Figure VII-7
Urban Stormwater Gardens in Planting Strip
Source: Nevue Ngan Associates

15. Street Trees

a. Purpose

i. The planting and maintenance of healthy trees and vegetation throughout Hudson County and along County rights-of-way furthers the County's conservation goals and commitment to sustainability. Specifically, trees offer the following health, environmental, energy-saving and community benefits:

(a) Provides shade and comfort to pedestrians and residents.

(b) Reduces air temperatures and the urban "heat island" effect.

(c) Reduces air movement into buildings and conductive heat loss from buildings.

(d) Sequesters CO2, reducing its presence in the atmosphere.

(e) Reduces air pollutant emissions of NO2, PM10, volatile organic compounds (VOCs), and SO2 and improves overall air quality.

(f) Intercepts dust and particulate matter, thereby purifying the air.

(g) Reduces the amount of stormwater runoff and pollutant-loading in receiving waters.

(h) Reduces flooding and prevents soil erosion.

(i) Trees provide screening, which in turn aids in the reduction of noise and glare.

(j) Beautifies the surrounding area, provides shade that increases human comfort and sense of place.

(k) Provides natural habitat for wildlife and birds.

(l) Improves human health, privacy, and well-being.

(m) Protects and enhances property values and community image.

(n) Creates a traffic calming effect to induce desired operating speeds.

(o) Creates an interesting pedestrian realm.

b. Applicability

i. For all site plan and subdivision applications, street trees shall be provided along all streets to define the street and sidewalk and to unify areas with a distinct identity, in accordance with these regulations.

ii. These standards apply to trees planted along or near a County Road right-of-way (such that by their proximity are reasonably expected to impact the County Road ROW or infrastructure after reaching maturity) and to all development projects requiring County approval.

iii. Number of Tress. One (1) street tree shall be provided for every 30 feet of street frontage of the lot. Fractions equal to or greater than one-half (0.5) resulting from this calculation shall be considered to be one (1) tree. Such trees shall be planted at approximately equal intervals along the entire length of the curb of the roadway subject to these requirements.

iv. If determined by the County Engineer that physical conditions within the County right-of-way do not allow the safe and effective planting of the required trees, the Developer, upon approval of the Board and County Engineer, shall make a cash contribution to the Hudson County Shade Tree Fund to be used solely for the planting and preservation of trees. In arriving at the determination of such number of trees and the cash contribution, the Board shall take into consideration the written opinion of an expert provided by the applicant, and in the Board's discretion, an expert consultant selected by the Board. The costs of all experts shall be borne by the applicant. The cash contribution per tree shall be the estimated cost of purchasing and planting if it were to be planted on the site.

c. Tree selection

i. Only trees which exhibit the following characteristics shall be selected:

(a) native to New jersey;

(b) drought tolerant;

(c) urban tolerant

(d) suitable to thrive in the soil conditions on the site;

(e) tolerant of road salts;

(f) have root growth and crown shape that will not be physically intrusive to surrounding utilities or County roads and structures;

(g) adequate canopies at maturity to provide shade and rain absorption;

(h) and require low maintenance.

ii. Tree species shall be selected in accordance with their growth habit and environmental function. Commercial streets should have trees that compliment the building facade and shade the street and sidewalk. Residential streets should provide for an appropriate canopy that provides shade and serves as a visual buffer between the street and home.

iii. Trees shall be planted in groupings of similar varieties, although monoculture plantings are discouraged. Use trees of similar form, height and character along a roadway to promote uniformity.

iv. The minimum caliper of trees shall be 2.5 to 3.5 inches (based on American Association of Nurseryman standards). The caliper shall be measured at a point four (4) feet above the ground.

v. The mature height and spread shall be considered to ensure that it will not interfere with existing or proposed structures and overhead utilities.

vi. Selected trees shall not cause interference with walls, walks, drives, and other paved surfaces, or affect water and sewer lines or underground drainage systems or sight triangles.

vii. All trees shall be supplied by reputable nurserymen and planted in accordance with these regulations.

viii. Species may be selected from the list of approved trees provided in the *Hudson County Community Forestry Plan*.

ix. No tree planting approval will be issued without a two (2) year guarantee period.

