Part II: Highlands Council Project Review Standards

Prepared by the State of New Jersey Highlands Water Protection and Planning Council in Support of the Highlands Regional Master Plan

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Introduction

This document is to provide standards for project reviews in accordance with the Goals, Policies and Objectives (GPOs) of the Highlands Regional Master Plan (RMP). The standards provide additional detail and clarification of the standards found in the RMP as adopted by the Highlands Council in accordance with the process established in the Highlands Act. If there is any discrepancy between the standards herein and the RMP, the RMP shall rule.

Please refer to the accompanying document "Highlands Council Project Review Procedures" for the applicability of these standards, the process for review and approval and any waiver or mitigation procedures.

ARTICLE 1. DEFINITIONS

§ 1.1 WORD USAGE

Terms used in the body of these standards which are defined by the Highlands Act are intended to have the same definitions as provided in the Highlands Act. Unless expressly stated to the contrary or alternately defined herein, terms which are defined by the MLUL are intended to have the same meaning as set forth in the MLUL. For purposes of these standards, the terms "shall" and "must" are indicative of a mandatory action or requirement while the word "may" is permissive.

§ 1.2 DEFINITIONS

For purposes of these standards the following definitions shall apply:

Agricultural or Horticultural Development – Construction for the purposes of supporting common farmsite activities, including but not limited to, the production, harvesting, storage, grading, packaging, processing, and the wholesale and retail marketing of crops, plants, animals, and other related commodities and the use and application of techniques and methods of soil preparation and management, fertilization, weed, disease, and pest control, disposal of farm waste, irrigation, drainage and water management, and grazing.

Agricultural or Horticultural Use – The use of land for common farmsite activities, including but not limited to, the production, harvesting, storage, grading, packaging, processing, and the wholesale and retail marketing of crops, plants, animals, and other related commodities and the use and application of techniques and methods of soil preparation and management, fertilization, weed, disease, and pest control, disposal of farm waste, irrigation, drainage and water management, and grazing.

Agricultural Impervious Cover – Agricultural or horticultural buildings, structures or facilities with or without flooring, residential buildings and paved areas, but not meaning temporary coverings.

Application for Development – The application form and all accompanying documents required by ordinance for approval of a subdivision plat, site plan, planned development, conditional use, zoning variance, or direction of the issuance of a permits pursuant to section 25 or section 27 of P.L.1975, c.291 (C.40:55D-34 or C.40:55D-36).

Aquifer – A geologic formation, group of formations, or partial formation containing saturated permeable rock, sand or gravel sufficient to store and transmit usable quantities of water to wells and springs.

Archaeological Resources – Any material remains of past human life or activities which are of archaeological interest, such as tools, structures or portions of structures, pit houses, rock paintings, rock carvings, intaglios, graves, human skeletal materials, or any portion or piece of any of the foregoing items.

Best Management Practices (BMP) – Structural or nonstructural methods used to prevent or reduce the movement of sediment, nutrients, pesticides and other pollutants from the land to surface or ground water.

Building Permit – A permit issued pursuant to the New Jersey Uniform Construction Code, Chapter 23 of Title 5 of the New Jersey Administrative Code (N.J.A.C. 5:23-1 et seq.), providing authorization to begin work subject to the conditions and requirements established under the provisions therein. Used interchangeably with the term "Construction Permit;"

CADB – County Agriculture Development Board

Carbonate Rock – Rock consisting chiefly of calcium and magnesium carbonates, such as limestone and dolomite.

Clear-Cutting – A forestry or logging practice in which most or all of the trees in a harvest area are cut down.

Cluster/Conservation Design Development – A development design technique where principal buildings and structures are grouped together on a portion of the Cluster Project Area, while the remaining land area is permanently deed-restricted in agricultural use, for conservation of environmental resources, or as open space for environmental protection including public recreational use.

Cluster Project Area – All of the individual parcels from which development is clustered including the area set aside for preservation and the area set aside for development.

Community On-Site Wastewater Treatment Facilities – Sanitary sewerage treatment facilities (i.e., domestic treatment works) that discharge treated wastewater to ground and surface waters as regulated by a NJPDES permit under N.J.A.C. 7:14A, which provide service to one or more parcels that are approved and constructed as a single development or planned development.

Conditional Water Availability – The amount of water availability allowed in a deficit HUC14 subwatershed, subject to certain mitigation requirements, as determined by the Highlands Council.

Consumptive Water Use – Any use of water that results in its evaporation, transpiration, incorporation into products or crops, consumption by humans or animals, or removal by any other means from a watershed or subwatershed, other than by conveyances as untreated water supply, potable water, or wastewater.

Contaminant – A substance capable of causing contamination of a water supply.

Contamination – The presence of any harmful or deleterious substances in the water supply, including but not limited to hazardous substances, hazardous wastes, and substances listed in the New Jersey Administrative Code at N.J.A.C. 7:9C (Ground Water Quality Standards), N.J.A.C. 7:9B (Surface Water Quality Standards) and N.J.A.C. 7:10 (NJ Safe Drinking Water Act Regulations), and as these regulations may be amended from time to time.

Cultural Resources – Sites, artifacts, or materials that relate to the way people live or lived, for example, archaeological sites, rock carvings, ruins, and the like. These resources are generally defined based on existing documentation or artifacts discovered relating to activities of people who lived, worked, or recreated in an area during a period in history.

Current Deficit Area – A HUC14 subwatershed characterized by negative Net Water Availability, meaning that existing consumptive and depletive water uses exceed the capacity of the ground water supply to sustain them.

Deforestation – The conversion of forested areas to non-forested areas, whether for use as urban land, or any other non-forest land use; disturbance of an area characterized as "forest" pursuant to the procedures provided in APPENDIX A, herein, the extent or effect of which is to disqualify the area from such designation.

Depletive Water Use – Use of water whereby it is withdrawn from a HUC14 subwatershed and transported outside of the subwatershed (through utility conveyances as untreated water supply, potable water, or wastewater), resulting in a net loss of water to the subwatershed from which it originated.

Density – The permitted number of dwelling units per gross acre of land to be developed.

Density, Septic System – The gross acreage of land area required per individual septic system to physically contain and support its functions in keeping with the specified wastewater design flow.

Development – The division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation, or enlargement of any building or other structure, or of any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, for which permission may be required pursuant to the MLUL.

Development Set Aside of Cluster Project Area – All of the individual parcels within the area set aside for residential development including the infrastructure, open space, and utilities necessary to support the development pursuant to the requirements of § 6.1.5.

Discharge – Any intentional or unintentional action or omission, unless pursuant to and in compliance with the conditions of a valid and effective federal or state permit, resulting in the releasing, spilling, pumping, pouring, emitting, emptying or dumping of a hazardous substance into the waters or lands of the state or into waters outside the jurisdiction of the state when damage may result to the lands, waters or natural resources within the jurisdiction of the state.

Disturbance – The placement of impervious surface, the exposure or movement of soil or bedrock, or the clearing, cutting, or removing of vegetation. (Pursuant to § 4.2.2.B, when considering land for conversion to non-agricultural land uses in a Highlands Open Water buffer, historic or current agricultural land uses shall not be considered "land improvements," "development," "land disturbances," or "land uses" for purposes of calculating the previously disturbed area.)

Disturbance, Ultimate – The total existing or proposed area of disturbance of a lot, parcel, or other legally designated (or otherwise legally recognized) tract or subdivision of land, for the

purpose of, and in connection with, any human activity, property improvement, or development, including the surface area of all buildings and structures, all impervious surfaces, and all associated land disturbances such as excavated, filled, and graded areas, and all lawn and landscape areas. Ultimate disturbance shall not include areas of prior land disturbance which at the time of evaluation: a) contain no known man-made structures (whether above or below the surface of the ground) other than such features as old stone rows or farm field fencing; and b) consist of exposed rock outcroppings, or areas which, through exposure to natural processes (such as weathering, erosion, siltation, deposition, fire, flood, growth of trees or other vegetation) are no longer impervious or visually obvious, or ecologically restored areas which will henceforth be preserved as natural areas under conservation restrictions.

Endangered Species – Species included on the list of endangered species that the NJDEP promulgates pursuant to the Endangered and Nongame Species Conservation Act, N.J.S.A. 23:2A-13 et seq., and the Endangered Plant Species List Act, N.J.S.A. 13:1B-15.151 et seq., and any species or subspecies of wildlife appearing on any federal endangered species list or any species or subspecies of plant designated as listed, proposed, or under review by the federal government pursuant to the Endangered Species Act of 1973, 16 U.S.C. §§ 1531 et seq.

Environmental Land Use or Water Permit – A permit, approval, or other authorization issued by the Department of Environmental Protection pursuant to the "Freshwater Wetlands Protection Act," P.L.1987, c.156 (C.13:9B-1 et seq.), the "Water Supply Management Act," P.L.1981, c.262 (C.58:1A-1 et seq.), the "Water Pollution Control Act," P.L.1977, c.74 (C.58:10A-1 et seq.), "The Realty Improvement Sewerage and Facilities Act (1954)," P.L.1954, c.199 (C.58:11-23 et seq.), the "Water Quality Planning Act," P.L.1977, c.75 (C.58:11A-1 et seq.), the "Safe Drinking Water Act," P.L.1977, c.224 (C.58:12A-1 et seq.), or the "Flood Hazard Area Control Act," P.L.1962, c.19 (C.58:16A-50 et seq.). (N.J.S.A. 13:20-3.)

Existing Constrained Areas – Stream flows within any HUC14 subwatershed(s) upstream of a Current Deficit Area.

Farm Conservation Plan – A site-specific plan that prescribes needed land treatment and related conservation and natural resource management measures, including forest management practices, that are determined to be practical and reasonable for the conservation, protection, and development of natural resources, the maintenance and enhancement of agricultural or horticultural productivity, and the control and prevention of non-point source pollution.

Farm Management Unit – A parcel or parcels of land, whether contiguous or noncontiguous, together with agricultural or horticultural buildings, structures and facilities, producing agricultural or horticultural products, and operated as a single enterprise.

Farmland Soils, Important – Soils based on soil data prepared by the USDA NRCS including the following four classifications: Prime Farmland Soils, Farmland Soils of Statewide Importance, Unique Farmland Soils, and Farmland Soils of Local Importance.

Farmland Soils of Local Importance – Farmland of local importance includes those soils that are not prime or of statewide importance and are used for the production of high value food, fiber or horticultural crops.

Farmland Soils, Prime – Prime Farmlands include all those soils in NRCS Land Capability Class I and selected soils from Land Capability Class II. Prime Farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops and is also available for these uses. It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed according to acceptable farming methods, Prime Farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding.

Farmland Soils of Statewide Importance – Farmlands of statewide importance include those soils in NRCS Land Capability Class II and III that do not meet the criteria as Prime Farmland. These soils are nearly Prime Farmland and economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce yields as high as Prime Farmland if conditions are favorable.

Farmland Soils, Unique – Soils used for special crops (such as cranberries in the New Jersey Pinelands). Unique soils are determined on a statewide basis by the State Soil Conservation Committee.

Farmsite – A Farm Management Unit as defined above.

Floor Area – The area of each floor of a building lying within the inside perimeter of its exterior walls excluding vent shafts, courts, and unfinished areas such as basements or attics having ceiling heights less than that required for habitable space under the building code.

Floor Area Ratio – The sum of the area of all floors of buildings or structures compared to the total area of the site.

Forest – A biological community as determined by the method set forth under APPENDIX A, as adapted from NJDEP Preservation Area Rules, at N.J.A.C. 7:38-3.9.

Forest Area, Upland – A biological community that is a "forest," as defined above, and that is not located in an area designated as Highlands Open Waters (i.e., not a forested wetland or other Highlands Open Waters).

Forest Area, Total – The percentage of total area that is covered in forest.

Forest, Core – The area and percent of a forest patch that is greater than 300 feet from a forest edge.

Forest Integrity – An expression of the application of landscape metrics to evaluate the effects of forest fragmentation across the landscape, thereby recognizing the ability of forests to provide essential ecosystem functions.

Forest Patch – A contiguous tract of forest bordered by either altered land or a road.

Forest Management Plan – A written guidance document describing the forest resources present on a property, the landowner's management goals and objectives, and the recommended practices or activities to be carried out over time on the land. This tool is used to evaluate a

forest land's current state and provide a management process which, over time, meets the landowner's objectives, while maintaining health and vigor of the resource. Forest Management Plans are typically written for a ten year period.

Ground Water – Water contained in the interconnected voids of a saturated zone in the ground. A saturated zone is a volume of ground in which the voids in the rock or soil are filled with water greater than or equal to atmospheric pressure.

Ground Water Availability – The total amount of water assigned by the Highlands Council to a HUC14 subwatershed that can be used for consumptive and depletive water uses by water uses that do not draw from water supplies with a NJDEP-approved safe yield.

Hazardous Substance – Any substance designated under 40 CFR 116 pursuant to Section 311 of the Federal Water Pollution Control Act Amendments of 1972 [Clean Water Act] (Public Law 92-500; 33 U.S.C. 1251 et seq.), the Spill Compensation and Control Act, N.J.S.A. 58:10-23.ll et seq., or Section 4 of the New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and as these regulations may, from time to time, be amended. Substances listed include petroleum, petroleum products, pesticides, solvents and other substances.

Hazardous Waste – Any solid waste that is defined or identified as a hazardous waste pursuant to the Solid Waste Management Act, N.J.S.A. 13:1E et seq., N.J.A.C. 7:26-8, or 40 CFR Part 261.

Highlands Act – The Highlands Water Protection and Planning Act (N.J.S.A. 13:20-1 to 35).

Highlands Applicability Determination (HAD) – The determination made by the NJDEP (pursuant to N.J.A.C. 7:38-2.4) indicating of whether a project proposed for the Preservation Area is a major Highlands development, whether any such major Highlands development is exempt from the Highlands Act, and whether the project is consistent with the applicable Areawide Water Quality Management Plan.

Highlands Area – That portion of the municipality for which the land use planning and regulation are in conformance with, or are intended or proposed to be in conformance with, the Highlands RMP.

Highlands Historic and Cultural Resource Inventory – The listing of historic, cultural and archaeological resources within the Highlands Region, including but not limited to: all properties listed on the New Jersey or National Register of Historic Places; all properties which have been deemed eligible for listing on the New Jersey or National Register of Historic Places; and all properties for which a formal opinion of the State Historic Preservation Office (SHPO) has been issued.

Highlands Open Waters – All springs, streams including intermittent streams, wetlands, and bodies of surface water, whether natural or artificial, located wholly or partially within the boundaries of the Highlands Region, but not including swimming pools. Highlands Open Waters include seeps, lakes, ponds, and vernal pools; all categories (including springs, streams, and wetlands) as defined in the Highlands Act.

Highlands Open Waters Buffer – In the Preservation Area, a 300-foot buffer adjacent to Highlands Open Waters in which no disturbance is permitted, except as provided in N.J.A.C.

7:38-3.6. In the Planning Area, a 300-foot buffer around all Highlands Open Waters from the edge of the discernible bank of the Highlands Open Waters feature, or from the centerline of that feature where no discernible bank exists. With respect to wetlands and other Highlands Open Waters features, the feature shall include a protection buffer of 300 feet, measured from the mapped wetlands (not from the wetlands buffer) delineated in a Letter of Interpretation or Highlands Resource Area Determination, as applicable, as provided by NJDEP.

Highlands Preservation Area Approval (HPAA) – An approval issued by the NJDEP pursuant to N.J.A.C. 7:38-6 pertinent to a regulated activity in the Highlands Preservation Area, including an HPAA that contains a waiver pursuant to N.J.S.A. 13:20-33b. Highlands Preservation Area Approval includes Highlands general permits issued pursuant to N.J.S.A. 13:20-33d and promulgated at N.J.A.C. 7:38-12. HPAA, includes Highlands general permits unless explicitly excluded.

Highlands Redevelopment Area – A property, portion of a property, or group of properties designated as such by the Highlands Council and which includes one or more of the following: a) a brownfield site; b) a greyfield site; and c) any previously developed site in the Highlands Region. A Highlands Redevelopment Area may include the intervening or surrounding lands which are significantly affected by or necessary to support such sites, and is subject to a Highlands Council-approved redevelopment plan setting forth the scope and details of any redevelopment project(s) and/or activities permitted to occur.

Highlands Resource Area Determination (HRAD) – A formal determination issued by the NJDEP that confirms the presence or absence of a Highlands Resource Area on a site, and if present, its location and applicable boundary lines. A person may apply for an HRAD only, or in connection with an application for an HPAA.

Highlands Scenic Resource Inventory – The inventory of regionally significant lands within the Highlands Region that encompasses elements of high scenic quality worthy of protection, as approved by the Highlands Council.

Historic District – One or more historic sites and intervening or surrounding property significantly affecting or affected by the quality and character of the historic site or sites.

Historic Resources – Buildings, structures, objects, districts, sites, or areas that are significant in the history, architecture, archaeology, engineering or culture of a place or time.

Historic Site – Any real property, man-made structure, natural object or configuration of any portion or group of the foregoing of historical, archaeological, cultural, scenic, or architectural significance.

HUC – Hydrologic Unit Code; identification number developed by the USGS to designate drainage basins including watersheds and subwatersheds.

HUC14 Subwatershed – A delineated subwatershed area identified by a 14-digit HUC, within which water drains to a particular receiving surface water body.

Impervious Surface – Any structure, surface, or improvement that reduces or prevents absorption of stormwater into land, including, but not limited to, porous paving, paver blocks, gravel,

crushed stone, decks, patios, elevated structures, and other similar structures, surfaces, or improvements.

Impervious Surfaces, Cumulative – The total area of all existing or proposed impervious surfaces situated or proposed to be situated within the boundary lines of a lot, parcel, or other legally recognized subdivision of land, expressed either as a measure of land area such as acreage, or square feet, or as a percentage of the total lot or parcel area.

Individual Subsurface Sewage Disposal System – A system regulated under N.J.A.C. 7:9A for disposal of sanitary sewage into the ground which is designed and constructed to treat sanitary sewage in a manner that will retain most of the settleable solids in a septic tank and to discharge the liquid effluent to a disposal field, disposal bed, or disposal trench or trenches. The term "septic system" is equivalent in meaning.

Karst – A distinctive topography that indicates solution of underlying carbonate rocks (such as limestone and dolomite) by surface water or ground water over time, often producing surface depressions, sinkholes, sinking streams, enlarged bedrock fractures, caves, and underground streams.

Light Detection and Ranging (LiDAR) – Technology that uses an active sensor, similar to radar that transmits laser pulses to a target and records the time it takes for the pulse to return to the sensor receiver. This technology is used for high-resolution topographic mapping.

Linear Development – Infrastructure, utilities and the associated right-of-ways therefor, including but not limited to such installations as railroads, roads, sewerage and water supply pipelines, stormwater management pipes and channels, natural gas and liquid fuel pipelines, electric, telephone and other transmission lines, and in all cases, the associated right-of-ways therefor.

Low Impact Development – An environmentally sensitive approach to land use planning that uses a variety of landscape and design techniques to manage development activities to mitigate potential adverse impacts on the natural environment.

Major Highlands Development – Except as otherwise provided pursuant to subsection a. of section 30 of the Highlands Act ("Exemptions"): (1) any non-residential development in the Preservation Area; (2) any residential development in the Preservation Area that requires an environmental land use or water permit [from the NJDEP, *see definition above*] or that results in the ultimate disturbance of one acre or more of land or a cumulative increase in impervious surface by one-quarter acre or more; (3) any activity undertaken or engaged in the Preservation Area that is not a development but results in the ultimate disturbance of one-quarter acre or more of forested area or that results in a cumulative increase in impervious surface by one-quarter acre or more on a lot; or (4) any capital or other project of a state entity or local government unit in the Preservation Area that requires an environmental land use or water permit [from the NJDEP, *see definition above*] or that results in the ultimate disturbance of one acre or more of land or a cumulative increase in impervious surface by one-quarter acre or more. Major Highlands Development shall not include any agricultural or horticultural development or agricultural or horticultural use. Solar panels shall not be included in any calculation of impervious surface.

