

# **SILVER SPRING STREETSCAPE PLAN**

*Technical Manual*

**CONCEPT, MATERIALS, DETAILS AND SPECIFICATIONS**

TREES, PAVERS, AND STREET FURNITURE FOR CREATING

ATTRACTIVE STREETS IN DOWNTOWN SILVER SPRING,

MONTGOMERY COUNTY,

MARYLAND



The Maryland-National Capital Park & Planning Commission  
MONTGOMERY COUNTY PLANNING DEPARTMENT  
URBAN DESIGN DIVISION  
8787 Georgia Avenue, Silver Spring, Maryland, 20910-3760

**DRAFT REPORT  
APRIL 1992**

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**ABSTRACT**

**TITLE:** The Silver Spring Streetscape

**AUTHOR:** The Maryland-National Capital Park &  
Planning Commission, Urban Design Division

**SOURCE OF COPIES:** MNCPPC, 8787 Georgia Avenue  
Silver Spring, MD 20910-3760  
(301) 495-4570

**DATE:** April 1992

**NUMBER OF PAGES:**

**ABSTRACT:** This document describes the overall concept for the Silver Spring Central Business District (CBD) streetscape system and is used for private and public development within the CBD. The M-NCCPC Streetscape (Plan B) was approved by the Planning Board in 1988. The Department of Housing and Community development has been implementing their streetscape (Plan A) since 1979.

Specific streetscape materials and specifications are included.

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## INTRODUCTION

**U**rban design integrates the street corridors, public spaces and building masses of an urban center into coherent form. A successful streetscape binds the components of the center together into an attractive whole. When trees, clearly marked pedestrian routes and sidewalk amenities are absent, the lack is felt; when present, streetscape elements greatly contribute to the attractiveness, safety and legibility of a center.

Silver Spring is a major point of vehicular access between the District of Columbia and suburban Maryland. An active transit, business and service destination, it is surrounded by a dense variety of residential neighborhoods and supplied with abundant commuter parking. Safe and attractive pedestrian circulation within the central business district and to metro is critical to the center's viability and vitality.

The center of the Silver Spring CBD is intersected by two major State highways with heavy vehicular and, increasingly, pedestrian traffic. While street trees and pavers exist on both Colesville Road and Georgia Avenue, more emphasis can be placed on the pedestrian nature of these roads as they pass through the core of Silver Spring. The existing streetscape can be augmented and extended to clearly demarcate the pedestrian as well as vehicular nature of Colesville Road and Georgia Avenue within the CBD.

The Silver Spring streetscape is being implemented as development occurs: On Fenton

Street, Ellsworth Drive, Second, Apple, Wayne and Dixon Avenues, as well as along Georgia Avenue and Colesville Road, street trees are beginning to mature and mitigate the glare off of roads and buildings.

The streetscape on parts of Georgia Avenue and Colesville Road (Plan A) has been implemented over the years by the Department of Housing and Community Development. The Urban Design Division of M-NCPPC designed the streetscape for the remaining streets in the CBD in 1988 (Plan B), and it has been implemented through either the optional method of development or the mandatory referral process.

The map on page 4 indicates the emphasis that has been given to implementing streetscape along the main axes of Georgia Avenue and Colesville Road and along the "ring road" defined by Wayne and Second Avenues and Cameron, Spring and Fenton Streets. East-West Highway is planned as an urban parkway with major public use spaces located between 16th Street and Georgia Avenue, and Georgia Avenue and Colesville Road are planned as urban boulevards, activated by pedestrians and lined with attractive store, restaurant, and office facades.

This draft technical report contains the materials and construction specifications currently in use in the Silver Spring CBD. Additional paving and landscape materials, signage and sidewalk amenities, such as kiosks, may be introduced in the future.

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## AMENDED SOIL PANEL

Trees are an essential streetscape element which provide shade, create "outdoor rooms," define edges, lend softness, and add color. However, street trees are often planted in confined areas in poor soils. In urban areas, one to two feet of good soil had traditionally been provided around the rootball, limiting how much the roots could grow. In addition, "urban soils" are often compacted, poorly drained, poorly aerated, and low in organic matter. Water does not readily penetrate the interface of different soil types until saturation of one medium is reached and surface tension forces are overcome. Consequently, moisture extremes often occur in the three adjacent soils of the planting area, i.e., root ball, backfill, and site. The extremes of saturation or drought often result in the acute stress and death of newly transplanted trees and shrubs.

A tree planting technique has been developed in response to the urban soil and growth problems identified by the Center for Urban Ecology of the National Park Service. The Urban Design Division's tree planting detail calls for the construction of an amended soil panel that runs the length of the curb, providing the root system with a large area in which to grow along the curb and beneath the sidewalk. The cross section provides room for a prepared soil mixture, aeration, drainage and drip irrigation.

An earlier, widely-used detail called for a concrete retaining wall along the curb. The wall, however, was extremely costly and its construction required closing travel lanes over an extensive period of time. These problems resulted in a modification to the detail, replacing the wall with timber shoring and a compacted slope.

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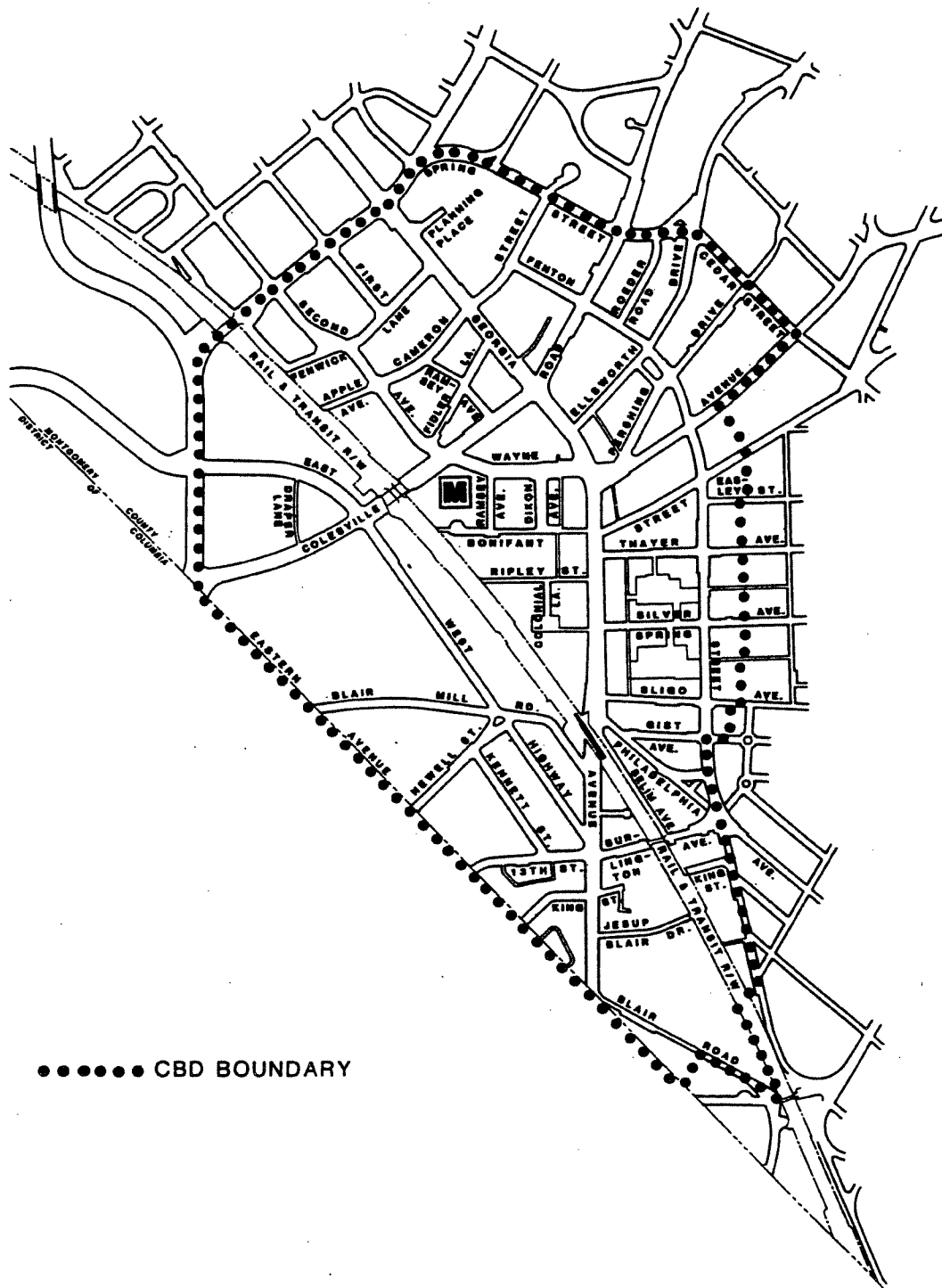
## **SOIL PANEL INSTALLATION**

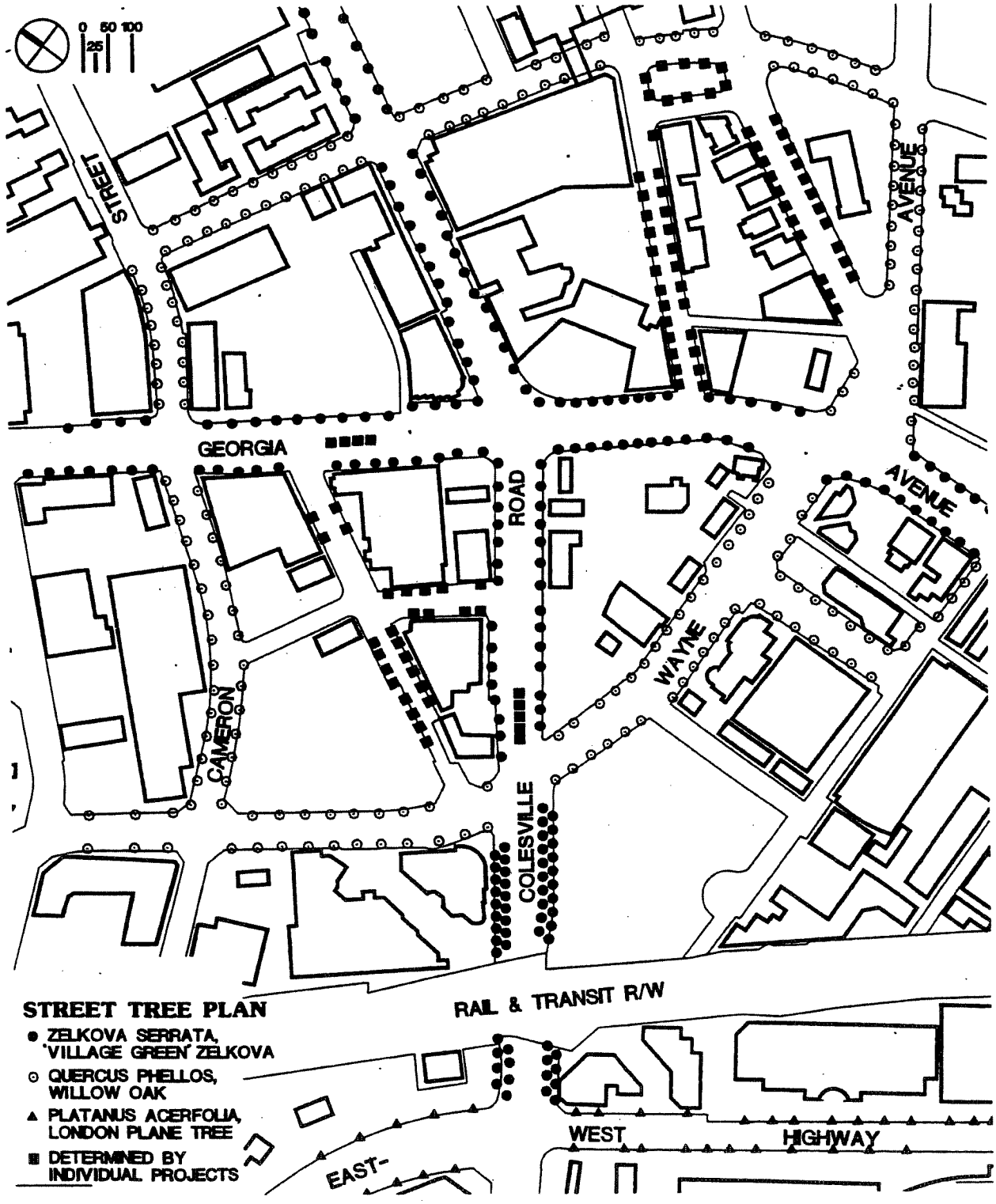
Construction begins with removal of all existing soil and pavement. The prepared soil mixture containing 1/3 native soil provides a suitable consistency for the tree in the urban environment. The soil panel increases the amount of amended soil to improve root development, providing a sub-surface drainage system to carry away excess water, avoiding root rot, and an irrigation pipe which will al-

low for manual watering of several trees at once during times of drought. In addition, the recommended paver detail over the amended soil panel will help minimize soil compaction.