e. **Spacing**

i. Spacing between trees shall be determined based upon species and the desired concept. Recommended spacing is 25 to 30 feet. Actual spacing may vary due to local conditions. Consideration will be made for bus stop locations. The maximum range is 25 to 45 feet to accommodate for variables such as streetlights, fire hydrants, underground vaults, bus stops…etc..

ii. Spacing of existing trees may determine the spacing standards for new street trees unless otherwise directed.

iii. Street trees may be inter-planted between existing street trees; however, the species should remain the same, or have similar growth habit and visual characteristics. Shade trees may vary from road to road.

iv. Street trees shall be spaced evenly along the street; however, if a specific effect is desired the trees may be massed at critical points or shall be a combination of both. If columnar trees are to be planted, the spacing may be closer. All tree spacing shall be subject to review and approval.

f. Planting location

i. Trees may not be planted such that their future growth will interfere with utility wires or other interference.

ii. Trees that grow taller than 35 feet should not be planted directly under power lines. When possible the tree leader shall be offset from power lines.

iii. All trees shall adhere to the following minimum planting distances for all utility or site infrastructure clearances:

(a) 10 feet from all buildings.

(b) 10 feet from streetlights, utility poles and above-ground utility wires.

(c) 3 feet from all underground utility lines.

(d) 10 feet from a fire hydrant and man-hole covers.

(e) 10 feet from all drain inlets, catch basins, and trench drains.

(f) 3 feet from the curbline or driveway.

(g) 10 feet from a stop sign.

(h) 25 feet from a street intersection.

iv. Within sight triangles, a single tree may be permitted only with site-specific approval of the Municipal Engineer. Such trees, including those at driveways, shall be of such size as will enable them to be immediately pruned up to seven feet height upon planting.

v. Consider the use of double and triple rows of street trees for special emphasis.

vi. Where on-street parking is provided, trees, shrubs and raised planters should be located as not to conflict with opening car doors or pedestrian access to and from on-street parking.

g. Planting Specifications

i. Trees shall be planted in tree pits or within a planting strip, in accordance with these requirements. Construction specifications for tree planting are provided in Figure VII-8 and Figure VII-9 below.

ii. Tree planting pits should be as large as possible to allow for ample growing space for tree roots and crown. The overall width of a sidewalk can limit the size of a tree pit. The minimum width of a tree pit in the sidewalk area is 5 feet.

iii. Consider using continuous planting strips as opposed to individual tree pits, where ever possible.

iv. Trees shall be properly planted in accordance with accepted horticultural standards; the standards and construction details used shall be submitted with the application and plans.

v. A protective root barrier shall be installed to a depth of eighteen (18) inches within the planting bed, between the sidewalk and curb.

vi. Depending on the size of the tree, staking of trees is not recommended unless required by the County Engineer or Inspector.

vii. A prepared planting medium shall be used that is capable of permitting the percolation of water and air.

viii. The surface of the planting area shall be mulched with wood-chips, or other suitable material to conserve soil moisture. Mulch shall be applied to a uniform depth of three (3) inches and shall be so distributed as to create a smooth, level cover over the exposed soil. A gap of approximately 2" should be left between the mulch and the trunk of the tree to avoid mounding above the trunk flare and to avoid the “mulch volcano.”

ix. On site irrigation methods shall be specified. Water hose locations shall be convenient and underground irrigation shall be provided if deemed appropriate and suitable.

x. The use of tree grates in areas with considerable commercial and pedestrian activity may be used as an alternative to tree pits, only where absolutely necessary and considered as a temporary structure with a 5-10 year life span. Only ADA compliant tree grates shall be permitted, as well as those that allow for radial expansion as the tree grows.

xi. During construction, protective barriers shall be installed around each plant and/or group of plants that are to be retained within the county right-of-way. Barriers shall be self-supporting and shall not be attached to the vegetation being protected. Barriers shall be a minimum of four (4) feet high and constructed of highly visible orange plastic mesh that is durable and that will last until construction is completed.

h. Tree Removal

i. No person shall remove any deciduous tree having a caliper of six (6) inches or greater or any coniferous tree having a height greater than nine (9) feet unless authorized by the Board.