Major Potential Contaminant Sources (PCS) – Land uses and activities determined by the Highlands Council to pose a major risk of ground water contamination (see APPENDIX B).

Master Plan, Highlands Regional (RMP) – All references to the Highlands Regional Master Plan (RMP), shall be by use of the words "Highlands Regional Master Plan," "Highlands RMP," "Regional Master Plan," or "RMP."

Minor Potential Contaminant Sources (PCS) – Land uses and activities determined by the Highlands Council to pose a minor risk of ground water contamination (see APPENDIX C).

Municipal Land Use Law (MLUL) – The New Jersey Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq.

NJDA – New Jersey Department of Agriculture

NJDA Agricultural Development in the Highlands Rules – The regulations established by the NJDA to implement requirements of the Highlands Act, titled and codified at N.J.A.C. 2:92.

NJDEP – New Jersey Department of Environmental Protection

NJDEP Preservation Area Rules – The regulations established by the NJDEP to implement requirements of the Highlands Act, titled "Highlands Water Protection and Planning Act Rules," and codified at N.J.A.C. 7:38-1 et seq.

NJPDES – New Jersey Pollutant Discharge Elimination System

NJPDES Permit – A permit issued by the NJDEP authorizing certain discharges to ground or surface waters of the State of New Jersey pursuant to the New Jersey Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., as amended, and its implementing rules at N.J.A.C. 7:14A.

NJ Soil Erosion and Sediment Control Act Rules – Regulations adopted by the State Soil Conservation Committee at N.J.A.C. 2:90-1, incorporating requirements for Best Management Practices regarding temporary and permanent soil erosion control.

Non-Public Well – Any water supply well used for potable purposes other than a public community or non-community water supply well.

Non-Structural Stormwater Management – Techniques and practices devised to manage stormwater runoff and reduce pollution levels, without extensive construction efforts. Non-structural management strategies often mimic the natural hydrology of a site and utilize site planning and design to accomplish stormwater control.

NRCS – Natural Resources Conservation Service of the United States Department of Agriculture

Operations and Contingency Plan – A management plan prepared in support of an existing or proposed Major or Minor Potential Contaminant Source (PCS), that: a) documents the specific PCS(s) existing or proposed for a particular site; b) describes the types and quantities of substances and/or wastes expected to be used, discharged or stored on the site; c) indicates the means by which spillage, leakage or discharge of such materials will be prevented; d) provides

the means or methods to be used to contain or remedy any accidental spill, leak, discharge or migration of such materials from the site directly or indirectly into ground water, surface water bodies, or the land surfaces that provide recharge to the underlying aquifer; e) indicates the procedures to be undertaken to notify the appropriate administrative authorities, including but not limited to the NJDEP and the Board of Health, regarding any accidental spillage or discharge of such materials; and f) demonstrates that best management practices have been incorporated into the design and management of both the site and the particular PCS(s) it contains to ensure against such discharges.

Person – Any individual, public or private corporation, company, partnership, firm, association, owner or operator, political subdivision of this State, and any state, federal or interstate agency or an agent or employee thereof.

Planning Area – Lands within the Highlands Region that are not located in that portion designated by the Highlands Act as the "Preservation Area" (see metes and bounds description at N.J.S.A. 13:20-7b).

Potential Contaminant Source (PCS) – Activity or land use that may be a source of a contaminant that has the potential to move into ground water withdrawn from a well.

Preservation Area – Lands within the Highlands Region that are located in that portion designated by the Highlands Act as the "Preservation Area" (see metes and bounds description at N.J.S.A. 13:20-7b).

Preservation Set Aside of Cluster Project Area – All of the individual parcels within the area set aside for preservation that must be deed-restricted against further subdivision pursuant to the requirements of § 8.1.4.

Public Community Water Supply System – A public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year round residents.

Public Community Well – A well that provides water to a public water system serving at least 15 service connections used by year-round residents or regularly serving at least 25 year-round residents.

Public Non-Community Water System – A public water system that is not a public community water system and is either a "public non-transient non-community water system" or a "public transient non-community water system" as defined herein.

Public Non-Community Well – A well that is not a public community well and that provides water to a public water system regularly serving at least 25 individuals for at least 60 days in any given calendar year.

Public Non-Transient Non-Community Water System – A public water system that is not a public community water system and that regularly serves at least 25 of the same persons for more than six months in any given calendar year.

Public Transient Non-Community Water System – A public water system that is not a public community or a public non-transient non-community water system and that serves at least 25 transient individuals for at least 60 days in any given calendar year.

Public Wastewater Collection and Treatment System – Any system designed for the collection of wastewater and treatment of wastewater other than a septic system.

Public Water Supply System – A system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least 15 service connections or regularly serves at least 25 individuals daily for at least 60 days out of the year. Such term includes any collection, treatment, storage and distribution facilities under control of the operator of such system and used primarily in connection with such system, and any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system. A public water system is either a "public community water system" or a "public non-community water system" as defined herein.

Reforestation – The restoration (replanting) of a forest that has been reduced by fire, cutting, or any other cause.

Residential Development – Development dedicated to the creation of new dwelling units or the improvement or expansion of existing dwelling units, whether by new construction or conversion of existing building areas or portions thereof, to dwelling use, including any type of residential structure whether a single-family home (including group home), duplex, townhouse, apartment or any other form of multi-family housing construction. Residential development shall include property improvements associated with and either, required in support of or customarily accessory to, the residential use, including but not limited to porches, patios, decks, driveways, garages, storage sheds, swimming pools, tennis courts, drywells, utility facilities, septic systems, yard grading and retaining walls.

Resource Management System Plan – A site-specific conservation system plan that: (1) prescribes needed land treatment and related conservation and natural resource management measures, including forest management practices, for the conservation, protection, and development of natural resources, the maintenance and enhancement of agricultural and horticultural productivity, and the control and prevention of non-point source pollution; and (2) establishes criteria for resources sustainability of soil, water, air, plants, and animals.

Reviewing Board – The municipal Planning Board or Zoning Board of Adjustment, as applicable, established pursuant to N.J.S.A. 40:55D-23 or N.J.S.A. 40:55D-69 respectively, or any committee formally designated and authorized to act on behalf of such Board pursuant to other provisions of the MLUL (e.g., Minor Subdivision Committee of a Planning Board).

Riparian Area – Areas adjacent to and hydrologically interconnected with Highlands Open Waters rivers and streams consisting of flood prone areas, wetlands, soils that are hydric, alluvial, or have a shallow depth to ground water, and including wildlife passage corridors within 300 feet of surface Highlands Open Waters features.

Riparian Soils – Soils associated with Highlands Open Waters that are hydric, alluvial, or exhibit a shallow depth to seasonal high water table.

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RMP Update – A factual update to the Highlands Regional Master Plan based upon receipt of new, corrected or updated factual information and verification by the Highlands Council.

SADC – State Agriculture Development Committee

SCD – Soil Conservation District, as established in accordance with the Soil Conservation Act, N.J.S.A. 4:24-1 et seq.

Scenic Resources – Sites and landscapes that are distinctive and remarkable for their geology, topography, history, culture, and aesthetics or can be representative of the defining character of a community. They may include prominent ridgelines, mountainsides or hillsides, panoramic vistas, community gateways and landmarks, river valleys, and agricultural landscapes.

Septic System – A system regulated by N.J.A.C. 7:9A for disposal of sanitary sewage into the ground which is designed and constructed to treat sanitary sewage in a manner that will retain most of the settleable solids in a septic tank and to discharge the liquid effluent to a disposal field, disposal bed, or disposal trench or trenches. The term "Individual Subsurface Sewage Disposal System" is equivalent in meaning.

Sewer Service Area (SSA) – The land area identified in an Areawide Water Quality Management Plan from which generated wastewater is designated to flow to a domestic treatment works or industrial treatment works. A distinct sewer service area is established for each domestic treatment works and industrial treatment works.

Shoreline – The Ordinary High Water Mark, or point on the bank or shore up to which the presence and action of the water is so continuous as to leave a distinct mark either by erosion, destruction of terrestrial vegetation, or other easily recognized characteristic.

Sinkholes – Sinkholes formed by the downward settlement of unconsolidated overburden into openings in underlying, soluble bedrock.

Site Disturbance – The placement of impervious surface, the exposure or movement of soil or bedrock, or the clearing, cutting, or removing of vegetation.

Slope (or "Grade") – An area of land forming an incline; a measure used to describe the degree of inclination of an area of land; the difference in vertical elevation ("rise") of a land area occurring over a specified horizontal distance ("run"). For example, a land area having a one (1)-foot vertical rise over a 10-foot horizontal run, has a slope of 10%. A 10-foot vertical rise over a 25-foot horizontal run indicates a slope of 40%.

Slope, Steep – Any slope having a grade of 15% or more, or if situated in a Riparian Area, of 10% or more.

Slopes, Constrained – All non-Riparian Area lands having a slope of 15% to less than 20% which are non-forested and exhibit one or more of the following characteristics: a) highly susceptible to erosion; b) shallow depth to bedrock; or c) a Soil Capability Class indicative of wet or stony soils.

Slopes, Limited Constrained – All non-Riparian Area lands having a slope of 15% to less than 20%, which are non-forested, are not highly susceptible to erosion, and do not have a shallow depth to bedrock or a Soil Capability Class indicative of wet or stony soils.

Slopes, Moderately Constrained – All forested non-Riparian Area lands having a slope of 15% to less than 20%.

Slopes, Severely Constrained – All lands having slopes of 20% or greater and all lands within Riparian Areas having slopes of 10% and greater.

Soil Capability Class – Soil class designated by the United States Department of Agriculture (USDA) "Soil Survey," available from the Natural Resource Conservation Service and containing descriptions of soil series on a county-by-county basis (available online at www.soildatamart.nrcs.usda.gov).

Solar Panel – An elevated panel or plate, or a canopy or array thereof, that captures and converts solar radiation to produce power, and includes flat plate, focusing solar collectors, or photovoltaic solar cells and excludes the base or foundation of the panel, plate, canopy, or array. (As defined by the Highlands Act, N.J.S.A. 13:20-1 et seq, as amended.)

Stormwater Management Rules – NJDEP rules at N.J.A.C. 7:8 that set forth the required components of regional and municipal stormwater management plans, and establish the stormwater management design and performance standards for new (proposed) development.

Structure – A combination of materials to form a construction for occupancy, use or ornamentation whether installed on, above, or below the surface of a parcel of land.

Surface Water – Any waters of the State of New Jersey which are not ground water.

Technical Service Provider (TSP) – Professionals from outside of the United States Department of Agriculture that are certified by the NRCS to assist agricultural producers in applying conservation measures.

Threatened Species – An indigenous nongame wildlife species of New Jersey designated pursuant to the Endangered and Nongame Species Conservation Act, N.J.S.A. 23:2A-13 et. seq., and its implementing rules, N.J.A.C. 7:25-4.17, as most recently amended.

Time of Travel – The average time that a volume of water will take to travel through the zone of saturation from a given point to a pumping well.

Total Maximum Daily Load (TMDL) – The pollutant loading that a surface water body may assimilate without violating NJDEP Surface Water Quality Standards (N.J.A.C. 7:9B) and a determination of the extent to which pollutant loadings to a water body must be reduced to restore that water body to a water quality that complies with the Surface Water Quality Standards. A TMDL includes an allocation of allowable pollutant loads to specific point sources (Wasteload Allocations) and categories of non-point sources (Load Allocations), after subtraction of a Margin of Safety and, where appropriate, a Reserve Capacity (for future pollutant loads).

Viewshed – An area of land, water or other physical features visible from a fixed vantage point.

Wastewater Utility – A publicly, privately, or investor-owned utility that collects and may treat sanitary wastewater, as regulated by the NJDEP.

Water Availability, Conditional – The amount of water availability allowed in a deficit HUC14 subwatershed, subject to certain mitigation requirements, as determined by the Highlands Council.

Water Availability, Net – The value assigned by the Highlands Council to a HUC14 subwatershed resulting from subtracting consumptive and depletive surface and ground water uses from ground water availability.

Water Conservation – Implementation of BMPs to ensure maximum water use efficiency and reduction in water use and losses; measures may include low impact development techniques, water conserving fixtures, water valves, beneficial re-use systems and capture of stormwater.

Water Quality Management Plan (WQMP) – A plan prepared pursuant to sections 208 and 303 of the Federal Clean Water Act, 33 U.S.C. § 1251 et seq., (33 U.S.C. § 1288 et seq and 1313 respectively) and the Water Quality Planning Act, N.J.S.A. 58:11A-1 et seq., including the Statewide WQMP, or Areawide or County WQMP as defined under N.J.A.C. 7:15.

Water Use and Conservation Management Plan – A planning document approved by the Highlands Council to ensure the sound use and management of water resources. Water Use and Conservation Management Plans document the current state of water availability and use in the subwatersheds of interest, set priorities for the use and protection of available water, and establish methods to reduce and, where feasible, eliminate net water availability deficits where they exist.

Wellhead – The well, borehole, and appurtenant equipment for a public community well, public non-community well, or non-public well within a cluster of non-public wells.

WHPA – Wellhead Protection Area

Zone of Saturation – A layer within or below the soil profile which is saturated with ground water either seasonally or throughout the year.

ARTICLE 2. HIGHLANDS AREA DISTRICTS

§ 2.1 HIGHLANDS PRESERVATION AREA AND PLANNING AREA

The Highlands Act establishes the Preservation Area and Planning Area of the Highlands Region. It describes the varied attributes of each and sets forth the major land use planning goals that pertain to the lands located within each. The Highlands Act defines the geographic extent of the Highlands Region to include the aggregated land area making up its constituent municipalities (N.J.S.A. 13:20-7a). It provides a physical delineation of the Preservation Area by use of a specific metes and bounds description (N.J.S.A. 13:20-7b), designating all remaining lands within the Highlands Region as the Planning Area.

§ 2.2 MAPPING AND RESOURCE STANDARDS

The Highlands RMP contains mapping of all Highlands Zones, Sub-Zones and resources. These maps are periodically updated in accordance with the procedures set forth in the Regional Master Plan (RMP.) For the purposes of any review the Highlands Council will utilize the most current data that has been published by the Highlands Council. This data can be found on the Highlands Council's interactive map and is available as a digital download on the Highlands Council's website.

§ 2.3 HIGHLANDS ZONES AND SUB-ZONES

The Highlands RMP establishes three primary zones (the Protection Zone, Conservation Zone and Existing Community Zone) and four sub-zones (Wildlife Management Sub-Zone, Conservation Zone–Environmentally Constrained Sub-Zone, Existing Community Zone–Environmentally Constrained Sub-Zone and Lake Community Sub-Zone) each with its own purpose, application and development criteria. Delineation of Highlands Zones finds basis in the underlying natural resources, the extent of existing development and supporting infrastructure, and the potential to support new development and redevelopment. Highlands Zones are intended to ensure that the density and intensity of future development and redevelopment do not exceed the capacity of the land, natural resources and existing infrastructure to support them.

§ 2.3.1 Protection Zone

The Protection Zone contains the highest quality natural resource value lands of the Highlands Area. Lands in the Protection Zone are essential to maintaining water quality, water quantity and sensitive ecological resources and processes and have limited or no capacity to support human development without adversely affecting overall ecological function. Land acquisition is a high priority for lands in the Protection Zone and development activities will be extremely limited. Any development will be subject to stringent limitations on consumptive and depletive water use, degradation of water quality, and impacts to environmentally sensitive lands and natural resources.

§ 2.3.2 Wildlife Management Sub-Zone

The Wildlife Management Sub-Zone, a sub-zone of the Protection Zone, consists of areas managed by the United States Fish and Wildlife Service as part of the National Wildlife Refuge System, and lands within the Wildlife Management Area System administered by the NJDEP Division of Fish & Wildlife's Bureau of Land Management. These areas are part of a network of lands and waters for conservation, management, and where appropriate, restoration of fish, wildlife and plant resources and their habitats. Lands within the Wildlife Management Sub-Zone are intended for compatible

wildlife-dependent recreational uses such as hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

§ 2.3.3 Conservation Zone

The Conservation Zone consists of areas with significant agricultural lands interspersed with associated woodlands and environmental features that should be preserved when possible. The Conservation Zone is intended primarily for agricultural use and development, including ancillary and supporting uses and activities. Non-agricultural development activities will be limited in area and intensity due to infrastructure constraints and resource protection goals. Where non-agricultural development does occur it must be compatible with agricultural uses.

§ 2.3.4 Conservation Zone – Environmentally Constrained Sub-Zone

The Conservation Zone–Environmentally Constrained Sub-Zone consists of lands containing significant environmental features within the Conservation Zone that should be preserved and protected from non-agricultural development. Development activities will be limited and subject to stringent limitations on consumptive and depletive water use, degradation of water quality, and impacts to environmentally sensitive lands.

§ 2.3.5 Existing Community Zone

The Existing Community Zone consists of areas of concentrated development representing existing communities. These areas tend to have limited environmental constraints due to previous development patterns, and may have existing infrastructure that can support additional development or redevelopment. Where served by adequate supporting infrastructure, lands within the Existing Community Zone are suited to higher densities and intensities of development than other Zones.

§ 2.3.6 Existing Community Zone – Environmentally Constrained Sub-Zone

The Existing Community Zone–Environmentally Constrained Sub-Zone consists of significant contiguous Critical Habitat, steep slopes and forested lands within the Existing Community Zone that should be protected from further fragmentation. They serve as regional habitat "stepping stones" to larger contiguous Critical Habitat and forested areas. As such, they are not appropriate for significant development, and are best served by land preservation and protection. Development is subject to stringent limitations on consumptive and depletive water use, degradation of water quality, and impacts to environmentally sensitive lands.

§ 2.3.7 Lake Community Sub-Zone

The Lake Community Sub-Zone consists of that portion of the Existing Community Zone that lies within 1,000 feet of all lakes of 10 acres or more in surface area. The purpose for the sub-zone is to protect and enhance water quality, resource features, shoreline recreation, scenic quality, and community character. This sub-zone incorporates unique regulatory requirements to prevent degradation of water quality, harm to lake ecosystems, and watershed pollution, while promoting natural aesthetic values within the Existing Community Zone.

§ 2.4 HIGHLANDS RESOURCE AND SPECIAL PROTECTION AREAS

The Highlands RMP establishes Highlands Resource Areas and Special Protection Areas, each delineated based on the existence of one or more significant Highlands resources or critical or sensitive environmental characteristics or features.

§ 2.4.1 Forest Resource Area

The Forest Resource Area contains high ecological value forest areas including forested areas having the least fragmentation which are vital to the maintenance of ecological processes. The Forest Resource Area includes forested areas characterized by one or more of the following forest integrity indicators: a contiguous forest patch of 500 acres or more; an area consisting of 250 contiguous acres or more of Core Forest; or areas accounting for 45% or more of mean total forest cover.

§ 2.4.2 Highlands Open Waters

Highlands Open Waters consist of all springs, streams including intermittent streams, wetlands, and bodies of surface water, whether natural or artificial, located wholly or partially within the boundaries of the Highlands Region, but not including swimming pools. Highlands Open Waters include seeps, lakes, ponds, and vernal pools, all categories (including springs, streams, and wetlands) as defined in the Highlands Act.

§ 2.4.3 Riparian Areas

Riparian Areas are areas adjacent to and hydrologically interconnected with Highlands Open Waters rivers and streams. They consist of flood prone areas, wetlands, soils that are hydric, alluvial, or have a shallow depth to ground water. Riparian Areas also include wildlife passage corridors within 300 feet of surface Highlands Open Waters features.

§ 2.4.4 Steep Slope Protection Area

The Steep Slope Protection Area is comprised of those portions of the Highlands Area encompassing a minimum of 5,000 square feet of contiguous area, which are characterized either by grades of 15% or greater, or, if in a Riparian Area, 10% or greater. The Steep Slope Protection Area includes the following sub-classifications:

A. *Severely Constrained Slopes.* All lands having slopes of 20% or greater and lands within Riparian Areas having slopes of 10% and greater.

