

Columbus Downtown Streetscape Plan



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In developing the Columbus Downtown Streetscape Plan, staff and consultants worked with the Downtown Streetscape Plan Steering Committee. Following are the names of those whose voluntary contribution of time and effort has helped to make this plan possible.

Downtown Streetscape Plan Steering Committee

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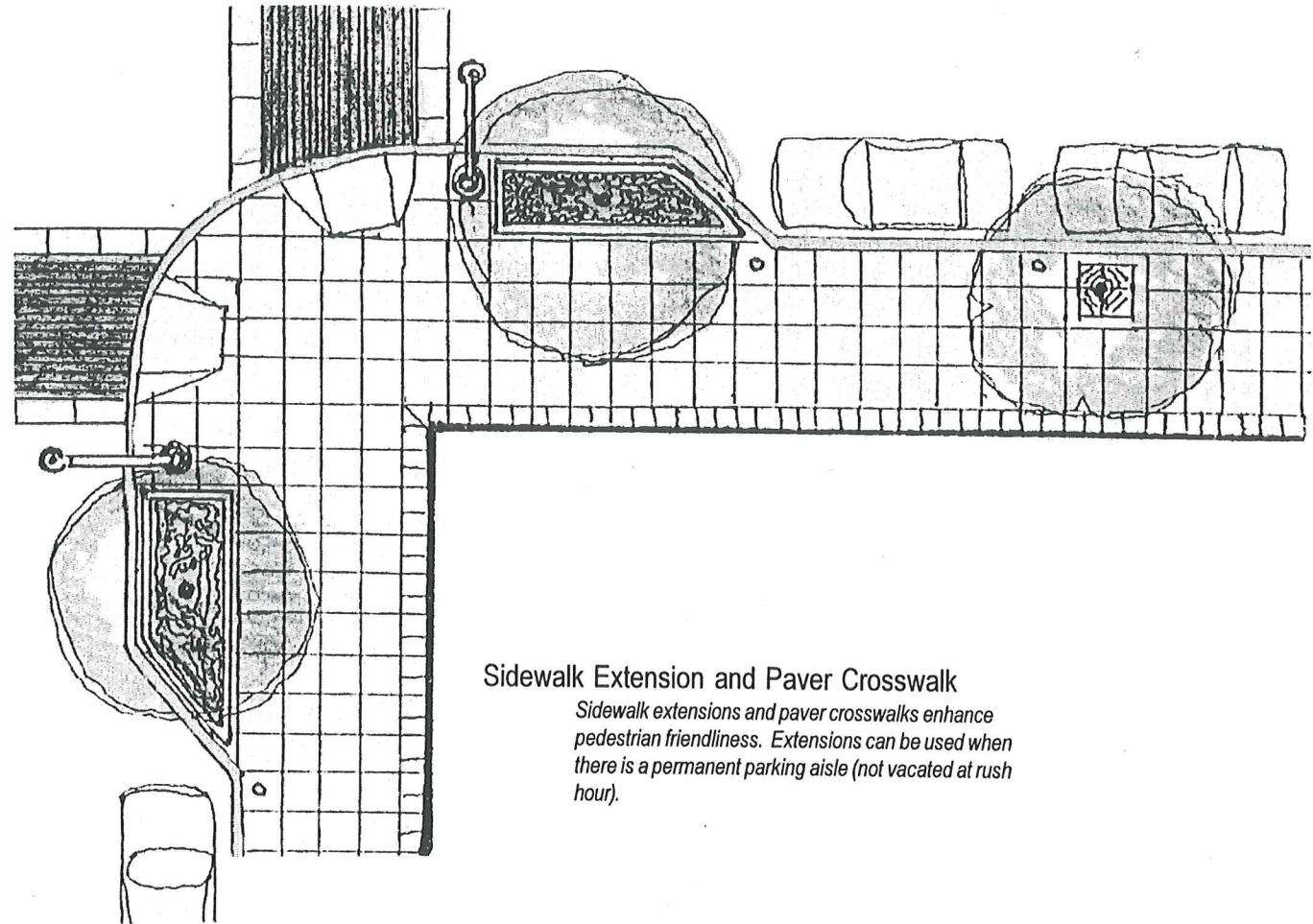
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Sidewalk Extension and Paver Crosswalk

Sidewalk extensions and paver crosswalks enhance pedestrian friendliness. Extensions can be used when there is a permanent parking aisle (not vacated at rush hour).

BACKGROUND

Downtown Columbus is currently in the midst of a sustained construction boom unequalled in its history. New office, residential, institutional, and entertainment projects as well as emerging district developments (i.e. Riverfront, Arena, Warehouse, PenWest, East Town, etc.) are reshaping downtown. Tying all of this together throughout downtown are the streets which are currently a deteriorated visual cacophony of pitted sidewalk paving and rotted curbs cluttered with poles, overhead wires, newspaper boxes and worn out furnishings, offering little in the way of visual appeal or positive identity.

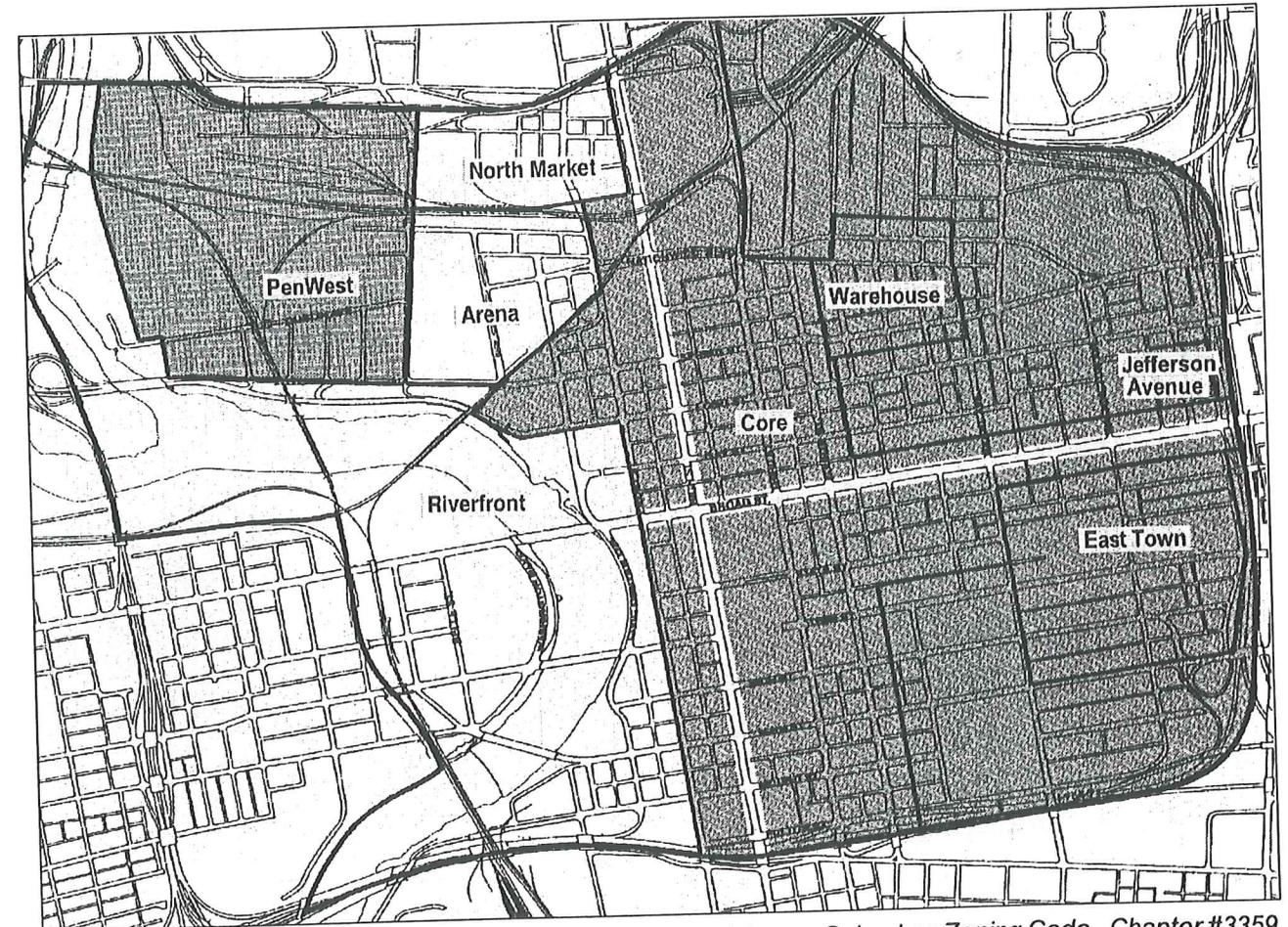
PROCESS

The Downtown Streetscape Plan process was initiated by the City of Columbus, Department of Trade and Development to address the need for excellence in the design and maintenance of downtown streetscape. The purpose of the Plan being to create a positive sense of streetscape identity and unity in the downtown, a sense of which will establish a streetscape environment conducive to further downtown economic development.

