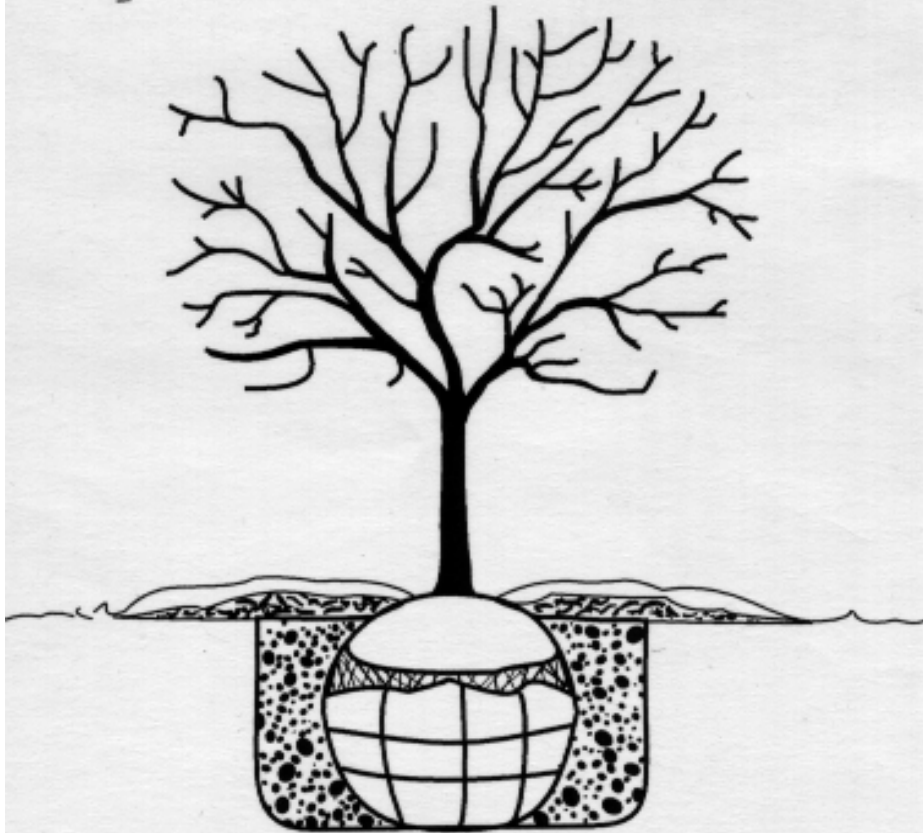


**CONSTRUCTION  
INSPECTOR'S  
HANDBOOK**  
for  
**LANDSCAPE  
PLANTING**



Prepared by the  
**Office of Highway Management  
Maintenance Section**

**February 1998**

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## Plant Inspection Guidelines

### General Appearance (661.04)

The general appearance of a plant is the quickest way to judge its health and vigor. Be sure that the plant:

- is healthy, typical of their species or variety and have a normal growth habit
- meets the minimum dimensions given in the General Notes
- container is not cracked or severely dented
- container is weed free
- is generally symmetrical with no large gaps in the branching structure
- has no broken limbs
- is free of excessive bark damage

The foliage of the plant should be:

- erect and firm (except for weeping type plants)
- a uniform green color (except for fall color)
- vigorous, healthy and robust
- free of wilting, yellowing and browning.

**NOTE:** Inspection of the plants before unloading from truck will save time and effort. Plants do not need to be individually inspected; a random inspection will be OK. The source of supply should be verified from the shipping ticket and compared to the plant material list (*CMS 661.05*) as submitted earlier. Plants not meeting spec or that differ in source of supply is justification for non-acceptance.

### Problem Signs

Substantial amounts of brown or yellow foliage indicate the plant may be experiencing stress or shock. (Be aware that some trees, depending on whether they are deciduous or evergreen, may change color during the fall.)

Wilted foliage probably indicates a lack of water during shipping or storage. All plants must be completely covered during shipping (*CMS 661.07*). A thorough watering should restore the foliage to a healthy appearance within a couple of days. If not, the plant should be monitored for a few more days to see if it recovers before planting. If the condition does not improve, reject the plant.

Broken and dead limbs indicate poor growing or handling conditions.

## Testing for Dead Plants or Limbs

It is not always easy to tell if a plant is alive, particularly during the winter if the plant is a deciduous variety and has shed its leaves. Some of the techniques listed below will help to determine if a plant (or a part of the plant) is alive.

- Using your fingernail, pocket knife or other sharp object, scratch the bark on the trunk or limbs. A living plant will be light-green and moist just below the soft bark. If the bark is hard and the scar is brown, that part of the plant is dead. A random check of other areas will help to determine if the plant is vigorous and healthy.
- Wrinkled bark that is off-color is an easy visual clue to dead parts of a plant.
- Plant roots should be white beneath the outer bark. Dark brown or blue-black roots indicate damaged or dead roots.
- Healthy limbs are flexible. They can be bent without breaking. Dead limbs are dry and brittle.

## Container Grown Plants

The roots of a container grown plant should:

- be growing throughout the growing medium
- bind all the soil together
- be white in color and moist; dark brown or blue-black roots indicate damaged or dead roots.

*Testing for adequate root system: **inspecting the root systems of plants is very important.*** It is not necessary to test all the plants; random checks will be sufficient if all the plants are from the same grower. If the plants are provided from more than one supplier or grower, be sure to random-check each group. Also inspect any plants that appear different or out of character with a group of like plants.

- For shrubs, hold the plant at the base of the trunk and gently lift the plant a few inches out of the container. If the entire contents of the container moves and holds its shape in a firm mass of roots, the plant is properly “rooted-out” and ready for planting.
- For trees, lay the container on its side, hold the tree at the base of the trunk as close to the soil level as possible and gently slide the tree from the container a few inches. If soil is left in the container or if the root system is not growing throughout the entire container, the plant is not ready for planting and should be considered for rejection.

This method is not possible for large trees. Instead, dig two to three inches into the soil at the very edge of the container and look for a firm mass of small roots.

## Root-bound Container Plants

If plants have been growing in their container for a long time, the roots will wrap around the inside of the container. These roots need to be cut or sliced prior to planting. These cuts should be made along the sides and bottom. Cutting these circling roots will enable the plant to produce new root offshoots and grow without problems.

*Checking Container Sizes.* The size of large plastic containers may be indicated on the handle. Since these are nominal volume sizes only, there may be some variation in actual size even though the containers from two different growers are labeled as being the same volume. Refer to Appendix for the minimum acceptable size ranges for containers without sizes printed on them or for wooden or metal containers.

*Soil Condition in Containers.* Check for the following soil conditions:

- The soil level should be within a couple of inches of the top of the container. It should be a light (by weight) soil mix of mostly bark mulch and perlite or vermiculite (small white or silver particles that help hold water).
- If you see clay, burlap or wire in what is supposed to be a container grown plant, inspect closer to determine if the plant has been dug from the field and then placed in the container. The root development test described previously should determine this. A containerized plant in lieu of a container grown plant is not acceptable and must be rejected.