B. *Moderately Constrained Slopes.* All forested non-Riparian Area lands having a slope of 15% to less than 20%.

C. *Constrained Slopes.* All non-forested, non-Riparian Area lands having a slope of 15% to less than 20% and exhibiting one or more of the following characteristics: a) highly susceptible to erosion; b) shallow depth to bedrock; or c) a Soil Capability Class indicative of wet or stony soils.

D. *Limited Constrained Slopes.* All non-forested, non-Riparian Area lands having a slope of 15% to less than 20%, which are not highly susceptible to erosion, and do not have a shallow depth to bedrock or a Soil Capability Class indicative of wet or stony soils.

§ 2.4.5 Critical Habitat

Critical Habitat is comprised of all land areas in the Highlands Area designated as Critical Wildlife Habitat, Significant Natural Areas, and Vernal Pools, including Vernal Pool Buffers. Each of these is established as an overlay to municipal zoning.

A. *Critical Wildlife Habitat.* Within the Planning Area, Critical Wildlife Habitat consists of those areas within NJDEP's Landscape Project Version 3 (or more recent version as amended)

that are Landscape Rank 3 through 5. In addition, it includes areas that are designated Landscape Rank 2 and have a Highlands Conservation Rank of Critically Significant or Significant. Within the Preservation Area, Critical Wildlife Habitat consists of those areas within Landscape Rank 2 through 5, including all Highlands Conservation Ranks.

B. *Significant Natural Areas.* Significant Natural Areas consist of the 95 NJDEP Natural Heritage Priority Sites, including habitat for documented threatened and endangered plant species, and lands that include unique or regionally significant ecological communities and other significant natural sites and features.

C. *Vernal Pools.* Areas designated as Vernal Pools consist of NJDEP-certified vernal pools plus a 1,000-foot wide protection buffer surrounding the perimeter of each such pool. Vernal Pools consist of confined, ephemeral wet depressions that support distinctive, and often endangered, species that are specially adapted to periodic extremes in water pool levels.

§ 2.4.6 Carbonate Rock Areas

Carbonate Rock Areas consist of those portions of the Highlands Area that are underlain by carbonate rock, such as limestone and dolomite. Inclusion of lands within a Carbonate Rock Area does not imply the presence of karst features area-wide, but is indicative of the potential for solution of underlying carbonate rock by surface or ground water, over time.

§ 2.4.7 Lake Management Area

The Lake Management Area is defined to include the drainage area of all Highlands Area lakes having a surface area of greater than ten acres. The Lake Management Area includes the following sub-classifications:

A. *Shoreland Protection Tier.* The Shoreland Protection Tier consists of the lands surrounding a lake that lie within 300 feet of its shoreline, or between the shoreline and the nearest property line adjacent to and alongside of the lake, whichever is the lesser.

B. *Water Quality Management Tier.* The Water Quality Management Tier consists of the lands surrounding and draining to a lake that lie within 1,000 feet of its shoreline. This tier includes the Shoreland Protection Tier.

C. *Scenic Resource Tier.* The Scenic Resource Tier consists of the lands surrounding a lake that lie within 300 feet of its shoreline (the Shoreland Protection Tier) plus any lands within 1,000 feet of its shoreline that fall within the viewshed observable from the opposite shoreline. The limits of such viewsheds require mapped delineations based upon the topography of such lands, with the highest observable elevations, forming the viewshed perimeter.

D. *Lake Watershed Tier.* The Lake Watershed Tier consists of the entirety of the land area draining to a lake, as determined through the evaluation of drainage areas using LiDAR topographic analysis or other topographic data where LiDAR data are not available.

§ 2.4.8 Prime Ground Water Recharge Areas

Prime Ground Water Recharge Areas consist of those lands having the highest ground water recharge rates within each HUC14 subwatershed (as indicated by analysis using the GSR-32

methodology of the New Jersey Geological Survey), and that cumulatively provide forty percent (40%) of the total recharge volume for the subwatershed.

§ 2.4.9 Wellhead Protection Areas

Wellhead Protection Areas consist of those areas surrounding a public water system well, from which ground water flows to the well and ground water contamination, if it occurs, may pose a significant threat to the quality of water withdrawn from the well. Wellhead Protection Areas are composed of three tiers reflecting the time required for ground water to flow into the well, as follows:

A. *Wellhead Protection Area Tier 1.* That area of land within a Wellhead Protection Area (WHPA) from which the flow of ground water to the well has a Time of Travel of 2 years.

B. *Wellhead Protection Area Tier 2.* That area of land within a WHPA from which the flow of ground water to the well has a Time of Travel of 5 years.

C. *Wellhead Protection Area Tier 3.* That area of land within a WHPA from the flow of ground water to the well has a Time of Travel of 12 years.

§ 2.4.10 Highlands Special Environmental Zone

The Highlands Special Environmental Zone consists of lands having the highest priority ranking for preservation based on the Highlands Council Resource Assessment methodology. This assessment considers five indicators for the protection of water resources and environmentally sensitive lands, including: Forest within the Forest Resource Area, Riparian Corridor Condition High, Highlands Open Water Protection Area, Critical Habitat, and the Water Quality Management Tier of Lake Management Areas (excluding those of the Lake Community Sub-Zone). The Special Environmental Zone is located within the Highlands Conservation Priority Area and is located solely within the Preservation Area.

§ 2.4.11 Agricultural Resource Area

The Agricultural Resource Area consists of those areas of the most concentrated and contiguous agricultural uses as determined based on the prevalence of active farms, contiguous farming units of 250 acres or more, and the presence of Important Farmland Soils.

§ 2.4.12 Highlands Historic, Cultural and Archaeological Resources

Highlands Historic, Cultural and Archaeological Resources consist of those properties, sites and districts listed in the Highlands Historic, Cultural and Archaeological Resources Inventory. These include but are not limited to: all properties listed on the New Jersey or National Register of Historic Places; all properties which have been deemed eligible for listing on the New Jersey or National Register of Historic Places; and all properties for which a formal opinion of the State Historic Preservation Office (SHPO) has been issued.

§ 2.4.13 Highlands Scenic Resources

Highlands Scenic Resources consist of those properties, sites, and viewsheds listed in the Highlands Scenic Resources Inventory. These include but are not limited to national historic landmarks and publicly-owned federal, state and county parks, forests, and recreation areas.

ARTICLE 3. HIGHLANDS AREA ZONE DISTRICT REGULATIONS

§ 3.1 PROHIBITED USES

A. *Carbonate Rock Area, Prime Ground Water Recharge Area, Wellhead Protection Area.* The following principal or accessory uses and structures related or devoted to such uses, where otherwise permitted by the underlying municipal Zoning Ordinance, are expressly prohibited from the Prime Ground Water Recharge Area, Wellhead Protection Area Tiers 1 and 2, from any portion of the Carbonate Rock Area determined to contain karst features, or from any lands identified as discharging surface water into any portion of a designated Carbonate Rock Area determined to contain karst features:

1. Landfills;
2. Facilities for the permanent storage or disposal of hazardous wastes, industrial or municipal sludge or radioactive materials, including solid waste landfills;
3. Collection and transfer facilities for hazardous wastes, solid wastes that contain hazardous materials, and radioactive materials; and
4. Industrial treatment facility lagoons.

B. *Wellhead Protection Area, Tier 1.* Any principal or accessory use, or structure related or devoted to such use, which is designated by the Highlands Council as a Major or Minor Potential Contaminant Source (PCS) (see APPENDIX B and APPENDIX C), where otherwise permitted by the municipal ordinance, is expressly prohibited from that portion of any Tier 1 Wellhead Protection Area lying within 200 feet of the wellhead.

§ 3.2 DENSITY AND INTENSITY OF DEVELOPMENT

The provisions of this section are intended to ensure that development in the Highlands Area occurs at densities and intensities that are appropriate to the water supply and wastewater treatment options available to support it.

§ 3.2.1 Development Subject to Water Availability

Any proposed increase in the demand for water supply averaging 6,000 gallons per day or more, deriving from Highlands Area ground water sources or from surface water sources that are not associated with a NJDEP-approved safe yield, shall be accompanied by a finding of sufficient water capacity, which finding shall be issued by the Highlands Council. This provision shall apply to all development as defined at § 1.2, expressly including changes in use and modifications to existing uses. Specific requirements pertinent to new development reliant upon ground water supplies may be found at § 4.7. For purposes of determining net increases in water demand associated with modifications to existing uses pursuant to these requirements, the following unit/square footage figures shall apply as 400-gallon-per-day equivalents:

A. Residential Uses (All Types) – 1 dwelling unit

B. Office and Commercial Uses – 2,400 square feet of floor area

C. Industrial (Including Warehousing/Distribution) Uses – 18,182 square feet of floor area (Excluding Process Wastewater Flow)

§ 3.2.2 Development Served by Septic Systems

A. ***Preservation Area.*** Development proposals involving new or increased demand for septic system capacity in the Preservation Area shall be regulated in accordance with NJDEP Preservation Area Rules (N.J.A.C. 7:38).

B. ***Planning Area.*** Development proposals involving new or increased demand for septic system capacity in the Planning Area shall be regulated in accordance with this subsection. These provisions shall apply equally in the case of any agricultural or horticultural development application proposing three or more residential dwelling units (including accessory dwelling units) served by individual on-site septic system(s). Nothing herein shall be deemed to apply to the replacement or repair of an existing septic system, however.

1. *Septic System Density Allowances.* Septic system density (gross acres per septic system) shall not exceed the following allowances, for each Highlands Zone and Sub-Zone: *Please see* www.nj.gov/njhighlands/planconformance/model_docs/planning_area_nitrate_septic_densities.pdf These allowances indicate the minimum acreage required per septic system, where that system is designed for a one-family household generating a maximum flow of 300 gallons of wastewater per day. The resulting acreage shall be applied as the minimum average acreage necessary to support every 300 gallons of daily wastewater flow generated by any proposed use where the unit/square footage figures below shall be applied as 300 gallon-per-day equivalents.

2. *Equivalent Yields.* The following unit/square footage figures shall be applied as 300 gallon-per-day equivalents:

   a) Residential Uses (All Types, except as provided below) – 1 dwelling unit

   b) Deed-Restricted Senior Citizen Residential Units, or Mobile Home Parks with dwelling units less than 500 square feet in size – 1.5 dwelling units

   c) Office and Commercial Uses – 2,400 square feet of floor area

   d) Industrial (Including Warehousing/Distribution) Uses – 18,182 square feet of floor area
   (Excluding Process Wastewater Flow)

   e) Specific Non-Residential Uses by Facility Type – In lieu of c., or d., above, 300 gallon-per-day equivalents may be computed based on the average sewage volumes provided in .APPENDIX D, from N.J.A.C. 7:9A-7.4.

3. *Floor Area.* For the purposes of this subsection, floor area shall comprise the area of each floor of a building lying within the inside perimeter of its exterior walls excluding vent shafts, courts, and unfinished areas such as basements or attics having ceiling heights less than that required for habitable space under the building code.

4. *Additional Septic System Requirements*. In addition to the requirements above, individual subsurface sewage disposal systems or equivalent disposal units shall satisfy all standards for design, installation, and maintenance as set forth in any applicable municipal Health Ordinance and any related and applicable regulatory requirements of other agencies having jurisdiction.

§ 3.2.3 Development Served by Existing or Extended Utility Infrastructure

For purposes of this provision, "existing" water and wastewater utility infrastructure refers to that, either: a) lawfully constructed and operational, or b) approved for construction in an Existing Community Zone (excluding the Constrained Sub-Zone, including the Lake Community Sub-Zone) in the Planning Area, under an Areawide Water Quality Management Plan.

§ 3.2.4 New or Extended Utility Infrastructure

A. ***Preservation Area.*** New, expanded or extended public water supply systems, public wastewater collection and treatment systems, and community on-site wastewater treatment facilities are prohibited unless approved by the Highlands Council in accordance with the issuance of either a Highlands Applicability Determination indicating that a project is exempt from the Highlands Act, or a Highlands Preservation Area Approval with waiver pursuant to N.J.A.C. 7:38.

B. ***Planning Area – Protection Zone, Conservation Zone, and Environmentally-Constrained Sub-Zones.*** New, expanded or extended public water supply systems, public wastewater collection and treatment systems, and community on-site wastewater treatment facilities are prohibited unless approved through a waiver to address a documented threat to public health and safety, for a Highlands Redevelopment Area or Takings Waiver (RMP Policies 7G1 and 7G2) or to serve a cluster development that meets the requirements of RMP Objective 2J4b.

C. ***Planning Area – Existing Community Zone*** *(excluding Environmentally-Constrained Sub-Zone)* ***and Lake Community Sub-Zone.*** Expansion or creation of public water supply systems, public wastewater collection and treatment systems, and community on-site wastewater treatment facilities are permitted: to serve lands which are appropriate for designated TDR Receiving Zones, infill development, or redevelopment; to address public health and safety; or to serve new areas for development.

§ 3.2.5 Development Served by New or Extended Utilities

Where new development proposed in the Highlands Area will not rely upon installation of septic systems, but will be served by new or extended public water supply systems, public wastewater collection and treatment systems, or community on-site wastewater treatment facilities, such development shall be in compliance with any conditions of approval required by the Highlands Council or the NJDEP, as applicable, in connection with amendment of the Areawide Water Quality Management Plan.

ARTICLE 4. HIGHLANDS AREA RESOURCE REGULATIONS

§ 4.1 FOREST RESOURCES

§ 4.1.1 Clear-Cutting Prohibited

Clear-cutting is prohibited in any forested portion of the Highlands, whether the affected lands are delineated as Total Forest Area or Forest Resource Area, or consist of lands containing upland forest, as determined under the procedures provided at APPENDIX A.

§ 4.1.2 Standards

Any forest disturbance (as defined at § 1.2) shall be permitted only upon a finding that the following requirements have been satisfactorily addressed:

A. Demonstration that the proposed disturbance can neither be avoided nor reduced in extent, while adequately providing for a proposed use that otherwise addresses the requirements herein;

B. Incorporation of Low Impact Development techniques appropriate to the activity or development project proposed;

C. For any proposed disturbance of one half (½) acre or more, other than that associated with the maintenance of a legally pre-existing use or structure (expressly excluding the expansion of any such use or structure), submission, approval and implementation of a Forest Mitigation Plan designed to minimize the extent of such disturbance, protect forest areas adjacent or proximate to the disturbance area, and mitigate for loss of trees or other forest vegetation removed during the course of such disturbance; and

D. Notwithstanding the preceding provisions, in the case of any proposed disturbance that by definition constitutes deforestation, submission, approval and implementation of a Forest Mitigation Plan designed to minimize the extent of deforestation, protect forest areas to remain, and restore or mitigate for forest area loss.

§ 4.1.3 Forest Impact Reports Required

Any application proposing a disturbance requiring a Forest Mitigation Plan, shall be accompanied by a Forest Impact Report containing at minimum, the items listed in this subsection.

A. *All Forest Impact Reports*

1. A map of upland forest area located on or within 500 feet of the subject property, as determined in accordance with Appendix A. A map indicating any on-site areas designated as Forest Resource Area or Total Forest (Exhibit 2). Where access is not available to adjacent properties, the municipal Environmental Resource Inventory and any updated Highlands Council GIS data delineating the Forest Resource Area and Total Forest may be relied upon for off-site forest identification.

2. A description of the nature, density and intensity of the proposed use or activity.

3. A plan indicating the extent of the forest disturbance area, identifying the number, location, species and, for trees of greater than six (6) inches in caliper (measured at 4.5 feet above grade level), the caliper of any trees proposed for removal.

4. A description of the site alternatives analysis undertaken to, in this order: a) avoid forest disturbance; b) minimize forest disturbance; and c) ensure that any forest disturbance that cannot be avoided results in the least impact.

5. A description of the low impact development practices to be used to minimize the disturbance area and its impact; design details to be indicated in development plans, if applicable.

6. If the applicant proposes site-specific forest information that differs from mapped forest resources, including information based on the method in APPENDIX A, it must be provided in a format and with sufficient information that the findings may be submitted for verification by the Highlands Council as an RMP Update.

7. An analysis of the effects (direct and indirect) of the proposed use or activity upon forests, including forest areas adjacent and proximate to the disturbance area.

B. *Deforestation Impact Reports.* In addition to the items required above for all Forest Impact Reports, any application proposing disturbance that by definition, constitutes deforestation, shall include:

1. A description of the area surrounding the subject property within a 0.5 mile radius.

2. A map of all forest resources, within a 0.5 mile radius of the property, including any areas designated as Forest Resource Area or Total Forest. Highlands Council Interactive Website mappings may be utilized to address this requirement in the event the affected land area extends into adjoining municipalities.

3. A field survey and description of the local ecological community type(s) on the site and a description of the surrounding, macro-scale ecological community type(s) of which the property is part.

4. An inventory of forest community composition and stand structure. The inventory shall include a description of vegetation species richness, vegetation species composition, stand density and basal area, connectivity with surround forested lands, and the survey method.

5. An impact analysis documenting and describing any increase in forest fragmentation, creation of forest edge, disruption of forest area on steep slopes or riparian areas, or disruption of core forest areas that will occur as a result of the proposed use or activity.

§ 4.1.4 Forest Mitigation Plans

All Forest Mitigation Plans must be prepared by a State of New Jersey Approved Forester or other qualified professional. A Forest Mitigation Plan must include each of the components listed herein.

A. *Mitigation Priority Area Map.* Priority Areas are forested locations within the site having the highest ecological value to be targeted for conservation, restoration, or mitigation, including such areas as:

1. Highlands Open Waters and Buffers
2. Riparian Areas, including Floodplains and Floodprone Areas
3. Critical Habitat
4. Steep Slopes and Ridgelines
5. Core Forests and Contiguous Forest Patches

B. *Protection Plan.* A plan providing the proposed methodology appropriate to, and by which the applicable mitigation priority areas will be protected throughout the period of forest disturbance and thereafter.

C. *Forest Protection Plan.* A plan incorporating pre-construction and construction best management practices to ensure the well-being of forest areas adjacent or proximate to the disturbance area. Such plans shall include prescribed limits of disturbance to be mapped, field marked, and provided with protective fencing prior to the start of any construction activity. Plans shall indicate installation of tree protection fencing along the drip line of trees to be protected, with instructions barring encroachment by machinery or heavy equipment of any kind, and requiring regular inspection and maintenance of fencing throughout the construction period.

D. *Mitigation Description.* A description of the proposed forest restoration, tree planting plan or other mitigation initiative proposed to provide equivalent or enhanced forest ecosystem benefit in consideration of the extent and type of disturbance or deforestation that would result if the use or activity is approved.

E. *Planting Plan.* A detailed plan indicating the specific plantings proposed for restoration, reforestation or mitigation, including size, species, quantity, location, separation distances, planting details, deer and pest management protections, and maintenance plans.

F. *Maintenance Agreement.* A minimum 3-year maintenance agreement that outlines care-taking responsibilities of the applicant once the proposed planting has been completed. The maintenance agreement must include monitoring of newly planted stands, provide for protection devices in working order for 3 years, and ensure at least a 75% survival rate after 3 years.

§ 4.2 HIGHLANDS OPEN WATERS & RIPARIAN RESOURCES

§ 4.2.1 Highlands Open Waters Protection Buffer

All Highlands Open Waters shall include a minimum 300-foot wide protection buffer, as measured from the edge of the discernible bank of the Highlands Open Waters feature, or from the centerline where no discernible bank exists. With respect to wetlands and other Highlands Open Waters

features not mapped in the RMP (e.g., seeps, springs), each shall include a 300-foot wide protection buffer measured from: for the Planning Area, a delineated wetlands line described in a Letter of Interpretation (LOI), or from a field-delineated boundary line for other features; or for the Preservation Area, the delineated limits of the feature, as indicated by a Highlands Resource Area Determination issued by the NJDEP.

§ 4.2.2 Highlands Open Waters Buffer Standards

Highlands Open Waters buffers shall be maintained in their undisturbed or pre-existing condition, unless a disturbance is approved in accordance with the provisions of this section.