The Plan process engaged staff and consultant with the private sector and the many city departments and divisions responsible for installation and maintenance of downtown streetscape elements. A Steering Committee representative of city, other organizations and private stake holders, was formed and met on a monthly basis from December 1998 to August 1999. The Plan process addressed sidewalks, curbs, lighting, trees, furnishings, and other elements occurring between curb and right-of-way lines along those streets within the shaded areas on the downtown map shown at right, that is: the Downtown Core District, the PenWest District, the Warehouse District, the East Town District, and the Jefferson Avenue District. The balance of downtown, that is: the North Market District, the Riverfront District, the 'Arena' District, and the High Street and Broad Street corridor, have their own streetscape plans or, as signature streets, merit their own specific plans (i.e. Broad Street Median study). The Plan process recognized the importance of compatibility with areas receiving special treatment such as Broad Street and the Arena District.

SUMMARY

The plan recommendations establish fundamental (baseline) treatments for streetscape elements that are consistent, high quality, pedestrian-oriented, and of equal intensity throughout downtown while encouraging unique district identities. The baseline aspect of the plan does not preclude unique treatments for new districts and major projects. The substitution of higher quality materials that maintain a relationship to the greater whole is a welcomed possibility. The plan recommendations also stress the need for thorough, comprehensive and timely maintenance of all downtown streetscape elements.



District map, Columbus Zoning Code, Chapter #3359

Columbus Downtown Streetscape Plan

Recommendations

Streetscape refers to the area within the street right-of-way with particular emphasis, in this case, given to the pedestrian area – sidewalks, trees, lighting, etc. The Division most responsible for design control of this public space is the Engineering and Construction. As such, application of the plan by Engineering and Construction and other germane departments to the various means of implementation – Capital Improvements Projects, assessments, economic development, and general development standards will help assure more attractive, environmentally sound and pedestrian friendly and ultimately generate a climate for positive economic growth.

1.0 Utilities

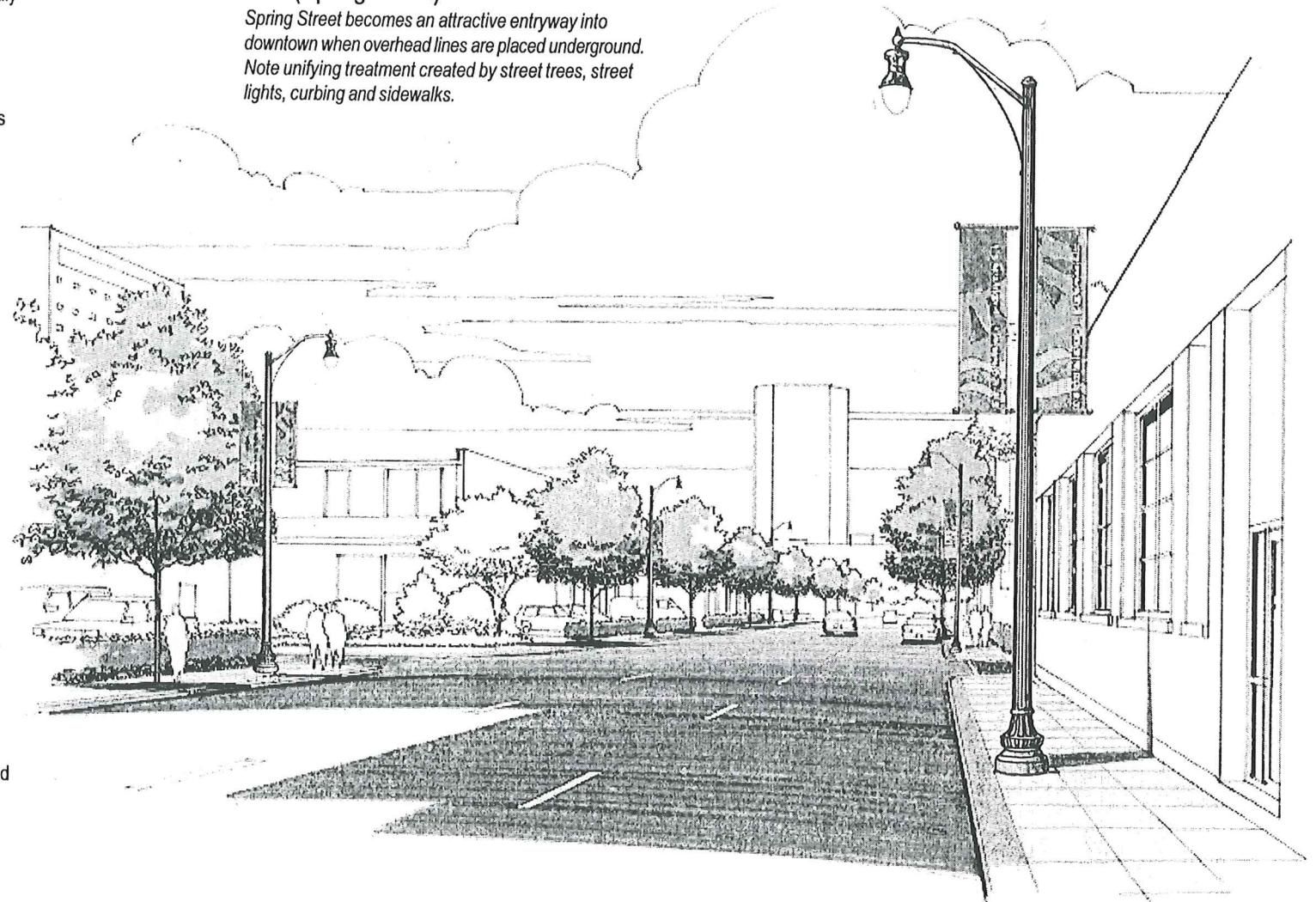
- 1.1 Repair, upgrade, or install or install, as necessary, utility (sanitary, storm, water, gas, etc.,) mains and service laterals.
- 1.2 Install overhead electric, telephone, cable TV, street light and traffic signal cable underground.
- 1.3 Take advantage of earth disturbing activity. Utilize excavation for one project to bury overhead lines.

2.0 Sidewalks

- 2.1 Install poured-in-place concrete as the predominant sidewalk material in the Core District, with hand-tooled scoring utilizing a three-foot by three-foot grid pattern
- 2.2 Utilize a broom finish on concrete sidewalks with the broom pattern perpendicular to the curb for drainage and to achieve a more uniform appearance.
- 2.3 Coordinate the scoring pattern of the concrete sidewalks with the placement of other streetscape elements such as tree grates.
- 2.4 Install standard 4" x 8" x 2 1/4" chamfered edge clay pavers on a concrete base as the predominant material in the East Town District, the Jefferson Avenue District, and the Penwest District. Install Pine Hall English Edge FR (red), clay pavers, or equal.
- 2.5 Maintain a minimum five-inch-thick sidewalk in all areas.
- 2.6 Maintain a minimum eight-inch-thick sidewalk in areas where vehicles may legally drive upon or cross the sidewalk.
- 2.7 Match or coordinate the color and pattern of sidewalk pavement treatment with that used on adjacent properties along the same block and in the same district.
- 2.8 Sidewalk extensions (see illustration on Contents page) are encouraged at intersections where and when traffic patterns permit.

Core District (Spring Street)

Spring Street becomes an attractive entryway into downtown when overhead lines are placed underground. Note unifying treatment created by street trees, street lights, curbing and sidewalks.



- 2.9 Consider non-conforming sidewalks when and where unique circumstances are present.
- 2.10 Due to safety and visibility concerns, clearly distinguish sidewalk pavement treatment from alleyway materials.
- 2.11 Do not use bituminous asphalt pavement as a sidewalk material.
- 2.12 Encourage the use of public sidewalks by the disabled. Refer to the American Disabilities Act in sidewalk design.

3.0 Curbs

- 3.1 Install at least ten-inch wide granite curbs as the predominant curbing in the Core District and six inch wide curbing in other Districts. Where sidewalk material is concrete, utilize Cold Spring "Cornelian" (red), or equal. Where clay pavers are used as the sidewalk material utilize curbs that are Cold Spring "Rockville" (gray), or equal.
- 3.2 Match the color, width and profile of the curb material used on adjacent properties along the same block and in the same district.
- 3.3 Install and maintain a curb height of six inches above street pavement.
- 3.4 Consider non-conforming curbs when and where unique circumstances are present.