## **B & B Plants (*Balled & Burlapped*)**

Inspect the rootball of B&B material for:

- a firm, tight ball with no roots protruding outside the wrapping
- wrapping that is snug and free of rips and holes
- cracked balls or balls that are soft and look like a bean bag (these should be rejected)
- damage to the base of the trunk caused by wire or string used to secure the wrapping
- moist soil

*Soil Condition of the Rootball.* The soil in a B&B rootball will almost always be clay or a tight, sandy clay. This is necessary so that the soil will hold its shape during digging, as well as hold water during shipping and storage. Rootballs that are mostly sand may crack and break easily, possibly exposing roots to heat and dry air. Plants with a sand rootball should not be accepted.

*The rootball must be moist and shaded for protection at all times when shipping or storing.*

*Measuring Caliper.* This is measured 6 inches above the ground (or top of root ball) up to and including 4 inch caliper size and 12 inches above the ground for larger sizes. Measurement should be taken with “pincher” type caliper or diameter tape.

### **Proper Habit of Growth:**

If a particular habit, i.e. single stem, multiple stem, etc., has been specified, be sure to obtain plants that conform to this requirement. Height of branching should bear a relationship to the size and kind of tree, also, so that the crown of the tree will be in good balance with the trunk as the tree grows.

*Example: 2 in. caliper =12 to 14 ft. average height; 16 ft. maximum height*

Shade and flowering trees should have top growth symmetrically balanced. Shade trees should have a single leader. The branching should be well developed and characteristic of the species. *Example: 3/4 in. caliper=7 or more branches*

Multi-stem trees can be defined as Clump or Shrub form. Clump form is a tree having two or more main stems arising from the root crown. Shrub form has multiple stems arising from the root crown in the manner of a shrub. Multi-stem trees are measured by height; taken from the ground level (or top of root ball) to the average uppermost point of growth of the plant.

Evergreen trees and shrubs should be full foliated plants with uniform density. Sheared plants, such as pines sheared for Christmas trees, must be avoided unless specified. Most evergreen shrubs, such as juniper and yew, are measured by spread and should be the average of the plant. Evergreen trees like pines and spruces are measured by their height.

Deciduous shrubs should be well branched and full with no large holes from missing branches. Most are broad upright type plants and are measured by their height. Well grown material should have a height equal to if not greater than the spread. However, the spread should not be less than two-thirds of the height.

### **Rejected Plants:**

Plants rejected for the project should be removed as soon as possible. They should be marked to preclude the possibility of their installation on the job. Since discarded plants are the property of the contractor, they should not be marked or mistreated in such a way as to make them unfit for other uses.

## **Insects (661.04)**

Do not allow the contractor to deliver any plants to the site that are infested with harmful insects. Harmful insects are those that eat or bore into the plant, including:

- caterpillars
- borers
- aphids
- scale
- mealy bugs
- bagworms

When inspecting for insects, look for:

- the insects themselves. Most insects that suck plant juices usually do so from the undersides of leaves, particularly tender new leaves. Be sure to check these areas: *aphids & mealy bugs*
- leaves that have holes or portions chewed out of their margin: *caterpillar*
- small bag-like structures hanging from limbs: *bagworms*
- holes in the bark that looks like shotgun holes: *borers*
- discolored bumps along a stem that look like shells: *scale*

Beneficial insects can include Lady Bugs and Butterflies.

If insects are found, and it is unknown whether they are harmful or beneficial, the inspector can call the Central Office Horticulturist or the County Extension office.

## Plant Damage - Trees and Shrubs

Things to Look For	What It Means	Action to Take
Minor amounts of breakage of small, twiggy growth.	Normal shipping damage. Should not be excessive.	Damaged twigs should be pruned.
Many small limbs broken.	Poor handling. Should not be excessive.	Broken limbs should be pruned. Reject if breakage is excessive.
Minor amounts of nicks and scratches.	Normal shipping damage. Should not be excessive.	None
Gashes in trunk that are 1/8" (0.3 cm) deep or less and less than 1" (2.5 cm) long.	Poor handling. Should not be excessive.	Treat with pruning paint. Reject if damage is excessive.
Gashes longer and deeper than the above.	Excessive damage. May stress plant and lead to loss of plant.	Reject the plant.
Broken limbs 3/8" (1 cm) in diameter or larger.	Poor handling. Damage done to larger limbs is more critical.	Broken limbs should be pruned. Reject if major limb or more than one.
Central leader (main trunk) is broken or cut.	Poor care or may have been pruned to meet specifications.	Reject the plant.
Limb partially broken or cut and has been wrapped or repaired.	Someone tried to repair evidence of poor handling.	Reject the plant.

## **Inspection During Planting**

The purpose of this part is to serve as a guide for an inspector who may not have the experience to determine that planting operations at the construction site are being properly completed in conformance with contract plans and specifications and good horticultural practices.

Planting stock should be inspected upon delivery. This will insure that the plants delivered meet the requirements of the contract planting plans and specifications.

If plants are delivered before the site is ready for planting, a location should be chosen to store the plants until time to plant. This site should be away from construction traffic and protected from direct sun and wind. Asphalt or concrete areas are not acceptable as storage locations. Plant root balls should be covered entirely with mulch approximately 3 inches deep. Plants should be watered as necessary (see watering table) while in this temporary location.

### **Preliminary Preparation:**

1. The inspector and contractor should jointly review and become familiar with all plan sheets, quantities, details, specifications, and other provisions of the contract. At this time, questions or interpretations can be answered or problems resolved through discussion with the landscape architect, horticulturist, or other authorized persons.
2. Sources of materials other than plants required for planting operations should be submitted for approval prior to use in the planting operation. Some of the materials that may require approval prior to use are topsoil, peat materials, (peats, mosses, humus, and related projected), compost, fertilizer, lime, mulch, stakes, wire and hose, and wrapping material.
3. The inspector (or approved other) should check and approve the stakeout of all planting areas and planting pit locations prior to excavation. Minor relocation of planting areas and pits can be done at this time to avoid utility lines, rock outcrops, drainage ditches, existing plants or impervious or wet soil conditions. If minor relocations of planting is not possible, the inspector should contact the landscape architect to adjust the design requirements.

### **Site Preparation:**

Prior to installing plant stock at the construction site, the following preparation must be completed according to the requirement of the contract plans and specifications.

1. Excavation of planting pits, pockets, or beds to the required size and depth and spaced as shown on the plans.
2. Onsite preparation of backfill mixture as called for by contract specifications.

## **Planting Operation:**

Unless in conflict with the contract specifications, the following check list of horticultural practices may be used by the inspector. This information pertains to new or replacement nursery stock and not to large, mature plants.