A. *Pre-existing Structures or Improvements.* Any lawfully pre-existing structure or improvement located within a Highlands Open Waters protection buffer area as of the effective date of these standards may remain and be maintained or rehabilitated, provided that the existing area of disturbance attributed to or associated with such structure or improvement shall not be increased.

B. *Agricultural & Horticultural Land Uses.* For purposes of this section, existing agricultural and horticultural uses, whether or not under active management or operation, shall not be included in any assessment of "previously disturbed" buffer areas with regard to proposals for non-agricultural development.

C. *Approvals Subject to Outside Agency Approvals.* Approval of any application involving the disturbance of a Highlands Open Waters buffer pursuant to this section shall not be construed to relieve the applicant from the applicable rules, regulations or legal requirements of any other agency having jurisdiction over such buffers, including but not limited to: the NJDEP (e.g., Freshwater Wetland Rules, N.J.A.C. 7:7, Stormwater Management Rules, N.J.A.C. 7:8, Flood Hazard Area Rules, N.J.A.C. 7:13, NJPDES Rules, N.J.A.C. 7:14A); a Soil Conservation District pursuant to its authority under New Jersey Soil Erosion and Sediment Control Act Rules, N.J.A.C. 2:90; or any county or other regional entity having authority pursuant to a Regional Stormwater Plan adopted by NJDEP under N.J.A.C. 7:8 and N.J.A.C. 7:15.

D. *Protection Buffer Expansion.* The provisions of this section shall not be construed to preclude the imposition of a wider protection buffer requirement where site-specific analysis and evaluation by a qualified professional indicates that such expansion is essential to the protection of Highlands Open Waters, associated Riparian Areas, or the habitat of water or wetlands-dependent species (particularly in the case of rare, threatened or endangered species) located therein.

E. *Preservation Area Standards.* Disturbance is prohibited within all Highlands Open Waters and adjacent 300-foot buffers except for linear development, which shall be permitted only provided that there is no feasible alternative for the linear development outside the Highlands Open Waters or Highlands Open Water buffer. The provisions of this subsection shall apply until and unless overridden by provisions adopted pursuant to a Highlands Council-approved Stream Corridor Protection and Mitigation Plan.

F. *Planning Area Standards.*

1. Protection Zone, Conservation Zone, and Existing Community Environmental Constrained Subzone: Disturbance is prohibited within all Highlands Open Waters and adjacent 300-foot buffers except for linear development, which shall be permitted only provided that there is no feasible alternative for the linear development outside the Highlands Open Waters or Highlands Open Water buffer. The provisions of this subsection shall apply until and unless overridden by provisions adopted pursuant to a Highlands Council-approved Stream Corridor Protection and Mitigation Plan.

2. Existing Community Zone: proposed disturbances of Highlands Open Waters buffers shall only occur in previously disturbed areas. Disturbances shall employ performance standards such that all proposed disturbances of Highlands Open Waters buffers shall employ Low Impact Development Best Management Practices to mitigate all adverse modification to Highlands Open Waters buffers so that there is no net loss of the functional value of the buffer.

G. **No Feasible Alternative for Linear Development:**

1. To address the "no feasible alternative for linear development" standard, the applicant shall demonstrate that there is no other location, design or configuration for the proposed linear development that would reduce or eliminate the disturbance. For proposed linear development that would provide access to an otherwise developable lot, the applicant shall, in addition, show that:

   a) The proposed linear development is the only point of access for roadways or utilities to an otherwise developable lot; and

   b) Shared driveways are used to the maximum extent possible to access multiple lots.

2. An alternative shall not be excluded from consideration under this subsection merely because it includes or requires an area not owned by the applicant that could reasonably be obtained, utilized, expanded or managed in order to fulfill the basic purpose of the proposed linear development.

§ 4.2.3 Riparian Area Standards

A. In the Protection Zone, Conservation Zones, and Environmentally Constrained subzones, disturbance of any portion of a Highlands Riparian Area is prohibited except for linear development, which shall be permitted only provided that there is no feasible alternative for the linear development outside of the Riparian Area. All provisions of § 4.2.3 above shall apply with regard to the "no feasible alternative" standard. These provisions shall apply until and unless Riparian Area disturbances are otherwise authorized under provisions adopted pursuant to a Highlands Council-approved Stream Corridor Protection and Mitigation Plan.

B. In the Existing Community Zone, disturbance or increases in impervious surfaces in a Highlands Riparian Area shall be limited to the minimal alteration feasible in areas beyond Highlands Open Waters.

§ 4.3 STEEP SLOPES

§ 4.3.1 Applicability

The provisions of this section shall apply to the Steep Slope Protection Area and to any other portion of the Highlands Area determined to consist of 5,000 square feet or more of contiguous steep slope(s) (as defined at § 1.2). For purposes of making such determinations, slopes shall be calculated for every two-foot contour interval over the full extent of the existing slope features, regardless of the location of property or other jurisdictional boundary lines.

§ 4.3.2 Steep Slope Standards

C. *Severely and Moderately Constrained Slopes.* Disturbance of Severely Constrained and Moderately Constrained Slopes is prohibited, with the exception of that required in connection with a linear development. Such linear development, however, shall be permitted only in the event that there is no feasible alternative for such development outside of the Severely Constrained or Moderately Constrained Slopes.

1. To address the "no feasible alternative for linear development" standard, the applicant shall demonstrate that there is no other location, design or configuration for the proposed linear development that would reduce or eliminate the disturbance of Severely Constrained or Moderately Constrained Slopes. For proposed linear development that would provide access to an otherwise developable lot, the applicant shall in addition, show that:

   a) The proposed linear development is the only point of access for roadways or utilities to an otherwise developable lot; and

   b) Shared driveways are used to the maximum extent possible to access multiple lots.

2. An alternative shall not be excluded from consideration under this subsection merely because it includes or requires an area not owned by the applicant that could reasonably be obtained, utilized, expanded, or managed in order to fulfill the basic purpose of the proposed linear development.

3. The Highlands Council shall not approve any application pursuant to this subsection if, after review of the information submitted to support an approval, it finds that there is a reasonable alternative to the proposed linear development.

B. *Constrained or Limited Constrained Slopes.* Disturbance shall be permitted only upon a finding by the Highlands Council that the application includes or satisfactorily addresses each of the requirements following:

1. Demonstration that the proposed steep slope disturbance can neither be avoided nor reduced in extent, while adequately providing for the proposed use.

2. Incorporation of Low Impact Development techniques (pursuant to § 5.2) appropriate to both the proposed activity and the steep slope environment, designed to reduce the extent of disturbance areas, stabilize areas that are disturbed, provide for stormwater management, and protect adjacent areas during site construction.

3. Development layout shall be designed to:

   a) Minimize the need for landform grading and retaining structures;

   b) Incorporate a cluster development format, where feasible, to minimize the extent of development on steep slopes; and

   c) Disturb steep slopes (where such disturbance cannot be avoided) having the minimum potential for slope instability.

4. Site design shall:

   a) Incorporate stabilization techniques that emphasize bioengineering;

   b) Ensure minimized soil loss during and after construction through steep slope-appropriate soil erosion and sediment control techniques;

   c) Prevent direct discharge of stormwater into Highlands Open Waters features;

   d) Provide for control of stormwater velocity and volume such that no net increase in runoff rates occurs between pre- and post-conditions; and

   e) Provide for maximum protection of existing trees, woodlands and surrounding natural vegetated areas.

§ 4.4 CRITICAL HABITAT

§ 4.4.1 Habitat Conservation and Management Plan

Upon municipal adoption of a Habitat Conservation and Management Plan, which, inclusive of any accompanying ordinances, rules or regulations, shall be approved by the Highlands Council, all applications proposing disturbance of a Critical Habitat area shall be reviewed and considered in accordance with the provisions and criteria provided therein.

§ 4.4.2 Critical Wildlife Habitat area or Significant Natural Area Disturbance

A Critical Wildlife Habitat area or Significant Natural Area may be disturbed only if an applicant can demonstrate that:

1. The nature of the site is such that it does not provide habitat for species of concern;

2. The species of concern are not present on the site during any critical part of their life cycle, do not depend upon the site for food, shelter or breeding, and the habitat; on the site is either unsuitable or not critical to species' recovery in the Region; or

3. Existing land uses present a human, natural or development barrier to the use of the site by species of concern.

4. Avoidance of disturbance to species of concern can be achieved through adherence to commonly accepted, species-specific timing restrictions including but not limited limitations on the timing of tree clearing, site disturbance and project development.

§ 4.4.3 Certified Vernal Pools

Vernal pools are small isolated temporary bodies of water that provide critical breeding habitat for a number of amphibian species. The NJDEP certifies the location and existence of Vernal Pools. The RMP provides for a 1000 ft. protection buffer from any NJDEP certified Vernal Pool.

1. A vernal pools protection buffer may be reduced only if an applicant can demonstrate that the reduction is the minimum feasible and that:

    a) In an undisturbed wetland, documented and field-determined vernal pool-breeding wildlife require a smaller protective buffer, as documented in scientific literature; or

    b) Existing land uses present a significant, insurmountable and permanent barrier to the migration or viability of vernal pool-breeding wildlife that is infeasible to mitigate.

§ 4.5 CARBONATE ROCK

§ 4.5.1 Applicability

The provisions of this section shall apply to all proposed development in the Carbonate Rock Area, including that in both the Preservation Area and the Planning Area.

§ 4.5.2 Geotechnical Investigation Required

Any Application for Development within the limits of the Carbonate Rock Area shall be preceded by a Geotechnical Investigation, as provided in this subsection, unless certification is provided by a qualified engineering/geotechnical/geological professional indicating that the area in question is neither underlain by, nor has the potential to develop, karst topography.

A. ***Purpose.*** The purpose for the Geotechnical Investigation is to locate carbonate rock features that may be affected by the development proposal, to reveal the potential threats to public health, safety or welfare, or ground water quality that may result, and to determine the most appropriate ways to address these issues in the design and implementation of the project proposal.

B. ***Professional Required.*** The Geotechnical Investigation must be conducted by a qualified professional, such as geologist, soils or geotechnical engineer, or other licensed professional engineer having experience in karst area investigations and associated development.

C. ***Program.*** The investigation shall occur in two phases, wherein the results of the first shall determine the need for and extent of requirements pertinent to the second.

    1. *Phase I Investigation.*

        a) The investigation shall commence with completion of a Phase I Geological Investigation which shall identify the geologic nature of the materials underlying the site. This assessment shall be based on review of existing available information, such as

prior investigation reports on properties proximate to the subject parcel(s), aerial photography, as well as on-site field investigation.

b) Phase I findings shall be provided in a summary report including: a description of the site geology; ground water conditions such as depth to water table and direction of flow; an evaluation of the potential impact of the project on ground water quality; and identification of any karst features observed. In addition, the report shall include the geological professional's recommendations as to whether, in light of the proposed development plan, a Phase II Geological Investigation should be prepared and submitted, and whether any portion of the requirements of the Phase II Investigation should be waived.

2. *Phase II Investigation.*

a) The purpose of the Phase II Investigation is to delineate and define potential karst areas noted or suspected in the Phase I Geological Investigation, to evaluate the effects of the proposed development on such areas, and to propose methods of protection and mitigation if needed.

b) A Phase II Investigation Plan shall include a narrative describing the types of features to be investigated, their locations, the types of direct/indirect methods to be used and the reasons for their use. Indirect methods include the use of aerial photography, satellite imagery and geophysical procedures, such as ground penetrating radar, electrical conductivity, electrical resistivity, magnetic field, very low frequency measurement, gravity field recording and seismic velocity measurements. Direct methods shall include test pits, test probes, test borings or other appropriate methods. A plan indicating the areas of investigation, proposed locations of testing and types of testing shall accompany the Phase II Investigation Plan.

c) At the completion of the Phase II Investigation, a formal Geotechnical Evaluation Report shall be submitted which shall include a geologic interpretation of the observed subsurface conditions, including soil and rock type, geologic unit, jointing, faulting, voids, fracturing, grain size and sinkhole formation. In addition:

(i) The Report shall provide all information gathered in the course of the testing protocol, including, as applicable: logs of all borings, test pits, and probes including evidence of cavities; loss of drilling fluid circulation during drilling; voids encountered and similar cavities; type of drilling or excavation technique employed; drawings of monitoring or observation wells as installed; time and dates of explorations and tests; reports of chemical analyses of on-site surface and ground water; names of individuals conducting tests if other than the applicant's designated professional; analytical methods used on soils, water samples, and rock samples; a 1" = 100' scale topographic map of the site (at a contour interval of two feet) locating all test pits, borings, wells, seismic or electromagnetic conductivity or other geophysical surveys; and analysis of the ground water including any potentiometric maps constructed from site data or aquifer tests with rate and direction of flow.

(ii) The Report shall include an evaluation of the geotechnical findings in relation to the proposed development, and recommendations for the planning, engineering design and construction techniques to be utilized in accomplishing the project. All design recommendations shall minimize, to the greatest extent practical, impacts upon water quality and structural hazards associated with carbonate rock formations. The engineering solutions proposed to minimize environmental and structural impacts must be clearly detailed.

§ 4.5.3 Carbonate Rock Drainage Area

Applicants seeking approval of development activities in subwatersheds that drain directly to the Carbonate Rock Area shall conduct a Phase I Geological Investigation. The Phase I investigation and Municipal Engineer's review shall ensure that any proposed development activity having potential to alter the types, volumes, or rates of runoff entering the Carbonate Rock Area, shall be designed to prevent the formation or enlargement of sinkholes, the introduction of contaminated surface water into ground water aquifers via sinkholes or cavities, or the lowering of the water table.

§ 4.5.4 Conditions of Development Application Approval

A. In no case shall an Application for Development, in either the Carbonate Rock Area or in a subwatershed that drains directly to the Carbonate Rock Area, be approved unless the applicant has demonstrated that all potential hazards to public health and safety, structures and ground water are fully addressed and mitigated, with the maximum emphasis given to nonstructural measures, such as avoidance of modifications to areas having karst potential, use of dry swales to divert runoff away from carbonate rock areas, minimization of site disturbance, and removal or minimization of impervious surface.

B. The following conditions shall accompany the approval of any project in the Carbonate Rock Area:

1. The location of all sinkholes, disappearing streams or karst features shown on documents submitted under the Phase I and/or Phase II Geologic Investigations shall be drawn on all preliminary and final plats, site plans and parcel plans. These shall also note any site remediation techniques to be utilized to stabilize any solution channels or subsidence karst features.

2. In the event a previously unidentified carbonate rock feature posing a geologic hazard is discovered during construction, the applicant shall:

a) Report the occurrence of the hazard to the Municipal Engineer within twenty-four (24) hours of discovery;

b) Halt construction activities which would affect the geologic hazard;

c) Prepare a report on the geologic hazard which analyzes the impact of the hazard and details a remediation plan for review and approval by the Municipal Engineer;

d) After obtaining approval from the Municipal Engineer, perform necessary remediation of the hazard to prevent or minimize damage to buildings, structures, utilities,

driveways, parking areas, roadways and other site improvements, and to minimize pollution of the ground water;

e) Repair any damage to improvements and restore ground cover and landscaping;

f) In those cases where the hazard cannot be repaired without adversely affecting the site plan or subdivision, the applicant shall file an amended application for a site plan or subdivision approval in compliance with the provisions of the municipal ordinances.

§ 4.5.5 Potential Contaminant Sources

Where any use or structure classified as a Major Potential Contaminant Source (PCS) (as listed at APPENDIX B) is proposed to be located or expanded within a Carbonate Rock Area determined to contain or have potential to develop karst features, or within any area discharging surface water into a Carbonate Rock Area containing or having potential to develop karst features, the standards of approval provided at subsection § 4.9.3 below, shall apply in addition to the preceding requirements.

§ 4.6 LAKE MANAGEMENT AREA

§ 4.6.1 Shoreland Protection Tier

The Shoreland Protection Tier encompasses the lands surrounding a Lake Management Area lake that lie within 300 feet of its shoreline. As such, these lands coincide with and are defined as Highlands Open Waters buffers pursuant to § 4.2 above. All provisions applicable to Highlands Open Waters buffers as provided therein, shall apply fully to the Shoreland Protection Tier of any lake in the Lake Management Area.

§ 4.6.2 Water Quality Management Tier

Any application proposing a disturbance within the Water Quality Management Tier shall be authorized only provided the Highlands Council finds that the proposal protects lake water quality, by implementation of the requirements of this subsection. The Water Quality Management Tier consists of all lands draining into a Highlands lake that lie within 1,000 feet of its shoreline, subsuming the whole of the Shoreland Protection Tier. As such, these provisions shall not be construed to waive or obviate the requirements of either the preceding section § 4.6.2, or of § 4.2.3 above concerning Highlands Open Waters buffers.

A. *Water Quality Protection Requirements.* To prevent or minimize continuous pollutant sources that can contribute pollutants overland or through ground water to the lake from greater distances than the Shoreland Protection Tier, the following measures shall be incorporated into all development proposals:

1. All disturbed parcels shall be provided with landscape or garden elements which retain stormwater, minimizing the potential for increases in the volume, time of concentration, or concentrated flow of runoff from the property. Such elements shall be designed to ensure to the maximum extent feasible, that during larger storms, water is released through overland sheet flow across a vegetated, naturally landscaped area.

2. All new development shall direct runoff from roofs, driveways and patios into landscape or garden elements which retain and filter stormwater, or to infiltration basins, trenches or other such appropriate stormwater management devices.

3. Stormwater management plans shall be designed to direct runoff away from the shoreline and to avoid stormwater discharges directly to the lake to the maximum extent feasible.

4. Stormwater shall be directed to a stormwater treatment train that cleans and reduces the rate of runoff to the maximum extent possible. Stormwater treatment trains shall maximize the use of swales with natural vegetation, infiltration mechanisms or constructed wetlands, and discharge through a constructed wetland or other channel that maximizes aeration and cleaning of water to the maximum extent feasible.

5. The discharge of stormwater shall be through sheet flow, where feasible, which may require the construction of an outlet that disperses the water over a substantial distance at a constant elevation so that water sheet flows over the top.

§ 4.6.3 Scenic Resources Tier

The Scenic Resources Tier includes lands surrounding Highlands lakes that lie within 300 feet of the shoreline (the Shoreland Protection Tier) plus lands within 1,000 feet of the shoreline that fall within the viewshed observable from the opposite shoreline. The provisions of this section are applicable to any development otherwise permitted in the Scenic Resources Tier. These requirements apply in addition to all requirements applicable to the Shoreland Protection Tier and Water Quality Management Tier.

A. ***Scenic Resources Tier Mapping.*** For purposes of this section, applicants may establish and indicate in submission materials that all lands falling within 1,000 feet of the shoreline of a Highlands lake (coincident with the Water Quality Management Tier) constitute the designated Scenic Resources Tier viewshed. In the alternative, the actual limits of the affected viewshed area must be delineated and mapped for submission by a licensed Land Surveyor, Professional Engineer, Landscape Architect, or other qualified professional. Such delineations shall be based upon the topography of the lands surrounding the Highlands lake, with the highest observable elevations from the opposing shoreline forming the viewshed perimeter. Observable elevations shall be those projected by use of topographic maps, regardless of any intervening building, structure, tree or other natural vegetation, along sight lines drawn radially from relevant vantage points along the opposing shoreline; such vantage points being sufficient in number and location to yield the full extent of the potential view. The viewshed perimeter shall in no location be less than the 300-foot depth of the Shoreland Protection Tier.

B. ***Protection Standards.*** For all lakes with public access (i.e., with shorelines that are not entirely privately-held and managed through a lake association), and for privately-held and managed lakes to the extent not contrary to statutory law or previously approved lake community development plans, the applicant must demonstrate that the protection of visual and scenic resources in the Scenic Resource Tier is achieved through implementation of the following requirements:

1. The application must clearly illustrate and assess the extent to which the proposed development will be visible from the opposite shore of the lake. If the applicant demonstrates that the proposed development will be completely obscured from view by virtue of existing topographic features (specifically excluding buildings, structures, trees or other vegetation) intervening between the opposite shoreline and the development site, the remaining provisions of this subsection shall not apply.