Providing the root system with an amended soil panel and more space to grow promotes the long-term survival and healthy mature growth of urban street trees.

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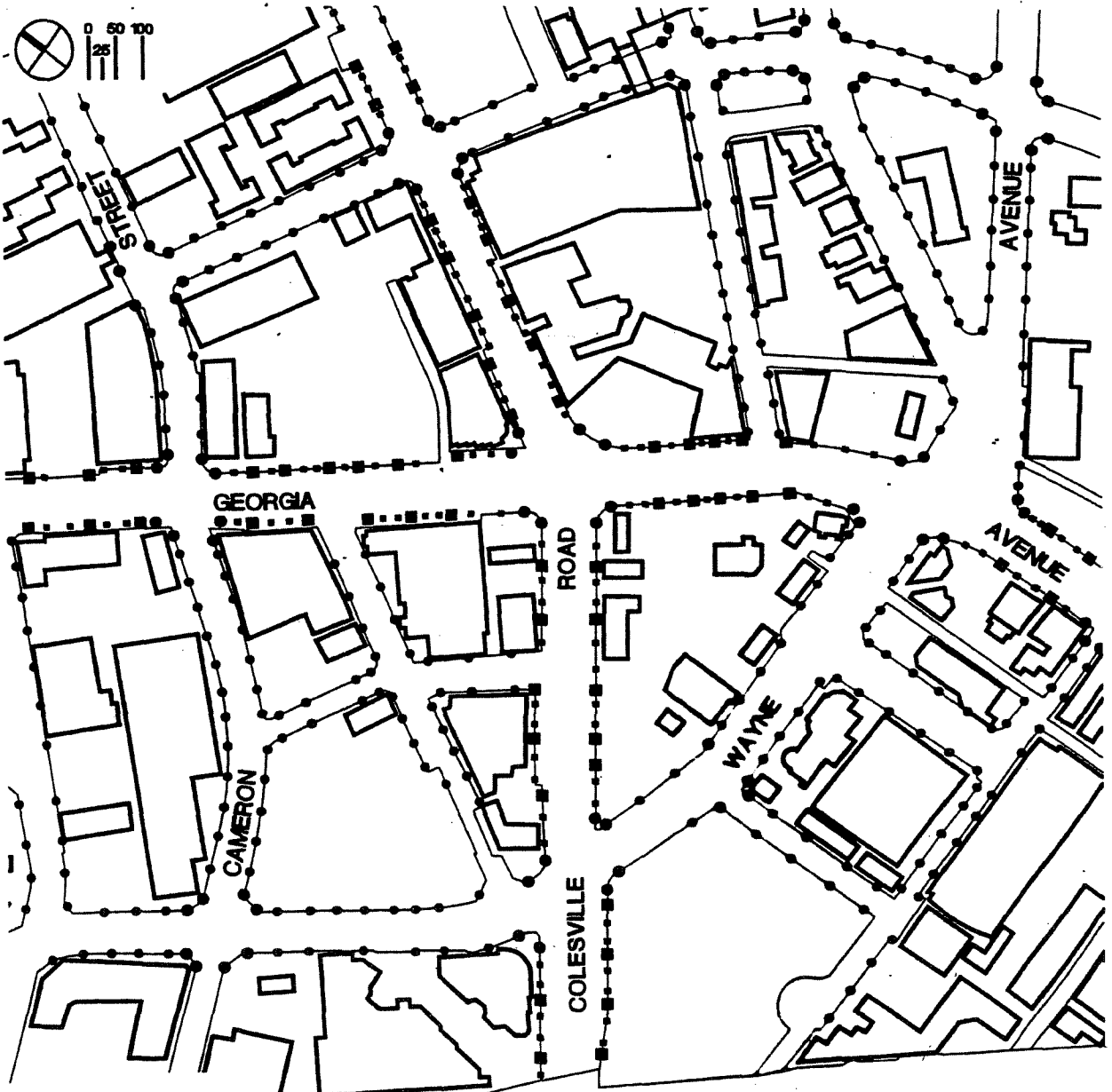
**STREET TREE PLAN**

- ZELKOVA SERRATA, VILLAGE GREEN ZELKOVA
- QUERCUS PHELLOS, WILLOW OAK
- ▲ PLATANUS ACERIFOLIA, LONDON PLANE TREE
- DETERMINED BY INDIVIDUAL PROJECTS

RAIL & TRANSIT R/W

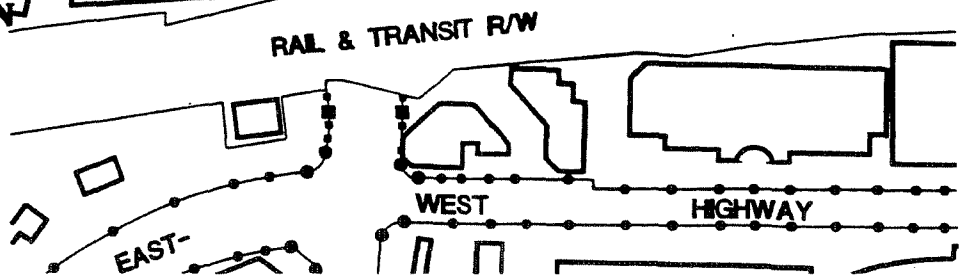
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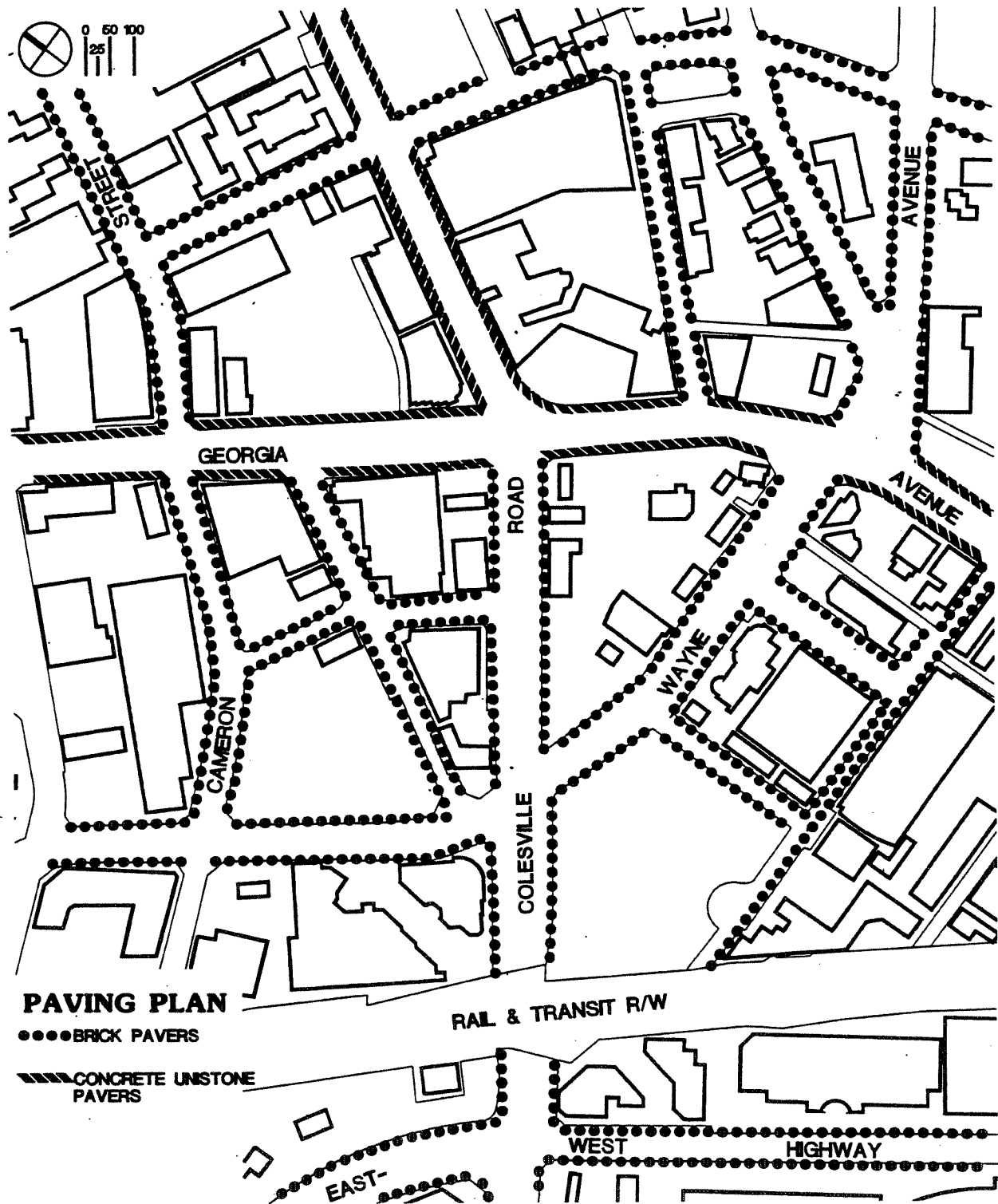
EAST-