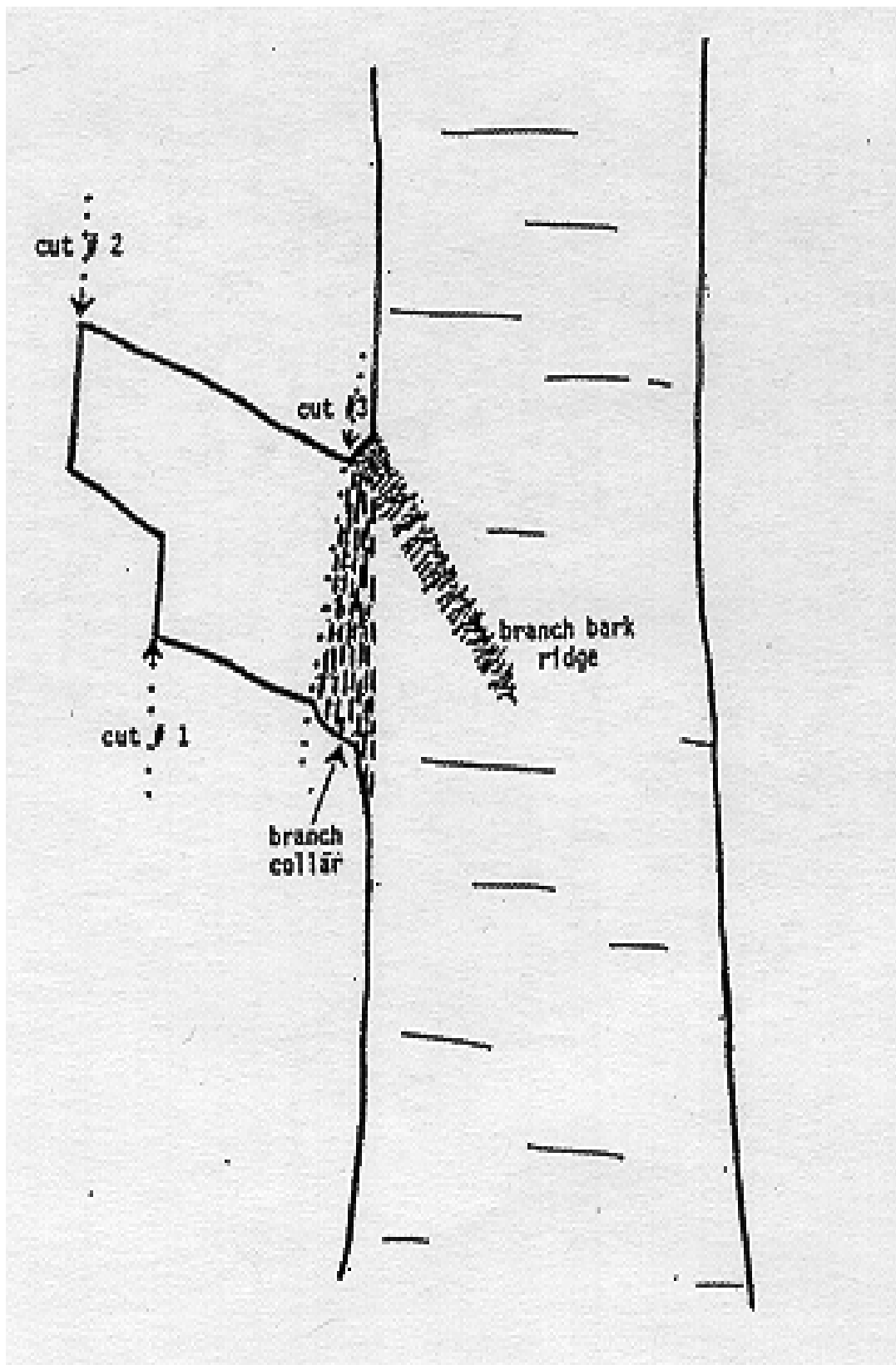
1. Planting should be performed only during the specified planting season (see *CMS 661.06*).
2. The inspector should check for proper positioning of the plants. After plants are set, burlap and any twine should be loosened, laid back and cut away, if bulky, without damaging the ball. Non bio-degradable materials should not be used in lieu of burlap.
3. Check for correct depth of the plant crown. Depth of crown will vary for different soil conditions. See enclosed LA-1.2M or pages 28 - 31 for details.
4. Place approved backfill material around plant roots or plant balls, being careful not to damage the ball or the fine root system. Backfill which is frozen or too wet is not acceptable.
5. Eliminate air pockets in the backfill by filling, tamping, and watering as required by the specifications. It is best to water plants thoroughly before backfilling. Container plants should be moist at the time of planting.
6. When the above operations have been completed, unless otherwise specified, place a berm of soil around the perimeter of the pit to form a basin or saucer to facilitate watering and retention of moisture.
7. Mulch all plants to the specified depth with approved material. The use of mulches prevents rapid temperature fluctuation, reduces moisture loss, and aids in weed control.

**NOTE:** *Installation can directly affect a plants survival rate. Concentration on the installation process is critical to a project's success or failure. Because the nature of this work is based upon the end result, i.e. plants live or die, inspectors need to watch the installation closely. If the inspectors have any questions during the installation work, they should contact the project designer or other knowledgeable personnel as soon as possible.*

## Wrapping, Staking, and Pruning

All plants should be wrapped, staked, and pruned as specified.

1. Drive stakes solidly into the ground and guying installed to prevent movement of the plant until the root system is firmly established in the new planting location. See LA-1.2M or pages 32 - 35 for details.
2. Wrap trunks or stems of plants from the root crown to the lower limbs with approved material to protect against drying or other physical damage. Wrapping should not be done prior to planting on deciduous trees.
3. Plants should be pruned at planting time to restore a balance between the root and top growth. Tops should be pruned to compensate for the partial loss of roots when the plant was removed from the nursery, and in a manner that will retain the characteristic shape of the plant.
4. Broken or damaged branches must be removed. The central leader of a deciduous tree should never be trimmed or removed. Deciduous trees with competing leaders should not be accepted for the project.
5. Prune all broken, torn, or damaged roots, leaving a clean cut surface to help prevent rot and disease.
6. Prune deciduous shrubs if only branches are broken during installation. Coniferous evergreens normally should not be pruned except for broken branches, unless otherwise specified or directed.
7. Trees may be pruned before planting to save time and trouble. At this time, hand clippers can be used to cut closer than can be done with pole pruners - usually used for trees in an upright position. Pruning may be done under inspector's supervision prior to planting.
8. The planting operation is completed by watering all plants as specified.
9. Pruning diagram is enclosed.



# LANDSCAPE INSTALLATION INSPECTION CHECKLIST

Project No.: \_\_\_\_\_ Date: \_\_\_\_\_

County: \_\_\_\_\_ Route: \_\_\_\_\_ Section: \_\_\_\_\_

Contractor: \_\_\_\_\_

Certified Landscape Technician: \_\_\_\_\_

Inspector: \_\_\_\_\_

Y	N	ITEM	REMARKS
		<b>Plant Installation: <i>General Condition</i></b>	
9	9	Plant identification (proper species, tag, certification)	
9	9	Overall foliage condition (shape, leaf color, wilt, scorch, etc.)	
9	9	Leaf discolorations (spots, splotches)	
9	9	Evidence of pruning (needed or properly performed)	
9	9	Insects (chewing damage, presence of insects)	
9	9	Condition of trunk and limbs (gashes, breakage)	
9	9	Condition of container or rootball (dented, cracked, broken)	
9	9	Soil condition in container or rootball (moist, dry)	
9	9	Root system (rooted throughout, healthy white color)	
Y	N	<b>Size Specifications</b>	
9	9	Container size	
9	9	Rootball size	
9	9	Height	
9	9	Spread	
9	9	Caliper	

Y	N	ITEM	REMARKS
		<b>Plant Delivery, Storage &amp; Handling</b>	
9	9	All plants delivered on trucks are completely covered during transit	
9	9	Rootballs and containers protected from direct sun	
9	9	Handling and unloading from truck is done by the rootball or container and not by trunk	
9	9	Are plants adequately watered	
9	9	Plants are healed in until planted	
Y	N	<b>Plant Installation</b>	
9	9	Plant locations staked in field	
9	9	Plant spacings conform to plan notes	
9	9	Plant pit or bed preparation conforms to details	
9	9	Plant is properly placed in pit	
9	9	Rootball relation to finished grade meets spec.	
9	9	Rootball supporting devices removed (twine, wire, etc.)	
9	9	Backfill mix meets specifications	
9	9	Backfill placed in lifts and properly watered	
9	9	Fertilizers added if specified	
9	9	Plant is properly watered during installation	
9	9	Watering basin conforms to details	
9	9	Tree supports installed according to details (stakes, guy wire)	
9	9	Vegetation barriers installed according to details	
9	9	Mulch installed according to details	
9	9	Tree trunk is wrapped to first branch	

## Hand Watering (662)

When watering by hand, attention should be given to the type of device used to apply the water. If the water is applied at too high a rate, the force of the water will displace mulches, soil and expose roots. All equipment used to direct water into the watering basin should have a flow-control device that will break the impact of the water so that it will flow gently into the basin.