2. Buildings shall be screened from view by trees and other native plant material to the maximum extent practicable and compatible with the existing character of the lake community, to minimize the visual intrusion on views from the opposing shorelines.

3. The massing of structures shall be designed and oriented to minimize lot disturbance, including cut and fill work, and to avoid blockage of views to the maximum extent possible.

4. The exteriors of all new or redeveloped buildings shall be designed and constructed with materials that minimize visual intrusion on the lake community character.

5. The clearing of trees shall be limited to the minimum extent needed to develop the site.

6. Any exterior lighting shall utilize full cut-off fixtures with light directed downward and away from the shoreline to the extent feasible.

C. *Highlands Scenic Resources.* In the event that an Application for Development within the Scenic Resources Tier involves a lot or lots that either contain, or lie adjacent to a property that contains a Highlands Scenic Resource, the provisions of § 4.12 below, shall apply.

§ 4.7 WATER CONSERVATION & DEFICIT MITIGATION

§ 4.7.1 Applicability

The provisions of subsection § 4.7.2 below, shall apply to all development. Specifically excluded from provisions § 4.7.3 through § 4.7.6 are modifications or improvements to existing uses and structures that do not result in an increase in water demand by an average of 6,000 gallons per day or more.

§ 4.7.2 Water Conservation Requirements

All development proposals shall incorporate, as applicable, the following water conservation measures to promote sound resource use, reduce supply deficits, and reduce the need for additional utility infrastructure:

A. Meet all applicable building code requirements for the use of water conservation fixtures and appliances in new or rehabilitated structures;

B. Provide automatic controls based on rain sensors (or soil moisture) for all new and replacement lawn irrigation systems, as required by the electrical subcode at N.J.A.C. 5:23-3.16;

C. Design all non-potable irrigation water uses to ensure that only the necessary amounts of water are used to achieve optimum plant growth, to the maximum extent practicable;

D. Provide for internal recycling or beneficial reuse of reclaimed water in new commercial development projects, to the maximum extent practicable;

E. Rely on stormwater for irrigation purposes to the maximum extent practicable, including but not limited to methods recommended by the U.S. Green Building Council through its Leadership in Energy and Environmental Design (LEED) program;

F. Reduce water losses to the maximum extent practicable, in the rehabilitation of on-site water supply utility infrastructure, through such means as application of American Water Works Association/International Water Association water loss analysis methods (AWWA Manual M-36 or most recent version).

G. Landscaping shall be designed to minimize the use of irrigation (with precipitation and/or stormwater providing the necessary water requirements) and shall use native, drought-tolerant (other than where used in rain gardens, biofiltration swales and other stormwater management facilities), disease-resistant plants, allowing for natural landscaping wherever feasible, and shall under no circumstances include invasive species. The Highlands Council maintains a list of recommended plantings which is available on the Highlands Council's website.

§ 4.7.3 Net Water Availability

Net Water Availability has been calculated by the Highlands Council for each HUC14 subwatershed. Expressed in million gallons per day (MGD), the values assigned to each HUC14 subwatershed derive from subtracting consumptive and depletive surface and ground water uses for a baseline year, from total ground water availability. Where Net Water Availability figures are negative numbers, the subwatershed is identified as a Current Deficit Area, meaning existing uses exceed sustainable supplies.

§ 4.7.4 Conditional Water Availability

For subwatersheds designated as Current Deficit Areas, the Highlands Council has assigned a limited amount of Conditional Water Availability, the use of which is conditioned upon satisfying certain mitigation requirements. Jurisdiction over the use of Conditional Water Availability lies solely with the Highlands Council and shall apply in the case of Current Deficit Areas until such time as a Water Use and Conservation Management Plan for such subwatersheds has been adopted and put into effect.

§ 4.7.5 Water Use and Conservation Management Plan

Where a Highlands Council-approved Water Use and Conservation Management Plan has been established for a municipality, HUC14 subwatershed, or group of HUC14 subwatersheds, any development application involving the use of water derived from such subwatershed(s) shall be regulated fully in accordance with the requirements of such Plan. Adherence to the provisions of an adopted Water Use and Conservation Management Plan shall constitute satisfactory compliance with all of the provisions of this section, including those pertaining to Net Water Availability and Conditional Water Availability.

§ 4.7.6 Absence of Water Use and Conservation Management Plan

In the absence of a Highlands Council-approved Water Use and Conservation Management Plan for a municipality, HUC14 subwatershed, or group of HUC14 subwatersheds, any development application involving the use of water derived from such subwatershed(s) shall be subject to requirements of this subsection.

A. ***Net Water Availability.*** The provisions of this subsection shall apply to any development application proposing the use of Net Water Availability. No application shall be approved unless the Highlands Council has determined that the proposed consumptive or depletive water use will not exceed the remaining Net Water Availability for the source HUC14 subwatershed(s).

B. ***Conditional Water Availability.*** The provisions of this subsection shall apply to any development application proposing the use of Conditional Water Availability. These requirements shall apply regardless of whether such water is supplied from an on-site well or through a water supply utility.

1. *Highlands Council Findings Required.* No application shall approved unless a finding has been issued by the Highlands Council indicating that: a) the proposed consumptive or depletive water use will not exceed the remaining Conditional Water Availability for the source HUC14 subwatershed(s); b) that the applicant has correctly determined the associated mitigation requirement; c) that the proposed development plan will incorporate or otherwise provide for acceptable methods of deficit mitigation; and d) that the mitigation measures proposed by the applicant can be reasonably anticipated to meet the required level of mitigation.

2. *Deficit Mitigation Requirements.* Applicants proposing the use of Conditional Water Availability shall comply with the deficit mitigation requirements herein.

a) The mitigation requirement applicable to any development project derives from the Highlands Council *Scaled Mitigation Requirements* table, provided below (Table 1). The figures represent the applicable recharge requirement as a percentage of consumptive/depletive water use.

Table 1. Scaled Mitigation Requirements

	Proposed Consumptive or Depletive Water Use (gpd)				
Deficit (MGD)	<= 1,000	1,001 – 5,000	5,001 – 10,000	10,001 – 25,000	>25,000
0.0001 – 0.050	125%	125%	125%	150%	150%
0.051 – 0.100	125%	125%	125%	150%	150%
0.101 – 0.250	125%	125%	150%	150%	175%
0.251 – 0.500	125%	150%	150%	175%	200%
0.501 – 1.000	125%	150%	175%	175%	200%
1.000 – 7.100	150%	175%	175%	200%	200%

b) Deficit mitigation must be provided within the same HUC14 subwatershed as from which the source Conditional Water Availability derives. If the project and water source are not located in the same subwatershed, however, only mitigation measures that benefit the source HUC14 subwatershed may be utilized to mitigate the deficit.

c) The approval of any application proposing off-site deficit mitigation measures, whether through enhanced recharge or offsets from water conservation, shall be subject to the receipt of approvals from the Highlands Council and any other entities having jurisdiction over the activities proposed at the off-site location (whether located within or outside of the municipality).

d) On-site deficit mitigation measures, whether from enhanced recharge or offsets from water conservation shall be subject to the following criteria:

(i) Water Conservation Measures. Water Conservation Measures may be credited toward mitigation requirements only with respect to existing land uses with consumptive or depletive water uses. (Such measures must be incorporated into the design of any new improvements, in accordance with § 4.7.3, above.) Approval of any application proposing such measures shall be conditioned upon implementation of the measures prior to receipt of any Certificate of Occupancy or Approval for the project improvements. If conservation measures include such methods as reduced irrigation of landscaping, protective covenants (e.g., homeowner's association by-laws) or other such legal mechanisms must be established to ensure their enforceability.

(ii) Recharge Measures. The applicant shall include the proposed mitigation measures in the project stormwater management plan, stormwater operation and maintenance manual, and applicable components of site design. The stormwater management plan and O&M manual shall achieve permanent maintenance and routine monitoring of the mitigation measure(s) so that the required rate of recharge is continuously achieved.

e) Any application for which deficit mitigation requirements cannot be achieved, shall not be approved by the Highlands Council. The applicant may modify any such proposal, however, to reduce the consumptive or depletive water uses to a level at which achieving deficit mitigation requirements is feasible. All applicants shall demonstrate compliance with these standards through submission of a Deficit Mitigation Plan, as provided below.

3. *Deficit Mitigation Plans.* All applicants proposing deficit mitigation shall prepare and submit Deficit Mitigation Plans for approval which shall include the following elements:

a) Detailed justification for the proposed Conditional Water Availability use and documentation that the amount of consumptive or depletive use is minimized (including the conservation measures outlined in subsection § 4.7.3, above).

b) Engineering plans and drawings of mitigation facilities proposed to provide the necessary mitigation in the source HUC14 subwatershed.

c) Sufficient information to demonstrate that the mitigation measures are individually feasible and in the aggregate will meet or exceed the mitigation requirement.

d) Sufficient information to substantiate that the facility will recharge the ground water table such that it reasonably can be expected (e.g., using general ground water flow models) to support aquifer recharge, or to support stream flow with a travel time in excess of one month.

e) Proposed implementation schedule demonstrating compliance with the following timeframe targets:

(i) Satisfaction of mitigation requirements within one (1) year of issuance of building permit(s) if the consumptive or depletive water use is less than 20,000 gpd in the Planning Area or 10,000 gpd in the Preservation Area, on average.

(ii) Satisfaction of mitigation requirements within a longer time period for larger amounts, up to five (5) years from issuance of building permit(s), but no later than upon initiation of the consumptive or depletive water use, except for projects that involve a combination of high current water deficits and large proposed consumptive and depletive water uses as shown in the shaded areas of the table *Scaled Mitigation Requirements* (Table 1., above), in which case, on-site mitigation shall be successfully completed prior to initiation of the water use but may be implemented concurrent with on-site construction. Off-site mitigation shall be successfully completed prior to any on-site construction.

(iii) Mitigation requirements may be phased in keeping with the level of consumptive and depletive water use that actually occurs based on phased construction of a project.

f) Proposed operation, maintenance and monitoring requirements to ensure that sufficient recharge is maintained over time. These requirements shall at a minimum be sufficient to comply with N.J.A.C. 7:8 stormwater maintenance requirements.

4. *Conditions of Approval.* As a condition of any approval of a development application, inclusive of the proposed Deficit Mitigation Plan, pursuant to this subsection, the applicant shall:

a) Demonstrate that the entity designated to implement the Deficit Mitigation Plan is qualified and capable of carrying out the plan, regardless of the timeframe involved.

b) Provide proof of acceptance of all responsibilities for implementation of the Deficit Mitigation Plan by the responsible entity.

c) Provide a cost estimate for implementation of the Deficit Mitigation Plan, inclusive of a 10% contingency.

d) Provide performance and maintenance guarantees in accordance with all municipal and MLUL requirements in amounts as approved by the municipal engineer, sufficient to ensure the installation and implementation of all required Deficit Mitigation Plan measures. Such guarantees shall be available to the municipality and secondarily, to the Highlands Council for implementation of the necessary deficit mitigation measures should the applicant fail to properly implement the measures according to the Deficit Mitigation Plan schedule. If the implementing entity is a public agency, the commitment must be in the form of a binding resolution or ordinance of the governing body, and the cost of implementation must be bonded to ensure sufficient resources.

e) Ensure that the responsible entity shall report annually to the Highlands Council and the municipality regarding implementation of the Deficit Mitigation Plan until fully

implemented, unless reporting is achieved through effectuation of a Water Use and Conservation Management Plan.

f) Establish an ongoing system of such reporting which must operate until the relevant subwatershed is no longer in deficit, or until the reporting responsibility is absorbed into implementation of an approved Water Use and Conservation Management Plan.

§ 4.8 PRIME GROUND WATER RECHARGE AREAS

§ 4.8.1 Applicability

The provisions of this section shall apply to any development application involving the Prime Ground Water Recharge Area, whether in the Preservation Area or the Planning Area.

§ 4.8.2 Standards

Disturbance of Prime Ground Water Recharge Area (PGWRA) by any regulated development shall be permitted only upon a finding by the Highlands Council that the proposal complies with the provisions of this subsection.

A. *Avoidance.* The proposed disturbance cannot be avoided. Development shall not occur in PGWRAs unless either, the entirety of the subject property is located within a PGWRA and thus cannot be avoided, or the disturbance represents the only viable alternate means to avoid Critical Habitat, Highlands Open Waters buffers, Moderately Constrained Steep Slopes, or Severely Constrained Steep Slopes, to the extent that these resources are also present upon the subject property.

B. *Minimization.* The proposed disturbance cannot be minimized. Where total avoidance is not feasible, total recharge area disruption (i.e., alteration of natural recharge patterns or volumes) shall not exceed 15% of the PGWRA located within the affected parcels, placed where feasible on those parts of the PGWRA having the lowest relative recharge rates and the least potential for aquifer recharge based upon site analysis.

C. *Low Impact Development.* The proposal incorporates Low Impact Development practices. Low Impact Development practices shall be used in the design of the development proposal to reduce total recharge disruption to the minimum feasible, within the 15% cap.

D. *Mitigation.* Any development application involving disturbance of a PGWRA shall be accompanied by a mitigation plan, providing for an equivalent of 125% of pre-construction recharge volumes for that portion of the Prime Ground Water Recharge Area that will be disturbed. The recharge mitigation shall occur within the following areas, in order of priority: (1) the same development site to the maximum extent feasible; (2) the same HUC14 subwatershed; or (3) where no feasible option exists in the same HUC14 subwatershed, an interrelated HUC14 subwatershed approved by the Highlands Council.

E. *Unavoidable Disturbance.* Where the proposed disturbance of a PGWRA exceeds the 15% cap, the Highlands Council may grant a waiver to permit disturbance upon a showing that the proposed development cannot avoid or minimize the impact, and that the area proposed for disturbance can be mitigated through the permanent protection or preservation of an area of property or equal or greater recharge value in the same HUC 14 subwatershed.

§ 4.8.3 Potential Contaminant Sources

Where any use or structure classified as a Major Potential Contaminant Source (PCS) (as listed at APPENDIX B) is proposed to be located or expanded within a Prime Ground Water Recharge Area, the standards of approval provided at subsection § 4.9.3 below, shall apply in addition to the preceding requirements.

§ 4.9 WELLHEAD PROTECTION

§ 4.9.1 Applicability

The provisions of this section shall apply to all proposed development activities in designated Wellhead Protection Areas in the Highlands Area, whether in the Preservation Area or the Planning Area.

§ 4.9.2 Potential Contaminant Sources

Where any permitted use or structure classified as a Major Potential Contaminant Source (PCS) (as listed at APPENDIX B) is proposed to be located or expanded within a Tier 1 Wellhead Protection Area, the standards of this subsection shall apply. As noted previously, these standards shall also apply to any Major PCS proposed to be located or expanded in: a) any Carbonate Rock Area containing or having potential to develop karst features; b) any area discharging surface water into a Carbonate Rock Area determined to contain or have potential to develop karst features; and c) any portion of a Prime Ground Water Recharge Area. These conditions shall not be construed to waive or obviate any rules, regulations, or other requirements pertinent to such uses that may derive from outside agencies having jurisdiction, such as the NJDEP.

A. *Best Management Practices.* All Major PCS facilities shall be designed in a manner that prevents the unintentional discharge of toxic or hazardous pollutants to ground water, surface water bodies, or the land surface, from all internal and external areas, including loading, storage, and transfer areas, in accordance with the provisions of this section.

1. All portions or areas of a facility in which hazardous substances or hazardous wastes are stored, processed, manufactured or transferred outdoors, shall be designed so that the discharges of hazardous substances will be prevented from overflowing, draining, or leaching into the ground water or surface waters.

2. Containers in which regulated substances are stored must be clearly and visibly labeled and must be kept closed and sealed when material is not being transferred from one container to another.

3. Wherever hazardous substances are stored, processed, manufactured or transferred outdoors, the design features shall include secondary containment and/or diversionary structures which may include but are not limited to any one or a combination of the following:

   a) Containers, dikes, berms or retaining walls sufficiently impermeable to contain spilled hazardous substances, for the duration of a spill event.

   b) Curbing.

c) Gutter, culverts and other drainage systems.

d) Weirs, booms and other barriers.

e) Lined diversion ponds, lined lagoons and lined retention basins, holding tanks, sumps, slop tanks and other collecting systems.

f) Drip pans.

4. Secondary containment and/or diversionary systems, structure or equipment must meet the following standards:

a) The system must block all routes by which spilled hazardous substances could be expected to flow, migrate, or escape into the ground water or surface waters.

b) The system must have sufficient capacity to contain or divert the largest probable single discharge that could occur within the containment area, plus an additional capacity to compensate for any anticipated normal accumulation of rainwater.

c) In order to prevent the discharge of hazardous substances into ground water, all components of the system shall be made of or lined with impermeable materials sufficient to contain the substance for the duration of a spill event. Such material or liner must be maintained in an impermeable condition.

d) No manufacturing area, processing area, transfer area, dike storage area, or other storage area, or secondary containment/diversion system appurtenant thereto shall drain into a watercourse, or into a ditch, sewer, pipe or storm drain that leads directly or indirectly into a surface or subsurface disposal area, unless provision has been made to intercept and treat any spilled hazardous substances in an NJDEP approved industrial wastewater treatment or pre-treatment facility, or other NJDEP approved facility.

e) Outdoor storage of regulated substances in regulated containers and the containment structure must include a cover to minimize accumulation of water in the containment area and contact between precipitation and storage container(s).

5. Catchment basins, lagoons and other containment areas that may contain hazardous substances shall not be located in a manner that would subject them to flooding by natural waterways.

6. Stormwater shall be managed so as to prevent contamination of ground water, and so as to be in accordance with applicable laws and regulations of the state of New Jersey, and of the municipality.

7. All transfers of petroleum from delivery trucks and storage containers over five gallons in capacity shall be conducted over an impervious surface having a positive limiting barrier (e.g. berm, lip) at its perimeter

B. *Compliance Mechanisms.* Any of the following permits and authorizations shall be considered equivalent to the best management practices of this section. As applicable to the PCS involved, these may also be submitted in lieu of an Operations and Contingency Plan, as otherwise required under subsection § 4.9.3.C, following.

1. A NJPDES permit approved by NJDEP pursuant to N.J.A.C. 7:14A;

2. An underground storage tank approved by NJDEP under N.J.A.C. 7:14B;

3. A Discharge Prevention, Containment and Countermeasure Plan (DPCC) approved by NJDEP pursuant to N.J.A.C. 7:1E;

4. A hazardous waste remedial action approved by NJDEP pursuant to N.J.A.C. 7:26B, 26C, 26D or 26E, or by the United State Environmental Protection Agency pursuant to the Resource Conservation Recovery Act (RCRA) or the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA);

5. A hazardous waste facility approved by NJDEP pursuant to N.J.A.C. 26G;

6. Approval by the SCD of a Farm Conservation Plan or Resource System Management Plan pursuant to N.J.A.C. 2:92, (see § 4.10.4 below and APPENDIX E);

7. A solid waste facility approved by NJDEP pursuant to N.J.A.C. 26H; and

8. A high-density Animal Waste Management Plan, an Animal Waste Management Plan, or a Comprehensive Nutrient Management Plan, as appropriate, developed pursuant to N.J.A.C. 2:91.

C. *Operations and Contingency Plans.* Unless one of the permits or approvals listed at § 4.9.3 B.1-8 above is provided, or the applicant certifies that no potential contaminants will be stored, discharged, manufactured or used on-site, as a condition of approval of any application involving a Major PCS, the applicant shall prepare and obtain approval of an Operations and Contingency Plan in accordance with the requirements herein. No Certificate of Occupancy or Approval (as appropriate) for the development shall be issued until or unless the qualified professional authorized to administer these provisions verifies that the Operations and Contingency Plan has been approved and is on file with the appropriate entities.