4.0 Handicap Ramps

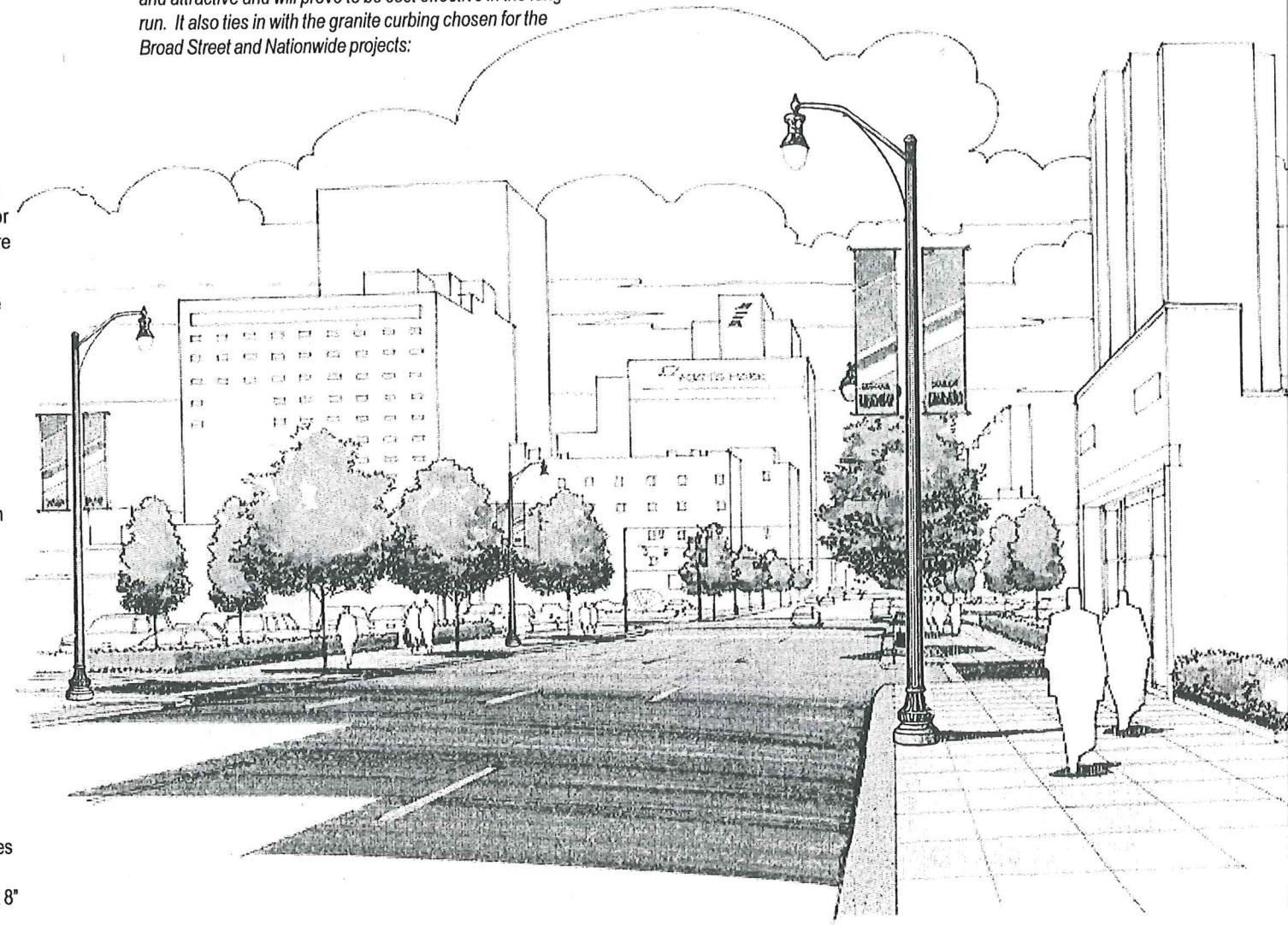
- 4.1 Construct and maintain handicap ramps at all legal crosswalks, marked and unmarked. Contain ramps within the crosswalk limits.
- 4.2 Install handicapped ramps in a direction parallel to the crosswalk.
- 4.3 Due to safety and drainage concerns, do not construct handicapped ramps in such a way as to extend a single curb ramp around the entire radius of an intersection.

5.0 Crosswalks

- 5.1 Locate crosswalks at street intersections as warranted by street characteristics, pedestrian volume, and signal operation.
- 5.2 The minimum width of crosswalks is six feet.
- 5.3 Indicate standard crosswalk locations with painted or thermoplastic pavement markings. In cases of high pedestrian traffic, at key intersections and mid-block crossings, construct crosswalks of clay pavers installed on a concrete base bound on both sides by a concrete band. Utilize 4" x 8" x 2-5/8" Pine Hall English Edge RF (red) clay pavers, or equal.

Core District (Third Street)

Another entry into downtown is Third Street. It is also increasingly being used by pedestrians heading to the Convention Center. High quality granite curbing is durable and attractive and will prove to be cost effective in the long run. It also ties in with the granite curbing chosen for the Broad Street and Nationwide projects:

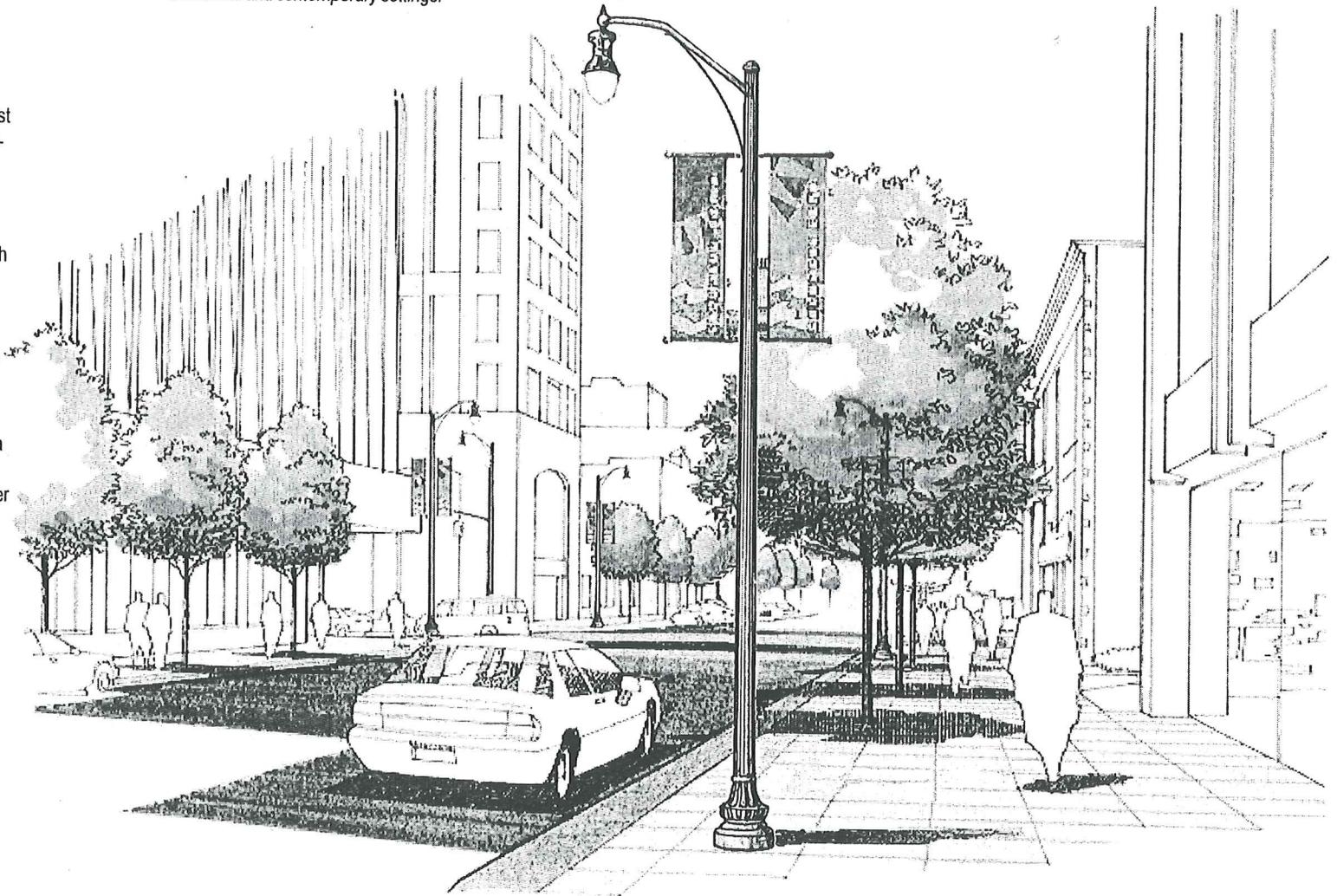


6.0 Street Lights

- 6.1 Consider the aesthetic quality of streetscape design when determining the height, spacing and placement of downtown street lights (e.g., increase the number/ frequency of placements to enhance the design intent).
- 6.2 As the predominant street light in the Core District, install the following as manufactured by Holophane Corporation, or equal: the Esplanade luminaire; "High Street" cross arm; and Colombian pole and base.
- 6.3 Allow for other downtown districts to establish identity by having other lighting standards. In the East Town Street and the Warehouse District erect pedestrian scaled "Acorn" luminaire and decorative-fluted pole/base (as exists in the North Market District). This lighting standard is part of the city inventory and is a close match with the core district standard.
- 6.4 In cases where proposed district lighting standards are outside of the existing inventory a contractual agreement is necessary with the Division of Electricity guaranteeing the district through Special Improvement District or other non-city entity will be responsible for installation, operation and maintenance of the lighting.
- 6.5 Color all street light installations, including traffic mast arms – black. The full implementation of this provision will require the identification of funds for the repainting of existing mast arms and street lights.
- 6.6 Install high-pressure sodium (HPS) street light lamps. Allow metal halide (MH) as an option on a street by street or district basis provided that installation, maintenance responsibilities and operational cost differential between HPS and MH is met by Special Improvement District or other non-city entity.
- 6.7 On street light poles, include threaded receptacles for banner arms and electrical outlets near the top for seasonal displays undertaken through agreement with the city.
- 6.8 Keep street light illumination levels in accordance with standards established by the City of Columbus Division of Electricity.
- 6.9 If and when signs are attached to street light pole, match the pole color and attachment color - black.

