekly to monthly basis depending on soil type and weather conditions.
4. Use a well-drained sandy loam soil for any shallow fills around trees. Deep fills require more elaborate measures specifically tailored for high value specimen trees.
5. Coordinate utility locations near trees and other vegetation to be protected in order to prevent or minimize damage from utility excavations. Adhere to Standard Specification (Table 2572-2) regarding tunneling under tree roots.
6. Incorporate additional measures such as plant growth regulators, corrective and clean-up pruning, vertical mulching and supplemental watering to increase survival chances and enhance tree vigor for high value specimen trees.

### **Vegetation Salvage Guidelines**

**Relocating Vegetation**—Good specimen trees and shrubs and other vegetation that exist in future transportation project construction zones shall be salvaged to the extent prudent and feasible. Depending upon circumstances, transplanting may be considered for inclusion in the roadway construction project; a separate construction project; or a maintenance operations activity. If these approaches are not feasible, the material may be offered for transplanting by a local unit of government.

Factors for determining the suitability of moving wild or landscape trees with hydraulic tree spades include size, adequacy of crown development, accessibility (typically 1:4 or shallower slopes, health and vigor, and soil compatibility of source and receiving sites.

HYDRAULIC TREE SPADE SIZE CHART

SPADE SIZE (Diameter)	OAK TREES (Caliper)	OTHER SHADE TREES (Caliper)	EVERGREENS (Height)
44"	1" to 1.5"	2" to 3"	5' to 7'
60"	1.5" to 2.5"	3" to 4"	7' to 9'
78"	2.5" to 3.5"	4" to 6"	9' to 14'
85"	3.5" to 5.0"	6" to 8"	14' to 18'

Threshold Criteria

<u>No. of Trees</u>	<u>Administration</u>
over 30	Separate transplant contract
over 10 & under 30	In grading contract
under 10	Move with maintenance forces or offer to local governments

**Utilizing Timber**— MN/DOT seeks to ensure utilization of marketable trees on transportation construction projects in accordance with Standard Specification 2101.3D (D1). The threshold of 100 cubic yards of wood equals roughly 25 cords, where a “standard cord” is defined as a stack of logs having dimensions of 4 feet in height, 4 feet in width, and individual sticks being 8’ 4” in length (all sticks having a minimum 4” inside the bark diameter). A cord of wood is roughly 400-500 board feet.

The Vegetation Management Plan (with cross-references to the Removal Plan) should indicate timber volume estimates and locations where the volume of marketable trees expected to be lost to construction activities exceeds the 100 cubic yard threshold. Estimates should be made under the following categories and timber volume standards:

- Sawtimber - Board Feet as determined by using the “Scribner Tree Scale” table
- Pulpwood - Cords as determined by using a “Standing Tree Pulpwood Measurement” table
- Firewood - Cords as determined by using a “Standing Tree Pulpwood Measurement” table
- Energy Fuel - Cubic yards

This inventory does not lock a contractor into utilization in accordance with the marketable tree inventory. Rather the intent is to encourage utilization as opposed to burning or burying marketable wood. Marketability reflects proximity to wood processing plants, current markets, and transportation project time schedules. Generally, wood markets and all types of processing plants are readily available in Northern and East Central Minnesota. Processing plants in southern Minnesota, are limited mostly to hardwood sawmills. Examples of timber availability on a transportation project that exceeds the 100 cubic yard threshold include:

- A project with two acres of red pine at 7" diameter at breast height (dbh) with three 100" pulpwood sticks per tree (.056 cords per tree) will yield approximately 22 cords per acre x two acres = 44 cords of pulpwood
- A project with 100 aspen trees averaging five 100" pulpwood sticks per tree (.225 cords per tree) plus 50 red oak trees averaging 16" diameter and 1.5 logs (one log=16' length) will yield approximately 22 cords of aspen pulpwood and approximately 6,350 board feet (equivalent to approximately 12 cords) of oak saw timber

### Hazard Trees Guidelines

Hazard trees are defined as trees that have structural defects in the roots, stem, and/or branches that may cause the tree or tree part to fail where property damage or personal injury may result from the failure. The Contractor shall identify current hazard trees and those that may result from construction activities. These trees or the hazardous portions shall be removed prior to construction in a manner that preserves the surrounding vegetation. It shall be the Contractor's responsibility to immediately deal with trees determined to be imminent hazards. Any pruning performed to remove a hazardous branch shall be pruned according to *How to Prune Trees* published by the US Forest Service, available at [http://www.na.fs.fed.us/spfo/pubs/howtos/ht\\_prune/prun001.htm](http://www.na.fs.fed.us/spfo/pubs/howtos/ht_prune/prun001.htm) . There are seven categories of defects, 1) decayed wood; 2) cracks; 3) root problems; 4) weak branch attachments; 5) cankers; 6) poor tree architecture; 7) dead trees, tops or branches. These defects are further explained in Chapter 3 of *Urban Tree Risk Management: A Community Guide to Program Design and Implementation*

## Vegetation Replacement Guidelines

Valuable vegetation assets serve many functions including prevention of soil erosion, improvement of air and water quality, modification of blowing and drifting snow formation, reduction of energy consumption (shade, etc.), provision of habitat for rare, endangered and valuable species, reduction of noise levels, and enhancement of visual quality and property values. MN/DOT seeks to replace valued vegetation assets and functions that are lost during construction activities wherever practical and feasible in accordance with the following minimum guidelines.

<u>Landscape Category</u>	<u>Minimum Replacement Ratio</u>
Boulevard Trees	1 for 1 - 2.5" cal. B&B preferred
Highway Landscape Projects—Trees, Shrubs, Native Grasses & Wildflowers	1 for 1 - tree for tree, equal square footage or acreage for shrub beds or native prairie plantings.
Historical or Specimen Trees	Inch for inch on a basal area basis or replace with equal value as determined by ISA Appraisal Guide whichever is less, e.g., 12 inch diameter = 113 square inches of basal area.
Living Snow Fences	1 for 1 basis
Salvage Yard Screens	1 for 1 basis—with larger plant materials in order to achieve effective screening within three years.
Noise Abatement	1 for 1 basis
Wildlife Habitat Areas (Tree and shrub clumps or masses)	Acre for acre basis
Wildlife Habitat Areas (Grasslands)	Replace with indigenous grasses and forbs (if appropriate). Generally a minimum of three species of native grasses should be used.
Forested Areas of Minnesota	Replace with indigenous tree and shrub seedlings or adopt a management program (mulching, minimal mowing, etc.) to encourage encroachment of adjacent woody vegetation and native seed banks.