D. *Approval of Operations & Contingency Plans.* The proposed Operations and Contingency Plan shall be submitted to the Board of Health (or equivalent acting authority), Fire Department, Police Departments and Office of Emergency Management, as applicable. These agencies shall review and make any appropriate recommendations for approval or modifications of the Operations and Contingency Plan. The applicant shall incorporate the recommendations to produce a final document, for review by the designated municipal professional and each of the participating agencies.

E. *Required Content of Operations & Contingency Plans.* An Operations and Contingency Plan shall be developed, for each Major PCS or group thereof (where multiple sources exist within a single facility owned and operated by a single entity) and shall address the following

elements. The Operations and Contingency Plan must demonstrate that the potential for a significant discharge is the lowest technologically feasible:

1. Documentation of the applicable Major Potential Contaminant Sources existing and proposed for the site;

2. Types and quantities of hazardous substances or wastes that may be used, discharged or stored on site;

3. Means used to prevent the spillage, leakage or discharge of such materials;

4. Means to be used to contain or remedy accidental spillage, leakage, discharge or migration of such materials from the site directly or indirectly into ground water;

5. At a minimum, utilize best management practices as defined by § 4.9.3 and as specified by NJDEP and the United States Environmental Protection Agency, including but not limited to the regulations and guidance in the following areas: Discharge Prevention Containment and Countermeasures [N.J.A.C. 7:1E-4.2 (or most current)], Spill Prevention Control and Countermeasures [40 CFR 112.3 et seq.(or most current)], Stormwater and Non-point Source Pollution Control Best Management Practices Manual [NJDEP, April 2004 (or most current)].

6. Specific training of facility personnel to contain or remedy accidental spillage, leakage, discharge or migration of such materials from the site directly or indirectly into ground water, or surface water bodies or the land surface that provide recharge to the underlying aquifer.

7. Procedures including a contact list and phone numbers for notifying the appropriate administrative authorities, including but not limited to NJDEP, the local fire and police, local office of emergency management and the Board of Health, regarding any spillage or discharge of such materials; and

8. Demonstration that the proposed facility is designed to employ best management practices to the maximum extent feasible.

F. *Confidentiality Protections.* Any information included in an Operations and Contingency Plan which constitutes proprietary commercial or financial information, or is otherwise protected from disclosure under 7 CFR Part 205.501 and 205.504 or the Open Public Records Act, N.J.S.A. 47:1A-1 et seq., shall be held confidential by all local entities participating in its review or implementation, subject to the limitations set forth therein.

§ 4.10 AGRICULTURAL RESOURCES

§ 4.10.1 Applicability

The provisions of this section apply to the lands of the Agricultural Resource Area as found in the RMP. The Agricultural Resource Area (ARA) consists of the areas of most concentrated and contiguous agricultural uses in the Highlands Area and contains major areas of Important Farmland Soils. These provisions shall apply to both the Preservation Area and the Planning Area.

§ 4.10.2 Agricultural Resource Area

A. *Residential Development.* Pursuant to § 3.2.1 above, where the municipal zoning permits residential development within any portion of the ARA, the only form of such development permitted is residential cluster development in accordance with the provisions of § 6.1, below, provided the minimum thresholds (see § 6.1.6) can be satisfied. Where such thresholds cannot be met, the allowances for residential development provided in the underlying Zoning Ordinance apply to applications for such development, subject to all density and resource protection requirements herein.

§ 4.11 HISTORIC, CULTURAL & ARCHAEOLOGICAL RESOURCES

§ 4.11.1 Applicability

The provisions of this section shall apply to any development application involving property which is located either, among those identified as containing Highlands Historic, Cultural and Archaeological Resources, or which lies adjacent to any property containing or partially containing such Resources. These provisions shall apply to both the Preservation Area and the Planning Area.

§ 4.11.2 Standards and Criteria

The Highlands Council shall follow The Secretary of the Interior's Standards for the Treatment of Historic Properties. For Archaeological Resources, the Highlands Council shall follow the NJ Historic Preservation Office Guidelines for Phase I Archaeological Investigations and may, based on the findings require the protection of any identified resources.

§ 4.12 SCENIC RESOURCES

§ 4.12.1 Scenic Resources Management Plan

Any development application involving property containing Highlands Scenic Resources, or which lies adjacent to any property containing or partially containing a Highlands Scenic Resource, shall comply with all requirements adopted pursuant to any Highlands Council-approved Scenic Resources Management Plan.

ARTICLE 5. HIGHLANDS AREA GENERAL REGULATIONS

§ 5.1 AFFORDABLE HOUSING

In accordance the requirements of the Fair Housing Act (N.J.S.A. 52:27D-329.9), any development consisting of newly-constructed residential units shall reserve for occupancy at least 20 percent (20%) of the residential units constructed for low or moderate income households, where economically feasible.

A. **Economic Feasibility Waiver.** For any development requesting a waiver from the reservation of 20% of the units constructed for low or moderate income households, the following information shall be submitted as part of the review process:

a) An executed contract of sale which shall state the total cost of the land and the total number of units (including low or moderate income units) to be developed under the current requirements.

b) A valid executed contract with an architect and/or engineer stating the total cost for their professional services. If the entity does not have such a contract then it will be assumed that these services will cost 20% of the total cost of land and construction.

c) A plan that displays the square footage for each type of unit to be built. This plan shall include the low or moderate income units required on the site as well. The plan must be signed and sealed by a licensed engineer.

d) A unit description from a licensed architect. The unit description will include a listing of all materials and appliances to be included in the sales price of the unit. This description will be submitted for the market units and the low or moderate income units.

e) A per unit cost estimate of construction cost. The estimate must be prepared utilizing a current, nationally recognized source such as the RS Means Guide for Construction Cost. The cost estimate must be submitted for each unit type being constructed in the project, including the low or moderate income units.

f) An affidavit establishing the sales price of the market units. The market unit prices should be based on comparable units within the community, or the nearby area if no comparable units exist within the community. Comparables should be consistent in age, type, size and context.

g) A cost estimate of the total project and per-unit cost of infrastructure. The estimate of this cost must be prepared utilizing a nationally recognized source, such as the RS Means Guide for Construction Cost. The cost must be assessed to all units being developed including the low or moderate income units.

h) A financial pro-forma summarizing the total costs and revenues of the project based on the information required in this section.

i) An alternatives analysis, including a review of the feasibility of providing the required units off-site but within the municipality through one or more of the N.J.A.C. 5:93 or Highlands Council permitted methods for the provision of affordable housing as approved by the municipality including but not limited to:

(i) Redevelopment;

(ii) 100% Affordable Development;

(iii) Accessory Apartments;

(iv) Market to Affordable unit(s);

(v) Supportive and special needs housing;

(vi) Assisted living residences;

(vii) Extension of expiring controls; or

(viii) Other Innovative approaches (as previously approved in a municipal Fair Share Plan).

j) The status of any project in an approved settlement agreement or affordable housing plan shall be considered during the review of any economic feasibility waiver.

B. Administration:

1. All affordable housing units shall comply with the rules pertaining to the phasing, integration, low/moderate income split, controls on affordability, bedroom distribution, affirmative marketing, heating source and administration of the affordable units as set forth in N.J.A.C. 5:93 and N.J.A.C. 5:80-26.1 et seq. (Uniform Housing Affordability Controls).

a) Where an odd number of low or moderate income housing units are required to be provided, the majority of the units shall be low income units.

a) Where there are an insufficient number of affordable housing units provided to meet the bedroom distribution requirements of N.J.A.C. 5:93, the first unit shall be a two-bedroom unit, the second unit shall be a three bedroom unit and the third shall be a one-bedroom unit. Otherwise, the bedroom distribution shall be in strict accordance with N.J.A.C. 5:93.

2. All affordable housing units shall be deed-restricted in accordance with N.J.A.C. 5:93 and guidelines found in N.J.A.C. 5:80-26.1 et seq. (Uniform Housing Affordability Controls).

3. It shall be the applicant's responsibility, at its sole cost and expense, to contract with an approved and municipally designated Administrative Agent for the initial and ongoing administration of the controls on affordability so as to ensure full compliance. The

designated Administrative Agent shall on a quarterly basis, and as needed throughout the year, file with the municipal Clerk to verify continuing compliance of each affordable unit.

4. It shall be the applicant's responsibility, at its sole cost and expense, to affirmatively market the affordable housing units in compliance with the municipal Affirmative Marketing Plan and ordinance and N.J.A.C. 5:80-26.1 et seq. (Uniform Housing Affordability Controls).

5. It shall be the applicant's responsibility, at its sole cost and expense, to prepare, file and record any and all necessary covenants, mortgages, deed restrictions and any and all other legal documentation necessary as outlined in any municipal affordable housing ordinance and N.J.A.C. 5:80-26.1 et seq. (Uniform Housing Affordability Controls) or as may further be required by any part of the approval process.

C. New residential housing units that meet the affordability requirements and deed restriction requirements found herein shall be exempt from the provisions of this section.

§ 5.2 LOW IMPACT DEVELOPMENT

§ 5.2.1 Applicability

The following provisions shall apply to all development applications involving property in the Highlands Area, whether in the Preservation Area or the Planning Area.

§ 5.2.2 Standards

A. Applicants shall demonstrate that the project design process incorporates conservation design planning, including the following steps:

1. Preparation of an existing features and site analysis plan, including identification of Highlands Area resources and Resource Areas;

2. Evaluation of site context through identification of the physical and community character of the surrounding area;

3. Selection of open space conservation areas, where applicable, that maximize the retention of resource values, provide connections to existing trails, open spaces or greenways, and incorporate natural features and characteristics as site amenities;

4. Establishment of development yield (e.g., residential, retail, office) and apportionment of septic system yield, net water availability, and water supply and sewer utility availability, as applicable, and in keeping with all density and intensity requirements of § 3.3, above;

5. Lay out of building lots, if applicable, and incorporation of low impact development design techniques for site design, stormwater management and resource protection; and

6. Incorporation of resource standards and smart growth guidelines.

B. Development applications must achieve stormwater management in compliance with § 5.4, below, including the municipal stormwater management ordinance established in compliance

with the municipal stormwater NJPDES permit under N.J.A.C. 7:14A and 7:8, and all applicable NJDEP standards and requirements.

C. Relief from the strict application of the provisions of the underlying municipal Zoning Ordinance applicable to site design shall be considered where necessary to provide for incorporation of smart growth principles and low impact development techniques such as use of shared parking and driveway areas, biofiltration swales, rainwater capture and reuse, and reduced road or driveway widths. Where such deviations will minimize or eliminate adverse impacts to Highlands natural resources, these benefits shall be given significant weight in the analysis of approval criteria.

D. The site preparation plan shall limit clearing, grading and soil compaction to the minimum required to construct the project in accordance with the approved plans, inclusive of area for construction equipment maneuvering, while ensuring protection of mature trees and habitat outside of the site development area.

E. Landscaping shall use native, drought-tolerant (other than where used in rain gardens, biofiltration swales and other stormwater management facilities), disease-resistant plants, allowing for natural landscaping wherever feasible, and shall under no circumstances include invasive species. The Highlands Council maintains a list of recommended plantings which is available on the Highlands Council's website.

F. Building orientation and design shall be designed to take advantage of micro-climate conditions, to the maximum extent feasible, to maximize solar gain for winter heating, and to minimize solar gain during high temperature summer conditions except where desirable for the construction of solar energy systems. Other energy-efficient features shall be considered and incorporated into site layouts and buildings, as appropriate.

G. The applicant shall ensure reuse and recycling of building materials, to the extent possible, when development involves demolition.

H. All low impact development features shall be maintained through a monitoring and maintenance plan, with procedures for replacing such features as necessary.

§ 5.3 CONSERVATION RESTRICTIONS

§ 5.3.1 Applicability

In the event that a Conservation Restriction is required to effectuate the purposes of the RMP, the provisions of this section shall apply. Nothing herein shall be construed to preclude the imposition of Conservation Restrictions in the case of Highlands Resources, Resource Areas, or Special Protection Areas, where the Highlands Council finds that such restrictions are necessary to protect the particular resource(s) at issue, or to ensure the public health, safety, or general welfare of the community.

§ 5.3.2 Standards

Conservation Restrictions shall be designed to protect the Highlands Resources, Highlands Resource Areas, or Special Protection Areas existing (or as remaining after an authorized disturbance) on the subject property in accordance with the requirements that follow.

A. The Conservation Restriction shall run with the land on which the approved project is located, shall apply to all lots subdivided from that land and sold or transferred to other persons, and shall be binding upon the landowner and his or her successors in interest. To ensure that notice of the conservation restriction is provided to all present and future interested parties, the landowner or contract purchaser receiving the approval shall:

   1. Record the Conservation Restriction(s) in the office of the County Clerk or Register, as applicable prior to commencement of any work authorized under the approval; and

   2. Ensure that a copy of the Conservation Restriction is provided to the Highlands Council and to the Municipal Clerk with a request that it be placed in the file for the lot containing the approved project.

B. The Conservation Restriction(s) shall describe and include all regulated features on the property, including any required mitigation. The proposed easement(s) shall be depicted in the proposed plans, inclusive in the case of major site plans and major subdivisions, of plan notes specifying the location and construction of clear and permanent on-site monuments, such as concrete posts, designed to minimize the need for land clearing and avoid obstruction of wildlife movement.

C. The Conservation Restriction shall include either:

   1. A survey and a metes and bounds description of the entire restricted area; or

   2. A parcel plan showing the survey boundary lines to the full extent of the subject property, and indicating the limits of the existing disturbance area, any additionally-approved disturbance area, and of any area excluded pursuant to an exemption, with the indication that no further development or disturbance shall be permitted; or

   3. In the case of no proposed encroachment upon Highlands Resources or Areas, and availability of Highlands Council GIS mappings for all such Resources and Areas present upon the property, copies of all such mappings applicable to the parcel.

D. In the case of preserved farmland or dedicated open space, the Conservation Restriction shall be enforceable by the Highlands Council and the municipality, and at least one of the following, as appropriate: the SADC or CADB, the NJDEP Green Acres Program, or a qualified non-profit land trust organization. All such easements shall require periodic monitoring to ensure that on-going land use and management practices remain protective of the subject resources.

E. All other Conservation Restrictions shall be enforceable by the municipality and, for Planning Area lands, by the Highlands Council, and for Preservation Area lands, the NJDEP and the Highlands Council.

§ 5.4 STORMWATER MANAGEMENT

Applicability
The provisions of this section shall apply to any development application involving property in the Preservation Area or the Planning Area.

§ 5.4.2 Standards

A. *Carbonate Rock Areas.* Stormwater management plans shall be provided in connection with any application proposing development within a Carbonate Rock Area. Such plans shall be in full compliance with the provisions of § 4.5 above, and shall be approved only upon demonstration that potential hazards to public health and safety, structures and ground water quality due to concentrated surface water flows that dissolve carbonate rock, have been eliminated or otherwise addressed to the satisfaction of the Highlands Council. Development plans must indicate the means and methods by which such discharge shall be mitigated, with the maximum emphasis on use of nonstructural measures and avoidance of modifications to carbonate rock features.

B. *Beneficial Stormwater Reuse.* Development applications involving water demands for recreational uses, non-agricultural irrigation, and other non-potable uses shall demonstrate maximum practical stormwater reuse to minimize both the volume of stormwater discharges and the water demand sought for such purposes.

C. *Regional Stormwater Plans.* The stormwater management aspects of any development plan shall comply with all applicable components of any regional stormwater management plans adopted by NJDEP pursuant to N.J.A.C. 7:8 and N.J.A.C. 7:15.

D. *Total Maximum Daily Loads (TMDLs).* Applications shall be designed in compliance with any TMDL adopted by NJDEP (pursuant to N.J.A.C. 7:15) that has also been adopted by the municipality in compliance with the municipal stormwater management ordinance as established pursuant to the municipal stormwater NJPDES permit under N.J.A.C. 7:14A and 7:8.

E. *Prime Ground Water Recharge Areas.* Where disturbance of Prime Ground Water Recharge Area (PGWRA) is permitted under § 4.8, above, the applicant shall demonstrate compliance with all provisions of § 5.2 and § 4.9, above.

F. *Water Quality.* To the maximum extent feasible, the plan shall ensure recharge of clean stormwater rather than contaminated stormwater. Where runoff from contaminated areas is unavoidable, the applicant shall incorporate Low Impact Development (see H., below) and other Best Management Practices standards to minimize the discharge of stormwater-entrained pollutants to ground and surface waters.

G. *Wellhead Protection Areas (WHPA).* Any stormwater management structure located within a WHPA shall be permitted only in compliance with the provisions of § 5.2 and § 4.9, above.

H. *Low Impact Development (LID).* To the maximum extent feasible, LID techniques shall be incorporated into the design of all development proposals, to preserve, mimic and enhance the natural hydrologic cycle, drainage patterns and natural land cover existing on the site, including but not limited to:

1. Implementation of on-site stormwater management features that maintain, restore and enhance the pre-existing natural drainage patterns of the site;

2. Achievement of an on-site stormwater capture performance standard of 80% for average annual precipitation, using low impact development design techniques preferentially, and structural stormwater measures only to the extent necessary;

3. Limitations on the amount of impervious cover on a site as a means to protect and increase stormwater infiltration and reduce stormwater runoff;

4. Use of a "design with nature" approach where natural features are used or enhanced to achieve management of runoff volume, rate and quality of stormwater;

5. Use of grass channels, dry swales, wet swales, infiltration basins, bio-swales and water gardens, green roofs, and other low impact approaches to attenuate and control stormwater and provide multiple environmental benefits; and

6. Minimization of: a) disturbances to natural vegetation and topography; b) exposure of stormwater runoff to pollutant-generating land uses; and c) alterations in the hydrologic response to precipitation through natural patterns.

7. Integration of stormwater management design features with public spaces, existing and proposed landscape features, and buffers, to the extent applicable.

8. Submission Requirements:

   a) Stormwater Management Plan and Stormwater Best Management Practices (BMPs) Operation and Maintenance Manual prepared in accordance with municipal regulations;

   b) Completed Low Impact Development Checklist.

§ 5.5 SPECIAL ENVIRONMENTAL ZONE

§ 5.5.1 Development Prohibited

The development of property designated as Special Environmental Zone in the RMP is prohibited.

§ 5.5.2 Highlands Council Offer to Purchase

For any development application involving a lot or lots located, or partially located within the Special Environmental Zone the Highlands Council in conjunction with the Highlands Development Credit Bank will review the property for the potential preservation through either the Highlands Open Space Partnership Program or the Highlands Development Credit Purchase

program. No such application will be considered sufficient for review until a Highlands Development Credit Allocation has been issued by the Highlands Council.

§ 5.5.3 Highlands Council and NJDEP Approval Required

Any development application involving a lot or lots located, or partially located within the Special Environmental Zone shall be approved only by the Highlands Council through the issuance of a waiver at duly noticed public hearing, in conjunction with the issuance of an HPAA with waiver from the NJDEP. Any such waiver shall be conditioned upon a determination that the Highlands Council and the NJDEP have exhausted all means for the permanent preservation of the property through use of preservation tools including, but not limited to, fee simple acquisition, easement acquisition, and TDR.

§ 5.6 SEPTIC SYSTEM DESIGN AND MAINTENANCE

The requirements herein apply to proposed development activities reliant upon installation of individual subsurface septic disposal systems, regarding the proper operation, design, development, monitoring, placement and maintenance of septic systems.

A. The design of septic systems shall be in compliance with the Standards for Individual Subsurface Sewage Disposal Systems at N.J.A.C. 7:9A and any applicable Board of Health Ordinance and shall be subject to approval of the Board of Health.

B. All applications shall demonstrate that the proposed plan incorporates the applicable requirements of N.J.A.C. 7:9A with respect to soils suitability, location, size, and separation distances.

C. All applications proposing new septic systems shall incorporate reserve septic system disposal areas for each septic system, which are sufficient with respect to soils suitability, location and size to meet the requirements of N.J.A.C. 7:9A, to ensure the long-term viability of septic systems in new development.