Core District (Gay Street near Third Street)

The most important single element in terms of creating a cohesive downtown is street lighting. This recommended light fixture adapts well to both traditional and contemporary settings.



7.0 Street Trees and Tree Grates

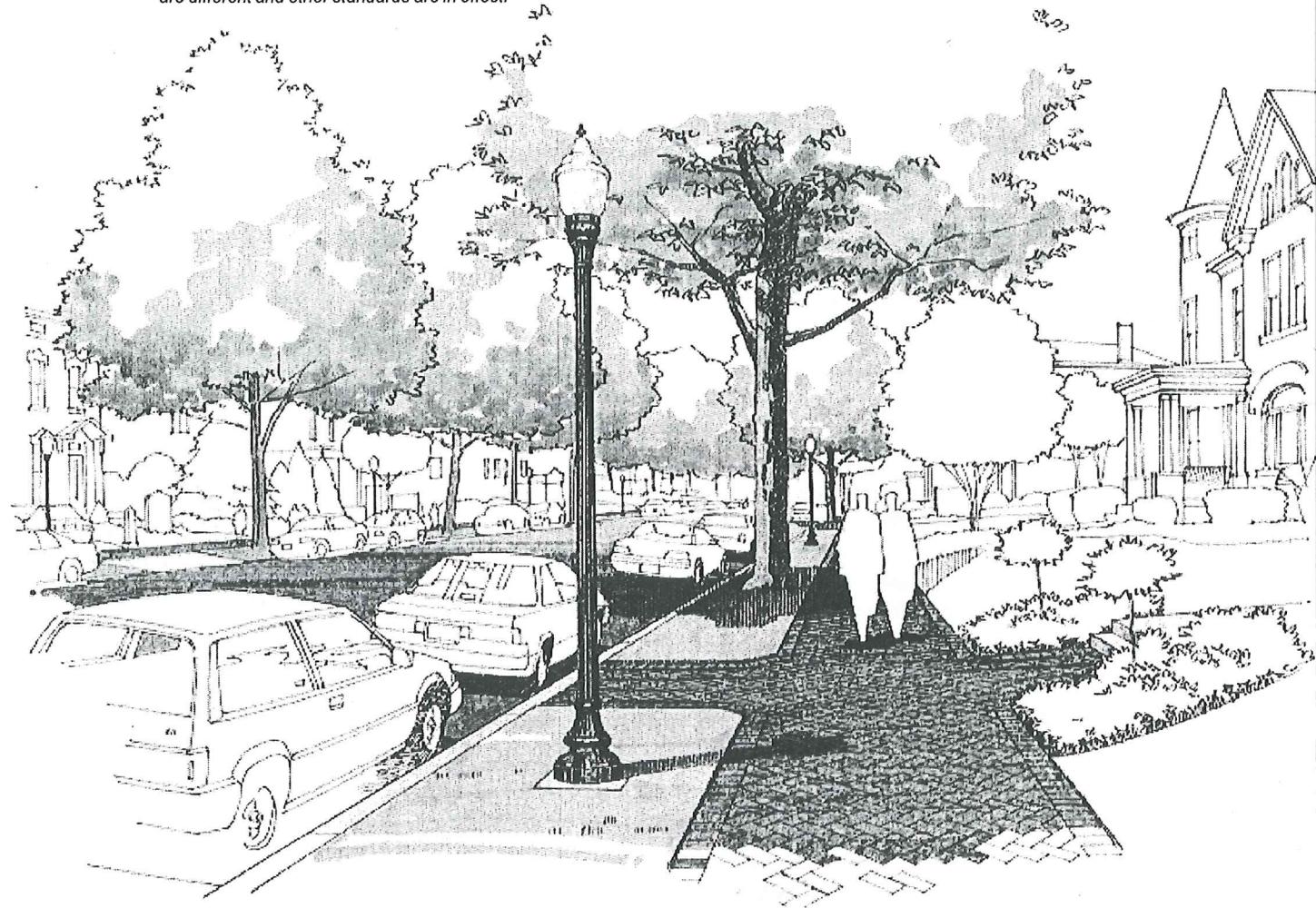
Approval by the City Forester is needed before installation of any planting within the right-of-way.

- 7.1 The Downtown Streetscape Plan encourages the planting and maintenance of street trees. Specific suggested trees are listed in the appendix on pages 14 and 15. Consult with the City Forester for alternatives.

- 7.2 Plant trees in lawns where there is adequate width for both lawn and sidewalk. Generally, do not plant trees in lawns less than three feet in width.
- 7.3 Plant trees in tree pits, particularly in the core area where there are expansive sidewalks. To insure survivability, install only if there is adequate space – a minimum surface area of twenty-four square feet to allow for penetration of water and oxygen. Five-foot by five-foot pits are preferred, however. Where narrow sidewalk dimensions dictate, four-foot by six-foot openings are acceptable. Openings larger than twenty-four square feet or continuous trench systems are encouraged where space and conditions permit.
- 7.4 Observe the following recommended distances whenever possible when planting trees in the right-of-way. These distances ensure room for access to other streetscape elements while enhancing tree survivability. All distances are measured from the face of the tree trunk and are design and species dependent.
 - Distance from face of curb: four feet.
 - Distance from tree to adjacent tree: twenty-five feet.
 - Distance from parking meters: six feet.
 - Distance from gas valves, water valves, oil fill pipes: three feet.
 - Distance from traffic control sign/signal: twenty-five feet unless tree growth at maturity will not overhang or block sign/signal visibility.
 - Distance from curb cuts or driveways: five feet.
 - Distance from fire hydrants: eight feet.
 - Distance from street light: eight feet.
 - Distance from an intersection: twelve feet (as measured from the R.O.W intersection) as long as adequate sight distances for motorists are maintained. See technical specification (p. 14) for drawing.
 - Distance from sidewalk to branches: eight feet.
 - Distance from the street to branches: thirteen feet.
- 7.5 Maintain an unobstructed walkway of at least six feet between the edge of the tree pit that is most distant from the curb and the edge of the sidewalk closest to the right-of-way.
- 7.6 Irrigation and a scheduled maintenance program for all planted areas is strongly encouraged.
- 7.7 Plant trees only while dormant during either the spring or fall season. Generally, the spring planting season commences no earlier than March 21st and concludes no later than May 15th. Fall season is from September 18th to November 30th.
- 7.8 Fill tree pits with topsoil at the time of planting to a depth of at least eighteen inches.
- 7.9 Install trees of a minimum caliper of 2½ to 3 inches, as measured six inches from the ground.
- 7.10 Install tree grates in conjunction with new tree plantings in tree pits. Select cast iron tree grates and frames manufactured by Neenah Foundry Company, model R-8734, or an acceptable equal.

East Town District (Town Street)

Trees already play a major defining role in some of the downtown districts, particularly the historic East Town Street where generous tree lawns provide optimum for trees. Elsewhere downtown, particularly in the core, conditions are different and other standards are in effect.



- 7.11 To prevent rocking of the grate, set the frame in a true, flat plane. Install grates flush to the sidewalk.
- 7.12 Securely affix grates to the concrete or steel frame in a manner which allows removal for tree maintenance.
- 7.13 Select grates that will allow for expansion as tree matures.
- 7.14 In areas where trees planted in pits and grates are not possible, mulch trees to a depth no greater than three inches. Install a continuous six-inch concrete curb around the perimeter of the pit to contain the mulch. Wood timbers are not permitted for use as tree pit curbs.
- 7.15 In areas where tree pits are not possible due to conflicts with underground infrastructure or other technical constraints, consider raised tree pits as an acceptable method of incorporating tree plantings into the right-of-way. Include concrete or masonry walls around the perimeter of the pit to contain the tree and planting soil. Install the raised tree pit no less than four feet from the face of curb and such that an unobstructed sidewalk is not less than six feet. Make certain the raised pits do not obstruct the view of motorist (maintain visibility triangles).

8.0 Parking Lot Screening and Barriers

For parking lot screening and barriers, conform with the city of Columbus Downtown Parking Lot Screening Guidelines, as follows:

- 8.1 For all surface parking lots, border the entire length of all lot lines fronting on public streets, except at established entrances and exits, by a frontage strip containing a vehicular barrier and visual screen. The barrier and screen prevent vehicular ingress or egress except at established entrances and exits, stop vehicles from encroaching into the public right-of-way and screen parked vehicles from view from the public right-of-way. Parking lot screening design require review and approval of the Downtown Commission, the city's downtown zoning authority.
- 8.2 Install visual screens as a continuous hedge of evergreen shrubbery supplemented by decorative metal fence or other design solution approved by the Downtown Commission, and deciduous trees, together providing 100% opacity to a height of three feet by the end of the second growing season after planting.
- 8.3 Plant trees used as part of any visual screen a minimum 2½ to 3 inch caliper at time of installation and spaced at twenty feet.
- 8.4 Replace plant material that fails with material that maintains the size and design integrity of the screen.

