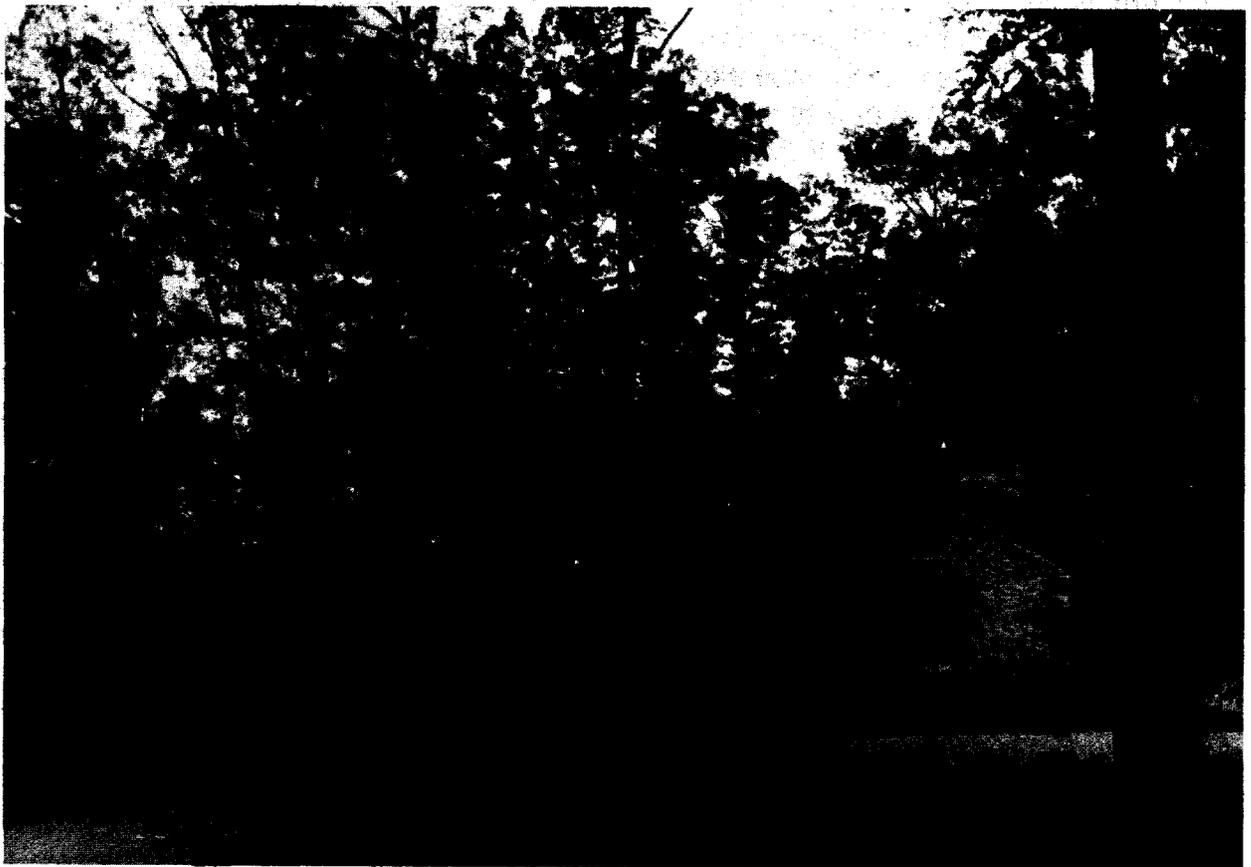


Protecting Trees During Construction

Saving trees during and after construction activities has many advantages. These include erosion control, aesthetic and monetary values, wildlife enhancement, screening, and protection from wind. These factors are important in considering the number, kind, and location of trees to be retained and protected.

Other evaluations need to be made in deciding which trees to save. These are species, size, age, vigor, cost, work involved in preserving trees, and adaptation of trees to environmental changes. Tree species vary in their characteristics, and this must be considered carefully in select-

ing trees to be saved. Maples, willow, dogwood, and most conifers are shallow-rooted and may hinder the desirable growth of lawns and certain ornamental shrubs. Willows and some poplars may clog tile or sewer lines. Some trees are more susceptible than others to insects and diseases. Poplar, willow, and locust adapt more easily to environmental changes. Less adaptable trees are beech, birch, hickory, tulip tree, some oaks, most apples, and most conifers. Old or large trees do not adapt to environmental changes as well as young trees of the same species.



