

Buckingham Township

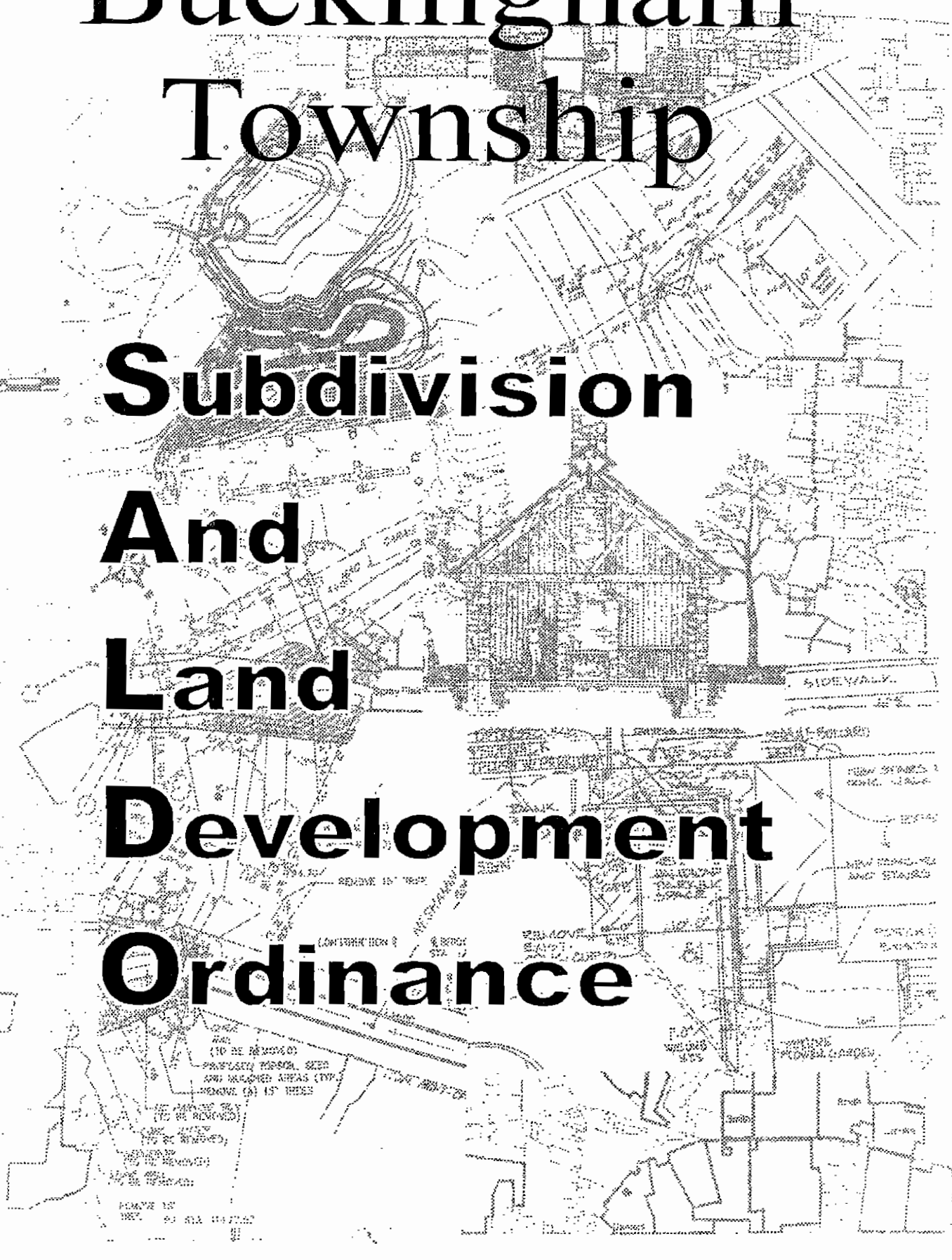
Subdivision

And

Land

Development

Ordinance



Buckingham Township
Bucks County, Pennsylvania

Subdivision and Land Development Ordinance

Enacted December 29, 2003

Incorporating Amendments Enacted To
October 14, 2009

Adopted by Ordinance 2009-04

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**ARTICLE 1
PURPOSES, SCOPE, PENALTIES, AND
PREVENTIVE REMEDIES**

1.1. TITLE

- A. An ordinance establishing rules and regulations governing the subdivision and development of land within the Township of Buckingham, Bucks County, Pennsylvania, pursuant to the authority set forth in the Pennsylvania Municipalities Planning Code, setting forth the procedure to be followed by the Planning Commission and the Board of Supervisors in applying these rules and regulations and providing penalties for the violation thereof.

1.2. PURPOSE

- A. These regulations are established to regulate and control the subdivision and development of land within Buckingham Township so as to provide sites suitable for human habitation, commercial and industrial operations, and other uses for which land may be developed, thereby creating conditions favorable to the health, safety, welfare of the community, and consistent with the goals of Buckingham Township.

1.3. SCOPE AND APPLICABILITY

- A. From and after the effective date of this ordinance, any subdivision or land development shall be in conformity with this Ordinance and all standards and specifications adopted as a part of such Ordinance.

1.4. INTERPRETATION

- A. The provisions of this ordinance shall be interpreted and applied as minimum requirements for the promotion of the public health, safety, comfort, convenience and general welfare. When provisions, standards, and specifications of this Ordinance impose greater restrictions than those of any state statute, other ordinance or regulation, this Ordinance shall be controlling unless specified to the contrary.
- B. Whenever the provisions of any other statute impose more restrictive standards than are required by any regulations of this Ordinance, the provisions of the more restrictive statute shall apply.
- C. This Ordinance does not repeal, abrogate, annul or any way impair or interfere with existing provisions or other laws or ordinances except those specifically or explicitly repealed by this Ordinance, or any restrictions placed upon property by covenant, deed or other private agreement.
- D. Wherever the provisions of this ordinance mirror language found in the MPC (Municipal Planning Code), upon the event of subsequent modifications to the MPC which do not explicitly overrule the provisions herein, then the provisions of the more restrictive statute/ordinance shall apply.

1.5. SUBDIVISION AND LAND DEVELOPMENT CONTROL

- A. It shall be unlawful for the owner or any other person, firm or corporation owning or controlling any land in the township, to subdivide any lot, tract, or parcel of land, or to lay out, construct, open or dedicate for public use or travel any street, sanitary or separate storm sewer system, drainage facility or other facility in connection therewith, for the common use of occupants of buildings located within the subdivision or land development, unless
1. Final plans of such subdivision or land development shall have been prepared in accordance with all licensing laws of the Commonwealth of Pennsylvania;
 2. Final plans of such subdivision or land development have been submitted to and approved in writing thereon by the Board of Supervisors;
 3. Final plans of such subdivision or land development have been reviewed and signed by the Bucks County Planning Commission;
 4. Final plans of such subdivision or land development have been recorded in the Bucks County Recorder of Deeds Office in Doylestown, Pennsylvania; and,
 5. The improvements required by the township in connection therewith have either been constructed or the township has been assured of proper completion by the deposit of funds or securities in escrow, sufficient to cover the cost of the required improvements, as determined by the methods set forth herein.

B. Sale of lots; and Issuance of building permits; Erection of buildings:

1. No lot in a subdivision may be sold nor any improvement constructed thereon, and no permit to erect, alter or repair any building upon land in a subdivision or land development may be issued unless and until the improvements required by the township in connection therewith have either been constructed or guaranteed as hereinafter provided; and the subdivision or land development plan has been approved by the Board of Supervisors and recorded in the Bucks County Recorder of Deeds Office.
2. No building in a subdivision or land development which depends upon the improvement of any street or streets herein provided for, for ingress and egress, shall be permitted to be occupied before improvements are substantially completed from an existing paved street to and across the front of the land on which the building is located, and/or to a sufficient depth along the side of the land to service any driveway, or parking spaces, or in the case of streets of insufficient width, until such widening of said street has been completed.
3. No building depending upon public water and sewer facilities shall be permitted to be occupied before such facilities are fully provided and operational.

1.6. FEES AND ESCROW DEPOSITS

- A. The Board of Supervisors shall adopt a schedule of fees and escrow deposits and a collection procedure for all applications and other matters pertaining to this Ordinance. The Board shall have the right to amend the fee and escrow deposits schedule by Resolution of the Board of Supervisors. The Applicant shall be required to pay all fees directly to any other reviewing agencies and separately from the fees paid to Buckingham Township. Plans shall not be released for recording until all fees and escrow deposits are paid and the Applicant has properly signed all plans and applications.

1.7. PENALTIES

- A. Civil Enforcement - Any person, partnership, or corporation who shall violate any of the provisions of this Ordinance shall, upon being found liable in a civil enforcement proceeding commenced by the township, pay a judgment of not more than \$500 plus all court costs, including reasonable attorney fees incurred by the township as a result thereof. No judgment shall commence or be imposed, levied or payable until the date of the determination of a violation by the district justice. If the defendant neither pays nor timely appeals the judgment, the township may enforce the judgment pursuant to the applicable rules of civil procedure. Each day that a violation continues shall constitute a separate violation unless the district justice determining that there has been a violation further determines that there was a good faith basis for the person, partnership or corporation violating the ordinance to have believed that there was no such violation, in which event there shall be deemed to have been only one such violation until the fifth day following the date of the determination of a violation by the district justice and thereafter each day that a violation continues shall constitute a separate violation. Note: See Section 515.3 of the Pennsylvania Municipalities Planning Code, 53 P.S. § 10515.3.
- B. Enforcement as a Summary Offense - Any person, partnership, or corporation who shall violate any of the provisions of this Ordinance shall be guilty of a summary offense, and upon conviction thereof, such person, or the members of such partnership, or the officers of such corporation, or the agent of any of them responsible for such violation, shall be sentenced to pay a fine of up to \$1,000.00 for each offense, or undergo imprisonment for up to thirty (30) days. Each day for which a person is found to be in violation of this Ordinance shall constitute a separate offense. Enforcement shall be by action brought before a district justice in the same manner provided for the enforcement of summary offenses under the Pennsylvania Rules of Criminal Procedure. The municipal solicitor may assume charge of the prosecution without the consent of the District Attorney as required under Pa.R.Crim.P. No. 83(c) (relating to trial in summary cases). All fines collected for violations shall be paid over to Buckingham Township.
- C. Enforcement provisions associated with MS-4 Compliance is addressed in Section 9.23.R of this ordinance

1.8. PREVENTIVE REMEDIES

- A. In addition to other remedies, the township may institute and maintain appropriate actions by law or in equity to restrain, correct or abate violations, to prevent unlawful construction, to recover damages and to prevent illegal occupancy of a building, structure or premises. The description by metes and bounds in the instrument of transfer or other documents used in the process of selling or transferring shall not exempt the seller or transferor from such penalties or from the remedies provided herein. Note: See Section 515.1 of the Pennsylvania Municipalities Planning Code, 53 P.S. § 10515.1.

- B. The township may refuse to issue any permit or grant any approval necessary to further improve or develop any real property which has been developed or which has resulted from a subdivision of real property in violation of an ordinance adopted pursuant to the Pennsylvania Municipalities Planning Code, Act 247, as amended. This authority to deny such a permit or approval shall apply to any of the following Applicants: (1) the owner of record at the time of such violation; (2) the vendee or lessee of the owner of record at the time of such violation without regard as to whether such vendee or lessee had actual or constructive knowledge of the violation; (3) the current owner of record who acquired the property subsequent to the time of violation without regard as to whether such current owner had actual or constructive knowledge of the violation; (4) the vendee or lessee of the current owner of record who acquired the property subsequent to the time of violation without regard as to whether such vendee or lessee had actual or constructive knowledge of the violation. As an additional condition for issuance of a permit or the granting of an approval to any such owner, current owner, vendee or lessee for the development of such real property, the township may require compliance with the conditions that would have been applicable to the property at the time that the Applicant acquired an interest in such real property. Note: See Section 515.1 of the Pennsylvania Municipalities Planning Code, 53 P.S. § 10515.1.

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ARTICLE 2 DEFINITIONS AND USAGE

2.1. WORD USAGE; TERMS NOT DEFINED

- A. Words and terms used in this ordinance shall be interpreted as follows:
1. Words used in present tense include the future.
 2. The singular includes the plural.
 3. The term "shall" is mandatory.
 4. The word "person" includes an individual, firm, corporation, partnership, company, association or government entity, including a trustee, a receiver, an assignee or a similar representative.
 5. The word "lot" includes the word "plot" or "parcel".
 6. The word "Commission" and the words "Planning Commission" always mean the Buckingham Township Planning Commission.
 7. The word "Supervisors" and the words "Board of Supervisors" or "Governing Body" always mean the Buckingham Township Board of Supervisors.
- B. Any word or term not defined herein shall be used with a meaning of standard usage.

2.2. DEFINITIONS

- A. For the purposes of this Ordinance, the following words or phrases shall have the meanings provided in the following definitions:
1. ACCELERATED EROSION - The removal of the surface of the land through the combined action of man's activity and the natural processes of a rate greater than would occur because of the natural process alone.
 2. AGENT- Any person other than the developer who, authorized by and acting for the subdivider or developer, submits to the township, subdivision or land development plans for the purpose of obtaining approval.
 3. AGRICULTURAL ACTIVITIES - The work of producing crops and raising livestock including tillage, plowing, disking, harrowing, pasturing and installation of conservation measures. Construction of new buildings or impervious area is not considered an agricultural activity.
 4. AGRICULTURAL PURPOSES - Those land uses which are devoted to the production of agricultural, horticultural, viticulture, dairy products, livestock and the products thereof, the products of poultry and bee raising, and any and all products raised or produced on farms intended for sale and human consumption.
 5. AGRICULTURAL SOILS - Soils with a Land Capability Classification of Class 1 or Class 2 or listed as Prime Farmland in the Official Soil Survey provided by the U.S. Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/>). In addition, soils identified in the Official Soil Survey with a Land Capability Classification of Class 3 or Class 4 or listed as Farmlands of Statewide Importance in the Official Soil Survey are also considered Agricultural Soils for the purposes of this Ordinance, unless otherwise specified.
 6. ALLEY - A right-of-way secondary service access to the side or rear of abutting properties.
 7. ALTERATION - As applied to land, a change in topography as a result of the moving of soil and rock from one location or position to another; also the changing of surface conditions by causing the surface to be more or less impervious; land disturbance.
 8. APPLICANT - A landowner or developer, as herein defined, who has filed an application for subdivision or land development, including heirs, successors, and assigns.
 9. ARCHITECT - A professional architect registered in the Commonwealth of Pennsylvania.
 10. AS-BUILT DRAWINGS - Engineering or site drawings maintained by the Applicant as he constructs the project and upon which he documents the actual locations of the building components and changes to the original contract documents. These documents, or a copy of same, are turned over to the Township at the completion of the project or at any other time specified by the Township.
 11. BANKFULL - The channel at the top-of-bank, or the point from where water begins to overflow onto a floodplain.

12. BASE FLOW – Portion of stream discharge derived from groundwater; the sustained discharge that does not result from direct runoff or from water diversions, reservoir releases, piped discharges, or other human activities.
13. BERM - An earth mound covered with grass, shrubbery or ground cover and which is intended to block views or create landscape interest or impound water.
14. BIKE/HIKE TRAIL - A recreational facility having a separate surface that is not contiguous with adjacent motor vehicle facilities.
15. BIORETENTION – A stormwater retention area that utilizes woody and herbaceous plants and soils to remove pollutants before infiltration occurs.
16. BMP (Best Management Practice) – Activities, facilities, designs, measures or procedures used to manage stormwater impacts from land development, to protect and maintain water quality and groundwater recharge and to otherwise meet the purposes of this Ordinance, including but not limited to infiltration trenches, seepage pits, filter strips, bioretention, wet ponds, permeable paving, rain gardens, grassed swales, forested buffers, sand filters and detention basins. See also Non-structural Best Management Practice (BMP).
17. BUFFER – Land area planted with trees, shrubs, groundcover, or a combination of landscape materials, used to separate a street from another land use or to separate one land use from another land use; or to shield or block lights, noise, or other nuisances. A buffer need not be adjacent to a street or to a property line but may be necessary anywhere on the land area if the provisions of this ordinance so require.
18. BUILDING - A structure under roof, used for the shelter or enclosure of persons, animals, or property. The word "building" shall include any part thereof.
19. BUILDING, ACCESSORY - A subordinate building located on the same lot as a principal building and clearly incidental and subordinate to the principal building. Any portion of a principal building devoted or intended to be devoted to an accessory use is not an accessory building.
20. BUILDING, PRINCIPAL - A building in which is conducted, or is intended to be conducted, the principal use of the lot on which it is located, and not an accessory building.
21. BUILDING AREA – The sum of the areas of the principal building, accessory buildings, decks and terraces, as defined by their aerial extent, exclusive of steps.
22. BUILDING/SETBACK LINES (BUILDING LINE)
 - a. Building Setback Line, Front - The rear line of the minimum front yard, as designated for each use and each district by the township zoning ordinance, measured at a distance equal to and no greater than the minimum front yard from the street line.
 - b. Building Setback Line, Side - A line parallel to the side lot line at a distance equal to the depth of the minimum side yard required.
 - c. Building Setback Line, Rear - A line parallel to the rear lot line at a distance from the rear lot line equal to the depth of the minimum rear yard required.
23. CALIPER (TREES) – The measurement of the diameter of a tree at a specific height.
24. CARTWAY (ROADWAY) - The portion of a street right-of-way, paved or unpaved, intended for vehicular use.
25. CATION EXCHANGE CAPACITY (CEC) - This is a measure of the soil's ability to adsorb exchangeable cations expressed in centimoles per kilogram (cmol/kg) of soil. Soils with high clay and organic material content normally have good CECs.
26. CENTERLINE OF STREET OR ROAD - A line midway between and parallel to the two street or road property lines, or as otherwise defined (plans, property corners, deeds, etc.).
27. CHANNEL - An open drainage feature through which stormwater flows. Channels include, but shall not be limited to, natural and man-made drainage ways, swales, streams, ditches, canals, and pipes flowing partly full.
28. CHANNEL EROSION - The widening, deepening, and headward cutting of small channels and waterways, caused by stormwater runoff or bankfull flows.
29. CISTERN - An underground reservoir or tank for storing rainwater.

30. CLEAR SIGHT TRIANGLE - An area of unobstructed vision at street intersections defined by lines of sight between points at a given distance from the intersection of the roadway lines.
31. CONSERVATION DISTRICT – The Bucks County Conservation District.
32. CROSSWALK - A pedestrian right-of-way which crosses a roadway.
33. CUL-DE-SAC - A street which intersects another street at one end and terminates at the other in a vehicular turnaround, including a loop street (P-road).
34. CULVERT - A structure with appurtenant works that carries a stream under or through an embankment or fill.
35. DAM - A man-made barrier, together with its appurtenant works, constructed for the purpose of impounding or storing water or another fluid or semifluid. A dam may include a refuse bank, fill or structure for highway, railroad or other purposes which impounds or may impound water or another fluid or semifluid.
36. DENSITY - The number of dwelling units per unit of area.
37. DESIGN BLOCK (DB) - A variable unit of measurement that defines residential lot sizes and placement for various housing types within a Living Community. They are a design tool and have no bearing or impact on the allowable density of a site. Site density is determined by the requirements of the district in which the Living Community is permitted.
38. DESIGN STANDARDS - Regulations imposing standards for the layout by which a subdivision or land development is developed.
39. DESIGN STORM - The magnitude and temporal distribution of precipitation from a storm event measured in probability of occurrence (e.g. a 5-year storm) and duration (e.g. 24-hours), used in the design and evaluation of stormwater management systems.
40. DESIGNEE - The agent of Buckingham Township involved with the administration, review, or enforcement of any provisions of this ordinance by contract or memorandum of understanding.
41. DESIGN PROFESSIONAL (QUALIFIED) – A Pennsylvania Registered Professional Engineer, Registered Landscape Architect or Registered Professional Land Surveyor trained to develop, among other things, stormwater management plans.
42. DESIGN STORM – The magnitude and temporal distribution of precipitation from a storm event measured in probability of occurrence (e.g., a 5-year storm) and duration (e.g., 24-hours), used in the design and evaluation of stormwater management systems.
43. DETENTION BASIN – An impoundment designed to collect and retard stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate. Detention basins are designed to drain completely soon after a rainfall event and become dry until the next rainfall event.
44. DETENTION DISTRICT – Those subareas of a watershed in which some type of detention is required to meet the Stormwater Management Plan requirements and the goals of Act 167.
45. DEVELOPER - Any landowner, agent of a landowner, or tenant with the permission of such landowner, who makes or causes to make a subdivision or a land development.
46. DEVELOPMENT - Any manmade change to improved or unimproved real estate, including but not limited to buildings or other structures, the placement of mobile homes, streets, public utilities and services, mining, dredging, filling, grading, excavation or drilling operations.
47. DIFFUSED DRAINAGE DISCHARGE – Drainage discharge that is not confined to a single point location or channel, including sheet flow or shallow concentrated flow.
48. DISCHARGE – 1. (verb) To release water from a project, site, aquifer, drainage basin or other point of interest (verb); 2. (noun) The rate and volume of flow of water such as in a stream, generally expressed in cubic feet per second. See also Peak Discharge.
49. DISCHARGE POINT – The point of discharge for a stormwater facility.
50. DISTURBED AREAS – Unstabilized land area where an earth disturbance activity is occurring or has occurred.
51. DITCH – A man-made waterway constructed for irrigation or stormwater conveyance purposes.
52. DOWNSLOPE PROPERTY LINE - That portion of the property line of the lot, tract, or parcels of land being developed located such that all overland or pipe flow from the site would be directed towards it by gravity.

53. DRAINAGE CONVEYANCE FACILITY - A stormwater management facility designed to transmit stormwater runoff, which shall include streams, channels, swales, pipes, conduits, culverts, separate storm sewer systems, etc.
54. DRAINAGE EASEMENT - A right granted by a landowner to a grantee, allowing the use of private land for stormwater management purposes.
55. DRAINAGE PERMIT - A permit issued by the Township after the drainage plan has been approved. Said permit is issued prior to or with the final township approval.
56. DRAINAGE PLAN - The documentation of the stormwater management system to be used for a given development site.
57. DRIVEWAY - A private way for the use of vehicles providing access between a public or private street and: (i) an interior area within a residential lot or property; or (ii) an interior area within an industrial or commercial lot or property containing less than eleven (11) parking places. The driveway turnaround area is considered to be part of the driveway.
58. DWELLING –
 - a. A residential building containing one or more dwelling units.
 - b. Dwelling Unit: Any room or group of rooms located within a residential building and forming a single, habitable unit with facilities used or intended to be used for living, sleeping, cooking, and eating by one family.
59. EARTH DISTURBANCE ACTIVITY – A construction or other human activity which disturbs the surface of land, including, but not limited to, clearing and grubbing, grading, excavations, embankments, land development, agricultural plowing or tilling, timber harvesting activities, road maintenance activities, mineral extraction, and the moving, depositing, stockpiling, or storing of soil, rock or earth materials.
60. EARTH/LAND DISTURBANCE - Any activity involving but not limited to construction, grading, grubbing, mining, tilling, timber harvesting, digging, or filling of ground or stripping of vegetation which alters, disturbs, and exposes the existing land surface or any other activity that causes an alteration to the natural condition of the land.
61. EASEMENT - A right-of-way granted, but not dedicated, for limited use of private land for a public or quasi-public purpose, and within which the owner of the property shall not erect any structures, but shall have the right to make any other use of the land which is not inconsistent with the rights of the grantee.
62. EMERGENCY SPILLWAY – A conveyance area that is used to pass peak discharge greater than the maximum design storm controlled by the stormwater facility.
63. ENCROACHMENT – A structure or activity that changes, expands or diminishes the course, current or cross section of a watercourse, floodway or body of water.
64. ENGINEER - A licensed professional civil engineer registered by the Commonwealth of Pennsylvania.
65. EROSION - The process by which the surface of land, including water/stream channels, is worn away by the action of wind, water, climate, or chemical action.
66. EROSION AND SEDIMENT POLLUTION CONTROL PLAN - A plan that is designed to minimize accelerated erosion and sedimentation. Said plan must be submitted to and approved by the Bucks County Conservation District before construction can begin.
67. EXCEPTIONAL VALUE WATERS – Surface waters of high quality which satisfy Pennsylvania Code Title 25 Environmental Protection, Chapter 93, Water Quality Standards, §93.4b(b) (relating to anti-degradation).
68. EXISTING (PRE-DEVELOPMENT) CONDITIONS - The initial condition of a project site prior to any construction or disturbance. If the initial condition of the site is undeveloped land, the land use shall be considered as “meadow” unless the natural land cover is proven to generate lower Curve Numbers “CN” or Rational “C” value, such as forested lands.
69. FLOOD - A temporary condition of partial or complete inundation of land areas from the overflow of streams, rivers, and other waters of this Commonwealth.

70. FLOOD PLAIN - Areas adjoining streams, ponds, or lakes subject to the 100-year recurrence interval flood. The areas considered to be Flood Plain within Buckingham Township shall include those areas identified as being subject to the 100-year flood in the Flood Insurance Study prepared for Buckingham Township by the Federal Emergency Management Agency (FEMA) dated September, 1978 and the accompanying maps dated March 15, 1979.(or more recent versions). For "critical facilities" the relevant flood plain is the 500 year flood plain; see Buckingham Township Zoning Ordinance Section 3102.Q.
71. FLOODWAY – The channel of a watercourse and those portions of the adjoining floodplains, which are reasonably required to carry and discharge the 100-year frequency flood. Unless otherwise specified, the boundary of the floodway is as indicated on maps and flood insurance studies provided by FEMA. In an area where no FEMA maps or studies have defined the boundary of the 100-year frequency floodway, it is assumed, absent evidence to the contrary, that the floodway extends from the stream to 50 feet from the top-of-bank.
72. FLUVIAL GEOMORPHOLOGY – The study of landforms associated with river channels and the processes that form them.
73. FOREST OR WOODLANDS - Forest or woodlands are areas of naturally occurring vegetation characterized by native trees whose crowns form a canopy, which occupies an area of not less than one-half acre, and contains some trees which are at least 20 feet in height or 3 inches diameter 14 inches above the ground. A forest or woodlands includes all the natural layers of vegetation beneath the canopy, all the diversity of organisms that inhabit it, both plant and animal, and the soil layers that develop beneath it. The following are not forests or woodlands: a field of nursery stock; plantations of non-native trees or of native species planted for commercial purposes. Both nurseries and plantations may become successional forests or woodlands in time, provided they meet the definition of forest or woodlands set forth herein.
74. FOREST MANAGEMENT/TIMBER OPERATIONS - Planning and activities necessary for the management of forest land. These include timber inventory and preparation of forest management plans, silvicultural treatment, cutting budgets, logging road design and construction, timber harvesting, and reforestation.
75. FREEBOARD - A vertical distance between the elevation of the design high-water and the top of a dam, levee, tank, basin, or diversion ridge. The space is required as a safety margin in a pond or basin.
76. GRADE - 1. (noun) A slope, usually of a road, channel or natural ground specified in percent of rise over run and shown on plans as specified herein. 2. (verb) To finish the surface of a roadbed, the top of an embankment, or the bottom of excavation.
77. GRASSED WATERWAY - A natural or constructed waterway, usually broad and shallow, covered with erosion-resistant grasses, used to convey surface water.
78. GROUNDWATER – Water beneath the earth's surface that supplies wells and springs, and is often between saturated soil and rock.
79. GROUNDWATER RECHARGE - The replenishment of existing natural underground water supplies from rain or overland flow.
80. HEC-HMS – The U.S. Army Corps of Engineers, Hydrologic Engineering Center (HEC) - Hydrologic Modeling System (HMS). This model was used to model the Neshaminy and Little Neshaminy Creeks watershed during the Act 167 Plan development and was the basis for the Standards and Criteria of this Ordinance.
81. HIGH QUALITY WATERS – Surface waters having quality which exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water by satisfying Pennsylvania Code Title 25 Environmental Protection, Chapter 93 Water Quality Standards, § 93.4b(a).
82. HOTSPOTS – Areas where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in stormwater. Typical pollutant loadings in stormwater may be found in Chapter 8 Section 6 of the Pennsylvania Stormwater Best Management Practices Manual, December 2006.
83. HYDROGRAPH – A graph representing the discharge of water versus time for a selected point in the drainage system.
84. HYDROLOGIC REGIME – The hydrologic cycle or balance that sustains quality and quantity of stormwater, base flow, storage, and groundwater supplies under natural conditions.

85. **HYDROLOGIC SOIL GROUP** – A classification of soils by the Natural Resources Conservation Service, formerly the Soil Conservation Service, into four runoff potential groups. The groups range from A soils, which are very permeable and produce little runoff, to D soils, which are not very permeable and produce much more runoff.
86. **IMPERVIOUS SURFACES** - Those surfaces that do not absorb water. All buildings, building area, parking areas, driveways, roads, sidewalks, wood decks and any areas in concrete, pervious or impervious pavement, paver blocks, asphalt and packed stone shall be considered impervious surfaces within this definition. The surface area of a swimming pool shall be considered pervious.
87. **IMPOUNDMENT** - A retention or detention basin designed to retain stormwater runoff and release it at a controlled rate.
88. **IMPROVEMENT** - A permanent addition to or betterment of real property that enhances its capital value and that involves the expenditure of labor or money and is designed to make the property more useful or valuable as distinguished from ordinary repairs.
89. **IMPROVEMENT SPECIFICATIONS** - Regulations adopted pursuant to this Ordinance imposing minimum standards for the construction of the required improvements such as curbs, sidewalks, sewers, water systems, drainage facilities, public utilities and services conveyed by wires, cable or pipe, parking areas, landscaping, and all other items required to render land suitable for the use proposed.
90. **INFILL** – Development that occurs on smaller parcels that remain undeveloped but are within or very close proximity to urban or densely developed areas. Infill development usually relies on existing infrastructure and does not require an extension of water, sewer or other public utilities.
91. **INFILTRATION** – Movement of surface water into the soil, where it is absorbed by plant roots, evaporated into the atmosphere, or percolated downward to recharge groundwater.
92. **INFILTRATION STRUCTURES** - A structure designed to direct runoff into the ground (c.g. French drains, seepage pits, and seepage trenches).
93. **INLET** - A surface connection to a closed drain. The upstream end of any structure through which water may flow.
94. **INTERMITTENT STREAM** – A stream that flows only part of the time. Flow generally occurs for several weeks or months in response to seasonal precipitation or groundwater discharge.
95. **IRON PIN** - A metal pipe of at least 5/8" diameter and at least 30" in length.
96. **LAND DEVELOPMENT** - Land development is defined as:
 - a. The improvement of one lot or two or more contiguous lots, tracts or parcels of land for any purpose involving:
 - i. A group of two (2) or more residential or nonresidential buildings, whether proposed initially or cumulatively, or a single nonresidential building on a lot or lots regardless of the number of occupants or tenure; or
 - ii. The division or allocation of land or space, whether initially or cumulatively, between or among two or more existing or prospective occupants by means of, or for the purpose of streets, common areas, leaseholds, condominiums, building groups or other features.
 - b. A subdivision of land.
97. **LANDSCAPE ARCHITECT** - A professional landscape architect registered by the Commonwealth of Pennsylvania
98. **LIMITING ZONE** – A soil horizon or condition in the soil profile or underlying strata that includes one of the following:
 - a. A seasonal high water table, whether perched or regional, determined by direct observation of the water table or indicated by soil mottling.
 - b. A rock with open joints, fracture or solution channels, or masses of loose rock fragments, including gravel, with insufficient fine soil to fill the voids between the fragments.
 - c. A rock formation, other stratum or soil condition that is so slowly permeable that it effectively limits downward passage of effluent.

99. LOOP STREET- A street which has one point of intersection road. A loop street enters a tract, follows a course through it and returns to itself before intersecting any other road. The area within the closed section of the "loop" shall contain a minimum of 1.8 Acres, except in the context of a Living Community.
100. LOT - A parcel of land, used or set aside and available for use as the site of one or more buildings and any buildings accessory thereto or for any other purpose, in one ownership and not divided by a street, nor including any land within the ultimate right-of-way of a public or private street upon which said lot abuts, even if the ownership to such right-of-way is in the owner of the lot. A lot for the purpose of this Ordinance may or may not coincide with a lot of record.
101. LOT, CORNER - A lot which has an interior angle of less than one hundred and thirty-five (135) degrees at the intersection of two (2) street lines. A lot abutting upon a curved street or streets shall be considered a corner lot if the tangent to the curve at the points beginning within the lot or at the points of intersection of the side lot lines with the street lines intersect at an angle of less than one hundred and thirty-five (135) degrees. A corner lot shall have two front yards, one on each of the two streets which it abuts, and shall have one rear yard and one side yard.
102. LOT, LANE - A lot that does not have the required minimum lot width at the minimum front yard line but has direct access to a street through a strip of land which is part of the same lot.
103. LOTS, THROUGH - A lot having frontage on two parallel or approximately parallel streets.
104. LOT AREA - The area contained within the property lines of the individual parcels of land shown on a subdivision plan or required by this Ordinance, excluding any area within the ultimate street right-of-way, and excluding any area required as open space under this Ordinance, and excluding the area of above-ground stormwater management facilities and any other areas as may be specifically excluded by the terms of this Ordinance or the Township Zoning Ordinance.
105. LOT DEPTH - The mean distance from the street line of the lot to its opposite rear line, measured in the general direction of the side lines of the lot.
106. LOT WIDTH - The distance measured between the side lot lines at the required front building setback line. In a case where there is only one side lot line, lot width shall be measured between such side lot line and the opposite rear lot line or street line.
107. LOT LINES
 - a. LOT LINES - Any boundary lines of a lot.
 - b. LOT LINE, FRONT - The dividing line between the street and the lot. The front lot line shall be the same as the ultimate right-of way line and is the same as the "street line."
 - c. LOT LINE, REAR - Any lot line that is parallel to or within forty-five (45) degrees of being parallel to a street line.
 - d. LOT LINE, SIDE - Any lot line which is not a street line or a rear lot line.
108. LOT LINE CHANGE - Any division of land for the adjustment or relocation of a boundary line(s) between two adjacent lots or the shifting of boundary lines.
109. LOW IMPACT DEVELOPMENT (LID) PRACTICES – Practices that will minimize proposed conditions runoff rates and volumes, which will minimize needs for artificial conveyance and storage facilities.
110. MAIN STEM (MAIN CHANNEL) – Any stream segment or other runoff conveyance used as a reach in the Neshaminy and Little Neshaminy Creeks hydrologic model.
111. MANNING EQUATION “n” (Manning formula) - A method for calculation of velocity of flow (e.g., feet per second) and flow rate (e.g., cubic feet per second) in open channels based upon channel shape, roughness, depth of flow and slope. “Open channels” may include closed conduits so long as the flow is not under pressure.
112. MONUMENT - A concrete monument with a flat top at least 4 inches square, containing a reference point, and at least 30" in length. The bottom sides shall be at least 2 inches greater than the top, to minimize movements caused by frost. The monument shall contain a metal rod.
113. NATURAL RECHARGE AREA – Undisturbed surface area or depression where stormwater collects, and a portion of which infiltrates and replenishes the groundwater.

114. NATURAL RESOURCES - For the purposes of this Ordinance, natural resources shall be considered those categories of resources protected by Article 31 of the Buckingham Township Zoning Ordinance.
115. NONPOINT SOURCE POLLUTION - Pollution that enters a watery body from diffuse origins in the watershed and does not result from discernible, confined, or discrete conveyances.
116. NON-STORMWATER DISCHARGES – Water flowing in stormwater collection facilities, such as pipes or swales, which is not the result of a rainfall event or snowmelt.
117. NONSTRUCTURAL BEST MANAGEMENT PRACTICE (BMPS) – Methods of controlling stormwater runoff quantity and quality, such as innovative site planning, the use of low impact development techniques, impervious area and grading reduction, protection of natural depression areas, temporary ponding on site and other techniques.
118. NPDES – National Pollutant Discharge Elimination System, the federal government’s system for issuance of permits under the Clean Water Act, which is delegated to DEP in Pennsylvania.
119. NRCS - Natural Resources Conservation Service (previously SCS).
120. OPEN CHANNEL - A drainage element in which stormwater flows with an open surface. Open channels include, but shall not be limited to, natural and man-made drainageways, swales, streams, ditches, canals, and pipes flowing partly full.
121. OPEN SPACE - Land used for recreation, farmland preservation, resource protection or scenic area. Open space areas must meet the requirements of the Township’s Ordinances in order to be deemed to be “Open Space”. Open space must be protected by the provisions of this Ordinance and the Zoning Ordinance to ensure that it remains protected from future development or disturbance.
122. OUTFALL POINT - where water flows from a conduit, stream, or drain.
123. OUTLET - Points of water disposal from a stream, river, lake, tidewater or artificial drain.
124. PARENT TRACT – The parcel of land from which a land development or subdivision originates, determined from the date of municipal adoption of this ordinance.
125. PARKING LOT STORAGE OF STORMWATER - Involves the use of impervious parking areas as temporary impoundments with controlled release rates during rainstorms.
126. PARKING SPACE - An area used for parking a vehicle(s).
127. PARKING SPACE ACCESS - The driveway or roadways and the maneuvering space required to service the parking space.
128. PEAK DISCHARGE RATE- The maximum rate of stormwater runoff from a specific storm event.
129. PEDESTRIAN WALKWAY - A path designated for pedestrians and separated from the cartway by space or other barrier.
130. PENN STATE RUNOFF MODEL – The computer-based hydrologic model developed at the Pennsylvania State University.
131. PERVIOUS SURFACE – A surface that allows the infiltration of water into the ground.
132. PIPE - A culvert, closed conduit, or similar structure (including appurtenances) that conveys stormwater.
133. PLAN, AS-BUILT - Drawings of all improvements constructed within any subdivision or land development, showing the precise locations and details of all such improvements required by this Ordinance or as required by the Board of Supervisors. Acceptable as-built plans shall be provided prior to dedication of improvements.
134. PLAN, FINAL - A complete and exact subdivision and/or land development plan, including all required supplemental data, to define property lines and proposed streets and other improvements.
135. PLAN, PRELIMINARY - A subdivision and/or land development plan (including all required supplementary data) showing the pertinent existing features of a tract and its surroundings and proposed street and lot layout as a basis for consideration prior to preparation of a final plan.
136. PLAN, PRE-SUBMISSION SKETCH - An informal plan, indicating existing features of a tract and its surroundings and the general layout of the proposed subdivision or land development, that is being-presented for discussion purposes only and not for approval.

137. PLAN, RECORD - An exact copy of the approved final plan on opaque linen, or other material acceptable to the Bucks County Recorder of Deeds, of standard size prepared for necessary signatures and recording with the Bucks County Recorder of Deeds.
138. PLAT - The map or plan of a subdivision or land development, whether preliminary or final.
139. POINT SOURCE - Any discernible, confined and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, or conduit from which stormwater is or may be discharged, as defined in State regulations at 25 Pa. Code § 92.1.
140. POST CONSTRUCTION - Period after construction during which disturbed areas are stabilized, stormwater controls are in place and functioning and all proposed improvements in the approved land development plan are completed.
141. PREDEVELOPMENT - Undeveloped/Natural Condition.
142. PRETREATMENT - Techniques employed in stormwater BMPs to provide storage or filtering to trap coarse materials and other pollutants before they enter the system, but not necessarily designed to meet the water quality volume requirements of this ordinance.
143. PROJECT SITE - The specific area of land where any Regulated Activities in the Municipality are planned, conducted or maintained.
144. RATIONAL FORMULA - A rainfall-runoff relation used to estimate peak flow.
145. RECHARGE - The replenishment of groundwater through the infiltration of rainfall, other surface waters, or land application of water or treated wastewater.
146. REDEVELOPMENT - Any development that requires demolition or removal of existing structures or impervious surfaces at a site and replacement with new impervious surfaces. Maintenance activities such as top-layer grinding and re-paving are not considered to be redevelopment. Interior remodeling projects and tenant improvements are also not considered to be redevelopment. Utility trenches in streets are not considered redevelopment unless more than 50 percent of the street width including shoulders is removed and re-paved.
147. REGULATED ACTIVITIES - Actions or proposed actions that have an impact on stormwater runoff and that are specified in this ordinance.
148. REGULATED EARTH DISTURBANCE ACTIVITY - Defined under NPDES Phase II regulations as Earth disturbance activity of one acre or more with a point source discharge to surface waters or the Municipality's storm sewer system, or five acres or more regardless of the planned runoff. This includes earth disturbance on any portion of, part, or during any stage of, a larger common plan of development.
149. RELEASE RATE - The percentage of predevelopment peak rate of runoff from a site or subarea to which the post development peak rate of runoff must be reduced to protect downstream areas.
150. REPAVING - Replacement of the impervious surface that does not involve reconstruction of an existing paved (impervious) surface.
151. REPLACEMENT PAVING - Reconstruction of and full replacement of an existing paved (impervious) surface.
152. RESERVE STRIP - A parcel of ground in separate ownership separating a street from other adjacent properties, or from another street.
153. RETENTION BASIN - A Stormwater Management Best Management Practice that includes a substantial permanent pool for water quality treatment and additional capacity above the permanent pool for temporary runoff storage. May also be referred to as a Wet Basin or Wet Pond.
154. RETURN PERIOD - The average interval, in years, within which a storm event of a given magnitude can be expected to recur. For example, the 25-year return period rainfall would be expected to recur on the average once every 25 years. The inverse of the return period gives the probability that that size storm will occur in any given year (i.e. the 25-year storm has a 1/25 or 4% chance of occurring in a given year).
155. REVERSE FRONTAGE LOT - A lot extending between and having frontage on a major street and a minor street with a vehicular access solely from the minor street. Does not apply to alleys or alleyways.
156. REVIEW - An examination of the Preliminary Plan and Final Plan by the Planning Commission and the Board of Supervisors to determine compliance with this Ordinance and the administrative regulations, design standards and improvement specifications enacted pursuant thereto.

157. RIGHT-OF-WAY

- a. RIGHT-OF-WAY - Land set aside for use as a street, alley, or other means of travel or for use by a utility.
 - b. EXISTING RIGHT-OF-WAY - The legal right-of-way as established by the Township or Commonwealth or other appropriate governing authority and currently in existence.
 - c. FUTURE RIGHT-OF-WAY/ULTIMATE RIGHT-OF-WAY - The right-of-way deemed necessary by Buckingham Township or by other governmental agencies with jurisdiction over roads within the Township to provide adequate width for future street improvements.
158. RISER - A vertical pipe extending from the bottom of a pond that is used to control the discharge rate from the pond for a specified design storm.
159. ROAD MAINTENANCE – Earth disturbance activities within the existing road cross-section, such as grading and repairing existing unpaved road surfaces, cutting road banks, cleaning or clearing drainage ditches and other similar activities.
160. ROOF DRAINS – A drainage conduit or pipe that collects water runoff from a roof and leads it away from the structure.
161. ROOFTOP DETENTION - Temporary ponding and gradual release of stormwater falling directly onto flat roof surfaces by incorporating controlled-flow roof drains into building designs.
162. RUNOFF - The surface water discharge or rate of discharge of a given watershed after a fall of rain or snow that does not enter the soil but runs off the surface of the land.
163. SEASONAL HIGH WATER TABLE - A body of water that is formed during wet portions of the year, and is separated from the deeper groundwater by a zone that is not saturated.
164. SEDIMENT BASIN A barrier, dam, or retention or detention basin located and designed to retain rock, sand, gravel, silt, or other material transported by water during construction.
165. SEDIMENT POLLUTION - The placement, discharge or any other introduction of sediment into the WATERS OF THE COMMONWEALTH/WATERS OF THE US occurring from the failure to design, construct, implement or maintain control measures and control facilities in accordance with the requirements of this ordinance.
166. SEDIMENTATION - The process by which mineral or organic matter is accumulated or deposited by moving wind, water or gravity. Once this matter is deposited (or remains suspended in water), it is usually referred to as sediment.
167. SEEPAGE PIT/SEEPAGE TRENCH - An area of excavated earth filled with loose stone or similar coarse material, into which surface water is directed for infiltration into the underground water.
168. SEPARATE STORM SEWER SYSTEM – A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains) primarily used for collecting and conveying stormwater runoff.
169. SETBACK (SEE BUILDING SETBACK LINES)
170. SHALLOW CONCENTRATED FLOW – Stormwater runoff flowing in shallow, defined ruts prior to entering a defined channel or waterway.
171. SHEET FLOW – A flow process associated with broad, shallow water movement on sloping ground surfaces that is not channelized or concentrated.
172. SIGHT DISTANCE - The required length of roadway visible to the driver of a passenger vehicle at any given point on the roadway when the view is unobstructed by traffic. Sight distance measurement shall be made from a point 3.5 feet above the centerline of the road surface to a point 3.5 feet above the centerline of road surface.
173. SITE OR TRACT - An area having specific boundaries and encompassing an existing or proposed land development, subdivision, building, or structure.

174. SITE OR TRACT AREA - All land area within the site as determined by an actual site survey.
175. SITE AREA, BASE – The site area minus existing roads, rights-of-way and easements, and land shown on previous subdivisions or land development plans as being restricted from development. See Article 31 of the Township Zoning Ordinance for the specific calculations.
176. SITE AREA, NET BUILDABLE - The portion of the base site area which is unaffected by those resource restrictions requiring 100 percent protection under the terms of this Ordinance. See Article 31 of the Township Zoning Ordinance for the specific calculations.
177. SOIL-COVER COMPLEX METHOD - A method of runoff computation developed by the NRCS that is based on relating soil type and land use/cover to a runoff parameter called Curve Number (CN).
178. SOIL GROUP, HYDROLOGIC - A classification of soils by the Soil Conservation Service into four runoff potential groups. The groups range from A soils, which are very permeable and produce little runoff, to D soils, which are not very permeable and produce a greater amount of runoff.
179. SOIL PERCOLATION TEST - A field test conducted by a person qualified according to the rules and regulations of the Bucks County Department of Health to determine the suitability of the soil for on-site sanitary sewage disposal facilities by measuring the absorptive capacity of the soil at any given location and depth.
180. SOILS ON THE FLOODPLAIN – Areas subject to periodic flooding or listed in the Official Soil Survey provided by the U.S. Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/>), as soils having a flood frequency other than none.
181. SOLAR ENERGY: Radiant energy (direct, diffuse, and reflected) received from the sun.
182. SOURCE WATER PROTECTION AREAS (SWPA) – The zone through which contaminants, if present, are likely to migrate and reach a drinking water well or surface water intake.
183. SPECIAL PROTECTION SUBWATERSHEDS – Watersheds that have been designated in Pennsylvania Code Title 25 Environmental Protection, Chapter 93 Water Quality Standards as exceptional value (EV) or high quality (HQ) waters.
184. SPILLWAY - A depression in the embankment of a pond or basin which is used to pass peak discharge greater than the maximum design storm controlled by the pond.
185. STATE WATER QUALITY REQUIREMENTS – The regulatory requirements to protect, maintain, reclaim, and restore water quality under Pennsylvania Code Title 25 and the Clean Streams Law. As defined under state regulations—protection of designated and existing uses (See 25 Pa. Code Chapters 93 and 96)—including:
 - a. Each stream segment in Pennsylvania has a “designated use,” such as “cold water fishery” or “potable water supply,” which are listed in Chapter 93. These uses must be protected and maintained, under state regulations.
 - b. “Existing uses” are those attained as of November 1975, regardless whether they have been designated in Chapter 93. Regulated Earth Disturbance activities must be designed to protect and maintain existing uses and maintain the level of water quality necessary to protect those uses in all streams, and to protect and maintain water quality in special protection streams.
 - c. Water quality involves the chemical, biological and physical characteristics of surface water bodies. After Regulated Earth Disturbance activities are complete, these characteristics can be impacted by addition of pollutants such as sediment, and changes in habitat through increased flow volumes and/or rates as a result of changes in land surface area from those activities. Therefore, permanent discharges to surface waters must be managed to protect the stream bank, streambed and structural integrity of the waterway, to prevent these impacts.
186. STEEP SLOPES - Areas where the average slope is equal to or exceeds eight (8) percent which, because of this slope, are subject to high rates of stormwater run-off, erosion, and flooding.
187. STORAGE INDICATION (MODIFIED PULS) METHOD - A reservoir routing procedure based on solution of the continuity equation (inflow minus outflow equals the change in storage) with outflow defined as a function of storage volume and depth.
188. STORM FREQUENCY - The number of times that a given storm “event” occurs or is exceeded on the average in a stated period of years. See “Return Period.”

189. **STORMWATER** - The surface runoff generated by precipitation reaching the ground surface.
190. **STORMWATER MANAGEMENT DISTRICTS** – The sub-drainage areas that comprise the watersheds of the Neshaminy Creek, the Little Neshaminy Creek, and the Delaware River South. See Stormwater District Map included in the appendix.
191. **STORMWATER MANAGEMENT FACILITY** - Any structure, natural or man-made, that, due to its condition, design, or construction, conveys, stores, or otherwise affects stormwater runoff. Typical stormwater management facilities include, but are not limited to, detention and retention basins, open channels, storm sewers, pipes, and infiltration structures.
192. **STORMWATER MANAGEMENT SITE PLAN** - The plan prepared by the Applicant or his representative indicating how stormwater runoff will be managed at the particular site of interest according to this ordinance.
193. **STREAM** - Any jurisdictional stream or watercourse that has regulated activities imposed upon it by governing agencies including the Army Corps of Engineers and Pennsylvania Department of Environmental Protection.
194. **STREAM BUFFER** – The land area adjacent to each side of a stream, essential to maintaining water quality.
195. **STREAM ENCLOSURE** - A bridge, culvert or other structure in excess of 100 feet in length upstream to downstream which encloses a regulated water of this commonwealth.
196. **STREET/ROAD** - A public or private way used or intended to be used for passage or travel by motor vehicles, or to provide access to abutting properties.
- a. **Arterial Highways:** Designed for large volumes of thru-traffic with controlled access to abutting properties.
 - b. **Collector Roads:**
 - i. **Major Collector** - Designed to provide the link between arterial highways and local neighborhood streets. Major collectors are designed to carry moderate volumes of traffic at uninterrupted flow.
 - ii. **Minor Collector** - Designed to provide similar function as major collectors. Minor collectors provide the link between major collectors and local streets, residential neighborhoods and nonresidential areas.
 - c. **Road** – Designed to provide similar function as minor collectors. Roads provide the link between minor collectors and local streets, residential neighborhoods and nonresidential areas.
 - d. **Street - Residential, Industrial, Institutional and Commercial.** Designed to provide access to residential developments (single family and multi-family), industrial parks, institutional facilities and shopping centers, whether or not intended for dedication to the Township. Main Streets and Lanes, as provided in Living Community type developments, are included in this classification.
 - e. **Alley** – Designed to provide access to the rear of residential units as a secondary means of access.
 - f. **Scenic Road** - Such roads as shall be so designated and approved by resolution of the Board of Supervisors.
197. **STREET LINE** - The dividing line between the street and the lot. The street line shall be the same as the legal right-of-way provided that where a future right-of-way width for a road or street has been established, then that width shall determine the location of the street line.
198. **STRUCTURE** - A combination of materials assembled, constructed or erected at a fixed location, including a building or a manufactured home, the use of which requires location on the ground or attachment to something having location on the ground. Any manmade object having an ascertainable stationary location on or in land or water, whether or not affixed to the land.
199. **SUBAREA** - The smallest drainage unit of a watershed for which stormwater management criteria have been established in the stormwater management plan.

200. **SUBDIVISION** - The division or redivision of a lot, tract or parcel of land by any means into two or more lots, tracts, parcels, or other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, of lease, transfer of ownership or building or lot development. The subdivision by lease of land for agricultural purposes into parcels of more than 10 acres, not involving any new street or easement of access, shall not constitute a subdivision.
- a. **MAJOR SUBDIVISION:** The division of a lot, tract or parcel of land or part thereof into more than two lots, tracts or parcels of land.
 - b. **MINOR SUBDIVISION:** The division of a single lot, tract, or parcel of land into two (2) lots, tracts, or parcels of land provided that there is no new street(s) created.
201. **SURFACE WATERS OF THE COMMONWEALTH** – Any and all rivers, streams, creeks, rivulets, ditches, watercourses, separate storm sewer systems, lakes, dammed water, wetlands, ponds, springs, and all other bodies or channels of conveyance of surface waters, or parts thereof, whether natural or artificial, within or on the boundaries of the Commonwealth.
202. **SURVEYOR** - A professional land surveyor registered by the Commonwealth of Pennsylvania.
203. **SWALE** - A low-lying stretch of land which gathers and/or carries surface water runoff.
204. **TIMBER OPERATIONS** - See Forest Management.
205. **TIME OF CONCENTRATION (TC)** - The time for surface runoff to travel from the hydraulically most distant point of the watershed to a point of interest within the watershed. This time is the combined total of overland flow time and flow time in pipes or channels, if any.
206. **TOP-OF-BANK** – Highest point of elevation in a stream channel cross-section at which a rising water level just begins to flow out of the channel and over the floodplain.
207. **TOWNSHIP ENGINEER** - A professional engineer registered by the Commonwealth of Pennsylvania designated by the Supervisors to perform the duties of a Township Engineer.
208. **TREE LAWN** – The area between the curb line and right of way line of a street. An area for placement of sidewalk/bike paths and trees.
209. **VERNAL POND** – Seasonal depressional wetlands that are covered by shallow water for variable periods from winter to spring, but may be completely dry for most of the summer and fall.
210. **WASTEWATER**
- a. **Wastewater** – Spent or used water with dissolved or suspended solids, discharged from homes, commercial establishments, institutions and industries.
 - b. **Public Wastewater System** – Any municipally or privately owned wastewater system in which wastewater is collected from buildings from more than one lot and/or dwelling unit and piped to an approved wastewater treatment and disposal system. It may also be referred to as “off-lot” or “off-site” sewer. This shall include capped sewers when installed to Township Specifications.
 - c. **On-lot wastewater disposal system:** A system of piping, tanks or other facilities serving a single lot and collecting and disposing of the wastewater in whole or in part to the soils or into the Waters of the Commonwealth .
 - d. **Wastewater Facilities Plan** – The Buckingham Township plan for wastewater facilities prepared for under Act 537 of 1972 as amended and approved by the Pennsylvania Department of Environmental Protection. This plan is typically amend for new subdivisions and land developments as provided for under 25 PA. Code Chapter 71, §71.52 and §71.53. The latest revision of the plan shall apply.
211. **WATERCOURSE** - Any channel for conveyance of surface water having a defined bed and banks, whether natural or artificial with perennial or intermittent flow.
212. **WATER SYSTEM, ON-SITE** - A system for supplying and distributing water to a single dwelling or other building from a source located on the same lot.
213. **WATER SYSTEM, COMMUNITY** - A system for supplying and distributing water from a common source to two or more dwellings and/or buildings within a single neighborhood.
214. **WATER SYSTEM, PUBLIC** - A system for supplying and distributing potable water to two (2) or more dwellings and/or buildings, owned and operated by Buckingham Township or identified as being offered for dedicated to Buckingham Township.

215. WATERS OF THE COMMONWEALTH/WATERS OF THE US - Any and all rivers, streams, creeks, rivulets, impoundments, ditches, water courses, stormwater management facilities, lakes, dammed water, ponds, springs, and all other bodies or channels of conveyance of surface and underground water, or parts thereof, whether natural or artificial, within or on the boundaries of the Commonwealth of Pennsylvania.
216. WATERSHED – Region or area drained by a river, watercourse, or other body of water, whether natural or artificial.
217. WELLHEAD – 1. A structure built over a well, 2. The source of water for a well.
218. WELLHEAD PROTECTION AREA – The surface and subsurface area surrounding a water supply well, well field, or spring supplying a public water system, through which contaminants are reasonably likely to move toward and reach the water source.
219. WET BASIN – Pond for urban runoff management that is designed to detain urban runoff and always contains water.
220. WETLANDS - Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs and similar areas. A wetland is an ecosystem that depends on constant or recurrent, shallow inundation or saturation at or near the surface of the substrate. The minimum essential characteristics of a wetland are recurrent, sustained inundation or saturation at or near the surface and the presence of physical, chemical, and biological features reflective of recurrent, sustained inundation or saturation. Common diagnostic features of wetlands are hydrology, hydric soils and hydrophytic vegetation. Any area containing all three elements shall be defined as wetlands as shall any area that meets the definition of a wetland in either 1) The United States Army Corps of Engineers Technical Report Y87-1, Corps of Engineers Wetlands Delineation Manual; or 2) The United States Environmental Protection Agency Wetlands Identification Delineation Manual, Volume I, Rational, Wetland Parameters, and Overview of Jurisdictional Approach, Volume II, Field Methodology, as most recently updated or modified; or 3) The Pennsylvania Department of Environmental Protection Wetlands Identification and Delineation, Chapter 105 Dam Safety and Waterways Management Rules and Regulations, as most recently updated or modified. Where a difference between the foregoing criteria exists, the most restrictive criteria will be used in any particular case. For the purposes of this definition and for its application to this Ordinance most restrictive criteria shall mean the criteria which effects preservation of the most extensive area of Wetlands.
221. WETLAND FUNCTIONS - Include, but are not limited to, the following:
- a. Serving natural biological functions, including food chain production; general habitat; and nesting, spawning, rearing and resting sites for aquatic or land species.
 - b. Providing areas for study of the environment or as sanctuaries or refuges.
 - c. Maintaining natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, natural water filtration processes, current patterns or other environmental characteristics.
 - d. Shielding other areas from wave action, erosion or storm damage.
 - e. Serving as a storage area for storm and flood waters.
 - f. Providing a groundwater discharge area that maintains minimum baseflows.
 - g. Serving as a prime natural recharge area where surface water and groundwater are directly interconnected.
 - h. Preventing pollution.
 - i. Providing recreation.
222. YARDS
- a. YARD - A space open to the sky on the same lot with a building, use or structure which is unoccupied except for accessory structures or uses to the extent specifically permitted by this ordinance. The size of a required yard shall be measured as the shortest distance between the structure and a lot line or street line.
 - b. YARD, FRONT - A yard between the front building line and a street line and extending the entire length of the street line. In the case of a corner lot, the yards extending along all streets are front yards. In the case of a lot other than a corner lot that fronts on more than one street, the yards extending along all streets are front yards.

- c. YARD, REAR - A yard between the rear building line and a rear lot line and extending the entire length of the rear lot line.
 - d. YARD, SIDE - A yard between the side building line and a side lot line, extending from the front yard to the rear yard. In the case of a lot having no street frontage or a lot of odd shape, any yard that is not a front yard or a rear yard shall be considered a side yard.
- B. CARBONATE (LIMESTONE) GEOLOGY – For the purposes of this Ordinance, as it relates to Carbonate Limestone Geology, the following words or phrases shall have the meanings given in the following definitions:
1. AGRICULTURAL PURSUITS: Activities including but not limited to the use of the land for farming, tilling, and cultivation; horticulture; floriculture, viticulture; forestry; excavation for farm buildings; ponds, etc. and animal husbandry, AND which individually or in combination equals or exceeds a total of a minimum of ten (10) acres in area on any one parcel; AND that the land on which the activity is to occur will be altered or changed to a degree which may influence or change the natural recharge potential to alter or influence the quality of groundwater reserves.
 2. AQUIFER: Any water-bearing soil or rock formation that is capable of yielding quantities of groundwater suitable as a potable water supply.
 3. CAVERNS: A subterranean cavity or cave produced by dissolution of limestone or dolomite.
 4. CLOSED DEPRESSION: Remnants of sinkholes that have partially filled with soil by erosion and settlement of the sinkhole walls. Generally, they are found as shallow, dish-shaped depressions on the land surface in areas of carbonate geologic formations.
 5. DISAPPEARING STREAMS: Streams that empty completely into a sinkhole or cavern.
 6. ENVIRONMENTAL ASSESSMENT REPORT: Shall consist of the information required on a report to assess the impact of the development on the environment.
 7. FAULT: The surface of rock rupture along which there has been differential movement of the rock on either side.
 8. FISSURE: A fracture or crack in rock along which there is a distinct separation.
 9. FRACTURE TRACES: Linear topographic depressions or lines of depression less than one mile in length revealing faults, joints, or fissures in the bedrock. These linear features are characterized by increased permeability, along which the solution of carbonate rocks is intensified and hence along which groundwater movement is concentrated. See lineaments.
 10. GEOTECHNICAL CONSULTANT: A registered Professional Geologist who renders technical advice in the disciplines of Geology, Hydrogeology, Water Resources Management and any other recognized groundwater resources planning and management fields. The technical competence of the individual or firm shall be demonstrated through educational accomplishments, applicable experience, or accreditation from a National Organization in the related discipline.
 11. GHOST LAKES: Small bodies of water which occur in and occasionally around closed depressions or sinkholes after periods of heavy precipitation. They may form from slow permeability of soils, rise in groundwater table, or from the creation of a natural liner of impermeable or slowly permeable clays or soils in the depression.
 12. GROUNDWATER: Water contained in a subsurface, water-saturated layer of soil or rock.
 13. HAZARDOUS MATERIAL: product or waste, or combination of substances that because of the quantity, concentration, physical, chemical or infectious characteristics, if not properly treated, stored, transported, used or disposed of, or otherwise managed would create a potential threat to the groundwater resources of the area through direct or indirect introduction into the subsurface environment that includes the soil and all subsequent materials located below.
 14. HYDROGEOLOGIST: A registered Professional Geologist or geotechnical consultant with documented educational accomplishments and supportive experience to provide technical expertise in the area of groundwater resources planning.
 15. JOINT: A large and relatively planar fracture in a rock across which there is no relative displacement of the two sides.

16. **LIMESTONE (CARBONATE) GEOLOGY:** The carbonate geologic formations consisting of both limestone and dolomite bedrock. The specific carbonate geologic formations within Buckingham consist of the Allentown Dolomite, Beekmantown Group and Leithsville Formations as identified in Conservation and Management Practices - for Buckingham and Durham Carbonate Valleys, February 1985 prepared by the Bucks County Planning Commission and International Exploration, Inc. (Intex).
17. **LINEAMENTS:** Linear topographic depressions or lines of depression longer than one mile in length revealing faults, joints or fissures in the bedrock. These linear features are characterized by increased permeability, along which the solution of carbonate rock is intensified and hence along which groundwater movement is concentrated. See fracture traces.
18. **PINNACLES:** Tall, slender spires of carbonate bedrock. Pinnacles are formed from the chemical dissolution of carbonate rocks along planes of weakness (joints, fractures).
19. **SURFACE PINNACLES -** Formations that protrude above the natural grade.
20. **SUBSURFACE PINNACLES -** Formations that exist below the surface of the ground.
21. **PROHIBITED USE:** Any activity/land use identified in the Table of Prohibited Uses.
22. **SECONDARY CONTAINMENT STRUCTURES/DEVICES:** Structures and devices including but not limited to such things as floor drains, double tank enclosures, impervious pads and pavements, collection barrels, building enclosures, self-contained drainage systems, detention basins, filters, separators or other devices, or other Best Management Practices.
23. **SINKHOLES:** Funnel shaped or steep sided depressions in the land surface that are caused by the dissolution and collapse or subsidence of the roofs of subterranean caverns in carbonate geologic foundations.
24. **SOLUTION CHANNELS:** Solution-widened joints or fractures occurring in carbonate bedrock. They can vary from less than one inch to several feet in width and often form a network of channels through the carbonate bedrock.
25. **STRATUM:** A single sedimentary bed or layer of a formation that consists of approximately the same kind of rock material.
26. **STRIKE OF BEDROCK:** The direction or bearing of a surface or subsurface stratum of the inclined bedrock in relation to the horizontal surface. The strike is perpendicular to the dip or slope of the stratum.
27. **WELLFIELD IMPACT ASSESSMENT:** A detailed technical report prepared by a professional hydrogeologist or other qualified professional, which will provide technical evidence that the land use activities proposed on a particular site will not adversely affect the quality of groundwater on-site or off-site.

**ARTICLE 3
GENERAL PROCEDURES AND REQUIRED
SITE ANALYSIS**

3.1. REVIEW AND APPROVAL STAGES

- A. Two stages are included in the procedure for approval of subdivision and land development plans: Preliminary and Final. The table below indicates the types of plan submissions.

Table 3-1 : Plan Submission Schedule

TYPES OF SUBMISSION	PLAN APPROVAL		
	Pre-Submission Sketch	Preliminary	Final
Land Development	Recommended	Required	Required
Lot Line Change	Optional	Not Required	Required
Minor Subdivision	Optional	Not Required	Required
Major Subdivision	Recommended	Required	Required

- B. The presentation of a preliminary plan and a final plan shall be considered separate submissions and the maximum review period shall be required for each such submission.
- C. The Board of Supervisors may, in their sole discretion, grant a waiver from the Land Development requirements for the uses listed below provided that all the conditions for the uses or activities proposed have been met and stormwater management has been provided for those structures which exceed 500 square feet (gross floor area) as demonstrated by a written report submitted to the Township complete with all relevant information:
1. The addition or construction of accessory farm buildings;
 2. The addition of a nonresidential accessory building of 500 square feet or less in gross floor area to be used for storage or other purposes incidental and subordinate to the principal use, provided that there is no increase in impervious surface on the lot and the Applicant can prove that the required parking (per Zoning Ordinance) is provided;
 3. An addition to an existing nonresidential building which addition is 500 square feet or less in gross floor area to be used for storage or other purposes incidental and subordinate to the principal use, provided that there is no increase in impervious surface on the lot and the Applicant can prove that the required parking (per Zoning Ordinance) is provided.
- D. Any renderings, photographs or drawings that are to be presented at a public meeting shall be submitted in PDF format on CD or DVD (at native scale) at least 5 days in advance of the meeting date.
- E. Refiling Plans - Any plan which meets any one of the criteria below shall be considered to be a new plan and shall be accompanied by an application, fees and all required information. The maximum review period shall be required for each such plan.
1. A plan, which is submitted after a previous plan for the same property has been withdrawn, shall constitute a new plan.
 2. A plan, which is submitted after a plan for the same property has been approved or rejected, shall constitute a new plan.
 3. A plan, which is submitted demonstrating an entirely new planning concept covering the same land that was included in a prior plan, shall constitute a new plan.
 4. A plan that revises road configuration, number or size of lots, shall constitute a new plan.
- F. All Subdivisions and Land Developments (both minor and major) shall be required to submit the appropriate Planning Module (as defined in Section 5.2.M.1 of this Ordinance) for Land Development to Buckingham Township at preliminary plan submission (final for minor residential subdivisions) for review. These modules will then be reviewed by DEP, and/or Bucks County Department of Health to verify the approvability of each lot for permitting by the appropriate agency (DEP and/or Bucks County Department of Health). The Sewage Enforcement Officer's review of the Applicant's Planning Module for Land Development for determining the adequacy of the project for sewage facilities must be received by the Township prior to preliminary (final for minor residential subdivisions) plan approval. The Applicant shall follow procedures and guidelines set forth in the Buckingham Township Wastewater Facilities Plan (last amended) in planning the lot layout, design of sewage facilities and in preparation of the Planning Modules for Land Development.

- G. Any plan that proposes the subdivision of a lot, tract or parcel of land for which a plan of subdivision has been submitted within sixty (60) months prior to submission of the new plan shall be deemed to include the prior subdivision. All subdivision plans shall include a note specifying that plans for the subject lot, tract or parcel of land submitted within sixty (60) months shall be considered to be inclusive as though the plans were submitted as one plan. Such note shall be acceptable to the Township.

3.2. PHASED PLANS

- A. Where a tract is to be developed in phases, a complete preliminary plan for the entire tract shall be submitted initially.
- B. Preliminary approval for the subdivision or land development must be obtained for the entire development. Final approval may be obtained phase by phase.
- C. The extent of each phase for which a separate final plan is to be submitted shall be shown and a time schedule presented for the submission of the final plan for those phases. The order of development shown on the preliminary plan must be adhered to; and if changes are required, plans must be refiled and reviewed and approved.
- D. Each phase of a development must be designed so that it could be developed independently and stand on its own meeting all applicable Township ordinances without other phases, including the street system, public utilities and services, easements, provision of required open land, and protection of all natural resources.

3.3. SITE ANALYSIS AND RESOURCE CONSERVATION PLAN REQUIRED

A. Applicability

1. Pre-submission sketch plans for land developments and major subdivisions, preliminary and final plans will not be accepted by the Township if they do not include the Site Analysis and Resource Conservation Plan.

B. Review by the Township

1. The first item to be discussed with all reviewing boards and commissions shall be the Site Analysis and Resource Conservation Plan. No discussion of the proposed subdivision or land development shall occur until the Applicant has provided a satisfactory analysis of the site and plan to protect resources. The purpose of the Site Analysis and Resource Conservation Plans is to ensure that all development in Buckingham Township occurs in a manner that respects the natural environment and that the Applicant and the township have a solid understanding of the natural conditions of any proposed development site, as well as conditions around the site which provide the context for the proposed development.

C. Required Contents of Site Analysis Plan

1. Site boundaries

2. Existing Resources Inventory - A comprehensive analysis of existing conditions on the proposed development site and areas within the site and within 500 feet for Major Subdivisions and Land Developments; 200 feet Minor Subdivisions; and 110 feet Lot Line Change applications, showing:

a. Topography - contours at 2-foot intervals and slopes of 8-15 percent, 15-25 percent, over 25 percent

b. Ridge lines and watershed boundaries

c. Floodplains

d. Wetlands

e. Waters of the Commonwealth/Waters of the US

f. Ponds, streams, and all natural drainage areas - explanation of how site drainage works

g. Vegetative cover - types and conditions

h. Existing land uses

i. Soils - including

- i. A description of the proposed wastewater treatment and disposal system. The site plan shall include soil suitability for land based wastewater disposal for all systems.

ii. Site geology and a description of the groundwater availability on site.

iii. alluvial soils

- iv. soils with seasonal high water table
 - v. hydric soils
 - vi. Class I - IV agricultural soils
 - j. Geological formations
 - k. Historic buildings or resources
 - l. All recorded easements
 - m. Existing buildings, structures, and roads
 - n. Photographs of the site including views of the proposed development site from all abutting public roads.
 - o. Any Pennsylvania Natural Diversity Inventory Sites
 - p. Reference to any areas or properties designated as preservation areas by the Buckingham Township Open Space Plan
 - q. Orientation of site to sun for use of solar resources
 - r. Renderings of proposed buildings and photographs of similar construction.
3. Analysis of how resources will be protected. Narrative shall be provided indicating the ways in which the Applicant will respect the existing features of the land described in the site analysis.
 4. Aerial photograph of the site.
- D. Contents of Resource Conservation Plan
1. Resource Conservation Plan and Narrative shall include the following:
 - a. The layout of lots or development shall occur so that the areas identified as being important in the site analysis are preserved and the areas of secondary importance are used for development.
 - b. Limits of disturbance on site - the limits of the grading and soil disturbance shall be shown
 - c. Areas that are to be preserved shall be described.
 - d. Description of the manner in which stormwater will be captured on site for maximum infiltration. This should indicate that the areas best suited for stormwater infiltration have been selected for that purpose.
 - e. Description and plan showing that existing natural contours and vegetation will be respected.
 - f. Limits on site disturbance and resources applicable to the site due to zoning ordinance requirements.
 - g. Description of any historic buildings or resources on the site and proposed efforts to preserve them.
 - h. Description and plan indicating that the site layout will provide advantageous solar orientation.
 - i. Analysis of the projected carbon footprint for the proposed development based on proposed building size, projected occupancy, estimated home energy usage, and typical travel energy usage. All calculation sources shall be identified. A description of how the projected carbon footprint will be offset by the development layout, solar orientation, building materials, resource conservation, proposed landscaping, connection to existing amenities, etc. shall be provided.

3.4. HIGHWAY OCCUPANCY PERMIT REQUIRED

- A. No plan which will require access to a highway under the jurisdiction of the Pennsylvania Department of Transportation ("PennDOT") shall be finally approved unless the plan contains a notice that a highway occupancy permit is required pursuant to section 420 of the Act of June 1, 1945 (P.L. 1242, No. 428) known as the "State Highway Law," before access to a state highway is permitted and a permit has been issued by PennDOT. The plan shall be marked to indicate that access to the State highway shall be only as authorized by a highway occupancy permit. The Township shall not be held liable for damages to persons or property arising out of the issuance or denial of a permit by PennDOT.

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ARTICLE 4 PRE-SUBMISSION SKETCH PLAN

4.1. PURPOSE

- A. The purpose of the Pre-Submission Sketch Plan is to provide an opportunity for the Applicant to consult early and informally with the Buckingham Township Planning Commission before preparing a preliminary and/or final plan and formal application for approval.
- B. The Pre-Submission Sketch Plan procedure gives the Township the opportunity to provide comments to the Applicant at a stage when potential differences can be easily resolved. This informal review in no way relieves the Applicant from meeting all Zoning and Subdivision and Land Development requirements nor does it commit either the Applicant or the township to specific plans or decisions.

4.2. SUBMISSION AND REVIEW PROCEDURE

- A. Sketch plan shall include the plan data as found in this Article and Applicant shall submit ten (10) copies of the Pre-Submission Sketch Plan, Site Analysis and Resource Conservation Plan, and application forms to the Township ten days prior to the scheduled Township Planning Commission Meeting. The Township will place the sketch plan on a Planning Commission agenda.
- B. The review procedure is an informal review. The Applicant shall describe the proposal and relate any concerns or questions to the township. The township will offer a non-binding opinion or suggest other sources that may be able to provide guidance regarding the proposal.

4.3. PLAN DATA

- A. The Pre-Submission Sketch Plan shall include the following:
 - 1. Preliminary Site Analysis and Resource Conservation Plan, as outlined in Article 3.
 - 2. Name and address of the owner of record and Applicant.
 - 3. Name and address of the engineer, surveyor, or person responsible for the plan.
 - 4. Zoning requirements, including:
 - a. Applicable district;
 - b. Maximum density permitted and proposed density;
 - c. Lot size;
 - d. Variances or special exceptions granted or needed.
 - 5. Written and graphic scales.
 - 6. Total acreage of the site and site boundaries.
 - 7. Streets on and adjacent to the site.
 - 8. Existing buildings (and their uses), driveways, sewer systems, wells if known, and any other significant features, including significant Forest or Woodlands.
 - 9. Proposed general lot layout.
 - 10. Types of buildings proposed.
 - 11. Number of units proposed.
 - 12. Open space and recreational areas, if applicable.
 - 13. Location map showing general location of site with respect to surrounding properties and roads.
 - 14. All natural resources located on the site.
 - 15. Tax Map Parcel Number.
 - 16. Aerial photograph of the site.
 - 17. Proposed water and wastewater facilities.

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**ARTICLE 5
PRELIMINARY PLAN
MAJOR SUBDIVISION OR LAND
DEVELOPMENT**

5.1. SUBMISSION AND REVIEW PROCEDURE

- A. The Applicant or his agent shall distribute the required documents in accordance with the most current Township application form, which specifies number of copies and reviewing agencies. All required documentation (plans, applications, stormwater management reports, traffic studies etc.) shall also be submitted in PDF format. In addition to paper copies of the plans, the information required in Section 5.2.C of this ordinance shall be provided on acetate, mylar or other transparent material approved by the Township. These copies shall be provided at the same scale and on the same sheet size as the paper copies.

In addition to the above, an "information packet" shall be provided with the submission to the Township at the time the application is made for land development or subdivision of any property. The "information packet" shall include the location of the land development or subdivision, real and equitable owners, number of lots, lot size, housing type or non residential use, water and sewer availability (on-site or public), amount of open space and TDR usage and acquisition location (if applicable). The "information packet" shall include a map showing the properties (and their uses) surrounding the properties and a general plan of the development showing the lots, roads, parking etc. The maps shall be submitted on a 11" x 17" plan sheet. A copy of the "information packet" shall be provided to all surrounding property owners as referenced in section 5.1.E below.

The Applicant shall also submit an "information" plan. The "information" plan shall include an aerial photograph of the site and include the area 1000 feet surrounding the proposed development. The aerial photograph shall be the latest on file with the Bucks County Planning Commission and shall include a line drawing of the proposed lots and roads (if proposed) as well as a line drawing of all existing lots within 500 feet of the development. The "information" plan shall also show the approximate distances to the existing houses adjacent to site. The "information" plan shall be submitted as a "paper" plan as well as in PDF format on CD or DVD (at native scale) at least 5 days in advance of the meeting date.

- B. The above data shall be submitted to all agencies after being stamped in by the Township. The required fees along with the above data shall be submitted to the Township Manager or other person so designated by the Board of Supervisors. Plans and applications for other agencies (other than PennDOT applications) shall be delivered directly to the respective reviewing agencies.
- C. The Township Manager or other designated person shall notify the Applicant within five working days as to the completeness of the submission, which shall be based on the submission check list found in the Appendix of this ordinance.
- D. The Township shall forward the Plan to the Planning Commission.
- E. The Applicant for a subdivision or land development shall, with the submission of a preliminary plan, notify all surrounding property owners (minor subdivisions – adjacent property owners and major subdivisions and land developments within 1000 feet of the proposed development perimeter). The notice shall state that a subdivision or land development plan has been filed for the property (indicate tax map parcel number) and shall state that the Township office will schedule the meetings at which the plans will be reviewed. The Applicant shall include in the notice the date the plan is scheduled for the initial Township Planning Commission meeting. The notice shall include a copy of the proposed development plan showing proposed lots, streets, and perimeter roads. The notice shall be accompanied by a project narrative that identifies the total number of lots proposed, the locations of all proposed connections to the existing perimeter roads, and a general description of the proposed on-site and off-site utilities (wastewater disposal, water supply, stormwater management, etc.). The plan shall be either 8 ½" x 11" or 11" x 17". The notification shall be sent within 5 days of the date on which the plans are submitted to the Township. The Applicant shall submit an affidavit to the Township setting forth the list of the names and addresses to which notices have been sent and include the content of the notice. The affidavit shall be supplied by the Applicant to the Township 5 days prior to the first meeting of the Planning Commission at which the plans are to be discussed.
- F. The Township Planning Commission shall review the plans and carry out its responsibilities as set forth in the Municipalities Planning Code. The plans shall also be reviewed by the township staff, commissions, and departments designated by the Township.