Water should not be applied to where runoff will occur. If the plant is newly planted, too much water can erode the watering basin and allow water to escape before it can soak down into the soil. If this occurs, the basin should be repaired before the next watering.

### Water-related Stress Symptoms

Symptom	Soil Condition	Problem	Action to be Taken
Leaves are slightly drooping, soft, hazy-green color.	Dry	Lack of water	Apply water as soon as possible.
Leaves are drooped and wrinkled.	Dry	Severe lack of water	Apply water immediately
Leaves are drooping, brown and falling from the plant.	Very dry, look for cracking.	Severe lack of water	Water immediately Plant is near dying and shedding leaves is to compensate for lack of water.
Leaves are brown along margins but not drooping. Some leaves are falling from the tree.	Wet	Over watering	Stop watering. Allow soil to dry.

### Watering Table (662.03)

Shrubs	300-900 mm (12 - 36 in. height)	0.0149 cu. meter (15 L or 4 gal.)
Shrubs	900 mm - 1.5 m (36 in. - 5 ft. height)	0.0249 cu. meter (25 L or 7 gal.)
Trees	1.5 - 2.5 m (5 - 8 ft. height)	0.0549 cu. meter (55 L or 15 gal.)
Trees	50 - 75 mm (2 - 3 in. caliper)	0.0949 cu. meter (95 L or 25 gal.)
Trees	75 - 100 mm (3 - 4 in. caliper)	0.1149 cu. meter (115 L or 30 gal.)

### Planting Period Establishment Inspection

#### Warranty Periods (661.17)

Landscape projects normally include a period of establishment. During this time, all planting on the project shall be under the care of the contractor. This period begins immediately upon completion of the planting operation for any plant or species group and continues until October 1, but no less than one growing season (i.e. June 1 to October 1).

The stress caused by improper handling may not show its effect immediately. Plants (particularly large trees) may be under stress for months before showing obvious signs. By then, it is difficult to relate the damage to the plant installation phase rather than the maintenance it has received. Again, this points out the need for care early in the installation to make sure that the quality of plants is the highest and the care they receive is the best.

## Plant Establishment Period - Final Inspection

This inspection should include a plan-in-hand review of each planting area or bed to determine the arrangement, number and species of plants called for on the planting plans are present. If all plants have been properly installed, there should be minimal settlement of the backfill. Proper mulch depth should also be checked as this will affect plant survival.

Since this inspection is of major importance to the ultimate success of the project, the contractor, inspector and designer should be members of the inspection team.

All plants rejected during the inspection should be removed and replaced by new plants which meet all of the requirements of the project and specifications. The final acceptance of the project should not have been completed until all plant replacements have been satisfactorily made.

### Establishment Checklist - Final Inspection

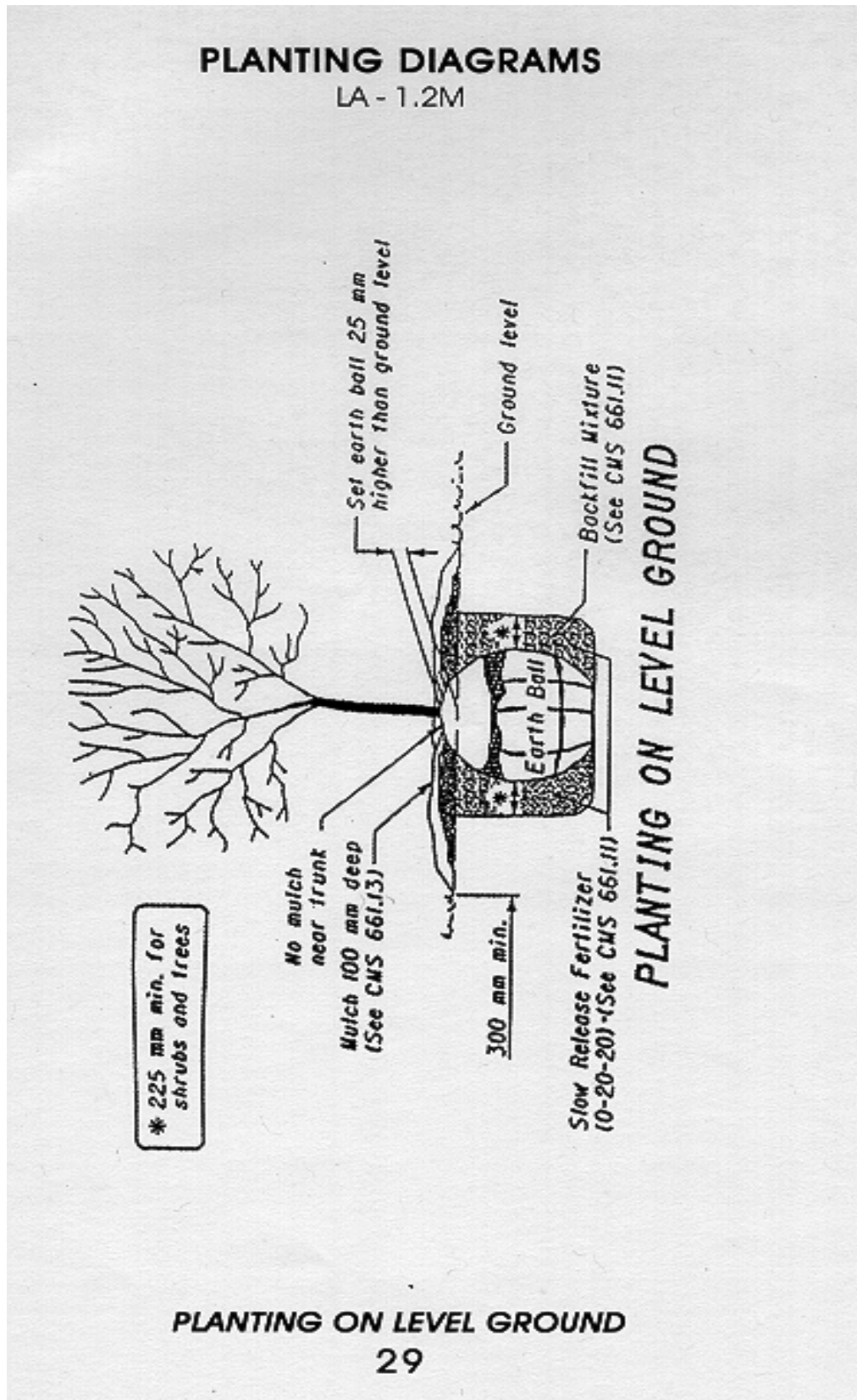
Y	N	ITEM	REMARKS
		<b>Foliage</b>	
9	9	Leaf wilt or browning	
9	9	Leaves healthy and green	
9	9	Yellowing	
9	9	Spots of discoloration	
9	9	Evidence of insect damage	
9	9	Webs or cocoons - caterpillars present	
9	9	Diseases present	
		<b>Tree Trunk and Limbs</b>	
9	9	Damage at the base of trunk	
9	9	Broken limbs that need pruned	
9	9	Dead limbs - no leaves present	
9	9	Damage from insects, birds, rodents or animals	
9	9	Sucker growth - prune out	
9	9	Straighten plant if needed	
9	9	Misc.	