On this urban development some trees have been saved.

Trees need to be protected from damage by construction equipment, storage of supplies, changed ground surface elevation (either higher or lower), and excavation near the root zone. To protect a tree against mechanical injury, construct a simple fence or other barrier around it. Enclose an area at least 10 feet square with the tree in the center for small trees and larger for mature trees. All roots subject to soil compaction or mechanical injury should be inside the barrier to prevent damage from vehicles and construction equipment.

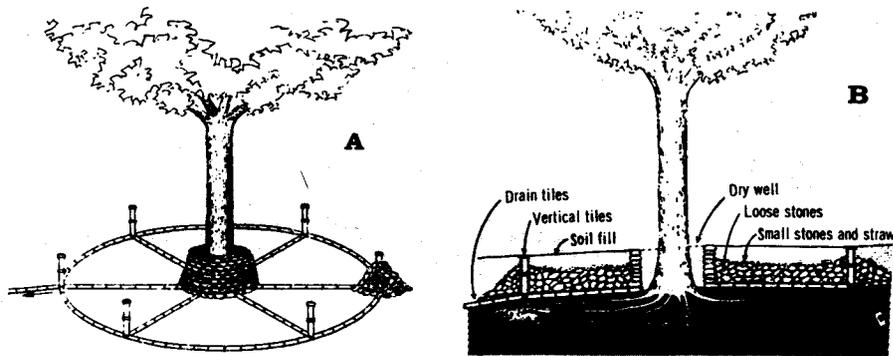
Tree roots need air, water, and minerals to survive. Any changes in the elevation of the ground surface will affect these important ingredients and a tree may have difficulty in obtaining normal amounts of each. In raising the ground surface elevation, minor fills—6 inches or less in depth—may not do any harm if soil is fertile and has good tilth. Major elevation increases usually require gravel layers and tile drain systems (Figure 1). Tiles are laid on original grade in the form of spokes of a wheel. The "spokes" open into a dry well built around the trunk. It may be necessary to place a series of bell tiles vertically over the roots and connect them to the rim of the wagon wheel system to allow for additional air and water circulation. The air system will have to be designed for each tree individually, and it will have to fit the contour of the land so water drains away from the tree trunk. Water concentrated from dwellings, parking areas, or faulty septic tank drainage fields may also cause damage or death to trees.

Protecting a tree from a lowered ground surface is usually less complicated than protecting it from a raised grade. Generally, protection is achieved by terracing. If space is available, the tree may be unharmed by letting it remain on a gently sloping mound. Another way to protect it from a lowered ground surface is to build a retaining wall between it and the lower grade (Figure 2).

Trees can be protected from underground utility lines. If the route cannot be diverted around the tree, tunneling under it may be necessary (Figure 3). In tunneling, cut as few roots as possible, cut them clearly, paint cut root ends with a wound dressing, such as asphalt-based paint, and backfill the trench as soon as possible to keep roots from being exposed to air. Figure 4 also illustrates various types of tree wells. Cost of tunneling must be considered against the value of trees to be saved.

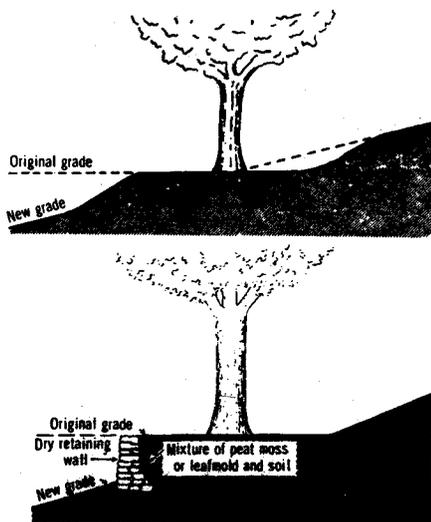
There may be occasions when the only way to save a tree is to move it. It is best to move trees when they are dormant. Practically no kind of plant can survive if roots have dried out. Roots must be moist at all times. Trees are moved either by the bare-root method or by the balled and burlapped (B&B) method. Bare-rooted trees may be moved if they are small and dormant. They should be protected by applying wet material such as peat moss to their roots immediately and keeping them moist. In the B&B method, balls of earth should be large enough to enclose the tree root system.