- G. Following receipt of the Township Planning Commission's report and, within the time limits set forth in the Municipalities Planning Code, the Board of Supervisors shall:
1. Receive, review and evaluate the Applicant's submission;
 2. Receive and review the reports by the Township Planning Commission, the Township Engineer, Township staff, Township Departments designated by the Township, Bucks County Planning Commission, and other agencies or officials who have submitted a report;
 3. Determine whether the preliminary plan meets the objectives and requirements of this Ordinance and the Township Zoning Ordinance;
 4. Express its approval of the plan, stating the conditions of such approval, if any, or its disapproval, stating the reasons therefor. The township may approve plans subject to conditions which require the consent of the Applicant in which event the Applicant shall advise the Board of Supervisors prior to the final vote by the Board of Supervisors on the plan as to whether he accepts or rejects said conditions.
 5. Within fifteen (15) calendar days following the decision, the Supervisors shall communicate in writing to the Applicant the terms and conditions of preliminary or final plan approval, if any, or their disapproval, stating the reasons therefor. If the Applicant shall not appeal the written approval within thirty (30) days of the date of the aforesaid written approval, the Applicant shall be deemed to have accepted all the terms and conditions of the approval. Approval of a preliminary plan shall not constitute approval of the final plan. If a preliminary plan is conditionally approved as aforesaid, it shall not be given final approval by the Board of Supervisors until all preliminary plan approval conditions are met and corrected on the final plan.
- H. Simplified procedure for subdividing land to be deed-restricted from development - It is the intent of the Township to simplify the process of subdividing land that is to be deed-restricted from future development. If a parcel of 25 acres or more is to be subdivided and where at least 85 percent of the parcel is to be restricted from future development by deed restriction that is acceptable to the township, the procedures outlined herein may be simplified upon request by the property owner/Applicant. A request for a simplified procedure shall be made to the Board of Supervisors at the time of submission of the development plans.

5.2. PRELIMINARY PLAN REQUIREMENTS

- A. Drafting Standards:
1. The plan shall be drawn at a scale of 1"=50' (preferred) or 1"=100' or other scale suitable for the specific project.
 2. All dimensions shall be set forth in feet and decimal parts thereof and bearings in degrees, minutes and seconds.
 3. Each plan sheet shall be numbered and shall show its relationship to the total number of plan sheets. Intermediate plan sheets (i.e. 26A) will not be permitted.
 4. Where any revision is made, or when the plan is a revision of a previously approved plan, dotted lines shall be used to show features or locations to be abandoned and solid lines to show the currently proposed features. Notations of revisions shall be numbered and dated. In addition, a list of revisions shall be provided which shall describe what has been revised and on which sheets the revisions are shown. Each plan sheet shall show the latest revision date.
 5. The plan shall be so prepared and bear an adequate legend to indicate clearly which features are existing and which are proposed.
 6. The boundary line of the subdivision shall be shown as a solid heavy line.
 7. All plan sheets shall be of the same size and shall be 24 inches by 36 inches. All lettering shall be so drawn so as to be legible if the plan should be reduced to half size, or a size necessary for recording in the Bucks County Recorder of Deeds, whichever lettering is larger.
 8. All plans shall include at least one plan sheet that shows the entire proposed subdivision or land development.
 9. The Signature Block for Township signatures (Supervisors and Engineer) shall always be placed on the extreme right hand side of the record plan, directly above the title block. When multiple Record Plan sheets are required, the signature blocks shall be located in the same location on each sheet.
 10. All plan submissions shall include a single plan sheet showing an overall view of all water and sewer facilities.

11. All plan submissions shall include a single plan sheet showing an overall view of all stormwater and stormwater management facilities.
 12. Where multiple plan sheets are employed for the development submission, all plan sheets shall provide overlap of the design information as opposed to "match" lines. Each lot in its entirety, including grading, shall be shown on one plan sheet.
- B. Plan shall show or be accompanied by the following information:
1. Name of the subdivision or land development including the Township's Subdivision and/or Land Development Application Number (SA#/LD#).
 2. Name, address, and telephone number of the owner of record and Applicant.
 3. Name and address of the Engineer, Surveyor, Architect, Landscape Architect, Planner or other professionals responsible for preparation of the plan.
 4. Tax parcel numbers, deed(s) of record, deed book and page numbers of property to be developed.
 5. Recorded plan book and page number for any previously recorded subdivisions which created the lot to be subdivided or developed or which involved in any way the lot to be subdivided or developed. A copy of the previously recorded plan shall also be submitted (if applicable).
 6. Zoning requirements, including:
 - a. Zoning District and proposed use;
 - b. Applicable area and dimensional requirements - required and proposed by the development;
 - c. Total impervious surface in square feet, impervious surface ratio, and method of calculating impervious surface ratio;
 - d. Parking requirements (if applicable)
 - e. Any variances or special exceptions granted or required.
 - f. Date of applicable Zoning Ordinance and Subdivision and Land Development Ordinance used for the preparation of the plan.
 - g. Open Space and type as required by the Zoning Ordinance
 7. Photographs of the site to be developed or subdivided and the location and description of current land uses and buildings or structures on the site. Photographs of buildings or structures on the site shall be included with plan submission. These can be included within the plan set or submitted separately. All photographs shall be provided in a digital format on a Compact Disk (CD) or a Digital Versatile Disc (DVD). An aerial photograph of the site shall also be submitted, on a CD or DVD, showing the site in relation to the surrounding properties.
 8. Location map showing relation of site to adjoining tax map parcels and proposed property lines and streets within and within 1000 feet of the development boundaries. Scale shall be 1"= 800'.
 9. Site Analysis and Resource Conservation Plans, as outlined in Article 3.
 10. North point. Written and graphic scales for plan and location map.
 11. Total acreage of the site (net and gross).
 12. A complete outline survey of the property to be subdivided or developed, showing all courses, distances and tie-ins to all adjacent road intersections. The outline survey shall also include spot elevations which shall be provided at intervals of fifty (50) feet or less. The outline survey shall be determined by field survey. All property corners shall be identified using the Pennsylvania State Plane Coordinate System. The date and by whom the survey was performed shall be indicated on the plan. The field survey shall be performed within 1 year of the preliminary plan submission. If the project review/approval process extends five (5) years from the date of original survey, the survey shall be updated to include all current topographic features.
 13. Location of all existing and proposed property monuments.
 14. Boundaries of all adjoining properties with tax parcel number, names of landowners and existing uses.
 15. Streets on and adjacent to the site with legal and future rights-of-way.

16. Existing buildings (and their uses), driveways, wastewater lines, storm drains, culverts, bridges, utility easements, quarries, railroads, wells, sewage disposal systems, underground public utilities and services, streams, and other significant features within 500 feet of and within the site (this includes properties across roadways). If significant features exist farther than 500 feet, the township may require their inclusion. All existing features shall be determined by an actual field survey which shall be based on the Pennsylvania State Plane Coordinate system. A minimum of two (2) survey benchmarks shall be provided on the site. The location (including elevation and state plane coordinates) shall be provided on the Record Plan and all grading plans.
17. Any deed restrictions or easements affecting the site - Information on restrictions and recorded information.
18. The proposed layout shall include:
 - a. The area for each lot including the provided and required building envelope free of resource restrictions as required by the Township Zoning Ordinance. Area free of resources for the wastewater treatment and disposal system, if applicable, shall also be shown.
 - b. The layout of streets, including widths of cartways and rights-of-way.
 - e. The layout and dimensions, areas, and uses of lots; building setback lines - front, rear, and side yard lines.
 - d. The arrangement and use of buildings and parking areas in non-residential, multi-family, townhouse, Living Community or other performance developments, as defined in the Township's Zoning Ordinance, with all necessary dimensions and number of parking spaces.
 - e. Provide lot development plan showing the maximum building footprint, driveway, sidewalk, patio area and all other lot improvements for each type of dwelling unit proposed. The plan shall also contain a table identifying the lot area, maximum impervious surface area, and maximum impervious surface ratio for each lot.
 - f. Open space areas, outlined or shaded to indicate full extent of open space. No areas shall be proposed to be left unused that does not meet open space requirements in terms of layout, shape, or other criteria contained in the Township's Ordinances. No areas that fail to meet the requirements for Open Space shall be designated as "Open Space" on any plan.
 - g. Recreational facilities proposed to meet the mandatory dedication of recreation land requirements of this ordinance.
 - h. Rights-of-way and/or easements for all drainage, public utilities and services, or other purposes.
 - i. Sidewalks, bike ways, and pedestrian paths.
 - j. Lighting plan as required below.
 - k. Fire hydrants.
 - l. Monuments.
 - m. Architectural elevations for multi-family, Living Community or other performance developments and non-residential developments. In addition, a color, computer-generated rendering of the proposed development superimposed onto the existing site, complete with all proposed landscaping and fencing shall be required.
 - n. Water supply system and wastewater treatment and disposal systems.

C. Natural Features Plan

1. Soils - Soils types within the site, based on maps contained in the Official Soil Survey provided by the U.S. Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/>), as last revised. The soil classifications and boundary lines of all soils located on the tract shall be shown with reference to any alluvial soils boundary. Soil descriptions for all soil types shall be provided. Any building or septic system restrictions due to wet soils, seasonally high water table or other restrictions shall be noted on the plans and considered in the site layout. Agricultural soil areas indicating Class I, Class II, Class III, and Class IV.
2. Contour lines measured at vertical intervals of two (2) feet. Such slopes shall be determined by on-site survey, not interpolation of U.S.G.S. maps. Use of aerial photography to determine contour elevations shall not be permitted. All contour elevations shall be determined by an on-site survey.

3. Flood plain and Floodway areas, using FEMA maps. Where no FEMA mapping has been prepared, a determination of the floodplain for any stream with a drainage area of 3 acres or more shall be provided by the Applicant.
 4. Flood plain soil areas.
 5. Slope areas - Areas are to be shown graphically. The amount of area in each slope category shall be shown numerically, with a calculation as to the amount and percentage of the slope area to be preserved and amount and percentage to be disturbed.
 - a. 8 -15%
 - b. >15 - 25%
 - c. >25% or over
 6. Limestone areas or any area of carbonate geology.
 7. Forest or Woodland Areas or Trees Standing Alone – The plans shall include an inventory of all trees three (3”) inches or greater in caliper or 20 feet in height. Caliper measurements shall be obtained at a point on the trunk 14 inches above the natural ground line. The plans shall indicate location, species and size of trees. For trees thirty-six inches (36”) or greater in caliper, the plan shall include a field surveyed delineation of the tree canopy. In addition, a Tree Inventory Tabulation shall be provided that includes the location (based on state plane coordinates), species, size of tree, and an indication as to whether the tree is “to be preserved”, “disturbed but not removed” or “to be removed” for all trees referenced above.
 8. Other vegetation, including hedgerows and roadside vegetation.
 9. Streams, watercourses, Waters of the Commonwealth/U.S.
 10. Swales
 11. Lakes and ponds
 12. Wetlands
 - a. If any of the three wetlands parameters (hydric soils, hydrophytic vegetation or evidence of hydrology) are present on a site proposed for development, a separate wetlands delineation of sufficient detail to allow for thorough review by Township officials must be submitted to the township. As part of the delineation process, a field investigation shall be performed and wetlands boundaries on the site shall be verified and flagged. Delineation and verification shall be performed by a qualified wetlands professional. The person or organization performing the delineation shall certify that the delineation has been performed in accordance with the criteria for wetlands delineation established in the 1989 “Federal Manual for Identifying and Delineating Jurisdictional Wetlands,” or any more restrictive amendments thereto. For all areas that have been disturbed prior to submission of the subdivision application, any areas that contain two of the three required wetland parameters shall be considered as wetlands. Wetlands shall be defined by metes and bounds.
 - b. The Township may perform its own wetland delineation, at the Applicant’s expense, in conjunction with any subdivision or land development application. In the event the Applicant’s and the Township’s delineations are conflicting, the delineation that causes the preservation of the larger area of wetlands shall govern.
 13. Site capacity calculations as required by the Zoning Ordinance.
- D. Sedimentation and Erosion Control Plan pursuant to the Clean Streams Law, P.L. 1987, 35 P.S. § 691.1 et seq., and in accordance with the standards and requirements of PADEP and the Bucks County Conservation District.
- E. Stormwater Management Plan, showing all elements required by the Stormwater Management section of this ordinance.
- F. Landscape Plan - A Landscape Plan showing all required street trees, buffers, tree protection areas, and other required plantings, as required by this ordinance and other township ordinances shall be provided. The Landscape Plan shall contain a Plant Schedule that includes all proposed plant species, sizes, installation requirements, and quantities of plant material to be provided. The landscape plan shall be prepared by a Registered Landscape Architect.

- G. Improvements Proposed - Plans showing proposed public improvements, including bike paths, streets, curbs, gutters, and sidewalks, including a typical cross-sectional diagram of proposed street construction, and a utility plan indicating the utility company to provide services. All public utilities and services to be provided including but not limited to water, gas, electric, wastewater, shall be shown on a utility plan.
- H. Lighting Plan - All proposed street, pole, and building lighting shall be shown. Nonresidential or multi-family development plans shall include a diagram showing lighting intensity at all points on the site and within site boundaries. Type of light fixtures and source of illumination must be shown.
- I. Impact Studies Required - The applicable requirements of this ordinance and the Zoning Ordinance for traffic impact studies, environmental impact studies, historic resources studies must be met with the plan submissions.
- J. If land to be subdivided lies within 1000 feet of an adjoining municipality, the Applicant shall submit information concerning the location and design of streets, layout and size of lots, and provision of public utilities and services on lands subject to this control within the adjoining municipalities. Evidence of review of this information by appropriate officials of the adjoining municipalities shall be submitted by the Applicant prior to preliminary plan approval by the Township Board of Supervisors.
- K. Grading Plan - Site and lot grading plans and such additional drawings as required to detail the construction of all proposed subdivisions and land developments.
 - 1. Individual lot grading plans shall be consistent with the subdivision site grading plans and with the Township's Grading requirements.
 - 2. Clearing and grading for any purpose, including the installation of public utilities and services, shall be shown on the plans.
 - 3. The plans shall show clearly the limits of the site disturbance with a line or shading or other means.
 - 4. A vegetation clearing plan shall be submitted showing the areas of vegetation to be removed and the limits of clearing.
 - 5. The grading plan shall include the location of all test sites for wastewater disposal (whether used or not used). A tabulation shall also be provided on the grading plan or in a separate report that includes all test data (soil horizons and percolation rates).
- L. Improvement Construction Plan - Improvement construction plans shall be prepared for all improvements including but not limited to streets, storm drains, wastewater lines, and water service. This includes both on site improvements and off site improvements if required. Plan and profile views shall be on the same plan sheet. Improvement construction plans shall be prepared using the following scales:

Horizontal	Vertical
20 feet/inch	2 feet/inch
40 feet/inch	4 feet/inch
50 feet/inch	5 feet/inch

- 1. Horizontal Plan (streets) - The horizontal plan shall show details of the horizontal layout including:
 - a. Centerline of streets with bearings, distances, curve data, and stations corresponding to the profile.
 - b. Right-of-way and curb lines with radii at intersections.
 - c. Beginning and end of proposed construction.
 - d. Tie-ins by course and distances to intersection of all public roads, including their names, roadway and right-of-way widths.
 - e. Location and reference of all proposed property monuments.
 - f. Property lines and ownership of abutting properties.
 - g. Location and size of all drainage structures, sidewalks, public utilities and services, lighting standards, and street name signs.

2. Horizontal Plan (storm drains, wastewater and water lines, wastewater and water service lines and gas lines)
 - a. Location and size of line with stations corresponding to the profile. All stationing shall correspond with roadway stationing.
 - b. Location of all separate storm sewer system manholes, inlets, endwalls, separate storm sewer systems, including length of line, size of line, slope of line, and top and invert elevation of each manhole, inlet, and endwall. The elevation shall be provided for all storm sewers entering and exiting manholes, inlets and endwalls.
 - c. Location of all wastewater lines, manholes, wastewater mains, wastewater laterals, pump stations, force mains including length of line, size of line, slope of line, and top and invert elevation of each manhole.
 - d. Location of all water mains, service lines, fire hydrants, valves, tees, fittings, including length of line, size of line and size of valves.
 - e. Property lines and ownership with details of easements where required.
 - f. Beginning and end of proposed construction.
 - g. Location of all other drainage facilities and public utilities and services, including gas lines, in the vicinity of the storm and/or wastewater lines and/or water lines.
 - h. Hydraulic design data for all separate storm sewer systems and bridge structures.
3. Profile (streets, storm sewers, and wastewater lines).
 - a. Profile of existing ground surface along centerline of street and pipe.
 - b. Proposed centerline street grades with percent of slope on tangents. Elevations at 50 feet intervals, at all grade intersections, at all street intersections, at the beginning and ending of all horizontal curves and at all points of inflection.
 - c. Vertical curve data including length, elevations and stations at the beginning and ending of the vertical curve including high points and low points, elevations at 50 feet intervals, and minimum sight distance.
 - d. Profile of existing and proposed ground surfaces along centerline of separate storm sewer systems and wastewater lines including top and invert elevations of manholes and inlets where separate storm sewer systems and wastewater lines are not located within a proposed street.
 - e. Profile of storm drain and wastewater lines showing type and size of pipe, grade, and manhole, and inlet locations.
 - f. The profiles of separate storm sewer system pipe shall show the minimum and maximum fill depths for each separate storm sewer system pipe.
4. Typical Section (streets)
 - a. Right-of-way width, location and width of paving.
 - b. Type, thickness, and crown of paving.
 - c. Type and size of curb (if applicable).
 - d. Grading of sidewalk area (if applicable).
 - e. Grading of stormwater swale adjacent to roadway (if applicable).
 - f. Location, width, type, and thickness of sidewalks.
 - g. Typical location of public utilities and services (with sizes) including by way of example but not limited to separate storm sewer system pipes, wastewater lines, underground gas, electric, water, telephone and cable.
 - h. Location of street trees.

M. Sewage Disposal Information and Planning Modules

1. Planning Modules - In order to be deemed a complete application, any application for preliminary subdivision or land development approval must be accompanied by a duly completed Department of Environmental Protection sewage facilities planning module application. Such planning module shall also meet all the requirements of the Buckingham Township Wastewater Facilities Plan as well as those contained in 25 PA. Code Chapter 71, Subchapter D, Official Plan Requirements for Alternative Evaluations.

2. Such application and planning module shall meet all the procedural and content requirements of 25 PA. Code Chapter 71, §71.52 and §71.53, including the requirement that they be accompanied by the comments on the planning module of the Bucks County Department of Health and the Bucks County Planning Commission.
 3. Soil Test Pit and Percolation Test results shall be submitted for all on-site septic systems that were tested, whether they will be used or not used for the final wastewater design.
 4. The location of all treatment components, conveyance lines, and disposal components of the proposed wastewater system(s) shall be identified.
 5. Hydrogeological test results, if required by either the Township of DEP, for groundwater mounding or nitrogen dispersion analysis shall be provided.
 6. An Engineers report on the system design including the sizing of major system components, disposal areas, and storage facilities along with the identification of the suppliers of major equipment components shall be provided.
- N. Plans for water supply shall provide the following:
1. Isolation distances for all wells.
 2. Wellhead Protection Distances.
 3. All production and monitoring wells.
 4. Water quality tests as required by the Township's Well Ordinance.
 5. All distribution lines, fire hydrants, valves, and treatment and storage facilities.
 6. An Engineers report on the system design including the sizing of major system components, booster pumps, fire flow calculations, storage facilities along with the identification of the suppliers of major equipment components.
- O. Water Resources Impact Study – See the requirements included in the Appendix of this Ordinance.
- P. Open Space Use and Management Plan - Where open space is proposed to be part of the subdivision or land development; the plans shall indicate the proposed ownership of the open space, a description of the land and soil characteristics of the proposed open space (woods, fields, farmland, wetlands, floodplain, etc.), a description of the proposed use for the open space. Plans shall show clearly the areas proposed to be set aside as open space. A calculation of the area of all open spaces shall be shown on the plans. Any area which does not meet the definition or requirements for open space shall not be shown. The plans shall indicate in particular if the land is suitable for farming or is currently farmed.
- Q. All design standards listed in Article 9 shall be addressed in the preliminary plan submission.
- R. List of Waivers Requested - Any waivers or modifications requested shall be submitted with the preliminary plan application, along with the information required for waivers or modifications by this ordinance.
- S. A copy of all restrictions, covenants, etc., if any under which lots are to be sold.

**ARTICLE 6
FINAL PLAN
MINOR SUBDIVISION/LOT LINE CHANGE**

6.1. APPLICABILITY

- A. This procedure applies to the subdivision of land into not more than two lots (minor subdivision) or the movement or changing of a lot line where no additional lots are created (lot line change).
- B. In the event that the proposed subdivision creates or involves a change in streets, the provisions of this Article shall not be applicable. The owner shall be required to comply with all requirements and procedures for major subdivisions and land developments.

6.2. SUBMISSION AND REVIEW PROCEDURE

- A. The submission and review procedure specified in Section 5.1 of this Ordinance shall apply.

6.3. FINAL PLAN REQUIREMENTS – MINOR SUBDIVISION

A. Drafting Standards:

- 1. The plan shall be drawn to a scale of 1"=50' (preferred) or 1"=100' or other scale suitable for the specific project.
- 2. All dimensions shall be set forth in feet and decimal parts thereof and bearings in degrees, minutes and seconds.
- 3. Each plan sheet shall be numbered and shall show its relationship to the total number of plan sheets. Intermediate plan sheets (i.e. 26A) will not be permitted.
- 4. Where any revision is made, or when the plan is a revision of a previously approved plan, dotted lines shall be used to show features or locations to be abandoned and solid lines to show the currently proposed features. Notations of revisions shall be numbered and dated. In addition, a list of revisions shall be provided which shall describe what has been revised and on which sheets the revisions are shown. Each plan sheet shall show the latest revision date.
- 5. The plan shall be prepared and bear an adequate legend to indicate clearly which features are existing and which are proposed.
- 6. The boundary line of the subdivision shall be shown as a solid heavy line.
- 7. All plan sheets shall be 24 inches by 36 inches. All lettering shall be so drawn as to be legible if the plan should be reduced to half size, or a size necessary for recording in the Bucks County Recorder of Deeds, whichever lettering is larger
- 8. All plans shall include at least one plan sheet that shows the entire proposed subdivision.
- 9. The Signature Block for Township signatures (Supervisors and Engineer) shall be placed on the extreme right hand side of the record plan, directly above the title block. When multiple Record Plan sheets are required, the signature blocks shall be located in the same location on each sheet.
- 10. Where multiple plan sheets are employed for the development submission, all plan sheets shall provide overlap of the design information as opposed to "match" lines. Each lot in its entirety, including grading, shall be shown on one plan sheet.

B. Plan information:

- 1. Name of the subdivision or land development including the Township Subdivision and/or Land Development Application Number (SA#/LD#)
- 2. Name, address, and telephone number of the owner of record and Applicant.
- 3. Name and address of the Engineer, Surveyor, Architect, Landscape Architect, Planner or other professionals responsible for preparing the plan.
- 4. Tax parcel numbers, deed(s) of record, deed book of property to be developed including any deed restrictions and easements.
- 5. Recorded plan book and page number for any previously recorded subdivisions which created the lot to be subdivided or developed or which involved in any way the lot to be subdivided or developed. A copy of the previously recorded plan shall also be submitted (if applicable),

6. Zoning requirements, including:
 - a. Zoning District and proposed use;
 - b. Applicable area and dimensional requirements - required and proposed by the development.
 - c. Total impervious surface in square feet, impervious surface ratio, and method of calculating the impervious surface ratio.
 - d. Any variances or special exceptions granted or required.
 - e. Date of applicable Zoning Ordinance and Subdivision and Land Development Ordinance used for the preparation of the plan.
7. Photographs of site to be developed or subdivided and the location and description of current land uses and buildings or structures on the site. Photographs of buildings or structures on the site shall be included with plan submission. These can be included within the plan set or submitted separately. All photographs shall be provided in a digital format on a Compact Disk (CD) or a Digital Versatile Disc (DVD). An aerial photograph of the site shall also be submitted, on a CD or DVD, showing the site in relation to the surrounding properties.
8. Location map showing relation of site to adjoining tax map parcels and proposed property lines within and within 1000 feet of the development boundaries. Scale shall be 1"= 800'.
9. Site Analysis and Resource Conservation Plans, as outlined in Article 3.
10. North point. Written and graphic scales for plan and location map.
11. Total acreage of the site (net and gross).
12. A complete outline survey of the property to be subdivided or developed, showing all courses, distances, tie-ins to all adjacent intersections. The outline survey shall also include spot elevations which shall be provided at intervals of fifty (50) feet or less. Outline survey shall be determined by field survey. All property corners shall be identified using Pennsylvania State Plane Coordinate System. The date and by whom the survey was performed shall be indicated on the plan. The field survey shall be performed within 1 year of the plan submission. If the project review/approval process extends five (5) years from the date of original survey, the survey shall be updated to include all current topographic features. Use of current aerial photograph shall also be permitted.
13. Location of all existing and proposed property monuments.
14. Boundaries of all adjoining properties with tax parcel number and names of landowners and existing uses.
15. Streets on and adjacent to the site with legal and future rights-of-way.
16. Existing buildings (and their uses), driveways, wastewater lines, storm drains, culverts, bridges, public utility easements, quarries, railroads, wells, sewage disposal systems, underground public utilities and services, streams, and other significant features within 200 feet of and within the site (this includes properties across roadways). If significant features exist farther than 200 feet, the Township may require their inclusion. All existing features shall be determined by an actual field survey that shall be based on the Pennsylvania State Plane Coordinate system. A minimum of two (2) survey benchmarks shall be provided on the site. The location (including elevation and state plane coordinates) shall be provided on the Record Plan and all grading plans.
17. Any deed restrictions or easements affecting the site - Information on restrictions and recorded information.
18. The proposed layout shall include:
 - a. The area for each lot including the provided and required building envelope free of resource restrictions as required by the Township Zoning Ordinance. Area free of resources for the wastewater disposal system, if applicable, shall be shown.
 - b. The layout and dimensions, areas, and uses of lots; building setback lines - front, rear, and side yard lines.
 - c. Provide lot development plan showing the maximum building footprint, driveway, sidewalk, patio area and all other lot improvements for each type of dwelling unit proposed. The plan shall also contain a table identifying the lot area, maximum impervious surface area, and maximum impervious surface ratio for each lot.
 - d. Recreational facilities proposed to meet the mandatory dedication of recreation land requirements of this ordinance.
 - e. Rights-of-way and/or easements for all drainage, public utilities and services, or other purposes.

- f. Sidewalks, bikeways, and pedestrian paths.
- g. Monuments.

C. Natural Features Plan - The following features shall be shown to the extent that they are applicable to the site.

1. Soils - Soils types within the site, based on maps contained in the Official Soil Survey provided by the U.S. Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/>), as last revised. The soil classifications and boundary lines of all soils located on the tract shall be shown with reference to any alluvial soils boundary. Soil descriptions for all soil types shall be provided. Any building or septic system restrictions due to wet soils, seasonally high water table or other restrictions shall be noted on the plans and considered in the site layout. Agricultural soil areas indicating Class I, Class II, Class III, and Class IV.
2. Contour lines measured at vertical intervals of two (2) feet. Such slopes shall be determined by on-site survey, not interpolation of U.S.G.S. maps.
3. Flood plain and Floodway areas, using FEMA maps. Where no FEMA mapping has been prepared, a determination of the floodplain for any stream with a drainage area of 3 acres or more shall be made by the Applicant.
4. Flood plain soil areas.
5. Slope areas - Areas are to be shown graphically. The amount of area in each slope category shall be shown numerically, with a calculation as to the amount of the slope area to be preserved and amount and percentage to be disturbed.
 - a. 8 -15%
 - b. >15 - 25%
 - c. >25% or over
6. Limestone areas or any area of carbonate geology.
7. Forest or Woodland Areas or Trees Standing Alone – The plans shall include an inventory of all trees three (3”) inches or greater in caliper or 20 feet in height. The plans shall indicate location, species and size of trees. Caliper measurements shall be obtained at a point on the trunk 14 inches above the natural ground line. For trees thirty-six inches (36”) or greater in caliper, the plan shall include a field surveyed delineation of the tree canopy. In addition, a Tree Inventory Tabulation shall be provided that includes the location (based on state plane coordinates), species, size of tree, and an indication as to whether the tree is “to be preserved”, “to be disturbed but not removed” or “to be removed” for all trees referenced above.
8. Other vegetation, including hedgerows and roadside vegetation.
9. Streams, watercourses, Waters of the Commonwealth, Waters of the U.S.
10. Natural drainage of site
11. Lakes and ponds
12. Wetlands
 - a. If any of the three wetlands parameters (hydric soils, hydrophytic vegetation or evidence of hydrology) are present on a site proposed for development, a separate wetlands delineation of sufficient detail to allow for thorough review by Township officials must be submitted to the township. As part of the delineation process, a field investigation shall be performed and wetlands boundaries on the site shall be verified and flagged. Delineation and verification shall be performed by a qualified wetlands professional. The person or organization performing the delineation shall certify that the delineation has been performed in accordance with the criteria for wetlands delineation established in the 1989 “Federal Manual for Identifying and Delineating Jurisdictional Wetlands,” or any more restrictive amendments thereto. For all areas that have been disturbed prior to submission of the subdivision application, any areas that contain two of the three required wetland parameters shall be considered as wetlands. Wetlands shall be defined by metes and bounds.
 - b. The Township may perform its own wetland delineation, at the Applicant’s expense, in conjunction with any subdivision or land development application. In the event the Applicant’s and the Township’s

delineations are conflicting, the delineation that causes the preservation of the larger area of wetlands shall govern.

13. Site capacity calculations as required by the Zoning Ordinance.
- D. Sedimentation and Erosion Control Plan pursuant to the Clean Streams Law, P.L. 1987, 35 P.S. § 691.1 et seq., and in accordance with standards and requirements of DEP and the Bucks County Conservation District, if applicable.
- E. Stormwater Management and Grading Plan, showing all elements required by the Stormwater Management section of this ordinance, if applicable.
- F. Landscape Plan - A Landscape Plan showing all required street trees, buffers, tree protection areas, and other required plantings, as required by this ordinance and other township ordinances shall be provided. The Landscape Plan shall contain a Plant Schedule that includes all proposed plant species, sizes, installation requirements, and quantities of plant material to be provided.
- G. Improvements Proposed - Plans showing proposed public improvements, including bike paths, streets, curbs, and sidewalks, a utility plan indicating the utility company to provide services, to the extent applicable, and a lighting plan if applicable.
- H. Impact Studies Required - The applicable requirements of this ordinance and the Zoning Ordinance for traffic impact studies, environmental impact studies, historic resources studies must be met with preliminary plan and final plan submissions.
- I. If land to be subdivided lies partly in another municipality, the Applicant shall submit information concerning the layout and size of lots, and provision of public utilities and services on lands subject to this control within the adjoining municipalities. Evidence of review of this information by appropriate officials of the adjoining municipalities shall be submitted by the Applicant prior to plan approval by the Township Board of Supervisors.
- J. Grading Plan - Site and lot grading plans and such additional drawings as required detailing the construction of all proposed subdivisions and land developments.
 1. Individual lot grading plans shall be consistent with the subdivision site grading plans and with the Township's Grading requirements.
 2. Any clearing and grading for any purpose, including the installation of public utilities and services, shall be shown on the plans.
 3. The plans shall show clearly the limits of the site disturbance with a line or shading or other means.
 4. A vegetation clearing plan shall be submitted showing the areas of vegetation to be removed and the limits of clearing.
- K. Sewage Disposal Information and Planning Modules
 1. Planning Modules - In order to be deemed a complete application, any application for preliminary subdivision or land development approval must be accompanied by a duly completed Department of Environmental Protection sewage facilities planning module application. Such planning module shall also meet all the requirements contained in 25 PA. Code Chapter 71, Subchapter D, Official Plan Requirements for Alternative Evaluations.
 2. Such application and planning module shall meet all the procedural and content requirements of 25 PA. Code Chapter 71, §71.52 and §71.53, including the requirement that they be accompanied by the comments on the planning module of the Bucks County Health Department and the Bucks County Planning Commission.
 3. Soil Percolation Test results and soils information shall be submitted for all on-site septic systems that were tested, whether they will be used or not used for the final wastewater design.
 4. The location of all treatment components, conveyance lines, and disposal components of the proposed wastewater system(s) along with the required isolation distances as required in 25 PA. Code Chapter 71, and the Township Zoning Ordinance.
- L. Plans for water supply - Water supply facilities proposed with required isolation distances shown, if applicable.
- M. The plans shall show all information necessary to demonstrate that the Design Standards in Article 9 are complied with.
- N. List of Waivers Requested - Any waivers or modifications requested shall be submitted with the plan application, along with the information required for waivers or modifications by this ordinance.

6.4. FINAL PLAN REQUIREMENTS – LOT LINE CHANGE

A. Drafting Standards:

1. The plan shall be drawn to a scale of 1"=50' (preferred) or 1"=100' or other scale suitable for the specific project.
2. All dimensions shall be set forth in feet and decimal parts thereof and bearings in degrees, minutes and seconds.
3. Each sheet shall be numbered and shall show its relationship to the total number of sheets. Intermediate plan sheets (i.e. 26A) will not be permitted.
4. Where any revision is made, or when the plan is a revision of a previously approved plan, dotted lines shall be used to show features or locations to be abandoned and solid lines to show the currently proposed features. Notations of revisions shall be numbered and dated. In addition, a list of revisions shall be provided which shall describe what has been revised and on which sheets the revisions are shown. Each plan sheet shall show the latest revision date.
5. The plan shall be prepared and bear an adequate legend to indicate clearly which features are existing and which are proposed.
6. The boundary line of the subdivision shall be shown as a solid heavy line.
7. All plan sheets shall be 24 inches by 36 inches. All lettering shall be so drawn as to be legible if the plan should be reduced to half size, or a size necessary for recording in the Bucks County Recorder of Deeds, whichever lettering is larger
8. All plans shall include at least one plan sheet that shows the entire proposed subdivision.
9. The Signature Block for Township signatures (Supervisors and Engineer) shall be placed on the extreme right hand side of the record plan, directly above the title block. When multiple Record Plan sheets are required, the signature blocks shall be located in the same location on each sheet.

B. Plan Information:

1. Name of the subdivision or land development including the Township Subdivision and/or Land Development Application Number (SA#/LD#)
2. Name, address, and telephone number of the owner of record and Applicant.
3. Name and address of the Engineer, Surveyor, Architect, Landscape Architect, Planner or other professionals responsible for preparing the plan.
4. Tax parcel numbers, deed book and page numbers of property to be developed including any deed restrictions and easements.
5. Recorded plan book and page number for any previously recorded subdivisions which created the lot to be subdivided or developed or which involved in any way the lot to be subdivided or developed. A copy of the previously recorded plan shall also be submitted (if applicable),
6. Zoning requirements, including:
 - a. Applicable Zoning District and proposed use;
 - b. Applicable area and dimensional requirements - required and proposed by the development.
 - c. Total impervious surface in square feet, impervious surface ratio, and method of calculating the impervious surface ratio.
 - d. Any variances or special exceptions granted or required.
 - e. Date of applicable Zoning Ordinance and Subdivision and Land Development Ordinance used for the preparation of the plan.
7. Photographs of site to be developed or subdivided and the location and description of current land uses and buildings or structures on the site. Photographs of buildings or structures on the site shall be included with plan submission. These can be included within the plan set or submitted separately. All photographs shall be provided in a digital format on a Compact Disk (CD) or a Digital Versatile Disc (DVD). An aerial photograph of the site shall also be submitted, on a CD or DVD, showing the site in relation to the surrounding properties.

8. Location map showing relation of site to adjoining tax map parcels and proposed property lines within and within 1000 feet of the development boundaries. Scale shall be 1"= 800'.
9. North point. Written and graphic scales for plan and location map.
10. Total acreage of the site (net and gross).
11. A complete outline survey of the property to be subdivided or developed, showing all courses, distances, tie-ins to all adjacent intersections and areas. Outline survey shall be determined by field survey. All property corners shall be identified using Pennsylvania State Plane Coordinate System. The date and by whom the survey was performed shall be indicated on the plan. The field survey shall be performed within 1 year of the plan submission. If the project review/approval process extends five (5) years from the date of original survey, the survey shall be updated to include all current topographic features. Use of current aerial photograph shall also be permitted.
12. Location of all existing and proposed property monuments.
13. Boundaries of all adjoining properties with tax parcel number, names of landowners and existing uses.
14. Streets on and adjacent to the site with legal and future rights-of-way.
15. Existing buildings (and their uses), driveways, wastewater lines, storm drains, culverts, bridges, public utility easements, quarries, railroads, wells, sewage disposal systems, underground public utilities and services, streams, and other significant features within 200 feet of and within the site (this includes properties across roadways). If significant features exist farther than 200 feet, the Township may require their inclusion. All existing features shall be determined by an actual field survey that shall be based on the Pennsylvania State Plane Coordinate system. A minimum of two (2) survey benchmarks shall be provided on the site. The location (including elevation and state plane coordinates) shall be provided on the Record Plan and all grading plans.
16. The proposed layout shall include:
 - a. The area for each lot including the provided and required building envelope free of resource restrictions as required by the Township Zoning Ordinance. Area free of resources for the wastewater disposal system, if applicable, shall be shown.
 - b. The layout and dimensions, areas, and uses of lots; building setback lines - front, rear, and side yard lines.
 - c. Rights-of-way and/or easements for all drainage, public utilities and services, or other purposes.
 - d. Sidewalks, bikeways, and pedestrian paths.
 - e. Monuments.
- C. List of Waivers Requested - Any waivers or modifications requested shall be submitted with the plan application, along with the information required for waivers or modifications by this ordinance.

6.5. RECORDING OF FINAL PLAN

- A. The Plan shall be prepared and recorded in accordance with the requirements of Article 8 of this Ordinance. In addition, the plans shall also be signed by the owners of both tax parcels affected by a lot line change if the two parcels affected are in separate ownership. If parcels or portions of tax parcels are to be combined, a deed of consolidation will be required by the Township.

**ARTICLE 7
FINAL PLAN
MAJOR SUBDIVISION OR LAND
DEVELOPMENT**

7.1. PURPOSE

- A. The purpose of the final plan review is to obtain formal approval by the Board of Supervisors for plans and to enter into necessary contracts prior to recording and commencement of work. The final plan shall conform to the preliminary plan as approved; but if desired by the Applicant, it may constitute only that portion of the approved preliminary plan which he proposes to record and develop in phases. The Board of Supervisors shall require the Applicant to submit a total development plan for all portions of the plan and in such detail as required by the Board of Supervisors. All required permits and approvals shall be acquired by the Applicant prior to Final Plan Approval.
- B. The Final Plan shall be submitted in conformance with the changes required during the Preliminary Plan approval. The Final Plan submission shall be prepared to comply with provisions of this Ordinance, except where variation therefrom may be specifically approved in writing by the Board of Supervisors pursuant to the requirements of this Ordinance.

7.2. SUBMISSION AND REVIEW PROCEDURE

- A. The procedure for submission and review of final plans shall be that same as that procedure for preliminary plans as stated in Section 5.1 of this ordinance.

7.3. FINAL PLAN REQUIREMENTS

- A. Final plans shall meet the same requirements as those set forth for preliminary plans in Section 5.2.A through R.

7.4. SUPPLEMENTAL INFORMATION TO BE PROVIDED

- A. All offers of dedication and covenants governing the reservation and maintenance of undedicated open space before being accepted shall be approved in writing by the Township Solicitor.
- B. Any private deed restrictions as may be imposed upon the property as a condition to sale, together with a statement of any restrictions previously imposed which may affect title to the land to be subdivided.
- C. Legal descriptions for all conservation easements, separate storm sewer system easements, water distribution, and wastewater conveyance easements shall be submitted with the final plan submission.

7.5. ADEQUATE WATER AND SEWER REQUIRED

- A. Applicants proposing a private water supply or the creation or expansion of a public water system shall submit a Water Resources Impact Study in accordance with the requirements provided in the Appendix found in this ordinance.
- B. No plan shall receive final plan approval until the Applicant has demonstrated that the project can provide for adequate water supply and can provide for wastewater disposal. All subdivisions and land developments must be able to be self-sufficient in the provision of water supply and wastewater disposal. Provision of water and wastewater disposal may be accomplished by connecting to other systems, but the demonstration of self-sufficiency is required.

7.6. PHASED PLANS

- A. Phased plans shall follow the procedure as set forth in section 3.2 of this ordinance.

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ARTICLE 8 RECORDING OF PLANS

8.1. RECORDING THE PLAN

- A. The final plan as approved and signed by the Board of Supervisors shall, within ninety (90) days of the satisfaction of all conditions of approval, be recorded in the office of the Recorder of Deeds of Bucks County. The date of approval shall be deemed to be the date on which the Applicant has satisfied all the conditions of plan approval. Plans submitted for recording by the Bucks County Recorder of Deeds shall officially note that the plans have been reviewed by the Board of Supervisors and the Bucks County Planning Commission.
- B. The Applicant shall notify the Board of Supervisors in writing of the date of such recording and the Plan Book and Page wherein such subdivision or land development is recorded.
- C. No plan shall be released for recording until the documents necessary to meet the Township Disclosure Ordinance requirements have been received, reviewed and accepted by the Township.

8.2. RECORD PLANS

- A. The record plan shall be a clear and legible blue or black line print on 4 mil, single-matt mylar, or other material acceptable to the Bucks County Recorder of Deeds, and shall be an exact copy of the approved final plan on one sheet of the size required for final plans. Two (2) mylar copies and one (1) paper copy of the Record Plan(s), four (4) paper prints (including all plan sheets), and one digital copy (in AutoCAD R2005 (or latest release) formatted with defined layers) of the Record Plan will be required as the record plan submission. One (1) mylar copy, the digital copy, and two (2) paper print (including all plan sheets) will be retained by the Township for its files.
- B. The following information shall be provided with, or appear on the record plan, in addition to the information required elsewhere in this Ordinance.
 - 1. On all development plans where there are plans in addition to the Record Plan, the following note shall appear on the Record Plan: "Sheets 2 through --- inclusive, on record at Buckingham Township, shall be considered a part of the approved final plan as if recorded with same." The Record Plan shall contain a list of all drawings included in the plan set. The list of drawings shall include the title of each drawing, the date of the drawings as well as the latest revision date.
 - 2. Seals, Notes, and Certificates
 - a. The seal, signature (including printed name) and license number of the Registered Land Surveyor certifying that the plan represents a survey made by him; that the monuments shown hereon exist as located; and the dimensional and geodetic details are correct. The certification shall also include the firm name and address that the surveyor represents.
 - b. The impressed corporation seal if the Applicant is a corporation.
 - c. The impressed seal of a notary public or other qualified officer acknowledging owner's statement of intent.
 - 3. Legal descriptions for all conservation areas, open space areas, and utilities (water, sewer, stormwater, etc.) both on-site and off-site.
- C. Acknowledgments
 - 1. A statement to the effect that the Applicant is the owner of the land proposed to be developed and that the subdivision or land development shown on the final plan is made with his or their free consent and that it is desired to record the same.
 - 2. An acknowledgment of said statement before an officer authorized (i.e., notary public) to take acknowledgments.
 - 3. A statement indicating that the plan has been reviewed by the Bucks County Planning Commission, in accordance with the Pennsylvania Municipalities Planning Code, Act 247, as amended, 53 P.S. § 10101, et seq. (See Appendix)

- D. Signatures - The following signatures shall be placed directly on the plan in ink.
1. The signatures (include printed name) and professional seals (original) of the owner or owners of the land. If the owner of the land is a corporation, the signatures of the president and secretary of the corporation shall appear.
 2. The signature of the notary public or other qualified officer acknowledging the owner's statement of intent.
 3. The signatures and professional seals (original), printed name and license number of all professionals responsible for preparation of the plan including but not limited to engineer, surveyor, landscape architect, Professional Geologist, wetlands specialist etc.
 4. The signature of the Township Engineer.
 5. The signatures of two members of the Board of Supervisors.
- E. Plan Approval Booklet – The Applicant shall be required to submit two (2) copies of a Plan Approval Booklet. The Plan Approval Booklet shall include the following:
1. Copies of all final reports and approvals from the Township Engineer, the Township's Water and Sewer Engineer, the Township's Landscape Review Consultants, the Township Solicitor, the Bucks County Planning Commission, and all other agencies (i.e., PaDEP, BCCD, DRBC, etc.) or officials (Fire Marshall, Police Department, Water and Sewer Director, etc.) who have submitted a report or approval.
 2. Copies of Zoning Hearing Board variances granted.
 3. Copies of all waiver requests approved by the Board of Supervisors.
 4. Copies of Permits (PennDOT, PADEP, DRBC, etc.) received in conjunction with the project, including off-site improvements.
 5. A certification by the design engineer that all necessary permits and approvals have been received in order for construction of the project to commence. Work may not commence until all permits and approvals are acquired.
 6. Evidence of any necessary permit(s) for Regulated Earth Disturbance activities from the appropriate PADEP regional office or County Conservation District must be provided to the Township.
- F. Lot Development Restriction Plan – The Applicant shall submit two (2) copies of the Lot Development Restriction Plan. The Lot Development Restriction Plan shall include the following:
1. A plan shall be provided for each individual lot.
 2. All restrictions shall be shown on the plan, including but not limited to:
 - a. Building Set-back lines
 - b. Impervious surface limitations due to Zoning and stormwater management constraints
 - c. Water, sanitary and stormwater easements
 - d. Open space limitations and restrictions
 - e. Natural resource limitations and restrictions (tree removal, wetlands, steep slopes etc.)
 3. All areas restricted from building shall be cross-hatched in RED. All building restriction areas shall be labeled on the plan and indicate any and all restrictions.
 4. Plan shall include but not be limited to grading (existing and proposed), site improvements such as building footprint, driveway, entrance walkway, deck, sidewalks, bicycle paths, water, sewer and stormwater facilities, landscaping and buffer requirements and proposed property monuments (concrete and iron pins) etc.
 5. Plan shall include dimensions for all restricted areas including the depth of the rear yard from the rear of the proposed dwelling to the rear property line or use restriction line, whichever is less.
 6. Plan shall include a signature block, date of signature and notary public signature for the future owner of the lot. In addition, two copies of the Lot Development Restriction Plan shall be submitted with the Disclosure Statement in conjunction with Building Permit Application. The Lot Development Restriction Plan that accompanies the Disclosure Statement shall include the signatures of all owners which signatures shall be notarized.
 7. Lot Development Restriction Plans shall be provided on a "single" plan sheet 11" x 17" in size.

8. Lot Development Restriction Plans shall include the original seal and signature of the professional engineer responsible for preparation of the plan.

8.3. EFFECT OF PLAN RECORDING

- A. After a plan has been duly recorded, the streets, parks and other public improvements shown thereon shall be considered to be a part of any Official Map, which was or has been adopted by the Township in accordance with Article IV of Act 247.
- B. Every street, park or other improvement shown on a subdivision or land development plan that is recorded shall be deemed to be a private street, park, or improvement until such time as it has been offered for dedication to the Township, accepted by resolution of the Board of Supervisors, and recorded in the Bucks County Courthouse or until it has been condemned for use as a public street, park or other improvement.
- C. All expenses and costs of maintaining all improvements prior to dedication including, but not limited to, snow plowing shall be the responsibility of the Applicant.

8.4. EASEMENTS

- A. Conservation easements, separate storm sewer system easements and wastewater conveyance easements etc. shall be recorded with the Record Plans. Acceptance/recording of easements does not relieve the responsibility of the Applicant to construct the improvements as provided on the approved plans.

8.5. REQUIRED NOTES

- A. The following statements shall be required on the final plans where applicable:
 1. "The retention/detention basins and stormwater facilities (as shown on this plan) are a basic and perpetual part of the storm drainage system of the Township of Buckingham, and as such are to be protected and preserved, in accordance with the approved final plan by the owner(s) on whose lands the structure(s) is(are) located. The Township of Buckingham and/or its agents reserves the right and privileges to enter upon such lands from time to time for the purpose of inspection of said retention/detention basin(s) in order to determine that the structural and design integrity are being maintained by the owner(s). "
 2. "All development activities, such as clearing, grading, regrading, driveways, roads, buildings, septic systems, retention/detention basins, and utility easements shall be limited to the natural resource protection standards as specified in the Buckingham Township Zoning Ordinance as last amended. The remaining resources shall remain in their natural condition including the natural forest ground cover with exception of the removal of invasive exotic species such as Japanese Honcysuckle and Bittersweet or poison ivy and any other noxious weeds not mentioned. This restriction shall run with the land and be binding on the present and all future owners and/or lessees. "

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ARTICLE 9 DESIGN STANDARDS

9.1. APPLICATION

- A. The standards and requirements outlined herein shall be considered minimum standards and requirements for the promotion of the public health, safety, and general welfare.
- B. All improvements shall be constructed in accordance with the specifications as provided herein or other specifications of the Township, Pennsylvania Department of Transportation, Pennsylvania Department of Environmental Protection, Delaware River Basin Commission, Bucks County Water and Sewer Authority, or the Authority having jurisdiction over said improvements.
- C. When changes from the accepted drawings and specifications become necessary during construction, a qualified professional engineer shall prepare and submit plans detailing all such changes to the Township Engineer for review and approval. Written acceptance by the Township Engineer shall be secured before the execution of such changes.

9.2. GENERAL STANDARDS

- A. All portions of a tract being subdivided shall be included in one of the categories listed below. No remnants of land not fitting into these three categories shall be permitted:
 - 1. Lots for any use listed and defined in the zoning ordinance;
 - 2. Streets and rights-of-way;
 - 3. Open space – must comply with the definitions and requirements of township ordinances to be qualified as open space, as distinct from a remnant of leftover land;
- B. Lot lines shall follow Township boundary lines rather than cross them.
- C. Developments proposing the B14 use (Living Communities or LC) shall generally adhere to the design guidelines included in the Patterns for Development of B14 Neighborhoods (Appendix M).
- D. Subdivisions and land developments shall be laid out so as to avoid the necessity for excessive cut or fill. Excessive cut or fill shall be defined as site improvements requiring greater than four (4) feet of excavation or backfill. Site disturbance, grading, removal of vegetation shall be the absolute minimum necessary to meet ordinance requirements. Natural drainage patterns and vegetation shall be preserved to maximize infiltration of water.
- E. Land subject to flooding (in accordance with the Federal Emergency Management Agency (FEMA), the Flood Hazard Boundary Map (FHBM), and the Official Soil Survey provided by the U.S. Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/>)) or other hazards to life, health, or property, and land deemed to be topographically unsuitable, shall not be platted for residential occupancy or for such other uses as may increase danger to health, life, property, or aggravate erosion or flood hazard unless adequate safeguards against such hazards are provided by the subdivision or land development plans. Such land within the subdivision or land development shall be set aside on the plan for uses that shall not be endangered by periodic or occasional inundation.
- F. The name of the development used for identification during the approval process, marketing purposes, safety respects, Fire Department and clarity in identification, shall be approved by the Township Board of Supervisors. The development name shall not include the word "Buckingham" nor shall the name include anything that has been destroyed, displaced or substantially altered by the project.
- G. The developer shall convey a Conservation Easement conveying flood plains, streams, watercourses, waters of the Commonwealth/US, and tree protection areas to Buckingham Township providing for the protection of said resources, which easement shall be in the form as attached in the Appendix of this ordinance. Conservation Easement areas located on or along individual lots shall be clearly delineated from private lot areas by fences and landscaping.

9.3. LOTS

- A. Corner lots or through lots shall provide for equal setbacks on all streets.
- B. All lots shall front on a public street or private street (providing they have the right to access) meeting Township Standards.
- C. Double-frontage lots are prohibited, except where they are reverse frontage lots that meet all the requirements for reverse frontage lots of the Subdivision/Land Development Ordinance and the Township Zoning Ordinance.

- D. Side lot lines shall be substantially at right angles (i.e. not less than 60 degrees or more than 120 degrees) or radial to street lines.
- E. All principal buildings, decks and patios shall be located within the building envelope.
- F. Lots for a Living Community type development shall be developed in accordance with the requirements of the Zoning Ordinance and in general conformance with the examples of LC Neighborhood Variants provided in the Patterns for Development of B14 Neighborhoods (Appendix M).
- G. The first floor elevation of all principal buildings, except in Living Community type developments, shall be no higher than 1.5 feet above existing ground. The existing ground elevation shall be considered as the average ground elevation that is calculated as the arithmetic average of the elevations taken from the four principle corners of the building, ten feet away from those corners along a line that bisects the corner at its center. When walkout basements are utilized on a sloping site, the average ground elevation shall be based on the front two principle corners of the building.
- H. Proposed residential lots within a Living Community type development shall be setback 200 feet from the Ultimate Right-of-Way of all existing streets.
- I. For any lot which takes access to an internal street, all structures shall be setback a minimum of 200 feet from any public road existing at the time of the subdivision application.

9.4. PROVISIONS FOR ENCOURAGING THE USE OF RENEWABLE ENERGY SYSTEMS AND ENERGY CONSERVING BUILDING DESIGN

A. Building Orientation

- 1. **Solar Axis and Access Plan:** A solar axis and access plan is to be submitted with all subdivision and land development plans.
- 2. **Streets:** Streets shall be designed so that the buildings in the subdivision or land development can be oriented with their long axes parallel to nine (9°) degrees south of West with a possible variation to six (6°) degrees north of West or to twenty (20°) degrees south of West.
- 3. **Lot design:** The lot design shall provide for lots of adequate width, depth, and shape for solar energy orientation, to provide open area, to eliminate overcrowding, and to be appropriate for the location of the subdivision or land development and for the type of development contemplated. Lots and building setback lines shall be designed so that the buildings in the subdivision or land development can be oriented with their long axes parallel to nine (9°) degrees south of West with a possible variation to six (6°) degrees north of West or to twenty (20°) degrees south of West. In subdivisions or land developments of more than 5 buildings, only eighty percent (80%) of the proposed buildings need be oriented as required by this paragraph.
- 4. **Building Placement:**
 - a. Buildings shall be placed on an axis parallel to nine (9°) degrees south of West with a possible variation to six (6°) degrees north of West or to twenty (20°) degrees south of West with the longest wall facing southward to benefit from solar energy, natural shading, and natural lighting and thus reduce energy requirements. In subdivisions or land developments of more than 5 buildings, only eighty percent (80%) of the proposed buildings need be oriented as required by this paragraph. A group of connected townhomes is to be considered one building for the purposes of this rule.
 - b. Buildings shall be placed within the topography such that walkout basements (where used) are positioned so that the exposed or walk out part of the basement is on the southward facing side of the building.
 - c. No structure, whether Principal Use or Accessory Use; and no coniferous plant materials, whether trees, shrubs or other; and no permanently fixed equipment shall be of such a height that it would cast a shadow during daylight between 9 A.M. and 3 P.M. of the winter solstice (the shortest day of the year) on any solar gathering component of an existing or proposed solar energy system.
- 5. **Shading:**
 - a. No structure, whether Principal Use or Accessory Use; and no coniferous plant materials, whether trees, shrubs or other; and no permanently fixed equipment shall be of such a height that it would cast a shadow during daylight between 9 A.M. and 3 P.M. of the winter solstice (the shortest day of the year) on the southward face of another building at the wall and/or at roof line or the buildable area of a parcel if no building exists.

- b. Buildings shall be built incorporating an overhang, awning, deciduous trees, or other methodology that casts a shadow on all fenestration on the southward exposure of the building during daylight between 9 A.M. and 5 P.M. (daylight savings time) of the summer solstice (the longest day of the year).

B. Floor plans

1. Energy-efficient floor plans shall be implemented that place the primary living spaces on the south side of a structure and lesser-used rooms, such as storage and utility rooms, laundry rooms, mudrooms, closets on the colder north side.
2. Garage doors shall be located on the east or west side of a structure.
3. The majority of fenestration (measured in square feet) of a building shall be located on the southward facing façade of the building.
4. 70% of the windows used in a building are to be operable.
5. Floor plans shall be laid out employing such techniques and at such depth as to allow the penetration of natural light to the center part of the building.
 - a. Examples of acceptable techniques to accomplish this are:
 - i. The area of interior space that can be day lit using windows depends on both building depth and floor-to-ceiling height. The higher the ceiling, (and windows) the greater depth of light penetration.
 - ii. Single-story buildings and the top floors of multi-story buildings can be top lit using skylights, roof monitors or light wells.
 - iii. Useful daylight from typical windows can only reach 15 to 25 ft. into spaces with 8 or 9 ft. floor-to-ceiling heights; therefore floor plans should not be deeper than 56 ft. (two rooms flanking a double loaded corridor) or they will require constant electric lighting.
 - iv. Floor plans with relatively narrow wings, such as I-, H-, U-, or T-shaped plans, ensure that most interior spaces have good access to natural light and winds.
 - v. Courtyards and atria can also be used to bring light and air to surrounding narrow spaces.
 - vi. Redirecting daylight with light shelves, prismatic glazing and other reflective systems can extend naturally lit interior space to 30 to 35 ft. deep.
 - b. Other methods that are demonstrated to allow the penetration of natural light to the center part of the building shall also be permitted.
6. Building form and orientation shall be shaped to take advantage of natural cooling opportunities. The Applicant shall demonstrate the availability of natural ventilation throughout each building through the use of one or more of the following strategies:
 - a. Air inlets shall be placed in upwind exposures, where the pressure is highest. Air outlets shall be placed in downwind, low-pressure exposures.
 - b. Narrow floor plans shall be used to increase the potential for effective cross-ventilation: bringing outdoor air into one side of a space and exhausting it on an adjacent or opposite side. The practical limit for the length of the airflow path is five times the ceiling height (50 ft. for a 10 ft. ceiling).
 - c. Single-sided, single-opening natural ventilation may be used to a depth of two times the ceiling height. This allows a maximum room depth of 18 to 20 ft., for 9 to 10 foot ceiling height with a window five foot high. [Explanation: Single-sided ventilation, where only one exterior wall has operable windows or vents, is less effective than cross ventilation, since air speed (with its cooling effect) is typically lower than in cross-ventilation situations. With a single operable window or vent, natural ventilation relies on wind turbulence and buoyancy, instead of the higher pressures available from wind. In single-sided ventilation, air flows in the bottom, is heated within the space, and flows out at the top of the same opening. The larger the height between the top and bottom, and the higher the temperature change, the greater the airflow.]
 - d. Interior walls shall be placed where they do not block airflow.
 - e. Tall spaces may be employed that enhance natural cooling. [Explanation: Tall spaces that allow heated air to rise out of the occupied zone and out of the building.]
 - f. Thermally massive floors and walls that store the cold from night air may be employed. [Explanation: Thermally massive floors and walls, due to their lag in temperature adjustment, moderate temperatures by releasing the day's heat at night and the cold from night air during the day.]

- g. Other methods that are demonstrated to allow the availability of natural ventilation throughout each building shall also be permitted.
- 7. Attic fans shall be employed that can provide a complete evacuation of the air within a structure every hour.
- C. Landscaping:
 - 1. Prevailing winds are to be identified and landscaping shall be positioned to provide a windbreak for any occupied building.
 - 2. Street trees shall be placed considering solar access and shading.
 - 3. Coniferous trees shall be placed on the North side of a structure to provide a windbreak in the winter and deciduous trees shall be placed on the south side of structures so as to provide shading in the summer and solar energy access in the winter.
 - 4. All landscape berming shall be on the north side of any occupied building upon a lot.
- D. Mechanical Heating and Cooling Systems to Use Renewable Energy. All lots shall be laid out so as to permit and all buildings shall employ renewable energy sources such as closed loop geothermal energy, wind energy or solar energy in the mechanical heating and cooling of any building.
- E. Wastewater Facilities
 - 1. The selection of wastewater conveyance, treatment and disposal options must comply with the Township's official (Act 537) sewage facilities plan but also must consider system components that minimize energy use and long term operational costs.
- F. Exceptions to the requirements of this Section (9.4) may be granted (in accordance with 53 P.S. § 10512.1) when it is shown that literal enforcement will extract undue hardship due to: the size, configuration, or orientation of the property, the nature of surrounding development, exceptional topographical or other physical conditions, circulation patterns, improved design, unavoidable conflict between two or more of the requirements herein resulting from their application to the circumstances of the property, or existing physical features of the site such as resource restrictions or vegetation. However, such exception(s), if authorized, shall represent the minimum variance that will afford relief and will represent the least modification of the requirement(s) possible.

9.5. BELOW GRADE STRUCTURES - SEASONAL HIGH WATER TABLE AND GROUNDWATER

- A. For all dwelling units and buildings proposed to be provided with basements and/or other below grade areas (i.e. crawl spaces, tuck under garages, etc.), the Seasonal High Water Table (SHWT) and/or groundwater elevation within the building envelope for the lot(s) where the dwelling units and buildings are proposed to be constructed shall be identified and provided to the Township with the Preliminary and Final Plans. The SHWT and/or groundwater elevation shall be determined for each dwelling unit or building by on-site testing completed prior to the Preliminary Plan submission. The test results shall be certified by a qualified professional engineer.
- B. All basements and below grade areas (finished floor elevation) shall be set a minimum of 2 feet above the Seasonal High Water Table and/or groundwater elevation. In areas where the Seasonal High Water Table or groundwater elevation is located within three (3) feet of the proposed ground surface, basements and other below grade areas shall be prohibited.
- C. Should the Applicant demonstrate a hardship in accordance with 53 P.S. § 10512.1 whereby the Board of Supervisors grants a waiver from the requirements of this Section, all basements and/or other below grade areas so permitted shall employ gravity or mechanical devices to remove water from the below grade areas. Gravity removal is the preferred method of removal. The water removed from the below grade areas must be discharged to a groundwater recharge facility sized to accommodate the flow from the below grade area(s). Direct connection to the Township's stormwater management or piping system is not permitted.

9.6. EASEMENTS

- A. Utility Easements
 - 1. Utility Easements shall be provided as necessary. Joint utilization of easements by two (2) or more public utilities and services is encouraged.
 - 2. Easements shall be centered on or adjacent to rear and side lot lines.
 - 3. Easements shall have a minimum width of twenty (20) feet and shall be provided for all public utilities and services. Easements having more than one utility shall have a minimum width of thirty (30) feet.

4. Nothing shall be permitted to be placed, planted, set or put within the area of a utility easement except lawns, low ground cover, or other landscaping that will not adversely affect the utility or the easement.
 5. Public utilities and services shall not be installed within 5' of an easement line.
- B. No right-of-way or easement for any purpose shall be created, recited or described in any deed unless the same has been shown on the approved plan.
- C. Where a subdivision or land development contains a watercourse or a proposed drainage swale intended to convey stormwater at a rate of 4 CFS or greater, and provided that an easement for the area of the swale or watercourse has not been provided under section 9.2.F hereof, than a drainage easement shall be provided to the Township conforming with the line of the watercourse and of a width as will be adequate to preserve drainage but not less than twenty (20) feet wide, top of bank or limit of 100 year storm event, whichever is greater. The easement shall be in the form as attached in the Appendix of this ordinance.
- D. Metes and bounds descriptions shall be provided for all easements. All easements shall be monumented at the beginning, end, and at all changes in direction.

9.7. STREETS

A. General

1. At the time any application, petition, or request is filed by any person, partnership, association, or corporation for the approval of the construction, opening or dedication of any proposed road or street, the Township shall be assured that said proposed street or road shall be completed and said assurances shall be governed by the provisions of Section 509 of the Pennsylvania Municipalities Planning Code and this Ordinance.
2. The development shall provide safe and convenient vehicular and pedestrian circulation and access. Provision shall be made for convenient and safe access throughout a site and along perimeter roads for pedestrians and for emergency vehicles.
3. The township street design standards are meant to promote safety, comfort, and community aesthetics rather than high vehicle speeds and efficiency. All streets shall be able to accommodate pedestrians and bicyclists safely.
4. Traffic calming devices shall be used along streets, roads, and lanes to control traffic speeds and volumes in neighborhoods. There shall be no uninterrupted street lengths in residential and non-residential developments of more than 600 feet without a traffic calming measure. The traffic calming measure shall be designed and constructed in accordance with the guidelines specified in Pennsylvania's Traffic Calming Handbook Publication 383 – January 2001, as last revised. All Traffic Calming measures shall be approved by the Township prior to implementation.
5. Streets that are extensions of existing streets shall bear the names of the existing streets. Street names shall not be duplicated within the Township. Street names shall not be named after anything that has been destroyed, displaced or substantially altered by the project. All street names shall be subject to the review and approval by the Board of Supervisors and reviewed by the Township Police Department and Township Fire Marshal.
6. Dead-end streets (with exception of stub streets that are provided for connection for future development) and Cul-de-Sac Streets shall be prohibited.
7. Private streets shall be subject to review by the Board of Supervisors and approved only if they are designed to meet public street standards.
8. All streets shall be logically related to topography so to produce reasonable grades, satisfactory drainage and suitable building sites and shall avoid excessive cut and fill. Streets shall be laid out to avoid flood plains, steep slopes, and wetlands.
9. Streets shall be laid out to connect to adjacent existing stub streets and shall provide for connections to adjacent tracts where future development could occur by means of stub street(s).
10. All new residential subdivisions or land developments containing eleven (11) dwelling units or more or in the case of Living Community type developments, twenty-four (24) or more dwelling units shall have a minimum of two public street entrances from public roads to the residential subdivision or land development so that it is possible to enter the development and drive through on a continuous road to a second entrance/exit to a public street. This requirement shall not be satisfied by a divided, boulevard type entrance; nor shall it be satisfied with an emergency access unless such access is paved and built to public street standards and is open continuously.

11. The right-of-way widths for residential streets as outlined shall be adequate to provide required street pavements. Additional width may be required to accommodate sidewalks, public utilities and services, drainage facilities, landscaping and grading. Layout of residential areas shall be planned so no future need to widen residential streets will arise.
12. Where a subdivision or land development abuts or contains an existing street of inadequate right-of-way width, additional right-of-way width shall be dedicated to the Township to conform to the standards set by this Ordinance.
13. Where a subdivision or land development abuts or contains an existing street of inadequate width or substandard construction, the Applicant shall be required to widen and/or reconstruct the roadway to meet current Township standards.
14. The Applicant is responsible for the evaluation of the roadside safety design for all streets (existing and proposed), in accordance with the Roadside Design Guide, as prepared by the American Association of State Highway and Transportation Officials (AASHTO). Where inadequate facilities are provided or are created, the Applicant shall be responsible for the design and construction of facilities (i.e., guide rails, attenuation devices, embankment slopes, etc.) that meet the minimum guidelines of the Roadside Design Guide and PennDOT Design Manuals, latest revision, or as required by this ordinance. All guide rails within Buckingham Township shall be "weathering" steel or wood. The use of galvanized guide rail is prohibited.

B. Standards

1. The Road Dimensional Standards listed below are a general guide to the dimensional standards for the various classifications of road types.

Table 9-1 : Road Dimension Standards

Street Type	Cartway Width	Shoulders	Right-of-Way	Parking
Arterial Highway	56 feet	Yes	100 feet	No
Collector Road - Major	24 feet	Yes	80 feet	No
Collector Road - Minor	24 feet	Yes	60 feet	No
Roads	24 feet	Yes	50 feet	No
Streets	32 feet	No	60 feet	One or Two Sides
Alleys	See Section C below			

C. Alleys - Standards

1. Alleys may be provided at the rear of lots for any development and are an integral component of Living Community type developments. However, alleys shall be provided at the rear of lots for all townhouse and multifamily developments where the lot width is less than 40 feet.
2. Paved width of the alley shall be 12 feet.
3. Parking shall be prohibited along alleys.
4. No curbs or sidewalks are required along alleys.
5. Alley right-of-way shall be 16 feet.
6. Garages shall be setback a minimum of 10 feet from the Alley right-of-way.
7. Fences shall be set back from the paved area at least 3 feet to accommodate turning movements.
8. Alleyways may not intersect existing public roads of types "Arterial Highway", "Major or Minor Collectors" and "Roads" (Table 9-1). They may only access local streets internal to a development as defined in Table 9-2.
9. Alleyway design must allow for the circulation of trash collection vehicles.
10. For the Living Community type development, alleys shall be designed to minimize their impact on the viewscape of the development while providing adequate sight distance at the intersection with development streets. Compact Hedges, small walls, and other screening techniques shall be employed at all alley intersections with internal roadways to reduce the visual impacts. At a minimum, the alley screening shall be a minimum of 3 feet in height and shall provide a complete visual screen of the alley from the adjacent roadway, except to provide the required sight distances.

D. Street Alignments

1. Whenever street lines are deflected in excess of one (1) degree, the transition shall be made with a horizontal curve.
2. To ensure adequate sight distance, the minimum centerline radii for horizontal curves shall be 400 feet for Arterial Highways, Collector Highways and Roads. For Local Streets, the minimum centerline shall be 150 feet. The centerline radii shall be increased based on the speed limit and design parameters set forth by AASHTO.
3. On Local Streets,, a minimum tangent length of one hundred (100) feet shall be required between horizontal curves. On Arterial and Collector Highways and Roads, a minimum tangcnt length of one hundred fifty (150) feet shall be required between horizontal curves.
4. A long radius curve shall be preferred in all eases to a series of curves and tangents.
5. Side streets approaching an intersection shall follow a straight course for a minimum of fifty (50) feet.

E. The following strect standards are applicable to the Living Community (LC) only, as defined and regulated by the Buckingham Township Zoning Ordinance and which requires a mix of uses and prescribed densities.

1. Following standards shall be used for developing a Living Community type development:

Table 9-2 : Living Community Road Dimension Standards

Street Type	Lanes	Streets			Main Streets
Pavement Width	20 feet	26 feet	26 feet	32 feet	38 feet
Traffic Movement	One-Way	One-Way	Two-Way	Two-Way	Two-Way
Parking on street	No	Yes – Informal – Both Sides	Yes– Informal – One Side	Yes – Informal - Both Sides	Yes – Designated and marked
Parking lane Width	N/A	7 feet	7 feet	7 feet	8 feet
Right of Way	46 feet	52 feet	52 feet	58 feet	68 feet
Sidewalks	5 feet, both sides	5 feet, both sides	5 feet, both sides	5 feet, both sides	6 feet, both sides
Tree Lawn	8 feet, both sides	8 feet, both sides	8 feet, both sides	8 feet, both sides	8 feet, both sides
Design Speed	20 mph	20 mph	20 mph	20 mph	25 mph

2. Centerline Radii – In Living Community developments, the minimum centerline radii shall be based upon the grid created by the Design Blocks and Right-of-Way areas (See Neighborhood Variants examples in the Patterns for Development of B14 Neighborhoods Appendix). If the centerline radius for any roadway with parking is less than 400 feet, the width of the Pavement and Right-of-Way width shall be increased by four feet to allow for emergency vehicle access.
3. Curb Radii – The following curb radii are required for Living Communities:
 - a. For design speeds of 20 mph - 15 feet
 - b. For design speeds of 25 mph - 25 feet
4. Note: Parking shall be restricted within 30 feet of the intersection of each street which shall be measured from the intersection of the curb lines. Sidewalks and Pedestrians - The minimum sidewalk width is 5 feet. Within nonresidential areas and places with high pedestrian volume (greater than 150 pedestrians per hour), sidewalks shall be 6 feet wide and surfaced to accommodate pedestrian traffic. All sidewalks shall meet ADA standards.
5. Bicyclists – On residential streets, bieyclists shall be considered a normal part of the vehicle mix on the street. On roads and highways, bicyclists shall be accommodated with an 8-foot wide macadam bike path that is separated from the street.
6. On-Street Parking – Informal parking is parking that is allowed along residential streets, but is not designated or marked as parking areas. On-street parking along Main Streets shall be signed, designated and marked.
7. Living Community Development Design considerations
 - a. The street system shall provide at least two routes of access to any property within Living Community developments.

- b. A Living Community Development shall be designed at a walkable scale, with the maximum walk from the edge to the core being no more than 10 minutes. Development layout, uses and intensity shall encourage and promote pedestrian access.
- c. All streets within the proposed Living Community Development shall be part of an interconnected pattern. Living Community streets shall be designed to minimize through traffic.
- d. The streets are important components of the Living Community public space and shall be planned to enhance pedestrian and bicycle mobility as well as creating an appealing public area.
- e. Block length shall be between 250 and 500 feet. For Living Community type developments, the block length shall be between 10 and 20 Design Blocks (DB) in length.
- f. Pedestrian Safety shall be provided for all street crossings. Street crossings shall be not longer than necessary. Bulb-outs, raised crosswalks and similar techniques shall be provided to accommodate pedestrians. Where on-street parking is provided, bulb-outs shall be provided to reduce the crosswalk width to a maximum of 20 feet, except along Main Streets where the maximum width shall be 22 feet.
- g. Curb cuts shall be minimized by using combined access points, rear or side access, or other techniques to reduce conflicts with on-street parking, pedestrians, cyclists and interruptions to traffic flow.
- h. A Living Community Development shall not include any arterial or collector roads with peak hour traffic of 1200 vehicles per hour or more or with average daily traffic volumes of 15,000 vehicles or more. Such roads can only be located at the edge of a Living Community development.

9.8. STREET GRADES

- A. Centerline grades shall not be less than one percent (1.0%) on streets with curbs and one half of one percent (0.5%) on streets without curbs. A minimum slope of one (1) percent shall be provided along the gutter line.
- B. The maximum street grades shall be as follows:
 - 1. Arterial Highways, Collector Highways and Roads - 8 percent.
 - 2. Local Streets - 12 percent.
- C. Vertical curves shall be used at changes of grade exceeding one percent (1%) and shall be designed in relation to the extent of the grade change and to provide the following minimum sight distances:
 - 1. For crests, each four percent (4%) difference in gradient, use one hundred twenty-five (125) foot length of curve.
 - 2. For sags, each four percent (4%) difference in gradient, use one hundred (100) foot length of curve.
 - 3. Where the grade of any side street at the approach to an intersection exceeds four percent (4%), a leveling area shall be provided. The leveling area shall not be greater than a four percent (4%) grade for a minimum length of fifty feet from the edge of the roadway.
- D. Alleys may be constructed with an inverted pitch of not greater than one percent (1%) to permit stormwater collection in the center of the alleyway.

9.9. INTERSECTIONS

- A. Streets shall be laid out to intersect at right angles.
- B. Multiple intersections involving junction of more than two (2) streets shall be prohibited.
- C. In all districts, no structure, fence, planting or other obstruction shall be permitted where it will interfere with traffic visibility across the corner.
- D. Streets shall not intersect on the same side of an Arterial or Collector Highway or Road at an interval of less than eight hundred (800) feet between their centerlines. Dual Street Entry or Shared Entry layouts developed in Living Community developments may intersect the same side of an Arterial or Collector Highway or Road at an interval of less than eight hundred (800) feet if the entry roadways are designed in conjunction with the Patterns for Development of B14 Neighborhoods as provided in the appendix of this Ordinance.
- E. Streets shall not intersect an Arterial or Collector Highway or Road on opposite sides of the Arterial or Collector Highway or Road unless they are laid out directly opposite each other or at an interval of one hundred twenty-five (125) feet between their centerlines-

- F. Curb radii at Local Street intersections shall be a minimum of fifteen (15) feet and a maximum of twenty-five (25) feet. Minimum curb radii at Arterial and Collector Highways and Roads shall be thirty-five (35) feet. A minimum of ten (10) feet shall be provided between the edge of paving and the right-of-way line.
- G. Streets shall not access another street directly opposite an existing residence.
- H. Intersections shall be laid out to allow for pedestrian crossings in a safe manner by keeping crossing distance to a minimum and by providing crosswalks, either painted or with different paving material, to identify crosswalk area.

9.10. RESERVED FOR FUTURE USE

9.11. SIGHT DISTANCE

- A. The control of grades, curvature, and obstructions is required to insure adequate sight distance for safe and efficient vehicular operation. There are three types of sight distances:
 - 1. For stopping,
 - 2. For passing overtaken vehicles on two and three lane streets and,
 - 3. For intersections to insure safe crossing or entering of an intersecting street.
- B. The table below shows the minimum sight distance required for the three types of sight distance on the varying street types:

Table 9-3 : Minimum Required Sight Distances

Sight Distance	Arterial Highways	Collector Highways	Local Streets
Stopping	350 ft.	275 ft.	200 ft.
Passing	As Recommended by AASHTO		
Intersections	See Appendix		

9.12. STREET CONSTRUCTION

- A. All work and material involved in the construction of roadways covered by these specifications shall be, in every particular, in accordance with those requirements set forth in applicable sections of the Pennsylvania Department of Transportation Form 408 - Specifications, last amended and amendments thereto.
- B. The entire right-of-way shall be graded in accordance with a typical cross section of the road as shown on the final plan as approved by the Supervisors. The finished surface of the roadway shall have a minimum cross slope of 1/4" per foot and shall be uniform and conform to the lines, grade and width shown on the drawings. The cross slope of the roadway shall be 3/8" per foot if the centerline grade is less than one (1%) percent. Roadway banks beyond the right-of-way lines shall be sloped at a maximum slope of 3 horizontal to 1 vertical.
- C. All roadways covered by these specifications shall be constructed in accordance with the following standards and in accordance with specifications as found in PA DOT Form 408 – latest revised:
 - 1. Subbase - This work consists of construction of a compacted aggregate (PA DOT #2A) to a compacted depth of six (6) inches on a prepared subgrade
 - 2. Base Course - A bituminous concrete base course to a compacted depth of five (5) inches. When curbing is not required, shoulders shall be constructed with bituminous concrete base course and be provided on both sides of the cartway.
 - 3. Binder Course - A bituminous concrete binder course (SuperPave) to a compacted depth of two (2) inches shall be provided for all highways (arterial and collector), roads and all non-residential roads/highways. A bituminous tack coat shall be applied to the binder course prior to placement of the final wearing course.
 - 4. Wearing Course - A bituminous wearing course (SuperPave) to a compacted depth of one and one-half (1-1/2) inches.
- D. Bituminous paving mixtures shall not be placed when surfaces are wet or when the temperatures of either the air or the surface on which the mixture is to be placed is 40 degrees Fahrenheit or lower.
- E. The roadbed subgrade shall be prepared to the established subgrade elevation and compacted to not less than 100% of the determined dry-weight density as set forth in ASTM D 698. Preparation of the subgrade shall conform to PA DOT Form 408 – latest revised.
- F. Subgrade drains shall be placed along all proposed roadways to drain wet areas. Subgrade drains shall be constructed in accordance with PA DOT Form 408, last amended.