D. Any application proposing a new septic system (or systems) shall be conditioned upon filing of a deed restriction(s) or deed notice(s) protecting the delineated location(s) of the reserve septic system disposal field(s), prohibiting the placement thereon of any permanent structure(s), preserving the area (and its soils) for future installation of a replacement disposal field, and requiring that it be shown on all plans and referenced within any future applications for permits or improvements to the property.

E. All new individual septic disposal systems shall be subject to any applicable septic system management and maintenance requirements of the Board of Health, including those established in the Board of Health Ordinance and in compliance with the standards for septic system maintenance in the Water Quality Management Planning Rules, N.J.A.C. 7:15.

F. The application shall demonstrate compliance with any other Board of Health ordinances to achieve the maintenance of existing and new septic systems.

G. New development proposing to use septic systems shall be designed in a manner that ensures that untreated well water meets state drinking water quality standards for non-natural contaminants and minimizes the risk of well contamination due to the flow of septic systems

plumes within or between developed lots, addressing general background water quality and flow patterns, major fracture systems and other appropriate geological, geophysical and hydrogeological issues.

§ 5.7 PUBLIC WATER SYSTEMS

The creation or expansion of any public water system, as permitted in the Existing Community Zone of the Planning Area (pursuant to § 3.3.7, above) shall comply with the following requirements:

A. ***Estimation of Need.*** Development water supply demands shall be calculated based on maximum summer month demand and on annual average demand using demand factors in N.J.A.C. 7:10 "Safe Drinking Water Regulations."

B. ***Water Resource Transfers.*** Applicants shall demonstrate that under the proposed action either:

1. No new or increased water transfer between subwatersheds will occur; or

2. No other option exists to meet public health, safety and welfare objectives, and where such transfers do occur, they are in full compliance with the requirements of § 4.7 above (Water Conservation and Deficit Mitigation), including limitations on demands on the source subwatershed.

§ 5.8 WASTEWATER COLLECTION AND TREATMENT SYSTEMS

The creation or expansion of any wastewater collection and treatment system, as permitted in the Existing Community Zone (including the Lake Community Sub-Zone) of the Planning Area (pursuant to § 3.3.7, above), shall comply with the following requirements:

A. ***WQMP Consistency.*** The proposed system shall be consistent with the relevant Areawide Water Quality Management Plan adopted by NJDEP pursuant to N.J.A.C. 7:15.

B. ***Prohibitions.*** Expansion of sewer service areas shall not be permitted for existing wastewater collection and treatment systems that are non-compliant with NJPDES permit requirements for effluent quality.

C. ***Estimation of Need***. Development wastewater demands shall be calculated based on maximum three month demand and on annual average demand using demand factors in N.J.A.C. 7:14A or N.J.A.C. 7:9A as appropriate.

D. ***Water Resource Transfers.*** Applicants shall demonstrate that under the proposed action either:

1. No new or increased water transfer between subwatersheds will occur; or

2. No other option exists to meet public health, safety and welfare objectives, and where such transfers do occur, they are in full compliance with the requirements of § 4.7 above

(Water Conservation and Deficit Mitigation), including limitations on demands on the source subwatershed.

ARTICLE 6. PLANNED DEVELOPMENT REGULATIONS

§ 6.1 RESIDENTIAL CLUSTER DEVELOPMENT

§ 6.1.1 Applicability

The provisions of this section shall apply to all lands in the ARA, including that in both the Preservation Area and the Planning Area, as provided at § 2.4.11 and as designated in the RMP. The permitted principal residential use for any underlying municipal Zoning District in the ARA which permits single-family residential development as a principal use, is restricted solely to cluster development in accordance with all provisions of this section.

§ 6.1.2 Cluster Project Area Standards

The Cluster Project Area (as defined at § 1.2) includes all of the individual parcels from which development is clustered, including the area set aside for preservation and the area set aside for development. Residential cluster development shall be implemented in accordance with the provisions herein. The use of clustering in Highlands Zones or Sub-Zones having a high concentration of environmentally sensitive resources will be limited. The use of non-contiguous clustering, wherein the development rights of non-contiguous parcels are aggregated for use upon a single parcel (or group of adjacent parcels) suited to cluster development, shall be permitted and is encouraged where it affords a higher level of protection to Highlands Resources and Resource Areas than would otherwise be the case. Land management and stewardship, including best management practices and conservation and/or management plans, for the Cluster Project Area shall be subject to the provisions of Article 4 for all Highlands Area Resources including, but not limited to protection, restoration, maintenance and mitigation, as applicable.

§ 6.1.3 Preservation Set Aside of Cluster Project Area Standards

A. The area set aside for preservation in a Cluster Project Area shall comprise at least 80% of the total Cluster Project Area, and shall be preserved in perpetuity for agricultural use or for environmental protection. If the Cluster Project Area is served by a public or community on-site wastewater system, the area set aside for preservation shall comprise at least 90% of the Cluster Project Area to the maximum extent this is feasible. All land preserved in perpetuity shall require a conservation restriction that complies with § 5.3 and is enforceable and monitored by the Highlands Council and, where requested by the Highlands Council: for environmental protection, the NJDEP Green Acres or a qualified land trust non-profit organization, or for agricultural use, the CADB or the SADC. All Preservation Set Asides shall be deed-restricted against further subdivision and shall consist of one contiguous parcel, to the maximum extent feasible, unless non-contiguous clustering is utilized.

B. When agricultural resources are preserved the following provisions shall apply:

   1. The most productive Important Farmland Soils, determined in accordance with NRCS USDA soil survey data, NJDA and the local SCD shall be given priority in determining the area set aside for agricultural preservation within the Cluster Project Area.

   2. The conservation easement or deed restriction and a legally enforceable Homeowner's Agreement, where applicable, shall include Right to Farm Act provisions.

3. Retention of the original farmstead or construction of new farmsteads associated with preserved agricultural lands in cluster developments shall be permitted.

4. The preserved portion of the Cluster Project Area shall be buffered appropriately to avoid conflicts between agricultural operations and adjacent development, including the developed portion of the Cluster Project Area, and to facilitate compliance with any municipal Right to Farm regulations.

5. Community supported agriculture businesses shall be permitted within the preserved portion of the Cluster Project Area to allow homeowners to take advantage of local agricultural goods and services and to enhance the viability of the agricultural industry.

C. When natural resources are protected the following provisions shall apply:

1. Cluster development shall meet the resource management and protection requirements of Article 4 and shall be consistent with the policies of the Conservation Plan Element of the Master Plan.

2. Where high value natural resources are preserved, the conservation easement or deed restriction shall prohibit active recreational uses and facilities, and only allow minimal passive recreational uses dependent upon the nature of the resources.

3. Passive recreational trails shall be allowed provided they do not disturb habitat and shall be natural landscape trails constructed using native pervious materials. Where feasible, such passive recreational trails shall link to existing federal, state and local trail systems, greenways and parks.

4. Buffering techniques, management and stewardship of natural resources, and site design for the Cluster Project Area shall be used, where feasible, to enhance the existing natural resources protected within the Cluster Project Area.

§ 6.1.4 Development Set Aside of Cluster Project Area Standards

A. Cluster development shall be designed to avoid or minimize disturbance of natural resources and agricultural resources (including ARAs) of the Highlands Region in compliance with the provisions of herein.

B. The total area set aside for development in the Cluster Project Area shall not exceed 20%. To the maximum extent feasible, the developed area of the Cluster Project Area shall occupy no more than 10%, if the project area is served by a public or community on-site wastewater system.

C. For cluster development dependent upon septic systems, the unit yield for the whole of the Cluster Project Area shall be based on the septic system density allowances as established at § 3.2, or at the development density allowed under municipal zoning, whichever is more restrictive.

D. Septic System density allowances within the Development Set Aside portion of the Cluster Project Area shall not exceed that necessary to ensure that nitrate dilution for the developed

portion of the site is maintained at 10 mg/L, or less. These allowances shall be calculated in accordance with the Highlands Council Nitrate Dilution Model, information concerning which may be obtained through the Highlands Council. This model derives from two independent methods: a mass-dilution (modified Trela-Douglas) model and the New Jersey Geological Survey's (NJGS) ground-water-recharge method. It provides the minimum number of acres required per septic system (applied as an average density) to ensure that recharge is sufficient to achieve nitrate dilution targets.

E. Water and wastewater availability, expansion, or creation for cluster development shall be in compliance with § 3.2 and shall meet the resource management and protection provisions of the RMP.

F. Cluster residential development proposing to use septic systems shall meet the resource management and protection provisions of the RMP.

G. All infrastructure, open space and utilities necessary to support the residential cluster development shall be located within the Development Set Aside of the Cluster Project Area (i.e. streets, common open space areas, wastewater facilities and stormwater management).

H. Where a municipality has developed and the Highlands Council has approved a plan for the aggregation of cluster developments to minimize the potential for dispersed clusters, the cluster development shall be consistent with such plan.

I. Cluster development shall incorporate smart growth principles where feasible, including but not limited to: a mix of land uses; compact building design; walkable neighborhoods; a range of housing opportunities and choices; foster distinctive communities with a strong sense of place; preserve critical natural and agricultural resources; direct development towards existing infrastructure (i.e. water, wastewater, transportation, and community facilities); provide a variety of transportation choices (i.e. pedestrian, bicycle automobile, bus, rail); and encourage community and stakeholder collaboration in development decisions.

J. Cluster development shall incorporate LID techniques, as set forth at § 5.2.

K. Cluster development shall be designed to maintain the Highlands rural, scenic and historic character and shall consider and harmonize with existing community character with respect to architectural style, scale, massing and arrangement of buildings. Protection of Highlands Historic, Cultural and Archaeological Resources and Highlands Scenic Resources shall be considered and incorporated consistent with the provisions at § 4.11 and § 4.12. Primary criteria for site design decision-making shall include protection of existing resources and minimization of negative impacts.

L. All buffers and setbacks shall consider and incorporate or harmonize with existing natural, agricultural, historic and scenic resources and with community character. Buffers and setbacks shall be designed to consider and harmonize with the Cluster Project Area and adjacent existing development. Existing natural resources and vegetation (e.g., hedgerows/trees, woodlands or forest, wetlands, streams) shall be retained and may be enhanced as buffer features whenever feasible. Where the cluster development is integrated into an existing neighborhood or center-type development, the developed area of the cluster shall be located

behind an existing hedgerow (mature trees) or screened with a new buffer as appropriate, such as a thickly planted berm of native trees or shrubs that is landscaped in such a manner as to resemble existing woodlands.

M. Site disturbance shall be restricted to clearing and grading to the minimum extent necessary to make reasonable use of the designated building envelopes, including but not limited to compliance with LID requirements at § 5.2 and retention of existing mature trees.

N. Cluster development shall be configured to minimize impervious coverage.

§ 6.1.5 Minimum Acreage and Density Standards

Residential cluster development shall be tailored to the characteristics of the site and its environs, and shall be designed to avoid or minimize disturbance of existing Highlands Area Resources. The following standards shall apply to residential cluster development projects.

A. *Minimum Acreage Threshold Requirements.*

1. Cluster Development reliant upon on septic systems:

   a) Protection Zone – 120 acres

   b) Conservation Zone – 40 acres

   c) Existing Community Zone – 35 acres

2. Cluster Development served by wastewater utilities:

   a) All Zones – 30 acres

B. *Net Density/Intensity Threshold Requirements.*

1. New single-family residential cluster development shall be subject to a net septic system density limitation, calculated on the basis of the developed portion of the Cluster Project Area (as provided at § 3.2). Such density (acres per septic system) shall comply with a nitrate dilution target for the developed portion of the Cluster Project of 10 mg/L or less.

2. Where new residential development is proposed to rely on existing wastewater utilities the density and intensity standards shall be in compliance with the underlying municipal zoning ordinance.

C. *Minimum Unit Number Threshold Requirement.* Application of the acreage and density/intensity requirements of A. and B., above, shall yield a minimum of four (4) dwelling units.

D. *Other Requirements.* All other development requirements, including any bulk or minimum lot standards shall be as required pursuant to the underlying municipal zoning/land use ordinances. Cluster development within the Preservation Area may be restricted beyond these requirements, by applicable provisions of NJDEP Preservation Area Rules (e.g., 3% maximum impervious coverage).

APPENDIX A. FOREST DETERMINATION

The determination of whether a wooded area constitutes a forest, shall rely upon the Highlands Council procedures set forth herein, as adapted from NJDEP Preservation Area Rules (at N.J.A.C. 7:38-3.9). These standards shall apply to the entirety of the Highlands Area whether inclusive solely of Preservation Area, Planning Area, or any combination of the two.

A. The applicant shall identify on a site plan all forest in existence on the lot as of August 10, 2004 as well as those forest areas that have subsequently developed. An upland forest area shall be determined in accordance with the following method:

1. The limit of the forest shall be identified using aerial photographs obtained from the NJDEP, free of charge, at www.state.nj.us/dep/gis/; and

2. If the aerial photograph contains areas of sporadic coverage that have not been identified as forest by the applicant, the applicant shall lay a one-half acre grid system over the photograph. A standard 142 square foot grid block shall be used, as provided by the NJDEP at its website. Any grid block containing 33 percent or greater forest cover shall be considered as forest, unless the applicant demonstrates otherwise using the procedure established in B., below.

3. If the applicant has an approved forest management plan identifying forest on a site, the limits of the forest indicated in the plan may be submitted as an additional resource, but shall not be used in lieu of aerial photographs.

B. Alternatively, a forest determination may be made based upon the size and density of trees on the subject property, in accordance with the following method:

1. Select two 25-foot by 25-foot plots in every acre of the site potentially containing a forest.

a) The plots shall be located in the portion of each acre having the highest density of trees as determined by a visual inspection.

b) If the tree size and density are very uniform over some or the entirety of the site, one plot may be selected in the area of uniformity. However, the point total from the one plot shall be doubled to determine the total point value for the sampled acre pursuant to B.5., below.

2. In each plot, measure the diameter of each tree at four and one-half feet above ground (diameter at breast height, dbh).

3. Score each tree as follows:

Diameter of Tree (dbh)	*Points*
1 inch to 3 inches	2
Between 3 and 7 inches	4
7 inches to 12 inches	6
Greater than 12 inches	8

4. Add together the scores for all of the trees in each plot.

5. If the total score for both plots is equal to or greater than 16, the sampled acre is regulated as a forest. For example, if the two 25-foot by 25-foot plots contain a total of three trees which are two inches in diameter, two trees which are six inches in diameter, and one tree which is 15 inches in diameter, the score for the sampled area would be: (3x2)+(2x4)+(1x8) = 22, and the sampled acre is considered a forest.

6. If a sampled acre is a forest, the applicant shall assume that a half-acre of ground surrounding all sides of the sampled acre is also forest except for the surrounding areas that are sampled by the applicant and score under 16. In that case, a sufficient number of plots in the surrounding area shall be sampled by the applicant to delineate the forest portion of the surrounding area.

7. The applicant shall submit the results of field sampling data provided in B.1 through B.6 above. The outer perimeter of all sample plots shall be flagged in the field and their locations shown on a plan.

8. For a newly planted or regenerating forest, an area shall be considered forest if there are 408 seedlings or saplings per sampled acre, that is, the total number of seedlings or saplings in the two sample plots is 12 or more. For the purposes of this section, a tree will be considered a seedling or sapling if it is has a caliper (diameter) of less than one (1) inch.

9. Agricultural and/or horticultural uses such as orchards, tree farms and nurseries are not considered forest under this section.

C. The limit of the forest shall be the outermost edge of the canopy of the forest area identified in A. through B., above.

APPENDIX B. MAJOR POTENTIAL CONTAMINANT SOURCES

Land uses and activities determined by the Highlands Council (based on New Jersey Safe Drinking Water Act regulations at N.J.A.C. 7:10 and NJDEP regulations) to be Major Potential Contaminant Sources include those listed below.

1. Underground fuel and chemical storage and oil tanks regulated by NJDEP under provisions of the Underground Storage of Hazardous Substances Act (N.J.S.A. 58:10A-21 et seq.).
2. Above-ground storage facility for a hazardous substance or waste with a cumulative capacity greater than 2,000 gallons.
3. Automotive service center (repair & maintenance).
4. Dry cleaning processing facility.
5. Road salt storage facility.
6. Cemetery.
7. Highway maintenance yard.
8. Truck, bus, locomotive maintenance yard.
9. Site for storage and maintenance of heavy construction equipment and materials.
10. Site for storage and maintenance of equipment and materials for landscaping, excluding household storage and maintenance of such equipment.
11. Livestock operation containing 300 or more Animal Units (AU) [1 AU= 1000 pounds of live animal weight] as defined by the NJ Department of Agriculture in its Criteria and Standards for Animal Waste Management, at NJAC 2:91.
12. Quarrying and/or mining facility.
13. Asphalt and/or concrete manufacturing facility.
14. Junkyard/auto recycling and scrap metal facility.
15. Residential or agricultural motor fuel in NJDEP exempted underground storage tanks (i.e., under 1,000 gallons).

APPENDIX C. MINOR POTENTIAL CONTAMINANT SOURCES

Land uses and activities determined by the Highlands Council (based on New Jersey Safe Drinking Water Act regulations at N.J.A.C. 7:10 and NJDEP regulations) to be Minor Potential Contaminant Sources include those listed below.

1. Underground storage of hazardous substance or waste of less than 50 gallons.
2. Underground heating oil storage tank with a capacity of less than 2,000 gallons.
3. Sewage treatment facility regulated by a NJPDES permit granted under NJAC 7:14A.
4. Industrial waste line.
5. Septic system disposal field.
6. Facility requiring a ground water discharge permit issued by the NJDEP pursuant to N.J.A.C 7:14A et seq.
7. Stormwater retention-recharge basin on an industrial property receiving runoff from surfaces other than roof areas.
8. Dry well on an industrial property receiving runoff from surfaces other than roof areas.
9. Waste oil collection, storage and recycling facility.
10. Agricultural chemical bulk storage and mixing or loading facility including crop dusting facilities.
11. Above-ground storage of hazardous substance or waste in quantities of less than 2,000 gallons.
12. Livestock operation containing 8 or more Animal Units (AU) [1 AU= 1000 pounds of live animal weight] or those receiving 142 or more tons of animal waste per year as defined by the NJ Department of Agriculture pursuant to its Criteria and Standards for Animal Waste Management, at NJAC 2:91.

APPENDIX D. SANITARY SEWAGE VOLUMES BY FACILITY

The following table from N.J.A.C. 7:9A-7.4 is for use in calculating 300 gallon-per-day septic system equivalents by facility type, pursuant to § 3.3.5 B.

The criteria listed herein are minimum standards for average facilities of the categories listed. In cases where a facility does not fall within any of the categories, the administrative authority may approve the use of other documented criteria, such as actual water data for the facility or other similar facilities, provided that the value used for design is at least 50 percent greater than the average daily volume of sewage.