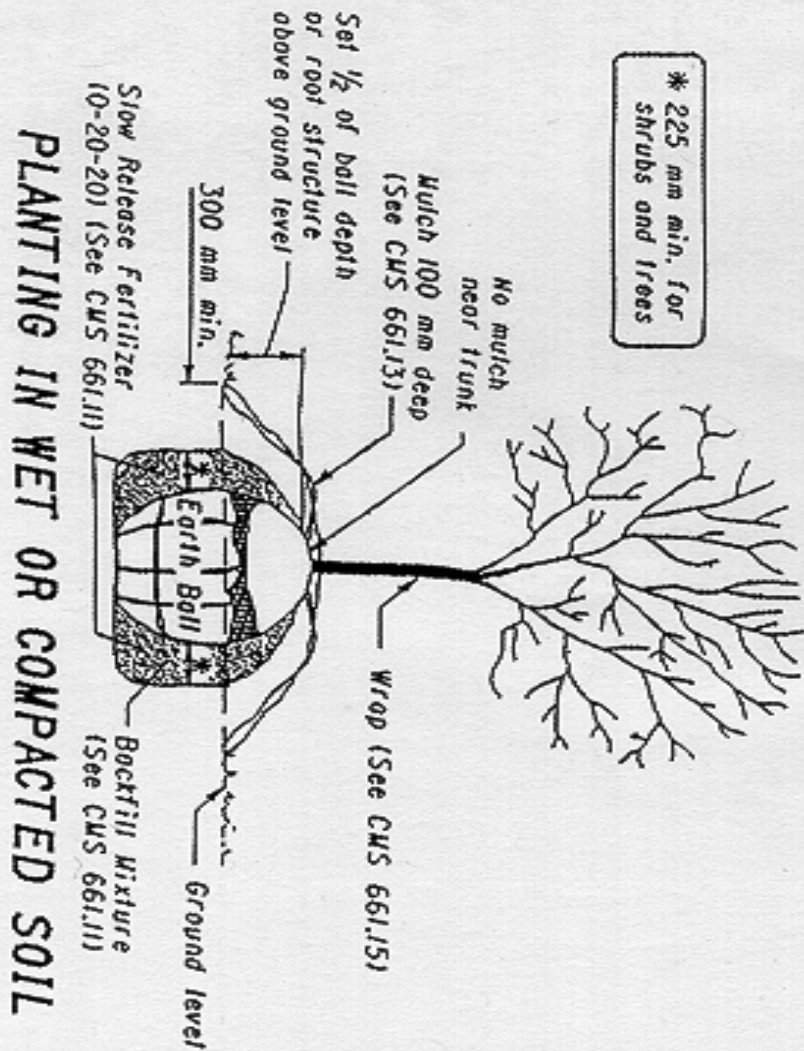
Y	N	Planting Pit and Rootball	REMARKS
9	9	Exposed roots - mulch is needed	
9	9	Settled backfill - replace as needed	
9	9	Animal damage	
9	9	Moisture level of soil - water if needed	
9	9	All stakes, guy wires and wrapping removed	
9	9	Weeds in mulch	
9	9	Leaning trees - straighten if needed	
		<b>Plant Replacement</b>	
9	9	Dead and missing plants replaced	
9	9	Vandalism or vehicular damage	
		<b>Ground Cover &amp; Shrub Bed Area</b>	
9	9	Weeded	
9	9	Dead shrubs - replace if needed	
9	9	Straighten if needed	
9	9	Replace dead ground cover	
9	9	Misc.	