- G. Utility trench construction (separate storm sewer system, wastewater lines, water main, gas main etc) within existing streets shall be backfilled with 2A modified stone placed and compacted in eight (8) inch lifts. The trench shall be paved with bituminous concrete base course (5" compacted depth), Bituminous Binder Course (SuperPave) (1 ½" compacted depth) and the entire roadway shall be paved with a full width overlayment (edge of road to edge of road) of Bituminous Wearing Course (SuperPave) (1" compacted depth). Utility trenches within proposed streets shall be backfilled with clean, dry, select material and compacted in eight (8) inch lifts to not less than one hundred (100%) percent of the determined dry weight density of the backfill material. Trenches within easements shall be backfilled with clean, dry, select material and compacted in twelve (12) inch lifts to not less than one hundred (100%) percent of the determined dry weight density of the backfill material as set forth in ASTM D 698 and PA DOT Form 408 – latest revised.
- H. During construction of roads, the contractor shall provide maintenance and protection of traffic meeting PennDOT standards.

9.13. RESERVED FOR FUTURE USE

9.14. STREET AND STOP SIGNS

- A. The developer shall erect at every street intersection street signs and stop signs meeting Township approval, having thereon the names of the intersecting streets. At intersections where streets cross, there shall be at least two (2) such street signs and at the intersections where one (1) street ends or joins with another street, there shall be at least one (1) such street sign.
- B. Regulation street and stop signs shall be erected on the street prior to the first dwelling on that street being occupied. Regulation street and stop signs shall also be provided on all streets providing access to the dwelling(s) being occupied. Temporary street signs may be erected upon the approval of the Township. However, the signs shall be made permanent prior to the Applicant's request for dedication.

9.15. STREET LIGHTS

- A. When required, the Applicant shall install or cause to be installed, at the Applicant's expense, street lights serviced by underground conduit in accordance with a plan to be prepared by the Applicant's engineer and approved by the Township. Where street lights are installed at street intersections, the developer shall provide a combination street sign/light. Design of light standards shall be approved by the Township prior to installation. Shop drawings (4 copies) of lighting facilities shall be submitted to and approved by the Township prior to installation. Provision shall be made by the owner/Applicant for energizing said lighting prior to the first dwelling on the street being occupied or after fifty (50%) percent of the dwellings in a given subdivision or land development (or phase) are occupied, whichever occurs first. The owner/Applicant shall be responsible for all utility costs involved in lighting the streets until such time that the streets are accepted as public streets by the Township.

9.16. STREET ACCESS

- A. Where a residential subdivision or land development abuts or contains an existing road, the following methods for providing street access may be used:
 - 1. Front-facing lots - Where a lot has its front yard or side yard facing the existing road, the following options shall apply:
 - a. Internal marginal access streets - Access to individual lots shall be by means of an internal marginal residential access street. Between the internal marginal access street and the existing street there shall be a landscaped berm and Type 1 buffer with a minimum width of 75 feet.
 - b. Driveways to existing roads - Access to individual lots may be by means of individual on-lot driveways provided that the minimum distance between driveways is not less than 200 feet.
 - c. Shared driveways - Access to individual lots may be by means of shared driveways or private lanes to the existing road provided that the minimum distance between driveways or lanes is not less than 200 feet. No more than five dwelling units may share a single shared driveway.
 - 2. Reverse frontage lots - Reverse frontage lots, which are lots where the rear of the lot is located facing and abutting the existing road and access is by means of an internal street, are permitted only where there is a berm and landscaped buffer between the rear of the lot and the existing road. The requirements for special setbacks in the Zoning Ordinance shall be met.

- B. For the purpose of servicing any property held under single and separate ownership, entrance and exit drives crossing the street line shall be limited to two (2) along the frontage of any single street, and their centerlines shall be spaced a minimum of eighty (80) feet apart. On corner properties, there shall be a minimum spacing of sixty (60) feet, measured from the curb line, between the centerline of any entrance or exit drive and the curb line of the street parallel to said access drive. Corner properties shall only be permitted access to the same street. On properties that about a round-a-bout, driveways shall not provide direct access to the round-a-bout. The centerline of any entrance or exit drive shall be located a minimum of sixty (60) feet, measured from the point of tangency of the curb return of the round-a-bout.
- C. Private driveways, where provided for living community developments, multi-family developments, and townhouse developments, shall be located not less than thirty (30) feet from the intersection of the curb line (or edge of road if curbs are not proposed) extended for each road for corner lots and shall be measured along the curb line or edge of road. All other private driveways shall be located not less than sixty (60) feet from the intersection of the curb line (or edge of road if curbs are not proposed) extended for each road for corner lots and shall be measured along the curb line or edge of road. All driveways shall provide access to the street of lower classification when a corner lot is bounded by streets of two different classifications as defined herein.
- D. Driveways shall be so located and designed to provide sight distance in accordance with the Minimum Sight Distance Diagram provided in the appendix of these regulations.
- E. Driveways to Residential Lots:
1. Where driveways provide access to an arterial highway or collector highway (major and minor), there shall be a driveway turn-around space on each lot so that no vehicle need back out onto an arterial highway or collector highway in order to leave the lot or back into the lot in order to enter the lot. The turnaround space shall be no closer than 5 feet from any property line.
 2. Driveways shall be designed and constructed to provide a stopping area not exceeding a four percent (4%) grade, twenty (20) feet behind the right-of-way.
 3. Driveways shall be designed and constructed to provide sight distance in accordance with the Minimum Sight Distance Diagram - Chart provided in the appendix of these regulations.
 4. All driveways shall be located at least five (5) feet from any side or rear lot line.
 5. For properties abutting curbed and uncurbed streets, the curb cut or driveway width at the street line for single width driveways shall be no less than ten (10) feet or more than fourteen (14) feet.
 6. All driveways shall be a minimum of ten (10) feet in width.
 7. All driveways shall be paved twenty-five (25) feet from the edge of the cartway using the following minimum standards:
 - a. Coarse aggregate (PennDOT #2A) having a compacted depth of six (6) inches.
 - b. A bituminous wearing course (ID-2) to a compacted depth of two (2) inches.
 8. Driveways shall not be permitted within the front yard when the lot is served by an alley.
- F. Driveways for Non-Residential Uses:
1. Driveways shall be located no less than 80 feet from any street intersection which shall be measured from the intersection of curb lines. Driveways to corner lots shall gain access from the street of lower classification when a corner lot is bounded by streets of two different classifications.
 2. There shall be a driveway turn-around space on each lot so that no vehicle need back out onto a street in order to leave the lot or back into the lot in order to enter the lot. Driveway turnaround facilities shall be designed to accommodate tractor trailers and articulated tractor trailers.
 3. Driveways shall be designed and constructed to provide a stopping space not exceeding a four percent (4%) grade, twenty (20) feet behind the right-of-way.
 4. Driveways shall be designed and constructed to provide sight distance in accordance with the Minimum Sight Distance Diagram - Chart provided in the appendix of this Ordinance.
 5. All driveways shall be at least five (5) feet from any side or rear lot line, except where joint or coordinated parking shared by 2 or more commercial or industrial uses is permitted by the Board of Supervisors.

6. The width of entrance and exit drives shall be:
 - a. A minimum for one-way use only of fifteen (15) feet.
 - b. A minimum for two-way use of twenty-six (26) feet.
 7. All Non-Residential use driveways shall be constructed in accordance with the standards as set forth for STREET CONSTRUCTION found in this Ordinance.
 8. Minimum curb radii at driveway entrances shall be ten (10) feet, where curbs are required.
 9. Non-Residential Development driveways shall be limited to providing access to ten (10) parking spaces or less. Non-Residential Developments providing access to eleven (11) or more parking spaces shall be required to construct a road for access. (See street construction standards for Non-Residential Developments)
- G. Standards - Lanes for Residential Lane Lots or Flag Lots
1. Each lane shall provide a ten (10) foot wide travel lane constructed with coarse aggregate- PennDOT #2A, to a compacted depth of six (6") inches.
 2. Each lane shall be cleared (brush and trees) to a minimum width of fifteen (15) feet to allow for emergency vehicles. Lanes shall be limited to a maximum slope of 10%.
 3. Each lane shall be paved twenty-five (25) feet from the edge of the existing street using the standards as set forth for residential driveways.
- H. Driveways to Living Community Lots:
1. Driveways shall provide access to internal residential roadways. Driveways shall not access arterial or collector highways.
 2. Driveways shall be designed and constructed to provide a stopping area not exceeding a four percent (4%) grade, twenty (20) feet behind the right-of-way.
 3. Driveways shall be designed and constructed to provide sight distance in accordance with the Minimum Sight Distance Diagram - Chart provided in the appendix of these regulations.
 4. All driveways to single family lots shall be located at least five (5) feet from any side lot line.
 5. For lots accessing curbed and uncurbed streets, the curb cut or driveway width at the street line shall be fourteen (14) feet, the minimum driveway width shall be ten (10) feet, and the maximum driveway width shall be eighteen (18) feet. Double width driveways are only permitted to access alleys.
 6. All driveways shall be paved using the following minimum standards:
 - a. Coarse aggregate (PennDOT #2A) having a compacted depth of six (6) inches.
 - b. A bituminous wearing course (ID-2) to a compacted depth of two (2) inches.
 7. Driveways may be constructed using two tire lanes with an intermediate grass strip when the access to the drive comes from an alleyway.
 8. Driveways shall not be permitted within the front yard when the lot is served by an alley.
 9. Driveways for Living Community developments shall not be permitted within the front yard when the lot fronts on or is opposite to a Common or Central Green.
 10. Where driveways are permitted within the front yard, garage doors shall be setback a minimum of 20 feet from the primary facade of the dwelling unit. No more than two garage doors facing a street may be located in a row, and such rows of garage doors must be separated from any other garage door facing a street by at least ten feet.
 11. Where driveways are permitted within the front yard, the minimum distance between driveways shall not be less than 100 feet.
 12. Driveways to DB1 and DB2 lots shall take access from an alley only.

9.17. PARKING, LOADING AND DRIVEWAYS - RESIDENTIAL (OTHER THAN SINGLE FAMILY) AND NON-RESIDENTIAL USES

- A. The design standards specified below shall be required for all driveways and off-street parking facilities built for a capacity of three (3) or more vehicles.
1. The following are minimum standards to be used for parking stall dimensions and aisle widths:
 - a. STANDARD PARKING DIMENSIONS – Compact parking spaces shall be 9 feet by 18 feet. Standard parking spaces shall be 12 feet by 20 feet, except for parallel parking spaces which shall be 8 feet by 22 feet. Compact parking spaces shall be placed between the building structure and the “standard” parking spaces. Of the parking requirements listed in the Buckingham Township Zoning Ordinance, 25% of the spaces shall be designed and designated as “compact” spaces.
 - b. Aisles within parking lots shall be 20 feet for one-way aisles and 24 feet for two-way aisles
 2. Parking areas shall be constructed in accordance with the standards as set forth for STREET CONSTRUCTION found in this Ordinance, except where pervious paving is permitted as part of a stormwater management plan.
 3. Parking areas shall be designed to permit each vehicle to proceed to and from the parking space provided for it without requiring the moving of any other vehicle.
 4. All parking spaces shall be marked so as to provide for orderly and safe parking.
 5. Parking areas shall not be located within the minimum front building setbacks as required by the township Zoning Ordinance, except where joint or coordinated parking is shared by two or more establishments in which case parking may be permitted in the side yard setback or yard only.
 6. Handicap parking spaces shall be designed (number, layout and signage) in accordance with Americans With Disabilities Act (ADA) requirements and the following:
 - a. Parking areas with twenty-four (24) spaces or less shall not have a grade exceeding six percent (6%).
 - b. Parking areas with more than twenty-four (24) spaces shall not have a grade exceeding four percent (4%).
 - c. The minimum slope of parking areas shall be 0.5% for parking areas without curb and 1.0% for parking areas with curb.
 7. Parking areas shall be designed so that cars will not back onto an existing public street.
 8. Parking shall be designed to prevent vehicle overhang on any sidewalk area.
 9. A minimum radius of five (5) feet shall be provided for all curb lines and curbed islands.
 10. All dead-end parking areas shall be designed to provide sufficient backup area for the end stalls of the parking area.
 11. Raised pedestrian crosswalks incorporating a distinguishing paving material and refuge islands incorporated within landscape areas shall be provided at intervals not exceeding one hundred feet along the length of each parking area and designed so that pedestrians will be out of the direct flow of traffic, or in general provide a safe means of travel for the pedestrian.
 12. Off-Street parking areas shall be located to the side or rear of buildings.
 13. If artificial lighting is used to illuminate any parking space or spaces, the lighting shall be so arranged that no direct glare from such lighting shall fall upon any neighboring property or streets. High brightness surface of the luminaries shall not be visible from neighboring properties or from any public street. Lighting must conform to standards set forth in the current Zoning Ordinance.
- B. Loading Facilities Design
1. Off-street loading facilities for non-residential uses shall be designed to provide adequate facilities for the proposed use and to allow for proper maneuvering area for all vehicles.

9.18. CURBS, SIDEWALKS, BICYCLE/PEDESTRIAN PATHS

A. Curbs

1. Curbs shall be provided along all streets/roads, existing and proposed.
2. All curbing shall be Belgian Block curbing. Standard Belgian Block curbing shall be a minimum of eleven (11) inches in depth and provide a minimum reveal (after placement of final wearing course) of seven (7) inches. In Living Community (LC) developments, Mountable Belgian Block curbing shall be required. Mountable Belgian Block curbing shall be a minimum of eleven (11) inches in depth, provided with a minimum reveal (after placement of final wearing course) of four and one half (4- ½) inches and shall be battered at a sixty-eight degree angle. After completion of the bituminous concrete base course paving, joint sealing material shall be applied to the joint between Belgian Block curb and the bituminous paving for a width of one (1) foot from the curb toward the center of the road to seal the joint between the Belgian Block curb footing and the bituminous paving. If required by PennDOT, plain cement concrete curb, conforming to PennDOT design standards, may be installed in the PennDOT Right-of-Way.
3. Whenever curbs may be safely omitted as determined by the Board of Supervisors, well-designed, maintainable roadside swales shall be used in lieu thereof. When curbing is not used, the stone subbase, bituminous concrete base course and the binder course shall be constructed to a point two (2) feet outside of each side of the finished roadway surface.
4. Curb cuts (Driveway depressions) shall be between a minimum of 1" and a maximum of 2" above the roadway surface, and shall have #6 reinforcing rods (2) placed for the full length of depression plus 18" on either side.
5. Curbing within parking areas may be designed to provide a minimum reveal of six (6) inches.

B. Sidewalks and Bicycle/Pedestrian Paths

1. Sidewalks or bicycle/pedestrian paths shall be provided along all existing and proposed streets. It is the intent of the township to accommodate safe pedestrian and bicycle access to all parts of the township.
2. Within a development, concrete sidewalks shall be provided on both sides of the street. Along perimeter roads, such as highways or roads, macadam bicycle/pedestrian paths may be provided in lieu of sidewalks. Bicycle/pedestrian paths may be constructed with brick or slate stamped (and painted) concrete or macadam. Pattern and color of stamping shall be approved by the Township.
3. The minimum width of all sidewalks shall be five (5) feet for residential developments and six (6) feet wide for multi-family, living community and performance developments and non-residential uses.
4. Construction - Sidewalks shall be concrete and shall have a minimum depth of four (4) inches and placed on a bed of coarse aggregate - PennDOT No. 2A - having a compacted depth of four (4) inches. Concrete driveways, driveway aprons, and sidewalks that will provide access for vehicles shall have a minimum depth of six (6) inches of concrete with a #10 WWF reinforcing grid and be placed on a bed of coarse aggregate - PennDOT No. 2A - having a compacted depth of six (6) inches. All concrete shall be Class A, 3300 psi, 28 day strength. Brick pavers may be used as a surface treatment for concrete sidewalks and shall use the concrete sidewalk and base as specified above.
5. Construction - Bicycle/pedestrian path shall be constructed of macadam. The minimum depth of macadam material (Bituminous Wearing Course - ID-2) shall be four (4) inches which shall be placed on a bed of coarse aggregate - PennDOT No. 2A - having a compacted depth of four (4) inches.
6. Sidewalks and bicycle/pedestrian paths shall be located within a public right-of-way, or an easement in favor of the Township.
7. Curb cuts and handicap ramped sidewalks shall be provided at street crossings and access to multi-family, living community and performance developments and non-residential parking areas and shall be in accordance with the latest ADA (Americans with Disabilities Act) standards as amended.
8. The grades and paving of sidewalks and pedestrian paths shall be continuous across driveways.
9. Sidewalks and pedestrian/bicycle paths shall be laterally pitched at a slope of not less than one-quarter (1/4) inch per foot to provide for adequate surface drainage.
10. Crosswalks shall be provided at all street intersections and wherever necessary to facilitate pedestrian circulation

C. Bicycle/Pedestrian Paths

1. All subdivisions and land developments shall be required to establish bike paths in accordance with the Township Bike Plan and Open Space Plan. Off-street bicycle/pedestrian paths are preferred. Bike lanes may be provided where bicycle/pedestrian paths cannot be built due to vegetation or building obstructions. Bicycle Paths are off-street bikeways laid out on private property, public right-of-way, or open space and recreational areas.
2. Bicycle/Pedestrian Construction Standards - Bicycle/pedestrian paths shall conform to the following construction standards:
 - a. The near edge of the path shall not be less than five (5) feet from the face of the curb along any street except in living community developments consistent with the design matrix.
 - b. Bicycle paths shall be a minimum of eight (8) feet wide.
 - c. Bicycle paths shall as near as possible follow the contour lines of the particular area where the paths are to be installed;
 - d. Curb ramps shall be the same width as the bike path and shall be installed to permit the crossing at intersecting streets; curb ramps shall have a maximum slope of twelve to one with sides having maximum slope of ten to one;
 - e. Bike paths shall be constructed of four-inch aggregate base of gravel, crushed stone or slag with four-inch asphalt surface course.
 - f. All bike paths shall be constructed in such a manner to insure adequate and proper drainage, no ponding water and to prevent the bike path from being inundated by surface drainage. The bike path shall also be designed to prevent stormwater flow along the path.
3. Path Markings and Signs - Stop signs shall be posted on the path where the path intersects driveways and streets. Stop signs shall be eight (8") inch octagonal signs. Signs shall be installed on a 4" x 4" post that is weather resistant and mounted 4' - 0" above the ground surface. The sign post shall be placed in the ground to a minimum depth of three (3') feet.
4. Bicycle/Pedestrian Paths shall be installed prior to the occupancy of any unit within the land development or subdivision. This shall include all pedestrian trails, walkways, or bicycle paths proposed in Right-Of-Way, common or open space areas and easements.

9.19. MONUMENTS

- A. Monuments shall be placed at each change of direction of the development boundary; two (2) to be placed at each street intersection and one (1) on one side of each street at angle points and at the beginning and end of curves. Utility easements shall be monumented on one (1) side at the beginning and end of the easement and at all changes in direction. Areas to be conveyed for public use shall be monumented at all changes of direction along boundaries.
- B. Monuments shall be placed in the ground after final grading is completed, at a time specified by the Township Engineer. The monument shall be concrete, the size and length shall be as specified in Article II.
- C. All property corners (changes in direction) shall be marked by use of iron pins or concrete monuments. Iron pins shall consist of a metal pipe or reinforcement rod, at least 5/8" diameter and thirty (30) inches in length.
- D. All monuments and iron pins shall be certified for accuracy by the Applicant's engineer/surveyor. Accuracy of monument/iron pin shall be within 3/100 of a foot. All monuments/iron pins shall be set no greater than one (1) inch above finished grade. All monuments/iron pins shall be provided with permanent caps (plastic/bronze) and shall include the license number and firm name of the professional surveyor responsible for setting the monument/iron pin. After installation, all monuments/iron pins shall be flagged with stakes and survey ribbon.
- E. Developments of 25 units or more shall establish a brass disc benchmark marking the elevation and vertical location relative to the National Geodetic Vertical Datum and the horizontal location relative to the Pennsylvania State Plane Coordinate System. The location of the disc shall be approved by the Township. The disc shall be numbered with a number assigned by the Township.

9.20. LANDSCAPE CONSERVATION AND IMPROVEMENT PLANS

- A. All plans shall contain a Landscape Plan which shall address conservation of the natural landscape and planting of additional plant materials to enhance the development and to protect surrounding areas. The Landscape Plan shall address all areas of a site that are preserved from development and all site development exclusive of building areas. The Landscape Plan must address the following requirements: minimization of site disturbance, street trees, buffers,

parking area landscaping, preservation of trees in the right-of-way, tree protection during grading and construction, and planting in conjunction with stormwater management.

B. Site Inventory and Proposed Disturbance -The plans shall show the following:

1. The plans shall show all areas that will be graded and from which soil or vegetation will be disturbed or removed. The plans shall include a line marking the edge of disturbance. Plans shall indicate the trunks of trees relative to the proposed disturbance line, not only tree canopy. Trees which are "to be preserved", "to be removed" or "to be disturbed, but not removed" shall be clearly differentiated on the plans.
2. Areas to be disturbed for utility installations, including electric, gas, water, and sewer, shall be shown on the landscape plan and on the grading plan.
3. All vegetation existing on the site: forests, trees standing alone, farm fields, meadows, shrubs, hedgerows, and groups of trees, with a description of the type of vegetation.
4. For all trees 36" in caliper or greater, the plans shall include a field-surveyed canopy line.

C. Street Trees

1. Within any land development or subdivision, street trees shall be planted along both sides of all streets except where the Township agrees that suitable street trees are already in place.
2. One street tree shall be provided for every 35 feet of street frontage.
3. One Small Ornamental/Flowering tree shall be provided for every 30 feet of alley frontage. The alley street tree shall be in addition to the street tree requirement for all lots that are provided with alley frontage. All alley street trees shall be placed along the alley right-of-way line.
4. One of the following street tree planting concepts shall be used, subject to Township approval:
 - a. Formal Allee of Street Trees
 - i. Use uniform street tree variety
 - ii. Coordinate new plantings with existing street tree plantings where applicable. A uniform canopy from both sides of the street shall be provided.
 - iii. Street trees shall be located within the right-of-way 4 to 6 feet from the curb line. The width of the planted area between the sidewalk and the curb shall be no less than 8 feet. See diagram in Appendix.
 - iv. Trees shall meet the requirements of the township for size, species, and planting requirements.
 - b. Naturalized Street Tree Planting
 - i. Vary street tree varieties, spacing 3 to 15 feet from the curb line.
 - ii. An average of one street tree shall be planted for every 35 feet of street frontage.
 - iii. Planting design shall accentuate views and integrate important landscape elements.
 - c. Living Community Street Tree Planting (permitted in Living Community type developments only)
 - i. Use uniform street tree variety.
 - ii. Street trees located on Living Community Lots shall be "Small Understory Trees" as identified in the Recommended Plant List Matrix.
 - iii. Street trees located on Common or Central Green Areas shall be "Large Canopy Trees" as identified in the Recommended Plant List Matrix.
 - iv. Street trees shall be located within the right-of-way, 4 to 6 feet from the curb line. The width of the planted area between the sidewalk and the curb shall be no less than 8 feet.
 - v. Entry Trees shall be provided in lieu of Street Trees along entry roadways. Entry Trees shall be provided in a radial manner, placed 160' feet from the center of the entry road, for a minimum length of 250 feet. Entry Trees shall comply with the planting requirements of a Type 2 Buffer. An example of the suggested Entry Tree arrangement is provided in the Patterns for Development of B14 Neighborhoods Appendix of this Ordinance.

5. Street trees shall meet the following standards:
 - a. Branching Height - The height of branching shall bear a relationship to the size and species of tree; those trees selected for street tree usage shall have a minimum clearance height of seven (7) feet above grade before branching begins.
 - b. All trees to be installed shall be balled and burlapped in accordance with American Association of Nurserymen Standards. The ball depth shall be not less than 60 percent of the ball diameter and in all cases contain the maximum of the fibrous roots of the tree. Bare root material is not acceptable. The following standards shall apply:

Table 9-4 : Minimum Ball Diameters

Caliper	Minimum Ball Diameter
3 to 3-1/2 inches	32 inches
3-1/2 to 4 inches	36 inches
4 to 5 inches	44 inches
5 to 6 inches	54 inches

- c. Excavated plant pits shall be two (2) feet wider than the ball size.
 - d. Backfill mix for the excavated plant pit area shall be composed of one part topsoil, one part peat moss, and one part coarse sand.
 - e. Tree Guying
 - i. Three (3) No. 12 galvanized steel wires shall be spaced equally around the tree and connected to the tree within rubber hoses so that the wire does not come in contact with the tree.
 - ii. For trees up to and including three and one half (3-1/2) inch caliper use three (3) oak 2" x 2" x 8' 0" rough sawed stakes.
 - iii. For trees over three and one-half (3-1/2) inch caliper use three ground anchor stakes 2" x 2" x 2' 6" driven flush with grade.
 - f. Provide tree wrapping paper the entire length of tree trunk from the top of ball to the start of lateral branching. Tree wrap shall be tied on with natural twine. Remove all tree guying material one (1) year after planting.
 - g. All plantings shall be mulched to a depth of three (3) inches in a 6-foot diameter ring around the base of each tree, excluding an area extending three (3) inches from the base of the tree or shrub, or continuous beds if trees or shrubs are less than 6 feet apart.
 - h. Pruning - Each plant shall be pruned to preserve the natural character of the plant in a manner appropriate to the particular requirements. Branches shall be thinned by approximately twenty-five percent (25%) by removal of crossing, damaged or competing limbs back to major crotch. The leader is to be left intact.
 - i. Plant Material - Trees shall be nursery grown stock of specimen quality. They shall be of symmetrical growth or typical of the variety and supplied from sources in the same hardiness zone as the development is located, and free of insect or disease problems.
6. Required trees shall meet the species and minimum size requirements as specified in the Township's Plant List contained in this ordinance. Caliper measurements shall be obtained at a point on the trunk 14 inches above the natural ground line.

D. Buffers

1. Buffers shall be provided in compliance with the following requirements:

Table 9-5 : Minimum Buffer Requirements

Situation	Buffer Required	Buffer Type
A new subdivision or land development regardless of abutting land use	Yes - buffer required around the perimeter	Type 1 Width of 50 feet
Any development adjacent to farmland or property within the agricultural security district	Yes - buffer required wherever the development abuts farmland	Type 2 Width of 25 feet
Separation between residential and institutions: schools, parks, township buildings, nursing homes	Yes - buffer required along lot lines wherever institutions abuts residential use and must be provided by either one land use or the other	Type 1 - 50 foot width Purpose - to minimize effects of lights, noise, traffic. Require extra space to separate parking area from houses
Separation between residences and any other nonresidential use - commercial or industrial	Yes - buffer required along lot lines where nonresidential abuts residential use	Type 5 - 75 foot width Buffer should be mix of hedges, evergreens, and larger trees. Require extra space to separate parking from houses
Visual screen around storage, maintenance, and waste disposal areas.	Yes - buffer required around the edge of the facility	Type 4 Fences + evergreen screen
Reverse frontage lots	Yes - buffer required where rear yard is adjacent to a perimeter street	Type 5 - 75 foot width; Landscaped berm
Any use abutting required open space	Yes	Type 2 - 15 foot width; Open space shall be delineated and separated from other lots, alleys or roads by means of a split rail or post and rail fence and a hedgerow.
Living Community Development Area (including Common Open Space and Lot Areas abutting required Open Space	Yes	Type 2 – 15 foot width when adjacent to a non-agricultural use Open Space Area Type 2 – 25 foot width when adjacent to agricultural use Open Space Area
Living Community Development Area abutting another Living Community Development Area	Yes	Type 2 – 15 feet buffer only. Perimeter buffer is not required if developments are “paired”.
Abutting rear yards	Yes	Type 3
Parking lots along roads	Yes	Type 3

2. General Buffer Requirements

- a. Where existing vegetation meets the objectives of the buffer requirements, it shall be preserved and may be used to meet the buffer and planting requirements. Quantities, size, species, and locations of existing materials must be shown on plans and verified by the Township. Where the Township allows existing vegetation to be counted toward meeting the buffer requirements of this ordinance, the vegetation shall not be removed except for exotic invasive species, poison ivy and poison oak. The vegetation shall also be protected by recorded plan note to insure that it remains as a part of the subdivision or land development.
- b. The buffer yard may overlap the required front yards and in case of conflict, the larger yard requirements shall apply. Buffer areas shall be provided in addition to the required minimum side and rear yards.

- c. All buffer yards shall be maintained and kept clean of all debris and rubbish.
 - d. No structure, driveway, storage of materials or equipment, Stormwater/Best Management Practice facility or parking areas shall be permitted in the buffer area, except that a driveway may cross a required buffer area in order to connect the street with a parking area or driveway lying outside the buffer area.
 - e. Buffers shall be required as specified in this section where the uses to be buffered are directly abutting as well as where the uses are across a street from each other.
 - f. In areas of necessary disturbance, existing quality vegetation may be relocated for use in other areas. Procedures for tree removal and areas of relocation shall be shown on the plan and material for relocation noted in the field by tagging for review and inspection by the Township.
3. Buffer Types
- a. Type 1 Buffer - Buffer Design and Plant Materials
 - i. A 50 -foot wide buffer is required. (See Minimum Buffer Requirements Table)
 - ii. Berming shall be provided for the Type 1 Buffer. Berms shall be between 2 and 5 feet in height and shall meander in a naturalistic fashion without adversely affecting drainage. Slope-to-height ratios shall not be less than 3:1
 - iii. Plant material shall be provided in accordance with the table provided below:

Table 9-6 : Type 1 Buffer Planting Requirements

Plant Types	Size	Plant Quantities Required
Evergreens	8-10 feet in height	3 evergreens per 60 feet of buffer
Shade trees	2 ½ - 3" caliper	1 shade tree per 60 feet of buffer length
Ornamental flowering trees	8 - 10 feet in height; 2-1/2" caliper	3 per 60 feet of buffer length
Shrubs	Minimum 3 feet in height	15 shrubs for every 60 feet of buffer
Ground covering plants or perennials	18" maximum height at maturity	150 plants for every 60 feet of buffer

- iv. Existing trees in the buffer area shall be preserved and supplemented with the above materials.
 - v. Planted area shall completely screen the views of abutting yards from the street from ground level to six feet above ground level at plant maturity, for reverse frontage lot buffer.
- b. Type 2 Buffer - Hedgerow with a fence
- i. The buffer width shall be 15 - 25 feet, in which a 10-foot wide planted area is required. See Minimum Buffer Requirements Table for width requirements.
 - ii. There shall be a 3-rail split-rail fence on the development side, constructed 10 feet inside the lot of the development site.
 - iii. The 10 feet immediately adjacent to the fence shall be planted with the following, for every 60 linear feet of buffer, all of which shall be native plant species:
 - (1) 3 shade trees plus
 - (2) 4 evergreens plus
 - (3) 6 flowering trees plus
 - (4) 20 shrubs for every 60 feet.
 - iv. The remaining 15 feet abutting the farmland shall be planted in grasses or wildflowers to be mowed or ground covering plants.
- e. Type 3 Buffer - Abutting rear yards in a residential use
- i. 10 foot buffer is required within a development to separate rear yards.

- ii. No fence is required. For every 60 linear feet of buffer, there shall be: 3 shade trees, 4 evergreens, 6 flowering trees, and 20 shrubs.
- d. Type 4 Buffer - Visual Screen for Storage and Maintenance Activities
 - i. A buffer wide enough to accommodate a fence and plantings abutting the fence, as described below, is required.
 - ii. A fence that is visually obscure shall be provided and shall be placed within the building envelope and not in any required yard area. The fence height shall be adequate to provide a visual screen from adjoining properties but not to exceed six (6) feet in height. Fence details shall be provided with the landscape plan.
 - iii. Along the exterior face of the fence there shall be a row of ornamental shrubs and/or evergreens in a hedging habit planted at a rate to obscure the appearance of the fencing after a five-year growing period. Minimum shrub and upright habit evergreen height at planting shall be four feet.
- e. Type 5 Buffer - Buffer Design and Plant Materials
 - i. A 75 -foot wide buffer is required. (See Minimum Buffer Requirements Table)
 - ii. Berming shall be provided for the Type 5 Buffer. Berms shall be between 2 and 5 feet in height and shall meander in a naturalistic fashion without adversely affecting drainage. Slope-to-height ratios shall not be less than 3:1
 - iii. Plant material shall be provided in accordance with the table provided below:

Table 9-7 : Type 5 Buffer Planting Requirements

Plant Types	Size	Plant Quantities Required
Evergreens	8-10 feet in height	5 evergreens per 60 feet of buffer
Shade trees	2 ½ - 3" caliper	3 shade tree per 60 feet of buffer length
Ornamental flowering trees	8 - 10 feet in height; 2-1/2" caliper	4 per 60 feet of buffer length
Shrubs	Minimum 3 feet in height	25 shrubs for every 60 feet of buffer
Ground covering plants or perennials	18" maximum height at maturity	200 plants for every 60 feet of buffer

- iv. Existing trees in the buffer area shall be preserved and supplemented with the above materials.
- v. Planted area shall completely screen the views of abutting yards from the street from ground level to six feet above ground level at plant maturity, for reverse frontage lot buffer.

E. Parking Area and Alley Landscaping

1. All parking lots, areas of parking for ten or more parking spaces, and alleys shall be enclosed, except for entrances and exits, by a compact hedge, wall or planted buffer which shall be not less than three (3) feet in height at time of planting and which effectively screens the view from adjacent property owners. Such hedge, wall or planted buffer shall contain overlapping evergreen and deciduous shrubs. The combined evergreen and deciduous shrub hedge shall constitute a continuous visual screen at the time of occupancy of any buildings, and/or at the time of initiation of any use.
2. All parking lots or areas for off-street parking or for the storage or movement of motor vehicles shall be separated from the ultimate right-of-way line by a barrier planting strip at least 15 feet in width, which shall contain evergreen trees and/or shrubs planted every three feet.
3. Between every twenty (20) contiguous parking spaces in a row there shall be a planting strip ten (10) feet wide and suitably planted which shall serve as a physical separation between every 20 parking spaces.
4. Parking islands ten (10) feet wide shall be constructed between each parking row. Planting islands shall contain a mix of deciduous trees and evergreen and deciduous shrubs. A plan for the perpetual care of the landscaped area shall be provided to the township.

5. Hardy ground cover shall be used in place of grass wherever possible with a mulch of a type that will aid in controlling erosion and noxious weeds and will generally preserve and enhance the quality and character of the proposed landscape planting. In all parking area planting, emphasis shall be put on simplicity of design and adequacy to meet specific aesthetic, physical, or safety needs as required by the Township.
 6. All parking areas shall have at least one (1) tree of two and one-half (2-1/2) inches caliper minimum for every 10 parking spaces. A minimum of ten (10) percent of any parking lot facility shall be devoted to landscaping, inclusive of required trees.
 7. Plantings shall be able to survive soot and gas fumes. Trees that have low growing branches, gum or moisture which may drop on vehicles, blossoms, thorns, seeds, or pods which may clog drainage facilities shall not be permitted.
 8. Parking areas for Commercial or Civic Uses within Living Community developments shall be screened from internal development areas by a compact hedge, wall and/or planted evergreen buffer that shall effectively screen the view from the adjacent areas. The hedge, wall and/or planted evergreen buffer shall be integrated with the Community Green landscaping design.
- F. Landscape Plan
1. All subdivisions and land developments shall have a landscape plan approved before construction and as part of the subdivision/land development approval. The landscape plan shall be prepared, signed, and sealed by a registered landscape architect.
 2. The landscape plan shall indicate the proposed location, quantities, and types of all plantings proposed, including additional plant material proposed at development entrances or within common areas. Plant material shall be selected from the Township Plant List, which is in the Appendix of this ordinance. Once a landscape plan has received final approval from the township, no changes may be made to the landscape plan without approval by the township.
 3. The landscape plan shall include adequate protection of undisturbed natural areas, riparian buffers, areas adjacent to stormwater management facilities or planted meadows. Low height notification signs shall be posted along the protected areas every 100 feet, or as directed by the Township. The signs shall consist of a 15" x 9" evergreen non-reflectORIZED street sign-blank with yellow lettering which indicates "Natural Area – No Mowing".
- G. Landscape Maintenance
1. All grading, seeding, mulched beds, and planting in multi-family and non-residential developments must be installed and maintained by the owner and/or lessee under lease agreements in accordance with approved landscape plans
- H. Planting Prior To Occupancy
1. Perimeter buffer plantings shall be installed prior to the occupancy of any unit within the land development or subdivision. Street trees shall be installed prior to a unit or residence being occupied. A waiver may be granted due to seasonal requirements of the plant material.
- I. Conservation Easement - Trees to be preserved in order to meet ordinance requirements shall be permanently preserved by means of a conservation easement to be held by the township and which shall require the preservation of trees on private property in perpetuity. The easement shall be in the form as attached in the Appendix of this Ordinance.
- J. Planting Requirements near Overhead Utility Lines
1. Where street trees or other landscaping is proposed to be planted along streets with overhead power lines, the following requirements shall be met:
 - a. If trees are to be planted within 15 feet of a utility pole or line, measured along the ground from the base of the pole, only trees which grow no taller than 25 feet shall be planted.
 - b. If trees are to be planted within 15-25 feet of a utility pole or line, measured along the ground from the base of the pole, only trees which grow no taller than 40 feet shall be planted. Refer to Township Plant List for specifications and acceptable trees.

K. Existing Trees in Right-of-Way

1. Trees in the right-of-way of Township roads, where the right-of-way belongs to the Township, shall not be removed without Township approval except within the clear sight triangle and except for the removal of dead or unhealthy trees or non-native invasive trees. All trees within the right-of-way shall be included in the tree inventory and landscape conservation plan.

L. Stormwater Management Facilities - The Landscape Plan shall indicate plantings proposed for all stormwater management facilities.

M. Tree Protection during Construction

1. Tree protection areas shall be delineated to implement the standards contained in the Township Zoning Ordinance and this ordinance regarding preservation of trees, woodlands, and forests during the development and construction process.
2. Tree Protection Area - An area that is radial to the trunk of a tree. The tree protection area shall be 15 feet from the trunk of the tree to be retained, or the distance from the trunk to the dripline (the line marking the outer edge of the branches of the tree), whichever is greater. Where there is a group of trees or woodlands, the tree protection area shall be the aggregate of the protection areas for the individual trees.
3. Tree Protection Plan -
 - a. Tree protection areas shall be shown on the landscape plan and the grading plan submitted by the Applicant. Tree trunk locations as well as tree canopy locations shall be shown.
 - b. The tree protection plan submitted shall include an aerial photograph of the site, with the tree protection limits shown on the aerial photograph. There shall be a grid imposed on the aerial photograph showing the location of tree protection. The grid shall correspond to stakes placed in the field to allow for field verification of the tree protection limits.
4. Protection from Mechanical Injury - Prior to any site work, clearing, tree removal, grading, or construction the tree protection area shall be delineated by the following methods:
 - a. The tree protection area that is delineated on the site prior to construction shall conform to the approved development plans.
 - b. All trees scheduled to remain shall be marked; where groups of trees exist, only the trees on the edge need to be marked.
 - c. The limits of clearing shall be marked on site by means of yellow nylon rope attached to 4-foot stakes, on 8-foot centers. After the installation of the yellow rope but before any site work begins, the Township shall inspect the rope installation and compare it with the approved plans. During the site walk, if the Committee determines that additional trees or vegetation could be saved, field modifications may be made in conjunction with the Applicant. Once agreement is reached on the limits of clearing, a forty-eight inch high snow fence or other suitable fence, such as super silt fence, mounted on steel posts located eight feet on center, shall be placed along the boundary of the tree protection area.
 - d. When the fencing has been installed, it shall be inspected and approved in writing by the township prior to commencing clearing and further construction. The fencing along the tree protection area shall be maintained until all work and construction has been completed. Any damages to the protective fencing shall be replaced and repaired before further construction shall begin. The fence shall include signs posted every 200 feet along the fence which shall say: "PROTECTED AREA - DO NOT MOVE OR REMOVE THIS FENCE. NO CONSTRUCTION ACTIVITIES OR STORAGE OR MATERIALS OR EQUIPMENT BEYOND THIS POINT."
 - e. Trees being removed shall not be felled, pushed or pulled into a tree protection area or into trees that are to be retained.
 - f. Grade changes and excavations shall not encroach upon the tree protection area.
 - g. No toxic materials shall be stored within 100 feet of a tree protection area, including petroleum based and/or derived products.
 - h. The area within the tree protection area shall not be built upon nor shall any materials be stored there either temporarily or permanently. Vehicles and equipment shall not be parked in the tree protection area.
 - i. When tree stumps are located within ten feet of the tree protection area, the stumps shall be removed by means of a stump grinder to minimize the effect on surrounding root systems.

- j. Tree roots which must be severed shall be cut by a backhoe or similar equipment aligned radially to the tree. This method reduces the lateral movement of the roots during excavation, which if done by other methods could damage the intertwined roots of adjacent trees.
 - k. Within four hours of any severance of roots, all tree roots that have been exposed and/or damaged shall be trimmed cleanly and covered temporarily with moist peat moss, burlap, or other biodegradable material to keep them from drying out until permanent cover can be installed.
 - l. Sediment, retention and detention basins shall not discharge into the tree protection area.
 - m. Sediment, retention and detention basins, as defined by the extent of the stormwater or drainage easement, shall not be located within the tree protection area.
 - n. Trees shall not be used for roping, cables, signs or fencing. Nails and spikes shall not be driven into trees.
 - o. Surface runoff shall not be altered so as to either direct stormwater into or away from the tree protection area.
5. Protection from Grade Change
- a. When the original grade cannot be retained at the tree protection area line, a retaining wall shall be constructed outside the tree protection area.
 - b. The retaining wall shall be designed to comply with the municipal standards for retaining walls; however, in no case shall the wall exceed 4 feet.
 - c. To ensure the survival of trees, the following methods shall be used.
 - i. The top of the wall shall be four inches above the finished grade level.
 - ii. The wall shall be constructed of large stones, brick, building tile, concrete blocks, or treated wood beams (wood treated with CCA shall not be permitted) not less than six inches by six inches. A means for drainage through the wall shall be provided so water will not accumulate on either side of the wall. Weep holes shall be required within any wall.
 - iii. Any severed roots as a result of excavation shall be trimmed so that their edges are smooth and are cut back to a lateral root if exposed.
6. Trees damaged during construction
- a. Tree trunks and exposed roots damaged during construction shall be protected from further damage. Damaged branches shall be pruned according to National Arborist Association standards. All cuts shall be made sufficiently close to the trunk or parent limb but without cutting into the branch collar or leaving a protruding stub. All necessary pruning cuts must be made to prevent bark from being torn from the tree and to facilitate rapid healing.
7. Protection from Excavations
- a. When there is no alternative but to locate an electrical or other small utility line within a tree protection area, the township shall determine the most desirable location for the line and the following guidelines shall be used:
 - i. Where possible, trenches should bypass the root area.
 - ii. Where trenches must be dug past the side of a tree, the following precautions shall be observed:
 - (1) Trenches shall be no closer to the trunk than half the distance from the drip line.
 - (2) Cut as few roots as possible.
 - (3) If roots have to be cut, cut them as cleanly as possible.
 - (4) Backfill the trench as soon as possible, avoiding soil compaction.
8. Tree Replacement
- a. No tree shown to remain on an approved subdivision or land development plan shall be removed without prior Township approval unless it is the cause of immediate danger to life or property.

- b. No tree shown to remain on an approved subdivision or land development plan other than that which is the cause of immediate danger to life or property shall be removed without Township approval based upon a determination that any of the following considerations exist:
 - i. Affliction by a disease which threatens injury or destruction of other trees.
 - ii. The tree has been substantially damaged or has died.
- c. In the event that a tree over 3 inches caliper which is shown on an approved plan to remain and which must be removed in accordance with i. or ii. above, such tree shall be replaced with a tree of the same species or as approved by the Township at a rate of one caliper inch per one caliper inch of tree removed.
 - i. The total number of caliper-inches removed in excess of the amount permitted to be removed shall be determined and replaced on a caliper-inch for caliper-inch basis;
 - ii. Replacement trees shall meet the following specifications:
 - (1) Deciduous trees shall be a minimum of 3" - 3 1/2" inches in caliper (meeting the American Association of Nurserymen Specifications)
 - (2) Coniferous trees shall be a minimum of 8'-10' in height;
 - (3) Two flowering trees may be substituted for one deciduous tree or one evergreen tree provided that the minimum size of the flowering trees shall be 2 1/2" - 3" in caliper.
 - (4) The types of trees to be planted shall be selected on the basis of the tree list and guidelines found in the Township Subdivision/Land Development Ordinance.
 - (5) Up to 25 percent of the new trees to be planted may be of the coniferous variety.
 - (6) Where 25 or more trees need to be planted to meet the reforestation requirements, a minimum of three (3) tree species shall be planted.
 - iii. Trees required to be planted under these reforestation procedures shall be in addition to any street trees or buffer requirements which this or any other applicable ordinance shall require.
- d. In the event that trees in forest or woodland areas to be protected are removed or damaged by accident or by violation of the tree protection requirements, trees shall be replaced in accordance with the following formula:
 - i. Trees up to 16 inches caliper shall be replaced with two caliper inch for every one caliper inch removed.
 - ii. Trees 16 inches or greater shall be replaced with 3 caliper inches for every 1 caliper inch removed. The replacement trees may be located on the development site or off site. If located off site, the developer shall pay for the trees as well as the cost of installation.
- e. In the event that the Township deems any of the required landscaping unacceptable (i.e., street trees, buffer plantings, etc.), the landscaping shall be replaced prior to acceptance of the improvements by the Township. The size of the replacement landscaping shall be equal to the average caliper and/or height of the landscaping units located on either side of the replacement landscaping. Required Landscaping that is deemed unacceptable by the Township during the Maintenance period shall also be replaced in accordance with the above requirements.

9.21. RESERVED FOR FUTURE USE

9.22. CLEARING AND GRADING

- A. Blocks and lots shall be graded to secure proper drainage away from buildings and to prevent ponding of stormwater, except in detention/retention areas.
- B. No excavation or fill shall be made with a face steeper than three (3) horizontal to one (1) vertical (3:1).
- C. The top or bottom edge of slopes shall be a minimum of five (5) feet from property or right-of-way lines of streets in order to permit the normal rounding of the edge without encroaching on the abutting property.

- D. Topsoil shall not be removed from the development site. The Applicant shall provide "Cut and fill calculations" for topsoil and subsoil with the initial submission of the Final development plans. The calculations shall verify that no topsoil will be removed from the site before development and during development of the project. The subsoil "cut and fill calculations" shall also verify that the grading proposed for the site development is not generating any excess subsoil. The use of "borrow pits" for disposing of excess topsoil shall not be permitted.
- E. Burying of trees, stumps or construction materials is prohibited. Trees and stumps may be chipped or ground and spread on the site.
- F. Individual lot grading plans shall be consistent with the subdivision site grading plans and with the Township's Grading requirements listed above. If during the building permit process, any revisions are made to the lot grading plan after the development plans are approved and recorded, the lot grading plans shall be reviewed and approved by the Township Engineer. Revisions include change in building footprint location or size, change to first floor elevation (exceeding 1.0 foot above or below designed elevation), and any revisions to site grading.
- G. Any clearing and grading for any purpose, including the installation of public utilities and services, shall be shown on the landscape plan and the grading plan.
- H. The plans shall show clearly the limits of site disturbance with a line or shading or other means.
 - 1. No grading or removal of vegetation is permitted within required open space, except to accommodate recreational paths or facilities, or central or community greens internal to a development, as approved by the township.
 - J. Grading shall only be permitted in the building envelope and for driveways or other means of access, unconventional wastewater disposal systems and stormwater facilities. The maximum width of grading for driveways shall be fifteen (15) feet. Utilities (water, wastewater, gas etc.) shall be placed within the area to be disturbed for driveway installation. The limit of grading shall not preclude tilling of soil to plant grass, placing of landscaping and installation of geothermal heating/air conditioning systems.

9.23. STORMWATER MANAGEMENT

- A. Stormwater management facilities shall be provided for all developments occurring within Buckingham Township to minimize the negative effects caused by inadequate management of stormwater runoff, manage accelerated runoff and erosion and sedimentation problems at their source by regulating activities that cause these problems, utilize and preserve the existing natural drainage systems, encourage recharge of groundwater where appropriate and prevent degradation of groundwater quality, maintain existing flows and quality of streams and watercourses in the municipality and the commonwealth, preserve and restore the flood-carrying capacity of streams, provide proper maintenance of all permanent stormwater management facilities that are constructed in the municipality and provide performance and design standards for watershed-wide stormwater management and planning. No Regulated Earth Disturbance activities within the Township shall commence until approval by the Township of a plan which demonstrates compliance with State Water Quality Requirements after construction is complete.
 - 1. The following activities are defined as Regulated Activities and shall require stormwater management controls and BMPs which shall be in compliance with this ordinance:
 - a. Land Development.
 - b. Subdivision (Minor and Major).
 - c. Construction of new or additional impervious or semi-pervious surfaces (driveways, parking lots, etc.) – where the impervious or semi-pervious surfaces exceed 5% of lot area or 500 square feet, whichever is smaller. Incremental increases to the impervious or semi-impervious surfaces shall be accumulative and considered as a single increase in the impervious or semi-impervious surface.
 - d. Construction of new buildings or additions to existing buildings – where building coverage exceeds 5% of the existing impervious cover, or 500 square feet, whichever is less.
 - e. Diversion piping or encroachments in any natural or man-made channel.
 - f. Installation of nonstructural or structural stormwater management BMPs or appurtenances thereto.
 - g. Temporary storage of impervious or pervious material (rock, soil, etc.) on an existing developed property – where coverage exceeds 5% of the lot or 1,000 square feet, whichever is less.
 - h. Prohibited or polluted discharges.
 - i. Alteration of the natural hydrologic regime.
 - j. Redevelopment.

- k. Any of the above Regulated Activities which were approved more than 5-years prior to the effective date of this ordinance and resubmitted for municipal review.

B. General Requirements

1. For modifications to all regulated activities within the Township as defined above, the Applicant shall submit a drainage plan consistent with these requirements to the Township for review. These criteria shall apply to the total proposed development (entire tract, including undeveloped portions of the tract) even if development is to take place in stages. If the development is to take place in stages, each stage shall provide adequate stormwater management facilities. Stormwater management facilities shall be designed to accommodate the flow from the maximum impervious surface permitted by the Buckingham Township Zoning Ordinance.
2. Stormwater drainage systems shall be provided in order to permit unimpeded flow along natural watercourses, except as modified by stormwater management facilities or open channels consistent with this ordinance.
3. The existing points of concentrated drainage that discharge onto adjacent properties shall not be altered in any manner which could cause property damage without permission of the adjacent property owner(s) and shall be subject to any applicable discharge criteria specified in this ordinance.
4. Development sites that discharge stormwater by sheet flow condition (diffused) shall be subject to all applicable discharge criteria, whether proposed to be concentrated or maintained as diffused flow, except as otherwise provided by this ordinance. If diffused flow is proposed to be concentrated and discharged onto an adjacent property, the developer must document that adequate downstream conveyance facilities exist to safely transport the concentrated discharge to a natural outfall, or otherwise prove that no erosion, sedimentation, flooding or other harm will result from the concentrated discharge. The Applicant shall submit a "Downstream Hydraulic Capacity Analysis" for all points of concentrated discharge where diffused drainage discharge existed before development. The Applicant shall also acquire approval from the downstream property owner by obtaining an easement for conveying stormwater through his/her property.
5. Where a development site is traversed by existing streams, drainage easements shall be provided conforming to the line of such streams. The terms of the easement shall conform to the stream buffer requirements contained in this ordinance.
6. Stormwater runoff or natural drainage shall not be so diverted as to overload existing drainage systems, or create flooding or the need for additional drainage structures on other private properties or public lands. Stormwater shall not be diverted from one watershed to another watershed.
7. Whenever a watercourse is located within a development site, it shall remain open in its natural state and location and shall not be piped, impeded, or altered (except for road crossings). It is the responsibility of the developer to stabilize existing eroded stream/channel banks.
8. The Applicant shall provide a permanent easement to the Township along any watercourse located within or along the boundary of any property being subdivided or developed. The purpose of any such easement shall be for the maintenance of the channel of any watercourse; the terms of the easement shall prohibit excavation, the placing of fill or structures, and any alterations which may adversely affect the watercourse. The easement shall conform to the line of the watercourse and shall be of sufficient width to protect the natural drainage system which shall be calculated using a 100-year storm event. However, in no case shall the easement be less than twenty (20) feet in width. The Applicant shall maintain the area of the easement until such time as one of the following occurs:
 - a. If an easement acceptable to the municipality is established, the maintenance shall then be the responsibility of the individual lot owners or homeowners association over whose property the easement passes. For land developments, the maintenance shall then be the responsibility of the owner.
 - b. A homeowners' association or other approved legal entity, approved by the Township, assumes responsibility for the maintenance of the development, including the retention of the watercourse easement.
9. When it can be shown that, due to topographic conditions, natural drainageways on the site cannot adequately provide for drainage, open channels may be constructed conforming substantially to the line and grade of such natural drainageways. Work within natural drainageways shall be subject to approval by PA DEP through the Joint Permit Application process, or, where deemed appropriate by PA DEP, through the General Permit process.

10. Stormwater management facilities shall not be located in waters of the commonwealth or existing wetlands. When there is a question whether wetlands may be involved, it is the responsibility of the Applicant or his agent to show that the land in question is not classified as wetlands or waters of the Commonwealth.
11. Any stormwater management facilities regulated by this Ordinance that would be located on state highway rights-of-way shall be subject to approval by the Township and the Pennsylvania Department of Transportation (PennDOT).
12. Minimization of impervious surfaces and infiltration of runoff through seepage beds, infiltration trenches, etc. are encouraged, in order to reduce the size or eliminate the need for detention facilities or other structural BMPs.
13. All stormwater runoff shall be pretreated for water quality prior to discharge to surface or groundwater.
14. All best management practices (BMPs) used to meet the requirements of this ordinance shall conform to the State Water Quality Requirements and any more stringent requirements as set forth in this ordinance.
15. Roof drains and basement sump pumps shall not be directly connected to streets, sanitary or separate storm sewer systems or roadside ditches. Roof drains and basement sump pumps shall not be permitted to flow directly onto a driveway. They shall be designed to promote overland flow and infiltration/percolation of stormwater where advantageous to do so. Roof drains shall discharge to infiltration areas or vegetative BMPs.
16. The Township may impose the following additional restrictions on stormwater discharges:
 - a. Peak discharge shall be further restricted when it can be shown that a probable risk to downstream structures or unique natural areas exists or that existing severe flooding problems could be further aggravated.
 - b. Measures shall be imposed to protect against ground or surface water pollution where the type of business activity results in significant non-point source pollution or the nature of soils or bedrock underlying a stormwater management structure constitutes substantial risk of contamination, such as might be the case in limestone formations. Special provisions to be followed in these cases will be provided by the Township Engineer.
17. If special geological hazards or soil conditions, such as carbonate derived soils, are identified on the site, the Applicant's engineer shall consider the effect of proposed stormwater management measures on these conditions. In such cases, the Township will require an in-depth report by a competent soils engineer and/or registered professional geologist.
18. The design of all stormwater management facilities shall incorporate sound engineering principles and practices. Guidelines established by the *Pennsylvania Stormwater Best Management Practices Manual*, December, 2006 (or as revised) shall be utilized in determining stormwater management facility design. The Township shall reserve the right to disapprove any design that would result in the occupancy or continuation of an adverse hydrologic or hydraulic condition within the watershed.
19. Stormwater Management Facilities and Structural BMPs shall not be constructed within any areas defined as a floodplain, unless approved by the Township. In no case shall any portion of a constructed earthen embankment be located within any portion of the floodplain. See Buckingham Township Zoning Ordinance Section 3102.

C. Site Assessment for Project Sequencing

1. The design of all Regulated Activities shall include the following to minimize stormwater impacts.
 - a. The Applicant shall find practicable alternatives to the surface discharge of stormwater, the creation of impervious surfaces and the degradation of Waters of the Commonwealth, and must maintain as much as possible the natural hydrologic regime of the site.
 - b. An alternative is practicable if it is available and capable of implementation after taking into consideration existing technology and logistics in light of overall project purposes, and other municipal requirements.
 - c. All practicable alternatives to the discharge of stormwater are presumed to have less adverse impact on quantity and quality of waters of the Commonwealth unless otherwise demonstrated.

2. The Applicant shall demonstrate that the project is designed in the following sequence. The goal of the sequence is to minimize the increases in stormwater runoff and impacts to water quality resulting from the proposed regulated activity:
 - a. Prepare a Site Analysis and Resource Conservation Plan, showing environmentally sensitive areas including, but not limited to, steep slopes, ponds, lakes, streams, wetlands, hydric soils, vernal pools, stream buffers, hydrologic soil groups. Land development, any existing recharge areas, potential infiltration areas or permeable soil areas and other requirements outlined in the ordinance shall also be included.
 - b. Establish a stream buffer according to this ordinance.
 - e. Prepare a draft project layout avoiding sensitive areas identified in this ordinance.
 - d. Identify site specific existing conditions, drainage areas, discharge points, recharge areas, and hydrologic soil groups A and B. (areas conducive to infiltration).
 - e. Evaluate nonstructural stormwater management alternatives:
 - f. Minimize earth disturbance.
 - g. Minimize impervious surfaces.
 - h. Break up large impervious surfaces.
 - i. Satisfy groundwater recharge (infiltration) objective and provide for stormwater pretreatment prior to infiltration.
 - j. Provide for water quality protection in accordance with the Water Quality Requirements.
 - k. Provide stream bank erosion protection in accordance with the Stream Bank Erosion Requirements.
 - l. Determine what Management District the site falls into (See Appendix E) and conduct an existing conditions runoff analysis.
 - m. Prepare final project design to maintain existing conditions drainage areas and discharge points, to minimize earth disturbance and impervious surfaces, and to the maximum extent possible, ensure that the remaining site development has no surface or point discharge.
 - n. Conduct a proposed conditions runoff analysis based on the final design that meets the Downstream Hydraulic Capacity and Management District Requirements.
 - o. Manage any remaining runoff prior to discharge, through detention, bioretention, direct discharge or other structural control.

D. Groundwater Recharge Requirements

1. Post development stormwater runoff volume being discharged from any regulated activity shall not exceed pre-development stormwater runoff volume for up to and including the 5-year frequency rainfall. (P = 4.2 inches)
2. Design of the stormwater management facilities shall give consideration to providing ground water recharge to compensate for the reduction in the percolation that occurs when the ground surface is paved and roofed over. A detailed geologic evaluation of the project site shall be performed to determine the suitability of the type of recharge facilities to be used. The evaluation shall be performed by a registered Professional Geologist and/or soil scientist, and at a minimum, address soil permeability, depth to bedrock, bedrock type, susceptibility to sinkhole formation, and subgrade stability. Where pervious pavement is permitted for parking lots, recreational facilities, non-dedicated streets, or other areas, pavement construction specifications shall be noted on the plan.
3. Whenever a basin will be located in an area underlain by limestone, a geological evaluation of the proposed location shall be conducted to determine susceptibility to sinkhole formations. The design of all facilities over limestone formations shall include measures to prevent ground water contamination and, where necessary, sinkhole formation. Soils used for the construction of basins shall have low-erodibility factors ("K" factors). The Township may require the installation of an impermeable liner in detention basins. See the Carbonate Geology Requirements listed in this ordinance.
4. It shall be the Applicant's responsibility to verify if the site is underlain by limestone. The following note shall be attached to all drainage plans and signed and sealed by the Applicant's registered professional geologist "I, _____, (License # _____) of (Firm name, address and phone #) certify that the proposed Stormwater Management Facility (circle one) is/is not underlain by limestone." The certification shall include the original seal and signature of the professional certifying the plans.

5. In calculating runoff after development, those areas covered by concrete lattice blocks on an appropriate base, porous pavement areas on an appropriate base, and roof areas which drain to properly designed and installed storage/groundwater infiltration beds, shall be considered acceptable to infiltrate any increased runoff from a 5-year storm. Supporting calculations shall accompany any such design that verify that appropriate infiltration rates exist under such facilities.
6. Stormwater being discharged to a groundwater recharge facility shall be free of any contaminants that may potentially degrade the quality of the existing groundwater resources. Stormwater from "hot spots" shall be filtered before the water is permitted to infiltrate into the ground.
7. Additional facility protection measures, including but not limited to the use of vegetated filters or buffers, shall be used where infiltration is proposed in Source Water Protection Areas as defined by the Township.
8. Infiltration management techniques shall be prohibited where salt or chloride would be a pollutant, since soils do little to filter these materials, and lead to contamination of groundwater. The qualified design professional shall evaluate the possibility of groundwater contamination from the proposed infiltration facility and perform a hydrogeologic justification study if necessary. The Groundwater Recharge requirement shall be met by providing infiltration in other locations on-site.
9. Infiltration facilities in High Quality or Exceptional Value waters shall be subject to the PADEP's Chapter 93 Antidegradation Regulations.
10. An impermeable liner will be required in detention basins where the possibility of groundwater contamination exists. A detailed hydrogeologic investigation shall be provided if requested by the Township.
11. The Applicant shall provide safeguards against groundwater contamination for land uses that may cause groundwater contamination should there be a mishap or spill.

E. Stormwater Peak Rate Control and Management District Requirements

1. In order to implement the provisions of this Ordinance, the Township is hereby divided into Stormwater Management Districts which are consistent with the proposed Neshaminy Creek Watershed Stormwater Management Plan and the approved Delaware River South Watershed (Act 167) Plan. The boundaries of the Stormwater Management Districts are shown on an official Stormwater Management District Map which is available for inspection at the Township Office.
2. The District boundaries, as originally drawn, coincide with topographic divides or, in certain instances, are drawn from the intersection of the watercourse and a physical feature such as the confluence with another watercourse or a potential flow obstruction (road, culvert, bridge, etc.) to the topographic divide consistent with topography. The location of the Stormwater Management District boundary on a stormwater management plan shall be reviewed and verified by the Township Engineer.
3. Proposed conditions rates of runoff from any regulated activity shall not exceed the peak release rates of runoff from existing conditions for the design storms specified on the Stormwater Management District Map and the Stormwater Management District tables provided below.
4. The standards for managing runoff from each District in the Neshaminy Creek and Little Neshaminy Creek Watershed are shown below. Development sites located in each of the A, B, and C Districts must control post-development runoff rates to pre-development runoff rates for the design storms as follows:

Table 9-8 : Neshaminy Creek and Little Neshaminy Creek Watersheds – Stormwater Management Districts

District	Design Storm Post-Development	Design Storm Pre-Development
A	2-year	1-year
	5-year	5-year
	10-year	10-year
	25-year	25-year
	50-year	50-year
	100-year	100-year
B	2-year	1-year
	5-year	2-year
	10-year	5-year
	25-year	10-year
	50-year	25-year
	100-year	50-year
C*	2-year	1-year
	5-year	2-year

(Source – Final Draft of the Neshaminy Creek and Little Neshaminy Creek Watershed Plan)

* In District C, development sites which can discharge directly to the main channel or major tributaries or indirectly to the main channel through an existing stormwater drainage system (i.e., separate storm sewer system or tributary) may do so without control of post-development peak rate of runoff greater than the 5-year storm. Sites in District C will still have to comply with the groundwater recharge criteria, the water quality criteria, and streambank erosion criteria. If the post-development runoff is intended to be conveyed by an existing stormwater drainage system to the main channel, assurance must be provided that such a system has adequate capacity to convey the flows greater than the 2-year pre-development peak flow or will be provided with improvements to furnish the required capacity. When adequate capacity in the downstream system does not exist and will not be provided through improvements, the post-development peak rate of runoff must be controlled to the pre-development peak rate as required in District A provisions (i.e., 10-year post-development flows to 10-year pre-development flows) for the specified design storms.

- The standards for managing runoff from each subarea in the Delaware River South Watershed are shown below. Development sites located in each of the A or B Districts must control post-development runoff rates to pre-development runoff rates for the design storms as follows:

Table 9-9 : Delaware River South Watershed – Stormwater Management Districts

District	Design Storm Post-Development	Design Storm Pre-Development
A	2-year	1-year
	5-year	5-year
	10-year	10-year
	25-year	25-year
	50-year	50-year
	100-year	100-year
B	2-year	1-year
	5-year	2-year
	10-year	5-year
	25-year	10-year
	50-year	50-year
	100-year	100-year

(Source – Delaware River South Watershed Plan)

- Sites Located in More Than One District - For a proposed development site located within two or more stormwater management district category subareas, the peak discharge rate from any subarea shall meet the Management District Criteria for the district in which the discharge is located. The calculated peak discharges

shall apply regardless of whether the grading plan changes the drainage area by subarea. An exception to the above may be granted if discharges from multiple subareas recombine in proximity to the site. In this case, peak discharge in any direction may follow Management District A criteria provided that the overall site discharge meets the Management District Criteria for which the discharge is located.

7. Off-Site Areas - Off-site areas that drain through a proposed development site are not subject to release rate criteria when determining allowable peak runoff rates. However, on-site drainage facilities shall be designed to safely convey off-site flows through the development site.
8. Design Storm Requirements
 - a. All stormwater management controls required by this Ordinance shall be designed for the following return periods and subsequent 24-hour rainfall depths:

Table 9-10 : Rainfall Depths

Frequency of Storm Event (years)	Rainfall Depth (inches)
1	2.71
2	3.01
5	4.02
10	4.76
25	5.81
50	6.67
100	7.60

(Source - National Oceanic and Atmospheric Administration Atlas 14 - Doylestown Gage (36-2221))

F. Water Quality Requirements

1. All stormwater management facilities shall incorporate provisions for improving the quality of stormwater runoff being discharged into receiving waterways. Innovative Best Management Practices (BMPs) shall be utilized by the developer to satisfy the following water quality requirements of this ordinance:
 - a. Detain the 1-year, 24-hour design storm using the NRCS Type II distribution. Provisions shall be made so that the 1-year storm requires a minimum of 24 hours to drain from the facility from a point where the maximum volume of water from the 1-year storm is captured. (i.e., the maximum water surface elevation is achieved in the facility). Release of water can begin at the start of the storm (i.e., the invert of the water quality orifice is at the invert of the facility). The design of the facility shall consider and minimize the chances of clogging and sedimentation potential.
 - b. To accomplish #1 above, the Applicant MAY submit original and innovative designs to the Township Engineer for review and approval. Such designs may achieve the water quality objectives through a combination of BMPs (best management practices). Guidelines established by the Pennsylvania Stormwater Best Management Practices Manual (2006 or as last revised) shall be utilized in determining stormwater management facility design. In evaluating potential stormwater BMPs, the order of preference for Buckingham Township is as follows:
 - i. infiltration BMPs,
 - ii. artificial wetlands, wet ponds, or other bioretention structures
 - iii. Wet Ponds,
 - iv. flow attenuation methods (c.g., vegetated open swales and natural depressions),
 - v. minimum first flush detention or dual purpose detention (where appropriate).
 - c. In selecting the appropriate BMPs or combinations thereof, the Applicant SHALL consider the following:
 - i. Total contributing area
 - ii. Permeability and infiltration rate of the site soils
 - iii. Slope, depth to bedrock, and bedrock type
 - iv. Seasonal high water table
 - v. Proximity to building foundations and wellheads

- vi. Erodibility of soils
 - vii. Land availability and configuration of the topography
- d. The following additional factors SHALL be considered when evaluating the suitability of BMPs used to control water quality at a given development site:
- i. Peak discharge and required volume control streambank erosion
 - ii. Efficiency of the BMPs to mitigate potential water quality problems
 - iii. The volume of runoff that will be effectively treated
 - iv. The nature of the pollutant being removed
 - v. Maintenance requirements
 - vi. Creation/protection of aquatic and wildlife habitat
 - vii. Recreational value
 - viii. Enhancement of aesthetic and property value
- e. All points of concentrated discharge shall discharge into a water quality BMP prior to being discharged off-site.
- f. Additional water quality facilities will be required for "Hot Spots" to ensure that containments are not conveyed into the groundwater supplies and/or downstream areas as defined below:
- i. Stormwater hotspots are defined as a land use or activity that generates higher concentrations of hydrocarbons, trace metals or other pollutants than are found in typical stormwater runoff, based on monitoring studies. The increased pollutant loadings from these hotspots can generate groundwater contamination and/or the toxicity in sediments or the water column of surface waters. If a site is deemed a stormwater hotspot, it has two important implications. First, a higher or more effective form of stormwater treatment is required to remove the elevated concentration of pollutants. Second, treated runoff from a BMP must be prevented from directly infiltrating into groundwater.
 - ii. Designers shall assess their sites to determine if any potential hotspots are present. Designers shall review the Pennsylvania BMP Manual for a listing of land uses that are considered hot spots. All potential hot spots shall be identified on the Stormwater Management Plan.
 - iii. Industrial and non-industrial facilities can range from very clean to very dirty, depending on the industrial process, site conditions, and the nature of chemical usage. The site shall be analyzed to determine if rainfall comes into contact with materials or surfaces, and has the potential for subsequent leaching and washoff. Many industrial facilities are required to have a NPDES stormwater discharge permit and pollution prevention plan, under the Clean Water Act. As part of their EPA stormwater NPDES permit, many individual facilities have collected monitoring data to characterize the quality of their stormwater runoff. This data shall be submitted to the Township Engineer to determine whether the industrial site has the potential to become a stormwater hotspot.
2. The BMPs shall be designed to protect and maintain existing uses (e.g., drinking water use; cold water fishery use) and to maintain the level of water quality necessary to protect those uses in all streams, and to protect and maintain water quality in "Special Protection" streams, as required by statewide regulations set forth at 25 Pa. Code Chapter 93 (collectively referred to herein as "State Water Quality Requirements").
3. The BMPs shall be selected and designed according to the preferences set forth in this Ordinance.
4. In order to control post-construction stormwater impacts from Regulated Earth Disturbance activities, State Water Quality Requirements may be met by BMPs, including site design, which provide for replication of pre-construction stormwater infiltration and runoff conditions, so that post-construction stormwater discharges do not degrade the physical, chemical or biological characteristics of the receiving waters. As described in the PADEP comprehensive Stormwater Management Policy (#392-0300-002, September 28, 2002), this may be achieved by the following:
- a. Infiltration: replication of pre-construction stormwater infiltration conditions;
 - b. Treatment: use of water quality treatment BMPs to ensure filtering out of chemical and physical pollutants from the stormwater runoff; and

- c. Streambank and Streambed Protection: management of volume and rate of post-construction stormwater discharges to prevent physical degradation of receiving waters (e.g., from scouring and erosion).
- 5. Developed areas shall provide adequate storage and treatment facilities necessary to capture and treat stormwater runoff. The groundwater recharge volume may be a component of the water quality volume if the Applicant chooses to manage both components in a single facility. If the groundwater recharge volume is less than the water quality volume, the remaining water quality volume may be captured and treated by methods other than infiltration BMPs. The required water quality volume is the storage capacity needed to capture and treat a portion of stormwater runoff from the developed areas of the site.
- 6. If a perennial or intermittent stream passes through the site, the Applicant shall create a stream buffer extending a minimum of one-hundred (100) feet to either side of the top-of-bank of the channel or equal to the extent of the 100-year floodplain. The buffer area shall be developed with native vegetation and as outlined in the PA BMP Manual (Refer to Appendix "B" of the December 2006 Pennsylvania Stormwater Best Management Practices Manual for recommended plant lists). This buffer requirement shall be in addition to the side and rear yard setbacks set forth in the Township's Zoning Ordinance.

G. Streambank Erosion Requirements

- 1. In addition to the control of water quality volume (in order to minimize the impact of stormwater runoff on downstream streambank erosion), the primary requirement is to design a BMP to detain the proposed conditions 2-year, 24-hour design storm to the existing conditions 1-year flow using the SCS Type II distribution. Additionally, provisions shall be made (such as adding a small orifice at the bottom of the outlet structure) so that the proposed conditions 1-year storm takes a minimum of 24 hours to drain from the facility from a point where the maximum volume of water from the 1-year storm is captured (i.e., the maximum water surface elevation is achieved in the facility). Release of water can begin at the start of the storm (i.e., the invert of the water quality orifice is at the invert of the facility).
- 2. The minimum orifice size in the outlet structure to the BMP shall be three (3) inches in diameter where possible, and a trash rack shall be installed to prevent clogging. On sites with small contributing drainage areas to this BMP that do not provide enough runoff volume to allow a 24-hour attenuation with the 3-inch orifice, the calculations shall be submitted showing this condition. Orifice sizes less than 3 inches can be utilized provided that the design will prevent clogging of the intake.
- 3. In "Conditional Direct Discharge Districts" (District C only), the objective is not to attenuate the storms greater than the 2-year recurrence interval. This can be accomplished by configuring the outlet structure not to control the larger storms or by a bypass channel that diverts only the 2-year stormwater runoff into the basin or conversely, diverts flows in excess of the 2-year storm away from the basin.

H. Erosion and Sedimentation Control Requirements

- 1. Whenever the vegetation and topography are to be disturbed, such activity must be in conformance with Pennsylvania Code Chapter 102, Title 25, Rules and Regulations, Part 1, Commonwealth of Pennsylvania, Department of Environmental Protection, Subpart C, protection of Natural Resources, Article II, Water Resources, Chapter 102, "Erosion Control;" Pennsylvania Code Chapter 92, Title 25, National Pollutant Discharge Elimination System Permitting, Monitoring and Compliance, requiring a PADEP "NPDES Construction Activities" permit for any earth disturbance one acre or more with a point source discharge to surface waters or the Township's separate storm sewer system, or five acres or more regardless of the planned runoff and including earth disturbance on any portion of, part of, or during any stage of, a larger common plan of development; and in accordance with the requirements of the Bucks County Conservation District and the standards and specifications of the Township. All erosion and sedimentation control facilities shall be designed and constructed in accordance with the Commonwealth of Pennsylvania, Department of Environmental Protection, Office of Water Management, "Erosion and Sediment Pollution Control Program Manual", latest edition. No Regulated Earth Disturbance activities within the Municipality shall commence until the Municipality approves an Erosion and Sediment Control Plan for construction activities. Adequate erosion protection shall be provided along all open channels and at all points of discharge.
- 2. Additional erosion and sedimentation control design standards shall be applied where infiltration BMPs are proposed and include the following:
 - a. Areas proposed for infiltration BMPs shall be protected from sedimentation and compaction during the construction phase, so as to maintain their maximum infiltration capacity and capability. Barriers such as Tree Protection fencing shall be used to protect and keep construction traffic away from the area where

infiltration BMPs are proposed. Inlets or pipes that are installed to these systems should be completely sealed or protected and monitored until the drainage areas are completely stabilized.

- b. Infiltration BMPs shall not be constructed nor receive runoff until the entire contributory drainage area to the infiltration BMP has been stabilized.
 3. Peak discharges and discharge volumes occurring during construction from the site shall comply with the appropriate sections above, with the following additions:
 - a. For purposes of calculating required detention storage during land disturbance, peak discharges and discharge volumes shall be calculated based upon the runoff coefficients for bare soils and maximum impervious surfaces during the maximum period and extent of disturbance. Controls shall insure that the "During Construction" peak discharge rate and discharge volume shall not exceed those peak discharges and discharge volumes before development. It should be understood that detention storage during the period of land disturbance and prior to establishment of permanent cover may require additional facilities on a temporary basis. Such measures shall be located so as to preserve the natural soil infiltration capacities of the planned infiltration bed areas.
 - b. During land disturbance, wherever soils, topography, cut and fill or grading requirements, or other conditions suggest substantial erosion potential, the township shall require that the entire volume of all storms up to a 2-year storm for the disturbed areas be retained on site and that special sediment trapping facilities (such as check dams, etc.) be installed.
 4. Sediment in runoff water shall be trapped in accordance with criteria of the Bucks County Conservation District and PADEP and removed through means approved by the Township Engineer to assure proper functioning and adequate capacity in the basins or traps.
 5. Procedures shall be established for protecting soils or geologic structures with water supply potential from contamination by surface water or other disruption by construction activity.
 6. Areas of the site to remain undisturbed shall be protected from encroachment by construction equipment/vehicles to maintain the existing infiltration characteristics of the soil. These areas shall be delineated on the plans and shall be separated from the development areas by a forty-eight inch high snow fence or other suitable fence, such as super silt fence, mounted on steel posts located eight feet on center or as approved by Township Engineer.
 7. Permanent erosion and sedimentation control facilities (i.e., sediment basins, sediment traps, grass diversion swales, terraces, etc.) shall be provided for all agricultural operations designed in conjunction with the development plans (farmland preserve areas, agricultural open space areas). Erosion and sedimentation control (E & SC) measures and facilities for agricultural operations must be designed to meet the same requirements and standards as non-agricultural operations. Likewise, agricultural erosion and sedimentation control plans must address all of the relative factors which contribute to erosion and sediment pollution as specified in Section 102.5 (b) of the PADEP Chapter 102 regulations. However, an additional requirement is placed on agricultural E & SC plans in that they must consider, and thereafter develop appropriate control measures and facilities for each year's operation. If for example, operations on a farm are based on a four year cycle of crop rotation, a separate E & SC subplan must be developed for each year's specific amount and configuration of earthmoving. These subplans, when added together, constitute that farm's overall E & SC plan. The Agricultural Erosion and Sedimentation Control Plans shall be incorporated into the Farm Conservation Plan, which shall be reviewed and approved by the Board of Supervisors with the Subdivision of Land Development Application.
 8. Adequate erosion protection shall be provided along all open channels, and at all points of discharge.
 9. A copy of the Erosion and Sediment Control Plan and any required permit, as required by DEP regulations, shall be available on the project site at all times.
 10. In addition to these requirements, the Erosion and Sedimentation Control requirements listed in Article 10 shall be followed for all earth disturbances.
- I. Runoff Pollution Control Standards
1. The following reduction in loading rates shall be achieved for all stormwater management facilities:
 - a. Total Phosphorus removal - 85%
 - b. Total Nitrogen removal -50%

c. Total Suspended Solids– 85%

2. In order to meet the above standards, the Applicant shall construct Stormwater Management Facilities with BMPs that provide the sufficient nutrient reductions. A number of BMPs may be installed in series to meet the minimum standards listed above. The Applicant shall provide an Analysis of Water Quality Impacts from Developed Land, with the appropriate worksheets, as specified in the Pennsylvania Stormwater Best Management Practices Manual.