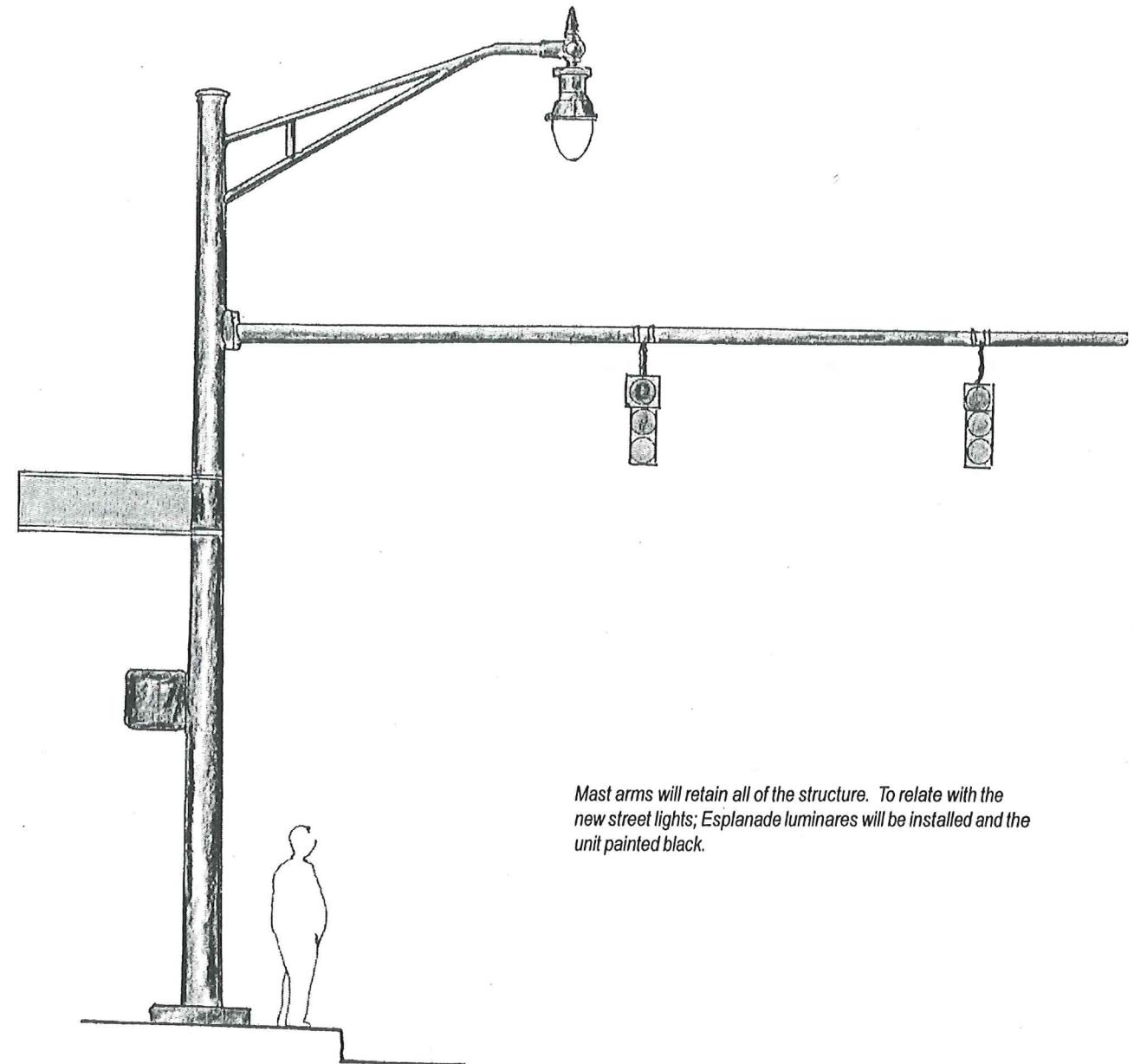
Warehouse District (Fifth Street)

The Warehouse District is distinguished from the bulk of downtown by historical post top pedestrian oriented lighting. Connection to the rest of downtown are maintained by the granite curbing and the sidewalk treatment.



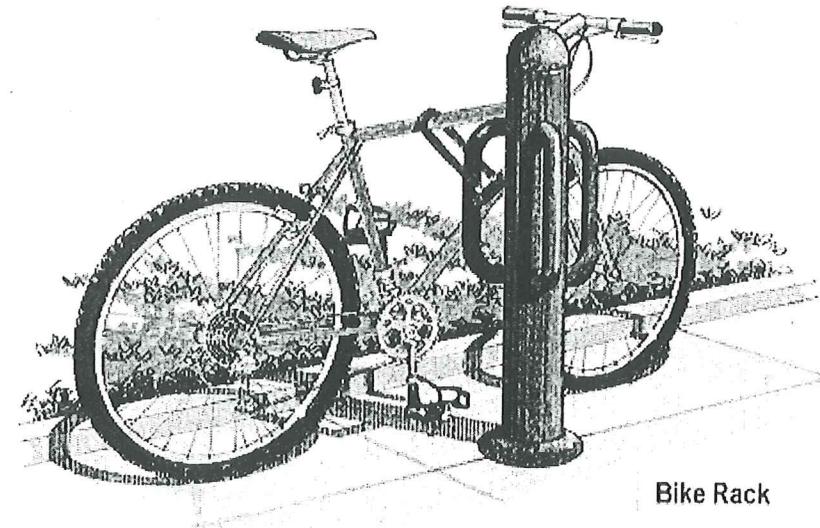
9.0 Other Streetscape Elements

- 9.1 Permanently install benches on a stable pavement surface. Select Victor Stanley, Inc. Model RB-28 or equal, four to five feet long, steel construction with black gloss finish.
- 9.2 Permanently install waste receptacles on a stable pavement surface. Select DuMore, Inc. Model 107 or equal, steel construction with black gloss finish.
- 9.3 Bike racks. Permanently install on a stable paved surface. Select Huntco Model BR3, creative pipe TB3, or equal galvanized steel construction Columbia Cascade Model 2173-P-C (bollard), or equal, steel construction with gloss black finish.
- 9.4 Explore alternative parking control methods that result in the reduction of individual parking meter post.
- 9.5 Locate kiosks, clocks, public art, and other amenities in the public right-of-way where they are part of a specific streetscape improvement plan that has been reviewed and approved by the city.
- 9.6 Install banners on street light poles in the public right-of-way. Establish a program by the city or other entity to review and approve locations, size, types, content, sponsorship, and other factors.
- 9.7 Coordinate bus shelters and related transit elements with the 'Broad Street Median Project' prototypes. Incorporate new design elements that treat districts uniquely. Do not obstruct walkways or interfere with storefront merchandizing by placement of shelters.
- 9.8 Allow sidewalk plaques, engraved pavers and other decorative elements in the public right-of-way to highlight building entrances or other focal points. Install such non-slip elements flush with the surrounding sidewalk surface.
- 9.9 Allow sidewalk vault covers and access doors in the right-of-way if they are deemed necessary for access to a building's lower level and if they do not interfere with the movement of pedestrian traffic. Install non-skid sidewalk vault covers flush with surrounding sidewalk surfaces.
- 9.10 Utilize the existing design of the traffic mast arms. Match the color of mast arms to those of street lights (black). For combination mast arm/ street lights install Esplanade luminaires. Whenever possible, utilize mast arms to suspend signal heads over intersections.
- 9.11 Install flat sheet aluminum street markers and traffic control signage to designated street light poles, traffic signal poles, or sign support poles. Match the color of mounting bracket and hardware for installation on street lights and traffic signal poles with the color of the pole. Erect sign support poles with galvanized pipe painted black to match street light poles. Make every effort to reduce visual clutter by minimizing the number of traffic control signs.
- 9.12 Emphasize maintenance that is thorough and comprehensive. Repair or replace broken, deteriorated, and inappropriate streetscape elements in a timely manner using elements and materials recommended by the Downtown Streetscape Plan.

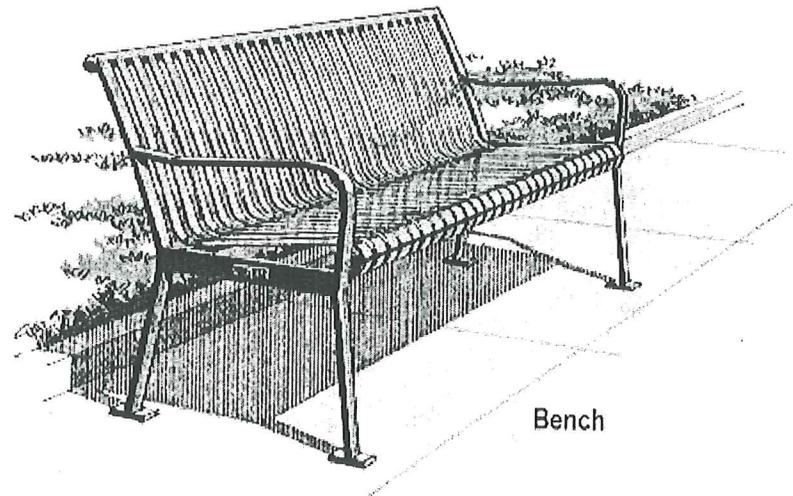


Mast arms will retain all of the structure. To relate with the new street lights; Esplanade luminaires will be installed and the unit painted black.