Figure 1



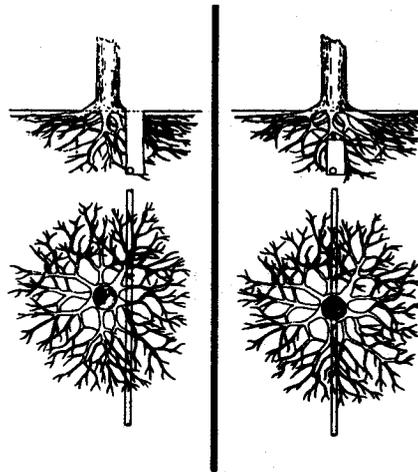
A tile system protects a tree from a raised grade. A, The tile is laid out on the original grade, leading from a dry well around the tree trunk. B, The tile system is covered with small stones to allow air to circulate over the root area.

Figure 2



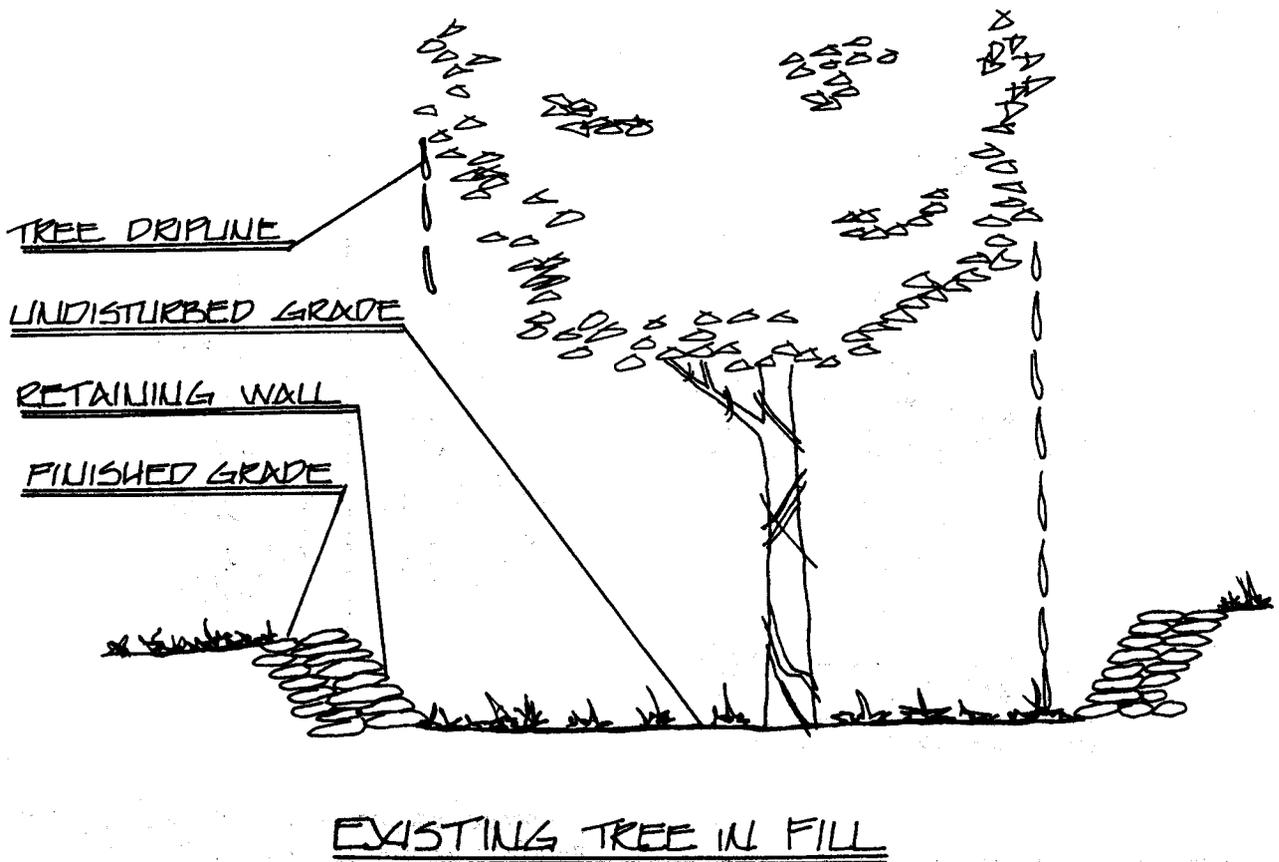
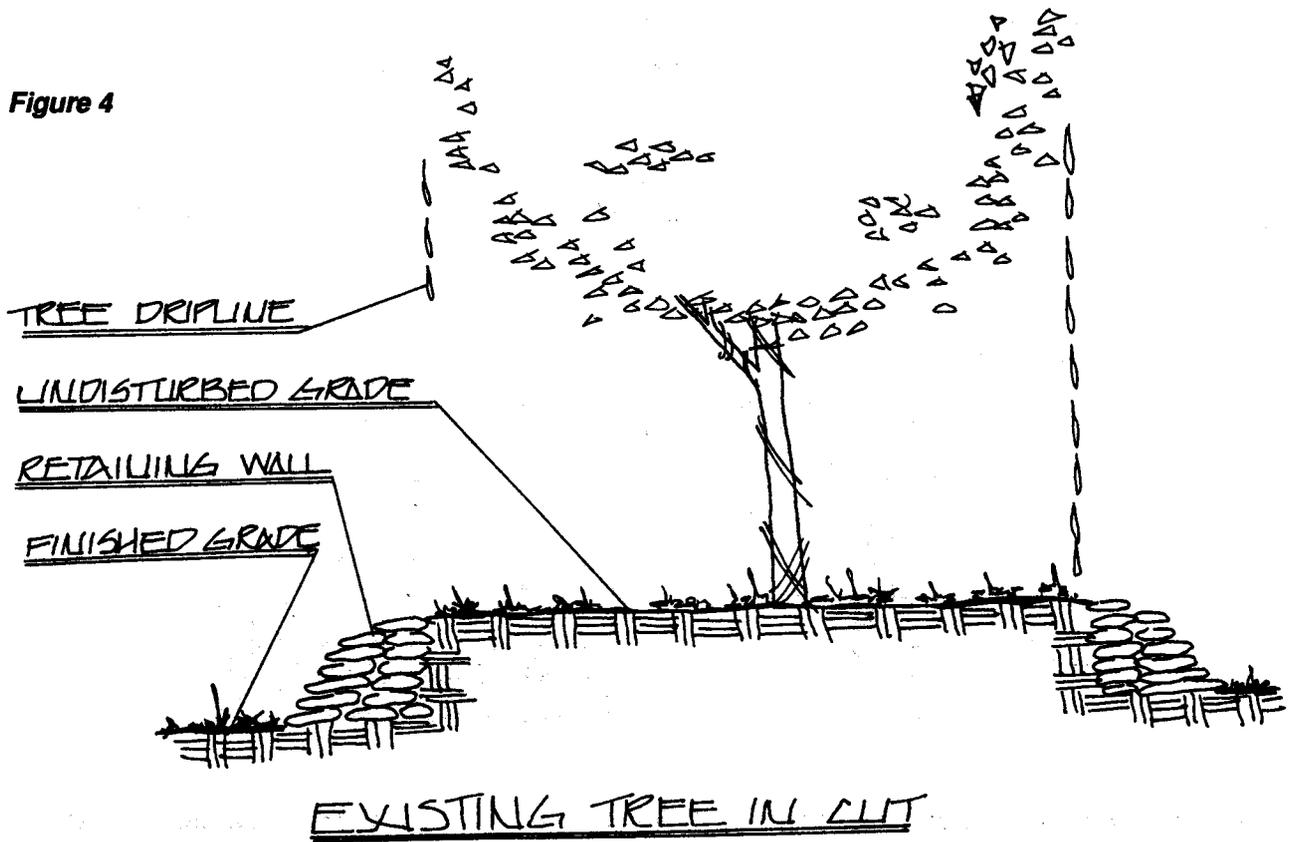
A retaining wall protects a tree from a lowered grade.