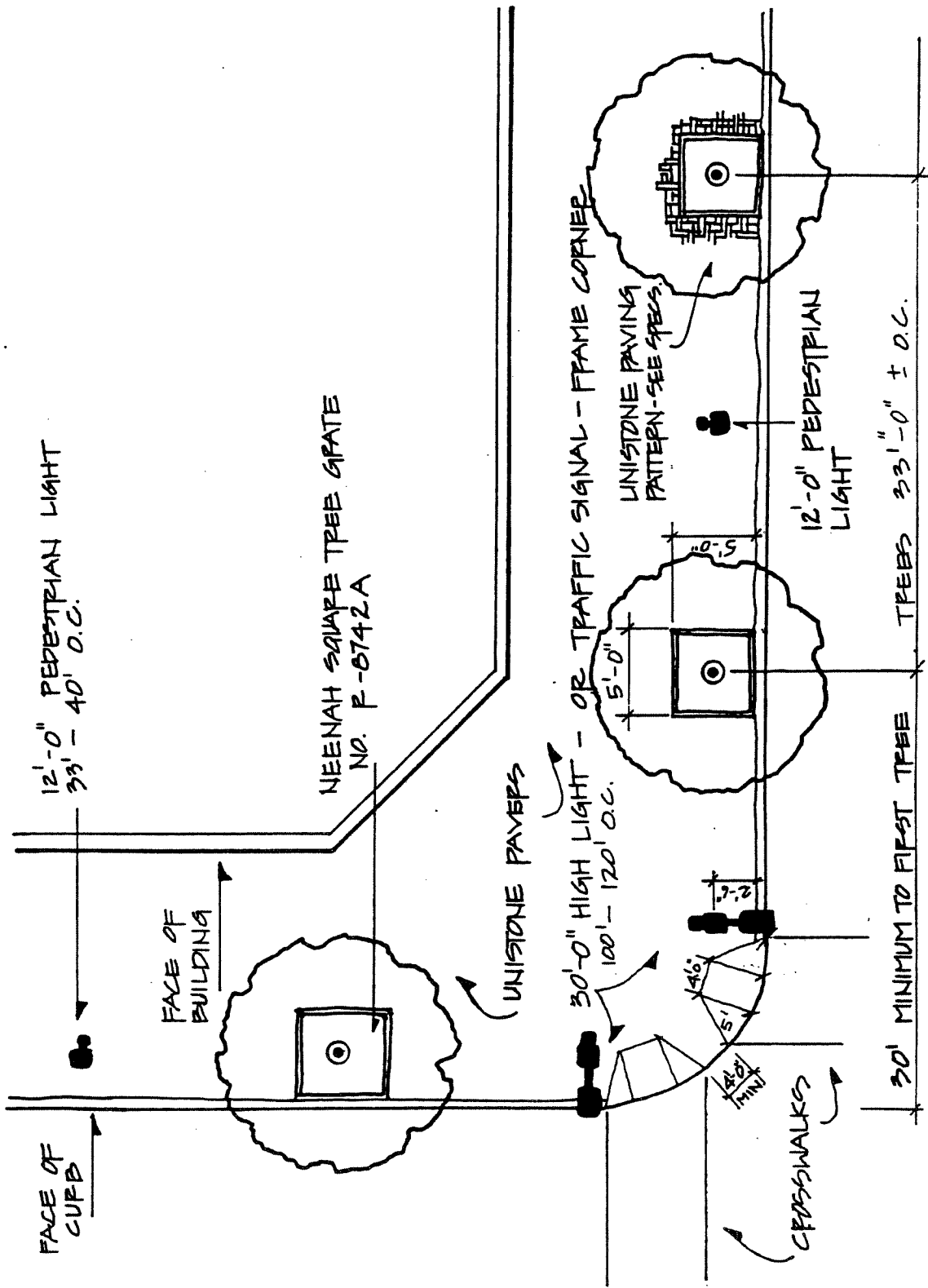


**LIGHTING PLAN**

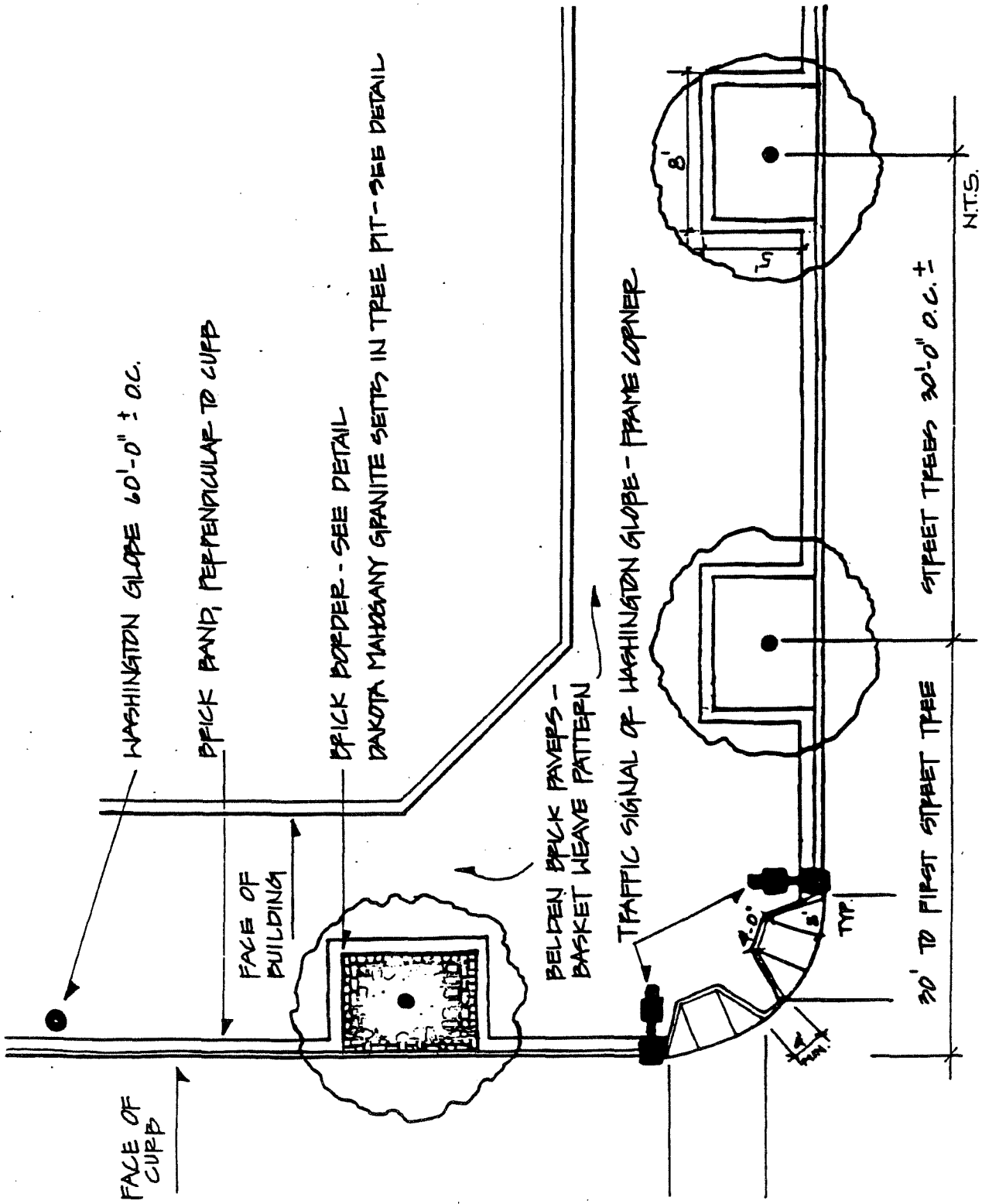
- CUTOFF HIGH LIGHT
- CUTOFF PEDESTRIAN LIGHT
- ROUND ALUMINUM TRAFFIC SIGNAL & STREET LIGHT
- LANTERN STREET LIGHT







PLAN A



PLAN B

## STREETSCAPE MATERIALS

### I. SILVER SPRING STREETSCAPE: PLAN A: (DHCD)

Georgia Avenue and Colesville Road only.  
See page 8 and specifications, pages 25-32.

#### A. Sidewalk Pavement

1. Pavers: concrete unistone (beige).
2. Base: Four-inch-thick concrete base on gravel.

B. Tree Grates: Five feet square, R-8742-A 180 degrees, Neenah. Phone: (414) 725-7000.

C. Backfill: See Planting Details and Specifications.

#### D. Street Lights

1. High (30 feet) street lights, 100-120 feet on center.
2. Low (12 feet) pedestrian lights, 33-40' feet on center. Contact MCDOT for specific poles and luminaires.

E. Bench: Bench Manufacturing Co., Model No. B-76. See specifications.

F. Trash Receptacle - Standard for Montgomery County. Contact MCDOT for specifications.

### II. SILVER SPRING STREETSCAPE: PLAN B: (M-NCPPC)

All streets other than Georgia Avenue and Colesville Road. See page 9, Details and Specifications, pages 12-24.

#### A. Sidewalk Pavement

##### 1. Brick Pavers

- a. Type: Belden Paver #470-479 (2-1/4" x 4" x 8") with orange range deleted or approved equal.

b. Pattern: basket weave set parallel to curb.

c. Border: Sailor course set perpendicular to curb with 4" trim.

#### 2. Setting Bed

3/4" asphalt cement base with brick pavers set in asphalt adhesive or approved equal.

#### 3. Joint Filler

Brick pavers will be set "hand-tight" with a mixture of sand and Portland cement brushed in joints.

#### 4. Concrete Base

Four-inch-thick concrete base set on gravel (C.R. 6).

#### B. Granite Setts for Tree Pits

Type: granite, rough cut.

Color: Dakota Mahogany.

Size: 4x4 (60%)

4x8 (40%)

4" minimum thickness

Quantity: Provide enough stone blocks to cover a 5'x8' tree pit.

Pagliari Brothers Stone Co. Phone: (301) 350-8600, or approved equal.

C. Amended Soil Panel, see page 2 and details.

#### D. Street Lights

Washington Globe - see specifications and details.

#### E. Teakwood Bench

1. Size: specified for each project.

- 
2. Type: Windemere by Country Casual or Winchester by Sherwood. Street between Georgia Avenue and 16th Street.
- F. Landscaping Type: Tilia tomentosa 'Green Mountain', Silver Linden.
1. Street Trees e. All other street trees to be determined by M-NCPPC.
- a. Georgia Avenue, between Spring Street and East-West Highway, and Colesville Road, between Spring Street and 16th Street. 2. Size (Plan B)
- Type: Zelkova serrata, 'Village Green' (3 - 3-1/2" caliper, Plan A only). 4" - 4-1/2" caliper with branching no less than 7' from the base.
- b. East-West Highway between 16th Street and Georgia Ave. 3. Amended Backfill (Plan B).
- Type: Platanus acerfolia 'Bloodgood', London Plane tree. The backfill shall consist of 2/3 topsoil and 1/3 native soil. See detail and specifications.
- c. Wayne Avenue, Second Avenue, Cameron Street between Second Avenue and Fenton Street, Fenton Street to Wayne Avenue. F. Trash Receptacle (Plan B).
- Type: Quercus phellos, Willow Oak Pennsylvania Avenue Trash Receptacle without lid.
- d. Ellsworth between Spring Street and Georgia Avenue, Spring Canterbury International  
P.O. Box 5730  
Sherman Oaks, CA 91413-5730  
Phone: (213) 936-7111
- Paint to match Washington Globe street lights, Federal Color 595 B, #14036.
- 
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Montgomery County, Maryland  
Department of Transportation  
Division of Traffic Engineering

PLAN B

Silver Spring Decorative Luminaire Specifications

**DESCRIPTION**

This luminaire shall be an outdoor decorative post top fixture, cylindrical in shape with an overall height of 41.0 +/- 1 inches and a overall width of 16.6 +/- 0.5 inches for the globe (see attached drawings). All exterior and structural parts shall be of aluminum alloy or cast iron. Exterior castings shall be cast in one piece, have a smooth surface finish and be free of mold lines. Visible metal surfaces shall have raised decorations integrally molded in the base piece. The luminaire shall come ready for quick and easy field assembly or fully assembled and include the following components:

- 1) lamp, as specified
- 2) button type photocell installed on the metal body of the luminaire
- 3) all necessary hardware and fasteners to assemble and secure on a 3.50 inch nominal diameter cast ferrous or aluminum lamp post tenon

The luminaire must be able to accommodate lamps and ballasts for either 70, 100 or 150 watt high pressure sodium vapor light sources.