J. Thermal Control Standards

1. There shall be no more than a two degree temperature (°C) change in any streams located within or downstream of the development site when the development site is located in a coldwater fishery and/or a trout stocking stream watershed.
2. In order to meet the above standards, the Applicant shall construct Stormwater Management Facilities with BMPs that provide the sufficient temperature reductions. A number of BMPs may be installed in series to meet the minimum standards listed above. The Applicant shall demonstrate, by either thermal modeling calculations or observed data, that the proposed Best Management Practices meet the objectives of the Ordinance.
3. The following are the Stream Classifications for those streams or tributaries located within the Township, as determined by PADEP under Pennsylvania Code Chapter 93, Title 25 classifications:
 - a. Paunaeussing – High Quality – Cold water fishery (HQ-CWF)
 - b. Delaware River/Pidcock Creek – Cold water fishery -- Migratory fishery (CWF – MF)
 - e. Watson Creek – Cold water fishery (CWF)
 - d. Mill Creek – Warm water fishery/migratory fishery (WWF-MF)
 - e. Neshaminy – Trout stocking fishery (TSF)
 - f. Pine Run – Warm water fishery (WWF)

K. Design Criteria for Stormwater Management Facilities and Best Management Practices

1. General Design Requirements

- a. Increased stormwater runoff which may result from Regulated Activities listed above shall be controlled by permanent stormwater runoff control measures that will provide the required standards. The methods of stormwater control or Best Management Practices (BMPs) which may be used to meet the required standards are described in this ordinance and should be considered the preferred methods of controlling stormwater runoff. The choice of BMPs is not limited to the ones appearing in this ordinance; however, any selected BMP must meet the various requirements of this ordinance.
- b. Unless otherwise specified in this Ordinance, the maximum slope of any stormwater management or best management practice facility earthen embankment shall be three (3) horizontal to one (1) vertical, unless the difference in elevation between the outlet structure invert and the top of berm exceeds eight (8) feet. If the elevation difference exceeds eight (8) feet, the maximum slope shall be four (4) horizontal to one (1) vertical. The top or toe of any slope shall be located a minimum of five (5) feet from any property line. Whenever possible, the side slopes and basin shape shall conform to the natural topography.
- c. The minimum top width of detention, retention, wet pond, or any other basin berm that stores stormwater volumes of 10,000 CF or greater at the 100-year water surface elevation shall be ten (10) feet. For basins with a storage volume less than 10,000 CF, the minimum berm width shall be five (5) feet. A cutoff trench (key-way) of impervious material shall be provided under all embankments that require fill material. The cutoff trench shall be a minimum of eight (8) feet wide, two (2) feet deep, and have side slopes of 1:1.
- d. All stormwater management facilities shall be provided with an emergency spillway or overflow device. Emergency spillways discharging over embankment fill shall be constructed of reinforced concrete checkerblock to protect the berm against erosion. The checkerblocks shall be backfilled with topsoil and seeded. The checkerblock lining shall extend to the toe of the fill slope on the outside of the berm, and shall extend to an elevation 3 feet below the spillway crest on the inside of the berm. The spillway material shall also be provided on the side slopes of the spillway and extend to the top of the berm. The emergency spillway shall be designed to accommodate the flow from the 100-year storm event considering “post development” flows into the basin (Q_{100} inflow).

- e. Vegetated spillways may be utilized for spillways constructed entirely on undisturbed ground (i.e., not discharging over fill) if the designer can demonstrate that flow velocities and sheer stresses through the spillway will not cause erosion of the spillway. A dense cover of vegetation shall be rapidly established in such spillways by sodding or seeding with a geotextile anchor. Such a vegetated spillway must be stabilized before runoff is directed to the basin.
- f. The minimum total freeboard shall be one (1) foot. Freeboard is to be provided such that six (6) inches is provided between the 100 year water surface elevation and the invert of the emergency spillway, and six (6) inches is provided between the design flow elevation in the emergency spillway and the top of the settled stormwater management facility earthen embankment.
- g. Stormwater management facility outlet piping shall be Type B (PENNDOT) reinforced O-Ring concrete pipe, unless under a collector or arterial roadway, in which case the pipe shall be Type A (PENNDOT). A minimum of two (2) concrete anti-seep collars shall be provided for each pipe outlet. Pre-cast concrete collars shall have a minimum thickness of eight (8) inches; field poured collars shall have a minimum thickness of twelve (12) inches. Collars may not be installed within two (2) feet of pipe joints. Collars must be designed to project a minimum of two (2) feet around the outside perimeter of the pipe. Maximum collar spacing shall be fourteen (14) times the minimum projection of the collar measured perpendicular to the pipe.
- h. All detention/retention basin embankment material shall be placed in maximum of eight (8) inch lifts compacted to a minimum of 95% of Modified Proctor Density as established by ASTM D-1557. Prior to proceeding to the next lift, the compaction shall be checked by the Township Engineer or Soils Engineer. Compaction tests shall be run on the leading and the trailing edge of the berm as well as along the top of the berm.
- i. Energy dissipating devices shall be placed at all basin inflow points and outfalls.
- j. Perforated distribution piping for infiltration structures shall be high density, corrugated polyethylene pipe (HDPE) – (smooth bore).
- k. Detention and retention basins shall be in place and functioning prior to the creation of any additional impervious surfaces on the site. As-built drawings of the basin(s) shall be submitted to the Township for review. The basin shall not be considered functional until it is proved by the Applicant that the basin meets the volume requirements and the outflow characteristics of the original design of the basin(s). Runoff shall not be directed to an infiltration structure until all tributary drainage areas are stabilized.
- l. Pipe outlets shall permit complete drainage of all detained water, unless the stormwater management facility is designed as a retention basin, wet pond or provides for stormwater renovation with constructed wetlands.
- m. Stone gabion baskets shall not be used in the construction of stormwater management facilities, retaining walls, etc.
- n. Retaining walls shall not be specified for use within the 100 year water surface elevation area of any stormwater management or best management facility or as part of any embankment or cut slope that is appurtenant to the construction of the stormwater management or best management practice facility.
- o. Access to facilities shall be provided for maintenance and operation. This access shall be a cleared access that is, when possible, at least fifteen (15) feet wide. Proximity of facilities to public rights-of-way shall be encouraged in order to minimize the length of access ways. Multiple accesses shall be encouraged for major facilities. The Applicant shall provide driveways, curb depressions, sidewalk aprons, easements and/or rights-of-way for access to stormwater management facilities as deemed necessary by the Township. The maximum slope of the access path shall be 10:1.
- p. In order to promote the safety of the residents of the Township, the Township may determine that fencing is required around all or portions of the stormwater management and best management practice facilities. When required by the Township, the fencing shall provide a suitable barrier at least four (4) feet in height of material approved by the Township, such as split rail fencing with wire backing.
- q. Any facilities that constitute water obstructions (e.g., culverts, bridges, outfalls, or stream enclosures), shall be designed in accordance with Chapter 105 and may require a permit from PA DEP.

- r. Any existing or proposed drainage conveyance facility and/or channel that does not fall under Chapter 105 Regulations, that is located within the development site must be able to convey, without damage to the drainage structure or roadway, runoff from the 50-year design storm. Conveyance facilities to or exiting from stormwater management facilities (i.e. detention basins) shall be designed to convey the design flow to or from that structure. Roadway crossings located within designated floodplain areas must be able to convey runoff from a 100-year design storm. Any facility located within a PennDOT right-of-way must meet PennDOT minimum design standards and permit submission requirements, unless a greater standard is listed in this Ordinance and/or the Buckingham Township Zoning Ordinance.
 - s. All outlet structures shall be located within the embankment for purposes of maintenance, access, safety and aesthetics. Below grade structures (standard inlet boxes, manholes, etc.) shall not project above the ground surface.
 - t. The minimum diameter of any free-flowing orifice shall be 3 inches. Innovative low flow or anti-clog devices with free-flowing orifices less than 3 inches are permitted upon review and approval by the Township.
 - u. All inflow headwalls and outlet structures shall be provided with slanted trash racks with a maximum grid opening of 4" by 4", constructed of aluminum. The trash rack shall be slanted at 45°, be able to withstand loading of 500 lbs and be hinged at the top for cleaning.
 - v. All Stormwater Management Facilities and BMPs shall be provided with a Landscaping Plan that is designed to effectively naturalize the area to become an integral and harmonious element in the natural landscape. For each proposed Stormwater Management Facility or BMP, the Applicant shall prepare a Landscaping Plan that follows the Landscaping Guidelines for Stormwater Management Facilities and BMPs provided in the Appendix of this Ordinance.
 - w. Water Wells shall not be permitted to be used to contribute to, or to maintain water surfaces in any Constructed Treatment Wetland (Extended Detention Wetland Systems), Retention Basin (Wet Pond) or any other designed Permanent Pool unless such use is specifically approved by the Township.
2. Infiltration Best Management Practices (BMPs) - Infiltration BMPs shall be designed in accordance with the design criteria and specifications in Section 5 of the *Pennsylvania Stormwater Best Management Practices Manual* (2006, or latest revision) and shall meet the following minimum requirements:
- a. Infiltration BMPs intended to receive runoff from impervious surfaces associated with residential land use and/or pervious surface runoff associated with both residential uses and non-residential uses shall be constructed on soils which have the following characteristics:
 - i. A minimum depth of 36 inches shall be provided between the intended bottom of the BMP facility and the top of the limiting zone (e.g., seasonal high water table, groundwater, bedrock). In areas where carbonate rock exists, a 48-inch minimum depth to a limiting zone shall be provided;
 - ii. For Infiltration BMPs with a tributary drainage area of greater than one (1) acre, the minimum infiltration and percolation rate shall be greater than 0.52 inches per hour. For Infiltration BMPs with a tributary drainage area of less than one (1) acre, the minimum infiltration and percolation rate shall be sufficient to meet the maximum ponding time (Tp) requirements listed later in this ordinance. Underdrain facilities may be introduced in bioretention or other types of filtering devices where soil testing indicates an infiltration rate less than 0.25 inches per hour.
 - b. Infiltration BMPs intended to receive runoff from impervious surfaces associated with non-residential uses shall be constructed on soils that have the following characteristics:
 - i. A minimum depth of 48 inches shall be provided between the intended bottom of the BMP facility and the top of the limiting zone (e.g., seasonal high water table, groundwater, bedrock);
 - ii. For Infiltration BMPs with a tributary drainage area of greater than one (1) acre, the minimum infiltration and percolation rate shall be greater than 0.52 inches per hour. For Infiltration BMPs with a tributary drainage area of less than one (1) acre, the minimum infiltration and percolation rate shall be sufficient to meet the maximum ponding time (Tp) requirements listed later in this ordinance. Underdrain facilities may be introduced in bioretention or other types of filtering devices where soil testing indicates an infiltration rate less than 0.25 inches per hour.

- c. Where direct discharge is permitted under the requirements of this Ordinance, at a minimum, infiltration BMPs shall be designed to provide adequate storage to accommodate the post-development first flush design storm volume with outlet and overflow controls to convey runoff larger than the first flush design storm volume safely to a natural outfall. All requirements of this ordinance, including groundwater recharge water quality, thermal control, etc. shall be provided in addition to the first flush requirements.
 - d. Infiltration BMPs shall be designed for a maximum ponding time (Tp) of 3 days (72 hours). Infiltration BMPs using commercially available turf grasses shall be designed for a maximum ponding time (Tp) of 2 days (48 hours).
 - e. Based on the maximum ponding time, the maximum allowable design depth of an infiltration structure shall be as follows:
 - i. $d_{max} = (f)(T_p \text{ max})$
 - (1) d_{max} = maximum depth of structure, inches
 - (2) f = infiltration rate, inches/hour
 - (3) $T_p \text{ max}$ = maximum ponding time, hours
 - f. For aggregate filled infiltration structures, the maximum allowable design depth shall be as follows:
 - i. $d_{max} = (f)(T_p \text{ max})/V_r$
 - (1) V_r = void ratio of aggregate fill, typically = 0.4
 - g. The maximum allowable design depth, the depth to limiting zone, and the design infiltration volume shall be considered in the design of an infiltration structure.
 - h. All runoff directed to an infiltration device shall first be filtered to remove sediment. Filtering devices include, but are not limited to, sediment retention basins, vegetative filters, sediment and grease traps in storm drainage structures, and sand filtration chambers.
 - i. Uniform sand, gravel or crushed stone (i.e. uniformity coefficient of 2 or smaller) is required as a drainage medium in infiltration trenches and dry wells. Drainage Media materials shall be hard, durable, inert particles, free from slate, shale, clay, silt and vegetation. Drainage media shall be enclosed in a properly specified filter geotextile.
 - j. A monitoring well for observing infiltration trenches and below ground infiltration facilities shall be included in the design. The well shall consist of a 4 to 6-inch diameter, perforated polyvinyl chloride (PVC) pipe with a locking cap. The well shall be placed near the center of the facility with the invert at the excavated bottom of the facility.
 - k. A 6 to 12-inch deep sand filter shall be provided between the stone storage area and the bottom of any infiltration facility designed to collect runoff from any identified stormwater "Hot Spots."
3. Constructed Treatment Wetland (Extended Detention Wetland Systems)
- a. Constructed treatment wetlands are to be designed to capture 75% of the Annual Runoff Volume. The Total Treatment Volume (V_T) shall be based on the following equation:
 - i. $V_T = (P_{75})(R_v)(A)$
 - (1) P_{75} = 24-hour Storm Volume representing 75 % of Annual Rainfall
 - (2) $R_v = 0.05 + 0.009 (I)$
 - (3) I = Percent of Impervious surface
 - (4) A = Drainage Area
 - ii. A minimum V_T of 0.25 watershed inches shall be provided.
 - b. The Wetland to Watershed Area Ratio (WWAR) shall not be less than 0.03 for Constructed Treatment Wetland Facilities (i.e., 0.3 acre wetland for a 10 acre drainage area). However, in no event shall the constructed wetland be less than 0.5 acre.

- c. 60% to 65% of the wetland shall be developed as a shallow water emergent wetland, with a water depth between 0 inches and 18 inches. The shallow water emergent wetland area be equally separated into "Hi marshes" (zero to six inches below normal pond) and "Low marshes" (six to eighteen inches below normal pool). The remainder shall be constructed as open water with depths between 18 inches and 6 feet. The open water zone shall be between 35% and 40% of the total water surface area.
- d. The perimeter slope above the permanent water surface shall have a maximum slope of 4:1 for a distance of at least 20 feet. The remaining areas above the permanent pool shall have a maximum slope of 3:1.
- e. Aquatic safety benches shall be placed adjacent to all open water zones with depths greater than 2 feet. The aquatic safety bench shall be a minimum of ten (10) feet wide and have a maximum slope of 10:1. A 3:1 slope shall lead from the edge of the safety bench toward the deep water portion of the pond. At least 15 feet of 3:1 slope shall be provided from the edge of the safety bench. Slopes in the remainder of the pond below the permanent pool elevation shall be a maximum of 2:1.
- f. The following percentages of the Total Treatment Volume (V_T) shall be provided in all extended detention wetland systems:
 - i. Deepwater Volume – 20%
 - ii. Marsh Volume – 30%
 - iii. Water Quality Volume – 50% (maximum)
- g. The length of the constructed treatment wetland between the inflow and outlet points shall be maximized. The minimum length to width ratio for all wetland systems shall be 3:1. A medial berm may be used to reduce flow width and improve flow distribution and length.
- h. Constructed treatment wetlands shall be constructed on hydric or wet soils and/or soils which have an infiltration rate of less than 0.2 inches/hour. A base flow of 0.10 cfs/50 Acres is recommended for all constructed treatment wetland facilities.
- i. The water quality volume shall not exceed 50% of the total treatment volume (V_T). The maximum water quality storm elevation shall not exceed 3 feet above the normal pool surface.
- j. The water quality volume shall be released over a minimum of 24 hours as described under Water Quality Requirements.
- k. For wetland facilities designed to provide extended detention, a minimum drainage area of 10 acres shall be directed to the wetland, unless a source of recharge is utilized, such as a natural spring or well.
- l. A shallow forebay shall be provided adjacent to all inflow areas, unless the inflow area provides less than 10% of the total inflow to the pond. The forebay shall be planted as a marsh with emergent wetland vegetation. The forebay serves to enhance sediment trapping and pollutant removal, as well as concentrating accumulated sediment in an area where it can be readily removed. To create a forebay, a baffle may be introduced to restrict hydraulic communication between the inlet and the remainder of the retention basin. The minimum standards for forebays are as follows:
 - i. The minimum forebay length is 10 feet.
 - ii. Sufficient storage volume shall be provided to trap sediment between clean-out intervals (typically ranging between 5- and 15-years). A minimum of 10% of the total wetland permanent pool volume shall be contained within the shallow forebay areas.
 - iii. The forebay shall be 4 to 6 feet deep.
 - iv. The height of the berm or baffle that separates the forebay from the remainder of the pond shall be one (1) foot below the ponding depth associated with the water quality design storm.
 - v. The forebay shall be accessible and stabilized to accommodate equipment used in removing accumulated sediment
- m. Narrow, deep water zones shall be provided at the inlet and outlet to balance head conditions and evenly distribute flow.

- n. A planting plan shall be developed for the artificial wetland showing all proposed aquatic, emergent, and upland plantings. The planting plan shall be developed to provide a diversity of species resulting in a dense stand of wetland vegetation. A comprehensive list of wetland plant species adapted for incorporation in constructed treatment wetlands as provided in the Appendix of this ordinance. The planting plan shall specify aquatic plugs (2" minimum) and containerized plant material to develop the "high marsh" and "low marsh" areas. The use of seed mixtures to develop the wetlands is not permitted. Seed mixes may only be utilized to stabilize berm slopes and meadow areas. All aquatic plant material shall be protected with fencing specifically intended to protect plant material from water fowl.
- o. A Wetland Drawdown Assessment shall be submitted for the proposed wetland basin. The assessment shall determine whether the wetland has an appropriate water balance to maintain a wet pool over a 30-day period without rainfall and during periods of high evaporation. The engineer shall submit a Precipitation and Evaporation Rate Table based on actual site conditions.
- p. In order to address the West Nile Virus concerns, Constructed Treatment Wetlands shall be designed to attract a diverse wildlife community. Proper hydrologic soil conditions and the establishment of hydrophytic vegetation shall be provided to promote the population of the wetland by amphibians and other mosquito predators. The design of the Constructed Treatment Wetlands shall include the selection of hydrophytic plant material that provides minimal submerged growth to reduce the potential for vector mosquito breeding.

4. Wet Pond

- a. Wet Ponds shall be constructed on hydric or wet soils and/or soils which have an infiltration rate of less than 0.2 inches/hour.
- b. A minimum drainage area of 10 acres shall be directed to the pond unless a source of recharge is utilized such as a natural spring or well.
- c. The length of the pond between the inflow and outlet points shall be maximized. In addition, an irregular shoreline shall be provided. By maximizing the flow length through the pond and providing an irregular shoreline, the greatest water quality benefit will be achieved by minimizing "short circuiting" of runoff flowing through the pond. A minimum length-to-width ratio of 2:1 shall be provided.
- d. A shallow forebay shall be provided adjacent to all inflow areas unless the inlet provides less than 10% of the total inflow to the pond. The forebay shall be planted as a marsh with emergent wetland vegetation. The forebay serves to enhance sediment trapping and pollutant removal, as well as concentrating accumulated sediment in an area where it can be readily removed. To create a forebay, a baffle can be introduced to restrict hydraulic communication between the inlet and the remainder of the basin. The minimum standards for forebays are as follows:
 - i. The minimum forebay length is 10 feet.
 - ii. Sufficient storage volume shall be provided to trap sediment between clean-out intervals (typically ranging between 5- and 15-years). At a minimum, the forebay shall be sized to contain 0.25 inches per impervious acre of contributing drainage.
 - iii. The forebay shall be 4 to 6 feet deep.
 - iv. The height of the berm or baffle that separates the forebay from the remainder of the pond shall be one (1) foot below the one year Water Quality storm calculation.
 - v. The forebay shall be accessible and stabilized to accommodate equipment used in removing accumulated sediment
 - vi. Non-erodible material shall be used to construct the forebay berm. Armoring, such as rip rap, is generally preferred to stabilize the upgradient face of the berm.

- e. All wet ponds shall be designed with public safety as a primary concern. An aquatic safety bench shall be provided around the perimeter of the permanent pool. The aquatic safety bench shall be a minimum of ten (10) feet wide and have a maximum slope of 10:1. A 3:1 slope shall lead from the edge of the safety bench toward the deep water portion of the pond. At least 15 feet of 3:1 slope shall be provided from the edge of the safety bench. Slopes in the remainder of the pond below the permanent pool elevation shall be a maximum of 2:1. The portion of the pond devoted to peak attenuation storage shall incorporate a nearly level terrestrial bench. Unlike the aquatic bench that is submerged at all times, this bench is inundated only during large storm events. The terrestrial bench shall be planted with shrubs and trees that shade the pool and help reduce warming effects. The width of the bench shall be at least ten (10) feet and may include a walking path.
- f. The perimeter slope above the permanent pool shall have a maximum slope of 4:1 for a distance of at least 20 feet. The remaining areas above the permanent pool shall have a maximum slope of 3:1.
- g. Wet ponds shall have a deep water zone to encourage gravity settling of suspended fines, and prevent stagnation and possible eutrophication. The maximum depth of the permanent pool shall not exceed eight feet, with an average depth of 5 feet.
- h. Wet ponds shall be capable of being substantially drained by gravity flow. Where possible, wet ponds shall be equipped with a manually operated drain that can be secured against unauthorized operation. Some guidelines for pond drains are provided below:
 - i. Pond drains shall be designed with sufficient capacity so that maintenance (e.g., sediment removal) can be carried out without fear of inundation from relatively common or frequent rainfall events. Therefore, pond drains shall be designed to pass a flood having a 1-year recurrence interval with limited ponding in the reservoir area. However, the pond drain shall not be less than eight (8) inches in diameter.
 - ii. Sluice gates shall be provided for all pond drains.
 - iii. Pond drains shall be accessible during all times (e.g., emergency spillway flow conditions).
- i. A planting plan shall be developed for the wet pond, showing all proposed aquatic, emergent, and upland plantings. The planting plan shall specify aquatic plugs (2" minimum) and containerized plant material for use in the aquatic bench. The use of seed mixtures to develop the aquatic bench is not permitted. Seed mixes may only be utilized to stabilize berm slopes and meadow areas. All aquatic plant material shall be protected with fencing specifically intended to protect plant material from water fowl.
- j. Wet Ponds shall be designed to completely control runoff generated by the water quality design storm within the water quality storage. The water quality storage is that part of the pond that lies between the crest of the high-level outlet and the permanent pool level. To promote quiescent settling of particulates, the water quality volume shall be released over a period of not less than 24 hours, but no more than 48 hours.
- k. Calculations, based on watershed sediment yields and pond trap efficiencies shall be submitted to calculate the sediment volume requirements and expected frequency of sediment removal. The facility shall be designed such that sufficient volume is provided for a 10-year frequency of removal.
- l. The permanent pool shall be equal to or greater than the water quality volume.
- m. The Applicant must submit a written procedure for implementing a maintenance program for the wet pond. The maintenance program shall follow the recommendations listed in the Pennsylvania Stormwater Best Management Practices Manual. The written procedure shall be provided to all persons responsible for the maintenance of the facilities including but not limited to homeowners and homeowners associations.
- n. The use of on-line stormwater ponds on streams capable of supporting trout and other native fish species shall be prohibited. Stormwater ponds located within watersheds defined by PADEP as Cold Water Fishery (CWF), High Quality Cold Water Fishery (HQ-CWF), Warm Water Fishery (WWF) and Trout Stocking Fishery (TSF) shall be designed to significantly reduce and/or eliminate thermal impacts. However, in no case shall runoff from a stormwater pond discharge directly into a stream that is classified as a CWF or HQ-CWF. Stormwater Pond outfall culverts shall be a minimum of 100 feet from the limits of any CWF or HQ-CWF classified stream.

- o. The preferred method of low flow discharge from a pond is a submerged reverse-slope pipe that extends downward from the riser/outlet structure to an inflow point one foot below the normal pool elevation. Alternative methods that should be employed are broad crested rectangular, v-notch, or proportional weirs, protected by a half-round high density polyethylene pipe (HDPEP) or similar device that extends at least 12 inches below the normal pool.
 - p. Warning signs prohibiting swimming and skating shall be posted for all ponds.
 - q. A Wet Pond Drawdown Assessment shall be submitted for the proposed wet pond. The assessment shall determine whether the wet pond has an appropriate water balance to maintain a wet pool over a 30-day period without rainfall and during periods of high evaporation. The engineer shall submit a Precipitation and Evaporation Rate Table based on actual site conditions.
 - r. In order to address the West Nile Virus concerns, Wet Ponds shall be designed to attract a diverse wildlife community and the ponds shall be stocked with fish. Aeration fountains shall be added to minimize larval mosquito populations.
5. Extended Detention Basin (Dry Pond)
- a. Extended Detention basins shall be designed to detain the 1-year, 24-hour design storm using the NRCS Type II distribution. Provisions shall be made so that the 1-year storm takes a minimum of 24 hours to drain from the facility from a point where the maximum volume of water from the 1-year storm is captured. (i.e., the maximum water surface elevation is achieved in the facility). Release of water can begin at the start of the storm (i.e., the invert of the water quality orifice is at the invert of the facility). The design of the facility shall consider and minimize the chances of clogging and sedimentation potential.
 - b. Two stage basins shall be utilized where first flush detention will be employed for water quality and conventional detention used for peak rate control of storms exceeding the 1-year, 24-hour event. Two stage basins shall be constructed so that the lower part of the basin is graded to detain stormwater from the "water quality storm", and the remainder of the basin graded as a flat overbank area to provide storage only for the larger, less frequent storm events. The overbank area shall be developed as an active or passive recreation area. The area inundated by the "water quality storm" shall be maintained as a wetland environment, which will increase the water quality benefits of the first flush/dual purpose detention basin, and will prevent the need for mowing of a frequently saturated area. If the upland area is to be used as a passive recreation area, the area shall be managed as an upland meadow with grass no shorter than 6 to 8 inches.
 - c. The water quality volume shall be provided below the primary outlet.
 - d. The length of the basin between the inflow and outlet points shall be maximized. In addition, an irregular shoreline shall be provided. By maximizing the flow length through the basin and providing an irregular shoreline, the greatest water quality benefit will be achieved by minimizing "short circuiting" of runoff flowing through the basin. A minimum length-to-width ratio of 2:1 shall be provided for all extended detention basins/dry ponds. A medial berm may be used to reduce flow width and improve flow distribution and length.
 - e. A serpentine low-flow channel shall be constructed through the flat overbank area to transport dry-weather flows and minor storm flows. The channel shall be grass-lined and sloped a minimum of 2 percent to promote drainage of the overbank area between storms. In order to ensure that the overbank area can be adequately used as an active or passive recreation area, the low-flow channel shall not bisect the overbank area.
 - f. A shallow forebay shall be provided adjacent to all inflow areas unless the inlet provides less than 10% of the total inflow to the pond. The forebay shall be planted as a marsh with emergent wetland vegetation. The forebay serves to enhance sediment trapping and pollutant removal, as well as concentrating accumulated sediment in an area where it can be readily removed. To create a forebay, a baffle can be introduced to restrict hydraulic communication between the inlet and the remainder of the basin. The minimum standards for forebays are as follows:
 - i. The minimum forebay length is 10 feet.
 - ii. Sufficient storage volume shall be provided to trap sediment between clean-out intervals (10 years minimum). At a minimum, the forebay shall be sized to contain 0.25 inches per impervious acre of contributing drainage.

- iii. The forebay shall be 4 to 6 feet deep.
 - iv. The height of the berm or baffle that separates the forebay from the remainder of the pond shall be one (1) foot below the ponding depth associated with the water quality design storm.
 - v. The forebay shall be accessible and stabilized to accommodate equipment used in removing accumulated sediment
- g. To minimize the visual impact of detention basins, the detention basin shall be designed to avoid the need for safety fencing. To meet this requirement, basins shall be designed to the following specifications:
- i. Maximum depth of detained runoff shall be 24 inches for a 2 year storm event.
 - ii. Maximum depth of detained runoff shall be 36 inches for a 100 year storm event.
 - iii. Interior slopes shall not be steeper than a ratio of 4:1 horizontal to vertical.
 - iv. Ponded water shall never exceed a depth of 24 inches for more than four hours.
 - v. Depths and slopes may be exceeded by permission of the Township on a case-by-case basis if lot runoff, topography and/or existing downstream systems make the required pond area unreasonably large. In such case, fence and landscape screens may be required.
- h. The minimum drainage area to an extended detention basin shall be 10 Acres.
6. Bioretention Facility
- a. All concentrated discharge directed to a bioretention facility shall be conveyed through a Pretreatment Filter Strip. The Pretreatment Filter Strip shall be designed to reduce the incoming velocities and to filter out coarser sediment particles. Examples of Pretreatment Filter Strips include sand or gravel diaphragms, grass swales, sand filters, stone check dams, etc.
 - b. Bioretention facilities shall be designed such that the required filter bed area (A_f) is calculated using the following equation:
 - i. $A_f = (WQ_v) (d_f) / [(k) (h_f + d_f) (t_f)]$, where:
 - (1) A_f = Surface area of filter bed (ft²)
 - (2) d_f = filter bed depth (ft)
 - (3) k = coefficient of permeability of filter media (ft/day)
 - (4) h_f = average height of water above filter bed (ft)
 - (5) t_f = design filter bed drain time (days)
 - (6) WQ_v = water quality volume (ft³)
 - (7) $= P \times R_v$
 - (8) $R_v = 0.05 + 0.009 (I)$
 - (9) I = Drainage Area Percent Impervious
 - (10) P = Rainfall, in Inches
 - c. Bioretention facilities shall be provided meeting the following minimum dimensions:
 - i. Minimum Width of 10 feet (excluding side slopes)
 - ii. Minimum Length 20 feet
 - iii. Minimum Length to width Ratio of 2:1
 - iv. Maximum shallow ponding depth of 6 inches
 - v. Minimum planting soil bed depth of 4 feet (excluding sand layer)

- d. All bioretention facilities shall incorporate an organic mulch layer. The organic mulch layer shall be standard landscape style, single or double, shredded hardwood mulch or chips. The mulch layer shall be well aged (stockpiled or stored for at least 12 months), uniform in color, and free of other materials, such as weed seed, soil roots, etc. The mulch layer shall be applied to maximum depth of three (3) inches. Grass clippings shall not be used as a mulch material.
 - e. An overflow curtain drain shall be provided to promote the infiltration of stormwater into the planting soil bed. The curtain drain shall be constructed of clean stone or pea gravel.
 - f. The planting soil bed shall be constructed with a sandy loam, loamy sand, loam (USDA), or a loam/sand mixture. The soils shall fall within the SM, ML, SC classifications of the Unified Soil Classification System (USCS). A permeability of at least 1.0 foot per day (0.5"/hr) is required. The soil shall be free of stones, stumps, roots, or other woody material over 1" in diameter. Brush or seeds from noxious weeds shall not be present in the soils. Placement of the planting soil shall be in lifts 12 to 18", loosely compacted. The specific characteristics presented below must be provided for all bioretention facilities. A soils analysis of the planting bed soil shall verify that the soils meet the below specification:
 - i. PH Range between 5.2 and 7.0
 - ii. Organic Matter between 1.5 and 4.0 percent
 - iii. Magnesium provided at 35 lbs. per acre, minimum
 - iv. Phosphorus (P₂O₅) provided at 75 lbs. per acre, minimum
 - v. Potassium (K₂O) provided at 85 lbs. per acre, minimum
 - vi. Soluble salts shall be less than 500 ppm
 - vii. Clay content between 10 and 25 percent
 - viii. Silt content between 30 and 55 percent
 - ix. Sand content between 35 and 60 percent
 - g. All bioretention facilities shall incorporate landscaping and shall be provided with a Landscaping Plan that meets the following standards:
 - (1) Plant species shall be selected based on the ability to tolerate urban stresses such as pollutants, variable soil moisture and ponding fluctuations. A list of acceptable native plants is provided in the PA Stormwater Best Management Practices Manual.
 - (2) A minimum of three (3) species of trees and three species of shrubs shall be selected to insure diversity.
 - (3) A minimum tree and shrub density of 1000 trees and shrubs per acre shall be provided. A 2:1 to 3:1 ratio of shrubs to trees shall be provided.
 - (4) Plant material sizes shall meet the minimum standards listed in the Landscaping Conservation and Improvement Plan section of this ordinance.
 - h. In cases where the coefficient of permeability of the existing soils is less than 0.5" per hour, an under-drain facility shall be provided. The under-drain facility shall be protected from sediment accumulation with filter fabric.
 - i. A 12" deep sand bed shall be provided below the planting soil bed. At the planting soil bed and sand bed interface, the soil and sand shall be roto-tilled approximately 6 inches.
 - j. An overflow spillway or storm drain shall be provided to adequately convey the 50 year storm event. The spillway or storm drain facility shall be set above the maximum proposed ponding depth.
7. Permeable Pavement
- a. In order to calculate the minimum surface area or the storage volume required for permeable pavement areas, the designer is directed to the Pennsylvania Stormwater Best Management Practice Manual. The Design Methodology for Controlling Peak Runoff and Design Methodology for Controlling Runoff Volume shall be used to meet the peak rate reduction and groundwater recharge requirements, respectively.

- b. The type of permeable pavement material (Perforated Brick Pavers, Concrete Grid Pavers, Permeable Interlocking Concrete Paving Blocks, Porous Bituminous Concrete, etc.) shall be determined based on required surface infiltration rates, total surface area of pavement area, and proposed use of the pavement/parking area.
 - e. Permeable Pavements shall be constructed with a perimeter overflow edge. The edge is intended to intercept runoff from the pavement, if for any reason the permeable surface were to become clogged. The perimeter overflow edges shall connect directly into the base layer of the pavement.
 - d. Soil percolation rates shall equal or exceed 0.50 inches per hour. Under certain circumstances, percolation rates as low as 0.25 inches per hour may be used, if approved by the Township.
 - e. Permeable Pavement recharge beds shall dewater within 72 hours.
 - f. A minimum depth of 48 inches between the intended bottom of the facility and the seasonal high water table and/or bedrock (limiting zones). In areas where carbonate rock does not exist, the 48-inch minimum depth to a limiting zone requirement may be reduced to 24 inches as long as the soil has a cation exchange capacity (CEC) of greater than ten and/or does not have a sandy loam or loamy sand texture. In circumstances where the recharge bed is located over carbonate rock, a minimum of 48 inches is required.
 - g. All recharge bed bottoms shall be flat (0% slope). Porous pavement surface slopes shall not exceed 2 percent and are encouraged to be designed at 1 percent. In certain cases, the Township may allow surface slopes up to 3 percent if natural grades are left largely undisturbed.
8. Non-infiltration Facilities used as Best Management Practices (BMPs)
- a. All facilities shall be designed in accordance to the design criteria and specifications in the *Pennsylvania Stormwater Best Management Practices Manual (2006 or as last revised)*. This design shall be in particular coordination with Section 8, Descriptions of Selected Best Management Practices.

L. On-Site Soils Analysis

- 1. The following analysis and testing shall be performed for all regulated activities to determine the suitability of on-site soils with respect to proposed BMPs for stormwater management. The testing shall be conducted by a qualified Professional Engineer, Professional Geologist, or soils scientist and must be submitted with the Preliminary Plan.
- 2. Analyze hydrologic soil groups as well as natural and man-made features within the site to determine general areas of suitability for infiltration practices. In areas where development on fill material is under consideration, conduct geotechnical investigations of sub-grade stability; infiltration is not permitted to be ruled out without conducting these tests.
- 3. Soil Testing Requirements
 - a. Excavate a test pit or drill a standard penetration soil boring to a minimum depth of four (4) feet below the proposed facility bottom.
 - b. Conduct a Standard Penetration Test boring every two (2) feet to a depth of four (4) feet below the facility bottom.
 - c. Determine depth to limiting zones including bedrock and groundwater table. The seasonal high water and/or groundwater table shall be measured upon initial excavation or drilling, and again 24 hours later.
 - d. Determine the USDA or Unified Soil Classification System textures at the proposed bottom design elevation of the BMP and 4 feet below the bottom of the BMP facility. Grab samples shall be procured at both elevations and laboratory grain-size analysis and hydrometer tests may be used to determine soil classification and textural analysis. The use of laboratory testing to establish infiltration rates is prohibited.
 - e. Provide a soil description for all soil horizons.
 - f. The location of the test pit or boring shall correspond to each BMP location. One test pit/boring shall be provided for each 2500 SF (50' x 50' grid) area of basin/filter area. The test pit boring location and number shall be identified on the grading/stormwater management plan. A report of the findings for all test pits shall be included with the stormwater management report.
 - g. Testing for infiltration/percolation rates shall be performed at the bottom design elevation of the proposed BMP. Hydraulic conductivity tests, double-ring infiltrometer tests, or basin flooding tests may be used provided documentation accompanies the test results.

- h. All field testing shall be performed in the presence of the Township Engineer. The Township Engineer shall be notified two (2) business days in advance of any field testing being performed.
- i. Additional on-site testing may be required by the Township Engineer for sites located in areas requiring special considerations (e.g. in areas underlain by carbonate limestone).
- j. Laboratory test results of amended soil mixtures proposed for BMPs shall be submitted to the Township Engineer for review.

M. Feasibility Analysis

- 1. A feasibility analysis that evaluates the potential application of infiltration, flow attenuation, wet pond, bioretention, or wetland BMPs must be submitted with the stormwater management plans required in this ordinance for all developments. This analysis shall provide:
 - a. A general assessment of the anticipated additional runoff based on the design storm and post-development condition and utilizing the calculation procedures required by this Ordinance.
 - b. Indication of drainage areas on the development site resulting in impervious, pervious, and rooftop runoff;
 - c. Indication of type of land use (residential, non-residential) generating the impervious runoff;
 - d. Delineation of soils on the site from the Official Soil Survey provided by the U.S. Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/>);
 - e. Indication of soils generally suitable for infiltration and/or wet pond/artificial wetland BMPs as shown in the table entitled: "General Soil Suitability for Infiltration, Wet Pond and Artificial Wetland Best Management Practices With Consideration to Runoff Point of Origin and Land Use Type;" including specification of those soils requiring modifications;
 - f. Calculated acreage of suitable soils for infiltration BMPs and wet pond or artificial wetland BMPs and percentage of suitable soils based on total site acreage;
 - g. Calculated acreage of suitable soils for infiltration BMPs and wet pond or artificial wetland BMPs made unavailable due to proposed development layout, and justification that alternative development layout which would reduce impact on suitable soil availability is unfeasible;
 - h. Analysis of potential infiltration or wet pond or artificial wetland BMPs which could be implemented to manage the projected post-development runoff with consideration of suitable soil availability, runoff point of origin and type of land use (items b. and c. above), and the general design standards and maintenance issues presented in this ordinance, including an indication of how most post-development runoff can be managed by these BMPs (e.g., the entire post-development runoff or partial amount of runoff expressed as a percentage); and
 - i. Rationale for the decision to not proceed with implementation of infiltration BMPs or wet pond or artificial wetland BMPs such as insufficient soil suitability, and development constraints.

N. Downstream Hydraulic Capacity Analysis

- 1. It shall be the Applicant's responsibility to prepare a Downstream Capacity Hydraulic Analysis for all points of discharge. The Downstream Capacity Hydraulic Analysis conducted in accordance with this ordinance shall use the following criteria for determining adequacy for accepting the post development peak flow rates:
 - a. Natural or man-made channels or swales must be able to convey the runoff associated with a post development 50-year return period event within their banks at velocities and shear stresses consistent with protection of the channels from erosion, independent of the pre-development rates. Acceptable velocities and shear stresses shall be based upon criteria included in the DEP *Erosion and Sediment Pollution Control Program Manual*.
 - b. Natural or man-made channels or swales must be able to convey the post development 100-year return period runoff without creating any hazard to persons or property.
 - c. Culverts, bridges, separate storm sewer systems or any other facilities which must pass or convey flows from the tributary area must be designed in accordance with DEP, Chapter 105 regulations (if applicable) and, at a minimum, pass the post development 100-year return period runoff.

- d. The Downstream Hydraulic Capacity Analysis shall be performed in accordance with the Floodplain delineation requirements listed in the Township Zoning Ordinance (i.e., HEC-2 or HEC-RAS Study).
- e. The Analysis shall be performed to the nearest “natural” outfall (stream, watercourse, etc.) for each point of concentrated or dispersed discharge, which shall not be less than 1000 feet downstream from the development boundary or to the “downstream” end of the next major offsite stormwater facility, as defined by this Ordinance (i.e., road culvert, wet pond, and detention/retention basin, etc.) whichever is less. However, in no event shall the analysis be performed less than 1000 feet downstream from the development boundary. The analysis shall document the depth of flow, duration of peak flow, and flow velocities at critical locations along the downstream channel. The analysis shall also identify any locations where the peak rate exceeds the capacity of the downstream facility. Development activities shall not adversely impact any off-site drainage facility.

O. Calculation Methodology

- 1. In all plans and designs for stormwater management systems and facilities submitted to the Township Engineer for approval, stormwater peak discharge and runoff shall be determined through the use of the Soil Cover Complex Method as set forth in Urban Hydrology for Small Watersheds, Technical Release No. 55, with specific attention given to antecedent moisture conditions, flood routing, and peak discharge specifications included therein and in Hydrology National Engineering Handbook, Section 4, both by the US Department of Agriculture, Natural Resources Conservation Service (Soil Conservation Service). Note that the use of TR-55 with many of the natural system-based approaches and practices recommended by this Ordinance requires that calculations be performed on a detailed small sub-area basis. The Township Engineer may permit the use of the Rational Method for calculation of runoff for regulated activities of 10 acres or less and for the design of storm structures. The design engineer shall request, in writing, authorization to utilize the Rational Method, from the Township Engineer.

Table 9-11 : Acceptable Computation Methodologies For Stormwater Management Plans

Method	Method Developed By	Applicability
TR-20 or commercial package based on TR-20	USDA - NRCS	When use of full model is desirable or necessary
TR-55 or commercial package based on TR-55	USDA - NRCS	Applicable for plans within the models limitations
HEC – 1	U.S. Army Corps of Engineers	When full model is desirable or necessary
PSRM	Penn State University	When full model is desirable or necessary
Rational Method or commercial package based on Rational Method	Emil Kuiching (1889)	For sites less than 10 acres
Other methods	Various	As approved by the municipal engineer

- 2. All calculations consistent with this ordinance using the soil cover complex method shall use the appropriate design rainfall depths for the various return period storms presented in Table 9-9 of this ordinance. If a hydrologic computer model such as PSRM or HEC-1 is used for stormwater runoff calculations, then the duration of rainfall shall be 24 hours. A Type II storm distribution of 24-hours duration shall be used as the basis for hydrograph generation. Antecedent moisture condition shall be assumed as the average condition.
- 3. The design of all Stormwater Management Facilities and BMPs shall be based on the maximum permitted impervious surface ratio, as defined by the Township’s Zoning Ordinance, for the development site or lot, whichever creates a greatest amount of impervious surface.
- 4. For the purposes of predevelopment flow rate and volume determination, the land shall be considered as “meadow” good condition, unless the natural groundcover generates a lower curve number or Rational ‘C’ value (i.e., forest). However, if farmland area is preserved with the development plan and the farmland area is intended to be farmed during and after development, the pre and post development ground cover for that portion of the development site may be considered as “Fallow – Crop residue cover (CR) – Good condition” if the post development area is tributary to either a sedimentation basin or a stormwater management facility.
- 5. All calculations using the Rational Method shall use rainfall intensities consistent with appropriate times of concentration for overland flow and return periods from the Design Storm Curves from PA Department of Transportation Design Rainfall Curves (1986 or last amended).

6. Times of concentration for overland flow shall be calculated using the methodology presented in Chapter 3 of Urban Hydrology for Small Watersheds, NRCS, TR-55 (as amended or replaced from time to time by NRCS). Times of concentration for channel and pipe flow shall be computed using Manning's equation. The maximum length of sheet flow over unpaved surfaces shall be 50 to 100 feet in calculating the time of concentration for a watershed. The theoretical maximum length of 300 feet shall be utilized only in unique situations such as uniformly sloped, smoothly paved parking areas. If the drainage area is small (less than 1 Acre) and sheet flow length is greater than 10% of the total hydraulic travel distance, the designer shall:
 - a. Re-check sheet flow T_t before accepting the calculated T_e Value,
 - b. If sheet flow T_t is greater than 80% of T_e , then sheet flow area may be "non-contributing area", especially if the sheet flow is from very flat slopes (1 to 2%).
 - c. The calculations may need to be revised to compute the peak discharge using a smaller drainage area and total runoff volume from the total drainage area.
7. Runoff Curve Numbers (CN) for both existing and proposed conditions to be used in the soil cover complex method shall be obtained from Table 2-2 of the NRCS TR-55.
8. Runoff coefficients "C" for both existing and proposed conditions for use in the Rational method shall be obtained from PennDOT's Design Manual No. 2.
9. In performing the stormwater calculations, all those areas to be disturbed during construction shall be assumed to be reduced one Hydrologic Soil Group (HSG) category level during post development runoff calculations (i.e., HSG B is reduced to HSG C, and so forth).
10. Where uniform flow is anticipated, the Manning equation shall be used for hydraulic computations, and to determine the capacity of open channels, pipes, and separate storm sewer systems. Values for Manning's roughness coefficient (n) shall be obtained from PennDOT's Design Manual 2.
11. Outlet structures for stormwater management facilities shall be designed to meet the performance standards of this ordinance using generally accepted hydraulic analysis techniques or methods.
12. The design of stormwater detention facilities shall be verified by routing the design storm hydrograph through these facilities using the Storage-Indication (Modified PULS) Method. The design storm hydrograph shall be computed using a calculation method that produces a full hydrograph. The Township may approve the use of any generally accepted full hydrograph approximation technique that shall use a total runoff volume that is consistent with the volume from a method that produces a full hydrograph.
13. The Township has the authority to require that computed existing runoff rates be reconciled with field observations and conditions. If the designer can substantiate through actual physical calibration that more appropriate runoff and time-of-concentration values should be utilized at a particular site, then appropriate variations may be made upon review and recommendations of the Township Engineer. Calibration shall require detailed gauge and rainfall data for the particular site in question.

P. Carbonate (Limestone) Geology Requirements

1. Land grading in areas underlain by carbonate geology, the construction of buildings, building additions or structures such as swimming pools that directly or indirectly diminish the natural flow of stormwater or springs, shall be prohibited unless the Applicant proves there is no impact to the groundwater or groundwater recharge. Grading on a site underlain by carbonate geology shall be kept to a minimum. If grading is to be performed, it shall be performed with the following standards:
 - a. Existing drainage patterns must be maintained.
 - b. No alteration (land disturbance greater than 500 square feet) shall be made to the run-off pattern.
 - c. French drains are prohibited near existing surface drainage channels.
 - d. Surface drainage channels shall not be affected by grading for and construction of roadways, driveways, structures, separate storm sewer systems, detention basins or other development improvements.

2. The creation of retention/detention basins, stormwater management facilities or ponds within or within two hundred (200) feet of a carbonate geologic formation shall be constructed, in addition to standards set forth in this Ordinance, in accordance with the following requirements:
 - a. No detention basin shall be located closer than the specified distances from the following features:

Table 9-12 : Required Setback Dimensions from Limestone Features

Feature	Setback Requirement (ft.)
Sinkholes (rim)	100
Closed Depressions (rim)	100
Lineaments	50
Fracture Traces	50
Caverns	100
Ghost Lakes	100
Disappearing Streams	100
Surface or Subsurface Pinnacles	25
Fissures	50
Faults	50

- b. The Applicant shall determine the strike of the rock for the location of the detention basins.
- e. The Applicant shall establish two (2) trenches perpendicular to the strike of the bedrock. The trenches shall be ten (10) feet from the outside edge of the stormwater management facility. The dimension of the proposed stormwater facility between the parallel trenches shall not exceed one hundred (100) feet measured from the outside edge of the stormwater management facility. Trenching shall be dug to a depth of two (2) feet below the intended floor of the basin. A detail of the required Basin Trenching is included in the Appendix attached to this Ordinance.
- d. The Applicant shall notify the Township Engineer at least forty-eight (48) hours prior to trenching activity taking place. The Applicant shall not begin trenching until the Township Engineer is on-site to observe the trenching.
- e. Stormwater management facilities shall not be located in an area where there are surface pinnacles, nor where subsurface pinnacles are encountered during trenching tests nor where they are known to exist.
- f. Outflow from stormwater management facilities shall not empty into or be directed to any of the following carbonate features:
 - i. Sinkholes
 - ii. Closed Depressions
 - iii. Lineaments
 - iv. Fracture Traces
 - v. Caverns
 - vi. Ghost Lakes
 - vii. Disappearing Streams
 - viii. Surface or Subsurface Pinnacles
 - ix. Fissures
 - x. Faults
- g. Stormwater Management Facilities shall be designed so that they return to normal conditions within thirty-six (36) hours after the termination of the storm, unless the Township Engineer finds that downstream conditions warrant revising the design criteria for stormwater release.

- h. Seepage pits, retention basins, ponds and other BMPs which may potentially impact the carbonate geology shall be prohibited. The use of infiltration or permanent pool facilities may be deemed unacceptable by the Township Engineer, governing body or appointed representative, if the improvement has the potential to contaminate groundwater supplies or cause damage to other natural resources or property.
3. Prior to locating stormwater management facilities, drainage channels, or French drains, the Applicant shall perform test borings (or alternate testing procedures, such as resistivity testing, ground penetrating radar, and/or other procedures or combinations approved by the Township) of the site in areas where the facilities are proposed. The test borings shall be laid out in a grid on fifty (50) foot centers under the proposed facilities. All boring holes shall be closed with concrete at the conclusion of the test procedures in accordance with applicable wellhead protection standards.
 4. Test borings shall be conducted in accordance with American Society for Testing Materials D-1586, standard method for "penetration test and split barrel sampling of soils." Where intact rock and consolidated material is encountered, samples shall be secured in accordance with ASTM D-2113 for "diamond core drilling for site investigation." The location and depth of each test boring shall be satisfactory to the geotechnical engineer providing the report required below. Test boring results shall be recorded on boring logs to include all information required in ASTM D-1586. Coordinates shall be provided for all test boring locations and shall be based on the Pennsylvania State Plane Coordinate system. All test information including location shall be included in the report provided to the Township. Boring samples shall be obtained and bottled in accordance with ASTM D-1586. An interpretation of test borings shall be provided by a professional geotechnical engineer licensed in the state of Pennsylvania and shall include a report of findings and recommendations with regard to building and site development construction requirements. The Applicant shall comply with the recommendations as found in the professional geotechnical engineer's report.
 5. All drainage on the site shall be channeled away from the carbonate features referenced below. French drains are also prohibited within one hundred (100) feet of these features.
 - a. Sinkholes
 - b. Closed Depressions
 - c. Lineaments
 - d. Fracture Traces
 - e. Caverns
 - f. Ghost Lakes
 - g. Disappearing Streams
 - h. Surface of Subsurface Pinnacles
 - i. Fissures
 - j. Faults
 6. Prior to installation of underground transmission lines and pipelines, auger borings (four (4) inch minimum) shall be made along all proposed underground conduit utility lines, wastewater lines, water lines, pipelines, and stormwater and wastewater lines at an interval of fifty (50) feet. These borings shall be drilled to a minimum of two (2) feet below bottom of the pipe or conduit. Pipelines and conduit shall be laid out so that they do not intersect rock surface pinnacles, sinkholes, fissures, lineaments, faults, fracture traces, or caverns.
 7. A dike of clay or other suitable material shall be constructed across the width of the trench at intervals of twenty (20) feet or less along all underground conduits, utility lines, wastewater lines, water lines, pipelines, and stormwater and wastewater lines.
 8. Ghost Lakes (closed depressions) may not be disturbed. They shall not be regraded, nor shall new construction or excavation be permitted within them.
 9. All drainage areas that contribute to disappearing streams and ghost lakes shall be assigned a pre-development discharge rate of "zero" and shall be subtracted out of the total site drainage area when comparing pre-development and post development rates and volumes.

Q. Drainage Plan Requirements

1. For any of the activities regulated by this ordinance, the final approval of subdivision and/or land development plans, the issuance of any building or occupancy permit, or the commencement of any land disturbance activity may not proceed until the property owner or developer or his/her agent has received written approval of a drainage plan from the Township, an adequate Erosion and Sediment Control Plan review from the Conservation District and a NPDES Permit for Stormwater Discharges Associated with Construction Activities (for proposed land disturbance over 1 acres) from the Pennsylvania Department of Environmental Protection.
2. The drainage plan shall consist of a general description of the project including sequencing items, all applicable maps, computations and plans. A note on the maps shall refer to the associated computations, the Erosion and Sedimentation Control Plan, and the Post Construction Stormwater Management Plan by title and date. The cover sheet of the computations and erosion and sedimentation control plan shall refer to the associated maps by title and date. All drainage plan materials shall be submitted to the Township in a format that is clear, concise, legible, neat, and well organized.
3. The following items shall be included in the Drainage Plan and Computations:
 - a. General
 - i. General description of project.
 - ii. General description of temporary and permanent stormwater management techniques, including construction specifications of the materials to be used for stormwater management facilities.
 - iii. Complete hydrologic, hydraulic, and structural computations for all stormwater management facilities.
 - iv. An erosion and sediment control plan, including all reviews and approvals by the Conservation District.
 - v. A general description of nonpoint source pollution controls.
 - vi. An Operations and Maintenance Plan for all proposed Best Management Practices.
 - b. Plan(s) of the project area shall be submitted on 24-inch x 36-inch sheets and shall be prepared in a form that meets the requirements for recording in the offices of the Recorder of Deeds of Bucks County. The contents of the plans(s) shall include, but not be limited to; all items required by other sections this ordinance, plus the following:
 - i. The location of the project relative to highways, municipal boundaries or other identifiable landmarks.
 - ii. Existing and proposed contours at intervals of two feet. In areas of slopes greater than 15 percent, five-foot contours intervals may be used with the approval of the Township.
 - iii. Existing streams, lakes, ponds, wetlands, Waters of the Commonwealth, or other bodies of water within the project area.
 - iv. Other physical features including flood hazard boundaries, sinkholes, streams, existing drainage courses, areas of natural vegetation to be removed and preserved, and the total extent of the upstream area draining through the site.
 - v. A clear acetate overlay plan showing the following:
 - (1) Soil types, including depth, slope, texture, and structure,
 - (2) Hydrologic Soil Group classifications and soil rated permeabilities in inches per hour.
 - (3) Soil constraints including depth to bedrock, depth to Seasonal High Water Table,
 - (4) Geologic formations underlying the project area and extending 50 feet beyond all property boundaries,
 - (5) Description of aquifer characteristics of formations; highlight special formations such as limestone.

- vi. Proposed changes to the land surface and vegetative cover, including the type and amount of impervious area that would be added.
- vii. Proposed structures, roads, paved areas, and buildings.
- viii. A key map showing all existing man-made features beyond the property boundary that would be affected by the project.
- ix. Location of all open channels and all down gradient receiving channels, swales, waters, into which stormwater runoff or drainage will be discharged.
- x. Horizontal and vertical profiles of all closed (pipe) and open channels, including hydraulic capacity.
- xi. Overland drainage patterns and swales and all down gradient receiving channels, swales, waters, to which stormwater runoff or drainage will be discharged.
- xii. A fifteen-foot wide access easement around the outside of all stormwater management facilities that provide ingress to and egress from a public right-of-way.
- xiii. The location of all post-construction stormwater management facilities, BMPs, etc.
- xiv. A note on the plan indicating the location and responsibility for maintenance of stormwater management facilities that would be located off-site. All off-site facilities shall meet the performance standards and design criteria specified in this Ordinance.
- xv. A construction detail of any improvements made to sinkholes and the location of all notes to be posted, as specified in this Ordinance.
- xvi. A statement, signed by the landowner, acknowledging the stormwater management system to be a permanent fixture that can be altered or removed only after approval of a revised plan by the Township.
- xvii. The location of all erosion and sediment control facilities.
- xviii. PCSWM Plans, E&SC Plans, and NPDES Permits/Plans shall be coordinated between the Township, CCD (County Conservation District) and PADEP (Pennsylvania Department of Environmental Protection).
- xix. A statement, signed by the Applicant, acknowledging that any revision to the approved drainage plan must be approved by the Township and that a revised E&S Plan must be submitted to the Conservation District for a determination of adequacy.
- xx. The following signature block for the Design Engineer:
- xxi. "I, (Design Engineer), on this date (date of signature), hereby certify that the Drainage Plan meets all design standards and criteria of the Buckingham Township Subdivision and Land Development Ordinance." Mapping of the watershed area and delineation of individual sub-areas for pre-development and post-development conditions.
- xxii. Delineation of all time of concentration and travel time flow paths used to develop runoff hydrographs. The endpoints of flow path segments shall be identified with a letter which corresponds to the calculation of travel time for that particular flow segment.
- xxiii. The location and elevation of all inlet and outlet devices. Invert, top of grate, and top of wall elevations shall be provided. All outlet devices discharging to existing separate storm sewer facilities, streams, wetlands or watercourses shall be identified with State Plane Coordinates.
- xxiv. The location and elevation of the emergency spillway with the limit and type of lining material clearly defined.

- xxv. Delineation of the limits of the permanent pool.
 - xxvi. Delineation of the limits of the 1-year “water quality” storm elevation.
 - xxvii. Delineation of the limits of the maximum water surface elevation (100-year storm event).
 - xxviii. Location of the outlet piping and anti-seep collars.
 - xxix. Location of energy dissipating and sediment removal devices.
 - xxx. A cross-section through the facility drawn to scale showing:
 - (1) Side slopes
 - (2) Bottom slopes
 - (3) Embankment with slopes identified
 - (4) Top of berm width and elevation
 - (5) Emergency spillway elevation
 - (6) Cutoff trench with side slopes, depth, and bottom width identified
 - (7) Permanent pool elevation
 - (8) Water quality storm elevation
 - (9) Maximum water surface elevation
 - (10) Infiltration bed lining
 - (11) Outlet structure, outlet pipe, anti-seep collars, and outfall structure
 - xxxi. Elevation views of the outlet structure and emergency spillway, at scale, showing:
 - (1) Maximum water surface elevation
 - (2) Maximum design flow depth in spillway and resulting freeboard to top of berm elevation
 - (3) Spillway lining and side slopes
 - (4) Top width and bottom width of spillway
 - (5) Size and elevation of all control devices in the outlet structure
 - xxxii. Additional details for construction of the stormwater management facility, including, but not limited to:
 - (1) Low flow channels with dimensions
 - (2) Energy dissipating and sediment removal devices, with dimensions
 - (3) Underdrains
 - (4) BMP Details
 - xxxiii. Limit of proposed disturbance.
- c. Supplemental Information – A written description of the following information shall be submitted:
- i. The overall stormwater management concept for the project.

- ii. Stormwater runoff computations as specified in this ordinance.
 - iii. Stormwater management techniques to be applied both during and after development
 - iv. The overall erosion and sedimentation control concept for the project.
 - v. The expected project time schedule.
 - vi. Development stages or project phases, if so proposed.
 - vii. An operation and maintenance plan.
 - viii. Landscape Plan which shall include the following, as applicable:
 - (1) Location of all aquatic, emergent, and upland plantings
 - (2) Specifications and/or typical details for installation of each type of plant
 - (3) Plant list including botanical name, common name, quantity, root type, and special remarks for each type of plant
 - (4) Specifications for seedbed preparation
 - (5) Expected project time schedule.
 - ix. A soil erosion and sedimentation control plan, where applicable, including all reviews and approvals, as required by PADEP.
 - x. A geologic assessment of the effects of runoff on sinkholes and other karst features as specified in this ordinance to be prepared by a Professional Geologist.
 - xi. The effect of the project (in terms of runoff volumes and peak flows) on adjacent properties and on any existing Township/PENNDOT/Private/Community separate storm sewer system that may receive runoff from the project site.
 - xii. A Declaration of Adequacy and Highway Occupancy Permit from PENNDOT District Office when utilization of a PENNDOT storm drainage system is proposed.
 - xiii. Photographs of all existing drainage facilities within 50 feet of the site.
 - xiv. Photographs of all proposed discharge locations within the project site
 - xv. Photographs of the proposed locations for all "off-site" stormwater management facilities.
- d. Stormwater Management Facilities
- i. All stormwater management facilities must be located on a plan and described in detail. Plan at a minimum should include Pre- and Post-Drainage Area Maps, an Overall Post-Construction Stormwater Management (PCSWM) Plan, Stormwater Details Sheets, Landscaping (if Low Impact Development or Bioinfiltration, Bioretention, or vegetated or Wetland Basins are proposed).
 - ii. When groundwater recharge methods such as seepage pits, beds, or trenches are used, the locations of existing and proposed septic tank infiltration areas, wastewater conveyance lines and wells must be shown. Minimum setback distances should be identified for both distances to wells and septic areas, etc.
 - iii. All calculations, assumptions, and criteria used in the design of the stormwater management facilities must be shown.

4. Plan Submission Procedures

- a. For all activities regulated by this ordinance, the steps below shall be followed for submission. For any activities that require a PADEP joint permit application and regulated under Chapter 105 (Dam Safety and Waterway Management) or Chapter 106 (Floodplain Management) of PADEP's Rules and Regulations, require a PENNDOT highway occupancy permit, require an NPDES Permit for Stormwater Discharges from Construction Activities, or require any other permit under applicable state or federal regulations, the permit(s) shall be included in the Final Plan submission.
- b. The drainage plan shall be submitted by the Applicant as part of the Preliminary and Final plan submission for the regulated activity.

R. Maintenance Responsibilities

1. No Regulated Earth Disturbance activities within the Municipality shall commence until approval by the Township of a Stormwater Control and BMP Operations and Maintenance plan that describes how the permanent (e.g., post-construction) stormwater controls and BMPs will be properly operated and maintained.
2. The following items shall be included in the Stormwater Control and BMP Operations and Maintenance Plan:
 - a. Map(s) of the project area, in a form that meets the requirements for recording at the offices of the Recorder of Deeds of Bucks County, and shall be submitted on 24-inch x 36-inch sheets. The contents of the maps(s) shall include, but not be limited to:
 - i. Clear identification of the location and nature of permanent stormwater controls and BMPs,
 - ii. The location of the project site relative to highways, municipal boundaries or other identifiable landmarks,
 - iii. Existing and final contours at intervals of two feet, or others as appropriate,
 - iv. Existing streams, lakes, ponds, or other bodies of water within the project site area,
 - v. Other physical features including flood hazard boundaries, sinkholes, streams, existing drainage courses, and areas of natural vegetation to be preserved,
 - vi. The locations of all existing and proposed utilities, sanitary sewers, and water lines within 50 feet of property lines of the project site,
 - vii. Proposed final changes to the land surface and vegetative cover, including the type and amount of impervious area that would be added,
 - viii. Proposed final structures, roads, paved areas, and buildings, and
 - ix. A fifteen-foot wide access easement around all stormwater controls and BMPs that would provide ingress to and egress from a public right-of-way.
 - b. A description of how each permanent stormwater control and BMP will be operated and maintained, and the identity and contact information associated with the person(s) responsible for operations and maintenance,
 - c. The name of the project site, the name and address of the owner of the property, and the name of the individual or firm preparing the plan, and
 - d. A statement, signed by the landowner, acknowledging that the stormwater controls and BMPs are fixtures that can be altered or removed only after approval by the Township.
3. The Stormwater Control and BMP Operations and Maintenance Plan for the project site shall establish responsibilities for the continuing operation and maintenance of all permanent stormwater controls and BMPs.
4. The Municipality shall make the final determination on the continuing operations and maintenance responsibilities. The Municipality reserves the right to accept or reject the operations and maintenance responsibility for any or all of the stormwater controls and BMPs.
5. It shall be unlawful to alter or remove any permanent stormwater control and BMP required by an approved Stormwater Control and BMP Operations and Maintenance Plan, or to allow the property to remain in a condition which does not conform to an approved Stormwater Control and BMP Operations and Maintenance Plan.

S. Prohibited Discharges

1. No person shall allow, or cause to allow, stormwater discharges into the Township's separate storm sewer system which are not composed entirely of stormwater, except (a) as provided in subsection 2 below, and (b) discharges allowed under a state or federal permit.
2. Discharges which may be allowed, based on a finding by the Township that the discharge(s) do not significantly contribute to pollution to surface waters of the Commonwealth, include:
 - Discharges from fire fighting activities
 - Potable water sources including dechlorinated water line and fire hydrant flushing.
 - Irrigation drainage.
 - Routine external building wash down (which does not use detergents or other compounds)
 - Air conditioning condensate
 - Water from individual residential car washing.
 - Flows from riparian habitats and wetlands
 - Pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spill material has been removed) and where detergents are not used.
 - Dechlorinated swimming pool discharges
 - Uncontaminated groundwater
 - Springs
3. In the event the Township determines that any of the discharges identified in paragraph 2, above, significantly contribute to pollution of waters of the Commonwealth, or in the event the Township is so notified by PADEP, the Township will notify the person responsible that such discharges must cease.
4. Upon receipt of such notice from the Township, the person responsible for prohibited discharges shall have a reasonable time, as determined by the Township, to cease the discharge, consistent with the degree of pollution caused by the discharge.
5. Nothing in this Section shall affect a discharger's responsibilities pursuant to state law.

T. Prohibited Connections

1. The following connections are prohibited, except as provided above:
 - a. Any drain or conveyance, whether on the surface or subsurface, which allows any non-storm water discharge including sewage, process wastewater, and wash water, to enter the separate storm sewer system, and any connections to the storm drain system from indoor drains and sinks; and
 - b. Any drain or conveyance connected from a commercial or industrial land use to the separate storm sewer system which has not been documented in plans, maps, or equivalent records and approved by the Township.

U. Enforcement -- In addition to the penalties imposed by Section 1.6 and the remedies available to the Township as set forth in Section 1.7 of this Ordinance, the following shall be applicable to violations of the stormwater regulations contained in Section 9.23:

1. Any person violating the provisions of Section 9.23 shall be guilty of a misdemeanor and, upon conviction, shall be subject to a fine of not more than \$1,000.00 for each violation, recoverable with costs. Each day that the violation continues shall be a separate offense.
2. The violation of any provision of Section 9.23 is hereby deemed a Public Nuisance. Each day that a violation continues shall constitute a separate violation.
3. Whenever the township finds that a person has violated a prohibition or failed to meet a requirement of Section 9.23, the Township may order compliance by written notice to the responsible person. Such notice may require without limitation:
 - a. The performance of monitoring, analyses, and reporting;
 - b. The elimination of prohibited discharges;
 - c. Cessation of any violating discharges, practices, or operations;
 - d. The abatement or remediation of storm water pollution or contamination hazards and the restoration of any affected property;
 - e. Payment of a fine to cover administrative and remediation costs;
 - f. The implementation of stormwater BMPs; and
 - g. Operation and maintenance of stormwater BMPs.

4. Failure to comply within the time specified in such written notice shall also subject such person to the penalty provisions set forth herein. All such penalties shall be deemed cumulative and shall not prevent the Township from pursuing any and all other remedies available in law or equity.
5. Any building, land development or other permit or approval for Regulated Earth Disturbance Activities issued by the Township may be suspended or revoked by the Township for:
 - a. Non-compliance with or failure to implement any provision of the permit;
 - b. A violation of any provision of Section 9.23; or
 - c. The creation of any condition or the commission of any act during construction or development which constitutes or creates a hazard or nuisance or pollution or which endangers the life or property of others.

9.24. STORM AND SURFACE DRAINAGE

A. General Requirements

1. Lots and developments shall be laid out and graded to provide positive drainage away from buildings.
2. Separate storm sewer systems, culverts and related installations shall be provided to:
 - a. To permit unimpeded flow of natural watercourses in such a manner as to protect the natural character of the watercourses and to provide regulated discharge,
 - b. To drain all low points along the line of streets; and gutter flow,
 - c. To intercept stormwater runoff along streets at intervals reasonably related to the extent and grade of the area drained and to prevent flow of water across intersections as further defined by this ordinance.
3. Separate storm sewer systems, as required, shall be placed in the right-of-way, parallel to the roadway. When located in undedicated land, they shall be placed within an easement not less than twenty (20) feet wide.
4. Manholes shall be spaced not more than three hundred (300) feet apart on pipe sizes up to and including twenty-four (24) inches in diameter, and not more than four hundred fifty (450) feet apart for pipe sizes greater than twenty-four (24) inches in diameter. Inlets may be substituted for manholes, on approval by the Township Engineer at the same spacing as required for manholes. In no case shall inlets or manholes be spaced more than four hundred fifty (450) feet apart. Manholes or inlets shall be provided at all changes of direction of storm sewer piping. Storm sewers shall be laid in a straight line. Storm manholes shall have a minimum opening of thirty (30) inches.
5. Inlets and manhole covers and frames shall conform to Pennsylvania Department of Transportation Specifications. At street intersections, inlets shall be placed in the tangent and not in the curved portion of the curbing. Manhole covers shall have the word "STORM" cast in two (2) inch high letters on the top of the cover.
6. Stormwater roof drains and sump pumps shall not discharge water directly onto a sidewalk or a street, and shall be constructed to retain all discharge wholly on the property.

B. Separate Storm Sewer System Design

1. Storm Frequency
 - a. Design Flow Rate - The storm drain system shall be designed to convey the flow from a fifty (50) year peak flow rate. The design fifty (50) year peak flow rate into each inlet shall be indicated in storm sewer calculations and the drainage area to each inlet shall be indicated on a plan. The fifty (50) year flow rate shall be determined by the rational formula $Q=CIA$, where:
 - i. Q = Peak runoff rate measured in cubic feet per second (CFS)
 - ii. C = Runoff Coefficient - The coefficient of stormwater runoff includes many variables such as: ground slope, ground cover, shape of drainage area, etc.
 - iii. I = Intensity - Average Rainfall Intensity in inches per hour for a time equal to the time of concentration.
 - iv. A = Area - Drainage area in acres.
 - b. Overflow System - An overflow system shall be provided to carry flow to the detention basin when the capacity of the storm drain pipe system is exceeded. The overflow system shall be of sufficient capacity to carry the difference between the one hundred (100) year and fifty (50) year peak flow rates.

C. Storm Duration

1. A five (5) minute storm duration shall be used if the duration does not result in a maximum expected discharge that exceeds the capacity of a thirty (30) inch pipe.
2. If a five (5) minute storm duration results in a pipe size exceeding thirty (30) inches, the time of concentration approach shall be used in determining storm duration.
3. If a five (5) minute storm duration results in a pipe size exceeding thirty (30) inches, within any run of pipe, the time of concentration approach may be used for sizing of pipes from that point on by adjusting the time of concentration.

D. Additional Design Criteria

1. Additional design criteria for specific drainage facilities are required as follows:
 - a. Shoulders in Cut Areas (without swales)
 - i. Water flowing in the shoulder shall not encroach more than two thirds (2/3) the shoulder width during a fifty (50) year frequency storm of five (5) minute duration.
 - ii. Inlets shall be provided to control the shoulder encroachment and water velocity.
 2. Swales Adjacent to Shoulders
 - a. When swales are provided in cut areas, the water shall not encroach upon the roadway area during a 50 year frequency storm of five (5) minute duration.
 3. Curbed Sections
 - a. The maximum encroachment of runoff on the roadway pavement shall not exceed one half of the traveled lane width during a fifty (50) year frequency storm of five (5) minute duration.
 - b. Inlets shall be provided to control the encroachment of water on the pavement.
 4. Inlets
 - a. When there is a change in pipe size in the inlet, the elevation of the top of pipes shall be the same or the smaller pipe higher. A minimum drop of two (2) inches shall be provided at the inlet pipe invert elevation and the outlet pipe invert elevation.
 - b. The capacity of inlets shall be based on a maximum surface flow to the inlet of 4.0 cfs. The maximum flow to inlets located in low points (such as sag vertical curves) shall include the overland flow directed to the inlet as well as all bypass runoff from upstream inlets. The bypass flow from upstream inlets shall be calculated using inlet efficiency curves found in PennDOT Design Manual Part 2, latest edition.
 - c. Double inlets shall not be utilized. If the surface flow to an inlet exceeds 4.0 cfs, additional inlets shall be placed upstream of the inlet to intercept the excessive surface flow. A minimum of 10 feet shall be provided between inlets.
 - d. Roadway inlets (Type C) shall not be located within seven (7) feet of any existing or proposed driveway depression.
 - e. Median Inlet Boxes (Type 'M' Box Tops) shall not be located within existing or proposed paved areas.
 5. Storm Pipes
 - a. Separate storm sewer system piping in dedicated areas shall be reinforced concrete pipe with a minimum diameter of 15 inches. Smooth bore, high density corrugated polyethylene pipe may be utilized in private, undedicated areas.
 - b. Inlets or manholes shall be placed at changes in vertical or horizontal direction of pipe.
 - c. Separate storm sewer systems shall be designed with a slope such that a minimum velocity of 2.0 fps will be attained during a 50-year storm event, however, the slope of the pipe shall not be less than 0.5%.
 - d. The design depth of flow in the separate storm sewer system shall result in at least 1.0 feet of freeboard in all inlets and manholes.
 - e. Separate storm sewer system pipes shall be designed for open channel flow during a 50 year storm event. If downstream conditions indicate that pressurized flow may occur, then the designer must calculate the elevation of the hydraulic grade line through the separate storm sewer system. Wherever the hydraulic

grade line elevation exceeds pipe crown elevation for the design flow, pipes with watertight joints must be specified.

- f. Separate storm sewer system pipes shall enter and exit the sides of inlet boxes and shall not encroach into the corners. A maximum skew angle of 45° is permitted for all pipes.
 - g. Separate storm sewer system pipes shall have a minimum of 18 inches of cover over the bell of the pipe.
 - h. Driveway culverts shall have sufficient cover to meet the expected traffic loading, however, in no cases shall less than 12" of cover be provided over the outside wall (including the bell) of the pipe. Tongue and groove pipe shall be utilized in minimum cover situations to prevent projection of pipe bells into driveway paving.
 - i. The design of culverts shall be based on procedures contained in Hydraulic Design of Highway Culverts, HDA No. 5, U.S. Department of Transportation, Federal Highway Administration.
 - j. Where cover is restricted, equivalent pipe arches may be used in lieu of circular pipe.
 - k. Endwalls shall be provided at the beginning and ending of all pipe runs. The upstream endwall shall be provided with a slanted, hinged trash rack. Flared end sections (FES) are recommended for all pipe inlets and outlets with a pipe diameter equal to or less than 24 inches. Endwalls with a height (top of wall to invert of pipe) greater than three feet shall be faced with stone or an approved material and shall include a safety fence at the top of the headwall consisting of a split rail and wire mesh fence (three rails with a minimum height of 4 feet).
6. Drainage Channels
- a. Drainage channels shall be designed to convey the design discharge at a stable, non-erosive velocity.
 - b. Channel linings that are specified in the design must be established before the channel is utilized for its stated objective. Diversions or alternate channel linings may be necessary to provide channel conditions in the field to match design assumptions.
 - c. If the design channel lining cannot be installed and stabilized before the design discharge is introduced, then the designer must check the stability of the channel assuming a bare earth condition.
 - d. Maximum channel shear stresses for vegetated and rock lined channels shall be as set forth in the PA DEP Bureau of Soil and Water Conservation Erosion and Sediment Pollution Control Program.
 - e. The outfalls of drainage channels shall be stable considering the maximum design discharge. Energy dissipaters shall be utilized to return drainage channel discharge to a stable velocity.

E. Standards for pre-cast construction

- 1. All pre-cast structures shall be designed and manufactured and installed in accordance with PennDOT's Standards for Roadway Construction (April 2000 Edition, as last revised) and PennDOT Specifications Publication 408/2000 (April 2000, as last revised).
- 2. The contractor shall only use pre-cast inlet boxes supplied by a manufacturer listed in PennDOT's Bulletin 15.
- 3. Class AA Concrete shall be used for all pre-cast inlet boxes.
- 4. Climbing rungs are required to be provided on all structures 5 feet or greater in depth. The climbing rungs shall begin at a maximum height of 24 inches from the structure invert, shall be spaced 12 inches on center, and shall terminate 12 inches from the top of the structure.
- 5. In cases where cover adjustment slabs and climbing rungs are required, the opening in the cover adjustment slab shall be located appropriately to accommodate the structure climbing rungs. Inaccessible inlets will not be accepted.
- 6. Concrete low flow channels (3300 psi minimum) shall be poured in the base of all inlet structures after the structures and associated piping are installed.
- 7. A minimum of 4 inches shall be maintained between the top of the pipe blockouts and the top of the base or riser section in accordance with PennDOT RC Standards. When projects require pipe blockouts to be formed within 4 inches from the top of the inlet box or riser, the manufacturer shall as a minimum provide an additional No. 3 reinforcement bar located 1-5/8 inches from the top of the inlet base, full width along the inlet face. The contractor shall remove any visible portion of the bar, if required, during installation and prior to joining the pipe to the inlet. The reinforcing rod shall be provided on the shop drawing when appropriate.