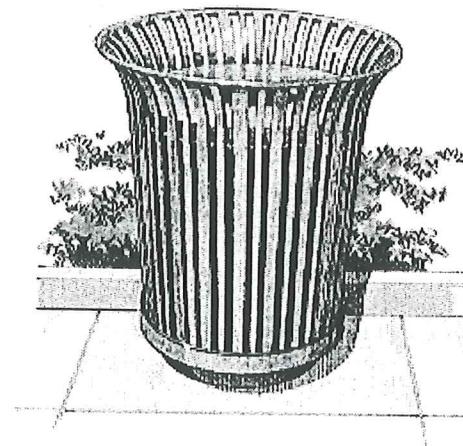
- 9.13 Encourage district identification within the context of "vision statements" adopted as part of the Downtown District Zoning Ordinance, Chapter No. 3359. Install unique streetscape elements such as banners, plaques, kiosks, clocks, gateways, arches, signage, furnishings, pavements, and other treatments when part of a specific streetscape plan that has been reviewed and approved by the city.
- 9.14 Explore the means to develop a comprehensive way-finding system that directs visitors to downtown's special areas, features, and districts.
- 9.15 Newspaper and Tabloid Dispensers
Newspaper vending dispensers throughout downtown are an aesthetic problem and need to be addressed. A number of systematic approaches have been suggested and are in the process of being evaluated in terms of aesthetics, administration, maintenance and other criteria.



Bike Rack



Bench



Waste Receptacle

Lasting and attractive sidewalks and other surfaces require the right materials, methods, design and craftsmanship. The following are guidelines that will help assure quality. The Engineering and Construction Division must approve plans before the issuance of a permit and is the final arbiter of standards. The Division has standards for most aspects of sidewalk construction. The following guidelines are supplemental.

Clay Paver Sidewalks

PART 1 MATERIALS

1.1 CONCRETE BASE AND AGGREGATE SUB-BASE (OR BASE)

- A. Concrete base and aggregate sub-base (or base) is described in the Portland Cement Concrete Sidewalks section of these Specifications.

1.2 ASPHALT SETTING BED

1.3 PAVERS

A. Physical Requirements

1. Pavers - repressed chamfered clay pavers conforming to the following ASTM requirements.
 - a. Pavers installed in sidewalks and drives - conform to ASTM C-902 (Pedestrian and Light Traffic Paving Brick), Class SX, Type I, Application PS.
 - b. Pavers installed in streets and roadways - conform to ASTM C-1272 (Heavy Vehicular Paving Brick), Type F, Application PX.
2. The average compressive strength for pavers installed in sidewalks and drives - 8000 PSI with no individual unit less than 7000 PSI. The average compressive strength for pavers installed in streets and roadways - 10,000 PSI with no individual units less than 8800 PSI.
3. The average cold water absorption for pavers installed in sidewalks and drives - shall not be greater than 8% with no individual unit greater than 11%. The average cold water absorption for pavers installed in streets and roadways - shall not be greater than 8% with no individual unit greater than 7%.
4. The average saturation coefficient for pavers installed in sidewalks and drives - shall not be greater than 0.78 with no individual unit greater than 0.80.
5. The average minimum modulus of rupture for pavers installed in streets and roadways - 1500 PSI with no individual unit less than 1275 PSI.
6. The abrasion index for all pavers - shall not exceed 0.11.
7. The top edges of all pavers shall be chamfered. Chamfers shall be clean and free of spurs.

B. Pavers shall be sized as follows:

1. Pavers installed in sidewalks and drives - 2¼" thick.
2. Pavers installed in streets and roadways - 2-5/8" thick.

PART 2 EXECUTION

2.1 PREPARATION OF SUBGRADE

- A. Ensure rough grading has brought subgrade to required elevations.
- B. Fill soft spots and hollows with additional fill.
- C. Level and compact subgrade to receive aggregate sub-base (or base) material as appropriate.

2.2 PLACEMENT OF CONCRETE BASE

- A. Concrete base shall be installed as per the Portland Cement Concrete Sidewalks section of these Specifications.

2.3 ASPHALT SETTING BED

2.4 PLACEMENT OF PAVERS

- A. Place pavers in patterns with hand tight joints not to exceed 1/8" (minimum 1/16").
- B. Where necessary to cut pavers, cutting shall be accomplished so as to leave a clean edge to the traffic surface. Pavers shall be cut with a masonry saw. The use of a block splitter is not permitted.
- C. Ensure finished surfaces do not vary from true lines, levels or grade by more than 5/16" in 3' when measured with a straight edge.
- D. Tops of pavers adjacent to poured concrete pavements shall not vary by more than 1/8" from the adjacent poured concrete pavement surface.
- E. Joints between pavers shall run in straight and continuous lines and shall not be offset by more than 1/8".
- F. No units which are chipped, cracked or otherwise damaged are to be installed.

Portland Cement Concrete

1.0 FORMING JOINTS FOR SIDEWALKS

- A. Place isolation (expansion), contraction (cold), and construction (score) joints as required or as shown on drawings. When sidewalks abut buildings, utility castings, light pole bases, and other vertical stationary structures, provide isolation joints with continuous joint filler with a smooth linear edge. If building foundation surface is irregular, locate isolation joint at first joint parallel to building.
- B. Fit isolation joints with filler of required profiles.
- C. Seal all exposed isolation joints. Examine joints to assure they are clean and dry and free from conditions that would affect the quality of the work. Prime joints in accordance with the manufacturer's instructions, and allow to dry before joint sealant is installed. Install backer rod to within 1/2" of face of adjoining surfaces. Apply joint sealer with a caulking gun with proper size nozzles to fit the joint. Apply with sufficient pressure to completely fill joints.

Do not apply sealant with substrate or air temperature below 50°F. Sealant must be tooled to insure intimate contact with joint sides. Remove all excess sealant and smears adjacent to the joints with cleaner recommended by the manufacturer. Protect joints from pedestrian traffic until initial set, and protect from vehicular traffic until firm cure.

1.1 SNOW MELTING / DE-ICING / ANTI-SLIP GRANULES

- A. For concrete surfaces less than one year old use Urea, sand or ashes for snow-melting/de-icing/anti-slip granules. Do not use rock salt (NaCl), brine or calcium chloride (CaCl) for "new" sidewalks.
- B. After the initial one year period additional de-icers may be considered for use keeping in mind the following limitations:
Rock salt, in the absence of freezing, has little to no chemical effect on concrete but will damage plants and corrode metal. Calcium Chloride in weak solutions generally has little chemical effect on concrete and vegetation but does corrode metal. Studies have shown that concentrated calcium chloride solutions can chemically attack concrete. (The reaction is accelerated with increased temperature.) Urea does not chemically damage concrete, vegetation or metal. The use of de-icers containing ammonium nitrate and ammonium sulfate are strictly prohibited as they rapidly attack and disintegrate concrete. The extent of scaling depends upon the amount of de-icer used and the frequency of application.

Historic Resources Commission

Right-of-way improvements within the specific boundaries of the Historic Resources Commission (HRC) come under the purview of the HRC. Final improvement plans must be reviewed and approved by the HRC.

Lighting

Install street lighting in accordance to the City of Columbus, Division of Electricity current street lighting material and installation specifications.

Landscape Work

In addition to beautifying, trees and other landscaping improve the urban environment by cleaning the air and lowering ambient temperatures in summer. Two aspects of planting are often overlooked but are critical in terms of assuring long term health and survivability – preparation before and maintenance after planting. Use the following guidelines.

PART 1 MATERIALS

1.1 TOPSOIL

- A. Topsoil - a natural surface soil which is a friable loam containing not less than 5% or more than 20% by weight of decayed organic matter (humus). It shall be free of subsoil, stones, earth, clods, sticks, roots or other objectionable extraneous matter or debris. It shall contain no toxic materials.
 1. Obtain topsoil from local sources or from areas having similar soil characteristics to that found at project site. Obtain topsoil only from naturally well-drained sites where topsoil occurs in a depth of not less than 4"; do not obtain from bogs or marshes.
 2. pH range of 5.7 to 7.0.
 3. No topsoil shall be delivered in a frozen or muddy condition.

1.2 PLANTING SOIL

- A. For backfilling plant beds or pits, planting soil mixture shall be prepared using the following rate of materials:
 - Four (4) parts loam topsoil
 - One (1) part leaf humus (or other approved composted organic matter)
 - One (1) part peat moss by volume.
 - One (1) part sharp horticultural sand

Note: When soil testing indicates the topsoil has adequate sand content, delete the sand from the mixture ratio.
- B. Mixture shall be well mixed and approved by the Landscape Architect before any plants are installed.
- C. For filling seasonal planters, planting soil shall consist of soilless mix commercially available under the trade name of Pro-mix or equal.