**ILLUMINATING PERFORMANCE**

The luminaire shall be capable of providing an average maintained footcandle level of 1.0 fc, an average/minimum ratio of 4.0:1.0, a maximum/minimum ratio of 10.0: 1.0 for the middle pair of five pairs of luminaires when

installed in accordance with the following criteria:

- Opposite arrangement with 60 foot spacing between opposite pairs
- 15' 1" mounting height to light center
- 48 foot wide roadway
- 2' 8" setback to the centerline of the poles behind curb faces
- Lamp Lumen Depreciation Factor is 0.9
- Luminaire Dirt Depreciation Factor is 0.9
- 100 watt high pressure sodium vapor lamp

**BALLAST**

The ballast shall be securely fastened into the base to the luminaire and have quick release electrical connections. The ballast shall be a high power factor ballast of at least 90% to supply power to a 100 watt high pressure sodium vapor lamp from a 120 volt, 60 cycle AC power supply. The space for the ballast shall have sufficient space to accommodate ballasts for 70, 100 or 150 watt high pressure sodium vapor lamps.

**GLOBE AND REFRACTOR**

The globe shall be supplied in one piece in the shape of an "acorn" globe as shown on the attached drawings and be composed of ul-

traviolet stabilized, impact resistant polycarbonate. The globe may be made of a maximum of two pieces permanently glued together. The globe shall have an alabaster rippled exterior. The bottom surface of the globe shall interface closely with the metal body so as to provide a weather, dust and insect proof interface. The globe or its mounting ring shall be fastened with three or more recessed set screws in the body of the fixture.

The internal IES Type II glass refractor shall be firmly positioned on the metal body of the fixture.

An internal reflector (s) that would leave the top of the globe dark at night is not permitted.

#### LAMP

100 watt high pressure sodium vapor. ANSI Code S62ME.

#### PHOTOCELL

"Button type," 3,000 tork or equal, mounted on the metal body of the luminaire.

#### METAL BODY

The body shall be cast in one piece and shall have raised surface decorations. The body shall taper smoothly and flow smoothly between the slip fitter and the base of the globe. The body shall be constructed so that rain-water will drain off the globe through weep holes in the mounting ring at the top of the body.

#### SLIP FITTER

The slip fitter shall have an inside diameter of 23.625 inches and shall be secured to the lamp post tenon with three or four evenly spaced set screws on a circle approximately 1.5 inches above the bottom of the metal body

at the luminaire. The slip fitter shall accommodate a tenon 3.0 inches long.

#### FINIAL

Cast aluminum securely fastened to the globe.

#### SOCKET

Four K. V. pulse rated porcelain mogul socket.

#### FINISH

The exterior surfaces of the finial and luminaire body shall be factory finished prior to shipment. The color shall be federal color number 595B, #14036. The finish shall be either electrostatically applied, thermoset powder coat or polyurethane enamel. The following products shall be used if the finish is polyurethane enamel:

Tnemec Company, Inc.: Series 71  
Endura Shield

DuPont: Imron Polyurethane Enamel

Application of the primer and finish system shall be in accordance with the manufacturer's recommendations. A one (1) pint can of touch-up enamel shall be supplied with every ten (10) or fewer luminaires ordered.

#### SUBMITTALS REQUIRED

The bidder shall submit the following items for approval:

A photometric test report certified by an independent testing laboratory demonstrating the performance characteristics of the proposed luminaire. The test report shall be in accordance with IES standard testing procedures at time of submission and contain the following data:

° candela distribution table

- isofootcandle plot of the light distribution at grade under test conditions
- coefficient of utilization graph
- lamp wattage vs. lamp voltage trapezoid diagram for the 100 watt high pressure sodium vapor ballast being used.

**CALCULATED DATA REQUIRED**

The bidder shall supply the following data for the middle pair of a total of 5 pairs of luminaires when positioned as described in the illumination performance section of this specification:

- luminaire layout information

- luminaire information
- a point-by-point maintained footcandle plot at grade with a maximum spacing of five feet between points
- maximum maintained footcandles at grade
- average maintained footcandles at grade
- minimum maintained footcandles at grade
- maximum/minimum uniformity ratio at grade
- average/minimum uniformity ratio at grade
- mean deviation of all points plotted



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**Silver Spring Decorative Lamp Post Specifications**

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1. The lamp post shall be integrally cast in one piece from cast iron which meets or exceeds the specification ASTM A-48-72, Class 30. The shaft section shall consist of sixteen (16) equally spaced flutes as shown on the attached cross sections drawings. The outer portion of each flute shall have a flat face  $\frac{3}{8}$ " in width, and this width shall remain constant ( $\pm \frac{1}{16}$ ") from top to bottom of the tapered column. There shall be no visible signs of separation between the cope and drag sections of the mold and the casting technique shall employ pick-off of loose pieces from a pattern arbor, or other suitable methods, to insure the fluting is uniform and conforms to the configurations indicated on the drawings. As an alternate, the lamp post may be cast in one piece in aluminum as described above. The aluminum used in the casting shall have a minimum yield strength of 30,000 PSI when heat treated. Other features of the lamp post shall include:
    - A. The pedestal portion of the base shall measure 24  $\pm \frac{1}{4}$ " in diameter and shall be 24" in height. The pedestal shall incorporate a removable access door 7" high by 23  $\frac{3}{4}$ " wide at the top and 7" wide at the bottom. The access door shall be secured with stainless steel tamperproof screws. A drilled and tapped hole shall be provided inside the base opposite the access door for the  $\frac{1}{4}$ " - 20 grounding lug.
    - B. The shaft shall taper uniformly from 7" OD at the bottom to 4  $\frac{9}{16}$ " OD at the top. The minimum wall thickness of the shaft, measured from the outermost edge of the flute to the inner surface of the wall, shall be  $\frac{5}{8}$ " at the bottom and  $\frac{1}{2}$ " at the top. The shaft shall be straight within  $\frac{3}{16}$ " along the center axis of the lamp post.
    - C. The top of the post shall be equipped with an integrally cast luminaire mounting tenon 3  $\frac{1}{2}$ " in outside diameter and 3" long. The overall height of the lamp post, less tenon, shall be 13' 2".
    - D. The nominal bolt circle of the lamp post shall be 17" in diameter and consist of four (4) equally spaced holes sized to accommodate 1" diameter anchor bolts. The base of the lamp post shall have a clear opening at grade 11" in diameter to accommodate two 4" ID schedule 40 PVC conduits.
  2. The lamp post shall be manufactured in accordance with the American Association of State Highway and Transportation Officials' "Standard Specifications for Structural Support for Highway Signs, Luminaires and Traffic Signals."
  3. The decorative lamp post and all parts shall be painted by the lamp post manufacturer prior to shipment with a shop primer suitable to accept the finish paint system specified.
  4. All lamp posts and access door covers shall be finished in the field after installation. The color shall be federal color specification number 595B, #14036. The finish shall be a polyurethane enamel, as manufactured by one of the following:

Tnemec Company, Inc.: Series 71  
Endura Shield

DuPont: Imron Polyurethane Enamel
-

Application shall be in accordance with manufacturer's recommendations. Alternate systems of equal performance may be considered, but shall be submitted for approval.

5. Each lamp post shall be furnished with four (4) 1" diameter by 36" long anchor bolts. Each 36" long anchor bolt shall have a 4" long "L" bend at the bottom. Each bolt shall be furnished with one nut and one flat washer. Anchor bolts and related hardware shall be furnished in accordance with the following specifications:

The bolts shall be made with high strength, low carbon alloy steel in accordance with ASTM A36-M55.

**Guaranteed Minimum Yield Strength:  
55,000 PSI**

**Guaranteed Minimum Tensile Strength:  
95,000 PSI**

**Maximum Elongation: 18%**

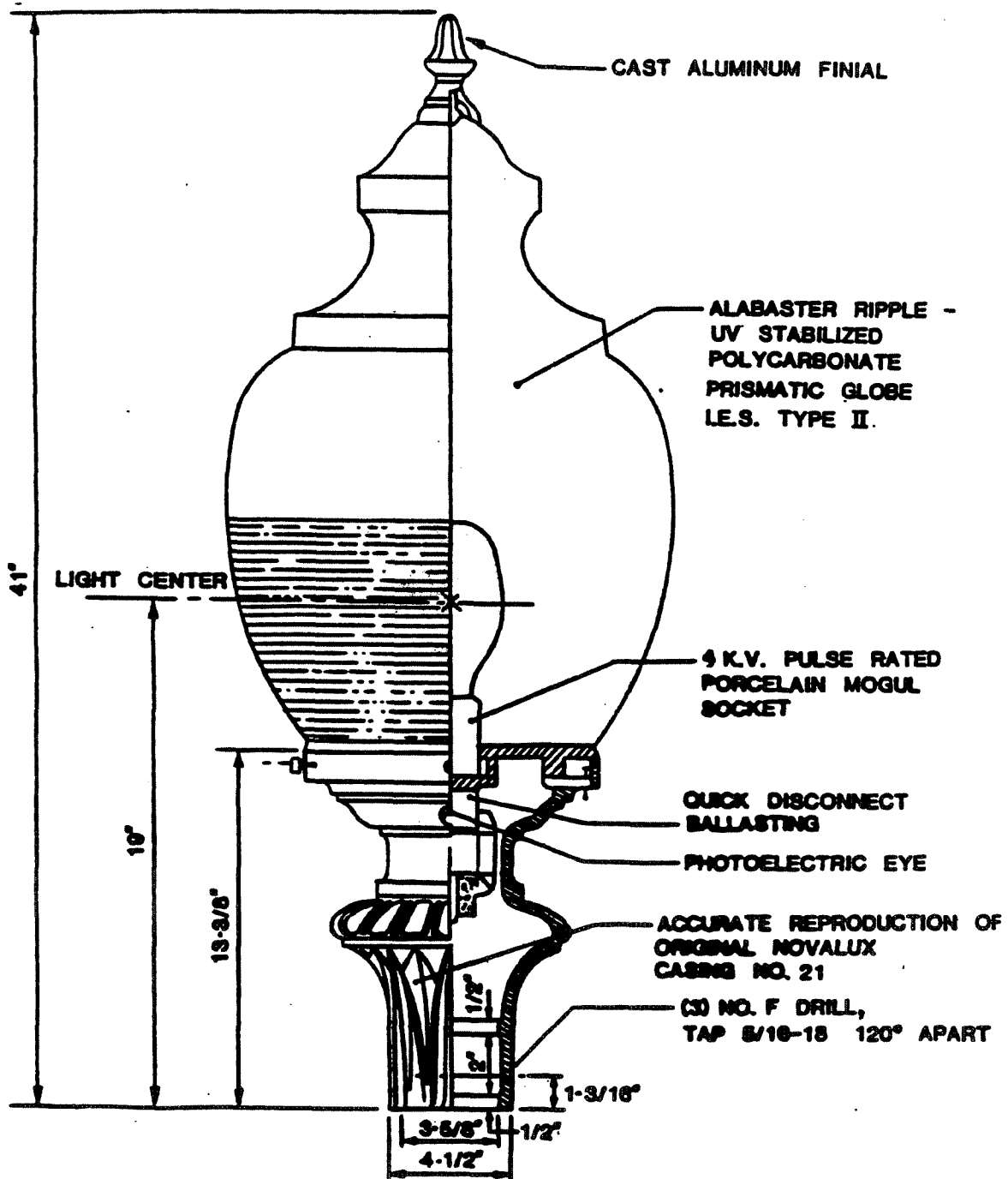
**The nuts shall be in accordance with  
ASTM A307 and ANSI B 18.2.2**