8. If reinforced concrete pipe is used, the pipe blockout may be formed "flush" with the inlet base.
9. For all inlet boxes, riser sections, and cover adjustment slabs that are not monolithic, construction joints, as shown on the PennDOT RC Standards, shall be provided.
10. All structure sections, including the Box Tops shall be set on a butyl seal (1" x 1" minimum).
11. All pipes shall be set flush with the inside structure face and parged using fibrous mortar in accordance with PennDOT Publication 408/2000.
12. Pre-cast riser sections and grate adjustment rings shall be used to adjust the inlet grate. The use of concrete block/brick and mortar is not permitted.
13. Pipe blockout sizes are limited to those listed in PennDOT's road construction standards. This includes pipes which enter inlet boxes at a skew angle. Encroachment into the corners will not be permitted.
14. Roof drain laterals, sump pumps, and yard drains are not permitted to enter into the Township's separate storm sewer system.
15. In cases where roadway subgrade drains discharge into pre-cast concrete inlet boxes, the roadway subgrade drain opening shall be pre-cast or core drilled into the inlet structure. All roadway subgrade drain discharge openings shall be parged with fibrous mortar in accordance with PennDOT Publication 408/2000.
16. All pre-cast structures shall be designed to withstand an AASHTO HS-25 live load.
17. All storm sewer inlets and manholes shall be set and completely backfilled with 2-A modified stone in accordance with the Approved plans and in the presence of the Township Engineer. The area immediately around the inlet and manhole facilities shall be compacted.
18. Prior to installation of pre-cast structures, 12" of subbase material (2-A modified stone) shall be placed meeting the requirements of Publication 408-2000, Section 350.2, in maximum layers 4" thick, and compacted to a density satisfactory to the Township Engineer.
19. Appropriate inlet markers ("DRAINS TO CREEK", "DRAINS TO WETLAND" or "DRAINS TO POND"), as identified in the approved drainage plan, shall be installed on all storm sewer inlets and headwalls. They shall be placed on the center of the top of the curb or headwall. Markers and application adhesive shall be purchased from Buckingham Township.

9.25. PUBLIC WATER SUPPLY

- A. A hydrogeologic study for all potential public water systems shall be submitted along with the submission of preliminary and final plans. The requirements for the hydrogeologic study are provided in the Appendix of this ordinance.
- B. Public water, as herein defined, shall be required for the following uses:
 1. Twenty five (25) or more single family homes.
 2. All multi-family developments and Living Community subdivisions.
 3. Manufactured home/mobile home developments.
 4. Life care facilities, hospitals, schools, nursing homes, gas stations, motor vehicle repair and any non-residential use that employs storage for dispensing of any substance that is a potential source of contamination. (PSOC)
- C. The Applicant shall construct water mains in such a manner as to make adequate water service available to each lot or dwelling unit within the subdivision or land development. A minimum pressure of thirty (30) pounds per square inch (psi) shall be provided at the highest point of use in each house or other building to be connected to the water supply main. The water supply must comply with the Regulations and the standards of any governmental agency having jurisdiction there over.
- D. The system shall also be designed with adequate capacity, storage facility and appropriately spaced fire hydrants for fire fighting purposes pursuant to the latest addition of the "Rating Schedule For Municipal Fire Protection" by Insurance Services Office. All water systems shall be designed in accordance with the Buckingham Township Standard Specifications for Design and Construction of Water Distribution and Sewage Collection Systems and Appurtenances and approved by the Township Water and Wastewater Engineer and the Township Fire Marshall.

9.26. PRIVATE WATER SUPPLY

- A. Where public water is not required, water shall be furnished by the owner on an individual lot basis. The requirements of the Township Well Ordinance and the Township Limestone/Carbonate Geology Ordinance must be

met. In addition, Applicants shall submit a Water Resources Impact Study in accordance with the requirements of Article VI of the Township Well Ordinance.

9.27. PUBLIC WASTEWATER

- A. If public wastewater facilities are proposed they must be in accordance with the Township's Act 537 Wastewater Facility Plan and must meet all Township specifications.
- B. All public wastewater facilities shall be designed and constructed in accordance with the current Buckingham Township Wastewater Facility Plan as approved by the Pennsylvania Department of Environmental Protection and meet all regulations and standards as adopted by Buckingham Township as latest revised.
- C. Public wastewater lines or wastewater treatment facilities shall not be constructed until plans and specifications have been submitted to the Pennsylvania Department of Environmental Protection, the Township and the Township Water and Wastewater Engineer and approved in accordance with existing laws.
- D. Each proposed land development or subdivision must demonstrate that it can be self-sufficient with regard to providing adequate wastewater disposal to serve the proposed development as part of the plan submission. The township may approve a connection to an existing system, but each development must have the ability to provide for its own wastewater disposal within the confines of its own site.

9.28. PRIVATE WASTEWATER DISPOSAL SYSTEMS

- A. The owner shall provide for wastewater disposal on an individual lot basis according to the rules, regulations, terms, definitions, and conditions of the Individual Sewage Disposal System Application and certification procedure for Bucks County, Pennsylvania, adopted by the Bucks County Board of Commissioners on March 24, 1971, and any amendments made thereto.
- B. On-lot wastewater disposal facilities must comply with the provisions of Chapters 71 and 73, Administration of Sewage Facilities Program, Pennsylvania Sewage Facilities Act, (Act of January 24, 1966), P.L. 1535, No. 537 as amended (35 P.S. & 750). The proposed facilities must be deemed satisfactory by the Bucks County Department of Health and a permit for on-lot disposal be issued. A Bucks County Department of Health "Letter of Suitability" for on-site disposal must be received by the Planning Commission with the preliminary plan for each and every lot.
- C. The developer shall provide the type of wastewater disposal facility consistent with existing physical, geographical and geological conditions. All lots shall be provided with an on-site wastewater disposal system of the type and design which shall, as a minimum requirement, meet the design standards of the Pennsylvania Department of Environmental Protection and/or the Bucks County Department of Health which systems shall be approved by the Pennsylvania Department of Environmental Protection and/or the Bucks County Department of Health.
- D. Each owner or occupant of a dwelling unit with on-lot facilities shall be provided by the Applicant with a plan of the system and an instruction manual for the use and proper maintenance of the system.
- E. If the site has "marginal conditions" as described by the DEP "Instructions for Completing Component 1" (3800-FM-WAWM0530) dated 10/20/01 (or as last amended), the Applicant shall provide a replacement area as covered in that same document.

9.29. ON-LOT SEWER AND WATER LOCATIONS

- A. The dimensioned location of the well and the on-lot wastewater treatment system (includes the footprint of the proposed system and all system components) as well as any required isolation distances required by the Pennsylvania Department of Environmental Protection shall be shown on the preliminary and final plan submission. The on-lot wastewater treatment system and the well must be installed where shown on the plan.
- B. Isolation distances shall not extend beyond the limits of the property owned by the Applicant for a subdivision or land development. All isolation distances must be contained within the property lines.
- C. On-site wastewater system and wells shall not be located within a floodplain as defined by the Township Zoning Ordinance.
- D. The area reserved for the on-lot wastewater system must be fenced and protected from any disturbance prior to the start of construction for all phases of construction.
- E. All test sites for on-lot wastewater disposal shall be shown on the grading plan whether used or not used for the final wastewater disposal design. A soils report shall be provided to the Township for all wastewater test sites.

9.30. SERVICES CONVEYED BY PIPE, WIRE OR CABLE

- A. All electric, telephone, cable television and all services carried by cable and/or wire, both main and service lines, shall be provided by underground cables and/or wire, installed in accordance with sound engineering practices. This requirement shall be inclusive of on-site and off-site cable and wire installation, and include the development frontage. If existing utility poles are to be used to carry cable and wire, they shall not be increased in height.
- B. All public utilities and services shall be located within the street right-of-way. Where it is not possible to place the utilities within the right-of-way, easements or rights-of-way of sufficient width for installation and maintenance shall be provided.
- C. All public utilities and services proposed to serve the proposed development (including off site) shall be shown on the preliminary and plans.
- D. For any development where alleyways are proposed or required, all utilities shall be confined to the alleyways.

9.31. OPEN SPACE

- A. Open space shall be clearly delineated from yards of private lots by a fence, walking path, or landscaping or a combination thereof along its entire length.
- B. Access to common open space or to open space to be dedicated to the Township shall be provided so that residents of the proposed development can reach the open space. Where pathways are provided between lots, the accessway shall have a minimum width of 25 feet and shall be delineated with a fence.
- C. The plans shall contain the following statement "OPEN SPACE LAND MAY NOT BE SEPARATELY SOLD NOR SHALL SUCH LAND BE FURTHER DEVELOPED OR SUBDIVIDED."

9.32. CONSTRUCTION SEQUENCE

- A. All subdivision and land development plans shall include a schedule listing the sequence of construction. The schedule shall include construction tasks, sequence of completion, approximate starting date, and length of time for completion. All erosion and sediment controls shall be in place prior to any earthmoving activity. All required stormwater detention/retention facilities must be in place and functioning prior to the creation of any impervious surface.

9.33. PRE-CONSTRUCTION CONFERENCE

- A. The Applicant shall be responsible to attend a pre- construction conference prior to the start of any work. The date and time of the pre-construction conference shall be established by the Township upon written request of the developer. The pre-construction conference shall be held a minimum of forty-eight (48) hours in advance of commencement of work.

9.34. ON-GOING INSPECTION

- A. The construction of all improvements (streets, curbs, storm drainage facilities, wastewater systems and water services, grading, detention/retention basins, etc.) shall be inspected by the Township Engineer and the Township's Water and Sewer Consultant. It is the responsibility of the Applicant to notify the Township Engineer a minimum of forty-eight (48) hours in advance of any such construction. Any construction not inspected while in progress may not be approved by the Township Engineer. If said construction is not approved, it shall be the responsibility of the Applicant to remove said item (at Applicant's cost) and replace to acceptable standards. The costs for all inspections by the Township Engineer shall be borne by the Applicant.

9.35. AS-BUILT DRAWINGS

A. INTERIM AS-BUILT DRAWINGS

- 1. Interim as-built drawings shall be submitted within 30-days of the completion of utility construction or prior to the installation of any curb, sidewalks and roadway construction (including placement of stone base course, bituminous paving material etc.) for private or roadways to be dedicated to the Township, whichever occurs first. The Applicant shall submit four (4) sets of "Interim Site Improvement As-Built Drawings" to the Township Engineer for review and approval. The Interim Site Improvement As-Built Drawings shall provide an as-built survey of the constructed water, wastewater and separate storm sewer system improvements installed within all right-of-way and easement areas. The drawings must be acceptable to the Township Engineer prior to the installation of any curb, sidewalks and roadway construction. The As-Built Drawings shall provide the information contained in the Township's "Interim As-Built Drawing Checklist" available from the Township and the Township Engineer. "Interim As-Built Drawings" shall be submitted on a phase by phase basis.

2. Stormwater Management Facilities, including sediment basins, shall be "in place" and functioning prior to the creation of any additional impervious surfaces being constructed on the site. The design engineer shall submit two (2) copies of the Interim Stormwater Management As-Built Drawings and calculations for each facility to the Township Engineer for review and approval. The facilities shall not be considered functional until it is proved by the Applicant that the facilities meet the volume requirements, outflow characteristics, and sedimentation control standards of the original design of the facility. The plans shall be submitted to and found acceptable by the Township Engineer prior to the installation of any impervious surfaces. The As-Built Drawings shall provide the information contained in the Township's "Interim As-Built Drawing Checklist" available from the Township Engineer.

B. FINAL AS-BUILT DRAWINGS

1. Prior to the Township accepting/dedicating the development improvements and processing a Final Escrow Release, the Applicant shall submit "acceptable" "Final As-Built Drawings" of the site improvements, including off-site improvements, as required by the Township's Acceptance/Dedication Checklist. The Final As-Built Drawing submission shall include but not be limited to As-Built Record Plans, Final Site Improvement As-Built Drawings, Final Stormwater management As-Built Drawings, Final Roadway and Cross-Section As-Built Drawings, and any supporting documentation required by the Acceptance/Dedication Checklist. The as-built drawings shall contain: plans and profiles showing finished grades for all roads; location, length, and slope of all separate storm sewer systems, wastewater lines, water, and gas mains; location of all wastewater laterals and water services - tie distances to be provided to buildings and roadway stationing; final grading plan for retention/detention basins with volume calculations; invert and top elevations for all sanitary manholes, storm manholes, inlets, endwalls, and location and depth of all public utilities and services, etc. State Plane coordinates shall be provided for all sanitary manholes, water valves, storm manholes, inlets and endwalls and retention/detention basins. The as-built plans shall be certified as to their correctness by the preparing engineer. All plans shall be sealed by a registered engineer and labeled "AS-BUILT DRAWINGS" and include date of preparation and firm name. The as-built submission shall also include electronic files in PDF, arc-info, CAD format etc. The as-built plans shall be approved by the Township prior to the Township Accepting/Dedicating the improvements and processing the Final Escrow Release.

9.36. ACCEPTANCE/DEDICATION OF IMPROVEMENTS

- A. When the Applicant has completed all of the necessary and appropriate Improvements as set forth on the approved development plans and so notified the Township under Section 510(a) of the MPC (53 P.S. § 10510(a)), the remaining Security, other than the maintenance bond under Section 509(k) of the MPC (53 P.S. § 10509(k)) as provided above, shall be returned to the Applicant after the Township Engineer has filed with the Township a Certificate of Completion, and only after release of same is approved by the Board of Supervisors of the Township in accordance with Section 510 of the MPC (53 P.S. § 10510). Piecemeal dedication of the Improvements will not be accepted.
- B. When any portion of the Improvements shall not be approved or shall be rejected by the Township, the Applicant shall have ninety (90) days from the date the Township Engineer files his/her report to complete and/or repair such unapproved or rejected Improvements and again notify the Township of their completion and/or repair under MPC Section 510(d). In such case, the Township Engineer's report made under MPC Section 510(a) shall be limited to only those Improvements that were previously unapproved or rejected. In the event the Township Engineer's inspection of the Improvements that originally were unapproved or rejected by the Township indicates the Applicant has successfully completed those items and/or repairs, then the Township shall act to accept dedication of the Improvements in accordance with MPC Section 510.

However, if:

1. the Applicant fails to complete and/or repair such unapproved or rejected Improvements and again notify the Township of their completion and/or repair in accordance with Section 510(d) of the MPC within ninety (90) days from the date the Township Engineer previously filed his/her report; or
 2. if the Township Engineer again rejects such previously unapproved or rejected Improvements, then any subsequent report made by the Township Engineer in accordance with a notification of the completion of Improvements made by the Applicant under Section 510(d) of the MPC shall address all of the Improvements in the development and not just those that had previously been rejected or not approved by the Township Engineer.
- C. Prior to the Township accepting/dedicating the required improvements, the Applicant shall submit the required documentation for acceptance/dedication of the improvements to the Township. It shall be the responsibility of the Applicant to contact the Township and obtain the procedures for acceptance/dedication of the project. It shall be the

Applicant's responsibility to submit the complete acceptance/ dedication documentation to the Township for review. After all documentation is complete and all improvements have been completed, the Applicant's request for acceptance/dedication of the improvements will be presented to the Board of Supervisors.

9.37. TRANSPORTATION IMPACT STUDY

- A. The study will enable the Township to assess the impact of a proposed development on the transportation system. Its purpose is to insure that proposed developments do not adversely affect the traffic network and to identify any traffic problems associated with access from the site onto the existing roads. The study's purpose is also to delineate solutions to potential problems and to present improvements to these areas to be incorporated into the proposed development.
- B. A Transportation Impact Study shall be required for all major subdivisions and land developments that meet one or more of the following criteria:
 - 1. Residential: 10 or more dwelling units or any developments that propose new roads (public or private).
 - 2. Non-Residential: Any non-residential use that provides ten (10) or more parking spaces.
 - 3. The Buckingham Township Board of Supervisors may require any other subdivision and/or land development to be accompanied by an impact study.
- C. The Buckingham Township Board of Supervisors, at its discretion, may waive the requirement for a Transportation Impact Study upon receiving a contribution from the developer for a Transportation Impact Study.
- D. A plan submission which requires a transportation impact study shall not be accepted as a complete submission unless the impact study is included or unless the Board of Supervisors has agreed to waive the requirement prior to plan submission.
- E. The Transportation Impact Studies shall be reviewed by the Township and must be found to be satisfactory prior to granting preliminary approval. Any necessary improvements identified by the studies will be required improvements at the time final plan approval is granted.
- F. The Transportation Impact Study shall also study the internal circulation of vehicles. Internal and external circulation of pedestrians shall also be included in the study.
- G. Transportation Impact Study/Analysis shall be conducted in accordance with the requirements found in Appendix of the Township Zoning Ordinance.

9.38. CARBONATE (LIMESTONE) GEOLOGY

- A. All subdivisions or land developments, or portions thereof, located within or within two hundred (200) feet of areas identified as having carbonate limestone geology in Conservation and Management Practices for Buckingham and Durham Carbonate Valleys, February, 1985 shall be mapped in accordance with the requirements of Sections 5.3.C.6 and 7.3.C.6 hereof and shall be subject to the following requirements which shall be in addition to all other requirements set forth in the Zoning and Subdivision and Land Development Ordinances:
- B. Grading
 - 1. Grading on a site underlain by carbonate geology shall be kept to a minimum.
 - 2. Existing drainage patterns must be maintained.
 - 3. No significant alterations may be made to the run-off pattern.
 - 4. French drains are prohibited within 100 feet of existing surface drainage channels.
 - 5. Surface drainage channels shall not be materially affected by grading for and construction of roadways, driveways, structures, detention basins or other development improvements.
- C. Location of Structures, Drainage Channels and French Drains
 - 1. The Applicant shall perform test borings (or an alternate testing procedure, such as resistivity testing or ground penetrating radar, which is approved by the Township) of the site in areas where structures are proposed. The test borings shall be laid out in a grid on fifty (50) foot centers under the proposed structures - a minimum of two test borings shall be required under any structures which are less than twenty-five hundred (2,500) square feet in area. All boring holes shall be closed with concrete at the conclusion of the test procedures.
 - 2. In the event that the preliminary plan does not indicate building locations, a minimum of two borings shall be provided within the buildable area of each proposed lot. In the event that the building is not built in the location in which the test borings were taken, new test borings must be performed in the location in which the building

is to be located before the issuance of a building permit. The test borings or approved alternate procedures shall be made to determine the depth to bedrock and suitability of bedrock to support structures.

3. Test borings shall be conducted in accordance with American Society for Testing Materials D-1586, standard method for "penetration test and split barrel sampling of soils". Where intact rock and consolidated material is encountered, samples shall be secured in accordance with ASTM D-2113 for "diamond core drilling for site investigation." The location and depth of each test boring shall be satisfactory to the engineer providing the report required below. Test boring results shall be recorded on boring logs to include all information required in ASTM D-1586. Boring samples shall be obtained and bottled in accordance with ASTM D-1586. Samples shall be delivered to the Township Municipal Building. An interpretation of test borings shall be provided by a professional engineer licensed in the state of Pennsylvania and shall include a report of findings and recommendations with regard to building and site development construction requirements. The Applicant shall be responsible for implementing the Professional Engineer/Professional Geologists recommendations.
4. No structures of any kind, roads or driveways shall be constructed within one hundred (100) feet of:
 - a. Sinkholes
 - b. Closed Depressions
 - c. Lineaments
 - d. Fracture Traces
 - e. Caverns
 - f. Ghost Lakes
 - g. Disappearing Streams
 - h. Surface or Subsurface Pinnacles
 - i. Fissures
 - j. Faults
5. All drainage on the site shall be channeled away from the carbonate features referenced above. French drains are also prohibited within one hundred (100) feet of these features.

D. Ghost Lakes (Closed Depressions)

1. Ghost lakes (closed depressions) may not be disturbed. They shall not be regraded, nor shall new construction or excavation be permitted within them.

E. Blasting

1. Blasting will not be permitted within one hundred (100) feet of the carbonate features referenced in 'C' above.

F. Prohibited Uses

1. The following uses shall be prohibited in areas underlain by carbonate limestone geology, as defined above:

Table 9-13 : Table of Prohibited Uses and Activities

Prohibited Uses
Intensive Agriculture
Junk Yards or Automotive Salvage Yards
Extractive Operation
Solid Waste Facility
Motor Vehicle Gasoline Station
Motor Vehicle Service Center/Repair Shop
Placement of Contaminated Fill
Uses and activities involving hazardous substances
Uses and activities involving the application of high-nitrate herbicides or pesticides
Underground storage tanks
The filling of sinkholes with any material other than clean fill or rock shall be approved by the Township
Other uses and activities with high risk of releasing pollutants, as determined by the Township or its consultants

9.39. MODIFICATIONS OR WAIVERS

- A. The Board of Supervisors may grant modification of the requirements of one or more provisions of this Ordinance in accordance with the provisions of the MPC (Municipalities Planning Code). All requests for a modification shall be in writing and shall accompany and be a part of the preliminary plan application for development. The request shall state in full the grounds and facts of unreasonableness or hardship on which the request is based, the provision or provisions of the Ordinance involved, and the minimum modification requested. If additional relief is requested during the Final Plan review process, the Applicant shall submit an updated waiver request letter, in accordance with the above, with the submission of Final Plans.

9.40. RECREATION LAND/FEE REQUIREMENTS

- A. Purpose - All residential subdivision or land development plans shall provide for suitable and adequate recreation land and/or fees as set forth in this Ordinance in order to:

- 1. Insure adequate recreational areas and facilities to serve the future residents of the Township in accordance with the level of recreational service determined to be suitable.
- 2. Maintain compliance with recreation standards as recommended by the Buckingham Township Park and Recreation Comprehensive Plan as adopted by the Buckingham Township Board of Supervisors.
- 3. Minimize overuse of and excessive demand for existing recreational areas and facilities by future residents.
- 4. Allow for orderly acquisition and development of recreational areas to serve new residents.
- 5. Ensure that dedicated recreation land is suitable for the intended use.
- 6. All recreational facilities shall be available for use by all Township residents.

- B. Recreation Land Dedication Requirements

- 1. All residential subdivision or land development plan submissions to the Township shall be required to provide for public dedication of land suitable for active and passive park and/or recreation use in accordance with the provisions of this Ordinance.
- 2. A minimum of 1565 square feet of suitable recreation land shall be provided per dwelling unit created within all residential subdivisions and land developments, unless the Applicant agrees to a fee-in-lieu of as outlined in subsection 5. This requirement is based on the following: a goal of providing 12 acres of recreation land per 1,000 population in accordance with the standards of the National Park and Recreation Association as reflected by the Township Comprehensive Park and Recreation Plan; and an assessment of level of service needs. In addition to the recreation facilities, the Applicant shall also provide parking facilities by providing one parking space per dwelling unit or a minimum of twenty (20) spaces shall be provided, whichever is greater.
- 3. Recreation land (or fee in lieu thereof) shall be provided in accordance with the standards of the National Park and Recreation Association for types of recreation land. This is to ensure that the recreational needs of all age and interest groups are met within the Township. The following ratios for types of land dedicated shall apply.
 - a. 65 percent of land dedicated shall meet the criteria for Community Park which is designed to serve the Township and be suitable for intense recreational activities.
 - b. 25 percent of land dedicated shall meet the criteria for neighborhood park/playground which is designed to serve neighborhoods within a 1/2 mile radius and which must be suitable for intense recreation such as field games, playground apparatus, skating, picnicking, etc. Land must be easily accessible by way of safe walking and bicycle paths. This land may include, up to a limit of 1/2 of this land requirement, areas for passive outdoor recreation such as walking, picnicking, and bicycling, provided that the requirements for passive recreation land are met.
 - c. 10 percent of land dedicated shall meet the criteria for mini-park, which is a specialized facility to serve a concentrated population or limited population or specific group such as small children or senior citizens or pets. Land shall be in close proximity to the population served.
- 4. This recreation land requirement shall in no way diminish the requirement for open space where an open space requirement is set by the Township Zoning Ordinance. Recreation land shall be provided in addition to any and all open space required by the Zoning Ordinance.

- C. Criteria for Determining the Location and Suitability of Recreation Areas

- 1. Site(s) shall be easily and safely accessible, have good ingress and egress and have access to a public road or to a road to be dedicated as a public road.

2. Site(s) shall have suitable topography for the development as a particular type of recreation area. Suitability shall be determined by the Township and shall be judged on the basis of the type of recreation area proposed.
3. Size and shape of the site(s) shall be suitable for the development as a recreation area. The configuration of the recreation area must be able to accommodate recreation activities proposed by the development plans. The required area shall not include narrow or irregular pieces which are remnants from lotting and/or street and parking areas.
4. Site(s) shall meet the minimum size with respect to usable acreage as recommended by the Park and Recreation Plan for Buckingham Township, based upon those sizes by the National Park and Recreation Association.
5. Sites designated for active recreation land shall not contain lands with natural resource restrictions, as defined by the Township Zoning Ordinance, stormwater detention facilities, or lands designated for any other purpose. Site(s) designated for passive recreation may contain lands with natural resource restrictions provided that the site(s) can be used by residents of the Township for passive recreational activities and can be developed with trails, picnic areas, nature study areas, greenways, access to waterways for fishing or boating, or other activities acceptable to the township. Plans shall show the features of the land and illustrate how it might be used for these passive recreation activities.
6. The recreational activities and/or facilities for which the area is intended must be specified on the development plans and recorded on the liens.
7. Recreation areas shall not be traversed by utility easements unless said public utilities and services are placed underground and no part of them or their supportive equipment protrudes above ground level. Recreational areas shall not contain or be traversed by any underground gas pipelines.
8. On-site improvements shall be commensurate with the adjacent on-site development improvements, including but not limited to grading, curbing and public utilities and services.
9. All subdivision and land development plans for development subject to this ordinance must include as part of the submission a plan showing how the recreational land requirements will be met. This shall include topography, natural features, access, improvements, and a possible layout for the site.

D. Ownership/Dedication to Township of Recreation Land

1. The Buckingham Township Planning Commission and/or the Buckingham Township Park and Recreation Commission will provide advice on any proposed recreation land dedication and any proposed assessment of recreation fees-in-lieu of land dedication.
2. If the Board of Supervisors determines that a recreation land dedication would be in the public interest, such recreation land shall be owned and maintained by an entity that the Board of Supervisors determines is acceptable to ensure proper long-term oversight and maintenance of the land. This may be any of, but not limited to, the following, providing such entity agrees to accept such land for permanent recreation purposes:
 - a. Retention by the owner of the development if such dwelling units are to be rented;
 - b. Dedication to a formal homeowner or condominium association, with such agreement subject to approval of the Board of Supervisors, after review by the Township solicitor. If any entity responsible for such recreation land should dissolve or become inactive or decide that it no longer wishes to be responsible for such land, it shall offer such land at no cost to the Township or to another entity that the Township so designates for continued use as recreation land.
 - c. Dedication to an established State, county or regional organization acceptable to the Board of Supervisors
 - d. Dedication to Buckingham Township.
3. If the Board of Supervisors deems it to be in the public interest to accept dedicated land for recreational purposes, such acceptance shall be by adoption of a resolution of the Board of Supervisors and acceptance of a deed of dedication from the developer.
4. Recreation land shall include deed restrictions to permanently restrict its use for recreation and to prohibit the construction of buildings on the land, except building for non-commercial recreation or to support maintenance of the land.

E. Fee in Lieu of Dedication

1. Where, upon agreement with the Applicant, it is determined that the dedication of all or any portion of the land area required for recreational purposes, as defined and required by subsections 2 and 3 is not feasible under the criteria set forth in this section, the Township shall require the Applicant to pay a fee in lieu of dedication of any such land or to construct recreational facilities at a site designated by the Township in lieu of recreation land dedication to the township as follows:
 - a. The fee shall be equal to the average fair market value of the land otherwise required to be dedicated. The average fair market value will be calculated from time to time and is included in the Township's Fee Schedule.
 - b. Limitations on Use of Fees
 - i. Any recreation fees collected under this section shall be placed within an interest-bearing "Recreation Fee Account" which shall function as a capital reserve fund and shall be accounted for separately from other Township funds.
 - ii. All fees and interest within the Recreation Fee Account shall only be used for acquisition of recreation land, development of and capital improvement to public recreational facilities, landscaping of recreation land, engineering, legal, planning, architecture, landscape architecture and the payment of debt directly resulting from such expenditures. Such fees specifically shall not be used for maintenance, routine repairs, operating expenses or recreational programs.
 - c. Fees required under this Section shall be paid prior to the recording of the applicable final plan.
 - d. If such fees are paid in installments or prior to the issuance of each building permit, then for the purpose of determining limits for the time within such funds are required to be expended under State law, such time limit shall begin when the total fees related to the final approval are paid in full, and not from the date of payment of any portion of such fees. Upon request, the Township shall refund such fee, plus interest accumulated thereon from the date of payment, if the Township has failed to utilize the fee paid for the purposes set forth in this section within 3 years.
 - e. The fee-in-lieu will be updated annually based on the Philadelphia Consumer Price Index.

9.41. MISCELLANEOUS DEVELOPMENT STANDARDS

- A. Development entrance signs or amenities - Development entrance signs, walls, structures, or other amenities are permitted however; they shall be removed prior to issuance of the last building permit or prior to acceptance/dedication of the improvements, whichever occurs first. If the development is phased, development entrance signs shall be removed prior to issuance of the last building permit or prior to acceptance/dedication of the improvements in the last phase of development, whichever occurs first.
- B. All final plans for subdivisions and land development shall indicate the proposed method of solid waste disposal. If the development is a multi-family, townhouse, commercial, industrial or institutional development, and if central waste storage is provided, areas for storage shall be provided and noted on the plan. All areas provided for central waste storage shall be fenced or screened from view by use of buffer plantings.
- C. All final plans for subdivisions or land developments shall indicate the proposed method for mail delivery. If group mail boxes are proposed, the location and design shall be shown on the final plans.

9.42. PRESERVATION AND PROTECTION OF WETLANDS

- A. Wetlands shall not be disturbed, filled, graded, or built upon. Wetlands are those areas of lands defined as wetlands by either 1) the United States Army Corps of Engineers Technical Report Y87-1, Corps of Engineers Wetlands Delineation Manual; or 2) The United States Environmental Protection Agency Wetlands Identification Delineation Manual, Volume 1, Rational, Wetland Parameters, and Overview of Jurisdictional Approach, Volume II, Field Methodology, as most recently updated or modified; or 3) The Pennsylvania Department of Environmental Protection Wetlands Identification and Delineation, Chapter 105 Dam Safety and Waterways Management Rules and Regulations, as most recently updated or modified. Where a difference between the foregoing criteria exist, the most restrictive criteria will be used in any particular case. For the purposes of this definition and its application to this Ordinance, most restrictive criteria shall mean the criteria which causes the preservation of the most extensive area of wetlands.

- B. The Applicant shall submit for all properties where wetlands exist, a Wetlands Delineation Report. The report shall be submitted regardless as to whether there is any proposed wetland disturbance and shall be prepared by a Wetland Specialist. The report shall contain the following:
1. A narrative of the project with proposed impacts to wetlands and all other jurisdictional waters of the United States and/or Commonwealth of Pennsylvania including headwater streams and isolated waters and wetlands.
 2. A sealed location map showing all existing wetlands and other jurisdictional waters. The map shall include the surface area of each wetland, stream, and pond. The map shall include the jurisdictional waters' special relationship to other physical features on the site including forests, fields, steep slopes and structures such as houses and barns. The map shall indicate the surface area of all proposed disturbances of jurisdictional waters including isolated wetlands by the land development project. The map shall indicate all locations of field data sampling points and traverse lines used to delineate the wetlands and jurisdictional waters.
 3. The report shall contain the field data sampling forms from each wetland and upland sampling point used in the delineation and shown on the location map. The data forms shall contain pertinent field information including hydrology, vegetation and soils as required by the delineation manuals cited in Section 9.42.A.
 4. Color photographs of each jurisdictional water shall be appended in the report. Each photograph shall be annotated and the direction of view and number shall be shown on the location map.
 5. The qualifications of the Wetlands Specialist preparing the delineation report shall be included as a brief narrative.
 6. The Wetlands Delineation Report shall be prepared in an acceptable format suitable for submission to the Corps of Engineers and/or the Department of Environmental Protection for a jurisdictional determination by either agency.
- C. Classification of freshwater wetlands by resource value
1. Freshwater wetlands shall be divided into three classifications based on resource value. The resource value classification of a wetland shall be used to determine the size of the transition area from the wetland.
 2. A freshwater wetland of exceptional resource value, or exceptional resource value wetland, is a freshwater wetland which:
 - a. Discharges into trout production waters or their tributaries;
 - b. Is a present habitat for threatened or endangered species; or
 - c. Is a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat.
 3. A freshwater wetland of ordinary resource value, or an ordinary resource value wetland, is a freshwater wetland which does not exhibit any of the characteristics in (b) above, and which is:
 - a. An isolated wetland, which:
 - i. Is smaller than 5,000 square feet; and
 - ii. Has the uses listed below covering more than 50 percent of the area within 50 feet of the wetland boundary. In calculating the area covered by a use, the Township will only consider a use that was legally existing in that location prior to the date of this Ordinance:
 - (1) Lawns;
 - (2) Maintained landscaping;
 - (3) Impervious surfaces;
 - (4) Active railroad rights-of-way; and
 - (5) Graveled or stoned parking/storage areas and roads;
 - b. A drainage ditch;
 - c. A swale; or
 - d. A detention facility not designed to recharge groundwater within the area of the basin created by humans in an area that was upland at the time the facility was created.

4. A freshwater wetland of intermediate resource value, or intermediate resource value wetland, is any freshwater wetland not defined as exceptional or ordinary.
5. If the Township disagrees with the classification of a wetland by an Applicant, then the Township may retain, at the Applicant's expense, an expert qualified in the designation and classification of wetlands to advise the Township as to the appropriate classification of the wetland. If the expert so hired by the Township and the Applicant's expert cannot agree as to the classification of a wetland, then the Township and Applicant shall jointly designate a third qualified expert whose classification of the wetland shall be final. If the Township and Applicant are unable to agree on a third qualified expert, then such expert, upon petition of either the Applicant or the Township, shall be appointed by the Court of Common Pleas of Bucks County.

D. Transition Area Provisions:

1. A transition area serves as:
 - a. An ecological transition zone from uplands to freshwater wetlands which is an integral portion of the freshwater wetlands ecosystem, providing temporary refuge for freshwater wetlands fauna during high water episodes, critical habitat for animals dependent upon but not resident in freshwater wetlands, and slight variations of freshwater wetland boundaries over time due to hydrologic or climatologic effects; and
 - b. A sediment and storm water control zone to reduce the impacts of development upon freshwater wetlands and freshwater wetlands species.
 - c. A habitat area for activities such as breeding, spawning, nesting and wintering for migrating, endangered, commercially and recreationally important wildlife;
 - d. An area to accommodate slight variations in freshwater wetland boundaries over time due to hydrologic or climatologic effects;
 - e. A remediation and filtration area to remove and store nutrients, sediments, petrochemicals, pesticides, debris and other pollutants as they move from the upland towards the freshwater wetlands;
 - f. A buffer area to keep human activities at a distance from freshwater wetlands, thus reducing the impact of noise, traffic, and other direct and indirect human impacts on freshwater wetlands species;
 - g. A corridor area which facilitates the movement of wildlife to and from freshwater wetlands and from and to uplands, streams and other waterways; and
 - h. A sediment and storm water control area to reduce the adverse effects of development or disturbance upon freshwater wetlands, flora and fauna, and nearby waterways.
2. A transition area is required adjacent to a freshwater wetland of exceptional resource value and of intermediate resource value. A transition area is not required adjacent to a freshwater wetland of ordinary resource value.
3. The standard width of a transition area adjacent to a freshwater wetland of exceptional resource value shall be 150 feet.
4. The standard width of a transition area adjacent to a freshwater wetland of intermediate resource value shall be 100 feet.
5. A transition area shall be measured outward from a freshwater wetland boundary line on a horizontal scale perpendicular to the freshwater wetlands boundary line. The outside boundary line of a transition area shall parallel, that is, be equidistant from, the freshwater wetlands boundary line. The width of the transition area shall be measured as the minimum distance between the freshwater wetlands boundary and the outside transition area boundary. The outside boundary of a transition area is determined solely by reference to the freshwater wetlands boundary and is not affected by property lines. Therefore, a property within 150 feet of a freshwater wetlands may contain a transition area that arises from a freshwater wetlands on another property. Every property containing a transition area is subject to this chapter, even if the freshwater wetland that causes the transition area is located on another property.

E. Prohibited Activity in Transition Areas

1. Except as provided in (2) below, the following are prohibited activities when they occur in transition areas:
 - a. Removal, excavation, or disturbance of the soil;
 - b. Dumping or filling with any materials;
 - c. Erection of structures;
 - d. Placement of pavements;
 - e. Destruction of plant life which would alter the existing pattern of vegetation; and
2. Notwithstanding (1) above, the following activities are not prohibited in transition areas provided that the activities are performed in a manner that minimizes adverse effects to the transition area and adjacent freshwater wetlands:
 - a. Normal property maintenance;
 - i. *For the purposes of this paragraph, "normal property maintenance" means activities required to maintain lawfully existing artificial and natural features, landscaping and gardening. These activities include:*
 - (1) Mowing of existing fields or lawns;
 - (2) Pruning of trees and shrubs;
 - (3) Cutting of dead trees;
 - (4) Replacement of existing non-native plants with either native or non-invasive, non-native species;
 - (5) Limited supplemental planting of non-invasive, non-native plant species that will not significantly change the character of the existing vegetational community of the transition area. The creation of a lawn is not considered supplemental planting;
 - (6) Planting of native species, that is, plants naturally occurring in transition areas in the local region;
 - (7) Continued cultivation of existing gardens; and
 - (8) Maintenance of artificial features including the repair, rehabilitation, replacement, maintenance or reconstruction of any currently serviceable structure, lawfully existing prior to the date of this Ordinance.
 - ii. Any activity which involves or causes the substantial alteration or change of the existing characteristics of a transition area shall not be considered normal property maintenance. Activities which involve or cause substantial alteration or change of the transition area include, but are not limited to, extensive removal or destruction of vegetation by clear cutting, cutting, mowing (except as described in 2.a.i. above), burning or application of herbicides, planting of ornamental plants or lawns for landscaping purposes (except as described in 2.a.i. above), regrading or significant changes in the existing surface contours and the placement of fill, pavement or other impervious surfaces.
 - b. Minor and temporary disturbances of the transition area resulting from, and necessary for, normal construction activities on land adjacent to the transition area, provided the activities do not result in adverse environmental effects on the transition area or on the adjacent freshwater wetlands, and do not continue for more than six months. For the purposes of this paragraph, minor and temporary disturbances include, but are not limited to, the removal of human-made debris by non-mechanized means which does not destroy woody vegetation and the placement of utility lines over or under a previously authorized, currently serviceable paved roadway surface;

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ARTICLE 10
EROSION AND SEDIMENT CONTROLS

10.1. GENERAL PROVISIONS AND COMPLIANCE

- A. No changes shall be made to the contour of the land, and no grading, excavating, removal or destruction of the topsoil, trees or other vegetative cover of the land shall be commenced, until such time as a plan for minimizing erosion and sedimentation has been processed, and reviewed by the Planning Commission and approved by the Bucks County Conservation District and the Board of Supervisors. Erosion and sedimentation control BMPs shall be implemented and maintained in accordance with the requirements of Pennsylvania Code Chapter 102.
- B. Approval of the Board of Supervisors of all preliminary and/or final plans of subdivision and land development does not relieve the Applicant of his obligation to execute the erosion and sediment control measures as contained in this Ordinance.
- C. Where required, all plans shall be submitted and approved by the Bucks County Conservation District. Final approval of plans and specifications by the Bucks County Conservation District for the control of erosion and sedimentation shall be concurrent with the approval of the plans of subdivision or land development, and become a part thereof. Final plans for minimizing erosion and sedimentation as approved will be incorporated in the agreement and bond requirements as required by the Township.
- D. At the time a building permit is applied for, a review shall be conducted by the Township Engineer to insure conformance with the plan as approved. During construction, further consultative technical assistance will be furnished, if necessary, by the Bucks County Conservation District. During the development phase, the Township Engineer shall inspect the development site and enforce compliance with the approved erosion and sediment control plans.
- E. A copy of the Erosion and Sediment Control plan and any required permit, as required by PADEP regulations, shall be available at the project site at all times.

10.2. GENERAL PERFORMANCE STANDARDS

- A. Measures used to control erosion and reduce sedimentation shall, as a minimum, meet the standards and specifications of the Bucks County Conservation District. In cases where the Bucks County Conservation District does not have jurisdiction, other known and commonly accepted standards and specifications shall be used as required by the Township.
- B. In those areas where grading is permitted, the mandate from the Township is to keep grading and site disturbance to a minimum so that natural drainage patterns and natural vegetation are preserved. The following measures to minimize erosion and sedimentation shall be included in the erosion and sedimentation control plan:
 - 1. Stripping of vegetation, regrading, or other development shall be minimized and shall be done in a way that will minimize erosion.
 - 2. Development plans shall preserve salient natural features, keep cut and fill operations to a minimum, and ensure conformity with topography so as to create the least erosion potential and adequately control volume and velocity of surface water runoff.
 - 3. Whenever feasible, natural vegetation shall be retained, protected, and supplemented.
 - 4. The disturbed area and the duration of exposure shall be kept to a practical minimum and shall be stabilized immediately. Areas disturbed between October 15 and April 15 shall be stabilized by placement of sod or other means acceptable to the Township.
 - 5. Temporary vegetation and/or mulching shall be used to protect all exposed areas during development and shall be installed prior to any work being performed on the site.
 - 6. The permanent (final) vegetation and mechanical erosion control and drainage system shall be installed as soon as possible in the development.
 - 7. Provisions shall be made to accommodate effectively the increased runoff caused by changed soil and surface conditions during and after development within the site. Where necessary, the rate of surface water runoff shall be mechanically retarded.
 - 8. Sediment in the runoff water shall be trapped until the disturbed area is stabilized by the use of debris basins, sediment basins, silt traps, or similar measures.

10.3. SITE GRADING FOR EROSION CONTROL

- A. In order to provide more suitable sites for building and other uses, improve surface drainage, and control erosion. The following requirements shall be met:
1. All grading shall provide proper drainage away from buildings and dispose of it without ponding, except where ponding is part of the Stormwater Management Plan.
 2. Concentration of surface water runoff shall be permitted only in swales, watercourses, or stormwater management facilities. Subject to the approval of the Township, swales shall be sodded, utilize the appropriate stabilization fabric, or other similar measures to insure establishment of ground cover.
 3. Grading shall not be performed in such a way as to increase stormwater runoff onto the property of another landowner.
 4. During grading operations, dust control must be exercised on a daily basis. Wind blown erosion shall not be permitted.
 5. Grading equipment will not be allowed to cross streams. Provisions shall be made for the installation of temporary culverts and bridges.
 6. Tire cleaning areas shall be provided and maintained at each point of access to the development site. When the tire cleaning area at the development access is removed, individual tire cleaning areas shall be provided for each development lot or work area under construction. Work shall not begin on a development site, individual lot, or work area until a tire cleaning area is installed.

10.4. EXCAVATIONS AND FILLS

- A. No excavations shall be made with a cut face steeper than three (3) horizontal to one (1) vertical, except under one or both of the following conditions:
1. The material in which excavation is made is sufficiently stable to sustain a slope of steeper than three (3) horizontal to one (1) vertical. A written statement to that effect from an engineer licensed by the Commonwealth of Pennsylvania and experienced in erosion control, shall be submitted to the Township Engineer for approval. The statement shall affirm that the site has been inspected and the deviation from the slope will not result in injury to persons or damage to property.
 2. A concrete, masonry or other approved retaining wall constructed in accordance with appropriate standards is provided to support the face of the excavation.
- B. Edges of slopes shall be a minimum of five (5) feet from property lines or right-of-way lines of streets in order to permit the normal rounding of the edge without encroaching on the abutting property.
- C. Adequate provisions shall be made to prevent surface water from damaging the cut face of excavations and the sloping surfaces of fills.
- D. Cut and fill shall not endanger adjoining property.
- E. Fill shall be placed and compacted so as to minimize sliding or erosion of the soil.
- F. Fills shall not encroach on natural watercourses or constructed channels.
- G. Fills placed adjacent to natural watercourses or constructed channels shall have suitable protection against erosion during periods of flooding.

10.5. RESPONSIBILITY

- A. Whenever sedimentation is caused by stripping of vegetation, grading or other development, it shall be the responsibility of the person, corporation, or other entity causing such sedimentation to remove it from all affected surfaces, drainage systems and watercourses on and off-site, and to repair any damage at his expense as quickly as possible.

B. Maintenance of drainage facilities and watercourses:

1. Any lot containing stormwater management basins and runoff swales required pursuant to this Ordinance shall be subject to an easement in favor of the Township to ensure proper maintenance of such facilities. It shall be the primary responsibility of the Applicant and/or the successor owner of any lot subject to such easement to maintain any stormwater management basins and runoff swales located within the easement on such lot. Such stormwater management basins and runoff swales shall be maintained, improved, repaired, managed, insured and controlled by the lot owner. The owner of any lot containing such features may not plant any landscaping items or place structures (including fences and swimming pools) on or in the area of the easement and such owner shall be required to perform regular lawn mowing of the stormwater management basins and runoff swales.
 2. The easement shall give the Township the right to enforce compliance with these maintenance requirements against the owner of any lot subject to the easement, including the right, after giving the lot owner an opportunity to cure any failure to maintain the easement area, to enter the premises to return the facilities to good order and maintenance, if necessary, and the right to be reimbursed for expenses incurred in doing so, including reasonable attorneys fees. The amount of any such expenses incurred by the Township shall be a municipal lien against the lot subject to the easement whose owner has failed to reimburse the Township for such expenses. The Township may exercise any and all available remedies to collect the amount of the expense, including but not limited to foreclosure on the municipal lien. In addition, the owner (or joint owners) of any such lot subject to a municipal lien shall be personally obligated for reimbursement of the Township's expenses and the Township shall have the right to sue to collect a money judgment for such unpaid expenses, interest, costs and fees, including attorneys' fees, and may maintain such suit without waiving the aforesaid lien.
- C. It is the responsibility of any person, corporation, or other entity doing any work on or across a stream, watercourse, or swale or upon the flood plain or right-of-way during the period of the work, to return it to its original or equal condition after such activity is completed. This shall require revegetation of stream banks.
- D. No person, corporation, or other such entity shall block, impede the flow of, alter, construct any structure or deposit any material or thing or perform any work which will affect normal or flood flow in any communal stream or watercourse without having obtained prior approval from the Township and/or Department of Environmental Protection, whichever is applicable.
- E. It shall be unlawful to dump, deposit or otherwise cause any materials including, but not limited to, fill, trash, landscape debris, grass clippings, leaves or any other item that could displace or impede the flow of water in any stream, channel, swale, ditch, pond, wetland, basin or any other natural or man-made structure that regularly or periodically carries or stores storm water or runoff.
- F. Each person, corporation or other entity that makes any surface changes shall be required to:
1. Collect on-site surface water runoff, provide water quality measures and, to the extent possible, provide groundwater recharge and control the remaining surface runoff to a point of discharge into the natural watercourse of the drainage area.
 2. Convey water originating off-site through the site at the same or less rate of flow as the water entering the site.
 3. Provide and install at the Applicant's expense, in accordance with Township requirements, all drainage and erosion control improvements (temporary and permanent) as required by the approved Erosion and Sediment Control Plan.

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ARTICLE 11 ADMINISTRATION

11.1. COMPLETION OF IMPROVEMENTS

- A. Before the Board of Supervisors shall cause its approval to be endorsed on the final plans of any subdivision or land development and as a requirement for the approval thereof, the Applicant shall enter into a written agreement with the Township in the manner and form set forth by the Township Solicitor, to guarantee the construction and installation of all improvements at the Applicant's expense required by this Ordinance. The agreement shall also provide for engineering inspections, insurance, reimbursement of expense to the Township, procedure upon default, and other subjects related to the development of the land.
- B. No plan shall receive final approval unless the streets shown have been improved to a permanently passable condition, or improved as may be required by this Ordinance and any walkways, bikeways, curbs, gutters, street lights, fire hydrants, shade trees, water mains, wastewater lines, storm drains and other improvements as may be required by this Ordinance have been installed. In lieu of the completion of any improvements, the Applicant shall furnish to the Township financial security with such surety as the Board of Supervisors shall approve, in an amount sufficient to cover the costs of any improvements which may be required.
- C. When requested by the Applicant, in order to facilitate financing, the Board of Supervisors shall furnish the Applicant with a signed copy of a resolution indicating approval of the final plan contingent upon the Applicant obtaining satisfactory financial security. The final plan or record plan shall not be signed nor recorded until the financial improvements agreement is executed. The resolution or letter of contingent approval shall expire and be deemed to be revoked if the financial security agreement is not executed within 90 days unless a written extension is granted by the Board of Supervisors.
- D. If financial security has been provided in lieu of the completion of improvements required as a condition for the final approval of a plan as set forth in this Section, the Township shall not condition the issuance of building, grading or other permits relating to the construction of the improvement, including buildings, upon lots or land as depicted upon the final plan. If an escrow fund has been established, occupancy permits for any building or buildings to be erected shall not be withheld following: the improvement of the streets providing access to and from existing public roads to such building or buildings to a permanently passable condition (bituminous binder or bituminous base course) as well as the completion of all other improvements as depicted upon the approved plan, either upon the lot or lots or beyond the lot or lots in question if such improvements are necessary for the reasonable use of or occupancy of the building or buildings.

11.2. ACCEPTABLE SECURITY

- A. Without limitation as to other types of financial security which the Township may approve, which approval shall not be unreasonably withheld, Federal or Commonwealth chartered lending institution irrevocable letters of credit and restrictive or escrow accounts in such lending institutions shall be deemed acceptable financial security for the purposes of securing the completion of the required improvements.
- B. Such financial security shall be posted with a bonding company or Federal or Commonwealth chartered lending institution chosen by the Applicant, provided such bonding company or lending institution is authorized to conduct such business within the Commonwealth of Pennsylvania.
- C. Such bond, or other security shall provide for, and secure to the public, the completion of any improvements which may be required on or before the date fixed in the formal action of approval or accompanying agreement for completion of improvements.

11.3. AMOUNT OF SECURITY

- A. The amount of financial security to be posted for completion of the required improvements shall be equal to 110% of the cost of completion estimated as of 90 days following the date of scheduled for completion by the developer. Annually the Township may adjust the amount of the financial security by comparing the actual cost of the improvements which have been completed and the estimated cost for the completion of the remaining improvements as of the expiration of the 90th day after either the original date scheduled of completion or a rescheduled date of completion. Subsequent to said adjustment, the Township may require the Applicant to post additional security in order to assure that the financial security equals said 110 percent. Any additional security shall be posted by the developer in accordance with this section.

- B. The amount of financial security required shall be based upon an estimate of the cost of completion of the required improvements, submitted by an Applicant and prepared by a professional engineer licensed as such in the Commonwealth of Pennsylvania and certified by such engineer to be a fair and reasonable estimate of such cost. The Township, upon recommendation of the Township engineer, may refuse to accept such estimate for good cause shown. If the Applicant and the Township are unable to agree upon an estimate, the procedures set forth in the Pennsylvania Municipalities Planning Code, Article V, Section 509 (g) shall be followed.
- C. If the Applicant requires more than one year from the date of posting of the financial security to complete the required improvements, the amount of financial security may be increased by an additional ten percent (10%) for each one year period beyond the first anniversary date from posting of financial security or to an amount not exceeding one hundred ten percent (110%) of the cost of completing the required improvements as re-established on or about the expiration of the preceding one year period by using the above bidding procedure.

11.4. COMPLETION IN STAGES

- A. In the case where development is projected over a period of years, the Board of Supervisors may authorize submission of final plans by section or phases of development subject to such requirements or guarantees as to improvements in future stages of development as it finds essential for the protection of any finally approved section of the development.
- B. Each phase or section in any residential subdivision or land development, except for the last section, shall contain a minimum of 25% of the total number of dwelling units as depicted on the preliminary plan, unless a lesser percentage is approved by the Board of Supervisors.
- C. If the plan is proposed to be phased after final plan approval, then a revised final plan shall be submitted.

11.5. RELEASES OF ESCROW

- A. As the work of installing the required improvements proceeds, the party posting the financial security may request the governing body to release or authorize the release, from time to time, such portions of the financial security necessary for payment to the contractor or contractors performing the work. Any such requests shall be in writing addressed to the governing body, and the governing body shall have 45 days from receipt of such request within which to allow the municipal engineer to certify, in writing, to the governing body that such portion of the work upon the improvements has been completed in accordance with the approved plat. Upon such certification, the governing body shall authorize release by the bonding company or lending institution of an amount as estimated by the municipal engineer fairly representing the value of the improvements completed or, if the governing body fails to act within said 45-day period, the governing body shall be deemed to have approved the release of funds as requested.
- B. The governing body may, prior to final release at the time of completion and certification by its engineer, require retention of ten percent (10%) of the estimated cost of the aforesaid improvements.

11.6. ACCEPTANCE OF STREETS AND IMPROVEMENTS

- A. With respect to those streets which the plan approval contemplates are to be dedicated to the Township, the Township shall have no obligation to take over and make public any such street or other improvement unless the required improvements shown on the approved plan have been constructed in accordance with all requirements and to the satisfaction of the Township Engineer and the Board of Supervisors. The Township shall have no responsibility with respect to any undedicated street or other improvement.
- B. Conditions - The Township shall have no obligation to take over and make public any street or other improvement unless:
 - 1. The required improvements, utility mains and laterals, and monuments, shown on an approved plan or plans have been constructed to meet all Township requirements;
 - 2. It is established to the satisfaction of the Board of Supervisors that there is a need for the improvements to be taken over and made public;

3. A deed of dedication to the Township and release of mortgage or other liens executed by all parties shown on the certificate to have an interest in the improvements is delivered to the Township. The Applicant shall tender a deed of dedication to the Township or appropriate authority for such streets, and improvements thereto including street paving, curbs, sidewalks, bike paths, shade trees, monuments, sanitary and separate storm sewer systems, manholes, inlets, pumping stations and other appurtenances as shall be constructed as public improvements and as are required for the promotion of public welfare, after all streets, curbs, bike paths, sidewalks, and sewers are completed and such completion is certified as satisfactory by the Township Engineer.
 4. A maintenance bond for a period of eighteen (18) months from the date of acceptance, in the amount of fifteen percent (15%) of the cost of construction with surety satisfaction to the Board of Supervisors is supplied.
 5. The Applicant shall pay all costs for the recording of the acceptance of the required improvements.
 6. All advertising and marketing signs and all signs bearing the name of the Development selected by the Applicant for marketing purposes shall be removed from the development by the Applicant.
- C. No roads or other improvements will be accepted by the Township during the period from October 15 to April 15 of each year.

11.7. MAINTENANCE GUARANTEE

- A. Where the Township accepts dedication of all or some of the required improvements following completion, the Township shall require the posting of financial security to secure structural integrity of said improvements as well as the functioning of said improvements in accordance with the design and specifications as shown on the final plan. The maintenance period shall be 18 months from the date of acceptance of dedication. The financial security shall be of the same type as described in these regulations, and the amount of the financial security for maintenance shall be 15 percent of the actual cost of installation of said improvements.

11.8. FINAL RELEASE FROM IMPROVEMENT BOND

- A. When the Applicant has completed all of the necessary and appropriate improvements, the Applicant shall notify the Township, in writing, by certified or registered mail, of the completion of the aforesaid improvements and shall send a copy thereof to the Township Engineer. The Township shall, within ten (10) days after receipt of such notice, direct and authorize the Township Engineer to inspect all of the aforesaid improvements. The Township Engineer shall, thereupon, file a report, in writing, with the Township and shall promptly mail a copy of same to the developer by certified or registered mail. The report shall be made and mailed within thirty (30) days after receipt by the Township Engineer of the aforesaid authorization from the Township; said report shall be detailed and shall indicate approval or rejection of the improvements, either in whole or in part, and if said improvements, or any portion thereof, shall not be approved or shall be rejected by the Township Engineer, said report shall contain a statement of reasons for such non-approval or rejection.
- B. In addition to the Township Engineer's report, the Township will request the following departments to report any outstanding items with regard to their departments that require resolution prior to dedication. The report shall be submitted within 20 days of receipt of the "notice of completion of improvements" submitted by the developer. If no open items exist within the department, then the department head shall submit a "sign-off" sheet acknowledging that there are no open issues. A copy of the report shall be provided to the Township Engineer within the said 20 day period. The departments required to report are:
1. Finance Director
 2. Police Department
 3. Township Manager
 4. Township Water and Wastewater Engineer
 5. Landscape Review Consultants

- C. If any portion of the Improvements shall not be approved or shall be rejected by the Township, the Applicant shall have ninety (90) days from the date the Township Engineer files his/her report to complete and/or repair such unapproved or rejected Improvements and again notify the Township of their completion and/or repair under MPC Section 510(d). In such case, the Township Engineer's report made under MPC Section 510(a) shall be limited to only those Improvements that were previously unapproved or rejected. In the event the Township Engineer's inspection of the Improvements that originally were unapproved or rejected by the Township indicates the Applicant has successfully completed those items and/or repairs, then the Township shall act to accept dedication of the Improvements in accordance with MPC Section 510. However, if the Applicant fails to complete and/or repair such unapproved or rejected Improvements and again notifies the Township of their completion and/or repair in accordance with Section 510(d) of the MPC within ninety (90) days from the date the Township Engineer previously filed his/her report; or if the Township Engineer again rejects such previously unapproved or rejected Improvements, then any subsequent report made by the Township Engineer in accordance with a notification of the completion of Improvements made by the Applicant under Section 510(d) of the MPC shall address all of the Improvements in the development and not just those that had previously been rejected or not approved by the Township Engineer.

11.9. REMEDIES TO EFFECT COMPLETION OF IMPROVEMENTS

- A. In the event that any required improvements have not been installed as provided for in these regulations, or in accordance with the approved final plan, the Township shall have the power to enforce any corporate bond, or other security, by appropriate legal and equitable remedies. If the proceeds of such bond, or other security, are insufficient to pay the cost of installing or making repairs or corrections to all the improvements covered by said security, the Township may, at its option, install part of such improvements in all or part of the subdivision or land development and may institute appropriate legal or equitable action to recover the monies necessary to complete the remainder of the improvements. All of the proceeds, whether resulting from the security or from any legal or equitable action brought against the Applicant, or both, shall be used solely for the installation of the improvements covered by such security. All such security shall be maintained in an account separate from any Township funds and shall not be subject to commingling.

11.10. FEES

- A. Application Filing Fees - The Applicant or owner submitting plans for a subdivision or land development shall pay Application Filing Fees made payable to Buckingham Township at the time of application in accordance with a fee schedule adopted by resolution by the Board of Supervisors.
- B. Escrow Review Deposit (Plan Review) - In addition to application filing fees the Applicant shall be required to furnish an escrow deposit to pay the professional fees and other costs incurred in reviewing the plans and/or processing the application. Such fees shall include the reasonable and necessary charges for the Township engineer and other professional consultants to review the plans, in accordance with a fee schedule set by resolution of the Board of Supervisors. Upon completion of the review, whether the application is approved or rejected, any monies not expended in the review shall be refunded to the Applicant. Fees in excess of the escrow fund will be charged to the Applicant.

11.11. DETENTION BASIN, RETENTION BASIN AND STORMWATER MANAGEMENT MAINTENANCE CONTRIBUTIONS

- A. Pursuant to regulations promulgated by PADEP, the Township is required to ensure the design, implementation and maintenance of Best Management Practices ("BMPs") that control runoff from new development and redevelopment after Regulated Earth Disturbance activities are complete. These requirements include the need to implement post-construction stormwater BMPs with assurance of long-term operations and maintenance of those BMPs.
- B. All subdivisions and land developments that are required to construct detention/retention basins and storm water management facilities shall be required to provide a contribution to the Township for future maintenance of the stormwater management facilities. For residential subdivisions and land developments, said contribution shall be calculated on a perdwelling unit basis. For non-residential developments, said contribution shall be calculated on the basis of the total number of parking spaces required by the Buckingham Township Zoning Ordinance. The contribution per dwelling unit and parking space shall be determined by resolution of the Board of Supervisors.
- C. Maintenance shall be limited to the basin outlet structure, piping, embankment berm, emergency spillway, pond sediment removal etc. The lot owners or homeowners association shall be responsible for normal routine maintenance such as grass cutting etc.
- D. All contributions shall be provided to the Township at the time of final approval of the development or subdivision is granted.

**ARTICLE 12
AMENDMENTS, VALIDITY, AND
REPEALER**

12.1. AMENDMENTS

- A. Proposed amendments prepared by other than the Planning Commission shall be submitted to it for recommendations at least thirty (30) days prior to the date set for the public hearing on such proposed amendment.
- B. The regulations set forth in this Ordinance may be amended by the Board of Supervisors by Ordinance, following the procedures set forth in the Municipalities Planning Code, Section 505, 53 P.S. § 10505.
- C. Upon receipt of the report of the Planning Commission, a public hearing on the proposed amendment shall be held. Public notice (as defined in Section 107 of the MPC, 53 P.S. § 10107) shall be given not more than thirty (30) days and not less than seven (7) days in advance of the public hearing. Such notice shall be published once each week for two consecutive weeks in a newspaper of general circulation in the municipality and shall state the time and place of the hearing and the nature of the amendment.

12.2. EFFECTIVE DATE

- A. This Ordinance shall become effective five (5) days after final approval.

12.3. VALIDITY

- A. If any section, paragraph, sub-section, clause or provision of this Ordinance shall be declared by a court of competent jurisdiction to be invalid, such decision shall not affect the validity of this Ordinance as a whole or in part thereof.

12.4. ENACTMENT

- A. Enacted and ordained this 14th day of October, 2009.

BUCKINGHAM TOWNSHIP
BOARD OF SUPERVISORS

BY: Maggie Rask
Maggie Rask

BY: [Signature]
Jon Forest

BY: [Signature]
Henry R. Rowan

ATTEST: [Signature]
Township Manager

APPENDIX A
SIGNATURE BLOCKS

PROFESSIONAL ENGINEER CERTIFICATION

I, _____ (Name) _____ (Registration Number)
DO HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF, THAT THE INFORMATION CONTAINED IN THE ACCOMPANYING PLANS, SPECIFICATIONS, AND REPORTS HAS BEEN PREPARED IN ACCORDANCE WITH ACCEPTED ENGINEERING PRACTICE, IS TRUE AND CORRECT, AND IS IN CONFORMANCE WITH THE ZONING ORDINANCE AND THE SUBDIVISION AND LAND DEVELOPMENT ORDINANCE OF BUCKINGHAM TOWNSHIP AS LAST AMENDED.

(Signature – Professional Engineer) (Registration Number) (Date)

PROFESSIONAL SURVEYOR CERTIFICATION

I, _____ (Name) _____ (Registration Number)
DO HEREBY CERTIFY THAT THE EXISTING FEATURES, TOPOGRAPHY AND METES AND BOUNDS DESCRIPTION SHOWN ON THIS PLAN REFERENCES A FIELD SURVEY PERFORMED BY:

(Signature – Professional Engineer/Surveyor) (Registration Number) (Date)

OWNERS ACKNOWLEDGEMENT

TO ALL TO WHOM THESE PRESENTS MAY COME, KNOW YE THAT I/WE _____ (Owner of Record) _____ HAVE LAID OUT UPON MY/OUR LAND SITUATED IN THE TOWNSHIP OF BUCKINGHAM, COUNTY OF BUCKS, COMMONWEALTH OF PENNSYLVANIA, CERTAIN LOTS ACCORDING TO THIS PLAN WHICH IS INTENDED TO BE FORTHWITH RECORDED. WITNESS OUR HAND AND SEAL THIS _____ DAY OF _____, 20_____.

(Sign and print name)

(Sign and print name)

COMMONWEALTH OF PENNSYLVANIA – COUNTY OF BUCKS

ON THE _____ DAY OF _____, 20____ BEFORE ME, THE
SUBSCRIBER, A NOTARY PUBLIC OF THE COMMONWEALTH OF PENNSYLVANIA, PERSONALLY
APPEARED _____ WHO ACKNOWLEDGED THIS PLAN TO BE THE
OFFICIAL PLAN OF PROPERTY AND IMPROVEMENTS SHOWN THEREON, SITUATED IN THE TOWNSHIP
OF BUCKINGHAM, COUNTY OF BUCKS, COMMONWEALTH OF PENNSYLVANIA, AND DESIRED THAT
THIS PLAN BE RECORDED ACCORDING TO LAW.

NOTARY PUBLIC

MY COMMISSION EXPIRES

BOARD OF SUPERVISORS' APPROVAL

THIS PLAN WAS APPROVED BY THE BOARD OF SUPERVISORS OF THE TOWNSHIP OF BUCKINGHAM AT
A PUBLIC MEETING HELD ON THE _____ DAY OF _____, 20____.

TOWNSHIP ENGINEER APPROVAL

THIS PLAN WAS RECOMMENDED FOR APPROVAL BY THE TOWNSHIP ENGINEER THIS _____ DAY OF _____, 20_____.

(Buckingham Township Engineer)

RECORDING CERTIFICATION – COUNTY OF BUCKS

THIS PLAN WAS RECORDED IN THE OFFICE FOR THE RECORDING OF DEEDS, IN AND FOR THE COUNTY OF BUCKS AT DOYLESTOWN, PENNSYLVANIA IN PLAN BOOK NO. _____, PAGE _____ ON _____, 20_____.

Recorder of Deeds

BUCKS COUNTY PLANNING COMMISSION NOTATION

BCPC NO. _____

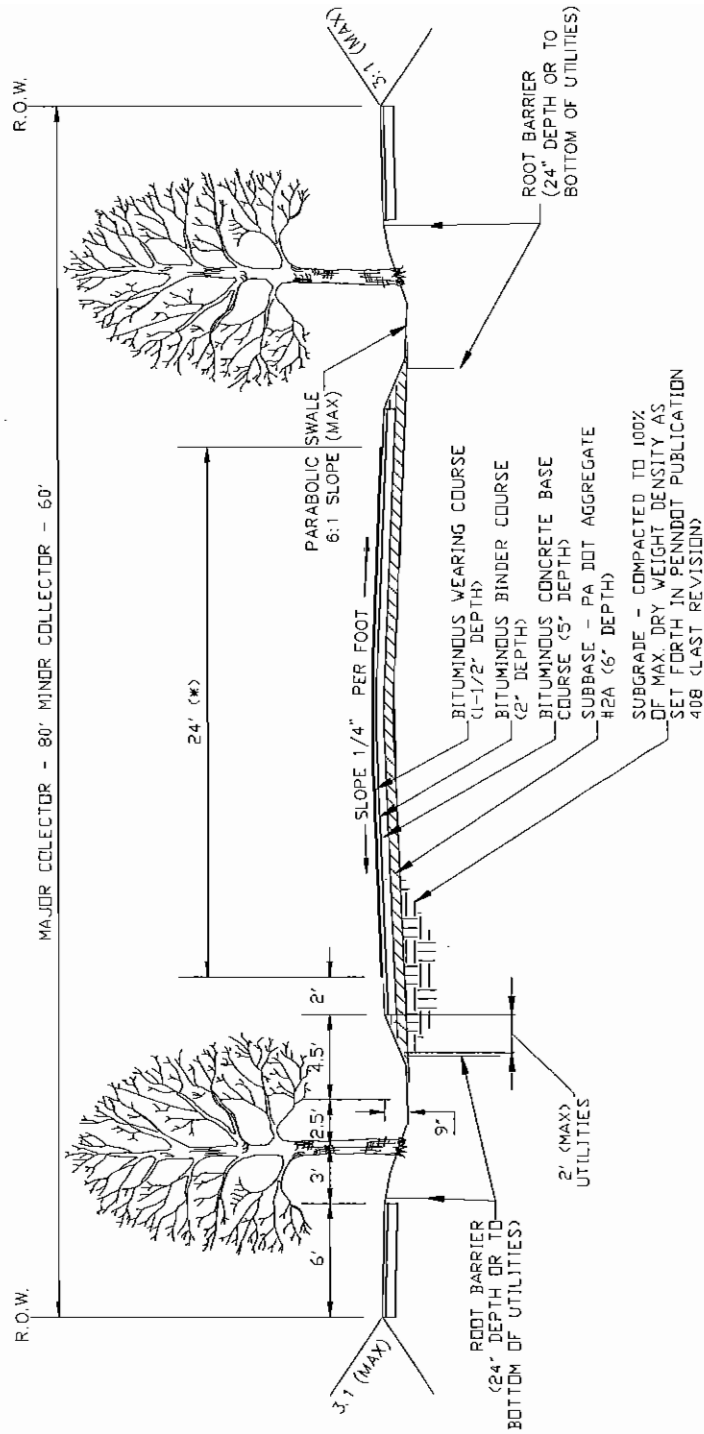
PROCESSED AND REVIEWED. REPORT PREPARED BY THE BUCKS COUNTY PLANNING COMMISSION IN ACCORDANCE WITH THE MUNICIPALITIES PLANNING CODE.
CERTIFIED THIS DATE _____.

BUCKS COUNTY PLANNING COMMISSION

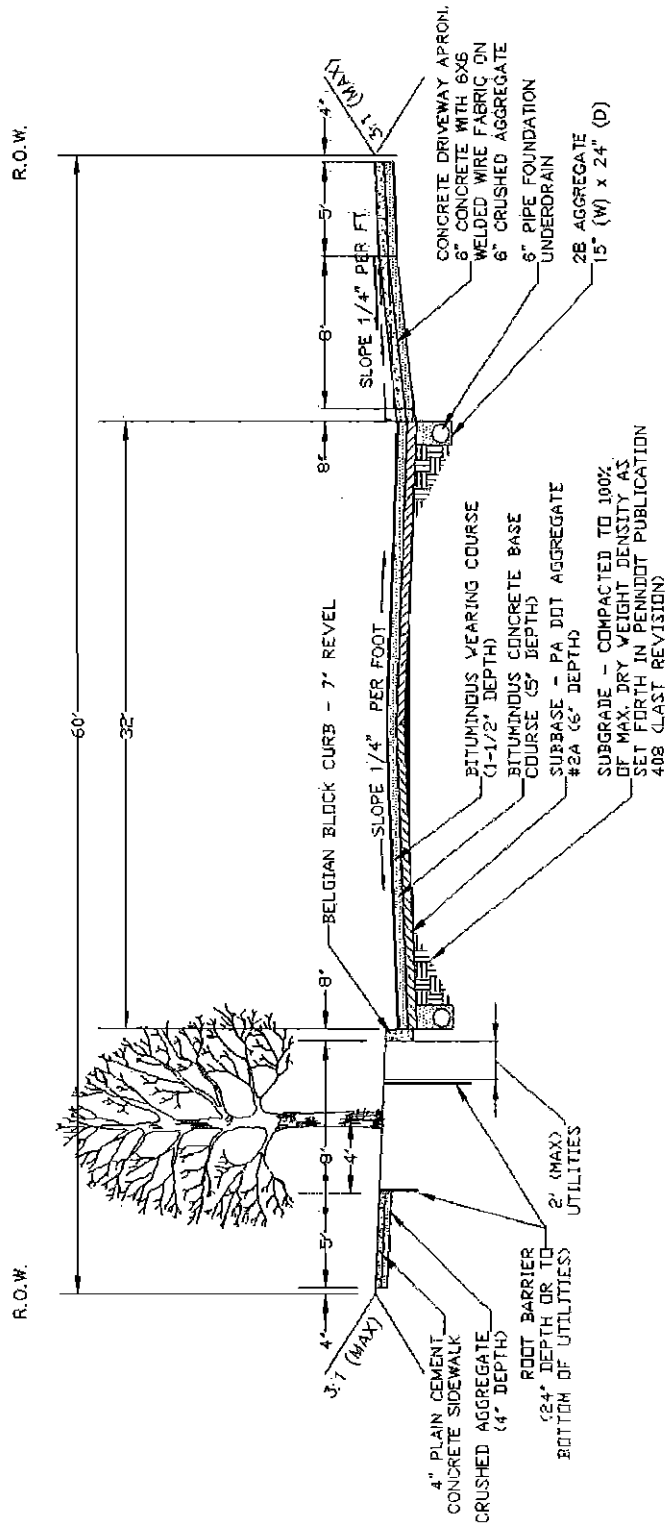
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APPENDIX B
TYPICAL ROADWAY SECTIONS

(*) OR AS REQUIRED BY THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION



TYPICAL ROAD CROSS-SECTION SWALE SECTION



TYPICAL STREET CROSS-SECTION
CURBED SECTION

SEE DESIGN STANDARDS FOR LIVING
COMMUNITY (LC) STREET STANDARDS

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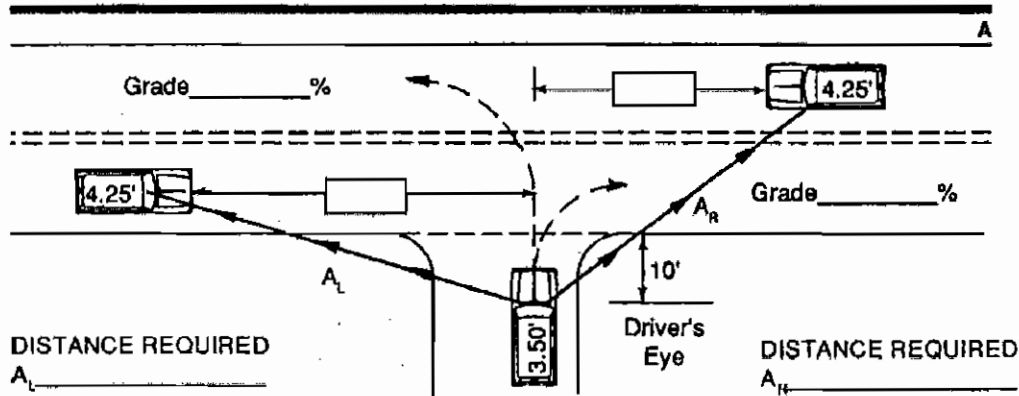
APPENDIX C
MINIMUM SIGHT DISTANCE REQUIREMENTS

FORMULA SIGHT DISTANCE MEASUREMENTS

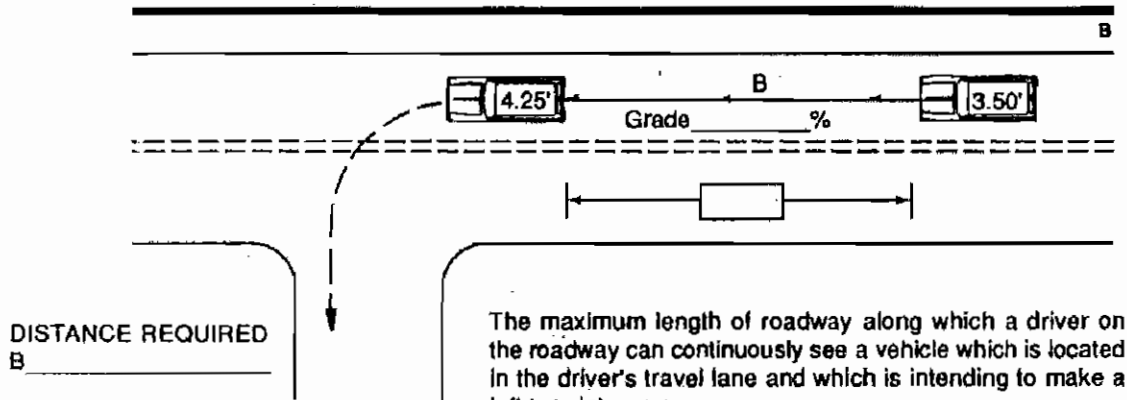
Applicant _____ Application No. _____

S.R. _____ Seg. _____ Offset _____ Posted Speed Limit _____

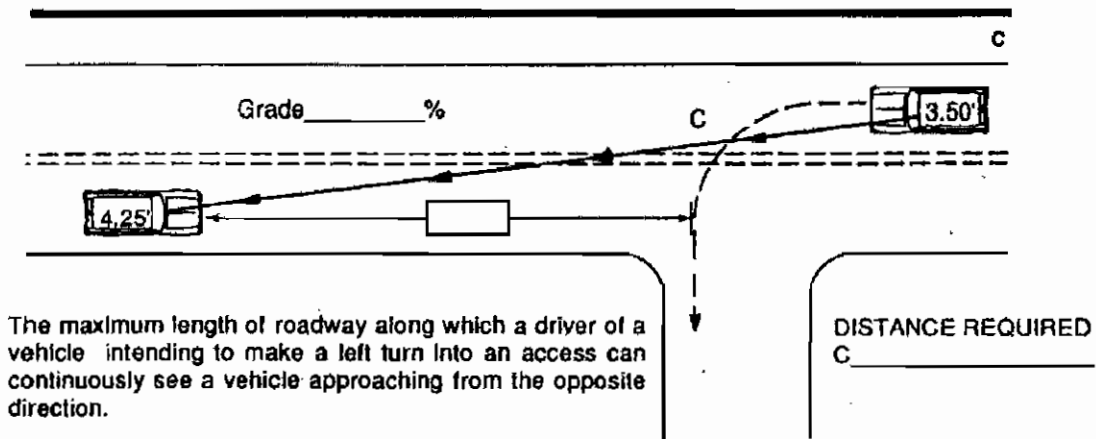
Measured By _____ Date _____ or
Safe Operating Speed _____
(Unposted Highway)



The maximum length of roadway along which a driver at an access location can continuously see another vehicle approaching on the roadway.



The maximum length of roadway along which a driver on the roadway can continuously see a vehicle which is located in the driver's travel lane and which is intending to make a left turn into an access.



The maximum length of roadway along which a driver of a vehicle intending to make a left turn into an access can continuously see a vehicle approaching from the opposite direction.