**NOTES:**

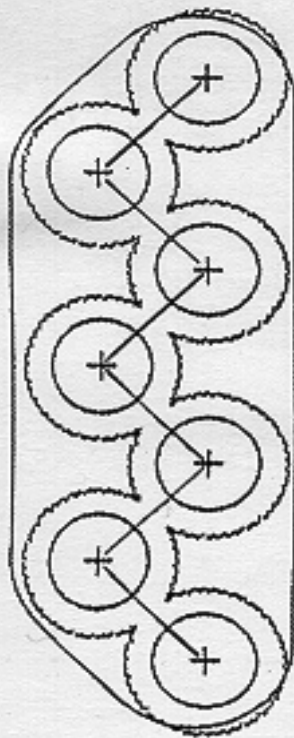
**PLANTING DIAGRAMS**  
**LA - 1.2M**



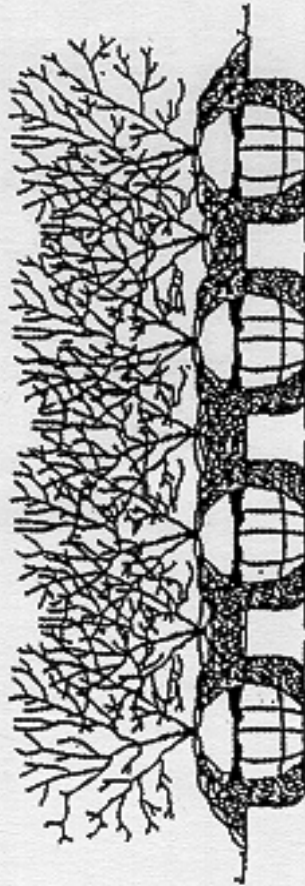


**PLANTING IN WET OR COMPACTED SOIL**

**PLANTING IN WET OR COMPACTED SOIL**

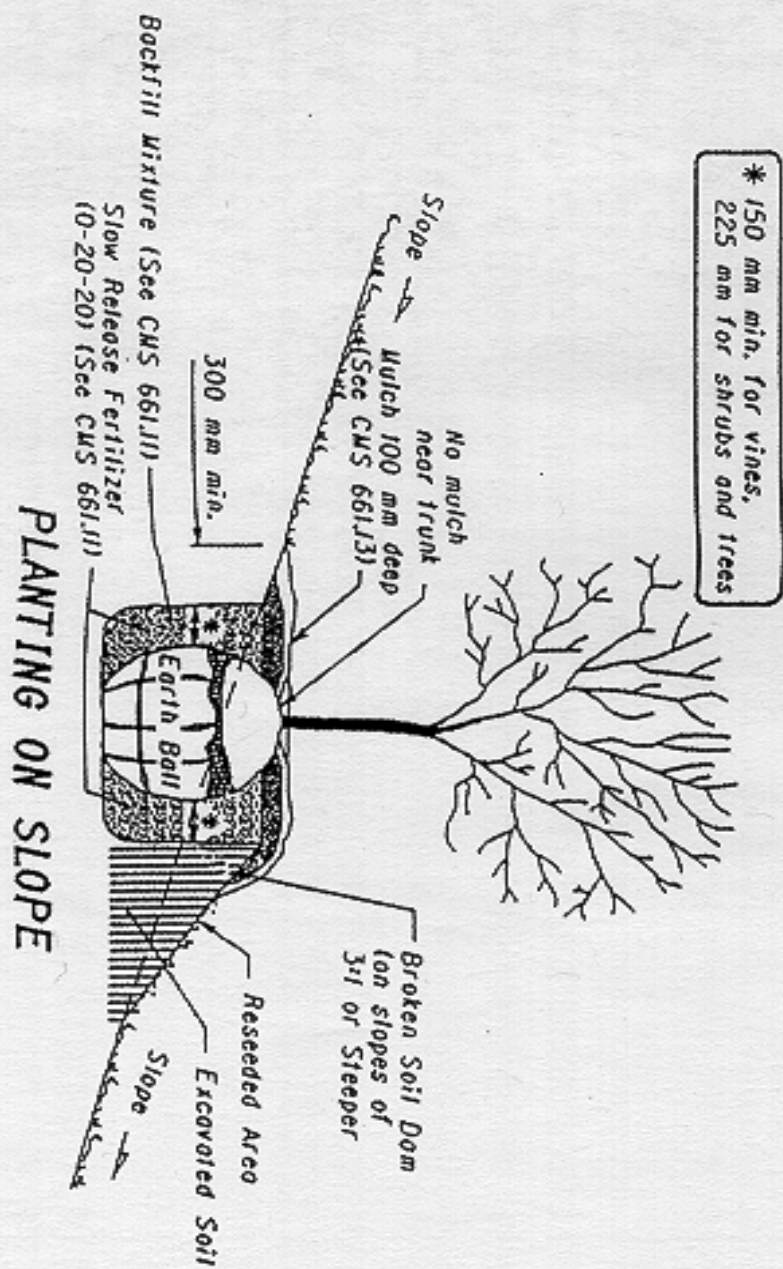


PLAN VIEW



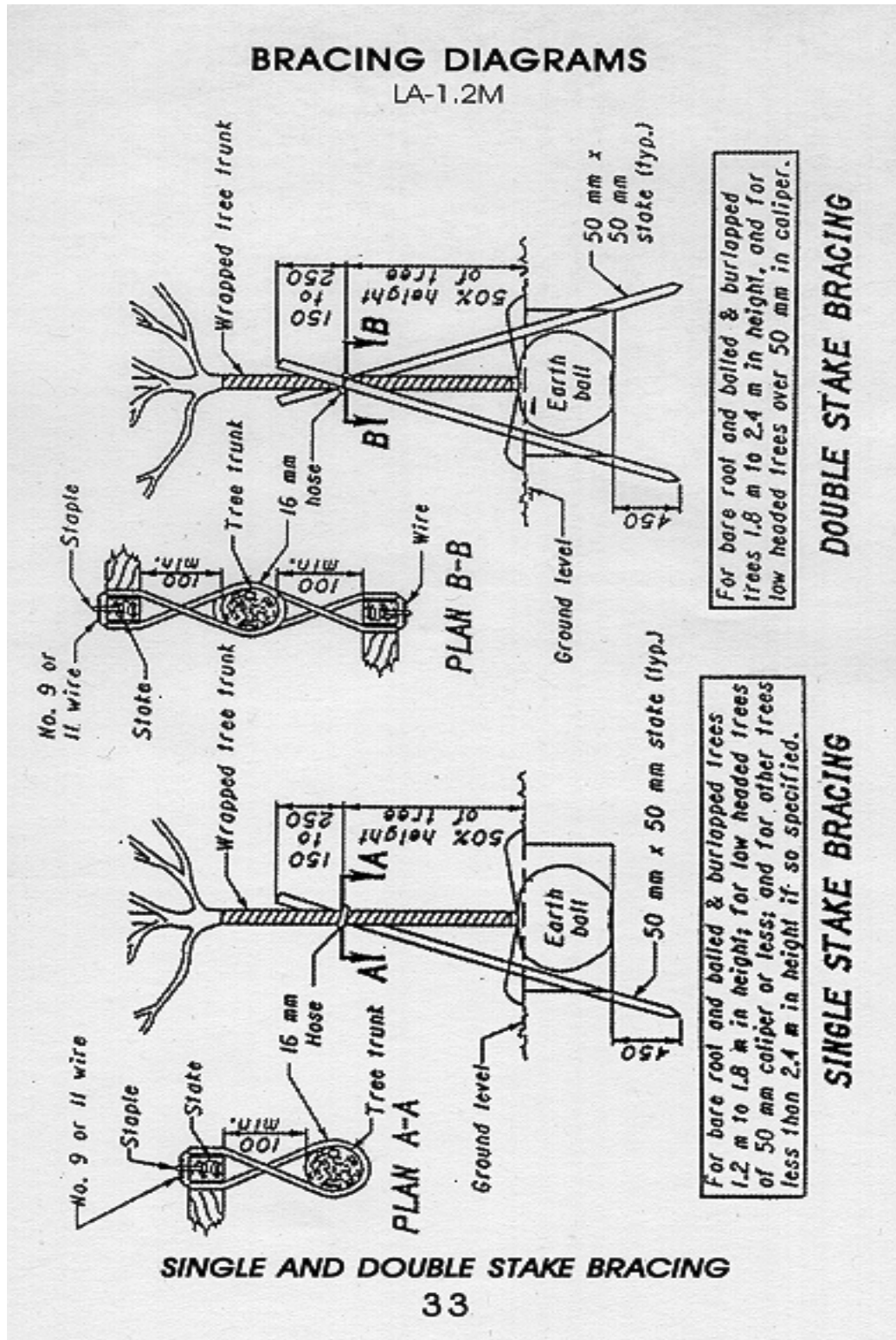
SHRUB BED PLANTING IN  
WET OR COMPACTED SOIL