1.3 SOIL AMENDMENTS

- A. General: Unless specified otherwise below, the following soil amendments shall be used at rates recommended by topsoil testing.
- B. Lime: Natural dolomitic limestone containing not less than 85% of total carbonates with a minimum of 30% magnesium carbonates, ground so that not less than 90% passes a 10-mesh sieve and not less than 50% passes a 100-mesh sieve. Use limestone to raise the pH of planting soil when necessary.
- C. Aluminum Sulfate: Unadulterated free flowing and delivered in containers with the name of the material, name of the manufacturer, net weight and purity. Use aluminum sulfate to lower the pH of the planting soil when necessary.
- D. Weed Control: A labeled herbicide appropriate for use with the plants grown. It can be applied in either granular or liquid form according to directions.
- E. Leaf Humus: Leaves composted 18-24 months in high temperatures, creating rich, mellow dark leaf humus. Leaf humus to be shredded and screened, and free of weed seeds and toxic materials.
- F. Peat Moss: Shredded sphagnum peat moss and reasonably free from woody substances and mineral matter which could be harmful to root growth or plant development.
- G. Sand: A standard horticultural product, washed, sharp sand, clean and free from foreign matter and chemical contamination. Suitable for incorporating into planting soil.
- H. Commercial Fertilizers: Complete fertilizer of neutral character with some elements derived from organic sources and containing the following percentages of available plant nutrients:
 - 1. For trees, shrubs, groundcovers, and perennials, provide controlled release fertilizer with not less than 5% total nitrogen, 10% available phosphoric acid and 5% soluble potash. Fertilizer shall be added in proportions determined by soil analysis and per manufacturer's recommendation.
 - 2. For seasonal flowers in planters, provide a slow-release fertilizer having an analysis of 8-6-12, known as Osmocote or equal.

1.4 PLANT MATERIALS

- A. General:
 - 1. Provide plants of size, genus, species and variety shown and scheduled for landscape work and complying with latest recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock". All plants shall be nursery grown.
 - 2. Install plants that are hardy under climatic conditions and nursery grown in the same hardiness zone, or colder, as the project.
 - 3. Install plants with outstanding form; symmetrical, heavily branched with an even branch distribution, densely foliated and/or budded, and a strong, straight, distinct leader where this is characteristic of

species. Plants shall possess a normal balance between height and spread. The Landscape Architect will be the final arbiter of acceptability of plant form.

- 4. Provide plants with a vigorous, well-developed fibrous root system.
- 5. Install plants that are healthy and vigorous, free of disease, insect pests and their eggs, larvae, borers, and all other forms of infestation.
- 6. Plants shall be free of physical damage such as scrapes, broken or split branches, scars, bark abrasions, sun scalds, frost cracks, fresh limb cuts, disfiguring knots, or other defects.
- 7. Balled and burlapped plants shall be dug with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. Provide ball sizes complying with the latest edition of the "American Standard for Nursery Stock." Cracked or mushroomed balls are not acceptable. Plastic burlap and/or twine is not acceptable.
- 8. Install container grown plants that are well rooted and established in the container in which they are growing. They shall have grown in the container for a sufficient length of time for the root system to hold the planting medium when taken from the container, but not long enough to become root bound. Container grown plants exceeding the sizes indicated in ANSI Z60.1 shall have containers which are not less than 75% of the ball sizes for comparable B&B plant material. Inspect and root prune each container plant as needed.
- B. Deciduous Trees: Provide trees of height and caliper scheduled or shown and with branching configuration recommended by ANSI Z60.1 for type and species required. Provide single stem trees except where special forms are shown or listed.
 - 1. Provide balled and burlapped (B&B) deciduous trees.
- C. Shrubs: Provide shrubs with not less than minimum number of canes required by ANSI Z60.1 for type and height of shrub required.
 - 1. Container grown deciduous shrubs are acceptable in lieu of balled and burlapped deciduous shrubs subject to specified limitations for container grown stock.
- D. Coniferous and Broadleafed Evergreens: Dimensions indicate minimum spread for spreading and semi-spreading type evergreens and height for other types, such as globe, dwarf, cone, pyramidal, broad upright and columnar. Provide normal quality evergreens with well-balanced form complying with requirements for other size relationships to the primary dimensions shown.
 - 1. Provide balled and burlapped (B&B) evergreen trees.
- E. Ground Cover: Provide plants established and well-rooted in pots with not less than minimum number and length of runners required by ANSI Z60.1 for the size shown.
- F. Perennials and Ornamental Grasses:
 - 1. Provide plants established and well-rooted in pots. The top growth diameter shall fully cover or extend past the surface (top diameter) of the container.

- G. Seasonal Planters:
 1. Plants shall be blooming or well-budded and on the verge of blooming at time of planting.
 2. All plants shall be healthy and in vigorous growth and display foliage and flowers characteristic of species and variety indicated.
 - H. Bulbs:
 1. Bulbs shall be topsize for their specific variety, and delivered to the site for planting at the appropriate season.
- 1.5 MISCELLANEOUS LANDSCAPE MATERIALS
- A. Shredded Bark Mulch: A finely shredded hardwood tree bark of uniform texture and size and shall be a slow decomposing, all organic material. Shredded bark shall be aged at least one year and dark brown in color. It shall not contain an excessive amount of acid or other toxins that may adversely affect plant growth.
 - B. Anti-Desiccant: Emulsion type, film forming agent designed to permit transpiration but retard excessive loss of moisture from plants. Deliver in manufacturer's fully identifiable containers and mix in accordance with manufacturer's instructions.
 - C. Herbicide: A labeled herbicide for the plants grown. It can be applied in either granular or liquid form according to directions.
 - D. Guying, Staking, Wrapping:
 1. Tree Wrap: Double layered, bituminous cemented, waterproof, crinkled paper 4" wide, manufactured for this purpose.
 2. Guying Stakes: Sound uniform hardwood stakes 2" x 2" x 36", or as shown on detailed drawings.
 3. Bracing Stakes: Shall be sound uniform hardwood stakes 2" x 2" x 8' to 10', or as shown on detailed drawings.
 4. Hose: Hose for covering staking wire two ply, reinforced black rubber hose with a minimum inside diameter of 5/8".
 5. Twine: Jute twine not less than two ply (no synthetic twines).
 6. Cable/Wire: 12 or 14 gauge galvanized steel solid strand wire depending on size of tree. See planting details.
 7. Turnbuckles: Galvanized or zinc coated, having a 3" minimum lengthwise opening fitted with screw eyes, and shall have a tensile strength equal to or greater than the attaching wire or cable.
 8. Deadmen: 2-4' long by 4-8" wide timbers, or other approved material capable of supporting the tree specified for its use.
 - E. Water: Suitable for irrigation and shall be free from ingredients harmful to plant life.
 - F. Pea Gravel Mulch: Maximum 3/16" diameter / minimum 1/8" diameter and washed and free from deleterious materials. Install pea gravel at tree cutouts with tree grates.

PART 2 INSTALLATION

2.1 GENERAL

- A. Examine proposed planting areas and conditions of installation. Do not start planting work until unsatisfactory conditions are corrected.
- B. Take all proper precautions so as not to disturb or damage subsurface improvements.
- C. Test topsoil for nutrients, pH range and organic content. When testing indicates a deficiency, apply soil amendments and fertilizer at rates indicated by testing as specified herein.

2.2 PREPARATION OF PLANTING BEDS

- A. For all areas that are specifically designated on the drawings as landscape beds, remove all sod and undesirable plant grown from the entire bed area. Remove and dispose of all undesirable material to off the site.
 1. In areas where existing sod and other vegetation exists, spray the proposed bed area with Roundup (or other approved herbicide) seven (7) days before the removal of the vegetation.
- B. Loosen the bed prior to planting by rototilling, or picking (generally done on small areas or on slopes). Soil shall be loosened to a depth of 8-12". Remove sticks, roots, rubbish, extraneous matter and any stones over 1 1/2" in any dimension.
- C. Spread 4"-6" of specified planting mixture over loosened bed areas and rototill thoroughly throughout.
 1. Add additional planting mixture as required to meet lines, grades, and elevations of the site in accordance with the drawings and details. This includes allowance for natural settlement and compaction of prepared beds.
- D. Fertilizer shall be top dressed over prepared bed areas at the rate specified. Incorporate fertilizer thoroughly into bed.

2.3 PLANTING PIT EXCAVATION

- A. Excavate pits, beds and trenches with vertical sides. Loosen hard subsoil on bottom and sides of excavation.
- B. For shrubs, make excavations for planting pits at least twice as wide as the ball or container diameter and equal to the ball or container depth or as indicated on the Drawings, which ever is greater in size.
- C. Dispose of subsoil removed from planting excavations. Do not mix hardpan clay soil with planting soil or use as backfill.
- D. Fill excavations for trees and shrubs with water and allow to percolate out before planting.