FORMULA SIGHT DISTANCE TABLE

Speed (V) (Miles Per Hour)	Average Grade (G) (Percent)										
	0.0	+1.0	+2.0	+3.0	+4.0	+5.0	+6.0	+7.0	+8.0	+9.0	+10.0
25	147	145	144	143	142	140	139	138	137	136	135
30	196	194	191	189	187	185	183	182	180	178	177
35	249	245	242	239	236	233	231	228	226	224	221
40	314	309	304	299	295	291	287	284	280	277	274
45	383	376	370	364	358	353	348	343	339	334	330
50	462	453	444	436	429	422	415	409	403	397	392
55	538	527	517	508	499	490	482	475	468	461	454
	0.0	-1.0	-2.0	-3.0	-4.0	-5.0	-6.0	-7.0	-8.0	-9.0	-10.0
25	147	148	150	151	153	155	157	159	161	164	166
30	196	199	201	204	207	210	214	217	221	226	230
35	249	252	256	260	265	269	275	280	286	292	299
40	314	319	325	331	338	345	352	360	369	379	389
45	383	390	398	406	415	425	435	447	459	472	487
50	462	471	481	492	504	517	531	546	563	581	600
55	538	550	562	576	590	606	622	641	661	682	706

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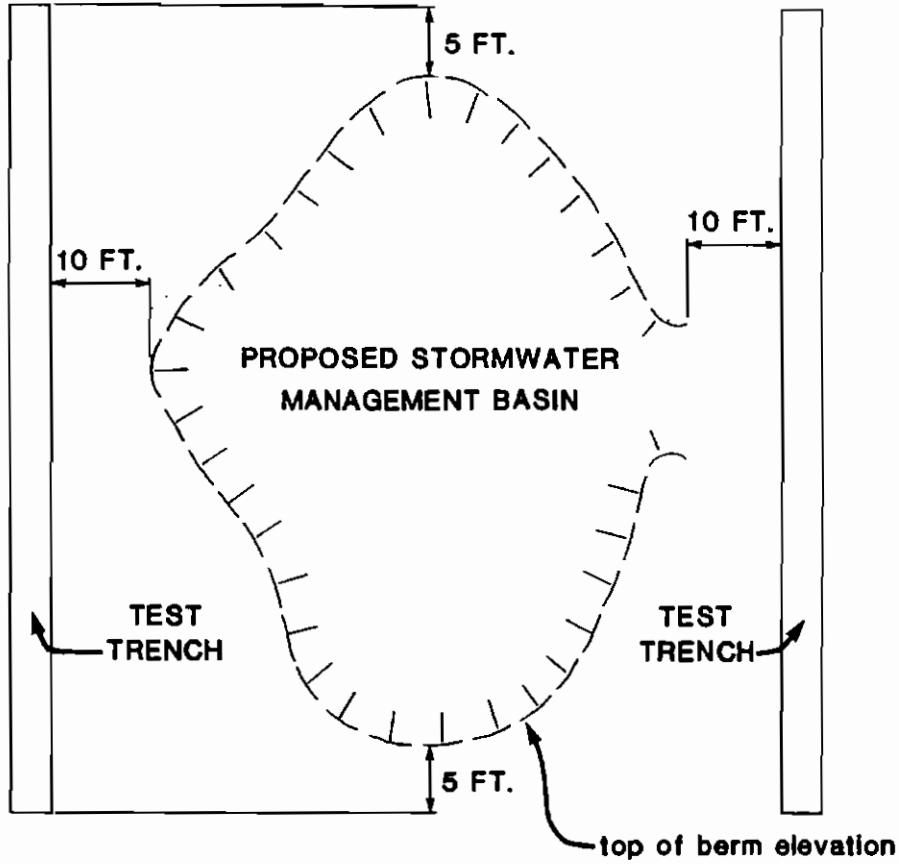
APPENDIX D

**TEST TRENCH DETAIL FOR
STORMWATER MANAGEMENT BASINS**

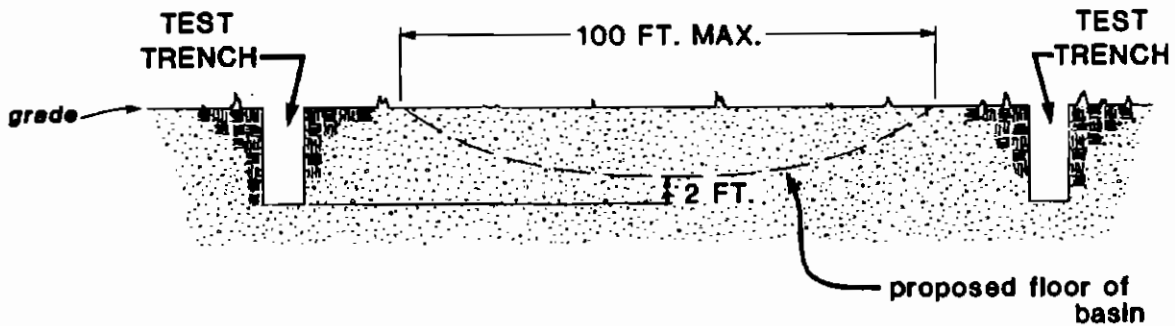
TEST TRENCH DETAIL FOR STORMWATER MANAGEMENT BASINS

STRIKE OF BEDROCK

a. Plan View of Site

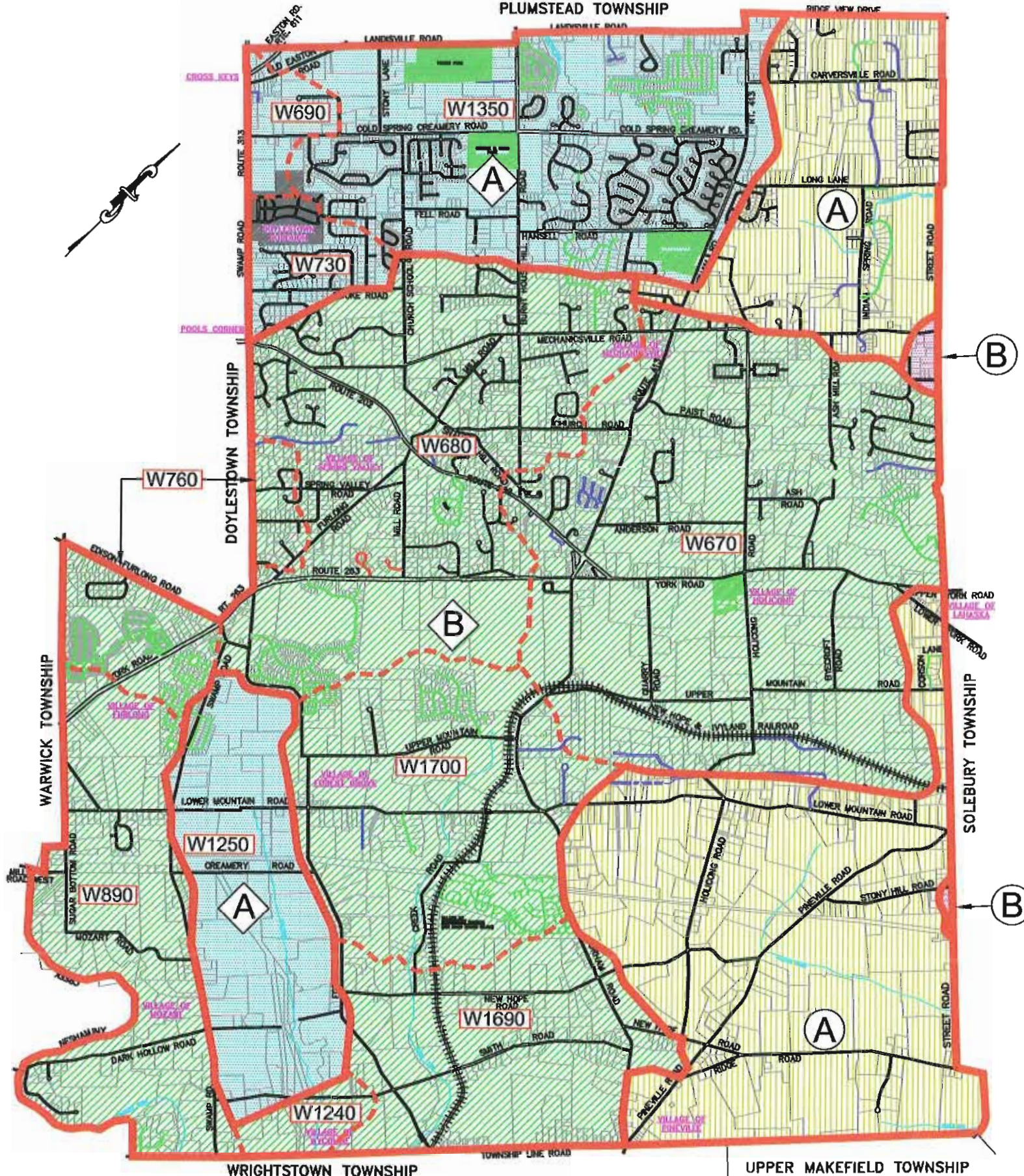


b. Profile View of Site



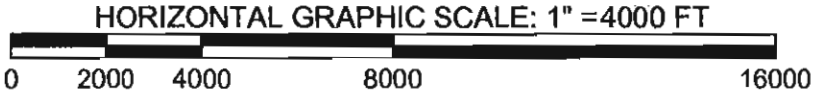
APPENDIX E
STORMWATER MANAGEMENT DISTRICT MAP

BUCKINGHAM TOWNSHIP STORMWATER MANAGEMENT DISTRICT PLAN



LEGEND

DISTRICT	DESIGN STORM PROPOSED CONDITIONS	DESIGN STORM EXISTING CONDITIONS
NESHAMINY CREEK STORMWATER MANAGEMENT PLAN - PHASE II STUDY - DISTRICT 'A'	2-YEAR 5-YEAR 10-YEAR 25-YEAR 50-YEAR 100-YEAR	1-YEAR 5-YEAR 10-YEAR 25-YEAR 50-YEAR 100-YEAR
NESHAMINY CREEK STORMWATER MANAGEMENT PLAN - PHASE II STUDY - DISTRICT 'B'	2-YEAR 5-YEAR 10-YEAR 25-YEAR 50-YEAR 100-YEAR	1-YEAR 2-YEAR 5-YEAR 10-YEAR 25-YEAR 50-YEAR
DELAWARE RIVER SOUTH ACT 167 WATERSHED MANAGEMENT DISTRICT 'A'	2-YEAR 5-YEAR 10-YEAR 25-YEAR 50-YEAR 100-YEAR	1-YEAR 5-YEAR 10-YEAR 25-YEAR 50-YEAR 100-YEAR
DELAWARE RIVER SOUTH ACT 167 WATERSHED MANAGEMENT DISTRICT 'B'	2-YEAR 5-YEAR 10-YEAR 25-YEAR 50-YEAR 100-YEAR	1-YEAR 2-YEAR 5-YEAR 10-YEAR 50-YEAR 100-YEAR
NESHAMINY CREEK STORMWATER MANAGEMENT PLAN - PHASE II STUDY SUBAREA BOUNDARY LINE		
W670	NESHAMINY CREEK STORMWATER MANAGEMENT PLAN - PHASE II STUDY SUBAREA IDENTIFIER LABEL	



NOTE: THE SUBAREAS AND STORMWATER MANAGEMENT DISTRICTS SHOWN ON THIS MAP COINCIDE WITH TOPOGRAPHIC DIVIDES, OR IN CERTAIN INSTANCES, ARE DRAWN FROM THE INTERSECTION OF THE WATERCOURSE AND A PHYSICAL FEATURE SUCH AS THE CONFLUENCE WITH ANOTHER WATERCOURSE OR A POTENTIAL FLOW OBSTRUCTION (ROAD, CULVERT, BRIDGE, ETC.) TO THE TOPOGRAPHIC DIVIDE CONSISTENT WITH TOPOGRAPHY. DISTRICT BOUNDARIES FOR THE NESHAMINY CREEK STORMWATER MANAGEMENT PLAN - PHASE II AND DISTRICT BOUNDARIES FOR THE DELAWARE RIVER SOUTH ACT 167 WATERSHED MANAGEMENT PLAN ARE SHOWN HEREON FROM AVAILABLE MAPPING FOR THESE STUDIES. THE LOCATION OF STORMWATER MANAGEMENT DISTRICTS SHALL BE SUBJECT TO THE VERIFICATION OF THE TOWNSHIP ENGINEER ON A CASE BY CASE BASIS.



KNIGHT ENGINEERING INC.
4998 MECHANICSVILLE ROAD, P.O. BOX 247
MECHANICSVILLE, PENNSYLVANIA 18934
(215) 794-5958

OCTOBER 14, 2009

APPENDIX F
RECOMMENDED PLANT LIST

STREET TREES FOR SIDEWALKS/PARKING ISLANDS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
ACER CAMPESTRE	<i>Hedge Maple</i>	"Fastigiatum, Postelense, Schwerinii"
ACER RUBRUM *	<i>Red Maple</i>	"Armstrong, Bowhall, Northwood, October Glory, Red Sunset"
CARPINUS BETULUS	<i>European Hornbeam</i>	"Fastigiata"
COTINUS OBOVATUS	<i>American Smoketree</i>	None available
CRATAEGUS CRUSGALLI *	<i>Cockspur Hawthorn</i>	"Inermis"
CRATAEGUS PHAENOPYRUM	<i>Washington Hawthorn</i>	"Clarke, Fastigiata, Princeton Sentry"
CRATAEGUS VIRIDIS	<i>Green Hawthorn</i>	"Winter King"
GLEDITSIA TRIACANTHOS INERMIS *	<i>Thornless Honeylocust</i>	"Halka, Shademaster, Skycolor, Rubylace"
HALESIA MONTICOLA	<i>Mountain Silverbell</i>	None available
KOELREUTERIA PANICULATA	<i>Golden Raintree</i>	"September"
OSTRYA VIRGINIANA *	<i>American Hophornbeam</i>	None available
PRUNUS SARGENTII	<i>Sargent Cherry</i>	"Columnaris"
QUERCUS ACUTISSIMA	<i>Sawtooth Oak</i>	"Gobbler"
QUERCUS BICOLOR *	<i>Swamp White Oak</i>	None available
QUERCUS IMBRICARIA *	<i>Shingle Oak</i>	None available
QUERCUS PHELLOS *	<i>Willow Oak</i>	None available
SOPHORA JAPONICA	<i>Scholar Tree</i>	"Princeton Upright, Regent"
SYRINGA RETICULATA	<i>Japanese Tree Lilac</i>	"Ivory Silk"
TILIA CORDATA	<i>Littleleaf Linden</i>	"Greenspire" and others:
ZELKOVA SERRATA	<i>Zelkova</i>	"Green Vase, Halka, Village Green"

* NATIVE TO PENNSYLVANIA

PLANTS TOLERANT OF WET CONDITIONS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
ACER RUBRUM *	<i>Red Maple</i>	"Armstrong, Bowhall, Northwood, October Glory, Red Sunset"
AESCULUS GLABRA *	<i>Ohio Buckeye</i>	None available
AESCULUS PARVIFLORA	<i>Bottlebrush Buckeye</i>	"Serotina, Rogers"
ALNUS GLUTINOSA *	<i>Black Alder</i>	"Pyramidalis"
AMELANCHIER CANADENSIS *	<i>Shadblow Serviceberry</i>	"White Pillar, Autumn Brilliance, Magnificent"
AMELANCHIER LAEVIS *	<i>Allegheny Serviceberry</i>	"Snowcloud"
ARONIA PRUNIFOLIA *	<i>Purplefruit Chokeberry</i>	None available
BETULA NIGRA *	<i>River Birch</i>	"Heritage"
BETULA POPULIFOLIA *	<i>Gray Birch</i>	None available
CALYCANTHUS FLORIDUS *	<i>Common Sweetshrub</i>	"Ovatus"
CARPINUS CAROLINIANA *	<i>American Hornbeam</i>	None available
CELTIS OCCIDENTALIS *	<i>Common Hackberry</i>	"Prairie Pride, Magnifica"
CEPHALANTHUS OCCIDENTALIS *	<i>Common Buttonbush</i>	None available
CHIONANTHUS VIRGINICUS *	<i>White Fringetree</i>	None available
CLETHRA ALNIFOLIA *	<i>Summersweet Clethra</i>	"Rosea"
CORNUS AMOMUM *	<i>Silky Dogwood</i>	None available
CORNUS SERICEA*	<i>Redosier Dogwood</i>	"Flaviramea, Kelseyi"
FOTHERGILLA GARDENII	<i>Dwarf Fothergilla</i>	None available
FRAXINUS PENNSYLVANICA *	<i>Green Ash</i>	"Kindred, Newport, Patmore, Summit, Moraine, Raywood"
GLEDITSIA TRIACANTHOS INERMIS *	<i>Thornless Honeylocust</i>	"Halka, Shademaster, Skycolor, Rubylace"
HALESIA CAROLINA	<i>Carolina Silverbell</i>	None available
HAMAMELIS VERNALIS	<i>Vernal Witchhazel</i>	"Orange Glow, Rubra"
HAMAMELIS VIRGINIANA *	<i>Common Witchhazel</i>	None available
ILEX DECIDUA	<i>Possumhaw</i>	"Warren's Red"
ILEX GLABRA *	<i>Inkberry</i>	"Compacta, Viridis, Nigra"
ILEX VERTICILLATA *	<i>Winterberry</i>	"Winter Red, Harvest Red, Raritan Chief, Sparkleberry"
ITEA VIRGINICA *	<i>Virginia Sweetspire</i>	"Henry's Garnet"

* NATIVE TO PENNSYLVANIA

STREET TREES

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
QUERCUS COCCINEA *	<i>Scarlet Oak</i>	None available
QUERCUS IMBRICARIA *	<i>Shingle Oak</i>	None available
QUERCUS MACROCARPA *	<i>Bur Oak</i>	None available
QUERCUS PALUSTRIS *	<i>Ptn Oak</i>	None available
QUERCUS PHELLOS *	<i>Willow Oak</i>	None available
QUERCUS RUBRA*	<i>Northern Red Oak</i>	None available
SOPHORA JAPONICA	<i>Scholar Tree</i>	"Princeton Upright, Regent"
SYRINGA RETICULATA	<i>Japanese Tree Lilac</i>	"Ivory Silk"
TILIA AMERICANA *	<i>American Linden</i>	"Redmond" and others.
TILIA CORDATA	<i>Littleleaf Linden</i>	"Greenspire" and others.
TILIA TOMENTOSA	<i>Silver Linden</i>	'Green Mountain'
ULMUS AMERICANA *	<i>American Elm</i>	"Delaware, Princeton, Washington"
ZELKOVA SERRATA	<i>Zelkova</i>	"Green Vase, Halka, Village Green"

* NATIVE TO PENNSYLVANIA

BUFFER PLANTS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
ABELIA X GRANDIFLORA	<i>Glossy Abelia</i>	"Edward Goucher, Francis Mason, Sherwood"
ACER CAMPESTRE	<i>Hedge Maple</i>	"Fastigiatum, Postelense, Schwerinii"
ACER GINNALA	<i>Amur Maple</i>	"Flame"
ACER GRISEUM	<i>Paperbark Maple</i>	None available
ACER PENNSYLVANICUM *	<i>Striped Maple</i>	"Erythrocladum"
ACER RUBRUM *	<i>Red Maple</i>	"Armstrong, Bowhall, Northwood, October Glory, Red Sunset"
ACER SACCHARUM *	<i>Sugar Maple</i>	"Bonfire, Columnare, Goldspire, Green Mountain, Legacy"
ACER SPICATUM *	<i>Mountain Maple</i>	None available
AESCULUS GLABRA *	<i>Ohio Buckeye</i>	None available
AESCULUS PARVIFLORA	<i>Bottlebrush Buckeye</i>	"Serotina, Rogers"
AESCULUS PAVIA	<i>Red Buckeye</i>	"Rubra"
ALNUS GLUTINOSA *	<i>Black Alder</i>	"Pyramidalis"
AMELANCHIER CANADENSIS *	<i>Shadbowl Serviceberry</i>	"White Pillar, Autumn Brilliance, Magnificent"
AMELANCHIER LAEVIS *	<i>Alleghany Serviceberry</i>	"Snowcloud"
ARONIA ARBUTIFOLIA *	<i>Red Chokeberry</i>	"Brilliantissima, Erecta"
ARONIA MELANOCARPA *	<i>Black Chokeberry</i>	"Elata, Grandifolia"
ARONIA PRUNIFOLIA *	<i>Purplefruit Chokeberry</i>	None available
BETULA LENTA *	<i>Sweet Birch</i>	None available
BETULA NIGRA *	<i>River Birch</i>	"Heritage"
BETULA POPULIFOLIA *	<i>Gray Birch</i>	None available
BUDDLEIA DAVIDII	<i>Butterfly Bush</i>	"Black Knight, Charming, Dubonnet, Empire Blue, Fascination, Royal Red, White Profusion"
CALLICARPA DICHOTOMA	<i>Purple Beautyberry</i>	None available
CALYCANTHUS FLORIDUS *	<i>Common Sweetshrub</i>	"Ovatus"
CARPINUS BETULUS	<i>European Hornbeam</i>	"Fastigiata"
CARPINUS CAROLINIANA *	<i>American Hornbeam</i>	None available
CARYA GLABRA *	<i>Pignut Hickory</i>	None available

* NATIVE TO PENNSYLVANIA

EVERGREEN PLANTS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
CRYPTOMERIA JAPONICA	<i>Cryptomeria</i>	"Lobbii"
CUPRESSOCYPARIS LEYLANDI	<i>Leyland Cypress</i>	None available
ILEX FOSTERI	<i>Foster Holly</i>	None available
ILEX GLABRA *	<i>Inkberry</i>	"Compacta, Viridis, Nigra"
ILEX OPACA *	<i>American Holly</i>	"Jersey Knight, Jersey Princess, Old Heavy Berry"
ILEX PEDUNCULOSA	<i>Longstalk Holly</i>	None available
ILEX X MESERVEAE	<i>Meserve Holly</i>	"Blue Girl, Blue Angel, Blue Prince, Blue Princess, China Boy, China Girl"
JUNIPERUS COMMUNIS *	<i>Common Juniper</i>	"Compressa, Hibernica" many others
JUNIPERUS HORIZONTALIS *	<i>Creeping Juniper</i>	"Douglasi, Emerald Spreader, Grey Carpet, Hughes, Plumosa, Winter Blue" others
JUNIPERUS VIRGINIANA *	<i>Eastern Red Cedar</i>	"Staver"
LEUCOTHOE CATESBAEI	<i>Drooping Leucothoe</i>	"Girard's Rainbow, Nana, Scarletta"
MYRICA PENNSYLVANICA *	<i>Northern Bayberry</i>	None available
NANDINA DOMESTICA	<i>Nandina</i>	"Harbor Dwarf, Nana"
PICEA OMORIKA	<i>Serbian Spruce</i>	None available
PINUS STROBUS *	<i>Eastern White Pine</i>	"Fastigiata" others
PSEUDOTSUGA MENZIESII	<i>Douglasfir</i>	None available
PYRACANTHA COCCINEA	<i>Firethorn</i>	"Lalandei, Mohave, Navaho, Rutgers, Shawnee"
RHODODENDRON CAROLINIANUM	<i>Carolina Rhododendron</i>	"Album, Luteum"
RHODODENDRON CATAWBIENSE	<i>Catawba Rhododendron</i>	"Cunningham's White, Nova Zembla, Purpureum Elegans, Roseum Elegans"
RHODODENDRON MAXIMUM *	<i>Rosebay Rhododendron</i>	None available
TAXUS CUSPIDATA	<i>Japanese Yew</i>	"Capitata"
THUJA OCCIDENTALIS	<i>Eastern Arborvitae</i>	"Nigra, Smaragd"
VIBURNUM TINUS	<i>Laurustinus</i>	None available
VIBURNUM X PRAGENSE	<i>Prague Viburnum</i>	None available

* NATIVE TO PENNSYLVANIA

MEADOW PLANTS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
BETULA POPULIFOLIA *	<i>Gray Birch</i>	None available
CELTIS OCCIDENTALIS *	<i>Common Hackberry</i>	"Prairie Pride, Magnifica"
CRATAEGUS CRUSGALLI *	<i>Cockspur Hawthorn</i>	"Inermis"
CRATAEGUS PHAENOPYRUM	<i>Washington Hawthorn</i>	"Clarke, Fastigiata, Princeton Sentry"
CRATAEGUS VIRIDIS	<i>Green Hawthorn</i>	"Winter King"
HYPERICUM PROLIFICUM *	<i>Shrubby St. Johnswort</i>	None available
JUNIPERUS COMMUNIS *	<i>Common Juniper</i>	"Compressa, Hibernica" many others
JUNIPERUS VIRGINIANA *	<i>Eastern Red Cedar</i>	"Staver"
MALUS SPP. *	<i>Crabapple</i>	"Coralburst, Donald Wyman, Dolgo, Harvest Gold, Prairifire, Naragansett, Red Jade, Red Jewel, Strawberry Parfait, Sugartyme, Tina"
QUERCUS ALBA *	<i>White Oak</i>	None available
QUERCUS COCCINEA *	<i>Scarlet Oak</i>	None available
QUERCUS IMBRICARIA *	<i>Shingle Oak</i>	None available
QUERCUS RUBRA*	<i>Northern Red Oak</i>	None available
RHUS AROMATICA *	<i>Fragrant Sumac</i>	None available
RHUS COPALLINA *	<i>Flameleaf Sumac</i>	None available
RHUS GLABRA *	<i>Smooth Sumac</i>	None available
RHUS TYPHINA *	<i>Staghorn Sumac</i>	None available
SASSAFRAS ALBIDUM *	<i>Common Sassafras</i>	None available
SYMPHORICARPOS ORBICULATUS *	<i>Indiancurrant Coralberry</i>	None available
VACCINIUM CORYMBOSUM *	<i>Highbush Blueberry</i>	Many available
VIBURNUM NUDUM *	<i>Possumhaw Viburnum</i>	None available
VIBURNUM TRILOBUM *	<i>American Cranberrybush</i>	"Andrews, Hahs, Wentworth"

* NATIVE TO PENNSYLVANIA

ORNAMENTAL/FLOWERING PLANTS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
ABELIA X GRANDIFLORA	<i>Glossy Abelia</i>	"Edward Goucher, Francis Mason, Sherwood"
ACER GINNALA	<i>Amur Maple</i>	"Flame"
ACER GRISEUM	<i>Paperbark Maple</i>	None available
ACER PENNSYLVANICUM *	<i>Striped Maple</i>	"Erythrocladum"
ACER SPICATUM *	<i>Mountain Maple</i>	None available
AESCULUS GLABRA *	<i>Ohio Buckeye</i>	None available
AESCULUS PARVIFLORA	<i>Bottlebrush Buckeye</i>	"Serotina, Rogers"
AESCULUS PAVIA	<i>Red Buckeye</i>	"Rubra"
ALNUS GLUTINOSA *	<i>Black Alder</i>	"Pyramidalis"
AMELANCHIER CANADENSIS *	<i>Shadblow Serviceberry</i>	"White Pillar, Autumn Brilliance, Magnificent"
AMELANCHIER LAEVIS *	<i>Alleghany Serviceberry</i>	"Snowcloud"
ARONIA ARBUTIFOLIA *	<i>Red Chokeberry</i>	"Brilliantissima, Erecta"
ARONIA MELANOCARPA *	<i>Black Chokeberry</i>	"Elata, Grandifolia"
ARONIA PRUNIFOLIA *	<i>Purplefruit Chokeberry</i>	None available
BETULA LENTA *	<i>Sweet Birch</i>	None available
BETULA NIGRA *	<i>River Birch</i>	"Heritage"
BETULA POPULIFOLIA *	<i>Gray Birch</i>	None available
BUDDLEIA DAVIDII	<i>Butterfly Bush</i>	"Black Knight, Charming, Dubonnet, Empire Blue, Fascination, Royal Red, White Profusion"
CALLICARPA DICHOTOMA	<i>Purple Beautyberry</i>	None available
CALYCANTHUS FLORIDUS *	<i>Common Sweetshrub</i>	"Ovatus"
CARPINUS CAROLINIANA *	<i>American Hornbeam</i>	None available
CARYA GLABRA *	<i>Pignut Hickory</i>	None available
CARYA OVATA *	<i>Shagbark Hickory</i>	None available
CELTIS OCCIDENTALIS *	<i>Common Hackberry</i>	"Prairie Pride, Magnifica"
CEPHALANTHUS OCCIDENTALIS *	<i>Common Buttonbush</i>	None available
CERCIS CANADENSIS*	<i>Eastern Redbud</i>	"Forest Pansy"
CHIONANTHUS VIRGINICUS *	<i>White Fringetree</i>	None available

* NATIVE TO PENNSYLVANIA

ORNAMENTAL/FLOWERING PLANTS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
CLETHRA ACUMINATA *	<i>Cinnamon Clethra</i>	None available
CLETHRA ALNIFOLIA *	<i>Summersweet Clethra</i>	"Rosea"
CORNUS ALTERNIFOLIA *	<i>Pagoda Dogwood</i>	None available
CORNUS AMOMUM *	<i>Silky Dogwood</i>	None available
CORNUS FLORIDA *	<i>Flowering Dogwood</i>	"Apple Blossom, Cherokee Chief, Cherokee Princess, Cloud Nine, White Cloud"
CORNUS KOUSA	<i>Kousa Dogwood</i>	"Milky Way, Summer Stars, Steeple, Aurora, Constellation, Celestial, Ruth Ellen, Stellar Pink"
CORNUS MAS	<i>Cornellancherry Dogwood</i>	"Flava, Golden Glory"
CORNUS RACEMOSA *	<i>Gray Dogwood</i>	None available
CORNUS SERICEA*	<i>Redosier Dogwood</i>	"Flaviramea, Kelseyi"
ELAEAGNUS ANGUSTIFOLIA	<i>Russian-olive</i>	None available
EUONYMUS ALATUS	<i>Burning Bush</i>	"Compactus"
FORSYTHIA X INTERMEDIA	<i>Forsythia</i>	"Beatrix Farrand, Lynwood Gold, Spectabilis, Spring Glory"
FOTHERGILLA GARDENII	<i>Dwarf Fothergilla</i>	None available
FOTHERGILLA MAJOR	<i>Large Fothergilla</i>	None available
FRANKLINIA ALATAMAHA	<i>Franklinia</i>	None available
GYMNOCLADUS DIOICUS *	<i>Kentucky Coffeetree</i>	None available
HALESIA CAROLINA	<i>Carolina Silverbell</i>	None available
HAMAMELIS VERNALIS	<i>Vernal Witchhazel</i>	"Orange Glow, Rubra"
HAMAMELIS VIRGINIANA *	<i>Common Witchhazel</i>	None available
HAMAMELIS X INTERMEDIA	<i>Chinese Witchhazel</i>	"Arnold Promise, Diana, Jelena, Moonlight, Ruby Glow"
HYDRANGEA ARBORESCENS *	<i>Smooth Hydrangea</i>	"Grandiflora, Annabelle"
HYDRANGEA QUERCIFOLIA	<i>Oakleaf Hydrangea</i>	"Snowflake, Snow Queen"
HYPERICUM PROLIFICUM *	<i>Shrubby St. Johnswort</i>	None available
ILEX DECIDUA	<i>Possumhaw</i>	"Warren's Red"
ILEX VERTICILLATA *	<i>Winterberry</i>	"Winter Red, Harvest Red, Raritan Chief, Sparkleberry"

* NATIVE TO PENNSYLVANIA

ORNAMENTAL/FLOWERING PLANTS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
ITEA VIRGINICA *	<i>Virginia Sweetspire</i>	"Henry's Garnet"
LINDERA BENZOIN *	<i>Common Spicebush</i>	"Rubra"
LIRIODENDRON TULIPIFERA*	<i>Tulip Poplar</i>	None available
MAGNOLIA ACUMINATA *	<i>Cucumbertree Magnolia</i>	None available
MAGNOLIA STELLATA	<i>Star Magnolia</i>	"Centennial, Rosea, Royal Star, Waterlily"
MAGNOLIA VIRGINIANA	<i>Sweetbay Magnolia</i>	"Henry Hicks"
MAGNOLIA X SOULANGIANA	<i>Saucer Magnolia</i>	"Alexandrina"
MALUS SPP. *	<i>Crabapple</i>	"Coralburst, Donald Wyman, Dolgo, Harvest Gold, Prairifire, Naragansett, Red Jade, Red Jewel, Strawberry Parfait, Sugartyme, Tina"
OXYDENDRUM ARBOREUM *	<i>Sourwood</i>	None available
PARROTIA PERSICA	<i>Parrotia</i>	None available
PHELLODENDRON AMURENSE	<i>Amur Corktree</i>	"Shademaster"
PHILADELPHUS CORONARIUS	<i>Sweet Mockorange</i>	"Belle Etoile' Mont Blanc"
PRUNUS VIRGINIANA *	<i>Common Chokecherry</i>	"Shubert"
RHODODENDRON ARBORESCENS *	<i>Sweet Azalea</i>	"Rubescens"
RHODODENDRON CALENDULACEUM*	<i>Flame Azalea</i>	None available
RHODODENDRON NUDIFLORUM*	<i>Pinkshell Azalea</i>	"Roseum"
RHODODENDRON ROSEUM *	<i>Roseshell Azalea</i>	None available
RHODODENDRON VASEYI	<i>Pinkshell Azalea</i>	None available
RHODODENDRON VISCOSUM	<i>Swamp Azalea</i>	None available
RHUS AROMATICA *	<i>Fragrant Sumac</i>	None available
RHUS COPALLINA *	<i>Flameleaf Sumac</i>	None available
RHUS GLABRA *	<i>Smooth Sumac</i>	None available
RHUS TYPHINA *	<i>Staghorn Sumac</i>	None available
ROSA RUGOSA	<i>Rugosa Rose</i>	Many available
SALIX GRACILISTYLA	<i>Rosegold Pussy Willow</i>	None available
SAMBUCUS CANADENSIS *	<i>American Elder</i>	"Aurea, Rubra"

* NATIVE TO PENNSYLVANIA

ORNAMENTAL/FLOWERING PLANTS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
SASSAFRAS ALBIDUM *	<i>Common Sassafras</i>	None available
SORBUS ALNIFOLIA	<i>Korean Mountainash</i>	"Redbird"
STAPHYLEA TRIFOLIA *	<i>American Bladdernut</i>	None available
STEWARTIA OVATA	<i>Mountain Stewartia</i>	"Grandiflora"
STEWARTIA PSEUDOCAMELLIA	<i>Japanese Stewartia</i>	None available
STYRAX JAPONICUS	<i>Japanese Snowbell</i>	None available
SYMPHORICARPOS ALBUS *	<i>Common Snowberry</i>	"Laevigatus, Mother of Pearl"
SYMPHORICARPOS ORBICULATUS *	<i>Indiancurrant Coralberry</i>	None available
SYRINGA	<i>Lilac</i>	Many available
VACCINIUM CORYMBOSUM *	<i>Highbush Blueberry</i>	Many available
VIBURNUM ACERIFOLIUM *	<i>Mapleleaf Viburnum</i>	None available
VIBURNUM ALNIFOLIUM *	<i>Hobblebush</i>	"Pracox"
VIBURNUM CARLESI	<i>Koreanspice Viburnum</i>	"Cayuga, Compactum"
VIBURNUM CASSINOIDES *	<i>Witherod Viburnum</i>	None available
VIBURNUM DENTATUM *	<i>Arrowwood Viburnum</i>	None available
VIBURNUM DILATATUM	<i>Linden Viburnum</i>	"Catskill, Erie, Iroquois, Onieda"
VIBURNUM LENTAGO*	<i>Nannyberry</i>	"Pink Beauty" Very durable.
VIBURNUM NUDUM *	<i>Possumhaw Viburnum</i>	None available
VIBURNUM PLICATUM TOMENTOSUM	<i>Doublefile Viburnum</i>	"Mariesii, Shasta"
VIBURNUM PRUNIFOLIUM*	<i>Blackhaw Viburnum</i>	None available
VIBURNUM SETIGERUM	<i>Tea Viburnum</i>	None available
VIBURNUM SIEBOLDI	<i>Siebold Viburnum</i>	"Seneca" and others.
VIBURNUM TRILOBUM *	<i>American Cranberrybush</i>	"Andrews, Hahs, Wentworth"
VIBURNUM X BURKWOODII	<i>Burkwood Viburnum</i>	"Mohawk" and others

* NATIVE TO PENNSYLVANIA

APPENDIX 9 - Plant List
STREET TREES

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
ACER CAMPESTRE	<i>Hedge Maple</i>	"Fastigiatum, Postelense, Schwerinii"
ACER RUBRUM *	<i>Red Maple</i>	"Armstrong, Bowhall, Northwood, October Glory, Red Sunset"
ACER SACCHARUM *	<i>Sugar Maple</i>	"Bonfire, Columnare, Goldspire, Green Mountain, Legacy"
CARPINUS BETULUS	<i>European Hornbeam</i>	"Fastigiata"
CERCIDIPHYLLUM JAPONICUM	<i>Katsuratree</i>	None available
CLADRASTIS LUTEA	<i>American Yellowwood</i>	"Rosea, Sweetshade"
COTINUS OBOVATUS	<i>American Smoketree</i>	None available
CRATAEGUS CRUSGALLI *	<i>Cockspur Hawthorn</i>	"Inermis"
CRATAEGUS PHAENOPYRUM	<i>Washington Hawthorn</i>	"Clarke, Fastigiata, Princeton Sentry"
CRATAEGUS VIRIDIS	<i>Green Hawthorn</i>	"Winter King"
FAGUS GRANDIFOLIA *	<i>American Beech</i>	None available
FRAXINUS AMERICANA *	<i>White Ash</i>	"Autumn Applause, Autumn Purple, Greenspire, Rosehill, Royal Purple, Skyline"
FRAXINUS PENNSYLVANICA *	<i>Green Ash</i>	"Kindred, Newport, Patmore, Summit, Moraine, Raywood"
GINKGO BILOBA (MALE ONLY)	<i>Ginkgo</i>	"Autumn Gold, Magyar, Princeton Sentry"
GLEDITSIA TRIACANTHOS INERMIS *	<i>Thornless Honeylocust</i>	"Halka, Shademaster, Skycole, Rubylace"
HALESIA MONTICOLA	<i>Mountain Silverbell</i>	None available
KOELREUTERIA PANICULATA	<i>Golden Raintree</i>	"September"
LIQUIDAMBAR STYRACIFLUA *	<i>American Sweetgum</i>	"Burgandy, Moraine, Rotundifolia" (sets no fruit)
OSTRYA VIRGINIANA *	<i>American Hophornbeam</i>	None available
PLATANUS X ACERIFOLIA	<i>London Planetree</i>	"Bloodgood"
PRUNUS SARGENTII	<i>Sargent Cherry</i>	"Columnaris"
PRUNUS X "OKAME"	<i>Okame Cherry</i>	
QUERCUS ACUTISSIMA	<i>Sawtooth Oak</i>	"Gobbler"
QUERCUS ALBA *	<i>White Oak</i>	None available
QUERCUS BICOLOR *	<i>Swamp White Oak</i>	None available
QUERCUS CERRIS	<i>Turkey Oak</i>	None available

* NATIVE TO PENNSYLVANIA

BUFFER PLANTS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
CARYA OVATA *	<i>Shagbark Hickory</i>	None available
CELTIS OCCIDENTALIS *	<i>Common Hackberry</i>	"Prairie Pride, Magnifica"
CEPHALANTHUS OCCIDENTALIS *	<i>Common Buttonbush</i>	None available
CERCIDIPHYLLUM JAPONICUM	<i>Katsuratree</i>	None available
CERCIS CANADENSIS*	<i>Eastern Redbud</i>	"Forest Pansy"
CHIONANTHUS VIRGINICUS *	<i>White Fringetree</i>	None available
CLADRASTIS LUTEA	<i>American Yellowwood</i>	"Rosea, Sweetshade"
CLETHRA ACUMINATA *	<i>Cinnamon Clethra</i>	None available
CLETHRA ALNIFOLIA *	<i>Summersweet Clethra</i>	"Rosea"
CORNUS ALTERNIFOLIA *	<i>Pagoda Dogwood</i>	None available
CORNUS AMOMUM *	<i>Silky Dogwood</i>	None available
CORNUS FLORIDA *	<i>Flowering Dogwood</i>	"Apple Blossom, Cherokee Chief, Cherokee Princess, Cloud Nine, White Cloud"
CORNUS KOUSA	<i>Kousa Dogwood</i>	"Milky Way, Summer Stars, Steeple, Aurora, Constellation, Celestial, Ruth Ellen, Stellar Pink"
CORNUS MAS	<i>Corneliancherry Dogwood</i>	"Flava, Golden Glory"
CORNUS RACEMOSA *	<i>Gray Dogwood</i>	None available
CORNUS SERICEA*	<i>Redosier Dogwood</i>	"Flaviramea, Kelseyi"
COTINUS OBOVATUS	<i>American Smoketree</i>	None available
CRATAEGUS CRUSGALLI *	<i>Cockspur Hawthorn</i>	"Inermis"
CRATAEGUS PHAENOPYRUM	<i>Washington Hawthorn</i>	"Clarke, Fastigiata, Princeton Sentry"
CRATAEGUS VIRIDIS	<i>Green Hawthorn</i>	"Winter King"
CRYPTOMERIA JAPONICA	<i>Cryptomeria</i>	"Lobbii"
CUPRESSOCYPARIS LEYLANDI	<i>Leyland Cypress</i>	None available
ELAEAGNUS ANGUSTIFOLIA	<i>Russian-olive</i>	None available
EUONYMUS ALATUS	<i>Burning Bush</i>	"Compactus"
FAGUS GRANDIFOLIA *	<i>American Beech</i>	None available
FORSYTHIA X INTERMEDIA	<i>Forsythia</i>	"Beatrix Farrand, Lynwood Gold, Spectabilis, Spring Glory"

* NATIVE TO PENNSYLVANIA

BUFFER PLANTS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
FOTHERGILLA GARDENII	<i>Dwarf Fothergilla</i>	None available
FOTHERGILLA MAJOR	<i>Large Fothergilla</i>	None available
FRANKLINIA ALATAMAHA	<i>Franklinia</i>	None available
FRAXINUS AMERICANA *	<i>White Ash</i>	"Autumn Applause, Autumn Purple, Greenspire, Rosehill, Royal Purple, Skyline"
FRAXINUS PENNSYLVANICA *	<i>Green Ash</i>	"Kindred, Newport, Patmore, Summit, Moraine, Raywood"
GINKGO BILOBA (MALE ONLY)	<i>Ginkgo</i>	"Autumn Gold, Magyar, Princeton Sentry"
GLEDITSIA TRIACANTHOS INERMIS *	<i>Thornless Honeylocust</i>	"Halka, Shademaster, Skycole, Rubylace"
GYMNOCLADUS DIOICUS *	<i>Kentucky Coffeetree</i>	None available
HALESIA CAROLINA	<i>Carolina Silverbell</i>	None available
HALESIA MONTICOLA	<i>Mountain Silverbell</i>	None available
HAMAMELIS VERNALIS	<i>Vernal Witchhazel</i>	"Orange Glow, Rubra"
HAMAMELIS VIRGINIANA *	<i>Common Witchhazel</i>	None available
HAMAMELIS X INTERMEDIA	<i>Chinese Witchhazel</i>	"Arnold Promise, Diana, Jelena, Moonlight, Ruby Glow"
HYDRANGEA ARBORESCENS *	<i>Smooth Hydrangea</i>	"Grandiflora, Annabelle"
HYDRANGEA QUERCIFOLIA	<i>Oakleaf Hydrangea</i>	"Snowflake, Snow Queen"
HYPERICUM PROLIFICUM *	<i>Shrubby St. Johnswort</i>	None available
ILEX DECIDUA	<i>Possumhaw</i>	"Warren's Red"
ILEX FOSTERI	<i>Foster Holly</i>	None available
ILEX GLABRA *	<i>Inkberry</i>	"Compacta, Viridis, Nigra"
ILEX OPACA *	<i>American Holly</i>	"Jersey Knight, Jersey Princess, Old Heavy Berry"
ILEX PEDUNCULOSA	<i>Longstalk Holly</i>	None available
ILEX VERTICILLATA *	<i>Winterberry</i>	"Winter Red, Harvest Red, Raritan Chief, Sparkleberry"
ILEX X MESERVEAE	<i>Meserve Holly</i>	"Blue Girl, Blue Angel, Blue Prince, Blue Princess, China Boy, China Girl"
ITEA VIRGINICA *	<i>Virginia Sweetshrub</i>	"Henry's Garnet"
JUNIPERUS COMMUNIS *	<i>Common Juniper</i>	"Compressa, Hibernica" many others

* NATIVE TO PENNSYLVANIA

BUFFER PLANTS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
JUNIPERUS HORIZONTALIS *	<i>Creeping Juniper</i>	"Douglasi, Emerald Spreader, Grey Carpet, Hughes, Plumosa, Winter Blue" others
JUNIPERUS VIRGINIANA *	<i>Eastern Red Cedar</i>	"Staver"
KOELREUTERIA PANICULATA	<i>Golden Raintree</i>	"September"
LARIX LARICINA *	<i>Eastern Larch</i>	None available
LEUCOTHOE CATESBAEI	<i>Drooping Leucothoe</i>	"Girard's Rainbow, Nana, Scarletta"
LINDERA BENZOIN *	<i>Common Spicebush</i>	"Rubra"
LIQUIDAMBAR STYRACIFLUA *	<i>American Sweetgum</i>	"Burgandy, Moraine, Rotundifolia" (sets no fruit)
LIRIODENDRON TULIPIFERA *	<i>Tulip Poplar</i>	None available
MAGNOLIA ACUMINATA *	<i>Cucumber tree Magnolia</i>	None available
MAGNOLIA STELLATA	<i>Star Magnolia</i>	"Centennial, Rosea, Royal Star, Waterlily"
MAGNOLIA VIRGINIANA	<i>Sweetbay Magnolia</i>	"Henry Hicks"
MAGNOLIA X SOULANGIANA	<i>Saucer Magnolia</i>	"Alexandrina"
MALUS SPP. *	<i>Crabapple</i>	"Coralburst, Donald Wyman, Dolgo, Harvest Gold, Prairifire, Naragansett, Red Jade, Red Jewel, Strawberry Parfait, Sugartyme, Tina"
METASEQUOIA	<i>Dawn Redwood</i>	None available
MYRICA PENNSYLVANICA *	<i>Northern Bayberry</i>	None available
NANDINA DOMESTICA	<i>Nandina</i>	"Harbor Dwarf, Nana"
NYSSA SYLVATICA *	<i>Black Tupelo</i>	None available
OSTRYA VIRGINIANA *	<i>American Hophornbeam</i>	None available
OXYDENDRUM ARBOREUM *	<i>Sourwood</i>	None available
PARROTIA PERSICA	<i>Parrotia</i>	None available
PHELLODENDRON AMURENSE	<i>Amur Corktree</i>	"Shademaster"
PHILADELPHUS CORONARIUS	<i>Sweet Mockorange</i>	"Belle Etoile' Mont Blanc"
PICEA OMORIKA	<i>Serbian Spruce</i>	None available
PINUS STROBUS *	<i>Eastern White Pine</i>	"Fastigiata" others
PLATANUS X ACERIFOLIA	<i>London Planetree</i>	"Bloodgood"

* NATIVE TO PENNSYLVANIA

BUFFER PLANTS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
PRUNUS SARGENTII	<i>Sargent Cherry</i>	"Columnaris"
PRUNUS VIRGINIANA *	<i>Common Chokecherry</i>	"Shubert"
PRUNUS X "OKAME"	<i>Okame Cherry</i>	
PSEUDOTSUGA MENZIESII	<i>Douglasfir</i>	None available
PYRACANTHA COCCINEA	<i>Firethorn</i>	"Lalandei, Mohave, Navaho, Rutgers, Shawnee"
QUERCUS ACUTISSIMA	<i>Sawtooth Oak</i>	"Gobbler"
QUERCUS ALBA *	<i>White Oak</i>	None available
QUERCUS BICOLOR *	<i>Swamp White Oak</i>	None available
QUERCUS CERRIS	<i>Turkey Oak</i>	None available
QUERCUS COCCINEA *	<i>Scarlet Oak</i>	None available
QUERCUS IMBRICARIA *	<i>Shingle Oak</i>	None available
QUERCUS MACROCARPA *	<i>Bur Oak</i>	None available
QUERCUS PALUSTRIS *	<i>Pin Oak</i>	None available
QUERCUS PHELLOS *	<i>Willow Oak</i>	None available
QUERCUS RUBRA*	<i>Northern Red Oak</i>	None available
RHODODENDRON ARBORESCENS *	<i>Sweet Azalea</i>	"Rubescens"
RHODODENDRON CALENDULACEUM*	<i>Flame Azalea</i>	None available
RHODODENDRON CAROLINIANUM	<i>Carolina Rhododendron</i>	"Album, Luteum"
RHODODENDRON CATAWBIENSE	<i>Catawba Rhododendron</i>	"Cunningham's White, Nova Zembla, Purpureum Elegans, Roseum Elegans"
RHODODENDRON MAXIMUM *	<i>Rosebay Rhododendron</i>	None available
RHODODENDRON NUDIFLORUM*	<i>Pinksterbloom Azalea</i>	"Roseum"
RHODODENDRON ROSEUM *	<i>Roseshell Azalea</i>	None available
RHODODENDRON VASEYI	<i>Pinkshell Azalea</i>	None available
RHODODENDRON VISCOSUM	<i>Swamp Azalea</i>	None available
RHUS AROMATICA *	<i>Fragrant Sumac</i>	None available
RHUS COPALLINA *	<i>Flameleaf Sumac</i>	None available
RHUS GLABRA *	<i>Smooth Sumac</i>	None available

* NATIVE TO PENNSYLVANIA

BUFFER PLANTS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
RHUS TYPHINA *	<i>Staghorn Sumac</i>	None available
ROSA RUGOSA	<i>Rugosa Rose</i>	Many available
SALIX BABYLONICA	<i>Weeping Willow</i>	None available
SALIX GRACILISTYLA	<i>Rosegold Pussy Willow</i>	None available
SAMBUCUS CANADENSIS *	<i>American Elder</i>	"Aurea, Rubra"
SASSAFRAS ALBIDUM *	<i>Common Sassafras</i>	None available
SOPHORA JAPONICA	<i>Scholar Tree</i>	"Princeton Upright, Regent"
SORBUS ALNIFOLIA	<i>Korean Mountainash</i>	"Redbird"
STAPHYLEA TRIFOLIA *	<i>American Bladdernut</i>	None available
STEWARTIA OVATA	<i>Mountain Stewartia</i>	"Grandiflora"
STEWARTIA PSEUDOCAMELLIA	<i>Japanese Stewartia</i>	None available
STYRAX JAPONICUS	<i>Japanese Snowbell</i>	None available
SYMPHORICARPOS ALBUS *	<i>Common Snowberry</i>	"Laevigatus, Mother of Pearl"
SYMPHORICARPOS ORBICULATUS *	<i>Indiancurrant Coralberry</i>	None available
SYRINGA	<i>Lilac</i>	Many available
SYRINGA RETICULATA	<i>Japanese Tree Lilac</i>	"Ivory Silk"
TAXODIUM DISTICHUM	<i>Common Baldcypress</i>	None available
TAXUS CUSPIDATA	<i>Japanese Yew</i>	"Capitata"
THUJA OCCIDENTALIS	<i>Eastern Arborvitae</i>	"Nigra, Smaragd"
TILIA AMERICANA *	<i>American Linden</i>	"Redmond" and others.
TILIA CORDATA	<i>Littleleaf Linden</i>	"Greenspire" and others.
TILIA TOMENTOSA	<i>Silver Linden</i>	"Green Mountain"
ULMUS AMERICANA *	<i>American Elm</i>	"Delaware, Princeton, Washington"
VACCINIUM CORYMBOSUM *	<i>Highbush Blueberry</i>	Many available
VIBURNUM ACERIFOLIUM *	<i>Mapleleaf Viburnum</i>	None available
VIBURNUM ALNIFOLIUM *	<i>Hobblebush</i>	"Pracox"
VIBURNUM CARLESI	<i>Koreanspice Viburnum</i>	"Cayuga, Compactum"
VIBURNUM CASSINOIDES *	<i>Witherod Viburnum</i>	None available
VIBURNUM DENTATUM *	<i>Arrowwood Viburnum</i>	None available

* NATIVE TO PENNSYLVANIA

BUFFER PLANTS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
VIBURNUM DILATATUM	<i>Linden Viburnum</i>	"Catskill, Erie, Iroquois, Onieda"
VIBURNUM LENTAGO*	<i>Nannyberry</i>	"Pink Beauty" Very durable.
VIBURNUM NUDUM *	<i>Possunhaw Viburnum</i>	None available
VIBURNUM PLICATUM TOMENTOSUM	<i>Doublefile Viburnum</i>	"Mariesii, Shasta"
VIBURNUM PRUNIFOLIUM*	<i>Blackhaw Viburnum</i>	None available
VIBURNUM SETIGERUM	<i>Tea Viburnum</i>	None available
VIBURNUM SIEBOLDI	<i>Siebold Viburnum</i>	"Seneca" and others.
VIBURNUM TINUS	<i>Laurustinus</i>	None available
VIBURNUM TRILOBUM *	<i>American Cranberrybush</i>	"Andrews, Hahs, Wentworth"
VIBURNUM X BURKWOODII	<i>Burkwood Viburnum</i>	"Mohawk" and others
VIBURNUM X PRAGENSE	<i>Prague Viburnum</i>	None available
ZELKOVA SERRATA	<i>Zelkova</i>	"Green Vase, Halka, Village Green"

* NATIVE TO PENNSYLVANIA

PLANTS TOLERANT OF WET CONDITIONS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
LARIX LARICINA *	<i>Eastern Larch</i>	None available
LIQUIDAMBAR STYRACIFLUA *	<i>American Sweetgum</i>	"Burgandy, Moraine, Rotundifolia" (sets no fruit)
MAGNOLIA VIRGINIANA	<i>Sweetbay Magnolia</i>	"Henry Hicks"
METASEQUOIA	<i>Dawn Redwood</i>	None available
MYRICA PENNSYLVANICA *	<i>Northern Bayberry</i>	None available
NYSSA SYLVATICA *	<i>Black Tupelo</i>	None available
OSTRYA VIRGINIANA *	<i>American Hophornbeam</i>	None available
PLATANUS X ACERIFOLIA	<i>London Planetree</i>	"Bloodgood"
QUERCUS BICOLOR *	<i>Swamp White Oak</i>	None available
QUERCUS IMBRICARIA *	<i>Shingle Oak</i>	None available
QUERCUS MACROCARPA *	<i>Bur Oak</i>	None available
QUERCUS PALUSTRIS *	<i>Pin Oak</i>	None available
QUERCUS PHELLOS *	<i>Willow Oak</i>	None available
RHODODENDRON ARBORESCENS *	<i>Sweet Azalea</i>	"Rubescens"
RHODODENDRON VASEYI	<i>Pinkshell Azalea</i>	None available
RHODODENDRON VISCOSUM	<i>Swamp Azalea</i>	None available
SALIX BABYLONICA	<i>Weeping Willow</i>	None available
SALIX GRACILISTYLA	<i>Rosegold Pussy Willow</i>	None available
TAXODIUM DISTICHUM	<i>Common Baldcypress</i>	None available
THUJA OCCIDENTALIS	<i>Eastern Arborvitae</i>	"Nigra, Smaragd"
VIBURNUM CASSINOIDES *	<i>Witherod Viburnum</i>	None available
VIBURNUM DENTATUM *	<i>Arrowwood Viburnum</i>	None available
VIBURNUM NUDUM *	<i>Possumhaw Viburnum</i>	None available
VIBURNUM TRILOBUM *	<i>American Cranberrybush</i>	"Andrews, Hahs, Wentworth"

* NATIVE TO PENNSYLVANIA

HEDGEROW PLANTS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
FRAXINUS AMERICANA *	<i>White Ash</i>	"Autumn Applause, Autumn Purple, Greenspire, Rosehill, Royal Purple, Skyline"
HAMAMELIS VERNALIS	<i>Vernal Witchhazel</i>	"Orange Glow, Rubra"
HAMAMELIS X INTERMEDIA	<i>Chinese Witchhazel</i>	"Arnold Promise, Diana, Jelena, Moonlight, Ruby Glow"
HYDRANGEA ARBORESCENS *	<i>Smooth Hydrangea</i>	"Grandiflora, Annabelle"
HYPERICUM PROLIFICUM *	<i>Shrubby St. Johnswort</i>	None available
ILEX GLABRA *	<i>Inkberry</i>	"Compacta, Viridis, Nigra"
ILEX OPACA *	<i>American Holly</i>	"Jersey Knight, Jersey Princess, Old Heavy Berry"
ILEX VERTICILLATA *	<i>Winterberry</i>	"Winter Red, Harvest Red, Raritan Chief, Sparkleberry"
JUNIPERUS VIRGINIANA *	<i>Eastern Red Cedar</i>	"Staver"
LINDERA BENZOIN *	<i>Common Spicebush</i>	"Rubra"
LIRIODENDRON TULIPIFERA*	<i>Tulip Poplar</i>	None available
MALUS SPP. *	<i>Crabapple</i>	"Coralburst, Donald Wyman, Dolgo, Harvest Gold, Prairifire, Naragansett, Red Jade, Red Jewel, Strawberry Parfait, Sugartyme, Tina"
MYRICA PENNSYLVANICA *	<i>Northern Bayberry</i>	None available
NYSSA SYLVATICA *	<i>Black Tupelo</i>	None available
PHILADELPHUS CORONARIUS	<i>Sweet Mockorange</i>	"Belle Etoile' Mont Blanc"
PINUS STROBUS *	<i>Eastern White Pine</i>	"Fastigiata" others
PRUNUS SARGENTII	<i>Sargent Cherry</i>	"Columnaris"
PRUNUS VIRGINIANA *	<i>Common Chokecherry</i>	"Shubert"
PRUNUS X "OKAME"	<i>Okame Cherry</i>	
PYRACANTHA COCCINEA	<i>Firethorn</i>	"Lalandei, Mohave, Navaho, Rutgers, Shawnee"
QUERCUS ALBA *	<i>White Oak</i>	None available
QUERCUS COCCINEA *	<i>Scarlet Oak</i>	None available
QUERCUS IMBRICARIA *	<i>Shingle Oak</i>	None available
QUERCUS RUBRA*	<i>Northern Red Oak</i>	None available

* NATIVE TO PENNSYLVANIA

HEDGEROW PLANTS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
ACER CAMPESTRE	<i>Hedge Maple</i>	"Fastigiatum, Postelense, Schwerinii"
ACER GINNALA	<i>Amur Maple</i>	"Flame"
ACER PENNSYLVANICUM *	<i>Striped Maple</i>	"Erythrocladum"
ACER SPICATUM *	<i>Mountain Maple</i>	None available
AESCULUS PAVIA	<i>Red Buckeye</i>	"Rubra"
AMELANCHIER CANADENSIS *	<i>Shadblow Serviceberry</i>	"White Pillar, Autumn Brilliance, Magnificent"
AMELANCHIER LAEVIS *	<i>Allegheny Serviceberry</i>	"Snowcloud"
ARONIA ARBUTIFOLIA *	<i>Red Chokeberry</i>	"Brilliantissima, Erecta"
ARONIA MELANOCARPA *	<i>Black Chokeberry</i>	"Elata, Grandifolia"
BETULA LENTA *	<i>Sweet Birch</i>	None available
CARYA GLABRA *	<i>Pignut Hickory</i>	None available
CARYA OVATA *	<i>Shagbark Hickory</i>	None available
CERCIS CANADENSIS*	<i>Eastern Redbud</i>	"Forest Pansy"
CLETHRA ALNIFOLIA *	<i>Summersweet Clethra</i>	"Rosea"
CORNUS ALTERNIFOLIA *	<i>Pagoda Dogwood</i>	None available
CORNUS FLORIDA *	<i>Flowering Dogwood</i>	"Apple Blossom, Cherokee Chief, Cherokee Princess, Cloud Nine, White Cloud"
CORNUS KOUSA	<i>Kousa Dogwood</i>	"Milky Way, Summer Stars, Steeple, Aurora, Constellation, Celestial, Ruth Ellen, Stellar Pink"
CORNUS MAS	<i>Corneliancherry Dogwood</i>	"Flava, Golden Glory"
CORNUS RACEMOSA *	<i>Gray Dogwood</i>	None available
CORNUS SERICEA*	<i>Redosier Dogwood</i>	"Flaviramea, Kelseyi"
COTINUS OBOVATUS	<i>American Smoketree</i>	None available
CRATAEGUS CRUSGALLI *	<i>Cockspur Hawthorn</i>	"Inermis"
CRATAEGUS PHAENOPYRUM	<i>Washington Hawthorn</i>	"Clarke, Fastigiata, Princeton Sentry"
CRATAEGUS VIRIDIS	<i>Green Hawthorn</i>	"Winter King"
ELAEAGNUS ANGUSTIFOLIA	<i>Russian-olive</i>	None available
FORSYTHIA X INTERMEDIA	<i>Forsythia</i>	"Beatrix Farrand, Lynwood Gold, Spectabilis, Spring Glory"

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HEDGEROW PLANTS

BOTANICAL NAME	COMMON NAME	RECOMMENDED CULTIVARS
RHODODENDRON ARBORESCENS *	<i>Sweet Azalea</i>	"Rubescens"
RHODODENDRON CAROLINIANUM	<i>Carolina Rhododendron</i>	"Album, Luteum"
RHODODENDRON NUDIFLORUM*	<i>Pinxterbloom Azalea</i>	"Roseum"
RHUS AROMATICA *	<i>Fragrant Sumac</i>	None available
RHUS COPALLINA *	<i>Flameleaf Sumac</i>	None available
RHUS GLABRA *	<i>Smooth Sumac</i>	None available
RHUS TYPHINA *	<i>Staghorn Sumac</i>	None available
ROSA RUGOSA	<i>Rugosa Rose</i>	Many available
SALIX GRACILISTYLA	<i>Rosegold Pussy Willow</i>	None available
SAMBUCUS CANADENSIS *	<i>American Elder</i>	"Aurea, Rubra"
SASSAFRAS ALBIDUM *	<i>Common Sassafras</i>	None available
SORBUS ALNIFOLIA	<i>Korean Mountainash</i>	"Redbird"
SYMPHORICARPOS ORBICULATUS *	<i>Indiancurrant Coralberry</i>	None available
SYRINGA	<i>Lilac</i>	Many available
THUJA OCCIDENTALIS	<i>Eastern Arborvitae</i>	"Nigra, Smaragd"
TILIA TOMENTOSA	<i>Silver Linden</i>	"Green Mountain"
VACCINIUM CORYMBOSUM *	<i>Highbush Blueberry</i>	Many available
VIBURNUM ACERIFOLIUM *	<i>Mapleleaf Viburnum</i>	None available
VIBURNUM CASSINOIDES *	<i>Witherod Viburnum</i>	None available
VIBURNUM DENTATUM *	<i>Arrowwood Viburnum</i>	None available
VIBURNUM LENTAGO*	<i>Nannyberry</i>	"Pink Beauty" Very durable.
VIBURNUM PRUNIFOLIUM*	<i>Blackhaw Viburnum</i>	None available
VIBURNUM TINUS	<i>Laurustinus</i>	None available
VIBURNUM TRILOBUM *	<i>American Cranberrybush</i>	"Andrews, Hahs, Wentworth"
VIBURNUM X BURKWOODII	<i>Burkwood Viburnum</i>	"Mohawk" and others
VIBURNUM X PRAGENSE	<i>Prague Viburnum</i>	None available

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PENNSYLVANIA SHORT GRASS MEADOW MIX

Grasses

BOUTELOUA CURTIPENDULA--Side-oats Grama	68 oz.
SCHIZACHRIUM SCOPARIUM--Little Bluestem	68 oz.
SPOROBOLUS HETEROLEPIS--Northern Dropseed	8 oz.

Forbs

ALLIUM CERNUUM-Nodding Onion	6 oz.
ANEMONE CYLINDRICA-Thimble Weed	2 oz.
ASCLEPIAS TUBEROSA-Butterfly Weed	7 oz.
ASTRAGALUS CANADENSIS-Canadian Milk Vetch	0.5 oz.
BAPTISIA AUSTRALIS-Blue Wild Indigo	0.5 oz.
EUPHORBIA COROLLATA-Flowering Spurge	1 oz.
HELIANTHUS OCCIDENTALIS-Western Sunflower	0.5 oz.
LESPEDEZA CAPITATA-Round-headed Bush Clover	4 oz.
LIATRIS SPICATA-Dense Blazing Star	5 oz.
MONARDA FISTULOSA-Wild Bergamont	3 oz.
PARTHENIUM INTEGRIFOLIUM-Wild Quinine	3 oz.
PENSTEMON DIGITALIS-Foxglove Beardtongue	2 oz.
PYCNANTHEMUM VIRGINIANUM-Mountain Mint	0.5 oz.
RUDBECKIA HIRTA-Black-eyed Susan	3 oz.
RUDBECKIA TRILOBA-Thin-leaved Coneflower	4 oz.
TRADESCANTIA OHIOENSIS-Ohio Spiderwort	2 oz.
ZIZIA AUREA-Golden Alexanders	4 oz.

Cover Crop (Recommended)

OATS	20 lb. per acre
ANNUAL RYEGRASS	5 lb. per acre

Recommended Mix

9 lb. per acre grasses

3 lb. per acre forbs

12 lb. Total per acre

RETENTION BASIN SEEDING LOW MAINTENANCE GRASS-LIKE MIX

AGROSTIS ALBA-Red Top	20%
AGROSTIS STOLONIFERA-Creeping Bentgrass	20%
CAREX VULPINOIDEA-Fox Sedge	20%
POA PALUSTRIS-Fowl Meadow Grass	20%
PUCCINELLIA DISTANS-Alkali Bulrush	20%

RETENTION BASIN SEEDING FOR WILDLIFE AND PLANT DIVERSITY

AGROSTIS STOLONIFERA-Creeping Bentgrass	25%
ALOPECURUS PRATENSIS-Meadow Foxtail	25%
BIDENS CERNUA-Nodding Bur-Marigold	5%
ELYMUS VIRGINICUS-Virginia Wild Rye	25%
LEERSIA ORYZOIDES-Rice Cut-Grass	10%
SCIRPUS CYPERINUS-Wool Grass	1%
SCIRPUS MICROCARPUS-Small Seeded Bulrush	1%
SCIRPUS POLYPHYLLUS-Many-Leaved Bulrush	1%
SPARGANIUM AMERICANUM-Lesser Bur-Reed	4%
VERBENA HASTATA-Blue Vervain	3%

Recommended Application:

Seed at 10 lbs. per acre

Seed annual rye grass as a companion crop and erosion control at 10 lbs. per acre

NATIVE WILDFLOWERS/GRASSES

<u>BOTANICAL NAME</u>	<u>COMMON NAME</u>
Achillea varieties	<i>Yarrow</i>
Acorus calamus	<i>Sweet Flag</i>
Andropogon varieties	<i>Bluestem Grass</i>
Angelica atropurpurea	<i>Purplestem Angelica</i>
Aquilegia canadensis	<i>Wild Columbine</i>
Asclepias tuberosa	<i>Butterfly Weed</i>
Aster varieties	<i>Aster</i>
Baptisia varieties	<i>False Indigo</i>
Bidens varieties	<i>Beggarticks</i>
Boltonia asteroides	<i>Marsh Boltonia</i>
Bouteloua curtipendula	<i>Side Oats Grama</i>
Calamagrostis varieties	<i>Reedgrass</i>
Caltha palustris	<i>Marsh Marigold</i>
Campanula varieties	<i>Bellflower</i>
Carex varieties	<i>Sedge</i>
Chasmanthium latifolium	<i>Wild Oats</i>
Chelone glabra	<i>White Turtlehead</i>
Chrysanthemum leucanthemum	<i>Ox-Eye Daisy</i>
Coreopsis varieties	<i>Coreopsis</i>
Cosmos bipinnatus	<i>Cosmos</i>
Echinacea purpurea	<i>Purple Coneflower</i>
Elymus canadensis	<i>Canada Wild Rye</i>
Erigeron varieties	<i>Fleabane</i>
Eupatorium varieties	<i>Joe-Pye Weed</i>
Festuca elatior	<i>Meadow Fescue</i>
Filipendula rubra	<i>Queen of the Prarie</i>
Gallardia varieties	<i>Indian Blanketflower</i>
Helenium autumnale	<i>Sneezeweed</i>

NATIVE WILDFLOWERS/GRASSES

<u>BOTANICAL NAME</u>	<u>COMMON NAME</u>
Hemerocallis fulva	<i>Common Daylily</i>
Hesperis matralis	<i>Dame's Rocket</i>
Hypericum varieties	<i>St. Johnswort</i>
Iris cristata	<i>Dwarf Crested Iris</i>
Iris versicolor	<i>Large Blue Flag</i>
Jeffersonia diphylla	<i>Twinleaf</i>
Liatris spicata	<i>Gayfeather</i>
Lilium canadense	<i>Canada Lily</i>
Linum varieties	<i>Flax</i>
Lobelia varieties	<i>Lobelia</i>
Lysimachia varieties	<i>Loosestrife</i>
Matricaria varieties	<i>Chamomile</i>
Mitchella repens	<i>Partridge Berry</i>
Monarda fistulosa	<i>Bergamont</i>
Myosotis varieties	<i>Forget-Me-Not</i>
Oenothera varieties	<i>Evening Primrose</i>
Panicum virgatum	<i>Switchgrass</i>
Penstemon varieties	<i>Beardtongue</i>
Phlox varieties	<i>Phlox</i>
Poa varieties	<i>Bluegrass</i>
Ranunculus varieties	<i>Buttercup</i>
Rudbeckia hirta	<i>Black-Eyed Susan</i>
Senecio varieties	<i>Groundsel</i>
Silene virginica	<i>Fire Pink</i>
Smilacina	<i>Solomon's Seal</i>
Solidago varieties	<i>Goldenrod</i>
Thalictrum varieties	<i>Meadowrue</i>
Tiarella cordifolia	<i>Foamflower</i>

NATIVE WILDFLOWERS/GRASSES

<u>BOTANICAL NAME</u>	<u>COMMON NAME</u>
Trifolium varieties	<i>Clover</i>
Trillium varieties	<i>Trillium</i>
Veronica varieties	<i>Speedwell</i>
Viola varieties	<i>Violet</i>

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	ABELIA X GRANDIFLORA
Common Name	Glossy Abelia
Recommended Cultivars	'Edward Goucher, Francis Mason, Sherwood'
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	3-6'
Mature Width	3-6'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input checked="" type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White; May thru frost; achene
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge/row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 3" caliper <input type="checkbox"/> 8"-10" height <input checked="" type="checkbox"/> 3" height
Comments	The hardiest and most free-flowering of the Abelias.

Botanical Name	ACER CAMPESTRE
Common Name	Hedge Maple
Recommended Cultivars	'Fastigiatum, Postelense, Schyerhijl'
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	25-35'
Mature Width	25-35'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Samarra
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedge/row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 3" caliper <input type="checkbox"/> 8"-10" height <input type="checkbox"/> 3" height
Comments	Excellent small lawn specimen and street tree; good under utility lines because of low height; can be effectively pruned into hedges; Good on dry, alkaline soils. Fine-textured foliage.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	AGER GINNALEA
Common Name	Amar Maple
Recommended Cultivars	Flame
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	15-18'
Mature Width	15-20'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Samara
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input checked="" type="checkbox"/> 8" caliper <input type="checkbox"/> 10" height <input type="checkbox"/> 3" height
Comments	Yellow to red Fall color, very easy to transplant, adaptable to wide range of soils, excellent for massing.

Botanical Name	ACER GRISEUM
Common Name	Paperbark Maple
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-30'
Mature Width	20-30'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Samara
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input checked="" type="checkbox"/> 8" caliper <input type="checkbox"/> 10" height <input type="checkbox"/> 3" height
Comments	Beautiful cinnamon or red-brown exfoliating bark; excellent red Fall color. Transplants best in Spring.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALLIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	ACER PENNSYLVANICUM
Common Name	Striped Maple
Recommended Cultivars	"Erythrocladum"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	35-50'
Mature Width	10-35'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	Samara
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input type="checkbox"/> Commercial Nursery <input checked="" type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" - 3" caliper <input checked="" type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3" height
Comments	Best used for naturalizing purposes; prefers part shade, well-drained, cool, moist, slightly acidic soil.

Botanical Name	ACER RUBRUM
Common Name	Red Maple
Recommended Cultivars	"Armstrong, Bowhall, Northwood, October Glory, Red Sunset"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	75-100'
Mature Width	50-75'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Red-March, April; Samara
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input checked="" type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3" height
Comments	Transplants best in Spring. Brilliant Fall coloring.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2" - 3 INCHES ● ORNAMENTAL/FLowering /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	ACER SACCHARUM
Common Name	Sugar Maple
Recommended Cultivars	Bonfire, Colonnare, Goldspire, Green Mountain, Legacy
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	75-100'
Mature Width	50-75'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	Samaras
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3" height
Comments	Does not perform well in restricted or compacted situations; susceptible to salt. Rich fall color.

Botanical Name	ACER SPICATUM
Common Name	Mountain Maple
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-35'
Mature Width	20-35'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	Greenish yellow-June
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input type="checkbox"/> Commercial Nursery <input checked="" type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" - 3" caliper <input checked="" type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3" height
Comments	Prefers cool, shady, acid, moist situations.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	AESCULUS GLABRA
Common Name	Ohio Buckeye
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	35-50'
Mature Width	20-35'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Greenish yellow; May; capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" <input type="checkbox"/> 3" caliper <input checked="" type="checkbox"/> 8" <input type="checkbox"/> 10" height <input type="checkbox"/> 3' height
Comments	Prefers moist, deep, well-drained, slightly acid soil. Native to bottomlands along river and creek banks.

Botanical Name	AESCULUS PARVIFLORA
Common Name	Bottlebrush; Buckeye
Recommended Cultivars	"Serotina; Rogers"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	12-20'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White; July; capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" <input type="checkbox"/> 3" caliper <input type="checkbox"/> 8" <input type="checkbox"/> 10" height <input checked="" type="checkbox"/> 3' height
Comments	Excellent plant for missing; very effective when used in shady areas.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	AESCULUS PAVIA
Common Name	Red Buckeye
Recommended Cultivars	"Rubra"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	12-20'
Mature Width	12-20'
Form	<input type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Red-April, May; capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedge/row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 3" caliper <input checked="" type="checkbox"/> 8-10" height <input type="checkbox"/> 3" height
Comments	Flowers well in rather dense shade.

Botanical Name	ALNUS GLUTINOSA
Common Name	Black Alder
Recommended Cultivars	"Pyramidalis"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	40-60'
Mature Width	20-40'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Reddish catkin; winged nutlet
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge/row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 3" caliper <input checked="" type="checkbox"/> 8-10" height <input type="checkbox"/> 3" height
Comments	Tolerates difficult, wet sites; will grow in standing water

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	AMELANCHIER CANADENSIS
Common Name	Shadbowl Serviceberry
Recommended Cultivars	"White Pillar", Autumn Brilliance, Magnificent
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	35-50'
Mature Width	35-50'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-April; black drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input checked="" type="checkbox"/> 3" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 10' height <input type="checkbox"/> 3" height
Comments	Blends well on the edges of woodlands, along streambanks and ponds. Performs best in lightly shaded areas. Beautiful Fall color.

Botanical Name	AMELANCHIER LAEVIS
Common Name	Allegany Serviceberry
Recommended Cultivars	"Snowcloud"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	25-30'
Mature Width	20-25'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	White-April; black berry
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input checked="" type="checkbox"/> 3" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 10' height <input type="checkbox"/> 3" height
Comments	Bronzy color to unfolding leaves. Site only in partly shaded areas.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	ARONIA ARBUTIFOLIA *
Common Name	Red Chokeberry
Recommended Cultivars	Brilliantissima, Erecta
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	3-6'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input checked="" type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-April, May; bright red, pome
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedge/row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Effective in mass; excellent fruit character in Fall

Botanical Name	ARONIA MELANOCARPA *
Common Name	Black Chokeberry
Recommended Cultivars	"Blala, Grandifolia"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	3-6'
Mature Width	3-6'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input checked="" type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-April, May; blackish-purple pome
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedge/row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Effective in mass; excellent fruit character in Fall

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	ARONIA PRUNIFOLIA
Common Name	Purple fruit Chokeberry
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	3-6'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input checked="" type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White; April, May; purple-black drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specially Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2 - 3" caliper <input type="checkbox"/> 8 - 10' height <input checked="" type="checkbox"/> 3' height
Comments	Excellent in mass; excellent fruit character in Fall

Botanical Name	BETULA LENTA
Common Name	Sweet Birch
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	50-75'
Mature Width	35-50'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Cakini; winged nutlet
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input type="checkbox"/> Commercial Nursery <input checked="" type="checkbox"/> Specially Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedge row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2 - 3" caliper <input type="checkbox"/> 8 - 10' height <input type="checkbox"/> 3' height
Comments	Excellent for naturalized areas; resistant to bronze birch borer. Best on deep, moist, slightly acid soil. One of the best birches for fall color. Do not transplant in Fall.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	BETULA NIGRA
Common Name	River Birch
Recommended Cultivars	'Heritage'
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	50-75'
Mature Width	35-50'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Catkin, small nutlet
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge Row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2 - 3" caliper <input checked="" type="checkbox"/> 8 - 10" height <input type="checkbox"/> 3' height
Comments	Very handsome specimen due to exfoliating bark; transplants best in Spring.