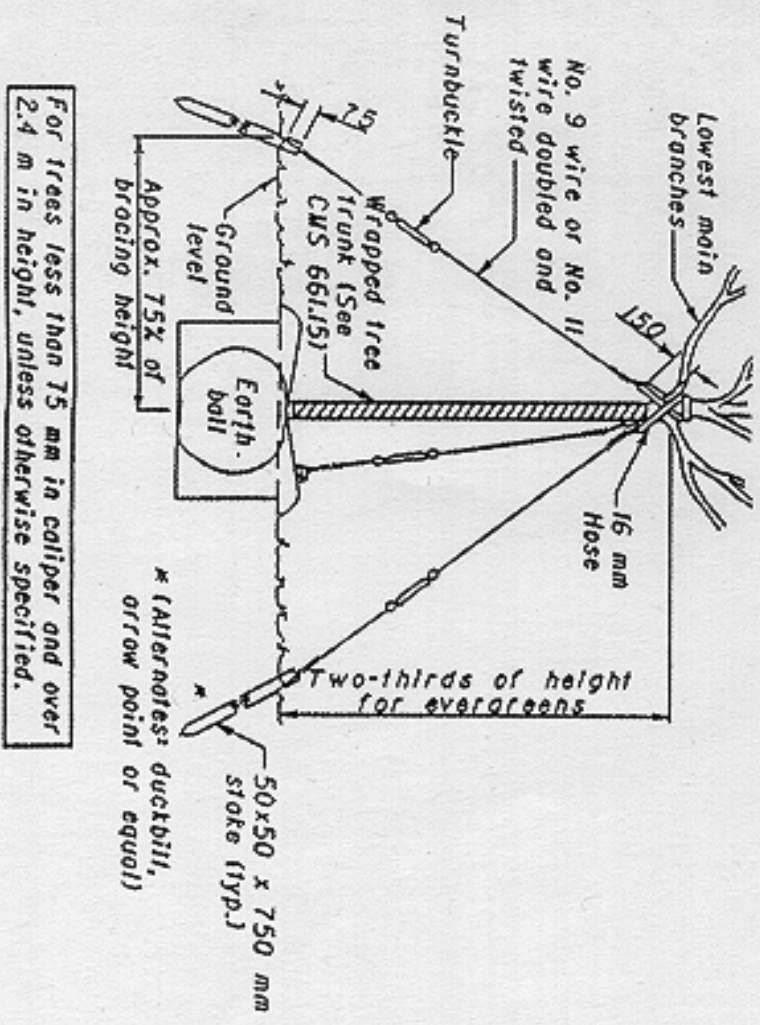
**SHRUB BED PLANTING IN WET OR COMPACTED SOIL**



PLANTING ON SLOPE

**BRACING DIAGRAMS**  
**LA-1.2M**

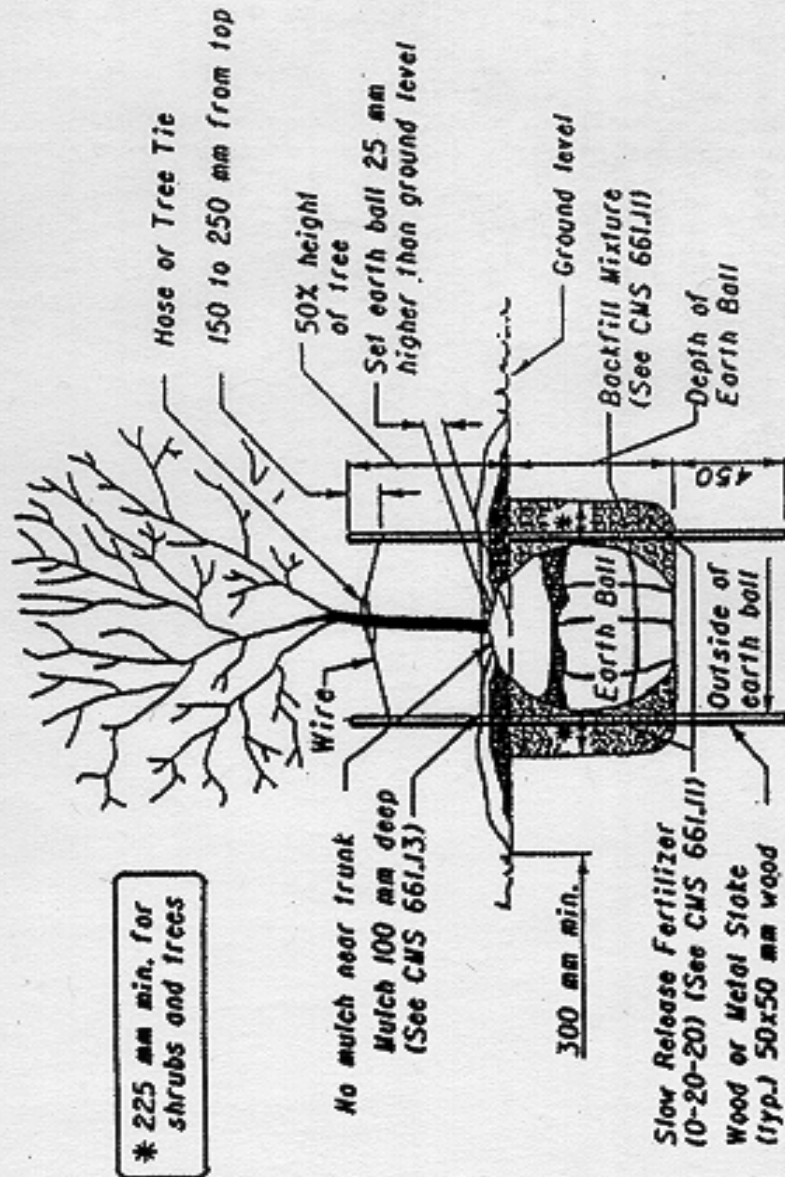




For trees less than 75 mm in caliper and over 2.4 m in height, unless otherwise specified.

**TRIPOD BRACING**

**TRIPOD BRACING**



**ALTERNATE DOUBLE STAKE BRACING**

**ALTERNATE DOUBLE STAKE BRACING**  
35

# NOTES

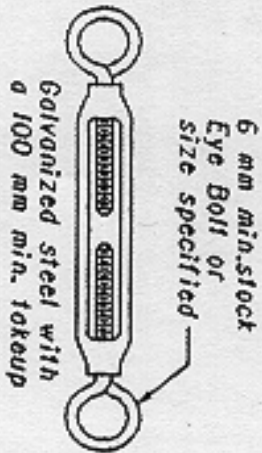
**PLANTING DETAILS** The types and quantities of fertilizer, herbicide, mulch and backfill vary with different soil and weather conditions. See CMS 661.19 for Method of Measurement and 661.20 for Basis of Payment.

Pit diameter and depth will vary with the type and size of the plant.

Backfill unless otherwise specified, will be in accordance with CMS 661.11.

Hose will be new garden hose (rubber and fabric). The 16 mm dimension is inside diameter.

Wire furnished for tree bracing will be of the type described as "regular galvanized soft wire of common quality."



**TURNBUCKLE**



**WIRE LOOP DETAIL**

All dimensions are in millimeters unless otherwise noted.

## APPENDIX I - SHADE TREES

Height relationship to caliper

Caliper (inches)	Avg. Height Range (feet)	Maximum Height (feet)	Minimum Diameter Ball (inches)
3/4	6 to 8	10	14
1	8 to 10	11	16
1 1/4	8 to 10	12	18
1 1/2	10 to 12	14	20
1 3/4	10 to 12	14	22
2	12 to 14	16	24
2 1/2	12 to 14	16	28
3	14 to 16	18	32
3 1/2	14 to 16	18	38
4	16 to 18	22	42
5	18 and up	26	54

Tree caliper is measured 6 inches above ground level up to and including 4-inch caliper size and 12 inches above the ground for larger sizes.

## APPENDIX I - SHADE TREES

### CONTAINER SPECIFICATIONS - shade trees

Tree sizes and acceptable container sizes:

Tree Height	Container Size
12 in.	#1
18 in.	
2 ft.	
3 ft.	
2 ft.	#2
3 ft.	
4 ft.	
4 ft.	#3
5 ft.	
6 ft.	

All container grown plants shall be healthy, vigorous, well rooted and established in the container in which they are sold.

An established container grown tree shall be a tree transplanted into a container and grown in that container sufficiently long for new fibrous roots to have developed so that the root mass will retain its shape and hold together when removed from the container.