ii. Every reasonable measure shall be taken to avoid the removal of deciduous trees with a caliper in excess of 24 inches and coniferous trees with a height in excess of fifteen (15) feet.

i. **Tree Replacement**

i. Any tree removed as a result of a site plan or subdivision application subject to County approval shall be replaced with a new tree at a ratio of one (1) new tree for every six (6) inches in diameter of existing tree removed, with a minimum caliper of three (3) inches.

ii. Developers are required to preserve as many of the existing trees as practical.

iii. Any planted tree that is dead or, in the opinion of Board, is in an unhealthy or unsightly condition, and/or has lost its natural shape due to dead branches, excessive pruning, inadequate or improper maintenance, or other causes including vandalism, prior to final acceptance, shall be replaced in the next planting season. There shall be a two (2) year guarantee on trees commencing after the final inspection of the permitted planting. The topsoil in the tree pit shall be changed when any replacement tree is planted.

iv. Where dead trees have been identified, whether due to natural causes or vandalism, the dead material shall be removed by the property owner, including stakes, and Arbor Tie within three (3) weeks of notification. When necessary, topsoil, grass seed or appropriate

paving material shall be added to the pit by the property owner to eliminate potential tripping hazards at the time of removal.

v. Where vandalism or related causes are agreed as the cause for tree replacement, the applicant or property owner shall be responsible for one replacement during the two (2) year guarantee period after final inspection of the permitted planting.

j. Maintenance

i. Maintenance of new trees shall be the responsibility of the adjoining property owner unless provided by the municipality.

ii. Maintenance shall include weeding, cultivating, edging, pruning, adjustment and repair of stakes, and Arbortie™, repair of minor washouts, soil replacement and other horticultural operations necessary for the proper growth of all trees, and for keeping the entire area within the planting area neat in appearance.

k. Time of Guarantee

All trees shall be guaranteed for a period of two (2) years from the date that all improvements are accepted as complete. Both the planting of and the two (2)-year guarantee for trees shall be covered under the developer's performance security for the road and/or drainage improvements.

l. **Finishing**

i. Paving blocks or tree pit guards shall be installed as finishes, and shall be designed to.

(a) Prevent dogs from depositing waste on tree trunks and in tree pits;

(b) Prevent pedestrians from stepping on the soil in the pit;

(c) Allow for the planting of flowers and ground covers in the pit;

(d) Protect a tree from mechanical damage caused by car doors, bumpers, bike locks, and other sidewalk traffic.;

(e) Prevent chemical, salt and other toxins from flowing into the tree pit.

ii. A tree pit guard must not:

(a) Restrict the growth of a tree.

(b) Raise the level of soil around the tree.

(c) Pose a trip hazard to pedestrians.

iii. Paving Blocks Design

Granite blocks shall be new or used and shall be cut from fine to medium grained sound and durable granite. The granite shall be reasonably uniform in quality and texture throughout and shall be free from an excess of mica and feldspar and from seams, scales or evidence of disintegration. If used blocks are utilized they shall be clean, free from mortar, asphalt, etc.

Blocks shall be fairly rectangular in shape. Granite blocks shall be so dressed that they may be laid with one (1) inch joints (See Figure VII-10).

iv. Tree Pit Guard Design

A tree pit guard is a device, usually a cast-iron fence or wrought-iron wickets, installed around a tree pit for protection. A low cast-iron fence or wrought-iron wickets from 18" to 30" high, around the perimeter of the tree pit are recommended. This will protect the tree from dogs and pedestrians and give it enough space to grow for many years. Guards should not be installed close to tree trunks as they strangle the tree as it grows and fail to protect the root zone. Guards are not appropriate for areas where car doors may swing into them (See Figure VII-10).

Figure VII-8
Tree Pit Guard and Paving Block Protection Approaches

Vegetated tree pit with brick paving blocks

Iron fence with an opening for car doors

Wrought Iron wicket fence elevated on granite curb with opening for car doors.

Iron fence elevated on granite blocks to protect the tree and allow room for growth

m. Resources

General methods, advice, and recommendations can be found in “Trees for New Jersey Streets”, New Jersey Federation of Shade Tree Commission, Blake Hall – Rutgers College of Agriculture and Environmental Science, New Brunswick, New Jersey, 1965.