Botanical Name	BETULA POPULIFOLIA
Common Name	Gray Birch
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	35-50'
Mature Width	20-35'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input checked="" type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Catkin, small nutlet
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge Row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2 - 3" caliper <input checked="" type="checkbox"/> 8 - 10" height <input type="checkbox"/> 3' height
Comments	Transplants best in Spring; tolerates wet and dry conditions. Good for naturalizing.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2" - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	BUDDLEIA DAVIDII
Common Name	Butterfly Bush
Recommended Cultivars	"Black Knight, Charming, Dubonnet, Empire Blue, Fascination, Royal Red, White Profusion"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White, pink or purple; July thru frost; capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Valued for summer flowering

Botanical Name	CALLICARPA DICHOTOMA
Common Name	Purple Beautyberry
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	3-6'
Mature Width	3-6'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input checked="" type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Pinkish-lavender; June thru August; violet fruit
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Very effective in mass plantings

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	CALYCANTHUS FLORIDUS
Common Name	Common Sweetshrub
Recommended Cultivars	"Ovalis"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input checked="" type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	Reddish brown-May, urn shaped, receptacle
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge/row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 3" caliper <input type="checkbox"/> 8-10' height <input checked="" type="checkbox"/> 3' height
Comments	Easily transplanted, good fall color, Fruity-scented flowers. Adaptable to many soils.

Botanical Name	CARPINUS BETULUS
Common Name	European Hornbeam
Recommended Cultivars	"Fastigiala"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	30-40'
Mature Width	20-30'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Nut
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge/row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 3" caliper <input type="checkbox"/> 8-10' height <input type="checkbox"/> 3' height
Comments	One of the finest small landscape trees; will tolerate difficult conditions. Do not transplant in Fall.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	CARPINUS CAROLINIANA *
Common Name	American Hornbeam
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	35-50'
Mature Width	35-50'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	Nut
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2 - 3" caliper <input checked="" type="checkbox"/> 8 - 10' height <input type="checkbox"/> 3' height
Comments	Transplant in Spring; tolerates heavy shade. Best in naturalized settings

Botanical Name	CARYA GLABRA *
Common Name	Pignut Hickory
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	50-60'
Mature Width	25-35'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Catkin; nut
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input type="checkbox"/> Commercial Nursery <input checked="" type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2 - 3" caliper <input checked="" type="checkbox"/> 8 - 10' height <input type="checkbox"/> 3' height
Comments	Rich golden-yellow fall color.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	CARYA OVATA *
Common Name	Shagbark Hickory
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	75-100'
Mature Width	35-50'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Catkin; nut
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input type="checkbox"/> Commercial Nursery <input checked="" type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge Row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input checked="" type="checkbox"/> 3" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 10" height <input type="checkbox"/> 3" height
Comments	Rich yellow fall color. Adaptable to wide range of soils.

Botanical Name	CELTIS OCCIDENTALIS *
Common Name	Common Hackberry
Recommended Cultivars	"Prairie Pride, Magnifica"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	75-100'
Mature Width	75-100'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input checked="" type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Yellowish green-April; May; purple-brown berry
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge Row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input checked="" type="checkbox"/> 3" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 10" height <input type="checkbox"/> 3" height
Comments	Very adaptable to soils and difficult sites. Do not transplant in Fall.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	CERCIS CANADENSIS*
Common Name	Eastern Redbud
Recommended Cultivars	Forest Pansy
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-30'
Mature Width	25-35'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Reddish-purple-March, April; pod
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input checked="" type="checkbox"/> 8" caliper <input type="checkbox"/> 10" height <input type="checkbox"/> 3" height
Comments	Effective in groupings and naturalized settings. Adaptable to wide range of site conditions.

Botanical Name	CHIONANTHUS VIRGINICUS*
Common Name	White Fringetree
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-35'
Mature Width	10-20'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-May-June, blue-ripe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input checked="" type="checkbox"/> 8" caliper <input type="checkbox"/> 10" height <input type="checkbox"/> 3" height
Comments	Transplants best in Spring; outstanding in flower.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	CLADRASTIS LUTEA
Common Name	American Yellowwood
Recommended Cultivars	Rosea Sweetshade
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	50-75'
Mature Width	50-75'
Form	<input type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input checked="" type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-May/June, pod
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	Sensitive to soil compaction. Excellent tree for flowers and foliage. Native to limestone soils but tolerates acid soils, also.

Botanical Name	CLETHRA ACUMINATA
Common Name	Cinnamon Cledra
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	12-20'
Mature Width	12-20'
Form	<input type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	White, July
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Polished cinnamon-brown bark sometimes exfoliating.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	CLETHRA ALNIFOLIA *
Common Name	Summersweet Clethra
Recommended Cultivars	'Rosea'
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	3-6'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-July-August; dehiscent capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" caliper <input checked="" type="checkbox"/> 10" height <input type="checkbox"/> 3' height
Comments	Good plant for heavy shade and wet soils. Extremely fragrant.

Botanical Name	CORNUS ALTERNIFOLIA *
Common Name	Pagoda Dogwood
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-35'
Mature Width	20-35'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Yellowish-white; May-June; blue-black drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" caliper <input type="checkbox"/> 10" height <input type="checkbox"/> 3' height
Comments	Good in naturalized settings; has strong horizontal branching effect.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	CORNUS AMOMUM *
Common Name	Silky Dogwood
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Yellowish-white; June; bluish drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge Row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 3" caliper <input checked="" type="checkbox"/> 8-10" height <input checked="" type="checkbox"/> 3' height
Comments	Easily transplanted; prefers partial shade and moist soils.

Botanical Name	CORNUS FLORIDA *
Common Name	Flowering Dogwood
Recommended Cultivars	"Apple Blossom, Cherokee Chief, Cherokee Princess, Cloud Nine, White Cloud"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-25'
Mature Width	20-25'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-April; May; glossy red drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedge Row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 3" caliper <input type="checkbox"/> 8-10" height <input checked="" type="checkbox"/> 3' height
Comments	Best sited in part shade; excellent flower, summer and fall foliage and winter habit.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	CORNUS KOUSA
Common Name	Kousa Dogwood
Recommended Cultivars	"Milky Way, Summer Stars, Steeple, Aurora, Constellation, Celestial, Ruth Ellen, Stellar Pink"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-30'
Mature Width	20-30'
Form	<input type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-June, red drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" - 3" caliper <input checked="" type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3" height
Comments	Requires a relatively sunny location; more drought resistant than Cornus florida.

Botanical Name	CORNUS MAS
Common Name	Comeliancherry Dogwood
Recommended Cultivars	"Flava, Golden Glory"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-30'
Mature Width	15-20'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Yellow-March; cherry-red drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" - 3" caliper <input checked="" type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3" height
Comments	Works well as hedge, screen, foundation, planting and excellent small tree.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	CORNUS RACEMOSA *
Common Name	Gray Dogwood
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-May; June; white drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Transplants well; very adaptable to wet or dry soils, full shade or sun.

Botanical Name	CORNUS SERICEA *
Common Name	Redosier Dogwood
Recommended Cultivars	"Flaviramea, Kelsey"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	White-May; June; white drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Excellent for massing; effective bank cover. Handsome stem color, especially in winter.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	COTINUS OBOVATUS
Common Name	American Smoke tree
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-35'
Mature Width	20-25'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Greenish-May, June, drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	Lovely small tree; adapts to limestone soils Spectacular Fall color.

Botanical Name	CRATAEGUS CRUSGALLI
Common Name	Cockspur Hawthorn
Recommended Cultivars	"Inermis"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-35'
Mature Width	20-35'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input checked="" type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-May; deep red drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input checked="" type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	Use tree form only for street trees. Do not transplant in Fall.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	CRATAEGUS PHAENOPYRUM
Common Name	Washington Hawthorn
Recommended Cultivars	"Clarke, Fastigiata, Princeton Sentry"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-35'
Mature Width	20-25'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input checked="" type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-Yune; glossy red drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input checked="" type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	Use tree form only for street trees. Do not transplant in Fall.

Botanical Name	CRATAEGUS VIRIDIS
Common Name	Green Hawthorn
Recommended Cultivars	"Winter King"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	25-30'
Mature Width	20-30'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input checked="" type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-May; bright red drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input checked="" type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	Use tree form only for street trees. Do not transplant in Fall.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	CRYPTOMERIA JAPONICA
Common Name	Cryptomeria
Recommended Cultivars	'Lobbiil'
Type	<input checked="" type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	50-60'
Mature Width	20-30'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Brown cones
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input checked="" type="checkbox"/> 8" caliper <input type="checkbox"/> 10" height <input type="checkbox"/> 3" height
Comments	A graceful, stately evergreen; shelter from winter winds.

Botanical Name	CUPRESSOCYPARIS LEYLANDI
Common Name	Leyland Cypress
Recommended Cultivars	None available
Type	<input type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	60-70'
Mature Width	12-15'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	None
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input checked="" type="checkbox"/> 8" caliper <input type="checkbox"/> 10" height <input type="checkbox"/> 3" height
Comments	Best in moist, well-drained soil. Excellent for quick screens, groupings and hedges.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	ELAEOAGNUS ANGUSTIFOLIA
Common Name	Russian-olive
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	12-15'
Mature Width	12-15'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White/Yellow-May; yellow drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedge row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input checked="" type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	High degree of salt tolerance.

Botanical Name	EUONYMUS ALATUS
Common Name	Burning Bush
Recommended Cultivars	"Compactus"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	8-10'
Mature Width	6-8'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	Yellow-green-May/June; red capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Easily transplanted; adapts to wide range of soils. Good red fall color.

RECOMMENDED PLANT LIST

• STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES • ORNAMENTAL/FLOWERING / EVERGREEN TREES - 8 TO 10 FEET • SHRUBS - 3 FEET MINIMUM

Botanical Name	FAGUS GRANDIFOLIA *
Common Name	American Beech
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	75-100'
Mature Width	50-75'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	Nut
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	Will not tolerate compacted soils. Do not transplant in Fall

Botanical Name	FORSYTHIA X INTERMEDIA
Common Name	Forsythia
Recommended Cultivars	"Beatrice Farrand", "Lynwood Gold", "Spectabilis", "Spring Glory"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	8-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Deep yellow; March, April; brown capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Excellent for massing and bank stabilization.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	FOTHERGILLA GARDENII
Common Name	Dwarf Fothergilla
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	3'
Mature Width	3-4'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input checked="" type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	White; April; May; capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 9" height
Comments	Interesting flowers; good summer foliage and outstanding fall color; good with rhododendrons and azaleas.

Botanical Name	FOTHERGILLA MAJOR
Common Name	Large Fothergilla
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	White; April, May; capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input type="checkbox"/> Commercial Nursery <input checked="" type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Excellent shrub for residential landscapes; acid soil is a must.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	FRANKLINIA ALBATAMAHA
Common Name	Franklinia
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-35'
Mature Width	10-20'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-July, August; capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input checked="" type="checkbox"/> 8" 10" height <input type="checkbox"/> 3" height
Comments	Handsome small specimen tree.

Botanical Name	FRAXINUS AMERICANA
Common Name	White Ash
Recommended Cultivars	"Autumn Applause, Autumn Purple, Greenspire, Rosehill, Royal Purple, Skyline"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	75-100'
Mature Width	50-75'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	Samaras
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" 3" caliper <input type="checkbox"/> 8" 10" height <input type="checkbox"/> 3" height
Comments	Easily transplanted.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	FRAXINUS PENNSYLVANICA *
Common Name	Green Ash
Recommended Cultivars	"Kindred", Newport, Patmore, Summit, Moraine, Raywood
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	50-75'
Mature Width	35-50'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Samarra
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3" height
Comments	Transplants readily; once established it tolerates high pH, salt and drought.

Botanical Name	GINKGO BILOBA (MALE ONLY)
Common Name	Ginkgo
Recommended Cultivars	"Autumn Gold", Magyat, Princeton-Sentry
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	50-80'
Mature Width	30-40'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Calum-March, April
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3" height
Comments	Plant only male trees; transplants easily; a durable tree for difficult landscape situations

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	GLEDITSIA TRIACANTHOS INERMIS *
Common Name	Thornless Honeylocust
Recommended Cultivars	Halka; Shademaster; Skycolor; Rubylace
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	50-75'
Mature Width	50-75'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Greenish; Yellow; May, June; pod
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8-10" height <input type="checkbox"/> 3" height
Comments	Excellent on limestone soils; salt tolerant

Botanical Name	GYMNOCLADUS DIOICUS *
Common Name	Kentucky Coffee tree
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	75-100'
Mature Width	50-75'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Greenish-white; May, June; pod
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input checked="" type="checkbox"/> 8-10" height <input type="checkbox"/> 3" height
Comments	Excellent on limestone soils

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	HALESIA CAROLINA
Common Name	Carolina Silverbell
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-35'
Mature Width	20-35'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub: 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White: April; May; brown drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" - 3" caliper <input checked="" type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3' height
Comments	Transplants best in Spring; handsome; lawn tree.

Botanical Name	HALESIA MONTICOLA
Common Name	Mountain Silverbell
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	40-50'
Mature Width	30-40'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub: 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White: April, May; brown drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3' height
Comments	Graceful; refined tree with delicate bell-like flowers on pendulous branches. Able to withstand urban conditions.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	HAMAMELIS VERNALIS
Common Name	Vernal Witchhazel
Recommended Cultivars	"Orange-Glow; Rubra"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Yellow to red January, February; capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8-10" height <input checked="" type="checkbox"/> 3" height
Comments	Best in moist situations.

Botanical Name	HAMAMELIS VIRGINIANA
Common Name	Common Witchhazel
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-35'
Mature Width	20-35'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Yellow-November; capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input checked="" type="checkbox"/> 8-10" height <input type="checkbox"/> 3" height
Comments	Avoid extremely dry situations.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	HAMAMELIS X INTERMEDIA
Common Name	Chinese Witchhazel
Recommended Cultivars	"Arnold Promise", Diana, Jelena, Moonlight, Ruby Glow"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	12-20'
Mature Width	12-20'
Form	<input type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Yellow, orange or red, January-March, capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Spectacular fall color

Botanical Name	HYDRANGEA ARBORESCENS
Common Name	Smooth Hydrangea
Recommended Cultivars	"Grandiflora", Annabelle"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	3-6'
Mature Width	3-6'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input checked="" type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Whites, June-September, capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Transplants well; very adaptable. Prefers part shade and sufficient moisture.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLowering /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	HYDRANGEA QUEROIFOLIA
Common Name	Oakleaf Hydrangea
Recommended Cultivars	"Snowflake, Snow Queen"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	3-6'
Mature Width	3-6'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	White; June, July; capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Excellent in shady situations and mass plantings.

Botanical Name	HYPERICUM PROLIFICUM
Common Name	Shrubby St. Johnswort
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	3'
Mature Width	3-6'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input checked="" type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Yellow; June-August; capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input checked="" type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Does well on dry, rocky soils. Excellent summer color.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIBER 2 1/2" - 3" INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	Botanical Name
ILEX DECIDUA	ILEX FOSTERI
Possumhaw	Foster Holly
Recommended Cultivars "Waireia's Red"	None available
Type Deciduous <input checked="" type="checkbox"/> Evergreen	Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height 12-20'	20-30'
Mature Width 12-20'	15-20'
Form <input type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow	Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+	0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input checked="" type="checkbox"/> All	Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All	Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance Yes <input checked="" type="checkbox"/> No	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Shade Tolerance None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy	None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy <input type="checkbox"/>
Flower/Fruit White, May; orange to scarlet fruit	White; red drupe
Fall Color Yes <input type="checkbox"/>	<input type="checkbox"/> Yes
Wildlife Value High <input type="checkbox"/> Medium	High <input type="checkbox"/> Medium
Native PA Plant Yes <input checked="" type="checkbox"/> No	Yes <input checked="" type="checkbox"/> No
Commercial Avail. Commercial Nursery <input checked="" type="checkbox"/> Specialty Nursery	Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use Street Tree <input checked="" type="checkbox"/> Wetland Sidewalk Tree <input type="checkbox"/> Hedgerow Parking Island <input type="checkbox"/> Meadow Buffer <input checked="" type="checkbox"/> Ornamental/Flowering	Street Tree <input type="checkbox"/> Wetland Sidewalk Tree <input type="checkbox"/> Hedgerow Parking Island <input type="checkbox"/> Meadow Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size 2 1/2" - 3" caliber <input type="checkbox"/> 8" - 10" height <input checked="" type="checkbox"/> 3" height	2 1/2" - 3" caliber <input checked="" type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3" height
Comments Better adapted to alkaline soils than Ilex verticillata. Light grey stems.	Excellent as foundation plants, hedges and specimens.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	ILEX PEDUNCULOSA
Common Name	Longstalk Holly
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	15-20'
Mature Width	15-20'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White; red drupe
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input checked="" type="checkbox"/> 8-10" height <input type="checkbox"/> 3' height
Comments	One of the hardiest evergreen red fruiting hollies.

Botanical Name	ILEX VERTICILLATA
Common Name	Winterberry
Recommended Cultivars	"Winter Red", Harvest Red, Raritan Chief, Sparkleberry"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White; May; red drupe
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8-10" height <input checked="" type="checkbox"/> 3' height
Comments	Excellent for mass effect, water-side or wet soils; requires male and female for fruit set.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	ILEX X MESERVEAE
Common Name	Meserve Holly
Recommended Cultivars	'Blue Girl', 'Blue Angel', 'Blue Prince', 'Blue Princess', 'China Boy', 'China Girl'
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White; May; red drupe
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	As a group, among the hardest and most ornamental of hollies

Botanical Name	ITEA VIRGINICA
Common Name	Virginia Sweetpire
Recommended Cultivars	'Henry's Garnet'
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	White; June; July; capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Fragrant flowers and excellent Fall color. Good in moist to wet areas.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	JUNIPERUS COMMUNIS *
Common Name	Common Juniper
Recommended Cultivars	Compressa, Hibernica, many others
Type	<input checked="" type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	3-6'
Mature Width	12-20'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input checked="" type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Bluish-black cones
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Useful for undergrowth and naturalized plantings.

Botanical Name	JUNIPERUS HORIZONTALIS *
Common Name	Creeeping Juniper
Recommended Cultivars	"Douglas", Emerald Spreader, Grey Carpet, Hughes, Plumosa, Winter Blue, others
Type	<input type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	Up to 3'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Bluish cones
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Tolerates hot, dry, sunny conditions. Excellent for slopes.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 6 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	JUNIPERUS VIRGINIANA
Common Name	Eastern Red Cedar
Recommended Cultivars	"Slaver"
Type	<input checked="" type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	40-50'
Mature Width	10-20'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Yellow-green, small globose cones
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input checked="" type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedge Row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input checked="" type="checkbox"/> 8-10" height <input type="checkbox"/> 3" height
Comments	Excellent native evergreen for naturalized plantings.

Botanical Name	KOELREUTERIA PANICULATA
Common Name	Golden Rain Tree
Recommended Cultivars	"September"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	30-40'
Mature Width	30-40'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Yellow, July-August; capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge Row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8-10" height <input type="checkbox"/> 3" height
Comments	Unrivaled for late yellow flowers; tremendous adaptability to extremes of soils.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	LARIX LARICINA *
Common Name	Eastern Larch
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	50-75'
Mature Width	35-50'
Form	<input type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Small oval cones
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input type="checkbox"/> Commercial Nursery <input checked="" type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	2 1/2" - 3" caliper <input checked="" type="checkbox"/> 8 - 10" height <input type="checkbox"/> 3" height
Comments	Excellent in groves in moist to boggy soils.

Botanical Name	LEUCOTHOE GATESBAEI
Common Name	Drooping Leucothoe
Recommended Cultivars	"Girard's Rainbow, Nana, Scarletta"
Type	<input type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	3-6'
Mature Width	3-6'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input checked="" type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	White-May capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	2 1/2" - 3" caliper <input type="checkbox"/> 8 - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Good cover for shady banks, missing or undergrowth; plant intolerant of drought or sweeping winds.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIBER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	LINDERA BENZOIN
Common Name	Common Spicebush
Recommended Cultivars	"Rubra"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Greenish-yellow; April; oval drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Does best in moist, well-drained soils; full sun to part shade. Brilliant scarlet fruits in Fall. Excellent for naturalizing.

Botanical Name	LIQUIDAMBAR STYRACIFLUA
Common Name	American Sweetgum
Recommended Cultivars	"Burgandy; Moraine; Rotundifolia" (sets no fruit)
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	75-100'
Mature Width	50-75'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Deliscent capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	Not to be used in small areas where roots are limited in their development; avoid polluted areas; transplants best in Spring. Handsome tree; rich fall color.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLowering /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

MAGNOLIA STELLATA

Botanical Name
 Common Name: Star Magnolia
 Recommended Cultivars: "Centennial", "Rosea", "Royal Star", "Waterlily"

Type: Deciduous Evergreen

Mature Height: 15-20'
 Mature Width: 10-15'

Form: Large Canopy Tree Large Shrub 12-20'
 Small Canopy Tree Medium Shrub 6-12'
 Large Understory Tree Small Shrub 3-6'
 Small Understory Tree Very Small Shrub 3'

Growth Rate: Fast Medium Slow

Distance Req'd from O'head Utility Lines: 0-15' 15-25' 25' +

Soil Moisture: Wet Moist Dry Average All

Soil pH: Neutral Acid Alkaline All

Wind Tolerance: Yes No

Shade Tolerance: None Light Medium Heavy

Flower/Fruit: White-April; aggregate of follicles
 Fall Color: Yes

Wildlife Value: High Medium

Native PA Plant: Yes No

Commercial Avail.: Commercial Nursery Specialty Nursery

Recommended Use: Street Tree Wetland
 Sidewalk Tree Hedgerow
 Parking Island Meadow
 Buffer Ornamental/Flowering

Required Minimum Size: 2 1/2 - 3" caliper 8 - 10" height 3' height

Comments: Use in protected site; avoid southern exposures.

MAGNOLIA VIRGINIANA

Botanical Name
 Common Name: Sweetbay Magnolia
 Recommended Cultivars: "Henry Hicks"

Type: Deciduous Evergreen

Mature Height: 10-20'
 Mature Width: 10-20'

Form: Large Canopy Tree Large Shrub 12-20'
 Small Canopy Tree Medium Shrub 6-12'
 Large Understory Tree Small Shrub 3-6'
 Small Understory Tree Very Small Shrub 3'

Growth Rate: Fast Medium Slow

Distance Req'd from O'head Utility Lines: 0-15' 15-25' 25' +

Soil Moisture: Wet Moist Dry Average All

Soil pH: Neutral Acid Alkaline All

Wind Tolerance: Yes No

Shade Tolerance: None Light Medium Heavy

Flower/Fruit: White-May, June; aggregate of follicles
 Fall Color: Yes

Wildlife Value: High Medium

Native PA Plant: Yes No

Commercial Avail.: Commercial Nursery Specialty Nursery

Recommended Use: Street Tree Wetland
 Sidewalk Tree Hedgerow
 Parking Island Meadow
 Buffer Ornamental/Flowering

Required Minimum Size: 2 1/2 - 3" caliper 8 - 10" height 3' height

Comments: Does well in wet and swampy soils; Very fragrant flowers. Often multi-stemmed; drops leaves late.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	MAGNOLIA X SOULANGIANA
Common Name	Saucer Magnolia
Recommended Cultivars	'Alexandrina'
Type	<input checked="" type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	20-30'
Mature Width	20-30'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input checked="" type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White to pink; March-April; aggregate of follicles
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input checked="" type="checkbox"/> 3" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 10" height <input type="checkbox"/> 3' height
Comments	Roots need ample room to develop. Good in groupings

Botanical Name	MALUS SPP.
Common Name	Crabapple
Recommended Cultivars	'Coralburst', Donald Wyman, Dolgo Harvest Gold, Prairifire, Naragansett, Red Jade, Red Jewel, Strawberry Parfait, Sugartyme, Tina'
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-35'
Mature Width	20-35'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White to pink-April-May; drupe of various colors
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input checked="" type="checkbox"/> Meadow <input type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input checked="" type="checkbox"/> 3" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 10" height <input type="checkbox"/> 3' height
Comments	Use only those cultivars with good to excellent disease resistance. Transplants best in Spring.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	METASEQUOIA GLYPTOSTROBILDES
Common Name	Dawn Redwood
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	70-100'
Mature Width	25-30'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Pendulous cones
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2 - 3" caliper <input checked="" type="checkbox"/> 8 - 10" height <input type="checkbox"/> 3" height
Comments	Transplants easily. Very effective screen; excellent in groves along streams.

Botanical Name	MYRICA PENNSYLVANICA
Common Name	Northern Bayberry
Recommended Cultivars	None available
Type	<input type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Greyish white, waxy drupe
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2 - 3" caliper <input type="checkbox"/> 8 - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Excellent for massing; good on poor soil sites.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	NANDINA DOMESTICA
Common Name	Nandina
Recommended Cultivars	Harbor Dwarf, Nana
Type	<input checked="" type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	3-6'
Mature Width	3-6'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Pinkish-white; May; June; bright red berry
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge row <input checked="" type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2 - 3" caliper <input type="checkbox"/> 8 - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Will grow under the shade of large trees. Protect from winter winds.

Botanical Name	NYSSA SYLVATICA
Common Name	Black Tupelo
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	30-50'
Mature Width	20-30'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Greenish-white; blue-black drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2 - 3" caliper <input type="checkbox"/> 8 - 10" height <input type="checkbox"/> 3" height
Comments	Difficult to transplant because of taproot; move in early Spring; not for heavily polluted areas. Spectacular Jacquer red Fall color.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	OSTRYA VIRGINIANA *
Common Name	American Hophornbeam
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	35-50'
Mature Width	20-35'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	Catkin, nutlet
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3" height
Comments	Tolerates very narrow tree lawns. Do not transplant in Fall. Very sensitive to salt.

Botanical Name	OXYDENDRUM ARBOREUM *
Common Name	Sourwood
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	35-50'
Mature Width	20-35'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White, June/July; capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" - 3" caliper <input checked="" type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3" height
Comments	An all season ornamental. Best Fall color in full sun.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2" - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	PARROTIA PERSICA
Common Name	Parrotia
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-40'
Mature Width	15-30'
Form	<input type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub: 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub: 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub: 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub: 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Crimson-March, April; capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input checked="" type="checkbox"/> 3" caliper <input type="checkbox"/> 3" height
Comments	Outstanding ornamental; Exfoliating bark; interesting foliage and brilliant fall color; very pest-free.

Botanical Name	PHELODENDRON AMURENSE
Common Name	Amur Corktree
Recommended Cultivars	"Shademaster"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	30-45'
Mature Width	30-45'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub: 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub: 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub: 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub: 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Yellowish-green; May thru June; black drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input checked="" type="checkbox"/> 3" caliper <input type="checkbox"/> 3" height
Comments	Transplants readily; withstands many soil types Usually pest free

RECOMMENDED PLANT LIST

• STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES • ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET • SHRUBS - 3 FEET MINIMUM

Botanical Name	PHILADELPHUS CORONARIUS
Common Name	Sweet Mockorange
Recommended Cultivars	"Belle Etoile" "Mont Blanc"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White; May; June; capsule
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Transplants readily; Very fragrant flowers.

Botanical Name	PICEA OMORIKA
Common Name	Serbian Spruce
Recommended Cultivars	None available
Type	<input type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	50-60'
Mature Width	20-25'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Cinnamon-brown cone
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3" height
Comments	Grows well on limestone soils. One of the most adaptable Spruces

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	PINUS STROBUS
Common Name	Eastern White Pine
Recommended Cultivars	"Fastigiata" others
Type	<input checked="" type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	75-100'
Mature Width	50-75'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Light brown cones
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input checked="" type="checkbox"/> 8-10" height <input type="checkbox"/> 3" height
Comments	Tends to lose lower limbs with age. Intolerant of air pollutants and salt.

Botanical Name	PLATANUS X ACERIFOLIA
Common Name	London Platane
Recommended Cultivars	"Bloodgood"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	70-100'
Mature Width	65-80'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Multiple fruit of elongated achenes
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8-10" height <input type="checkbox"/> 3" height
Comments	Use "Bloodgood" cultivar only; tolerates soil compaction, heat and drought.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	PRUNUS SARGENTII
Common Name	Sargent Cherry
Recommended Cultivars	'Columbian'
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-30'
Mature Width	20-30'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input checked="" type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Pink-April, May; black drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 3" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 10" height <input type="checkbox"/> 3" height
Comments	The best of the larger cherries for landscape use. Best transplanted in Spring.

Botanical Name	PRUNUS VIRGINIANA
Common Name	Common Chokecherry
Recommended Cultivars	'Shubert'
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	35-50'
Mature Width	20-35'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input checked="" type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-April, May; red-purple fruit
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 3" caliper <input checked="" type="checkbox"/> 8" height <input type="checkbox"/> 10" height <input type="checkbox"/> 3" height
Comments	Small suckering tree. Best transplanted in Spring.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	PRUNUS X "OKAME"
Common Name	Okame Cherry
Recommended Cultivars	
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	25-30'
Mature Width	20-25'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Clear pink March
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedge row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	Profuse bloom of clear pink flowers lasting 2-3 weeks. Fine-textured and graceful. Good orange-red fall color.

Botanical Name	PSEUDOTSUGA MENZIESII
Common Name	Douglasfir
Recommended Cultivars	None available
Type	<input type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	75-100'
Mature Width	20-35'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Light brown cones
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input checked="" type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	Intolerant of dry, poor soils.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	PYRACANTHA COCCINEA
Common Name	Firethorn
Recommended CultiVars	"Lalandei, Mohave, Navajo, Rutgers, Shawnee"
Type	<input checked="" type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-April; May; orange-red berry
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3' height
Comments	Excellent as an informal hedge.

Botanical Name	QUERCUS ACUTISSIMA
Common Name	Sawtooth Oak
Recommended CultiVars	"Gobbler"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	35-45'
Mature Width	35-45'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Acom
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 3' height
Comments	Wide spreading, clean foliated shade or lawn tree. Do not transplant in Fall!

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLowering /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

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Botanical Name	QUERCUS ALBA
Common Name	White Oak
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	75-100'
Mature Width	75-100'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Nil
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8"-10" height <input type="checkbox"/> 3" height
Comments	Intolerant of compacted soils. Do not transplant in Fall.

Botanical Name	QUERCUS BICOLOR
Common Name	Swamp White Oak
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	75-100'
Mature Width	50-75'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Acom
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8"-10" height <input type="checkbox"/> 3" height
Comments	Tolerates low lying, swampy situations. Do not transplant in Fall.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	QUERCUS IMBRICARIA
Common Name	Shingle Oak
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	50-60'
Mature Width	40-65'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from Overhead Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Acorn
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input checked="" type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	Leaves persist into winter and aid in screening or breaking the wind. Do not transplant in Fall.

Botanical Name	QUERCUS MACROCARPA
Common Name	Bur Oak
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	75-100'
Mature Width	75-100'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from Overhead Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Acorn
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	Tolerates limestone soils. Do not transplant in Fall.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	QUERCUS PALUSTRIS *
Common Name	Pin Oak
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	50-75'
Mature Width	50-75'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Undersory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Undersory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Acom
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	Transplants readily in Spring or Fall.

Botanical Name	QUERCUS PHELLOS *
Common Name	Willow Oak
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	40-60'
Mature Width	30-40'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Undersory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Undersory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Acom
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	Relatively fast growing; transplants readily.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	QUERCUS RUBRA*
Common Name	Northern Red Oak
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	60-75'
Mature Width	60-75'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Acorns
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input checked="" type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2 - 3" caliper <input type="checkbox"/> 8 - 10' height <input type="checkbox"/> 3' height
Comments	Transplants readily; fast-growing Oak. Magnificent native tree

Botanical Name	RHODODENDRON ARBORESCENS*
Common Name	Sweet Azalea
Recommended Cultivars	"Rubescens"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	12-20'
Mature Width	12-20'
Form	<input type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White to pink June, July
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2 - 3" caliper <input type="checkbox"/> 8 - 10' height <input checked="" type="checkbox"/> 3' height
Comments	Best native white azalea; fragrant flowers

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	RHODODENDRON CALENDULACEUM*
Common Name	Flame Azalea
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Lemon, apricot, pink, orange and scarlet
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgecrow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Most showy of the American azaleas; flowers for nearly two weeks. Excellent in naturalized settings.

Botanical Name	RHODODENDRON CAROLINIANUM
Common Name	Carolina Rhododendron
Recommended Cultivars	"Album; Luteum"
Type	<input type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	3-6'
Mature Width	3-6'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input checked="" type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	White, pale rose to lilac-rose
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgecrow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Good for groupings; massing and foundations; best if slightly shaded and out of strong winter winds. Must have good drainage.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 6 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	RHODODENDRON CATAWBIENSE
Common Name	Catawba Rhododendron
Recommended Cultivars	"Cunningham's White", Nova Zembla, "Purpureum", "Elegans", "Roseum", "Elegans"
Type	<input checked="" type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	Lilac-purple
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	One of the hardiest rhododendrons.

Botanical Name	RHODODENDRON MAXIMUM
Common Name	Rosebay Rhododendron
Recommended Cultivars	None available
Type	<input type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	12-20'
Mature Width	20-35'
Form	<input type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White; rose; purplish-pink;
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Requires cool, moist, well-drained root run. Acid soil and shade protection a must.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	RHODODENDRON NUDIFLORUM*
Common Name	Pinxterbloem, Azalea
Recommended Cultivars	Roseum
Type	<input checked="" type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	White, pink to pale violet
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2 - 3" caliper <input type="checkbox"/> 8 - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Useful for naturalizing; Fragrant flowers Deciduous

Botanical Name	RHODODENDRON ROSEUM*
Common Name	Roseholli, Azalea
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input checked="" type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Bright pink
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2 - 3" caliper <input type="checkbox"/> 8 - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Clove scented flowers; Extremely hardy; Deciduous

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	RHODODENDRON VASEYI
Common Name	Pinkshell Azalea
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	White, rose
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 3" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 10" height <input type="checkbox"/> 3' height
Comments	Makes a spectacular show in flower. Excellent for massing. Deciduous.

Botanical Name	RHODODENDRON VISCOSUM
Common Name	Swamp Azalea
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White;
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 3" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 10" height <input type="checkbox"/> 3' height
Comments	Spicy fragrance; open habit.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2" - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	RHUS AROMATICA *
Common Name	Fragrant Sumac
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	12-20'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Yellowish-March-April; red drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input checked="" type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedge Row <input type="checkbox"/> Parking Island <input checked="" type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input checked="" type="checkbox"/> 3' height
Comments	Easily transplanted; excellent fast cover for banks.

Botanical Name	RHUS COPALINA *
Common Name	Flametail Sumac
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-35'
Mature Width	20-35'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Greenish-yellow; July; August; crimson drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedge Row <input type="checkbox"/> Parking Island <input checked="" type="checkbox"/> Meadow <input type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" - 3" caliper <input checked="" type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3' height
Comments	Useful for dry, rocky banks; large areas and naturalistic plantings.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	ROSA RUGOSA
Common Name	Rugosa Rose
Recommended Cultivars	Many available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	3-6'
Mature Width	3-6'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input checked="" type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White to rose-purple; brick red hip
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Salt-tolerant and trouble-free; excellent for difficult sites.

Botanical Name	SALIX BABYLONICA
Common Name	Weeping Willow
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	30-40'
Mature Width	30-40'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input checked="" type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input checked="" type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	Good for moist to wet places where little else will grow. Especially useful near ponds. Transplant in Spring.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	SALIX GRACILISTYLA
Common Name	Rosegold Pussy Willow
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-10'
Mature Width	10-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Pink to red tinged catkins
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" - 3" caliper <input checked="" type="checkbox"/> 8" - 10" height <input checked="" type="checkbox"/> 3' height
Comments	Well suited to the small landscape. Transplant in Spring.

Botanical Name	SAMBUCUS CANADENSIS
Common Name	American Elder
Recommended Cultivars	"Aurea, Rubra"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input checked="" type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	White- June, July; purple-black berry
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input checked="" type="checkbox"/> 3' height
Comments	Naturalizing near wet sites; Transplants well.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	SASSAFRAS ALBIDUM
Common Name	Common Sassafras
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	35-50'
Mature Width	35-50'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input checked="" type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Yellow-April; dark blue drupe
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input checked="" type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" - 3" caliper <input checked="" type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3" height
Comments	Transplants best in Spring; outstanding Fall color.

Botanical Name	SOPHORA JAPONICA
Common Name	Scholar Tree
Recommended Cultivars	"Princeton Upright; Regent"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	50-75'
Mature Width	50-75'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Creamy white-July, August; pod
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3" height
Comments	Good tree for poor soils and polluted conditions.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING/EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	SORBUS ALNIFOLIA
Common Name	Korean Mountainash
Recommended Cultivars	"Redbird"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	40-50'
Mature Width	20-30'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White; May; orange, red or scarlet pome
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input checked="" type="checkbox"/> 8-10" height <input type="checkbox"/> 3' height
Comments	Does not tolerate polluted conditions. The best of the mountainash for fruit effect.

Botanical Name	STAPHYLEA TRIFOLIA
Common Name	American Bladdernut
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	Greenish-white; April; May; capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8-10" height <input checked="" type="checkbox"/> 3' height
Comments	Good for low maintenance naturalizing

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	STEWARTIA OVATA
Common Name	Mountain Stewartia
Recommended Cultivars	Grandiflora
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	12-20'
Mature Width	12-20'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	White July, August, capsule
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Excellent specimen; provide some shade during hottest periods; best transplanted in spring.

Botanical Name	STEWARTIA PSEUDOCAMELLIA
Common Name	Japanese Stewartia
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	30-40'
Mature Width	25-30'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White July
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3" height
Comments	Excellent fall color. Big white summer blossoms; exfoliating bark. An all-season tree.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	STYRAX JAPONICUS
Common Name	Japanese Snowbell
Recommended Cultivars	Note available
Type	<input checked="" type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	20-30'
Mature Width	20-30'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-May, June; grey drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input checked="" type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	A handsome small tree for any situation.

Botanical Name	SYMPHORICARPOS ALBUS *
Common Name	Common Snowberry
Recommended Cultivars	"Laevigatus; Mother of Pearl"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	3-6'
Mature Width	3-6'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Pink-June; white drupe
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Useful in shaded situations and for holding banks. Native to limestone and clay Suckers.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	SYMPHORICARPOS ORBICULATUS
Common Name	Indianturtle Coralberry
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	3-6'
Mature Width	3-6'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input checked="" type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White, June, July; purple-red drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specially Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input checked="" type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Good fruit and shade tolerance.

Botanical Name	SYRINGA
Common Name	Lilac
Recommended Cultivars	Many available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	12-20'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Many colors available
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specially Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Best used in hedgerows. Allow for good air circulation.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	SYRINGA RETICULATA
Common Name	Japanese Tree Lilac
Recommended Cultivars	Ivory Silk
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	20-30'
Mature Width	15-25'
Form	<input type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input checked="" type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Creamy white June, July; capsule
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2 - 3" caliper <input type="checkbox"/> 8 - 10' height <input type="checkbox"/> 3' height
Comments	Trouble-free Lilac. Excellent as street tree; good in groups. Allow good air circulation. Resistant to mildew, scale and borers. Fragrant.

Botanical Name	TAXODIUM DISTICHUM
Common Name	Common Baldcypress
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	75-100'
Mature Width	20-35'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Green to purple cones
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2 - 3" caliper <input checked="" type="checkbox"/> 8 - 10' height <input type="checkbox"/> 3' height
Comments	Transplants readily; good in groupings and groves in wet areas.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	TAXUS CUSPIDATA
Common Name	Japanese Yew
Recommended Cultivars	"Capitata"
Type	<input checked="" type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	12-20'
Mature Width	12-20'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	Red seed
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" 3" caliper <input type="checkbox"/> 8-10" height <input checked="" type="checkbox"/> 3" height
Comments	Soil must be well-drained; will not tolerate "wet feet" for any period of time.

Botanical Name	THUJA OCCIDENTALIS
Common Name	Eastern Arborvitae
Recommended Cultivars	"Nigra, Smaragd"
Type	<input checked="" type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	50-75'
Mature Width	35-50'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Conc
Fall Color	<input type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" 3" caliper <input type="checkbox"/> 8-10" height <input type="checkbox"/> 3" height
Comments	Tolerates most soils except those that are extremely wet or dry.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	TILIA AMERICANA
Common Name	American Linden
Recommended Cultivars	"Redmond" and others
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	75-100'
Mature Width	50-75'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	Pale yellow June
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3' height
Comments	Use only "Redmond" cultivar for street trees

Botanical Name	TILIA CORDATA
Common Name	Littleleaf Linden
Recommended Cultivars	"Greenspire" and others
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	60-70'
Mature Width	30-35'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Yellowish June, July, nulet
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input type="checkbox"/> 3' height
Comments	Tolerates limestone soils; readily transplanted.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	TILIA TOMENTOSA
Common Name	Silver Linden
Recommended Cultivars	'Green Mountain'
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	50-70'
Mature Width	35-40'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input checked="" type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Yellowish-white; June-July; nutlet
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Welland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 3" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 10" height <input type="checkbox"/> 3' height
Comments	Very beautiful shade tree. Dark green leaves with silvery undersides.

Botanical Name	ULMUS AMERICANA
Common Name	American Elm
Recommended Cultivars	'Delaware, Princeton, Washington'
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	75-100'
Mature Width	75-100'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input checked="" type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input checked="" type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Greenish-red; March; samara
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Welland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 3" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 10" height <input type="checkbox"/> 3' height
Comments	Easily transplanted. Use only above cultivars.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	VACCINIUM CORYMBOSUM
Common Name	Highbush Blueberry
Recommended Cultivars	Many available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input checked="" type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White, May; blue-black berry
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Acid, well-drained soils; spectacular fall color

Botanical Name	VIBURNUM ACERIFOLIUM
Common Name	Mapleleaf Viburnum
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	3-6'
Mature Width	3-6'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input checked="" type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	Yellow, white, June; black drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Excellent in heavily shaded situations; forms loose, open colonies; Beautiful Fall color.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	VIBURNUM ALNIFOLIUM
Common Name	Hobblebush
Recommended Cultivars	"Pracox"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	White, May; red to purple drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8-10' height <input checked="" type="checkbox"/> 3" height
Comments	Greatly adapted to shady, moist areas. Good Fall color.

Botanical Name	VIBURNUM CARLESII
Common Name	Korean Spice Viburnum
Recommended Cultivars	"Cayuga Compactum"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	4-6'
Mature Width	4-6'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input checked="" type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Pink to white, April; black drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedge row <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8-10' height <input checked="" type="checkbox"/> 3" height
Comments	Valuable shrub for fragrance.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	VIBURNUM CASSINOIDES
Common Name	Witcherod Viburnum
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input checked="" type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White, June, July; multicolor fruit
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3' height
Comments	Fruit changes color from green to pink; then red to blue before becoming black in September. Excellent for naturalizing and massing.

Botanical Name	VIBURNUM DENTATUM
Common Name	Arrowwood Viburnum
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input checked="" type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-May, June; bluish drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3' height
Comments	Excellent for screening parking areas; very durable. Transplants well.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	VIBURNUM PRUNIFOLIUM*
Common Name	Blackhaw Viburnum
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	12-20'
Mature Width	12-20'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White; May; bluish; black drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8-10' height <input checked="" type="checkbox"/> 3' height
Comments	Interesting as a small specimen; Transplants well.

Botanical Name	VIBURNUM SETIGERUM
Common Name	Tea Viburnum
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	8-12'
Mature Width	6-8'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25'+
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White; May; scarlet drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8-10' height <input checked="" type="checkbox"/> 3' height
Comments	Extremely heavy fruiting.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	VIBURNUM X PRAGENSE
Common Name	Prague Viburnum
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	10-12'
Mature Width	8-10'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input checked="" type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input checked="" type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input checked="" type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input checked="" type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Pink-April; red to black drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Evergreen. Extremely fast growing.

Botanical Name	ZELKOVA SERRATA
Common Name	Zelkova
Recommended Cultivars	"Green Vase; Halka; Village Green"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	50-80'
Mature Width	50-80'
Form	<input checked="" type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input checked="" type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input checked="" type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Small drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input checked="" type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input checked="" type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input type="checkbox"/> 3" height
Comments	Transplants readily; good foliage; interesting growth habit and handsome bark. Once established, very wind and drought tolerant. Do not transplant in Fall.

RECOMMENDED PLANT LIST

• STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES • ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET • SHRUBS - 3 FEET MINIMUM

Botanical Name	VIBURNUM TRILOBUM *
Common Name	American Cranberrybush
Recommended Cultivars	"Andrews, Halls, Wentworth"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input checked="" type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input checked="" type="checkbox"/> Heavy
Flower/Fruit	White, May; bright red drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input checked="" type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Excellent for screening and informal hedging; good for defining boundaries.

Botanical Name	VIBURNUM X BURKWOODII
Common Name	Burkwood Viburnum
Recommended Cultivars	"Mohawk" and others
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	8-10'
Mature Width	5-8'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Pink to white, April; red to black drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input checked="" type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2" - 3" caliper <input type="checkbox"/> 8" - 10" height <input checked="" type="checkbox"/> 3" height
Comments	Works well with broadleaf evergreens; extremely fragrant.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	VIBURNUM SIEBOLDI
Common Name	Siebold Viburnum
Recommended Cultivars	"Sibeca" and others
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	15-20'
Mature Width	10-15'
Form	<input type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	Creamy; White; May; red to black drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2 - 3" caliper <input type="checkbox"/> 8 - 10' height <input checked="" type="checkbox"/> 3" height
Comments	Transplants well; prefers moist soils and tolerates part shade; excellent foliage; flowers and fruit.

Botanical Name	VIBURNUM TINUS
Common Name	Laurustinus
Recommended Cultivars	None available
Type	<input type="checkbox"/> Deciduous <input checked="" type="checkbox"/> Evergreen
Mature Height	6-12'
Mature Width	6-8'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White; May; metallic blue fruit
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input checked="" type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2 1/2 - 3" caliper <input type="checkbox"/> 8 - 10' height <input checked="" type="checkbox"/> 3" height
Comments	Excellent for screening and hedging. Withstands considerable shade.

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLOWERING /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	VIBURNUM DILATATUM
Common Name	Linden Viburnum
Recommended Cultivars	Catskill, Eric, Iroquois, Omicdt
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	8-10'
Mature Width	5-8'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input checked="" type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input checked="" type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-May; lustered drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 3" caliper <input type="checkbox"/> 8-10" height <input checked="" type="checkbox"/> 3" height
Comments	Specimen, shrub border, all purpose shrub ornamentally valuable for three season interest, outstanding for fruit

Botanical Name	VIBURNUM LENTAGO*
Common Name	Nannyberry
Recommended Cultivars	"Pink Beauty" Very durable
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	12-20'
Mature Width	12-20'
Form	<input type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-May; bluish-black drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input checked="" type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 3" caliper <input type="checkbox"/> 8-10" height <input checked="" type="checkbox"/> 3" height
Comments	Excellent for screening, massing and naturalizing

RECOMMENDED PLANT LIST

● STREET TREES - MINIMUM CALIPER 2 1/2 - 3 INCHES ● ORNAMENTAL/FLowering /EVERGREEN TREES - 8 TO 10 FEET ● SHRUBS - 3 FEET MINIMUM

Botanical Name	VIBURNUM NUDUM
Common Name	Possumhaw Viburnum
Recommended Cultivars	None available
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	12-20'
Mature Width	12-20'
Form	<input type="checkbox"/> Large Canopy Tree <input checked="" type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-June-July, multicolor fruit
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input checked="" type="checkbox"/> Meadow <input type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	Good for naturalizing and massing.

Botanical Name	VIBURNUM PLICATUM TOMENTOSUM
Common Name	Doublefile Viburnum
Recommended Cultivars	"Mariesii-Shasia"
Type	<input checked="" type="checkbox"/> Deciduous <input type="checkbox"/> Evergreen
Mature Height	8-10'
Mature Width	9-12'
Form	<input type="checkbox"/> Large Canopy Tree <input type="checkbox"/> Large Shrub 12-20' <input type="checkbox"/> Small Canopy Tree <input checked="" type="checkbox"/> Medium Shrub 6-12' <input type="checkbox"/> Large Understory Tree <input type="checkbox"/> Small Shrub 3-6' <input type="checkbox"/> Small Understory Tree <input type="checkbox"/> Very Small Shrub 3'
Growth Rate	<input type="checkbox"/> Fast <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Slow
Distance Req'd from O'head Utility Lines	<input checked="" type="checkbox"/> 0-15' <input type="checkbox"/> 15-25' <input type="checkbox"/> 25' +
Soil Moisture	<input type="checkbox"/> Wet <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Dry <input type="checkbox"/> Average <input type="checkbox"/> All
Soil pH	<input type="checkbox"/> Neutral <input checked="" type="checkbox"/> Acid <input type="checkbox"/> Alkaline <input type="checkbox"/> All
Wind Tolerance	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Shade Tolerance	<input type="checkbox"/> None <input type="checkbox"/> Light <input type="checkbox"/> Medium <input type="checkbox"/> Heavy
Flower/Fruit	White-May; red to black drupe
Fall Color	<input checked="" type="checkbox"/> Yes
Wildlife Value	<input checked="" type="checkbox"/> High <input type="checkbox"/> Medium
Native PA Plant	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Commercial Avail.	<input checked="" type="checkbox"/> Commercial Nursery <input type="checkbox"/> Specialty Nursery
Recommended Use	<input type="checkbox"/> Street Tree <input type="checkbox"/> Wetland <input type="checkbox"/> Sidewalk Tree <input type="checkbox"/> Hedgerow <input type="checkbox"/> Parking Island <input type="checkbox"/> Meadow <input type="checkbox"/> Buffer <input checked="" type="checkbox"/> Ornamental/Flowering
Required Minimum Size	<input checked="" type="checkbox"/> 2-1/2" caliper <input type="checkbox"/> 8" height <input checked="" type="checkbox"/> 3" height
Comments	One of the most elegant of flowering shrubs.

APPENDIX G
LANDSCAPING REQUIREMENTS
FOR STORMWATER BMPS

Introduction

Landscaping is a critical element to improve both the function and appearance of Stormwater Best Management Practices (BMPs). This Appendix provides landscaping criteria and plant selection guidance for effective Stormwater BMPs. It is organized as follows:

The first section, G.1, outlines general guidance that shall be considered when landscaping any stormwater practice. Section G.2 then presents more specific guidance on landscaping criteria and plant selection for individual BMP designs. These include:

- Stormwater ponds and wetlands
- Infiltration and sand filter practices
- Bioretention
- Open Channels
- Filter Strips and Buffers

In Section G.3, key factors in selecting plant material for stormwater landscaping are reviewed, including hardiness zones, physiographic regions, hydrologic zones, and cultural factors. Section G.4 contains a detailed plant list of native woody and herbaceous species that can be used when preparing a stormwater planting plan.

Native Species

This manual encourages the use of native plants in stormwater management facilities. Native plants are defined as those species which evolved naturally to live in this region. Practically speaking, this refers to those species which lived in Pennsylvania before Europeans explored and settled in America. Many introduced species were weeds brought in by accident; others were intentionally introduced and cultivated for use as medicinal herbs, spices, dyes, fiber plants, and ornamentals.

Introduced species can often escape cultivation and begin reproducing in the wild. This is significant ecologically because many introduced species out-compete indigenous species and begin to replace them in the wild. Some introduced species like kudzu, phragmites, and dandelions are invasive, have few predators, and can take over naturally occurring species at an alarming rate. By planting native species in stormwater management facilities, we can protect Pennsylvania's natural heritage and provide a legacy for future generations.

Native species also have distinct genetic advantages over non-native species for planting in Pennsylvania. Because they have evolved to live here naturally, indigenous plants are best suited for our local climate. This translates into greater survivorship when planted and less replacement and maintenance during the life of a stormwater management facility. Both of these attributes provide cost savings for the facility owner.

Finally, people often plant exotic species for their ornamental value. While it is important to have aesthetic stormwater management facilities for public acceptance and the maintenance of property value, it is not necessary to introduce foreign species for this purpose. Many native species are aesthetically pleasing and can be used as ornamentals. For example, the following species are part of Pennsylvania's natural heritage and provide high aesthetic value throughout the year: rhododendron, pink azalea, red maple, pin oak, sycamore, flowering dogwood, mountain laurel willow, hemlock, white pine, bald cypress, Atlantic cedar, American holly, black-eyed Susan, sunflower, lobelia, pickerel weed, marsh hibiscus, and yellow pond lily. When selecting ornamentals for stormwater management facilities, planting preference shall be given to native ornamentals. Please refer to the plant list in Section H.4 for a comprehensive list of native species available for stormwater management facility planting.

G.1 General Landscaping Guidance for All Stormwater BMPs

- Trees, shrubs, and/or any type of woody vegetation are not allowed on the embankment, as defined by the core of the embankment.
- Plant trees and shrubs at least 15 feet away from the core of the embankment.
- Trees or shrubs known to have long taproots shall not be within the vicinity of the earth dam or subsurface drainage facilities.
- Plant trees and shrubs at least 25 feet away from perforated pipes.
- Plant trees and shrubs at least 25 feet away from a principal spillway structures.

- Provide 15 foot clearance from a non-clogging, low flow orifice.
- Herbaceous embankment plantings shall be limited to 10 inches in height.
- Use erosion control mats and fabrics in lieu of riprap, where possible, in channels to reduce the potential for erosion.
- Stabilize all emergency spillways with plant material that can withstand strong flows. Root material shall be fibrous and substantial but lacking a taproot.
- Sod channels that are not stabilized with erosion control mats.
- Divert flows temporarily from seeded areas until stabilized.
- Check water tolerances of existing plant materials prior to inundation of area.
- Stabilize aquatic and safety benches with emergent wetland plants and wet seed mixes.
- Do not block maintenance access to structures with trees or shrubs.
- To reduce thermal warming, shade inflow and outflow channels as well as southern exposures of ponds.
- Avoid plantings that will require routine or intensive chemical applications (i.e. turf area).
- Have soil tested to determine if there is a need for amendments.
- Native plant species shall be specified over exotic or foreign species because they are well adapted to local on-site soil conditions and require little or no additional amendments.
- Decrease the areas where turf is used. Use low maintenance ground cover to absorb run-off.
- Plant stream and water buffers with trees, shrubs, ornamental grasses, and herbaceous materials where possible, to stabilize banks and provide shade.
- Maintain and frame desirable views. Be careful not to block views at entrances, exits, or difficult road curves. Screen unattractive views into the site. Aesthetics and visual characteristics shall be a prime consideration.
- Use plants to prohibit pedestrian access to pools or steeper slopes.
- The designer shall carefully consider the long-term vegetation management strategy for the BMP, keeping in mind the "maintenance" legacy for the future owners. Provide a planting surface that can withstand the compaction of vehicles using maintenance access roads. Make sure the facility maintenance agreement includes requirements to ensure vegetation cover in perpetuity.
- If a BMP is likely to receive excessive amounts of deicing salt, salt tolerant plants shall be used.
- Provide signage for:
 - Stormwater Management Areas to help educate the public.
 - Wildflower areas, when possible, to designate limits of mowing.
- Avoid the overuse of any plant materials.
- Preserve existing natural vegetation when possible.

It is necessary to test the soil in which you are about to plant in order to determine the following:

- pH; whether acid, neutral, or alkaline
- major soil nutrients; Nitrogen, Phosphorus, Potassium
- minerals; such as chelated iron, lime

Have soil samples analyzed by experienced and qualified individuals who will explain in writing the results, what they mean, as well as what soil amendments would be required. Certain soil conditions, such as clays, can present serious constraints to the growth of plant materials and may require the guidance of qualified professionals. When poor soils can not be amended, seed mixes and plant material must be selected to establish ground cover as quickly as possible.

Areas that recently have been involved in construction can become compacted so that plant roots cannot penetrate the soil. Also seeds will lie on the surface of compacted soils and are often washed away or eaten by birds. For planting success, soils shall be loosened to a depth of three to five inches. Hard soils may require disking to a deeper depth. The soil shall be loosened regardless of the ground cover. This will improve seed contact with the soil, increase germination rates, and allow the roots to penetrate the soil. For areas to be sodded, disking is necessary so that the roots can penetrate the soil. Providing good growing conditions can prevent poor vegetative cover. This saves money because vegetation will not need to be replanted.

Whenever possible, topsoil shall be spread to a depth of six to eight inches and lightly compacted to minimum thickness of six inches. This provides organic matter and important nutrients for the plant material. The use of topsoil allows vegetation to become established faster and roots to penetrate deeper. This ensures quicker and more complete stabilization, making it less likely that the plants will wash out during a heavy storm.

If topsoil has been stockpiled in deep mounds for a long period of time, it is necessary to test the soil for pH as well as microbial activity. If the microbial activity has been destroyed, it is necessary to inoculate the soil after application.

Remember that newly installed plant material requires water in order to recover from the shock of being transplanted. Be sure that some source of water is provided, especially during dry periods.

This will reduce plant loss and provide the new plant materials with a chance to establish root growth.

G.2 Specific Landscaping Criteria for BMP Groups

G.2.1 Ponds and Wetlands

For planting within a stormwater management facility, it is necessary to determine what hydrologic zones will be created. Hydrologic zones describe the degree to which an area is inundated by water. Plants have differing tolerances to inundation and the six zones described in this section will dictate which plants will survive where. Every facility does not necessarily exhibit all of these zones.

Table G.1 Hydrologic Zones

<i>Zone #</i>	<i>Zone Description</i>	<i>Hydrologic Conditions</i>
Zone 1	Deep Water Pool	1.5-6 foot deep permanent pool
Zone 2	Shallow Water Bench (low marsh)	6 inches to 1.5 foot deep
Zone 3	Shoreline Fringe (high marsh)	Regularly inundated
Zone 4	Riparian Fringe	Periodically inundated
Zone 5	Floodplain Terrace	Infrequently inundated
Zone 6	Upland Slopes	Seldom or never inundated

Zone 1: Deep Water Area (1.5 to 6 feet)

Ponds and wetlands both have deep pool areas that comprise Zone 1. These pools range from one to six feet in depth, and are best colonized by submergent plants, if at all. This pondscaping zone has not been routinely planted for several reasons. First, the availability of plant materials that can survive and grow in this zone is limited, and it is also feared that plants could clog the stormwater facility outlet structure. In many cases, these plants will gradually become established through natural recolonization (e.g., transport of plant fragments from other ponds by waterfowl). If submerged plant material becomes more commercially available and elogging concerns are addressed, this area can be planted. The function of the planting is to reduce sedimentation and improve oxidation while creating a greater aquatic habitat.

- Plant material must be able to withstand constant inundation of water of one foot or greater in depth.
- Plants may be submerged partially or entirely.
- Plants shall be able to enhance pollutant uptake.
- Plants may provide food and cover for waterfowl, desirable insects, and other aquatic life.

Some suggested emergent or submergent species include, but are not limited to lotus, wild celery, and redhead grass.

Zone 2: Shallow Water Bench/Low Marsh (6 inches to 1.5 foot)

Zone 2 includes all areas that are inundated below the normal pool to a depth of one foot, and is the primary area where emergent plants will grow in stormwater wetlands. Zone 2 also coincides with the aquatic bench found in stormwater ponds. This zone offers ideal conditions for the growth of many emergent wetland species. These areas may be located at the edge of the pond or on low mounds of earth located below the surface of the water within the pond. When planted, Zone 2 can be an important habitat for many aquatic and non-aquatic animals, creating a diverse food chain. This food chain includes predators, allowing a natural regulation of mosquito populations, thereby reducing the need for insecticide applications.

- Plant material must be able to withstand constant inundation of water to depths between six inches and one foot deep.
- Plants will be partially submerged.
- Plants shall be able to enhance pollutant uptake.
- Plants may provide food and cover for waterfowl, desirable insects and other aquatic life.

Plants will stabilize the bottom of the pond, as well as the edge of the pond, absorbing wave impacts and reducing erosion, when water level fluctuates. In addition to slowing water velocities and increasing sediment deposition rates, plants can also reduce resuspension of sediments caused by the wind. Plants can also soften the engineered contours of the pond, and can conceal drawdowns during dry weather.

Some suggested species for Zone 2 include lobelia, bayberry, many asters, turtlehead, pond cypress, iris, and blue flag. It is important to recognize that a plant typically found in wetlands may be cultivated in nonwetland conditions. Hence the importance of obtaining plant stock which is cultivated in similar hydrologic and soil conditions as those present in the stormwater management facility. A plant typically found in wetlands, but cultivated in nonwetland conditions, may not survive if installed in wetland conditions. A nonwetland plant cultivated in wetland conditions should thrive when introduced to wetland conditions.

Table G.2 Common Emergent Wetland Plant Species Used for Stormwater Wetlands and on Aquatic Benches of Stormwater Ponds

<i>Common Name</i>	<i>Scientific Name</i>	<i>Inundation Tolerance</i>
Arrow Arum	<i>Peltandra virginica</i>	up to 12 inches
Arrowhead/Duck Potato	<i>Sagittaria latifolia</i>	up to 12 inches
Broomsedge	<i>Andropogon virginicus</i>	up to 3 inches
Broad Water Weed	<i>Elodea canadensis</i>	at least 12 inches
Bushy Beardgrass	<i>Andropogon glomeratus</i>	up to 12 inches
Common Three-square	<i>Scirpus pungens</i>	up to 6 inches
Marsh Hibiscus	<i>Hibiscus moscheutos</i>	up to 3 inches
Spatterdock	<i>Nuphar luteum</i>	up to 3 inches
Rice Cutgrass	<i>Leersia oryzoides</i>	up to 3 inches

Note 1: Inundation tolerance is maximum inches below the normal pool; most plants prefer shallower depths than the maximum indicated.

Note 2: For additional plant options, consult the recommended planting list in Section G.4. Other good sources include the 2006 Pennsylvania Stormwater Best Management Practices Manual (PADEP), Design of Stormwater Wetland Systems (Schueler, 1992) and Planting Guide for the Northeastern United States (Environmental Concern, 1993).

Zone 3: Shoreline Fringe/High Marsh (*regularly inundated*)

Zone 3 encompasses the shoreline of a pond or wetland, and extends vertically about one foot in elevation from the normal pool. This zone includes the safety bench of a pond, and may also be periodically inundated if storm events are subject to extended detention. This zone occurs in a wet pond or shallow marsh and can be the most difficult to establish since plants must be able to withstand inundation of water during storms, when wind might blow water into the area, or the occasional drought during the summer. In order to stabilize the soil in this zone, Zone 3 must have a vigorous cover.

- Plants shall stabilize the shoreline to minimize erosion caused by wave and wind action or water fluctuation.
- Plant material must be able to withstand occasional inundation of water. Plants will be partially submerged at this time.
- Plant material shall, whenever possible, shade the shoreline, especially the southern exposure. This will help to reduce water temperature.
- Plants shall enhance pollutant uptake.
- Plants may provide food and cover for waterfowl, songbirds, and wildlife. Large plants could also be selected and located to control overpopulation of waterfowl.
- Plants shall be located to reduce human access where there are potential hazards, but shall not block the maintenance access.
- Plants shall have very low maintenance requirements, because they may be difficult or impossible to reach.
- Plants shall be resistant to disease and other problems which require chemical applications (since chemical application is not advised in stormwater ponds).
- Native plants are preferred because they are low maintenance and disease resistant.

Many of the emergent wetlands plants outline in Table G.2 also thrive in Zone 3. Some other species that do well include bentgrass, foxtail, panic grass, and hawthorn. If shading is needed along the shoreline, the following tree species are suggested— river birch, ash, willow, red maple and willow oak.

Zone 4: Riparian Fringe (*periodically inundated*)

Zone 4 extends from one to four feet in elevation above the normal pool. Plants in this zone are subject to periodic inundation after storms, and may experience saturated or partly saturated soil. Nearly all of the temporary ED area is included within this zone.

- Plants must be able to withstand periodic inundation of water after storms, as well as occasional drought during the warm summer months.
- Plants shall stabilize the ground from erosion caused by run-off.
- Plants shall shade the low flow channel to reduce pool warming whenever possible.
- Plants shall enhance pollutant uptake.
- Plant material shall have very low maintenance, since they may be difficult or impossible to access.
- Plants may provide food and cover for waterfowl, songbirds and wildlife. Plants may also be selected and located to control overpopulation of waterfowl.
- Plants shall be located to reduce pedestrian access to the deeper pools.
- Native plants are preferred because they are low maintenance and disease resistant.

Some frequently used plant species in Zone 4 include coneflower, violets, primrose, milkwort, nannyberry, lespedeza, lilies, flatsedge, hollies, horsythia, lovegrass, hawthorn, spiraea, birch, and sugar maple.

Zone 5: Floodplain Terrace (*infrequently inundated*)

Zone 5 is periodically inundated by floodwaters that quickly recede in a day or less. Operationally, Zone 5 extends from the maximum two year water surface elevation up to the 100-year maximum water surface elevation. Key landscaping objectives for Zone 5 are to stabilize the steep slopes characteristic of this zone and establish low maintenance natural vegetation.

- Plant material shall be able to withstand occasional but brief inundation during storms. In between storms, typical moisture conditions may be moist, slightly wet, or even swing entirely to drought conditions during the dry weather periods.
- Plants shall stabilize the basin slopes from erosion.

- Ground cover shall be very low maintenance, since they may be difficult to access on steep slopes or if frequency of mowing is limited. A dense tree cover may help reduce maintenance and discourage resident geese.
- Plants may provide food and cover for waterfowl, songbirds, and wildlife.
- Placement of plant material in Zone 5 is often critical, as it often creates a visual focal point and provides structure and shade for a greater variety of plants.

Some commonly planted species in Zone 5 include solomon's seal, nannyberry, many fescues, many viburnums, cherries, chestnut oak, post oak, and phlox.

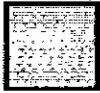
Zone 6: Upland Slopes/Pond Buffer (*seldom or never inundated*)

The last zone extends above the maximum 100 year water surface elevation, and often includes the outer buffer of a pond or wetland. Unlike other zones, this upland area may have sidewalks, bike paths, retaining walls, and maintenance access roads. Care should be taken to locate plants so they will not overgrow these routes or create hiding places that might make the area unsafe.

- Plant selections shall be made based on soil condition, light, and function within the landscape because little or no water inundation will occur.
- Ground covers shall require infrequent mowing to reduce the cost of maintaining this landscape.
- Placement of plants in Zone 6 is important since they are often used to create a visual focal point, frame a desirable view, screen undesirable views, serve as a buffer, or provide shade to allow a greater variety of plant materials. Particular attention should be paid to seasonal color and texture of these plantings.

Some frequently used plant species in Zone 6 include eastern cottonwood, american yew, linden, bald cypress, magnolia, and mountain ash.

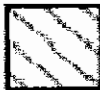
Figure G.1 Hydrologic Zones Around Stormwater Facilities – Legend



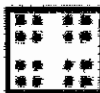
12"-36" depth below normal pool elevation
Water Lily, Deep Water Duck Potato, Sago Pond Plant, Wild Celery, Redhead Grass



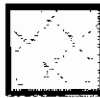
0"-12" depth below normal pool elevation.
Blue Flag Iris, Duck Potato, Flowering Bulrush, Softrush, Sedges, Lobelia, Pond Cypress, various asters



0" to 12" elevation above normal pool elevation
New England Aster, Marsh Aster, Marsh Marigold (Appalachian Plateau), Tussock Sedge, Spotted Joe, Pye Weed, Forget Me Nots, Inkberry, Purple Osier Dogwood, Pin Oak, River, Birch, Sycamore, Swamp White Oak (Coastal Plain), Weeping Willow, Dawn Redwood



1' to 4' elevation above normal pool elevation
Purple Cone Flower, Birds Foot Trefoil, Slender Rush, Deer Tongue Grass, Lespedeza, Switch Grass, Serviceberry, Gray Birch, Hackberry, Sweet Pepper Bush (Coastal Plain, Gray stem Dogwood, Red Osier Dogwood, Green Ash.



2-year to 100-year water surface elevation
(Many Wildflowers and native grasses) American Holly, Witch Hazel, Ninebark, Red Oak, American Elderberry, American Hemlock, Lowbush Blueberry, Maple Leaf Viburnum, Nannyberry, Blackhaw Viburnum



100-year water surface elevation and above
(Floodplain) Mostly ornamentals as long as soils drain well. Many natives. All species must be able to tolerate flood plain conditions. Hackberry, Pitch Pine, Sheep Fescue, Wildflowers, many Native Grasses.

Figure G.2 Hydrologic Zones Around Stormwater Facilities

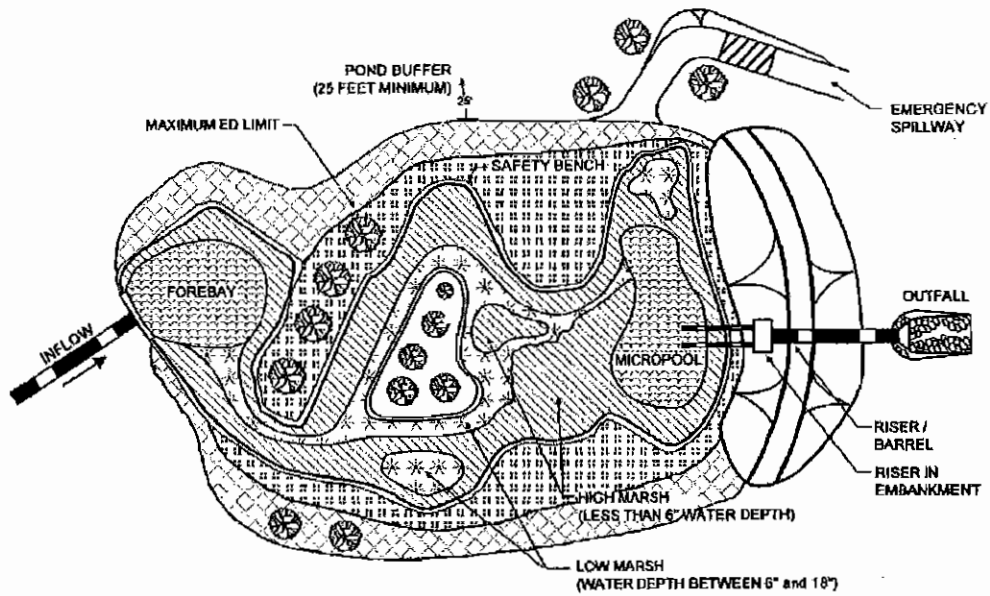
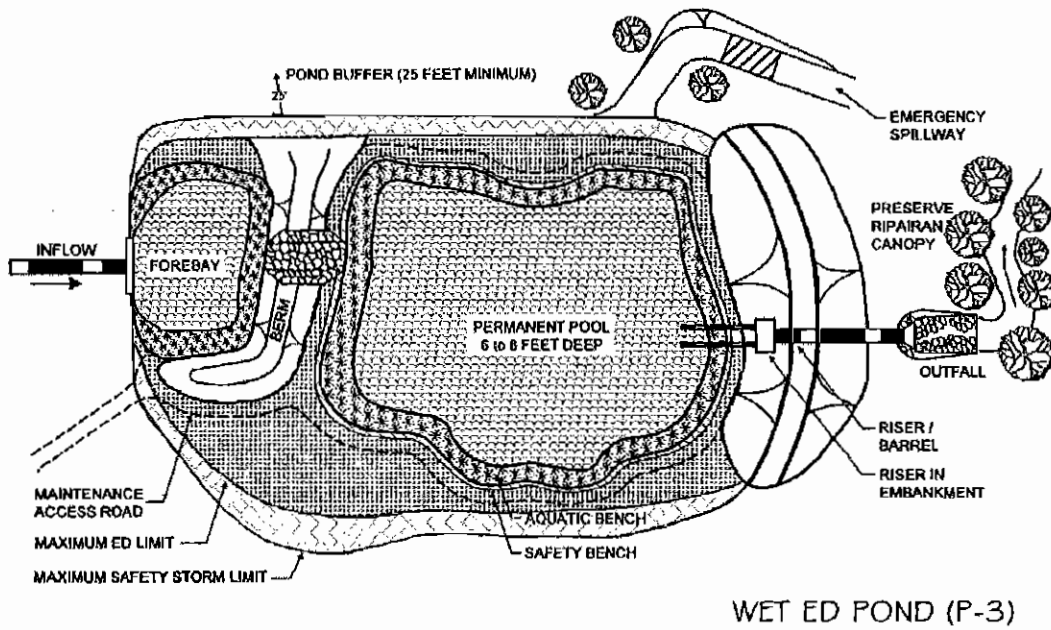


Figure G.3 Section of Typical Stormwater Management Detention Pond

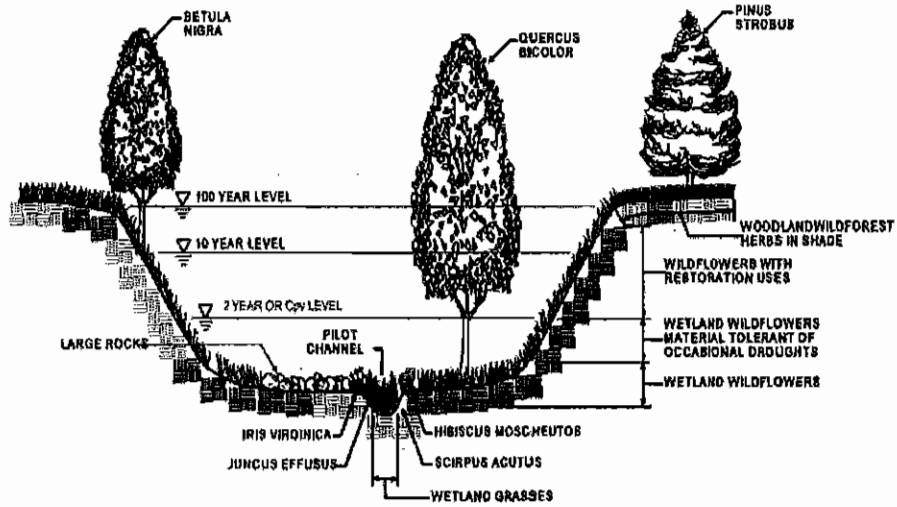
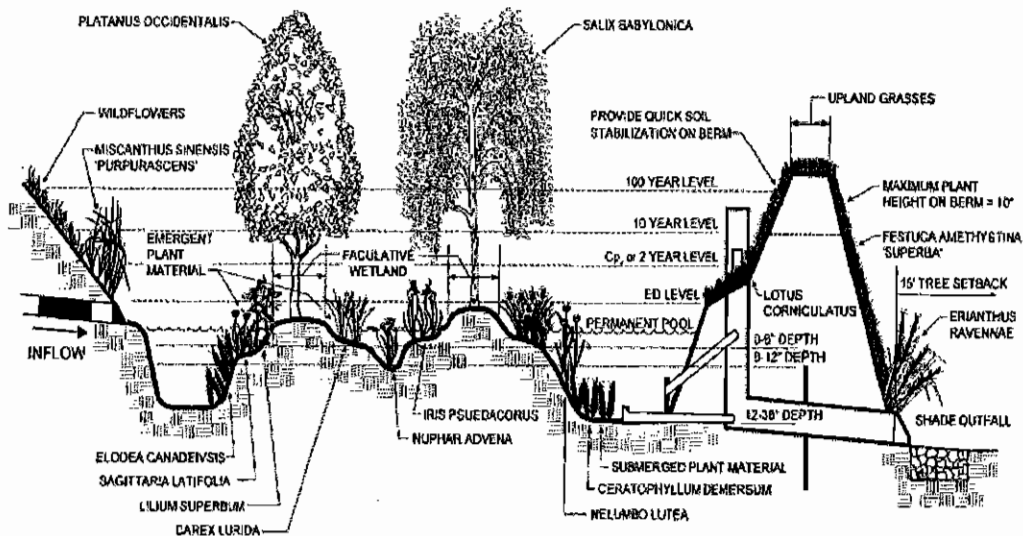


Figure G.4 Section of Typical Shallow Extended Detention Wetland System



G.2.2 Infiltration and Filter Systems

Infiltration and filter systems either take advantage of existing permeable soils or create a permeable medium such as sand for Water Quality and Recharge volumes. In some instances where permeability is great, these facilities may be used for Peak Rate Reduction as well. The most common systems include infiltration trenches, infiltration basins, sand filters, and organic filters.

When properly planted, vegetation will thrive and enhance the functioning of these systems. For example, pre-treatment buffers will trap sediments that often are bound with phosphorous and metals. Vegetation planted in the facility will aid in nutrient uptake and water storage. Additionally, plant roots will provide arteries for stormwater to permeate soil for groundwater recharge. Finally, successful plantings provide aesthetic value and wildlife habitat making these facilities more desirable to the public.

Design Constraints:

- Planting buffer strips of at least 20 feet will cause sediments to settle out before reaching the facility, thereby reducing the possibility of clogging.
- Determine areas that will be saturated with water and water table depth so that appropriate plants may be selected (hydrology will be similar to Bioretention facilities, see figure G.5 and Table G.4 for planting material guidance).
- Plants known to send down deep taproots shall be avoided in systems where filter fabric is used as part of facility design.
- Test soil conditions to determine if soil amendments are necessary.
- Plants shall be located so that access is possible for structure maintenance.
- Stabilize heavy flow areas with erosion control mats or sod.
- Temporarily divert flows from seeded areas until vegetation is established.
- See Table G.5 for additional design considerations.

G.2.3 Bioretention

Soil Bed Characteristics

The characteristics of the soil for the bioretention facility are perhaps as important as the facility location, size, and treatment volume. The soil must be permeable enough to allow runoff to filter through the media, while having characteristics suitable to promote and sustain a robust vegetative cover crop. In addition, much of the nutrient pollutant uptake (nitrogen and phosphorus) is accomplished through absorption and microbial activity within the soil profile. Therefore, soils must balance their chemical and physical properties to support biotic communities above and below ground.

The planting soil shall be a sandy loam, loamy sand, loam (USDA), or a loam/sand mix (shall contain a minimum 35 to 60% sand, by volume). The clay content for these soils shall be less than 25% by volume [Environmental Quality Resources (EQR), 1996; Engineering Technology Inc. and Biohabitats, Inc. (ETAB), 1993]. Soils shall fall within the SM, ML, SC classifications or the Unified Soil Classification System (USCS). A permeability of at least 1.0 feet per day (0.5"/hr) is required (a conservative value of 0.5 feet per day is used for design). The soil shall be free of stones, stumps, roots, or other woody material over 1" in diameter. Brush or seeds from noxious weeds (e.g., Johnson Grass, Mugwort, Nutsedge, and Canada Thistle or other noxious.) shall not be present in the soils. Placement of the planting soil shall be in 12" to 18" lifts that are loosely compacted (tamped lightly with a backhoe bucket or traversed by dozer tracks). The specific characteristics are presented in Table G.3.