**The washers shall be in accordance with  
ASTM F436**

**Threading shall be Unified National  
Course, ANSI B1.1, Class 2.**

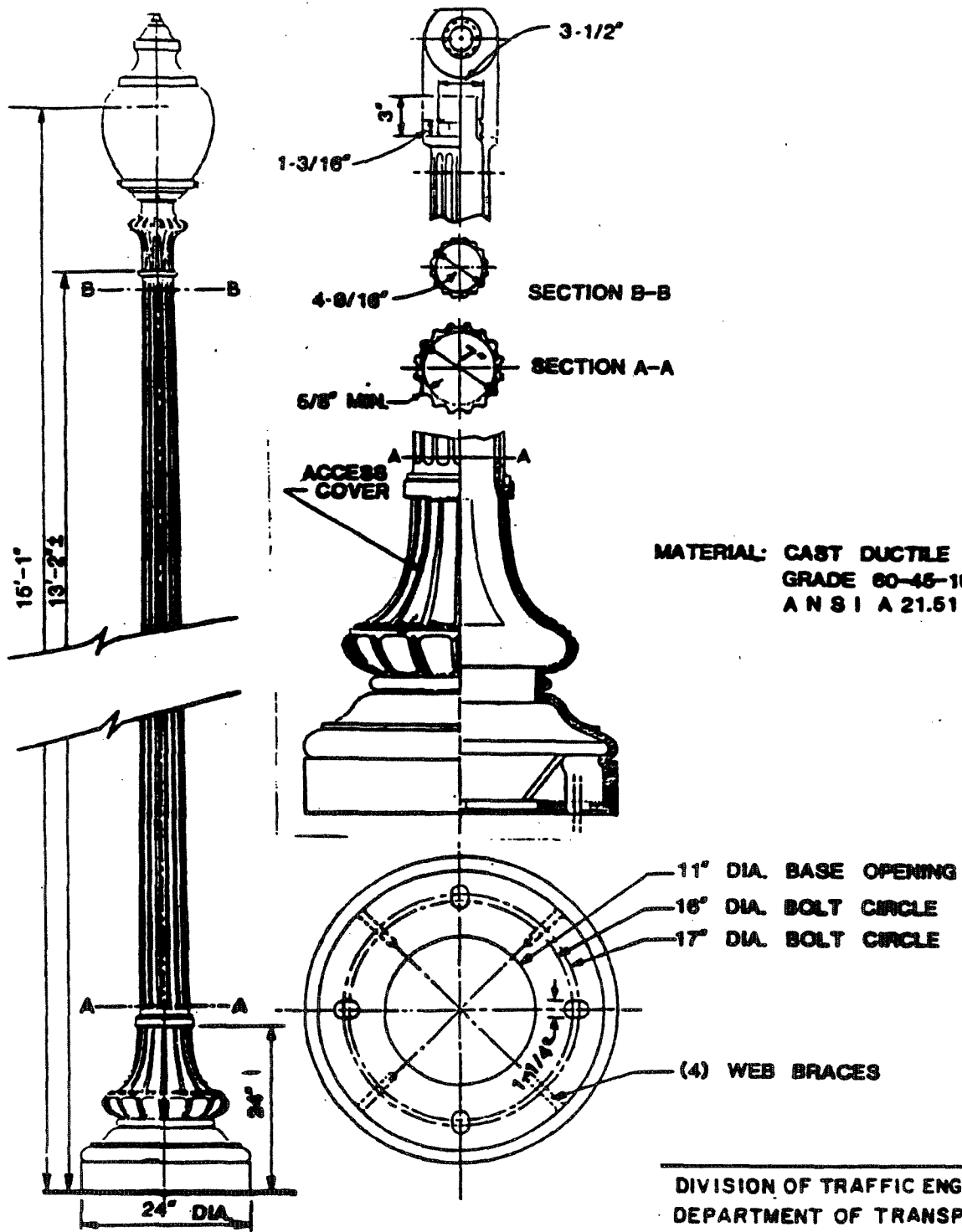
**Threads shall be rolled or cut.**

**Nuts, washers and anchor bolts shall be  
fully hot dipped galvanized in accordance  
with ASTM A153.**



DIVISION OF TRAFFIC ENGINEERING  
DEPARTMENT OF TRANSPORTATION  
MONTGOMERY COUNTY, MARYLAND

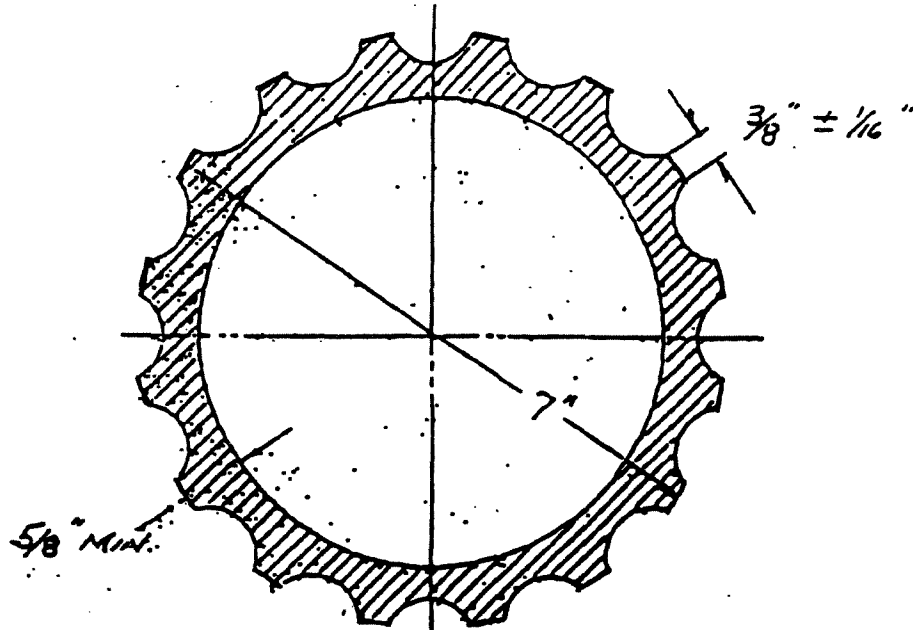
**SILVER SPRING  
DECORATIVE LUMINAIRE**



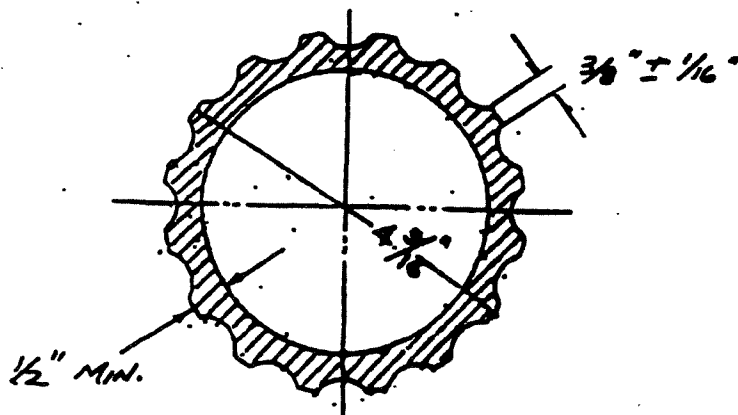
**MATERIAL: CAST DUCTILE IRON,  
GRADE 60-45-10 OR  
ANSI A 21.51**