Figure 3



Tunnel beneath root systems. Drawings at left show trenching that would probably kill the tree. Drawings at right show how tunneling under the tree will preserve many of the important, feeder roots.

Figure 4



Selecting, Lifting, and Planting

During urban construction, it is often desirable to lift and transplant existing trees and shrubs on the site. This helps insure that the species are adapted to the area and usually reduces costs. Following are suggestions and guides on selection, lifting, planting, and care of these plants:

1. Selection of specimens of native plants for transplanting: Select young plants growing in full sun on a site similar to the intended planting site.
 - a. Young plants are more satisfactory for transplanting than old plants.
 - b. Nursery stock is more suitable for transplanting than natural-grown specimens.
2. Time of planting and method of digging:

- a. Transplant trees and shrubs during the dormant season.
 - (1) Most small deciduous plants can be moved bare rooted.
 - (a) Dig plants carefully with a sharp spade. Begin far enough away from the plant to save most of the fibrous roots. Use a sharp axe to cut large roots with a slanting cut. Trim damaged roots and excessively long roots with a sharp knife.
 - (b) Keep roots of plants moist. Cover with moss, sawdust, or other moist material until planted.
 - (2) Large evergreens and large deciduous plants should be moved with a ball of earth. The size of the ball of earth depends upon species and the size of plants to be moved.

TABLE 7 — Guide for Lifting Balled Plants

Coniferous Evergreens		Shrubs & Small Trees		Shade Trees	
Height of Plant	Dia. of Ball	Height of Plant	Dia. of Ball	Dia. of Tree	Dia. of Ball
2'-3'	13"	18"-24"	11"	1-1/4"-1-1/2"	18"
2'-4'	15"	2'-3'	12"	1-1/2"-2"	22"
4'-5'	17"	3'-4'	14"	2"-2-1/2"	24"
5'-6'	19"	4'-5'	16"	2-1/2"-3"	28"
6'-7'	21"	5'-6'	18"	3"-3-1/2"	33"
7'-8'	24"	6'-7'	20"	3-1/2"-4"	38"
8'-9'	26"	7'-8'	22"	4"4-1/2"	43"
9'-10'	28"	8'-9'	24"	4"-5"	48"
10'-12'	31"	9'-10'	26"		
12'-24'	35"				

(a) To lift plants, the soil should be moist but not excessively wet. When soil is dry, water thoroughly at least 2 days before digging. Plants should not be lifted when soil is frozen.

(b) For dug stock where ball of earth is 16 inches in diameter or less, use a sharp spade, and cut straight down all around the plant. Break the ball of earth loose using the spade as a pry under one side.

(c) Protect dug stock from wind and keep moist by watering every 2 days until planted.

3. Planting:

a. Bare-rooted plants:

(1) Make holes large enough to accommodate the root system without cramping. Plants should be set as close as possible to the same depth as they grew originally.

(2) Plants should be planted 2 inches above the original ground line to allow for settlement in the planting pit.

(3) Water thoroughly when hole is half filled with soil. Allow soil to settle and finish filling the hole. Water until the hole is filled with soil.

b. Balled with burlap plants:

(1) Rototill or spade an area 5 times the diameter of the planting ball to

a depth of about 12". If soil additives are necessary, add uniformly.

(2) Excavate a hole in the center of the prepared area no deeper than the depth of the ball. Set tree in center of hole so new root ball sits on solid ground. The upper surface of the ball should be level with the existing ground line.

(3) Cut wire or twine from around root ball and peel back burlap. Place tree so the trunk is plumb.

(4) Backfill with soil excavated from planting pit; gently pack soil to prevent air pockets. (Watering can sometimes be used to achieve the desired effect.) Rake soil even over the entire area. Cover with 2"-4" of mulch, leaving "breathing" room around trunk.

(5) Prune broken branches. Do not paint pruned areas.

(6) Do not cut central leader.

(7) Do not leave a rim or saucer around the trunk to hold water.

(8) Do not stake the tree unless planted in a high wind area. If staked, remove wire after one year.

(9) Do not wrap tree with protective tape.

(10) Do not fertilize tree.

(11) Water frequently during the first growing season.