Table G.3 Planting Soil Characteristics
(Adapted from EQR, 1996; ETAB, 1993)

<i>Parameter</i>	<i>Value</i>
pH range	5.2 to 7.00
Organic matter	1.5 to 4.0% (by weight)
Magnesium	35 lbs. per acre, minimum
Phosphorus (phosphate - P2O5)	75 lbs. per acre, minimum
Potassium (potash - K2O)	85 lbs. per acre, minimum
Soluble salts	500 ppm
Clay	10 to 25%
Silt	30 to 55%
Sand	35 to 60%

Mulch Layer

The mulch layer plays an important role in the performance of the bioretention system. The mulch layer helps maintain soil moisture and avoids surface sealing which reduces permeability. Mulch helps prevent erosion, and provides a microenvironment suitable for soil biota at the mulch/soil interface. It also serves as a pretreatment layer, trapping the finer sediments which remain suspended after the primary pretreatment.

The mulch layer shall be standard landscape style, single or double shredded hardwood mulch or chips. The mulch layer shall be well aged (stockpiled or stored for at least 12 months), uniform in color, and free of other materials, such as weed seeds, soil, roots, etc. The mulch shall be applied to a maximum depth of three inches. Grass clippings shall not be used as a mulch material.

Planting Guidance

Plant material selection shall be based on the goal of simulating a terrestrial forested community of native species. Bioretention simulates an upland-species ecosystem. The community shall be dominated by trees, but have a distinct community of understory trees, shrubs and herbaceous materials. By creating a diverse, dense plant cover, a bioretention facility will be able to treat stormwater runoff and withstand urban stresses from insects, disease, drought, temperature, wind, and exposure.

The proper selection and installation of plant materials is key to a successful system. There are essentially three zones within a bioretention facility (Figure G.5). The lowest elevation supports plant species adapted to standing and fluctuating water levels. The middle elevation supports plants that like drier soil conditions, but can still tolerate occasional inundation by water. The outer edge is the highest elevation and generally supports plants adapted to dryer conditions. Samples of appropriate plant materials for bioretention facilities are included in Table G.4. The layout of plant material should be flexible, but shall follow the general principals described in Table G.5. The objective is to have a system which resembles a random and natural plant layout, while maintaining optimal conditions for plant establishment and growth. For a more extensive bioretention plan, consult ETA&B, 1993 or Claytor and Schueler, 1997.

Figure G.5 Planting Zones for a Bioretention Facilities

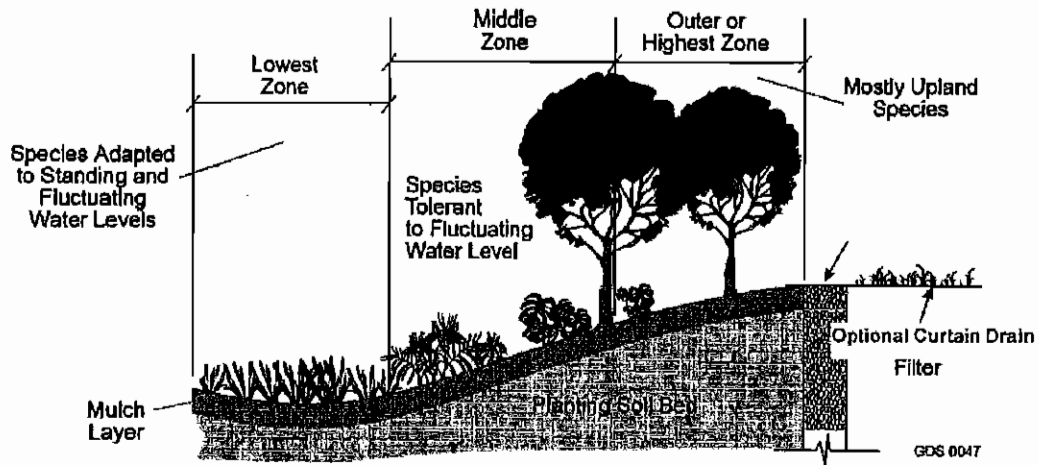


Table G.4 Commonly Used Species for Bioretention Areas

Trees	Shrubs	Herbaceous Species
<i>Acer rubrum</i> Red Maple	<i>Aesculus parviflora</i> Bottlebrush Buckeye	<i>Andropogon virginicus</i> Broomsedge
<i>Betula nigra</i> River Birch	<i>Cephalanthus occidentalis</i> Buttonbush	<i>Eupatorium purpurea</i> Joe Pye Weed
<i>Juniperus virginiana</i> Eastern Red Cedar	<i>Hamamelis virginiana</i> Witch Hazel	<i>Scirpus pungens</i> Three Square Bulrush
<i>Chionanthus virginicus</i> Fringe-tree	<i>Vaccinium corymbosum</i> Highbush Blueberry	<i>Iris versicolor</i> Blue Flag
<i>Nyssa sylvatica</i> Black Gum	<i>Ilex glabra</i> Inkberry	<i>Lobelia cardinalis</i> Cardinal Flower
<i>Diospyros virginiana</i> Persimmon	<i>Ilex verticillata</i> Winterberry	<i>Panicum virgatum</i> Switchgrass
<i>Platanus occidentalis</i> Sycamore	<i>Viburnum dentatum</i> Arrowwood	<i>Dichanthelium scoparium</i> Broom Panic Grass
<i>Quercus palustris</i> Pin Oak	<i>Lindera benzoin</i> Spicebush	<i>Rudbeckia laciniata</i> Tall Coneflower
<i>Quercus phellos</i> Willow Oak	<i>Myrica pennsylvanica</i> Bayberry	<i>Scirpus cyperinus</i> Woolgrass
<i>Salix nigra</i> Black willow		<i>Vernonia noveboracensis</i> New York Ironweed
<p>Note 1: For more options on plant selection for bioretention, consult Bioretention Manual (ETAB, 1993) or the Design of Stormwater Filtering Systems (Claytor and Schueler, 1997).</p>		

Table G.5 Planting Plan Design Considerations

- Native plant species shall be specified over exotic or foreign species.
- Appropriate vegetation shall be selected based on the zone of hydric tolerance.
- Species layout shall generally be random and natural.
- A canopy shall be established with an understory of shrubs and herbaceous materials.
- Woody vegetation shall not be specified in the vicinity of inflow locations.
- Trees shall be planted primarily along the perimeter of the bioretention area.
- Stressors (e.g., wind, sun, exposure, insect and disease infestation, and drought) shall be considered when laying out the planting plan.

- Noxious weeds shall not be specified or used.
- Aesthetics and visual characteristics shall be a prime consideration.
- Traffic and safety issues must be considered.
- Existing and proposed public utilities and services must be identified and considered.

Plant Material Guidance

Plant materials shall conform to the American Association of Nurserymen’s publication, the American Standard Nursery Stock. The planting plan shall include a sequence of construction; a description of the contractor's responsibilities; a planting schedule and installation specifications; initial maintenance requirements; and a warranty period stipulating requirements for plant survival. Table G.6 presents some typical issues for planting specifications.

Table G.6 Planting Specification Issues

<i>Specification Element</i>	<i>Elements</i>
Sequence of Construction	Describe site preparation activities, soil amendments, etc.; address erosion and sediment control procedures; specify step-by-step procedure for plant installation through site clean-up.
Contractor's Responsibilities	Specify the contractor's responsibilities, such as watering, care of plant material during transport, timeliness of installation, repairs due to vandalism, etc.
Planting Schedule and Specifications	Specify the plants to be installed, the type of materials (e.g., balled and burlap, bare root, containerized); time of year of installations, sequence of installation of types of plants; fertilization, stabilization seeding, if required; watering and general care.
Maintenance	Specify inspection periods; mulching frequency (annual mulching is most common); removal and replacement of dead and diseased vegetation; treatment of diseased trees; watering schedule after initial installation (once per day for 14 days is common); repair and replacement of staking and wires.
Warranty	Specify the warranty period, the required survival rate, and expected condition of plant species at the end of the warranty period.

G.2.4 Open Channels

Consult Table G.7 for grass species that perform well in the stressful environment of an open channel. For more detailed information, please consult the Pennsylvania Stormwater Best Management Practices Manual. If a BMP is likely to receive excessive amounts of deicing salt, salt tolerant plants shall be used.

G.2.5 Filter Strips and Stream Buffer

For design and plant selection of filter strips and stream buffers, please consult the Pennsylvania Stormwater Best Management Practices Manual.

Table G.7 Common Grass Species for Open Channels

Common Name	Scientific Name	Notes
Big Bluestem	<i>Andropogon gerardii</i>	Warm, not for Wet Swale
Creeping Bentgrass	<i>Agrostis palustris</i>	Cool,
Red Fescue	<i>Festuca rubra</i>	Cool, not for Wet Swale
Reed Canary grass	<i>Phalaris arundinacea</i>	Cool, Wet Swale
Redtop	<i>Agrostis alba</i>	Cool,
Smooth Brome	<i>Bromus inermis</i>	Cool, not for Wet Swale
Switch grass	<i>Panicum virgatum</i>	Warm

Note 1: These grasses are sod-forming and can withstand frequent inundation, and are thus ideal for the swale or grass channel environment. Most are salt-tolerant, as well

Note 2: Where possible, one or more of these grasses should be in the seed mixes. For a more thorough listing of seed mixes, consult the Pennsylvania Stormwater Best Management Practices Manual

G.3 Plant Selection for Stormwater Facilities

G.3.1 Hardiness Zones

Hardiness zones are based on historical annual minimum temperatures recorded in an area. A BMP's location in relation to plant hardiness zones is important to consider first because plants differ in their ability to withstand very cold winters. This does not imply that plants are not affected by summer temperatures. Given that Pennsylvania summers can be very hot, heat tolerance is also a characteristic that should be considered in plant selection.

Table G.8 Average Annual Minimum Temperature

Zone	USDA Minimum Temperature (°F)	
Temperate Zone 1	below -50°	
Temperate Zone 2	-50° to -40°	
Temperate Zone 3	-40° to -30°	
Temperate Zone 4	-30° to -20°	
Temperate Zone 5	A	-20° to -15°
	B	-15° to -10°
Temperate Zone 6	A	-10° to -5°
	B	-5° to 0°
Temperate Zone 7	A	0° to 5°
	B	5° to 10°
Temperate Zone 8	10° to 20°	

It is best to recommend plants known to thrive in specific hardiness zones. The plant list included in Section G.4 identifies the hardiness zones for each species listed as a general planting guide. It should be noted, however, that certain site factors can create microclimates or environmental conditions which permit the growth of plants not listed as hardy for that zone. By investigating numerous references and based on personal experience, a designer should be able to confidently recommend plants that will survive in microclimates.

G.3.3 Hydrologic Zones

For planting within a stormwater management facility, it is necessary to determine what hydrologic zones will be created. Hydrologic zones describe the degree to which an area is inundated by water. Plants have differing tolerances to inundation and as an aid to landscape designers, these tolerance levels have been divided into six zones and corresponding plant species have been identified.

Section G.4 includes a native plant list with appropriate hydrologic zones designated for each species. The hydrologic zones which are bracketed [] are where the plants tend to occur. There may be other zones listed outside of these brackets. The plants may occur in these zones, but are not typically found in them. Just as plants may, on occasion, be found outside of their hardiness zone, they may also be found outside of their hydrologic zone. They tend to grow where they can compete and survive. Additionally, hydrologic conditions in a stormwater management facility may fluctuate in unpredictable ways; thus the use of plants capable of tolerating wide varieties of hydrologic conditions greatly increases a successful planting. Conversely, plants suited for specific hydrologic conditions may perish when hydrologic conditions fluctuate, expose the soil, and increase the chance for erosion.

Table G.9 Hydrologic Zones

Zone #	Zone Description	Hydrologic Conditions
Zone 1	Deep Water Pool	1-6 foot deep permanent pool
Zone 2	Shallow Water Bench (low marsh)	6 inches to 1 foot deep
Zone 3	Shoreline Fringe (high marsh)	Regularly inundated
Zone 4	Riparian Fringe	Periodically inundated
Zone 5	Floodplain Terrace	Infrequently inundated

G.3.4 Other Considerations in Stormwater BMP Landscaping

Use or Function

In selecting plants, consider their desired function in the landscape. Is the plant needed as ground cover, soil stabilizer, or a source of shade? Will the plant be placed to frame a view, create focus, or provide an accent? Does the location require that you provide seasonal interest to neighboring properties? Does the adjacent use provide conflicts or potential problems and require a barrier, screen, or buffer? Nearly every plant and plant location should be provided to serve some function in addition to any aesthetic appeal.

Plant Characteristics

Certain plant characteristics are so obvious, they may actually be overlooked in the plant selection. These are:

- Size
- Shape

For example, tree limbs, after several years, can grow into power lines. A wide growing shrub may block an important line of sight to oncoming vehicular traffic. A small tree, when full grown, could block the view from a second story window. Consider how these characteristics can work for you or against you, today and in the future.

Other plant characteristics must be considered to determine how the plant provides seasonal interest and whether the plant will fit with the landscape today and through the seasons and years to come. Some of these characteristics are:

- Color
- Texture
- Seasonal Interest (e.g., flowers, fruit, leaves, stems/bark)
- Growth Rate

If shade is required in large amounts, quickly, a sycamore might be chosen over an oak. In urban or suburban settings, a plant's seasonal interest may be of greater importance. Residents living next to a stormwater system may desire that the facility be appealing or interesting to look at throughout the year. For example, willows are usually the first trees to grow leaves signaling the coming of spring. Pink and white dogwoods bloom in mid-spring to early summer, while witch hazel has a yellow bloom every fall which can be contrasted with the red fall foliage of a sugar maple. Careful attention to the design and planting of a facility can result in greater public acceptance and increased property value.

Availability and Cost

Often overlooked in plant selection is the availability from wholesalers and the cost of the plant material. There are many plants listed in landscape books that are not readily available from local nurseries. Without knowledge of what is available, time spent researching and finding the one plant that meets all the needs will be wasted. It may require shipping, therefore, making it more costly than the budget may allow. Some planting requirements may require a special effort to find the specific plant that fulfills the needs of the site and the function of the plant in the landscape.

In some cases, it may be cost effective to investigate nursery suppliers for the availability of wetland seed mixtures. Specifications of the seed mix shall include wetland seed types and the relative proportion of each species. Some suppliers provide seed mixtures suitable for specific wetland, upland, or riparian habitat conditions. This option may best be employed in small stormwater facilities such as pocket wetlands and open swales, or to complement woody vegetation plantings in larger facilities.

G.4 Stormwater Plant List

The pages at the end of this appendix present a list of herbaceous, tree and shrub plants native to Pennsylvania and suitable for planting in stormwater management facilities. The list is intended as a guide for general planting purposes and planning considerations. Knowledgeable landscape designers and nursery suppliers may provide additional information for considering specific conditions for successful plant establishment and accounting for the variable nature of stormwater hydrology.

The planting list is in alphabetical order according to the common name, with the scientific name also provided. Life forms indicate whether a plant species is an "annual," "perennial," "grass," "fern," "shrub," or "tree".

Each plant species has a corresponding hydrologic zone provided to indicate the most suitable planting location for successful establishment. While the most common zones for planting are listed in parenthesis, the listing of additional zones indicates that a plant may survive over a broad range of hydrologic conditions.

The wetland indicator status (from Region 1, Reed, 1988) has been included to show "the estimated probability of a species occurring in wetlands versus nonwetlands" (Reed, 1988). Reed defines the indicator categories as follows:

- Obligate wetland (OBL): Plants, which nearly always (more than 99% of the time) occur in wetlands under natural conditions.
- Facultative Wetland (FACW): Plants, which usually occur in wetlands (from 67 to 99% of the time), but occasionally found in non wetlands.
- Facultative (FAC): Plants, which are equally likely to occur in wetlands and non wetlands and are found in wetlands from 34 to 66% of the time.
- Facultative Upland (FACU): Plants, which usually occur in non wetlands (from 67 to 99% of the time), but occasionally found in wetlands (from 1 to 33% of the time).
- Upland (UPL): Plants, which almost always (more than 99% of the time) under natural conditions occur in non wetlands.
- A given indicator status shown with a "+" or a "-" means that the species is more (+) or less (-) often found in wetlands than other plants with the same indicator status without the "+" or "-" designation.

Since the wetland indicator status alone does not provide an indication of the depth or duration of flooding that a plant will tolerate, the "Inundation Tolerance" section is designed to provide further guidance. Where a plant species is capable of surviving in standing water, a "yes" is designated in this column. Additional information is provided for depth of inundation for aquatic vegetation and tolerance for seasonal inundation or saturated soil conditions. Because individual plants often have unique life requirements difficult to convey in a general listing, it will be necessary to research specific information on the plant species proposed in order to ensure successful plant establishment.

Pollution tolerance and salt tolerance information are indicated to identify plantings that would be most appropriate in pollution hot spots.

Hardiness zones are provided for the U.S.D.A. hardiness zones. The herbaceous plant list identifies the range of zones the plant may survive in, while the tree and shrub list shows the coldest zone where the plant may naturally occur.

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APPENDIX H

WATER RESOURCES IMPACT STUDY

Applicants seeking approval for a zoning permit, subdivision or land development that contain[s] four (4) or more dwelling units, or proposing to withdraw greater than 1,000 gallons per day (gpd) shall be required to submit a Water Resources Impact Study that shall include the following information:

1. Water Resources Impact Study – A water resources impact study is required for:
 - a. any subdivision containing four (4) or more dwelling units;
 - b. a zoning permit application for a use that will withdraw 1,000 gpd or more;
 - e. a land development which will withdraw in excess of 1,000 gpd.
2. Purpose – The purpose of the study is to determine if there is an adequate water supply to serve the proposed use and to estimate the impact of the additional water use on existing nearby wells, underlying aquifers, and surface water bodies. Any proposed community or public water system or on-site water supply for any zoning permit, subdivision and any land development which does not provide an adequate water supply for use, or which adversely affects nearby wells or streams shall not be approved by the Township and shall be cause for denial of the subdivision or land development plans unless an alternate water supply is available.
3. Supply Requirements – The adequacy of the water supply shall be determined based on the following assumptions:
 - a. Residential – An average of 300 gallons per day with a peak daily multiplier of 2.5 and a peak 30-day average multiplier of 2.0 unless provisions are provided for a separate source of water for landscape irrigation. This number is based on an average house size of 3.0 bedrooms and may be adjusted by the Township for developments of different housing types.
 - b. Nonresidential – A professional engineer shall prepare an estimate of the quantity of water needed for the proposed use. The estimates shall include peak hourly, peak daily and average daily water demand. The estimate shall also include water needs for fire flow.
4. Report Requirements – The water resources impact study shall be prepared by a qualified hydrogeologist and a Professional Engineer registered in the Commonwealth of Pennsylvania and shall include the following:
 - a. Calculations of the projected water needs using the criteria set forth in the following references:
 - (1) *Public Water Supply Manual*, Bureau of Water Supply and Community Health, Pennsylvania Department of Environmental Protection, Harrisburg, PA (current edition);
 - (2) *Guide for Determination of Required Fire Flow* by the Insurance Services Office (ISO) (current edition);
 - (3) *American Water Works Association (AWWA)* standards and manuals for the American Water Works Association, Denver, CO.
 - b. A geological map of the area within a 1.0 mile radius of the site;

- c. The location of all fault lines, lineaments, and fracture traces shall apply as follows:

Withdrawal (range – GPD) Distance (radius) for study (feet)

1,001 – 2,600	750
2,601 – 6,000	1,500
6,001 – 10,000	3,000
10,100+	1 (mile)

- d. A discussion of the aquifer characteristics underlying the site and their long-term drought recharge capability based on site specific investigation or an accepted published data. Long term drought recharge capability shall be defined as the average amount of water that can be withdrawn from an aquifer during extended periods of low rainfall and/or high temperatures without adversely affecting existing wells and stream flow in the surrounding area. The term “adversely affecting” means a measurable drop in the static water level that would cause the well to not meet the needs of the property under peak demand or a reduction of water quality to the point where treatment is required.
 - e. Based on the drought recharge capability using existing data from other Township wells where available and relevant, and the calculated daily groundwater withdrawals of the project, a hydrologic budget for the subject site property itself and for the surrounding area with the same criteria as listed in subsection c. above.
 - f. A determination aided by the results of the hydrologic budget, of whether the potential exists for causing adverse effects on the hydrologic environment by the proposed subdivision or land development.
 - g. Measures proposed to mitigate any potentially adverse impacts identified.
 - h. A discussion and evaluation of opportunities for the reuse of treated wastewater for non-potable uses to reduce the demand for potable water.
 - i. A statement of the qualifications of the person(s) preparing the study.
5. Test Wells Required – A Water Resources Impact Study shall include testing of the well(s) for the quantity and quality of the water. The testing shall follow the procedures in Article V of the Township's Well Ordinance.
 6. Test Report – A report shall be prepared and submitted to the Township and shall accompany the submission of the test well results and observation data. The report shall analyze and interpret all of the data as to the impact on the groundwater supply and existing wells. Conclusions shall be drawn from the analysis as to the appropriateness of the site for the proposed water supply system. The credentials of the individual(s) preparing the report shall be included. Reports shall be sealed by the Professional Engineer and Professional Geologist responsible for the work.

If the results of the pumping test indicate a potential for adverse effects on neighboring wells, an agreement between the Township and the Applicant shall be reached to mitigate future problems before the well is certified for use.
 7. Well Depletion Agreement – The Applicant shall enter into a Well Depletion Agreement with the Township in accordance with the provisions of Article VII of the Township's Well Ordinance.
 8. Application Submission – The complete submission to the Township shall include any and all applications, reports, or supplemental information submitted to the Bucks County Department of Health, the Pennsylvania Department of Environmental Protection and/or the Delaware River Basin Commission, as required by those agencies.
 9. Preliminary Plan – All well testing requirements as set forth herein for a proposed well shall be met by the Applicant for a subdivision or land development prior to receiving preliminary plan approval from the Board of Supervisors.

APPENDIX I

GRANT OF CONSERVATION EASEMENT(S) FOR WETLANDS, RIPARIAN BUFFERS AND WETLAND TRANSITION AREAS

THIS INDENTURE made this day of _____, 200_, by and between [DEVELOPER], a Pennsylvania [FORM OF ENTITY], maintaining a business address at _____, (hereinafter called "Grantor") and BUCKINGHAM TOWNSHIP, a Second Class Township organized and existing under the laws of the Commonwealth of Pennsylvania maintaining a business address at 4613 Hughesian Drive, P. O. Box 413, Buckingham, Pennsylvania 18912 (hereinafter called "Grantee").

WITNESSETH:

That the said Grantor, for and in consideration of the payment of ONE DOLLAR (\$1.00) and other good and valuable consideration, the receipt of which is hereby acknowledged, has granted and by these presents docs grant, bargain, and convey to Grantee, its successors and assigns the following easements:

Tract No. 1: A Riparian Buffer, Wetland and Wetland Transition Area Conservation Easement located in Buckingham Township, Bucks County, Pennsylvania, bounded and described in accordance with a plan entitled "Reord Plan for [NAME OF DEVELOPMENT] Sheet ___ of ___", prepared by _____, Engineers for [NAME OF DEVELOPER] dated _____, last revised _____, more fully described on Exhibit "A" attached hereto and made part hereof.

[INSERT ADDITIONAL TRACT REFERENCES IF MORE THAN 1 TRACT IS BEING CONVEYED]

BEING part(s) of Bucks County Tax Map Parcel No. _____.

BEING parts of the same premises which _____, by Dced dated _____, and recorded in the office of the Recorder of Deeds of Bucks County, in Land Record Book _____, page _____, granted and conveyed unto _____, in fee.

TO HAVE AND TO HOLD tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) above described with the hereditements and appurtenances, unto the same Grantee to and for the proper use and behoof of said Grantee, its successors and assigns forever as a Riparian Buffer, Wetland and Wetland Transition Area Conservation Easement within Buckingham Township and for that purpose Grantor for itself and its successors and assigns covenants that tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) shall be subject to the following terms and conditions:

- 1. No trees, shrubs or other vegetation now or hereafter existing within the area of the easement shall be destroyed or removed except by mutual agreement of Grantor, or its heirs, successors and assigns, as the case may be, and Grantee and consistent with the conservation purposes to be achieved hereby.

2. No topsoil, sand, gravel, loam, rock or any other minerals shall be excavated, dredged, disturbed or removed from the area of the easement except by mutual agreement of Grantors and Grantee.
3. No building, fence, swimming pool, outbuilding, play equipment or other structure or obstruction whatsoever shall be erected within the area of the easement and no pavement shall be constructed thereon.
4. No dumping or placing of soil or other substance or material as landfill. And no dumping or placing of trash, waste or unsightly or offensive materials shall be permitted within the area of the easement.
5. No other activities shall be permitted within the area of the easement which would or might be detrimental to drainage, flood control, water conservation, water quality facilities erosion control or soil conservation and no other acts or uses detrimental to the preservation of the area of the easement shall be permitted.
6. Notwithstanding paragraphs 1 through 5 above, Normal property maintenance is not prohibited provided that the activities are performed in a manner that minimizes adverse effects to the conserved area:
 - a. For the purposes of this paragraph, "normal property maintenance" means activities required to maintain lawfully existing artificial and natural features, landscaping and gardening. These activities include:
 - i. Mowing of existing fields or lawns;
 - ii. Pruning of trees and shrubs;
 - iii. Cutting of dead trees;
 - iv. Replacement of existing non-native plants with either native or non-invasive, non-native species;
 - v. Limited supplemental planting of non invasive, non-native plant species that will not significantly change the character of the existing vegetational community of the conservation area. The creation of a lawn is not considered supplemental planting;
 - vi. Planting of native species, that is, plants naturally occurring in the conservation areas in the local region;
 - vii. Continued cultivation of existing gardens; and
 - viii. Maintenance of artificial features including the repair, rehabilitation, replacement, maintenance or reconstruction of any currently serviceable structure, lawfully existing prior to the date of this Easement.
 - b. Any activity which involves or causes the substantial alteration or change of the existing characteristics of the conservation area shall not be considered normal property maintenance. Activities which involve or cause substantial alteration or change of the conservation area include, but are not limited to, extensive removal or destruction of vegetation by clear cutting, cutting, mowing (except as described in 6 a(i) above), burning or application of herbicides, planting of ornamental plants or lawns for landscaping purposes (except as described in 6 a iv, v and vi above), regrading or significant changes in the existing surface contours and the placement of fill, pavement or other impervious surfaces.
7. Minor and temporary disturbances of the conservation area resulting from, and necessary for, normal construction activities on land adjacent to the conservation area is permitted, provided the activities do

not result in adverse environmental effects on the conservation area and do not continue for more than six months. For the purposes of this paragraph, minor and temporary disturbances include, but are not limited to, the placement of scaffolds or ladders, the removal of human-made debris by non-meehanized means which does not destroy woody vegetation, the placement of temporary eonstruction supports, and the placement of utility lines over or under a previously authorized, currently serviceable paved roadway surface;

8. Nothing herein contained shall be deemed to restriet the right of Grantor to maintain all roads, trails, bridges and structures existing within the area of the easement as of the date hereof.
9. Although the conservation easement granted hereby has been created for the benefit of the general public through the protection of water and land resources and natural beauty, nothing herein contained shall be construed to convey to the public any right of access or to use the area of the easement, and Grantor, its heirs, successors and assigns shall, subject to Grantee's inspection rights hereinafter set forth, retain the exclusive right of access to and use of the area of the easement.

AND Grantor for itself and its successors and assigns further covenants that said easement shall consist of permanent width and dimension equal to that and the same as that set forth in Exhibit(s) A, (insert letters of additional exhibits if more than one tract is being conveyed).

TOGETHER with the right of the Grantee to inspect said tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) on an annual basis to determine whether the provisions of this Conservation Easement are being observed and the right of the Grantee to inspect traect(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) at any time, without prior notice, if it has reasonable cause to believe the provisions of this Conservation Easement have been or are being violated. Grantee may charge Grantor, its heirs, successors and assigns as the owner of any lot burdened with this easement an annual fee to cover the cost to Grantee of making the annual and other inspections permitted hereunder. The Grantee shall be entitled to obtain an injunction against any such violation from a court of competent jurisdiction along with an order requiring that tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) be restored to the condition it was in prior to the violation, and to recover any costs or damages incurred including reasonable attorney's fees. Such relief may be sought jointly, severally, or serially. If, in the opinion of Grantee, the area of the easement (s) are not kept in good order and maintenance in compliance with the restrictions set forth herein, then Grantee shall have the right, but not the obligation, after providing the owner of the lot subject to this easement, with written notice and a period of ten (10) days to cure any failure to maintain to comply with any restriction or obligation referred to above, to enter upon the premises and return them to good order and maintenance as contemplated by this Grant of Easement and be reimbursed for all expenses incurred, including reasonable attorneys fees. The amount of any such expenses incurred by the Grantee and the amount of any fee to cover the costs of inspections shall be a municipal lien against the Property, and/or the Lot(s) whose Owner(s) has not paid the amount of the expenses or inspection fee levied against them by the Grantee for the cost of maintaining compliance with the restrictions or obligations set forth above or performing inspections, and the Grantee may exereise any and all available remedies to collect the amount of the expense and inspection fee, including but not limited to foreclosure on the munieipal lien. Such expenses and inspection fees so assessed, together with such interest thereon and cost of eollection thereof shall also be the personal obligation of the person(s) who was the owner of such property at the time when the assessment was made. In the case of joint ownership, all co-owners shall be jointly and severally liable.

Suit to collect a money judgment for unpaid assessments, inspection fees, interest, costs and fees, including attorneys' fees, may be maintained without waiving the lien securing same.

IT IS FURTHER UNDERSTOOD that this is not a conveyance of a fee interest but merely a grant of easement and that by accepting this easement, Grantee assumes no responsibility for the maintenance of the easement area. The easement permits Grantee to maintain the said facilities only to assure compliance with the terms of this easement.

IT IS FURTHER UNDERSTOOD that this Conservation Easement shall be a covenant running with the land and shall be effective in perpetuity. The restrictions set forth in this Conservation Easement shall be included in any grant of easement, deed or other conveyance purporting to convey or transfer an ownership interest in tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) or part thereof. Grantor declares for itself, its successors and assigns, that it will include verbatim the provisions of this Conservation Easement in any deed or other legal instrument by which it divests itself, in any manner, of any interest in all or a portion of tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed). It is further understood that the Doctrine of Changed Circumstances is not applicable to the granting of this Conservation Easement. It is the intent of the Grantor that the stated purposes of this Conservation Easement not be diminished and that the conservation values achieved by this Conservation Easement be protected in perpetuity. This Conservation Easement shall be interpreted under the laws of the Commonwealth of Pennsylvania. For the purposes of interpretation, no party to this Conservation Easement shall be considered to be the drafter of the Conservation Easement. It is further understood that this Conservation Easement is drafted with the express intention that it conform with the requirements for the protection of easements under the Conservation and Preservation Easements Act, Act 29 of 2001, Pub. L. No. 330, 32 P.S. § 5051 et seq.

AND the said Grantor, for itself, its successors and assigns, does by these presents forever covenant, promise and agree to and with the said Grantee, its successors and assigns, that it the said Grantor, its successors and assigns, shall and will, subject as foresaid, WARRANT AND FOREVER DEFEND all and singular the title, rights and easements hereby granted unto the said Grantee, its successors and assigns, against all or any person or persons whomsoever lawfully claiming by, from or under it, them or any of them.

IN WITNESS WHEREOF, the said Grantor has hereunto set its hand and seal the day and year first above written.

ATTEST:

[DEVELOPER]

[SEAL]

By: _____

Title: _____

The precise address of the Grantee is:

Buckingham Township Building
4613 Hughesian Drive
P.O. Box 413
Buckingham, PA 18912-0413

On behalf of Grantee

COMMONWEALTH OF PENNSYLVANIA :

: ss

COUNTY OF BUCKS :

:

On this the ____ day of _____, 200__, before me, a Notary Public, the undersigned officer, personally appeared _____, who acknowledged himself (and duly appointed by its Members) to be _____ of [DEVELOPER], and in that capacity, being authorized to do so, executed the forgoing instrument for the purpose therein contained by signing his name.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

Notary Public

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APPENDIX J

GRANT OF CONSERVATION EASEMENT(S)

THIS INDENTURE made this day of _____, 200_, by and between [DEVELOPER], a Pennsylvania [FORM OF ENTITY], maintaining a business address at _____, (hereinafter called "Grantor") and BUCKINGHAM TOWNSHIP, a Second Class Township organized and existing under the laws of the Commonwealth of Pennsylvania maintaining a business address at 4613 Hughesian Drive, P. O. Box 413, Buckingham, Pennsylvania 18912 (hereinafter called "Grantee").

WITNESSETH:

That the said Grantor, for and in consideration of the payment of ONE DOLLAR (\$1.00) and other good and valuable consideration, the receipt of which is hereby acknowledged, has granted and by these presents does grant, bargain, and convey to Grantee, its successors and assigns the following easements:

Tract No. 1: A Conservation Easement located in Buckingham Township, Bucks County, Pennsylvania, bounded and described in accordance with a plan entitled "Record Plan for [NAME OF DEVELOPMENT] Sheet of ", prepared by _____, Engineers for [NAME OF DEVELOPER] dated _____, last revised _____, more fully described on Exhibit "A" attached hereto and made part hereof.

[INSERT ADDITIONAL TRACT REFERENCES IF MORE THAN 1 TRACT IS BEING CONVEYED]

BEING part(s) of Bucks County Tax Map Parcel No. _____.

BEING parts of the same premises which _____, by Deed dated _____, and recorded in the office of the Recorder of Deeds of Bucks County, in Land Record Book _____, page _____, granted and conveyed unto _____, in fee.

TO HAVE AND TO HOLD tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) above described with the hereditements and appurtenances, unto the same Grantee to and for the proper use and behoof of said Grantee, its successors and assigns forever as a Conservation Easement within Buckingham Township and for that purpose Grantor for itself and its successors and assigns covenants that tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) shall be subject to the following terms and conditions:

1. No trees, shrubs or other vegetation now or hereafter existing within the area of the easement shall be destroyed or removed except by mutual agreement of Grantor, or its heirs, successors and assigns, as the case may be, and Grantee and consistent with the conservation purposes to be achieved hereby.
2. No topsoil, sand, gravel, loam, rock or any other minerals shall be excavated dredged or removed from the area of the easement except by mutual agreement of Grantors and Grantee.
3. No building, fence, swimming pool, outbuilding, play equipment or other structure or obstruction whatsoever shall be erected within the area of the easement and no roads for motorized vehicles shall be constructed thereon.

4. No dumping or placing of soil or other substance or material as landfill. And no dumping or placing of trash, waste or unsightly or offensive materials shall be permitted within the area of the easement.
5. No other activities shall be permitted within the area of the easement which would or might be detrimental to drainage, flood control, water conservation, water quality facilities erosion control or soil conservation and no other acts or uses detrimental to the preservation of the area of the easement shall be permitted.
6. Nothing herein contained shall be deemed to restrict the right of Grantor to maintain all roads, trails, bridges and structures existing within the area of the easement as of the date hereof.
7. Although the conservation easement granted hereby has been created for the benefit of the general public through the protection of water and land resources and natural beauty, nothing herein contained shall be construed to convey to the public any right of access or to use the area of the easement, and Grantor, its heirs, successors and assigns shall, subject to Grantee's inspection rights hereinafter set forth, retain the exclusive right of access to and use of the area of the easement.

AND Grantor for itself and its successors and assigns further covenants that said easement shall consist of permanent width and dimension equal to that and the same as that set forth in Exhibit(s) A, (insert letters of additional exhibits if more than one tract is being conveyed).

TOGETHER with the right of the Grantee to inspect said tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) on an annual basis to determine whether the provisions of this Conservation Easement are being observed and the right of the Grantee to inspect tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) at any time, without prior notice, if it has reasonable cause to believe the provisions of this Conservation Easement have been or are being violated. Grantee may charge Grantor, its heirs, successors and assigns as the owner of any lot burdened with this easement an annual fee to cover the cost to Grantee of making the annual and other inspections permitted hereunder. The Grantee shall be entitled to obtain an injunction against any such violation from a court of competent jurisdiction along with an order requiring that tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) be restored to the condition it was in prior to the violation, and to recover any costs or damages incurred including reasonable attorney's fees. Such relief may be sought jointly, severally, or serially. If, in the opinion of Grantee, the area of the easement(s) are not kept in good order and maintenance in compliance with the restrictions set forth herein, then Grantee shall have the right, but not the obligation, after providing the owner of the lot subject to this easement, with written notice and a period of ten (10) days to cure any failure to maintain to comply with any restriction or obligation referred to above, to enter upon the premises and return them to good order and maintenance as contemplated by this Grant of Easement and be reimbursed for all expenses incurred, including reasonable attorneys fees. The amount of any such expenses incurred by the Grantee and the amount of any fee to cover the costs of inspections shall be a municipal lien against the Property, and/or the Lot(s) whose Owner(s) has not paid the amount of the expenses or inspection fee levied against them by the Grantee for the cost of maintaining compliance with the restrictions or obligations set forth above or performing inspections, and the Grantee may exercise any and all available remedies to collect the amount of the expense and inspection fee, including but not limited to foreclosure on the municipal lien. Such expenses and inspection fees so assessed, together with such interest thereon and cost of collection thereof shall also be the personal obligation of the person(s) who was the owner of such property at the time when the assessment was made. In the case of joint ownership, all co-owners shall be jointly and severally liable. Suit to collect a money judgment for unpaid assessments, inspection fees, interest, costs and fees, including attorneys' fees, may be maintained without waiving the lien securing same.

IT IS FURTHER UNDERSTOOD that this is not a conveyance of a fee interest but merely a grant of easement and that by accepting this easement, Grantee assumes no responsibility for the maintenance of the easement area. The easement permits Grantee to maintain the said facilities only to assure compliance with the terms of this easement.

IT IS FURTHER UNDERSTOOD that this Conservation Easement shall be a covenant running with the land and shall be effective in perpetuity. The restrictions set forth in this Conservation Easement shall be included in any grant of easement, deed or other conveyance purporting to convey or transfer an ownership interest in tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) or part thereof. Grantor declares for itself, its successors and assigns, that it will include verbatim the provisions of this Conservation Easement in any deed or other legal instrument by which it divests itself, in any manner, of any interest in all or a portion of tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed). It is further understood that the Doctrine of Changed Circumstances is not applicable to the granting of this Conservation Easement. It is the intent of the Grantor that the stated purposes of this Conservation Easement not be diminished and that the conservation values achieved by this Conservation Easement be protected in perpetuity. This Conservation Easement shall be interpreted under the laws of the Commonwealth of Pennsylvania. For the purposes of interpretation, no party to this Conservation Easement shall be considered to be the drafter of the Conservation Easement. It is further understood that this Conservation Easement is drafted with the express intention that it conform with the requirements for the protection of easements under the Conservation and Preservation Easements Act, Act 29 of 2001, Pub. L. No. 330, 32 P.S. § 5051 et seq.

AND the said Grantor, for itself, its successors and assigns, does by these presents forever covenant, promise and agree to and with the said Grantee, its successors and assigns, that it the said Grantor, its successors and assigns, shall and will, subject as foresaid, WARRANT AND FOREVER DEFEND all and singular the title, rights and easements hereby granted unto the said Grantee, its successors and assigns, against all or any person or persons whomsoever lawfully claiming by, from or under it, them or any of them.

IN WITNESS WHEREOF, the said Grantor has hereunto set its hand and seal the day and year first above written.

ATTEST:

[DEVELOPER]

[SEAL]

By: _____

Title: _____

The precise address of the Grantee is:

Buckingham Township Building
4613 Hughesian Drive
P.O. Box 413
Buckingham, PA 18912-0413

On behalf of Grantee

COMMONWEALTH OF PENNSYLVANIA :

: ss

COUNTY OF BUCKS

:

On this the ____ day of _____, 200__, before me, a Notary Public, the undersigned officer, personally appeared _____, who acknowledged himself (and duly appointed by its Members) to be _____ of [DEVELOPER], and in that capacity, being authorized to do so, executed the forgoing instrument for the purpose therein contained by signing his name.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

Notary Public

APPENDIX K

GRANT OF STORMWATER EASEMENT(S)

THIS INDENTURE made this _____ day of _____, 200_, by and between [DEVELOPER], a Pennsylvania [FORM OF ENTITY], maintaining a business address at _____, (hereinafter called "Grantor") and BUCKINGHAM TOWNSHIP, a Second Class Township organized and existing under the laws of the Commonwealth of Pennsylvania maintaining a business address at 4613 Hughesian Drive, P. O. Box 413, Buckingham, Pennsylvania 18912 (hereinafter called "Grantee").

WITNESSETH:

That the said Grantor, for and in consideration of the payment of ONE DOLLAR (\$1.00) and other good and valuable consideration, the receipt of which is hereby acknowledged, has granted and by these presents does grant, bargain, and convey to Grantee, its successors and assigns the following easements:

Tract No. 1: A Storm Drainage Easement located in Buckingham Township, Bucks County, Pennsylvania, bounded and described in accordance with a plan entitled "Record Plan for [NAME OF DEVELOPMENT] Sheet of ", prepared by _____, Engineers for [NAME OF DEVELOPER] dated _____, last revised _____, more fully described on Exhibit "A" attached hereto and made part hereof.

[INSERT ADDITIONAL TRACT REFERENCES IF MORE THAN 1 ARE BEING CONVEYED]

BEING part(s) of Bucks County Tax Map Parcel No. _____.

BEING parts of the same premises which _____, by Deed dated _____, and recorded in the office of the Recorder of Deeds of Bucks County, in Land Record Book _____, page _____, granted and conveyed unto _____, in fee.

TO HAVE AND TO HOLD tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) above described with the hereditaments and appurtenances, unto the same Grantee to and for the proper use and behoof of said Grantee, its successors and assigns forever as Storm Water Drainage Easements for purposes of stormwater runoff and stormwater system piping and for those purposes also the right, but not the obligation, to make and at all times install, construct, reconstruct, repair, replace and maintain said stormwater system drainage facilities and appurtenances installed therein as may be reasonable and proper in that behalf.

TOGETHER with the right of ingress and egress over tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) above described; and a perpetual right of way and easement to construct, lay, operate, renew, alter, inspect, maintain, repair, add to, change the size of, replace or remove such part or parts of its

stormwater system, its lines, pipes and additional lines, drainage structures, accessories and other appurtenances pertaining thereto as the Grantee may from time to time require, including any swales, pipes, conduits, manholes, valves, boxes, drains, wires, structures and other facilities used or useful in connection therewith in, upon, over, under, across and through the aforementioned properties, as the Grantee may from time to time require. Said easements shall consist of permanent width and dimension equal to that and the same as that set forth in Exhibit(s) A, (insert letters of additional exhibits if more than one tract is being conveyed) and any additional temporary construction easement as may have been reserved by said Grantor. It is understood that the property shall be returned to its former condition insofar as reasonably possible after any maintenance work.

IT BEING UNDERSTOOD that it is the primary responsibility of Grantor, its heirs, successors and assigns as the owner of any lot burdened with this easement on tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) to maintain any stormwater management basins and runoff swales located within the easement on a lot and that such stormwater management basins and runoff swales shall be maintained, improved, repaired, managed, insured and controlled by the lot owner. The Owner of any lot containing such features may not plant any landscaping items or place paving or structures (including fences, play sets and swimming pools) on or in the area of the easement(s). Owners of tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) shall be required to perform regular maintenance [DESCRIBE THE TYPE OF MAINTENANCE NECESSARY FOR THE STORMWATER SYSTEM USED] of the stormwater management basins and runoff swales.

IT BEING FURTHER UNDERSTOOD the Grantee shall have the right to inspect said tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) on an annual basis to determine whether the provisions of this Easement are being observed and the right to inspect the aforementioned tracts at any time, without prior notice, if Grantee has reasonable cause to believe the provisions of this Easement have been or are being violated. Grantee may charge Grantor, its heirs, successors and assigns as the owner of any lot burdened with this easement an annual fee to cover the cost to Grantee of making the annual and other inspections permitted hereunder. The Grantee shall be entitled to obtain an injunction from a court of competent jurisdiction against any violation of the terms of this easement and to compel the maintenance of the stormwater management basins and runoff swales and compliance with this Easement, and to recover any costs or damages incurred including reasonable attorney's fees. Such relief may be sought jointly, severally, or serially. If, in the opinion of Grantee, the area of the easement(s) are not kept in good order and maintenance so as to properly function as storm water drainage easements, then Grantee shall have the right, but not the obligation, after providing the owner of the lot subject to this easement, with written notice and a period of ten (10) days to cure any failure to maintain the stormwater management basins and runoff swales or to comply with any restriction or obligation referred to above, to enter upon the premises and return them to good order and maintenance as contemplated by this Grant of Easement and be reimbursed for all expenses incurred, including reasonable attorneys fees. The amount of any such expenses incurred by the Grantee and the amount of any fee to cover the costs of inspections shall be a municipal lien against the Property, and/or the Lot(s) whose Owner(s) has not paid the amount of the expenses or inspection fee levied against them by the Grantee for the cost of maintaining the stormwater management basins and runoff swales, compliance with the restrictions or obligations set forth above or performing inspections, and the Grantee may exercise any and all available remedies to collect the amount of the expense and inspection fee, including but not limited to foreclosure on the municipal lien. Such expenses and inspection fees so assessed, together with such interest thereon and cost of collection

thereof shall also be the personal obligation of the person(s) who was the owner of such property at the time when the assessment was made. In the case of joint ownership, all co-owners shall be jointly and severally liable. Suit to collect a money judgment for unpaid assessments, inspection fees, interest, costs and fees, including attorney's fees, may be maintained without waiving the lien securing same.

IT IS FURTHER UNDERSTOOD this is not a conveyance of a fee interest but merely a grant of easement for the operation and maintenance of the aforesaid facilities.

AND the said Grantor, for itself, its successors and assigns, does by these presents forever covenant, promise and agree to and with the said Grantee, its successors and assigns, that it the said Grantor, its successors and assigns, shall and will, subject as foresaid, WARRANT AND FOREVER DEFEND all and singular the title, rights and easements hereby granted unto the said Grantee, its successors and assigns, against all or any person or persons whomsoever lawfully claiming by, from or under it, them or any of them.

IN WITNESS WHEREOF, the said Grantor has hereunto set its hand and seal the day and year first above written.

ATTEST:

[DEVELOPER]

[SEAL]

By: _____

Title: _____

The precise address of the Grantee is:

Buckingham Township Building
4613 Hughesian Drive
P.O. Box 413
Buckingham, PA 18912-0413

On behalf of Grantee

COMMONWEALTH OF PENNSYLVANIA :

: ss

COUNTY OF BUCKS :

On this the ____ day of _____, 200__, before me, a Notary Public, the undersigned officer, personally appeared _____, who acknowledged himself (and duly appointed by its Members) to be _____ of [DEVELOPER], and in that capacity, being authorized to do so, executed the forgoing instrument for the purpose therein contained by signing his name.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

Notary Public

APPENDIX L

DEED OF DEDICATION AND EASEMENT

THIS INDENTURE made this _____ day of _____, 2003, by and between [DEVELOPER] , a Pennsylvania [FORM OF ENTITY] , maintaining a business address at _____, (hereinafter called "Grantor") and BUCKINGHAM TOWNSHIP, a Second Class Township organized and existing under the laws of the Commonwealth of Pennsylvania maintaining a business address at 4613 Hughesian Drive, P. O. Box 413, Buckingham, Pennsylvania 18912 (hereinafter called "Grantee").

WITNESSETH:

THAT the said Grantor, for and in consideration of the sum of ONE DOLLAR (\$1.00) lawful money of the United States of America, unto them well and truly paid by the said Grantee at and before the sealing and delivery of these presents, the receipt whereby is hereby acknowledged, and in consideration of the advantage to it accruing as well as for diverse and other considerations affecting the public welfare which it seeks to advance, has granted, sold and conveyed, and by these presents does grant, sell and convey unto the said Grantee, its successors and assigns the following easement(s):

Tract No. 1: A _____ foot Utility Easement located in Buckingham Township, Bucks County, Pennsylvania, bounded and described in accordance with a plan entitled "Record Plan for [NAME OF DEVELOPMENT] Sheet _____ of _____", prepared by _____ Engineers for [NAME OF DEVELOPER] dated _____, last revised _____, more fully described on Exhibit "A" attached hereto and made part hereof.

[INSERT ADDITIONAL TRACT REFERENCES IF MORE THAN 1 ARE BEING CONVEYED]

BEING part(s) of Bucks County Tax Map Parcel No. _____.

BEING parts of the same premises which _____, by Deed dated _____, and recorded in the office of the Recorder of Deeds of Bucks County, in Land Record Book _____, page _____, granted and conveyed unto _____, in fee.

TO HAVE AND TO HOLD tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) above described together with the sewer line facilities and water line facilities and appurtenances contained therein unto the said Grantee to be used and maintained by Buckingham Township and for its only proper use and on behalf of said Grantee, its successors and assigns forever as and for an easement for the purpose of maintaining sewer lines and water lines, together with the right of ingress, egress and regress over and across said lands for the purposes of installation, construction, reconstruction, maintenance, repair and replacement of facilities and appurtenances installed therein, making good, nevertheless at its own expense, all damage or disturbance which may be caused to the land in relation to such installation, construction, reconstruction, maintenance, repair and replacement.

TOGETHER with the right of ingress and egress over tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) above described; and a perpetual right of way and easement to construct, lay, operate, renew, alter, inspect, maintain, repair, add to, change the size of, replace or remove such part or parts of its water system and sewer system, lines and additional lines, drainage structures, accessories and other appurtenances pertaining thereto, as the Grantee may from time to time require, including any pipes, conduits, manholes, valves, boxes, drains, wires, structures and other facilities used or useful in connection therewith in, upon, over, under, across and through the aforementioned property. Said easements shall consist of permanent width and dimension equal to that and the same as that set forth in Exhibit(s) A, (insert letters of additional exhibits if more than one tract is being conveyed).

IT BEING UNDERSTOOD that the Owner of any lot burdened with this easement may not plant any landscaping items or place paving or structures (including fences, play sets and swimming pools) on or in the area of the easement(s).

IT BEING FURTHER UNDERSTOOD the Grantee shall have the right to inspect said tract(s) number(ed) 1, (insert numbers of additional tracts if more than one are being conveyed) on an annual basis to determine whether the provisions of this Easement are being observed and the right to inspect the aforementioned tracts at any time, without prior notice, if Grantee has reasonable cause to believe the provisions of this Easement have been or are being violated. Grantee may charge Grantor, its heirs, successors and assigns as the owner of any lot burdened with this easement an annual fee to cover the cost to Grantee of making the annual and other inspections permitted hereunder. The Grantee shall be entitled to obtain an injunction from a court of competent jurisdiction against any violation of the terms of this easement, and to recover any costs or damages incurred including reasonable attorney's fees. Such relief may be sought jointly, severally, or serially. If, in the opinion of Grantee, the area of the easement(s) are not kept clear of landscaping items, paving or structures, then Grantee shall have the right, but not the obligation, after providing the owner of the lot subject to this easement, with written notice and a period of ten (10) days to remove any landscaping items, paving or structures, or to comply with any restriction or obligation referred to above, to enter upon the premises and return them to good order and maintenance as contemplated by this Grant of Easement and be reimbursed for all expenses incurred, including reasonable attorneys fees. The amount of any such expenses incurred by the Grantee and the amount of any fee to cover the costs of inspections shall be a municipal lien against the Property, and/or the Lot(s) whose Owner(s) has not paid the amount of the expenses or inspection fee levied against them by the Grantee for the cost to remove any landscaping items, paving or structures, compliance with the restrictions or obligations set forth above or performing inspections, and the Grantee may exercise any and all available remedies to collect the amount of the expense and inspection fee, including but not limited

to foreclosure on the municipal lien. Such expenses and inspection fees so assessed, together with such interest thereon and cost of collection thereof shall also be the personal obligation of the person(s) who was the owner of such property at the time when the assessment was made. In the ease of joint ownership, all co-owners shall be jointly and severally liable. Suit to collect a money judgment for unpaid assessments, inspection fees, interest, costs and fees, including attorneys' fees, may be maintained without waiving the lien securing same.

IT IS FURTHER UNDERSTOOD this is not a conveyance of a fee interest but merely a grant of easement for the operation and maintenanece of the aforesaid facilities.

AND, the said Grantor, for itself, its successors and assigns, does by these presents further covenant, promise and agree to and with the said Grantee, its successors and assigns that it, the said Grantor, its successors and assigns, shall and will, subject as aforesaid, WARRANT AND FOREVER DEFEND all and singular the title, rights and premises hereby granted unto the said Grantee, its successors and assigns, against all or any person or persons whosoever lawfully elaiming or to claim the same or any part thereof, by, from and under it, them, or any of them.

IN WITNESS WHEREOF, the said Grantor has hereunto set its hand and seal the day and year first above written.

ATTEST:

[DEVELOPER]

[SEAL]

By: _____

Title: _____

The precise address of the Grantee is:

Buckingham Township Building
4613 Hughesian Drive
P.O. Box 413
Buckingham, PA 18912-0413

On behalf of Grantee

COMMONWEALTH OF PENNSYLVANIA :

: ss

COUNTY OF BUCKS :

On this the ____ day of _____, 200__, before me, a Notary Public, the undersigned officer, personally appeared _____, who acknowledged himself (and duly appointed by its Members) to be _____ of [DEVELOPER], and in that capacity, being authorized to do so, executed the forgoing instrument for the purpose therein contained by signing his name.

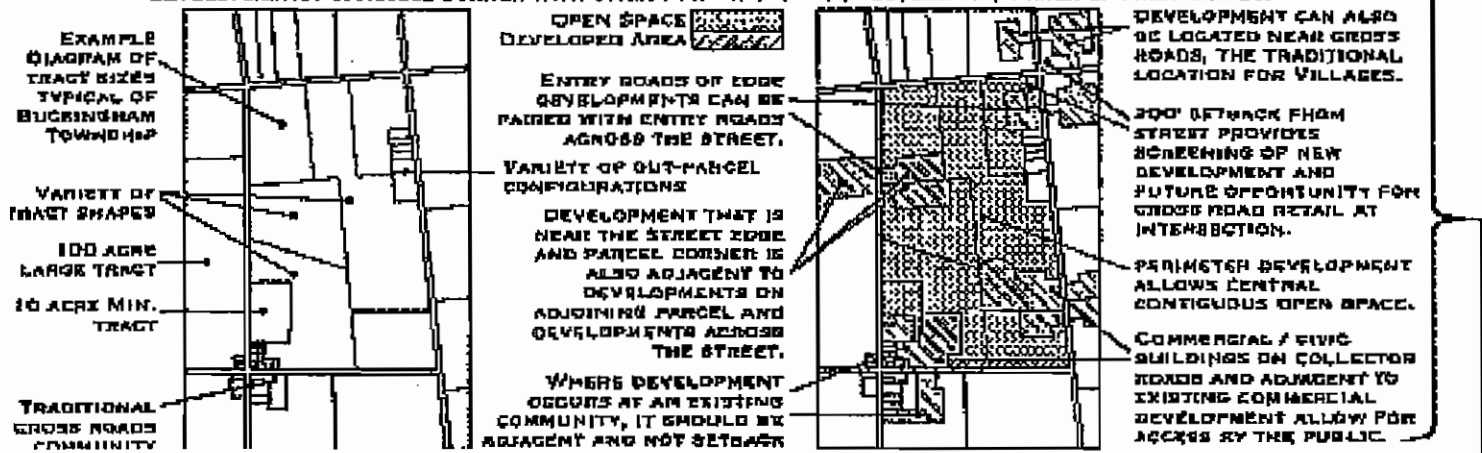
IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

Notary Public

APENDIX M - PATTERNS FOR DEVELOPMENT OF B14 NEIGHBORHOODS

EXAMPLE OF DEVELOPMENTS USING CONCEPT OF STREET EDGE & PARCEL CORNER

EDGE DEVELOPMENT LESSENS INFRASTRUCTURE DISTANCES, CREATES MORE CONTIGUOUS OPEN SPACE, AND HAS LESS IMPACT ON FARMING, WILDLIFE BOUNDARIES, AND DRAINAGE. DEVELOPMENT ALONG SIDEYAKS ALLOW CONNECTION TO ADJACENT FUTURE DEVELOPMENTS. A PARCEL CORNER WITH STREET FRONTAGE IS THE DEVELOPMENT AREA OF FIRST CHOICE.



CALCULATION OF MAX. DEVELOPMENT AREA

MAX. NET DEVELOPMENT AREA CALCULATION:
 $BASE\ SITE\ AREA * (20\% + (BASE * 0.07\%))$

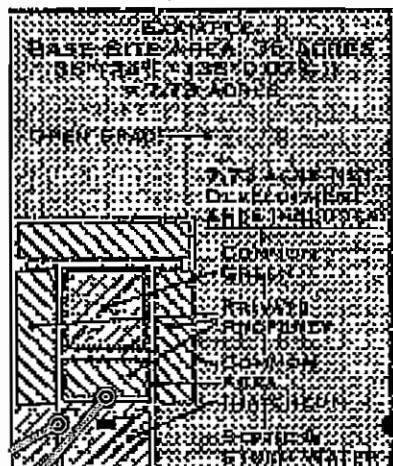
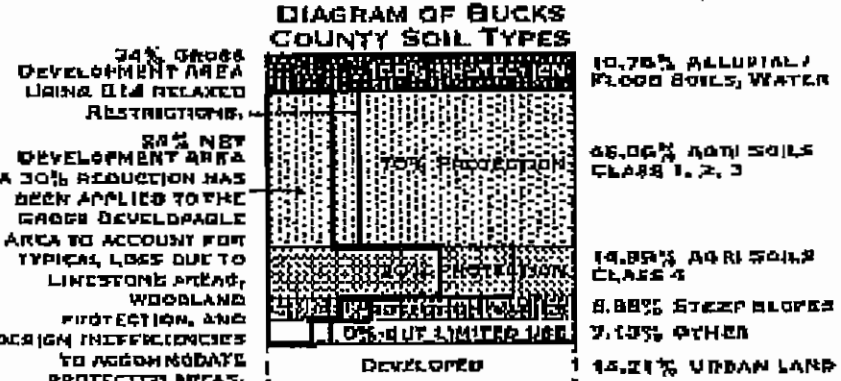


DIAGRAM OF BUCKS COUNTY SOIL TYPES



34% GROSS DEVELOPMENT AREA USING B14 RELAXED RESTRICTIONS.

22% NET DEVELOPMENT AREA A 30% REDUCTION HAS BEEN APPLIED TO THE GROSS DEVELOPABLE AREA TO ACCOUNT FOR TYPICAL LOSSES DUE TO LINGSTONE AREAS, WOODLAND PROTECTION, AND DESIGN INEFFICIENCIES TO ADOPT SUBSAFE PROTECTED AREAS.

LAYOUT EFFICIENCY THE LAYOUT OF A 110 ACRE PARCEL IS 30% MORE EFFICIENT THAN A 10 ACRE PARCEL, OR A RATIO OF 0.07% PER ACRE.

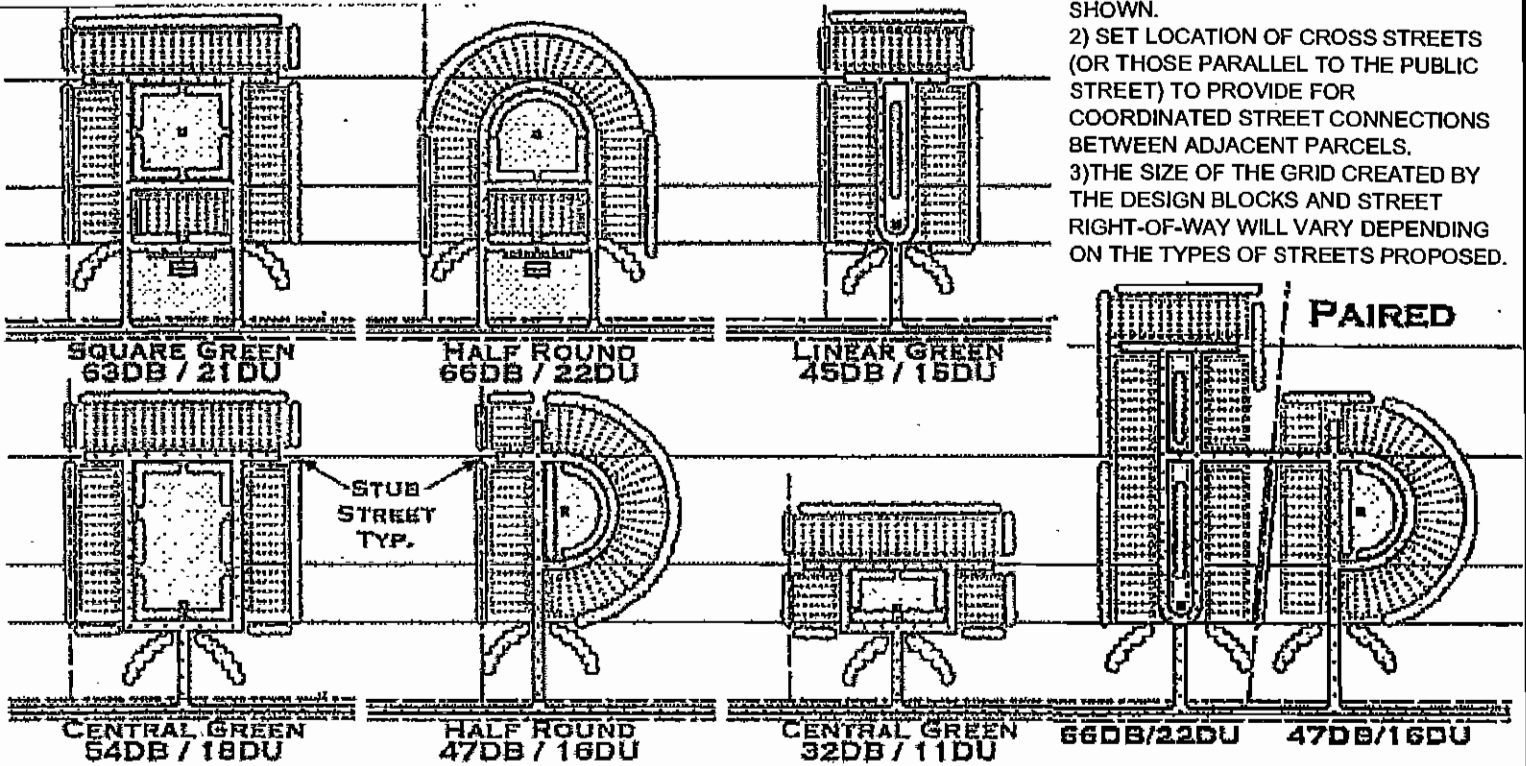
INCREASE IN CALCULATED MAX. DEVELOPMENT AREA THE MIN. INCREASE (UP TO OF 24%) MAY BE GRANTED IF IT IS TECHNICALLY INFEASIBLE TO FIT SEPTIC OR STORMWATER SYSTEMS.

SOURCE: SOIL SURVEY OF BUCKS & PHILADELPHIA COUNTIES, 1978. IT SHOULD BE NOTE THAT TO USE THE 1993 MAPS, CHECK THE 1987 SURVEY MAPS FOR ANY PUBLISHED IN 1990 DATE FORMER AND THE TABLES TABLE FOR SOIL SURVEY AND MAP SYMBOLS.

NEIGHBORHOOD VARIANTS

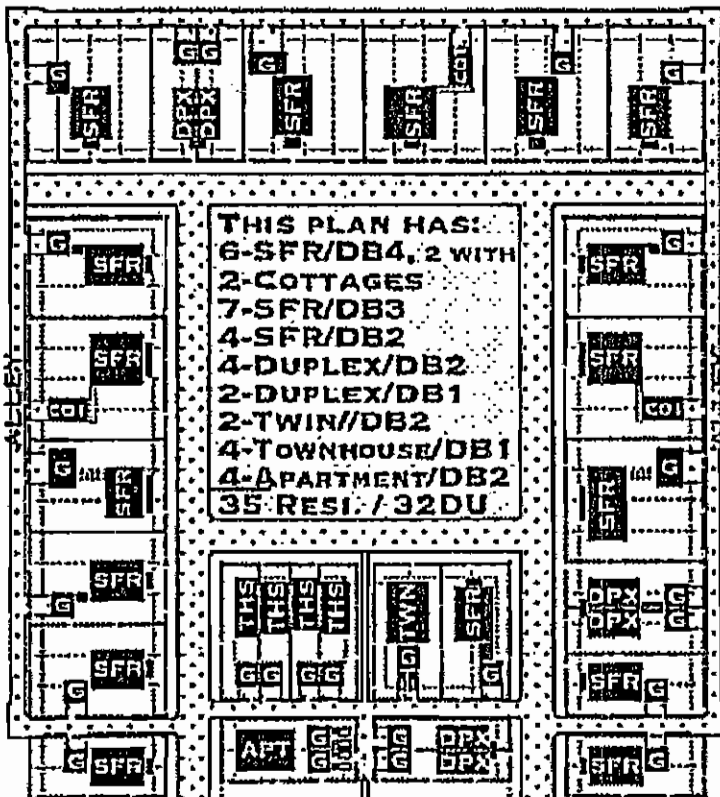
NEIGHBORHOODS

- 1) THERE ARE MANY MORE NEIGHBORHOOD VARIANTS THAN THOSE SHOWN.
- 2) SET LOCATION OF CROSS STREETS (OR THOSE PARALLEL TO THE PUBLIC STREET) TO PROVIDE FOR COORDINATED STREET CONNECTIONS BETWEEN ADJACENT PARCELS.
- 3) THE SIZE OF THE GRID CREATED BY THE DESIGN BLOCKS AND STREET RIGHT-OF-WAY WILL VARY DEPENDING ON THE TYPES OF STREETS PROPOSED.



DWELLING UNIT TYPES

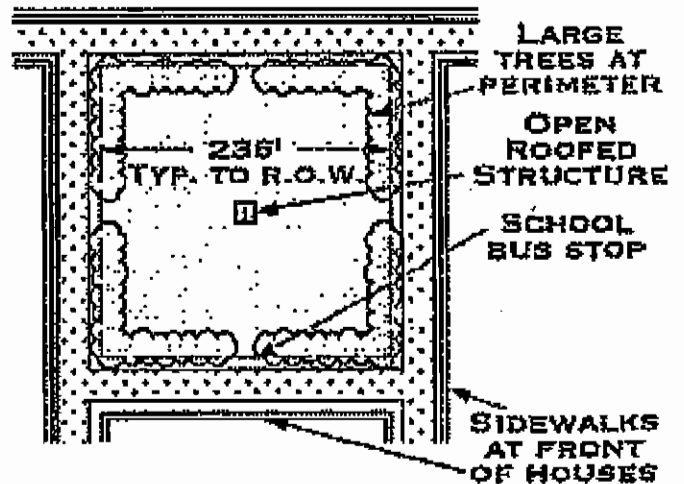
SAMPLE LAYOUT: 72DB / 32DU



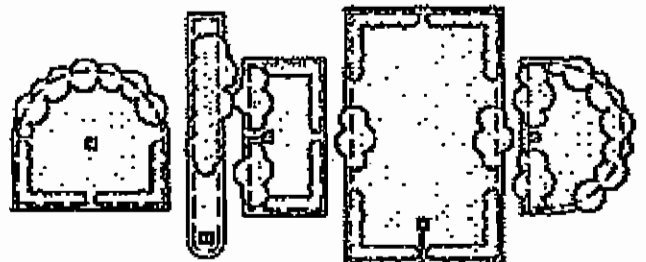
PATH TO ENTRY

EXAMPLE STREET PARKING RATIO: 4/DU

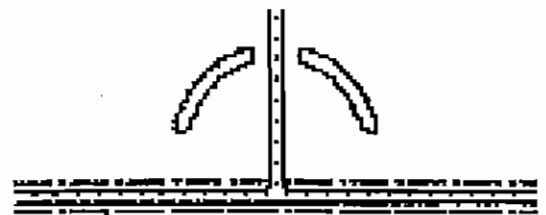
COMMON GREENS



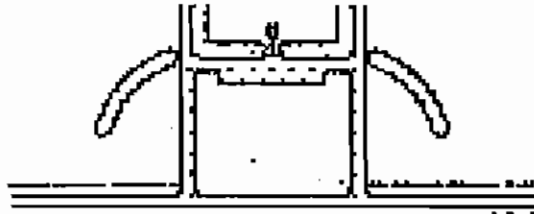
POSSIBLE VARIATIONS



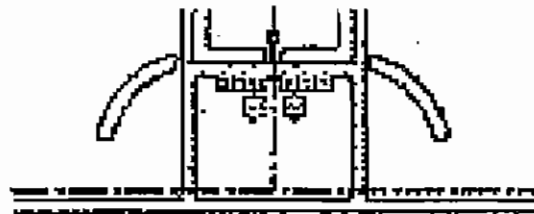
ENTRY VARIANTS



**SINGLE STREET ENTRY
FOR MAX. OF 24 DWELLINGS**



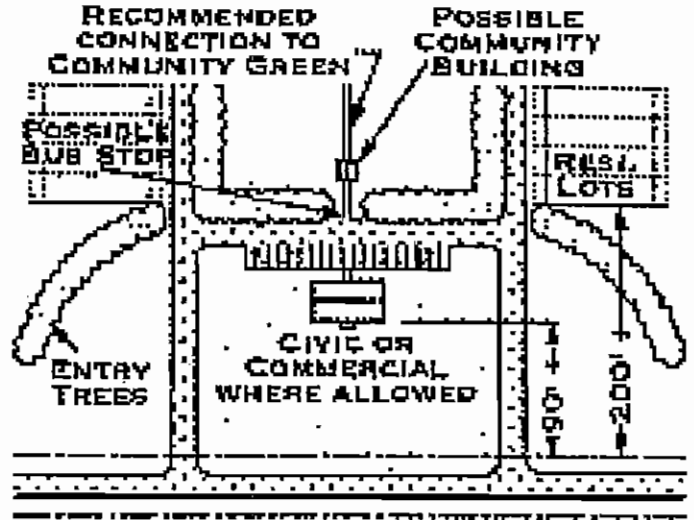
DUAL STREET ENTRY



SHARED ENTRY

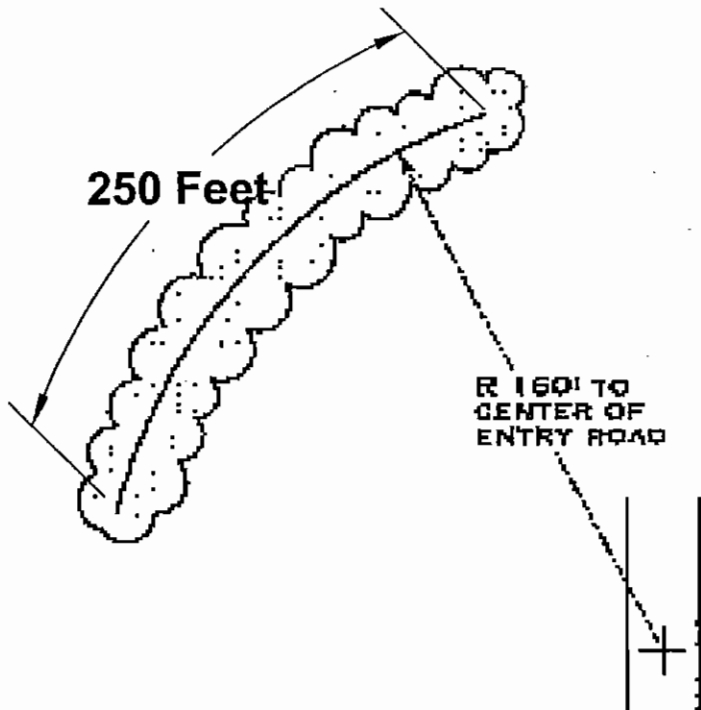
ENTRY FEATURES

TYPICAL GATEWAY ENTRY - DUAL STREET

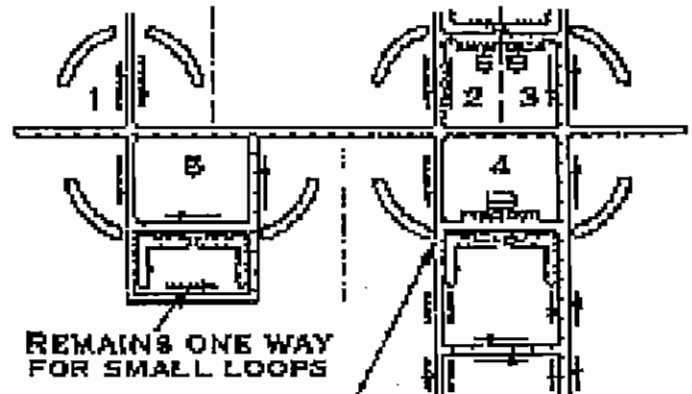
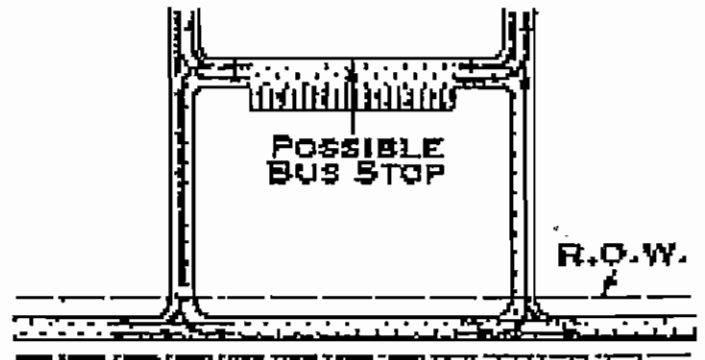


**BUILDING DESIGN
(1) PARKING FOR COMMERCIAL MUST BE
BEHIND BUILDING.**

ENTRY TREES

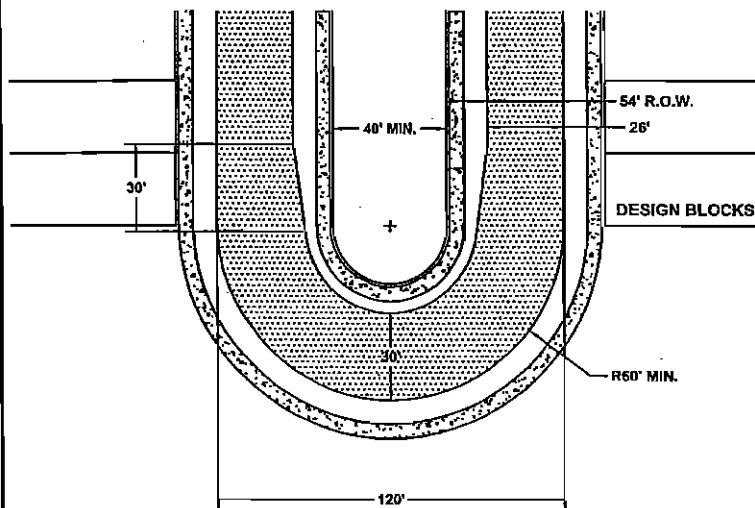


TRAFFIC PATTERNS

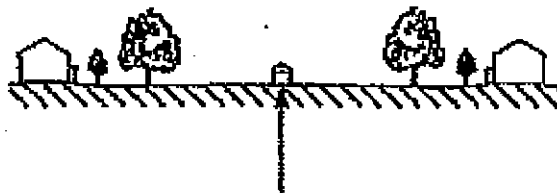


**REMAINS ONE WAY
FOR SMALL LOOPS
ROAD CHANGES TO TWO WAY
AT CROSS
STREET IN LARGER COMMUNITIES**

NARROWEST TURN-AROUND

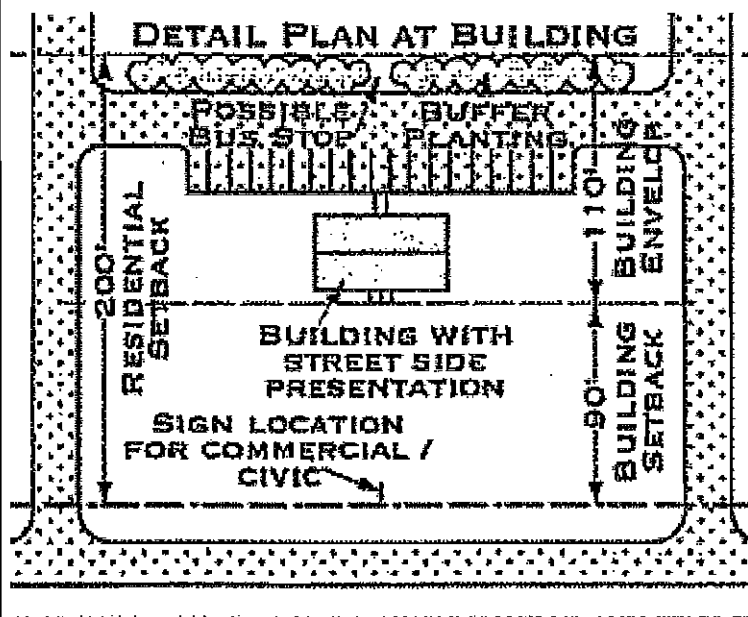


COMMON STRUCTURES



COVERED STRUCTURE FOR GREENS
 THE STRUCTURE'S PURPOSE IS TO PROVIDE RAIN AND SUN PROTECTION FOR OUTDOOR ACTIVITIES SUCH AS RESIDENT PARTIES, COOK-OUTS, COMMUNITY GARAGE SALES, AND OUTDOOR SEATING. THE SIDES SHOULD BE PREDOMINANTLY OPEN AND THE FLOOR SHOULD BE WEATHER PROOF AND APPROXIMATELY LEVEL WITH ADJACENT GRADE. THE STRUCTURE'S APPEARANCE SHOULD BE APPROPRIATE FOR A PARK OR GARDEN.

COMMERCIAL/CIVIC LAYOUT



MOUNTABLE CURB DETAIL