**DIVISION OF TRAFFIC ENGINEERING  
DEPARTMENT OF TRANSPORTATION  
MONTGOMERY COUNTY, MARYLAND**

**SILVER SPRING  
DECORATIVE LAMP POST**



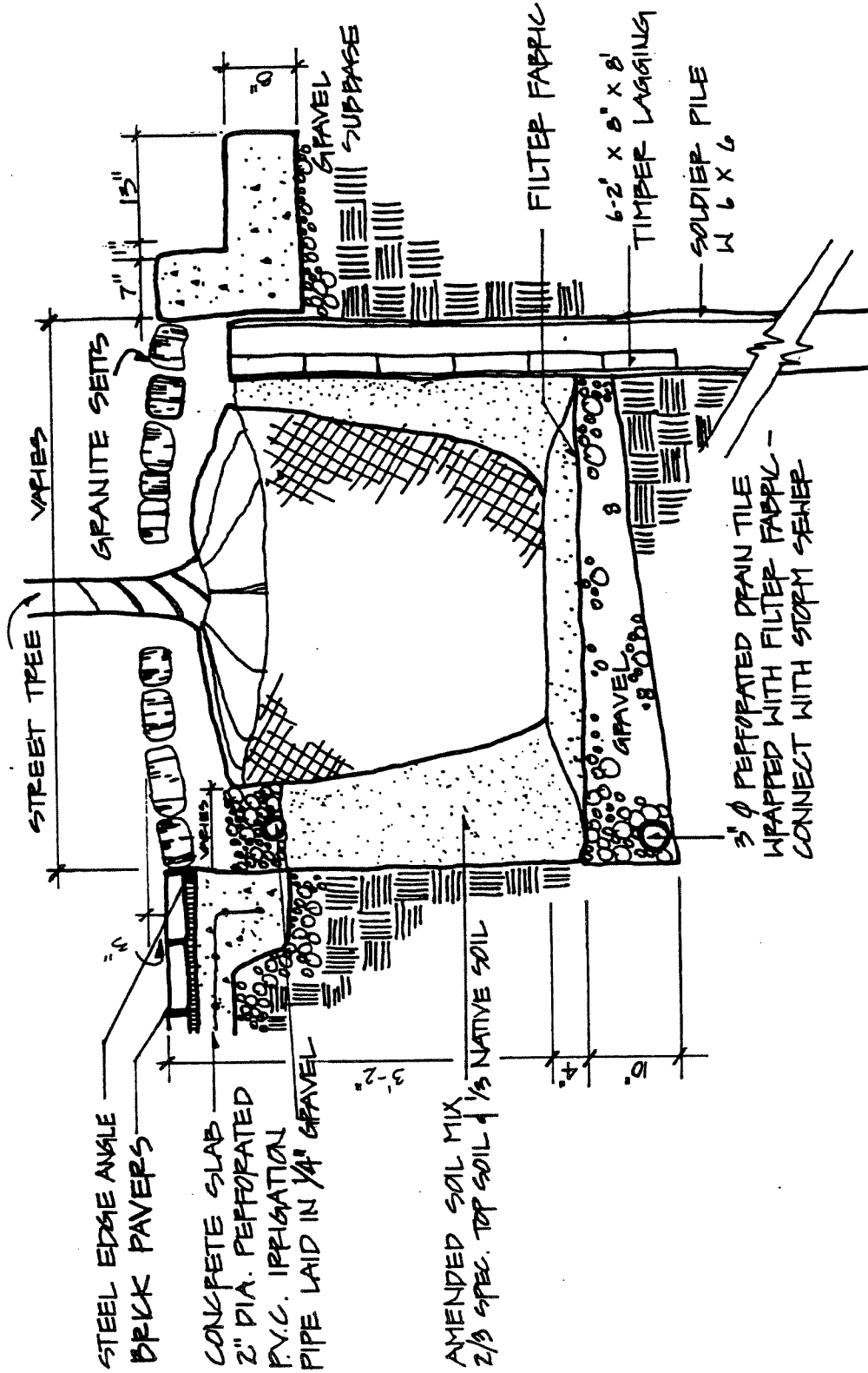
SECTION A-A



SECTION B-B

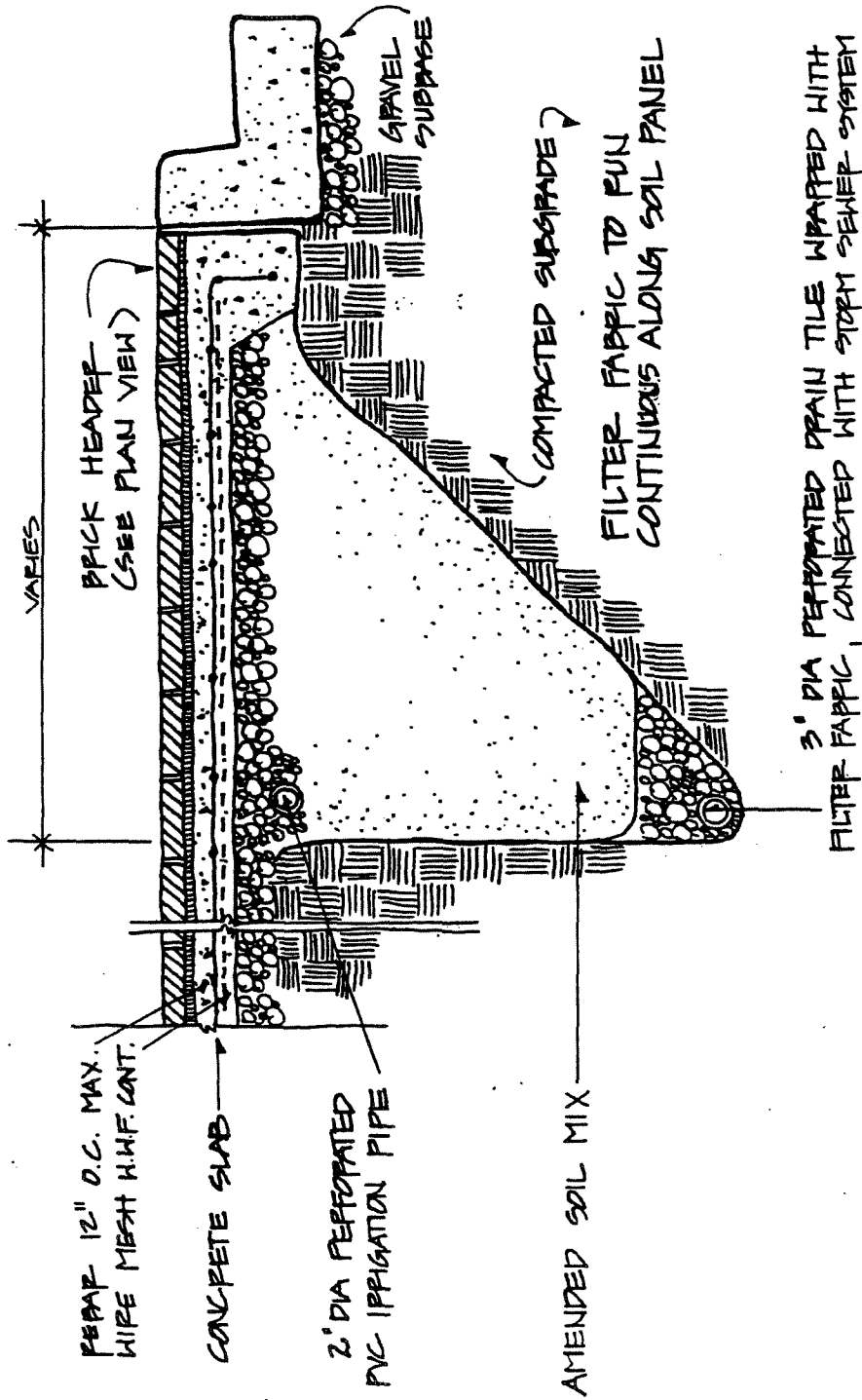
DIVISION OF TRAFFIC ENGINEERING  
DEPARTMENT OF TRANSPORTATION  
MONTGOMERY COUNTY, MARYLAND

SILVER SPRING  
DECORATIVE LAMP POST



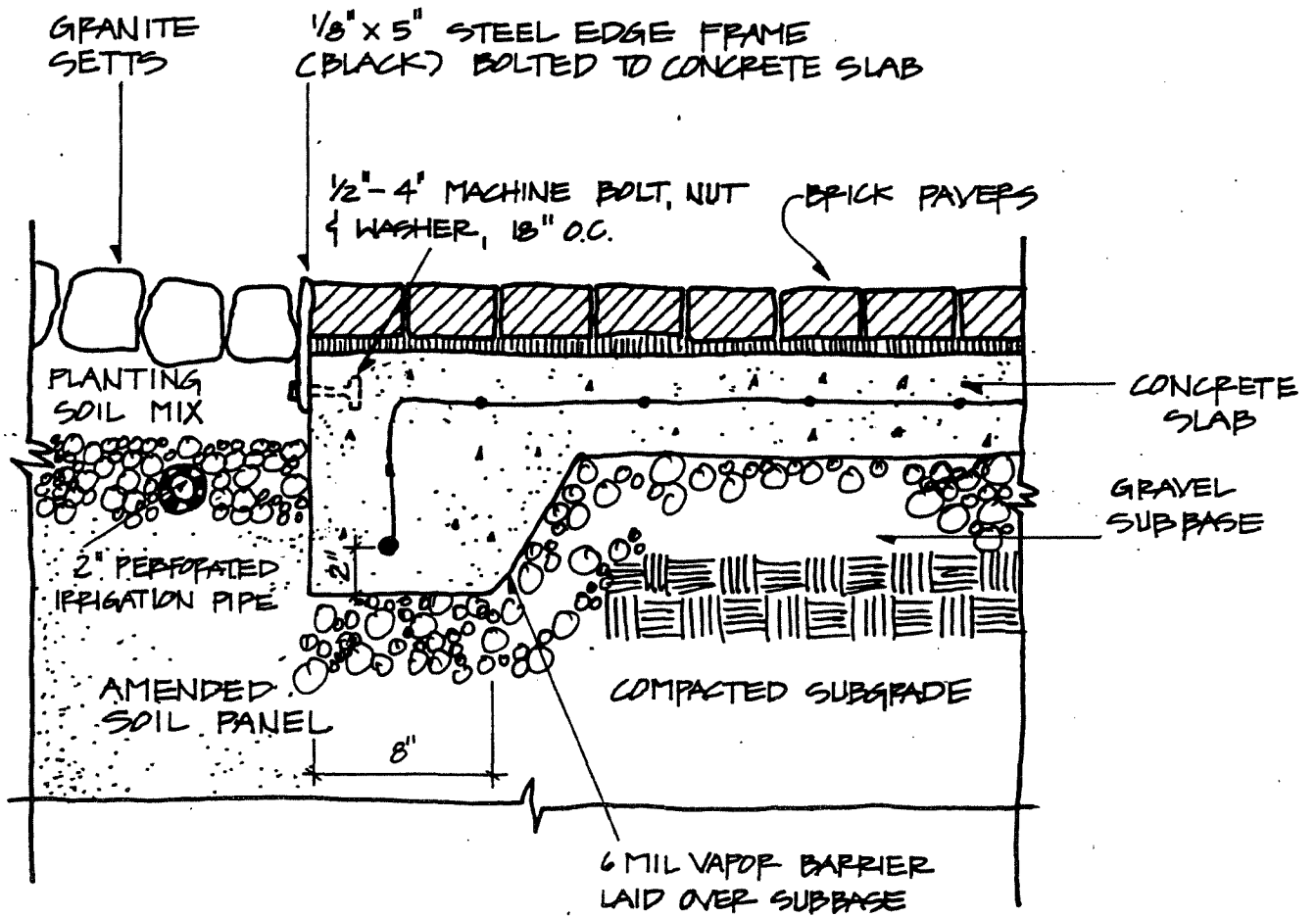
TYPICAL SECTION

TREE PIT & AMENDED SOIL PANEL

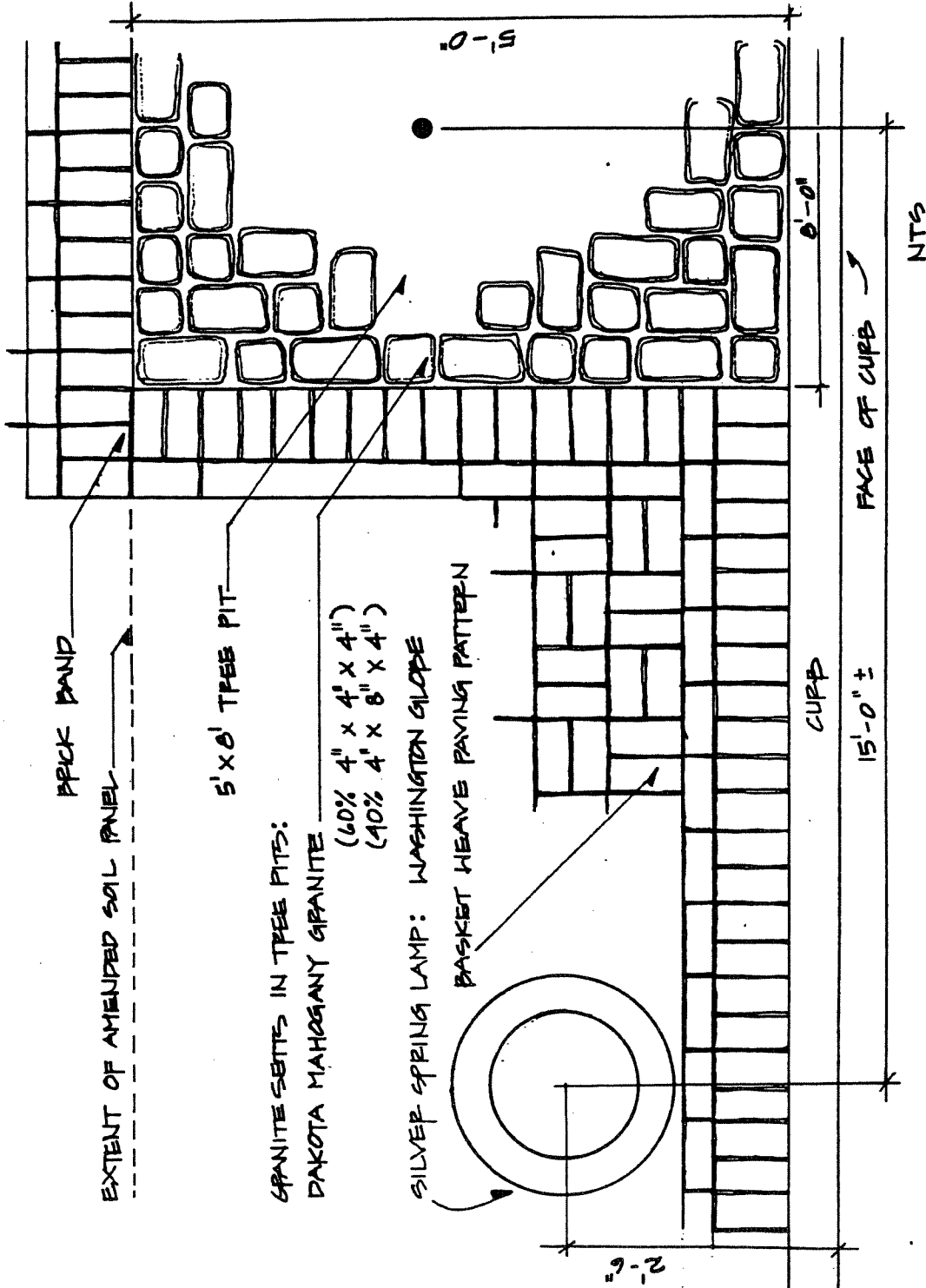


TYPICAL SECTION

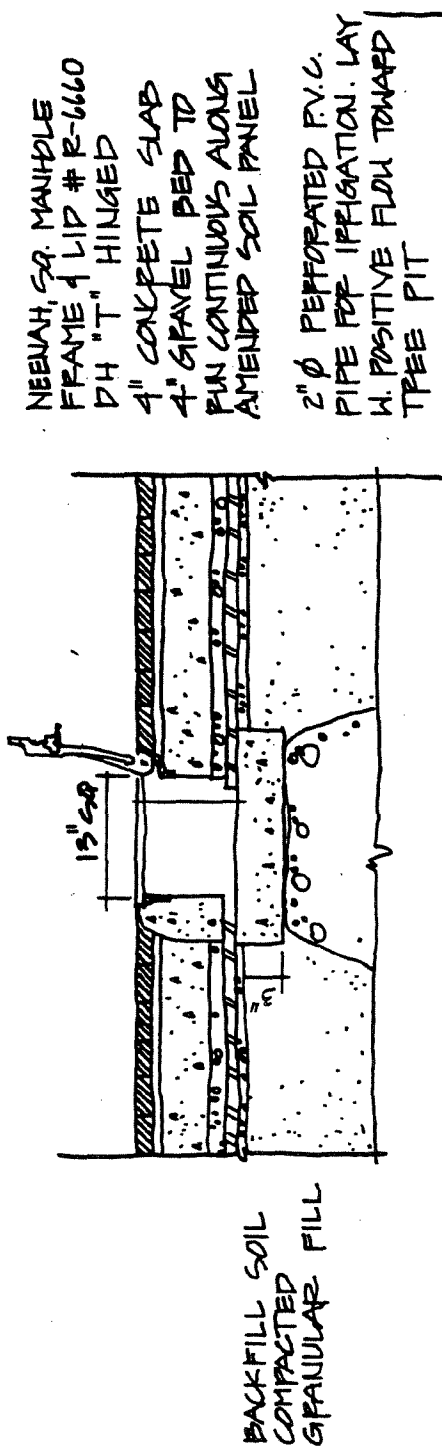
AMENDED SOIL PANEL, CONTINUOUS UNDER SIDEWALK