2.4 PLANTING INSTALLATION

- A. Setting of Trees and Shrubs:

- 1. Set balled and burlapped (B&B) plants in pits and at such a level that the top of the root ball shall be at the same elevation as the surrounding soil level. Set each plant in the center of an individual pit and set plumb and straight. Adjust all plants to conform and align with surrounding plants and properly faced so as to give the best effect.
 - 2. No filling around trunks or stems. Cut off all broken or frayed roots. No planting mixture in a frozen or muddy condition is permitted for backfilling.
 - 3. Set container grown stock as specified for balled and burlapped (B&B) stock.
 - 4. Do not accept trees and shrubs with broken root balls.
- B. Planting Ground Cover, Perennials, Ornamental Grasses, Annuals and Bulbs:
- 1. Ground Covers:
 - a. Prepare the ground cover bed in accordance with Item 2.02.
 - b. Mulch the entire bed to a minimum depth of 1½ inches (2 inches maximum).
 - c. Dig the ground cover planting holes through the mulch with a hand trowel.
 - d. Before planting, biodegradable pots shall be split, and non-biodegradable pots shall be removed. Root systems of all potted plants shall be split or crumbled.
 - e. The ground cover shall be planted
 - 1. So that the roots of the plant are surrounded by soil below the mulch; set potted plants so that the top of the pot is even with the required finish grade. Cover the roots of bare root plants to the crown.
 - 2. Space ground cover in accordance with indicated dimensions. Adjust spacing as necessary to evenly fill planting bed with indicated quantity of plants. Plant to within 12" of the trunks of trees and shrubs within planting bed and to within 6" of edge of bed.
 - f. Add additional mulch as necessary to maintain a uniform thickness, smooth and level out surface of bed to have a uniform appearance.
 - 2. Perennials, Ornamental Grasses and Annuals:
 - a. Prepare the planting bed in accordance with Item 2.02.
 - b. Remove plants from their pots and slash the sides of the root ball to prevent root girdling.
 - c. Set the plants so that the top of the root system is even with the required finish grade. Work soil around roots to eliminate air pockets.
 - d. Smooth and level out surface of bed to have a uniform appearance.
 - e. Mulch areas between plants with a minimum depth of 2 inches (3 inches maximum).
 - 3. Bulbs:
 - a. Plant bulbs at appropriate planting season. Plant to appropriate depth for variety and at spacing shown on the plant list.
- C. Filling Seasonal Planters:
- 1. Install gravel, landscape mat, mulch, specified planting soil mixture and seasonal plantings according to the detail drawing.

- D. Container and Burlap Removal:
 - 1. Remove burlap from top and sides of ball and retain on bottom. Cut wire baskets from ball after setting in pit. REMOVE ALL MANMADE AND NATURAL FIBER TWINE FROM THE TOP, SIDES, AND BASE OF ALL PLANTS.
 - 2. Plants grown in metal, plastic, paper, or tar paper pots shall be removed from their container and then 3 to 4 slices will be made through the roots and the roots on the outside of the plant ball will be worked free from the soil, or the root mass shall be "butterflied".
 - E. Backfill:
 - 1. When the plant has been properly set, back the pit with specified planting soil. Prepare by thoroughly mixing in the proper proportions prior to backfilling the pit.
 - 2. Incorporate fertilizer into backfill mix at the rate specified and as per manufacturer's recommendations.
 - 3. Loosely fill the pit until full. Backfill shall be settled by watering and refilled as necessary. Dish top of backfill to allow for mulching.
 - F. Watering of All Plants:
 - 1. Once backfilled, thoroughly soak all plants to the depth of the pit excavation.
 - a. Adequately water plants particularly in their first year after installation.
- 2.5 PLANT FINISHING
- A. Pruning: After planting, prune branches of deciduous stock to balance loss of roots in such a manner to preserve natural character appropriate to particular requirements of the plant, according to standard horticultural practices. Remove broken, damaged and unsymmetrical branches and sufficient other growth to insure healthy and symmetrical growth of new wood. Do not trim the central leader.
 - 1. Remove and replace excessively pruned or misformed stock resulting from improper pruning.
 - B. Weed Control: Applying pre-emergent herbicide at the rate specified by manufacturer.
 - C. Mulching: Mulch all trees, shrubs, bed areas, and planters to the depths specified.
 - D. Watering: Water all planted material thoroughly, immediately after planting.
 - E. Applying anti-desiccant: Use a power spray to provide an adequate film over trunks, branches, stems, twigs and foliage.
 - 1. If deciduous trees or shrubs are moved in full-leaf, spray with anti-desiccant at nursery before moving and again in 2 weeks after planting.
 - F. Guying, Staking, Wrapping: Trees shall be wrapped and staked immediately after planting. On B&B stock, do not drive stakes through ball.

- 2.6 CLEAN-UP AND PROTECTION
 - A. During landscape preparation, installation and maintenance, keep pavements debris free and work area in orderly condition. Remove all tags, labels, nursery stakes and ties from plants. Remove all excess soil, debris and surplus material attributed to landscape operations, and leave premises in neat, clean condition.
 - B. Protect landscape work and materials from damage due to landscape operations, operations by other installers and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.

- 2.7 MAINTENANCE OF PLANTS DURING THE 1 YEAR GUARANTEE PERIOD
 - A. Water, fertilize, weed, cultivate, prune, mulch, spray, trim, protect from wind, stake (or restake), reset, replace or do other procedures necessary to sustain all the plant materials in a healthy and thriving condition.
 - B. At the end of the first growing season, remove and properly dispose of all stakes from trees.

- 2.8 SUGGESTED GUARANTEE AND REPLACEMENT OF PLANT MATERIAL
 - A. All plants shall be guaranteed by the Installer for a period of one (1) year following installation. The Installer shall make a minimum monthly check of the project during this one year guarantee period and all dead plants or plants not in a vigorous, thriving condition shall be immediately replaced by this Installer at no expense to the Owner.
 - B. Should replacement fall due during a non-planting season the Installer may request the Owner's permission to defer the planting until the proper season. However, the installer will be required to immediately remove and dispose of the dead plants, including all roots. The hole shall be backfilled properly with topsoil to finish grade until proper planting season occurs.
 - C. Plants used for replacements shall be of the same kind and size originally specified, and they shall be planted, wrapped, mulched and guaranteed as originally specified. Only one replacement of each plant will be required except for losses of replacements due to failure to comply with specified requirements.

PART 3 STREET TREE RECOMMENDATIONS
 Other tree varieties may be added with the approval of the City Forester.

3.1 TREES LESS THAN 40' HEIGHT

Botanical Name	Common Name
Acer campestre 'Queen Elizabeth'	Queen Elizabeth Hedge Maple
Acer tataricum	Tatarian Maple
Acer truncatum 'Keithsform'	Norwegian Sunset Shantung Maple
Acer truncatum 'Warrenred'	Pacific Sunset Shantung Maple
Amelanchier x 'Cumulus'	Cumulus Serviceberry
Maackia amurensis	Amur Maackia
Prunus virginiana 'Canada Red'	Canada Red Common Chokeberry
Pyrus calleryana 'Aristocrat'	Aristocrat Callery Pear
Pyrus calleryana 'Whitehouse'	Whitehouse Callery Pear
Syringa reticulata 'Ivory Silk'	Ivory Silk Japanese Tree Lilac
Syringa reticulata 'Summer Snow'	Summer Snow Japanese Tree Lilac

3.2 TREES GREATER THAN 40' HEIGHT

Botanical Name	Common Name
<i>Acer x freemanii</i> 'Armstrong'	Armstrong Maple
<i>Acer x freemanii</i> 'Autumn Blaze'	Autumn Blaze Maple
<i>Acer x freemanii</i> 'Celebration'	Celebration Maple
<i>Acer nigrum</i> 'Green Column'	Green Column Black Maple
<i>Acer platanoides</i> 'Columnar'	Columnar Norway Maple
<i>Acer platanoides</i> 'Easy Street'	East Street Norway Maple
<i>Carpinus betulus</i> 'Fastigiata'	Upright European Hornbeam
<i>Celtis occidentalis</i> 'Prairie Pride'	Prairie Pride Hackberry
<i>Corylus columna</i>	Turkish Filbert
<i>Fraxinus americana</i> 'Skyline'	Skyline White Ash
<i>Fraxinus nigra</i> 'Fall Gold'	Fall Gold Black Ash
<i>Fraxinus pennsylvanica</i> 'Cimmaron'	Cimmaron Green Ash
<i>Fraxinus pennsylvanica</i> 'Patmore'	Patmore Green Ash
<i>Fraxinus pennsylvanica</i> 'Summit'	Summit Green Ash
<i>Fraxinus pennsylvanica</i> 'Urbanite'	Urbanite Green Ash
<i>Fraxinus quadrangulata</i>	Blue Ash
<i>Gleditsia triacanthos inermis</i> 'Halka'	Halka Honeylocust
<i>Gleditsia triacanthos inermis</i> 'Imperial'	Imperial Honeylocust
<i>Gleditsia triacanthos inermis</i> 'Skyline'	Skyline Honeylocust
<i>Tilia americana</i> 'Boulevard'	Boulevard American Linden
<i>Tilia cordata</i> 'Corinthian'	Corinthian Littleleaf Linden
<i>Tilia cordata</i> 'Glenleven'	Glenleven Littleleaf Linden
<i>Tilia cordata</i> 'Greenspire'	Greenspire Littleleaf Linden
<i>Ulmus parvifolia</i>	Chinese Elm