## APPENDIX II - DECIDUOUS SHRUBS

Height	Minimum Diameter Ball (inches)
12 in.	8 in.
18 in.	9 in.
2 ft.	10 in.
3 ft.	12 in.
4 ft.	14 in.
5 ft.	16 in.
6 ft.	18 in.
7 ft.	20 in.
8 ft.	22 in.
9 ft.	24 in.
10 ft.	26 in.

Plants dug to the specifications in the above table should have the center of the stem or cluster of stems of the plant in the center of the ball.

### APPENDIX III - CONIFEROUS EVERGREENS

#### Broad spreading and Globe Types (ex. *Taxus media*)

Height	Minimum Spread	Minimum Diameter Ball
6 in.	6 in.	
9 in.	9 in.	8 in.
12 in.	10 in.	8 in.
15 in.	12 in.	10 in.
18 in.	15 in.	10 in.
2 ft.	18 in.	12 in.
2 1/2 ft.	21 in.	14 in.
3 ft.	24 in.	16 in.
3 1/2 ft.		18 in.
4 ft.		21 in.
5 ft.		24 in.

#### CONTAINER GROWN SPECIFICATIONS

Height	Container Size
6 in.	#1
9 in.	
12 in.	
12 in.	#2
15 in.	
18 in.	#3
2 ft.	
2 1/2 ft.	

**APPENDIX III - CONIFEROUS EVERGREENS**  
**Conicals, Broad Upright and Columnar**  
*(ex. Pinus, Picea and Thuja)*

Height	Spread	Minimum Diameter Ball
12 in.	8 to 12 in.	10 in.
15 in.	9 to 15 in.	10 in.
18 in.	12 to 18 in.	10 in.
2 ft.	15 to 21 in.	12 in.
2 1/2 ft.	18 to 24 in.	12 in.
3 ft.	21 to 30 in.	14 in.
4 ft.	2 1/2 to 3 ft.	16 in.
5 ft.	3 to 4 ft.	20 in.
6 ft.		22 in.
7 ft.		24 in.
8 ft.		27 in.
10 ft.		34 in.
12 ft.		34 in.

Ball sizes should always be of a diameter and depth to encompass enough of the fibrous and feeding root system as necessary for the full recovery of the plant.

Plants dug to the specifications in the above table should have the center of the stem or cluster of stems of the plant in the center of the ball.

**APPENDIX III - CONIFEROUS EVERGREENS  
CONTAINER GROWN SPECIFICATIONS**

<b>Height</b>	<b>Container Size</b>
6 in.	#1
9 in.	
12 in.	
15 in.	
18 in.	
12 in.	#2
15 in.	
18 in.	
2 ft.	
18 in.	#3
2 ft.	
2 1/2 ft.	
3 ft.	
3 1/2 ft.	

All container grown plants shall be healthy, vigorous, well rooted and established in the container in which they are sold.

## APPENDIX IV - BROADLEAF EVERGREENS

### Spreading and Dwarf Types

(ex. *Buxus* and *Cotoneaster*)

Spread	Minimum Diameter Ball (inches)
18 in.	10 in.
2 ft.	12 in.
2 1/2 ft.	14 in.
3 ft.	16 in.
3 1/2 ft.	18 in.
4 ft.	21 in.

### CONTAINER GROWN SPECIFICATIONS

Height	Container Size
6 in. 9 in. 12 in.	#1
12 in. 15 in.	#2
12 in. 2 ft. 2 1/2 ft.	#3

All container grown plants shall be healthy, vigorous, well rooted and established in the container in which they are sold. They shall have tops of quality and in a healthy growing condition.

**APPENDIX IV - BROADLEAF EVERGREENS**

**Cone and Broad Upright Types**

(ex. *Ilex* and *Rhodoendron*)

Height	Minimum Diameter Ball (inches)
18 in.	10 in.
2 ft.	12 in.
3 ft.	14 in.
4 ft.	16 in.
5 ft.	20 in.
6 ft.	22 in.

**CONTAINER GROWN SPECIFICATIONS**

Height	Container Size
6 in.	#1
9 in.	
12 in.	
15 in.	
18 in.	
12 in.	#2
15 in.	
18 in.	
2 ft.	
18 in.	#3
2 ft.	
2 1/2 ft.	
3 ft.	
3 1/2 ft.	

## DEFINITIONS:

**Amendments** - mixed with the soil removed from the plant hole; to improve the soil texture, pH or add organic material; sphagnum peat moss, shredded pine bark, yard waste compost, and sand are all accepted amendments.

**Backfill** - this soil and amendment mixture is placed back into the hole after the plant has been set (*see CMS 611.11*)

**Balled and Burlapped** - this is one kind of method for digging field-grown plants with a ball of earth still intact in which they are growing; can be supported by a wire basket and or burlap and laced with baling twine; often denoted as B&B in plan notes; see appendix for correct plant/B&B sizes.

**Bare Root** - plants shipped by this method are done so without the soil from which they were grown; this type of plant can be seedlings, perennials, roses, fruit trees etc.; roots should be white and unbroken.

**Caliper** - this is measured as the width of a single stem plant; see page 6 on how to take measurement.

**Competing Leaders** - found at the top most branch, this condition is where the main stem (leader) has been cut or broken and has continued to grow into two main stems; one should be removed to eliminate the potential for future problems.

**Conifer** - cone-bearing plants; mostly evergreen but not always true

**Crown** - the upper part of a tree, also called the canopy.

**Deciduous** - term used to describe plants which lose their leaves at the end of a growing season; typically this occurs in the fall.

**Fertilizer** - a natural or synthetic material added to or spread on soil to increase its fertility; the three numbers indicate its percentage of ingredients; in order, these numbers are nitrogen, phosphorus and potassium.

**Foliage** - this is the leaf structure of a plant; can be composted of needles or deciduous leaves .

**Herbicide** - a natural or synthetic product typically used to eradicate weeds; product should be applied by a licensed applicator and as directed by the manufacturers label.

**Mulch** - placed onto top of the plants rootball; keeps the ground cool, retains moisture, prevents heaving and breaks down, providing nutrients to the root system (*see CMS 661.13*).

## **Definition's con't.**

**Multi-stem** - having two or more main stems; defined as clump or shrub form.

**Root Crown** - this is the union between the roots and the stem; care should be taken not to bury this union with soil when planting.

**Single Stem** - also called the central leader or trunk; tapers gradually from root crown to top.

**Shrubs** - usually multi-stemmed with numerous side branches; can be evergreen or deciduous.

**Tree Wrap** - placed around a deciduous tree trunk to protect it from frost cracking, sunscald or insect damage; (see *CMS 661.15*)

## REFERENCES:

Inspection Guide for Planting, *American Association of State Highway Officials, 1973*

Landscape Inspection, *Texas DOT, 1994*

Construction and Materials Specifications, 1997

American Standard For Nursery Stock, ANSI Z60.1-1990, American Association of Nurserymen

## WEB ADDRESS FOR PLANT INFORMATION:

<http://www.hcs.ohio-state.edu/webgarden.html>

## NOTE:

A small pocket sized version is available. Contact the Office of Maintenance Administration at 466-3264 to order.

For additional plant information please contact your County Extension office.

This handbook was prepared by Deborah L. Brown, Horticulturist.