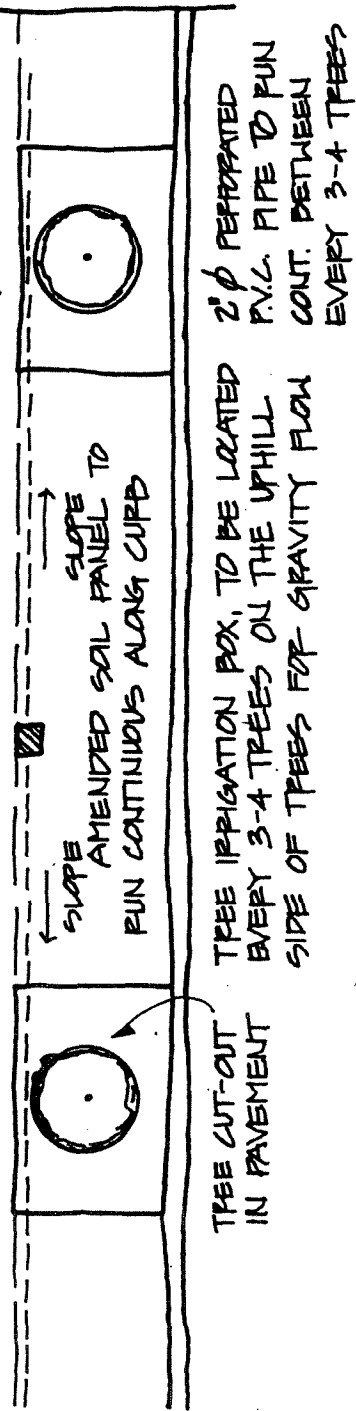
SECTION, TREE PIT EDGE



**TREE PIT WITH GRANITE SETTS**



### TREE IRRIGATION BOX



TREE CUT-OUT  
IN PAVEMENT

TREE IRRIGATION BOX, TO BE LOCATED  
EVERY 3-4 TREES ON THE UPHILL  
SIDE OF TREES FOR GRAVITY FLOW

PLAN: IRRIGATION

PLAN B ONLY

MONTGOMERY COUNTY, MARYLAND  
DEPARTMENT OF HOUSING AND  
COMMUNITY DEVELOPMENT (DHCP)

PLAN A SPECIFICATIONS

(301) 217-3650

I. PAVING AND SURFACING

A. UNI-STONE PAVER

**MATERIALS**

All interlocking concrete paving stones shall be as shown on dhcd plans. These products shall be as manufactured and supplied by BALCON, INC., Pulaski Hwy. & Rossville Blvd., Baltimore, MD 21237, Phone 301-687-5200, or approved equal.

All interlocking concrete paving stones shall conform to ASTM C-936-82 "Standard Specification for Solid Concrete Interlocking Paving Units."

- (1) Pavers shall have a minimum compressive strength of 8,000 P.S.I. and a maximum absorption of 5% when tested in accordance with ASTM C-140.
- (2) Materials used to manufacture interlocking concrete paving stones shall conform to the following:
  - a. Cement - ASTM C-150 Portland Cement Type II
  - b. Aggregates - ASTM C-33 (washed, graded sand and limestone, no expanded shale or lightweight aggregates)
- (3) Size, shape, design and colors shall be in accordance with details as noted on plans.

Leveling Course - Should be a clean washed concrete sand fitting the following gradation:

Sieve Size	Percent Passing
3/8" . . . . .	100
No. 4 . . . . .	90-96
No. 100 . . . . .	10-30

- a. The leveling course shall be screeded loose to a thickness of 1" to 1-1/2". The exact thickness shall be determined at the jobsite. Care will be taken to ensure the leveling base is loose and is not disturbed.
- b. The sand leveling course should be the responsibility of the paving stone installer.

CR-6 Stone Aggregate

CR-6 stone aggregate shall be free of asbestos and shall comply with MSHA Standards and Specifications, Article 20.01.

Plastic Edging

Plastic edging shall be 1-3/4" x 3-1/2" in size, manufactured by Pave Tech, Inc., Bloomington, Minnesota 55431, or approved equal. Supply in 15' lengths and with tapered steel spike as shown on drawings. Edging and spike shall be black in color. Spikes shall be galvanized.

Reinforced Concrete Slab Base

Four (4) inch concrete slab base shall be installed in sidewalk area as indicated on the drawing in accordance with MSHA Standards Section 501 and 502.

**Expansion Joints**

Expansion joint filler and caulking shall be as specified in DHCD Section 07900 joints and sealants and shall extend through setting bed and concrete slab.

**Asphalt Mastic Setting Bed**

Asphalt cement to be used in the setting bed shall conform to ASTM designation D-3381. The viscosity grade shall be grade A.C. 10 or A. C 20.

The fine aggregate to be used in the setting bed shall be clean, hard sand with durable Particles and free from adherent coatings, lumps of clay, alkali salts, and organic matter. It shall be uniformly graded from "coarse" to "fine" and all passing the No. 4 sieve and meet the gradation requirements when tested in accordance with the standard methods of test for sieve or screen analysis of fine and coarse aggregates, ASTM Designation C-136-81.

The dried fine aggregate shall be combined with hot asphalt cement, and the mix shall be heated to approximately 300 degrees fahrenheit at an asphalt plant. The approximate proportions of materials, shall be seven (7) percent cement asphalt and ninety- three (93) percent fine aggregate. Each ton shall be apportioned by weight in the approximate ratio of 145 lbs. asphalt to 1,855 lbs. sand. The Contractor shall determine the exact proportions to produce the best possible mixture for construction of the setting bed to meet construction requirements.

**Neoprene - Modified Asphalt Adhesive**

Mastic (asphalt adhesive):

Solids (base)	75 + 1%
Lbs./Gallon	8-8.51 lbs.
Solvent	Varsol (over 100 degrees fahrenheit flash)

Base (2% Neoprene, 10% Fibers, 88% Asphalt)

Melting Point - ASTM D-36 (200 degrees fahrenheit min.)

Penetration - 77 degrees fahrenheit 100 gram load 5 second - 23-27

Ductility - ASTM D-113-44 @25 degrees cel-sius 5 cms/Min. - 125 cm. min.

**EXECUTION**

**General Requirements**

- a. Protect masonry against freezing when the temperature of the surrounding air is 40 degrees Fahrenheit and falling. Heat materials and provide temporary protection of completed portions of masonry work. Comply with the requirements of the "Construction and Protection Recommendations for Cold Weather Masonry Construction: of the Technical Notes on Brick and Tile Construction by the Brick Institute of America (BIA).
- b. Do not use frozen materials or materials mixed or coated with ice or frost. For masonry which is specified to be wetted, comply with BIA recommendations.
- c. Do not build on frozen subgrade or setting beds. Remove and replace masonry work damaged by frost or freezing.
- d. Protect masonry paving in hot weather to prevent excessive evaporation of setting beds. Provide artificial shade, wind breaks, and use cooled materials, as required.
- e. For median strip and other area to be paved with brown paver, the Contractor shall place uni-stone pavers in sand setting bed on CR-6 aggregate base. For sidewalk area to be paved with beige pavers, the Contractor shall place unit-stone pavers on concrete slab in lieu of CR-6 aggregate base.

- f. Pavers shall be free of foreign materials before installation.
- g. Cutting of paving stone may be done with either a double bladed splitter or a masonry saw.
- h. Schedule and coordinate work to permit other subcontractors to install their work prior to installing the setting bed and the solid hydraulically pressed concrete masonry paving units.
- i. The area of setting bed placed in any work day shall be scheduled so that no bedding course remains at the end of the day without a paver course. After final shaping the bedding course shall not be disturbed prior to laying the pavers.
- j. Pavers shall be cut to fit around light fixture bases and all structures. Where cutting is required, it shall be done with a high-speed masonry saw producing clean, sharp edges. Cutting of units shall only be permitted when use of fun units is not possible. Cutting to conform to grades shall be done so that proper lines and angles are maintained, including handicapped ramps. All cutting to be included in the unit price bid for installing the pavers.
- k. Maintain surface plan for finished brick paving as required, and not exceeding a tolerance of 1/8" in 10 ft. when tested with a 10 ft. straight edge.
- l. At expansion joint locations place preformed joint filler strip with top edge of strip set 3/8" below top of paver to allow For sealant. Expansion joint filler shall extend through setting bed and concrete slab.
- m. No broken, chipped, or defective pavers will be acceptable in finished work. Remove and replace such units, if any, with new acceptable material.

#### **Pavers Laid on Sand Setting Bed Aggregate Base**

- a. Installation should start from a corner or straight edge and proceed forward over the undisturbed sand laying course.
- b. Paving work shall be plumb, level and true to line and grade; shall be installed to properly coincide and with adjacent work and elevations. (All edges must be restrained to secure the perimeter stones and the sand laying course).
- c. Paving stones should be installed hand tight and level on the undisturbed sand laying course. String lines should be used to hold pattern lines true.
- d. A Plate Vibrator or Roller Vibrator should be used to compact the stones and to vibrate the sand up into the joints between the stones.
- e. Fine sand should be spread over the installed paving stones and vibrated into the joints between the stones.
- f. Remaining sand should be swept into the joints until joints are filled flush with the top of the paving stones. Sweep excess sand clear from surface.
- g. The completed paving stone installation should be cleaned and washed down to provide a finished workmanlike installation.

#### **Pavers Laid on Asphalt Mastic Bed and Reinforced Concrete Slab**

- a. The Contractor shall place 1" deep setting bed directly over the concrete surface. If grade must be adjusted, set wood chocks under depth control bars to proper grade. Set two bars parallel to each other approximately eleven (11) feet apart to serve as guides for striking board (12' long x 2" x 6" board). The depth of control bars must be set carefully to bring the pavers, when laid, to grade.

Place some bituminous bed between the parallel depth control bars. Pull this bed with the striking board over these bars several times. After each passage, low porous spots must be showered with fresh bituminous material to produce smooth, firm and even setting bed. As soon as this initial panel is completed, advance the first bar to the next position in readiness for striking the next panel. Carefully fill up any depressions that remain after removing the depth control bars and wood chocks. The setting bed shall be rolled with a power roller to a nominal depth of 1" while still hot. The thickness shall be adjusted so that when the solid concrete masonry units are placed, the top surface of the pavers will be at the required finished grade.

b. A coating of two percent neoprene-modified asphalt adhesive shall be applied by mopping or squeegeeing or troweling over the top surface of the bituminous setting bed so as to provide a bond under the pavers. If it is troweled, the trowel shall be serrated with serrations not to exceed one-sixteenth (1/16) inch.

c. Uni-stone pavers shall be installed after the modified asphalt adhesive is applied. Pavers shall be carefully placed by hand in the herringbone pattern. Courses shall be straight with hand tight joints and uniform top surface. Hand tight joints shall be no greater than 1/8" and shall be swept with sand until joints are completely filled. The paving surface shall then be fogged lightly with water and cement stains removed from face of pavers.