Figure VII-9
Tree Planting Detail

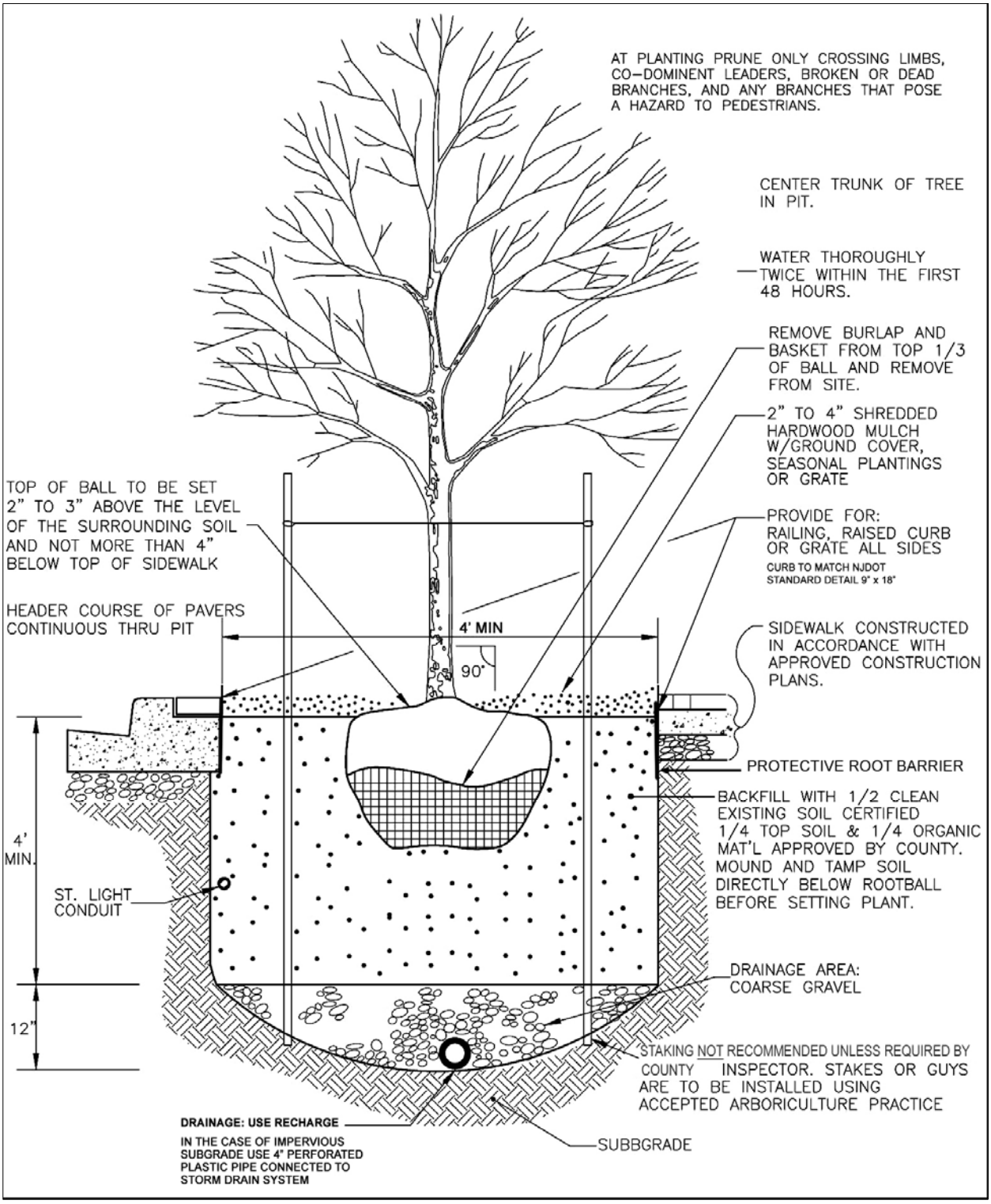
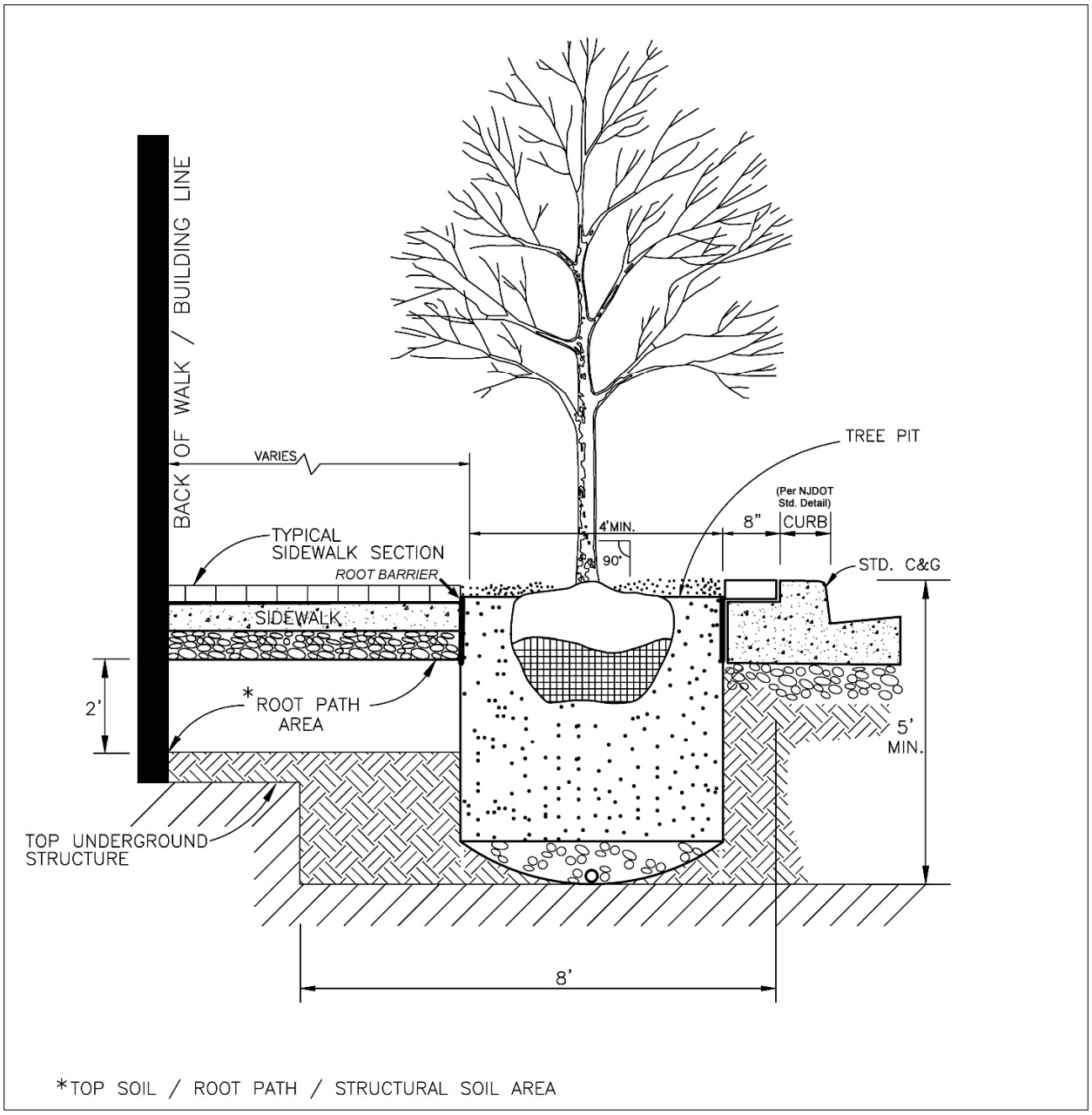


Figure VII-10
Tree Pit Detail



16. Roadway Lighting

a. All lighting shall be sufficiently illuminated to ensure traffic safety under all weather conditions.

b. The brightness of the roadway background, the glare from the luminaire and the reflected glare from pavement surface should be taken into consideration in determining adequate lighting.

c. Lighting for roadways shall be provided in accordance with the foot-candle levels set forth by the municipality or NJDOT, and should take into consideration the roadway hierarchy, area