## CONCRETE

### *MATERIALS*

#### *Cast-in-place Concrete*

a. Cement

- (1) Cement shall be as specified in Section 901.01 of the MSHA Standard Specifications.
- (2) Unless otherwise permitted or required, cement shall be Type II
- (3) The cement used in the work shall correspond to that upon which the selection of concrete proportions was based.
- (4) Only one brand and type of cement shall be used throughout the project, unless otherwise specified.

b. Aggregates

- (1) Fine aggregate shall be as specified in Section 903 of the MSHA Standard Specifications.
- (2) Coarse aggregate shall be as specified in Section 903 of the MSHA Standard Specifications, within the gradation limits of Size No. 57.

c. Water

Water used in mixing concrete shall be as specified in Section 919 of the MSHA Standard Specifications.

d. Strength

Concrete shall have a compressive strength at 28 days of 3000 psi for sidewalk slabs and 3500 psi for retaining walls.

e. Slump

Concrete mixture shall have a slump of between 2 and 4 inches.

f. Proportions

Proportions shall be Mix No. 2 as specified in Section 918 of the MSHA Standard Specifications. Special attention shall be paid to Note No. 1, Section 918.06.

g. **Finishes**

Cast-in-place concrete that will be exposed to view shall be medium broom finished.

**Reinforcing Steel**

Bar reinforcement for slabs, (structure and foundations) shall meet the requirements of ASTM A615, grade 60. Use 6x6 WWM for slab underneath uni-stone pavers.

**Expansion Joints**

Expansion joints shall be as specified in Section 07900, joints and sealants, in DHCD specs.

**Forms**

Forms shall conform to the requirements of Section 608 of the MSHA Standard Specifications.

**EXECUTION****Installing Reinforcement**

- a. Fabricate and install reinforcing and provide standard supporting accessories in accordance with ACI "Manual of Standard Practice for Detailing Reinforced Concrete Structures", ACI 135.
- b. Remove rust, scale, paint, and coatings from reinforcing. Furnish and install additional supports as necessary. Position wire to prevent movement during concrete placement. Provide necessary support bars.
- c. Provide for installation of metal angels, channels, plates, inserts, hangers, ties, anchors, dowels, bolts, slots, sleeves, blocking, conduits furnished by other trades, etc. Coordinate locations with other trades and secure in position before concrete placement. If sleeves, conduits, outlet boxes, pipes, etc., interfere with reinforcing, consult landscape Architect.

**II. CAST IRON TREE GRATE**

- A. Cast iron tree grate shall be the Standard Flat, 5' x 5', by Neenah Foundry Company. Cat. No. R-8742-A, 500 Winneconne Ave., P.O. Box 729, Neenah Wisconsin 54956, phone: 414-725-7000 or approved equal.
- B. All tree grates shall be painted with metal primer and black asphaltic paint in accordance with manufacturer's specifications and details shown on DHCD drawing. Expansion bolts shall meet the requirements of ASTM A325.

**III. PLANTING SPECIFICATIONS****MATERIALS**

Planting stock shall be well-branched and well-formed, sound, vigorous, healthy, and free from disease, sun-scald, windburn, abrasion, and harmful insects or insect eggs and shall have healthy, normal, and unbroken root systems. Deciduous trees and shrubs shall be symmetrically developed, of uniform habit of growth, with straight boles or stems, and free from objectionable disfigurements. Groundcovers and vines shall be as specified, and be the proper age for the length of runners and clump size specified. Only shrubs and groundcover plants well established in removable containers, integral containers, or formed homogeneous soil sections shall be used. Plants shall have been grown under climatic conditions similar to those in the locality of the project.

The minimum acceptable sizes of all plants, measured before pruning and with branches in normal position, shall conform to the measurements indicated on the drawings. Plants larger in size than specified may be used with the approval of the Landscape Architect with no change in the contract price. If larger plants are used, the ball of earth or spread of roots shall be increased in accordance with ANSI Z60.1.

Plant material shall be nursery grown unless otherwise indicated and shall conform to the requirements and recommendations of ANSI Z60.1. Plants shall be dug and prepared for shipment in a manner that will not cause damage to branches, shape, and future development after planting.

1. Balled and burlapped (B&B) plants shall have ball sizes conforming to ANSI Z60.1. Plants shall be balled with firm natural balls of soil. B&B plants shall be wrapped firmly with burlap or strong cloth and tied securely.

#### Anti-desiccant

- A. Anti-Desiccant: "Wilt-Pruf" Nursery Specialty Products, Inc., 410 Greenwich Avenue, Greenwich, Connecticut 06830, or approved equivalent.

#### Peat Moss

- A. Commercially available material consisting of shredded sedge peat and reed peat or sphagnum moss peat, or combinations of such, from fresh water sites. Peats in advanced stages of decay (parent material not identifiable) are not permitted. use peat having a minimum organic content of 80 percent organic matter by weight, a pH value of 3.5 to 5.5, and a maximum ash content of 15 percent.
- B. Compost: well rotted decomposed leaf material.

#### Fertilizers

- A. Commercial Fertilizers: FS 0-F-241, Type 1, of Grade noted, Level B, composite and bearing manufacturer's guaranteed statement of analysis. Unless otherwise noted or specified, use 10-6-4 meeting the following minimum requirements; 10 percent of nitrogen (50% organic by weight), 6 percent of

available phosphoric acid, and 4 percent potash.

#### Backfill Mixtures

- A. Utilize one-half by volume of existing soil and one-half new additional soil consisting of one-third topsoil, one-third peat moss or compost, and one-third sand, plus an amount of 10-6-4 fertilizer per cubic yard specified by soil test results. (1:1:1 ratio.)

#### Mulch

- A. Mulch material for plants not in grates shall be either composted (shredded) hardwood bark, double shred or approved equivalent. Material shall be mulching grade, uniform in size, and free of foreign matter.
- B. Mulch material for trees in grates shall be washed pea gravel or 3" mulch.

#### Stakes and Guying Material For Trees

- A. Stakes shall be rough lumber of uniform size, 2 inches by 2 inches in section, or 2-1/2 inches in diameter, pointed at one end with the slope of the point back about 6 inches from the end. Coated with one heavy brush coat of dark walnut oil stain before installation.
- B. Guying cable shall be galvanized steel, 9 gauge wire.
- C. Hose shall be high quality braided rubber or plastic hose, 3/4 inch diameter and suitable length, black in color.

#### Wrapping Material

- A. Tree wrapping material shall be the following:
  1. Osnaburg Cloth, 4-7/8 inches wide, unbleached, pinked on both edges, manufactured by Carnegie Textile Co., 6501 Hough Avenue, Cleveland, Ohio 44103.

- B. Tree wrap twine shall be a three-ply jute twine.

Water

- A. Potable: To be supplied by Contractor.

Fungicide

- A. Fungicide shall be Zinc ethylene bis-dithiocarbonate (Zineb), or equal.

Insecticide

- A. Isotox by Ortho or equal.

**EXECUTION**

Planting Procedures For Trees

Layout of Work:

- 1. Prior to digging plant pits. Contractor shall lay out and stake proposed locations for all plant materials. Layout shall be approved by the county prior to installation.

Test Pits:

- 1. Should staked locations lie in proximity to subsurface utilities, the contractor, with approval from the County, may perform subsurface exploration to verify utility locations.

Digging Plant Pits:

- 1. Walls of plant pits shall be dug so that they are vertical and scarified. Bottoms shall be scarified to depth of 3".
- 2. Plant pits must be a minimum of 12 inches larger for trees and 12 inches larger for shrubs on every side of the plant ball.
- 3. Plants shall bear the same relationship to finished grade as at the nursery. Any loose soil at the bottom of the pit shall be tamped by hand or with with bucket of the backhoe, so as to inhibit settling.
- 4. Add tree and shrub fertilizer specified.
- 5. Add perforated watering pipe.

Backfilling Plant Pits:

- 1. Backfill plant pit with the soil mixture stated in the specifications.
- 2. Mix soil amendments prior to filling pit.
- 3. Make sure plant remains straight during backfilling procedure.
- 4. Backfill sides of plant pit halfway with soil mixture and tamp as pit is being filled.
- 5. Cut rope or wire from ball and remove from plant. Pull burlap back to the edge of the tree ball. Remove all plastic wraps and twine.
- 6. Finish backfilling sides of plant pit and tamp firmly.
- 7. Never cover top of tree ball with soil.
- 8. Form a saucer above existing grade and around the outer rim of the plant pit, not above root ball, as shown on the Drawings.
- 9. Mulch top of root ball and saucer within 48 hours to a depth of 3 inches, as shown on DHCD Drawings. Mulch trees in tree grates with 2 inches of washed pea gravel as shown on DHCD Drawings.
- 10. Water to saturation on the interior of the tree saucer until it is filled, even if it is raining. A second watering may be necessary to ensure saturation of the root ball.

Fungicide Spraying

- 1. Immediately after planting, all trunks of deciduous trees shall be sprayed with fungicide spray, applied as directed by manufacturer.

Wrapping

- 1. Trunks of deciduous trees shall be wrapped with a spiral wrapping of tree wrap material to a minimum height of

the third branch or two-thirds the height of the tree, whichever is higher. Wrap shall be applied from base up and securely tied.

**Anti-desiccant Application**

1. In extremely hot weather, reduce foliage surface by pruning or stripping, and apply anti-desiccant as directed by the county.

**Pruning**

1. Each tree and shrub shall be pruned to preserve the natural character of the plant. Pruning shall be done after delivery of plants and after plants have been inspected and approved by the county.
2. DO NOT cut the main leader when pruning trees.
3. If side branches are cut to balance tree, make all cuts flush with lateral branch.
4. All cuts greater than 1/2 inch shall be carefully pared over with a sharp knife.
5. Prune out all dead and broken branches.

**N. WOOD BENCH**

**MATERIALS**

Wooden benches shall be manufactured by Bench Manufacturing Co. 01 P.O. Box 158, 56 Winthrop Street, Concord, MA 01742, Model No. B-76, or approved equal. Benches shall be 4' long with back, with 8 straight and two molded wood slats (1.06 251 x 2.50" finished dimension) and cast iron stanchion.

**Wood Members**

All members shall be Douglas Fir and shall be selected for quality and appearance. All wood members must be kiln dried to a moisture content of 19% or less clear all sides. Wood parts shall be free of planer skips, wane, knots, knotholes, rot, white specks and shall be suitable for the use intended. All edges shall be uniformly rounded and exposed ends shall be drilled, sanded and chamfered on all sides. All corners shall be eased. All members will have clear stain.

**Stanchions**

Stanchions shall be cast gray iron to meet ASTM A48-76 Class 30 Standards with polyester powder coating (.003-.005) coverage in standard deep black color.

**Hardware**

All hardware necessary for assembly shall be provided in sufficient quantity, sizes, lengths and quality suitable for the use intended.

All nuts, bolts and screws shall be stainless steel. Steel tie rod shall be .625 in diameter. All seat support straps shall be aluminum, .125" x 1.00". Anchor bolt holes shall be .50" in diameter.

**EXECUTION**

Each contour bench shall be installed according to the manufacturer's specifications and as indicated on the contract drawings. After assembly, all exposed hardware shall receive one coat of primer and be touched up with one color coat, as previously specified.

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