Type of Establishment	Method of Estimation (gallon per user or gallon per unit per day)
1. Airport	5 gal/passenger
2. Assembly Hall	3 gal/seat/day
3. Auto Service Station	10 gal/car served
4. Bar	5 gal/patron
5. Bathhouse with shower	25 gal/person
without shower	10 gal/person
6. Beach Club	25 gal/person
7. Beauty parlors and salons	120 gal/day/sink
8. Boarding House, Meals	75 gal/guest(2)
	15 gal/non-resident boarder
9. Bowling Alley, no food	125 gal/lane/day
with food, add	5 gal/patron
10. Bus Stop Rest Area	5 gal/passenger
11. Cafeteria	5 gal/customer
12. Camp, Cottage (barracks type)	65 gal/person
13. Camp, Day, no meals	20 gal/person
14. Camp, Resort	100 gal/site/day(2)
15. Camp, Trailer	100 gal/site/day(2)
with toilets, add	10 gal/person/day
16. Church, with or without kitchen	3 gal/seat/day
17. Cocktail Lounge	5 gal/customer
18. Coffee Shop	5 gal/customer
19. Comfort Station/Picnic Grounds	
with toilets	10 gal/person
with toilets and showers	15 gal/person
20. Cottages	100 gal/person(2) (minimum 350 gal/dwelling unit/day)
21. Country Club	60 gal/member/day 25 gal/non-member
22. Dining Hall	5 gal/customer
23. Dormitory, Bunkhouse	40 gal/bed/day
24. Factory/Industrial Building	15 gal/employee per eight hour shift

Type of Establishment	Method of Estimation (gallon per user or gallon per unit per day)
with showers, add	15 gal/employee per eight hour shift
25. Hospital, Medical	250 gal/bed/day
26. Hospital, Mental	150 gal/bed/day
27. Hotels	130 gal/room/day
28. Institution, Other than hospital	150 gal/bed/day
29. Laundry, Self-service	50 gal/wash
30. Motel	130 gal/room/day
31. Nursing/Rest Home	150 gal/bed/day
32. Office Buildings	15 gal/employee per eight hour shift or 0.125 gal/square ft., whichever is greatest
33. Prison	150 gal/inmate/day
34. Restaurant	
sanitary wastes only	5 gal/patron only
kitchen waste, add	5 gal/patron
35. Rooming House, no meals	65 gal/bed/day
36. School, Boarding	100 gal/student/day
37. School, Day	
No cafeteria or showers	10 gal/student/day
Cafeteria only	15 gal/student/day
Cafeteria and showers	20 gal/student/day
Cafeteria, showers and laboratories	25 gal/student/day
38. Shopping Center	0.125 gal/square ft./day(1)
39. Stadium	3 gal/seat/day
40. Store	0.125 gal/square ft./day(1)
41. Swimming Pool	10 gal/person
42. Theater, Indoor	3 gal/seat/day
43. Theater, Outdoor	10 gal/parking space
44. Visitor Center	5 gal/visitor

(1) Volume of sanitary sewage for employees included within method of estimation indicated.
(2) If laundry wastes are anticipated, increase the estimated flow by 50 percent.

New Jersey Highlands Water Protection and Planning Council

Recommended Native Plants for the Highlands Region

Release Date: June 2019

Abstract

This guidance document provides information about plants that are native to the New Jersey Highlands Region. Plant lists contained herein have been compiled from various sources and are recommended for proposed planting projects in the Highlands Region. A master list is provided as well as sub-lists sorted by County and planting area type. In addition, sample regulatory language and background information including reference materials, for use in developing sustainable landscaping plans, ordinances, and/or guidance material for use by interested citizens and/or applicants seeking municipal development approvals is provided in an attachment.

It is important to note that the majority of the listed plants are also included in Chapter 7 (*Landscaping*) of the NJ Stormwater Management Best Management Practices Manual of February 2004, as amended, and are commercially available. This document is provided as a supplement to the Highlands Region Stormwater Management Program Guidance (January 2016).

This document is intended to be used by professionals involved in the design of landscape plans for development projects within the Highlands Region. Although it was prepared specifically for use by professionals working in municipalities within the Region, it may be of interest to other stakeholders.

Highlands Council
New Jersey

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Statutory Platform, Purpose and Funding

Through the passage of the New Jersey Highlands Water Protection and Planning Act in 2004, the NJ Highlands Water Protection and Planning Council (the Highlands Council) was created and charged with developing a Regional Master Plan (RMP)[1]. Adopted in 2008, the RMP serves as the guiding document for the long-term protection and restoration of the region's critical resources. In accordance with Goal 6N of the RMP (*Use of Smart Growth Principles, Including Low Impact Development, to Guide Development in the Highlands Region*), the Highlands Council has developed this document to provide guidance and general information about native plants of the Highlands Region.

The content of this document pertains to the use of native plant species in the preparation of landscape plans as part of overall site plans for new or redevelopment projects situated in the Highlands Region of New Jersey. Although this document is intended to be used by municipalities and professionals working in the Highlands Region, the information contained herein, along with applicable rules and ordinances, may have application throughout all of New Jersey.

Although funding to support the development of landscape plans in not specifically provided through the Highlands Plan Conformance process, municipalities with approved Plan Conformance Petitions are eligible for grant funding to cover the reasonable expenses of related planning activities and should contact their Highlands Council Municipal Liaison for additional information. It is important to note that when a project triggers a review by the Highlands Council (Consistency Determination), native plant recommendations will be strongly encouraged as a condition of the project being found consistent with the RMP.

[1] *Copies of the Highlands Regional Master Plan are available in most municipal offices and can be obtained by contacting the Highlands Council office and at www.highlands.state.nj.us/njhighlands/master/rmp/final/highlands_rmp_112008.pdf*

Table of Contents

1.0 Introduction

This section briefly describes the contents of this document and how it is intended to be used.

1.1 Tables

A listing of the tables included in this document can be found below.

- Table 1 – Recommended Native Plants – All Highlands Counties – Trees & Shrubs
- Table 1A – Recommended Native Plants - Bergen County – Trees & Shrubs
- Table 1B – Recommended Native Plants - Hunterdon County – Trees & Shrubs
- Table 1C – Recommended Native Plants - Morris County – Trees & Shrubs
- Table 1D – Recommended Native Plants - Passaic County – Trees & Shrubs
- Table 1E – Recommended Native Plants - Somerset County – Trees & Shrubs
- Table 1F – Recommended Native Plants - Sussex County – Trees & Shrubs
- Table 1G – Recommended Native Plants - Warren County – Trees & Shrubs
- Table 2 – Recommended Native Plants – Highlands Region - Herbaceous
- Table 3 – Trees Recommended for Planting along Public Streets and Highways in Locations Where Low Maintenance, Hardy Specimens with High Canopies are Required
- Table 4 – Trees Recommended for Use within Interior of Site
- Table 5 – Upright Shrubs Recommended for Screening, Hedges and Specimen Planting
- Table 6 – Spreading Shrubs Recommended for Low Borders, Parking Lot Islands and Ground Covers
- Table 7 – Recommended Native Species for Planting Meadows
- Table 8 – Wetland Indicator Categories (description of wetland indicator status listed in Tables 1-6)
- Table 9 – Hydrologic Zones (description of zone and associated conditions listed in Table 2)
- Table 10– Nurseries with Natives (comprehensive list of nurseries that have supplies of native plants)
- Table 11 – References (list of references used in the development of this document)

1.2 Definitions/Descriptions

The following is a list of definitions and/or descriptions of fields found in Tables 1-9.

Commercial Availability – Form of plant that is commercially available

Deciduous – Plant sheds leaves annually

Drought Tolerant – Listed plant is able to grow or thrive during or in spite of drought conditions

Evergreen – A plant that has leaves throughout the year

Growth Habit – Characteristic appearance, form or manner of growth

Height – Height of plant at maturity

Hydrologic Zone – Describes the degree to which an area is inundated by water

Hydrophyte – A plant that grows only in or on water

Inundation Tolerance – Degree of inundation that a plant can tolerate

Legal Status – Lists whether plant is state and/or federally listed as threatened or endangered

Native Plant Society of NJ – A statewide non-profit organization dedicated to the appreciation, protection and study of the native flora of New Jersey. An "x" in this column indicates the plant is listed on their website.

NJ Stormwater BMP Manual – A manual that provides examples of ways to meet the standards contained in the Stormwater Management Rules (N.J.A.C. 7:8)

Nonhydrophyte – Opposite of *hydrophyte;* plants that usually occur in non-wetlands

NRCS Riparian Forest Buffer Conservation Practice Standard – Standard developed by the USDA Natural Resources Conservation Service containing information about why and where riparian forest buffers practices are applied. It sets forth the minimum quality criteria that must be met during the application of riparian forest buffers in order for them to achieve their intended purpose(s).

Ornamental –A plant or tree grown for its attractive appearance

Plant Type – General description of plant and lifespan

Shade – A tree planted to provide shade

Wetland Status or Indicator – Denotes the probability of the plant occurring in freshwater wetlands

1.3 Using this Document

The purpose of this document is to provide recommended plant lists comprised of species native to the Highlands Region. Professionals working in the Highlands can use the information contained herein when developing landscape plans for their projects. It is intended to be used in conjunction with Chapter 7 (*Landscaping*) of the NJ Stormwater Best Management Practices Manual[2]. In addition, Appendix B contains sample regulatory language and additional background information including reference materials, for use in developing sustainable landscaping plans, ordinances, and/or guidance material for use by interested citizens and/or applicants seeking municipal development approvals.

[2] http://www.nj.gov/dep/stormwater/bmp_manual/NJ_SWBMP_7.pdf

2.0 Tables

Table 1 – Recommended Native Plants – All Highlands Counties – Trees & Shrubs

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Bergen	Hunterdon	Morris	Passaic	Somerset	Sussex	Warren	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Acer rubrum	red maple	Tree	FAC	X	X	X	X	X	X	X	40-60		X	X	X
Acer saccharinum	silver maple	Tree	FACW	X	X	X	X	X	X	X	50-70			X	
Acer saccharum	sugar maple	Tree, Shrub	FACW	X	X	X	X	X	X	X	90				X
Alnus serrulata	hazel alder	Tree, Shrub	OBL	X	X	X	X	X	X	X	to 20			X	
Amelanchier canadensis	Canadian serviceberry	Tree, Shrub	FAC	X	X	X	X	X	X	X	20-30		X		X
Arctostaphylos uva-ursi	Bearberry	Subshrub, Shrub	UPL	X		X	X		X	X	0.5		X		
Asimina triloba	pawpaw	Tree, Shrub	FAC		X				X		15-40	NJ Endangered			
Baccharis halimifolia	eastern baccharis	Tree, Shrub	FACW					X			5-12			X	
Betula lenta	sweet birch	Tree	FACU	X	X	X	X	X	X	X	50-55				
Betula nigra	river birch	Tree	FACW	X	X	X	X	X	X	X	80			X	X
Betula populifolia	gray birch	Tree	FAC	X	X	X	X	X	X	X	20-25		X	X	
Carpinus caroliniana	American hornbeam	Tree, Shrub	FAC	X	X	X	X	X	X	X	40-60		X	X	
Carya glabra	pignut hickory	Tree	FACU-	X	X	X	X	X	X	X	80-135			X	
Ceanothus americanus	New Jersey tea	Subshrub, Shrub	--	X	X	X	X	X	X	X	3		X		
Celtis occidentalis	common hackberry	Tree, Shrub	FAC	X	X		X	X	X	X	40-60		X	X	X
Cephalanthus occidentalis	common buttonbush	Tree, Shrub	OBL	X	X	X	X	X	X	X	8			X	X
Cercis canadensis	eastern redbud	Tree, Shrub	UPL, FACU	X	X	X		X			20-25	NJ Endangered	X	X	
Chamaecyparis thyoides	Atlantic white cedar	Tree	OBL	X	X	X	X		X		80			X	X
Chamaedaphne calyculata	leatherleaf	Shrub	OBL	X	X	X	X		X	X	4				
Cornus florida	flowering dogwood	Tree, Shrub	FACU-, FACU	X	X	X	X	X	X	X	20-40			X	
Cornus sericea	redosier dogwood	Tree, Shrub	FACW+	X	X	X	X	X	X	X	6-10			X	X
Dasiphora fruticosa ssp. floribunda	shrubby cinquefoil	Shrub	--	X		X	X		X	X	2.5				

Table 1 (continued)

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Bergen	Hunterdon	Morris	Passaic	Somerset	Sussex	Warren	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Diospyros virginiana	common persimmon	Tree	FAC-	X	X	X	X	X	X	X	35-60				
Fagus grandifolia	American beech	Tree	FACU	X	X	X	X	X	X	X	50-70			X	
Fraxinus americana	white ash	Tree	FACU	X	X	X	X	X	X	X	50-70		X	X	X
Fraxinus pennsylvanica	green ash	Tree	FACU	X	X	X	X	X	X	X	40-60		X	X	X
Hamamelis virginiana	American witchhazel	Tree, Shrub	FAC	X	X	X	X	X	X	X	15-20		X	X	X
Hudsonia tomentosa	woolly beachheather	Subshrub, Shrub	--			X					1				
Ilex opaca	American holly	Tree, Shrub	FACU	X				X		X	15-20		X		X
Ilex verticillata	common winterberry	Tree, Shrub	FACW+	X	X	X	X	X	X	X	6-10				X
Juniperus virginiana	eastern redcedar	Tree	FACU+	X	X	X	X	X	X	X	40-50		X	X	
Ledum groenlandicum	bog Labrador tea	Shrub	OBL			X			X		3				
Lindera benzoin	northern spicebush	Tree, Shrub	FACW	X	X	X	X	X	X	X	6-12				X
Liquidambar styraciflua	sweetgum	Tree	FAC	X	X	X		X			60-80			X	X
Liriodendron tulipifera	tuliptree	Tree	FACU	X	X	X	X	X	X	X	70-90			X	
Magnolia virginiana	sweetbay	Tree, Shrub	FACW	X			X	X			10-30			X	
Morella pensylvanica	northern bayberry	Tree, Shrub	FAC	X	X	X	X	X	X	X	5-12				
Nyssa sylvatica	blackgum	Tree	FAC	X	X	X	X	X	X	X	60			X	X
Photinia pyrifolia	red chokeberry	Shrub	FACW	X	X	X	X	X	X	X	5				
Pinus echinata	shortleaf pine	Tree	UPL			X					100		X		
Pinus rigida	pitch pine	Tree	FACU	X	X	X	X	X	X	X	40-80			X	X
Pinus virginiana	Virginia pine	Tree	FACU	X	X	X		X	X	X	70		X	X	
Platanus occidentalis	American sycamore	Tree	FACW	X	X		X	X	X	X	80			X	X
Prunus serotina	black cherry	Tree, Shrub	FACU	X	X	X	X	X	X	X	50-60			X	
Quercus alba	white oak	Tree	FAC+	X	X	X	X	X	X	X	50-70		X	X	X
Quercus coccinea	scarlet oak	Tree	UPL	X	X	X		X	X	X	40-50		X	X	
Quercus ilicifolia	bear oak	Tree, Shrub	--	X	X	X	X	X	X	X	3-12				
Quercus macrocarpa	bur oak	Tree, Shrub	FAC-		X		X		X		70-80				
Quercus palustris	pin oak	Tree	FAC, FACW	X	X	X	X	X	X	X	50-70		X	X	X
Quercus prinus	chestnut oak	Tree	UPL	X	X	X	X	X	X	X	60-70		X	X	
Quercus rubra	northern red oak	Tree	FACU-	X	X	X	X	X	X	X	50-70		X	X	X
Quercus stellata	post oak	Tree	UPL	X	X					X	30-40			X	
Quercus velutina	black oak	Tree	UPL	X	X	X	X	X	X	X	50-60		X		

Table 1 (continued)

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Bergen	Hunterdon	Morris	Passaic	Somerset	Sussex	Warren	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Rhamnus alnifolia	alderleaf buckthorn	Shrub	OBL			X			X	X	3				
Rhus copallinum	winged sumac	Tree, Shrub	NI	X	X	X	X	X	X		20-30				
Rhus glabra	smooth sumac	Tree, Shrub	UPL	X	X	X	X	X	X	X	20-30				
Ribes americanum	American black currant	Shrub	FACW	X	X	X	X	X	X	X	3				
Ribes aureum var. villosum	golden currant	Shrub	--								3				
Ribes lacustre	prickly currant	Shrub	FACW							X	3				
Ribes triste	red currant	Shrub	OBL	X	X		X		X	X	2				
Salix discolor	pussy willow	Tree, Shrub	FACW	X	X	X	X	X	X	X	20-40			X	
Salix nigra	black willow	Tree	FACW+	X	X		X	X	X	X	50-100			X	X
Sassafras albidum	sassafras	Tree, Shrub	FACU-	X	X	X	X	X	X	X	30-60		X	X	
Smilax walteri	coral greenbrier	Shrub, Vine	OBL								1				
Spiraea alba	white meadowsweet	Shrub	FACW	X	X	X	X	X	X	X	3				
Spiraea tomentosa	steeplebush	Shrub	FACW	X	X	X	X	X	X	X	4			X	
Symphoricarpos albus	common snowberry	Subshrub, Shrub	FACU		X	X	X	X	X	X	3				
Symphoricarpos orbiculatus	coralberry	Shrub	FACU		X	X	X	X	X	X	2				
Taxus canadensis	Canada yew	Shrub	FAC	X	X		X		X	X	5			X	
Tilia americana	American basswood	Tree	FACU	X	X	X	X	X	X	X	50-70			X	
Vaccinium angustifolium	lowbush blueberry	Subshrub, Shrub	FACU	X	X	X	X	X	X	X	2		X	X	
Viburnum dentatum	southern arrowwood	Shrub	FACW-	X	X	X		X	X	X	6-15		X		X
Viburnum lentago	nannyberry	Tree, Shrub	FAC	X	X	X	X	X	X	X	15-20			X	
Viburnum nudum	possumhaw	Tree, Shrub	OBL	X		X			X	X	6-8			X	
Viburnum prunifolium	blackhaw	Tree, Shrub	FACU	X	X	X	X	X	X	X	15-20		X	X	

1. See Table 8, pg 33, for Wetland Status Indicator code explanations.

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Table 1A – Recommended Native Plants - Bergen County
Trees & Shrubs

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Acer rubrum	red maple	Tree	FAC	40-60		X	X	X
Acer saccharinum	silver maple	Tree	FACW	50-70			X	
Acer saccharum	sugar maple	Tree, Shrub	FACW	90				X
Alnus serrulata	hazel alder	Tree, Shrub	OBL	to 20			X	
Amelanchier canadensis	Canadian serviceberry	Tree, Shrub	FAC	20-30		X		X
Arctostaphylos uva-ursi	Bearberry	Subshrub, Shrub	UPL	0.5		X		
Betula lenta	sweet birch	Tree	FACU	50-55				
Betula nigra	river birch	Tree	FACW	80			X	X
Betula populifolia	gray birch	Tree	FAC	20-25		X	X	
Carpinus caroliniana	American hornbeam	Tree, Shrub	FAC	40-60		X	X	
Carya glabra	pignut hickory	Tree	FACU-	80-135			X	
Ceanothus americanus	New Jersey tea	Subshrub, Shrub	--	3		X		
Celtis occidentalis	common hackberry	Tree, Shrub	FAC	40-60		X	X	X
Cephalanthus occidentalis	common buttonbush	Tree, Shrub	OBL	8			X	X
Cercis canadensis	eastern redbud	Tree, Shrub	UPL, FACU	20-25	NJ Endangered	X	X	
Chamaecyparis thyoides	Atlantic white cedar	Tree	OBL	80			X	X
Chamaedaphne calyculata	leatherleaf	Shrub	OBL	4				
Cornus florida	flowering dogwood	Tree, Shrub	FACU-, FACU	20-40			X	
Cornus sericea	redosier dogwood	Tree, Shrub	FACW+	6-10			X	X
Dasiphora fruticosa ssp. floribunda	shrubby cinquefoil	Shrub	--	2.5				
Diospyros virginiana	common persimmon	Tree	FAC-	35-60				
Fagus grandifolia	American beech	Tree	FACU	50-70			X	
Fraxinus americana	white ash	Tree	FACU	50-70		X	X	X
Fraxinus pennsylvanica	green ash	Tree	FACU	40-60		X	X	X
Hamamelis virginiana	American witchhazel	Tree, Shrub	FAC	15-20		X	X	X

Table 1A – Bergen County con't.

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Ilex opaca	American holly	Tree, Shrub	FACU	15-20		X		X
Ilex verticillata	common winterberry	Tree, Shrub	FACW+	6-10				X
Juniperus virginiana	eastern redcedar	Tree	FACU+	40-50		X	X	
Lindera benzoin	northern spicebush	Tree, Shrub	FACW	6-12				X
Liquidambar styraciflua	sweetgum	Tree	FAC	60-80			X	X
Liriodendron tulipifera	tuliptree	Tree	FACU	70-90			X	
Magnolia virginiana	sweetbay	Tree, Shrub	FACW	10-30			X	
Morella pensylvanica	northern bayberry	Tree, Shrub	FAC	5-12				
Nyssa sylvatica	blackgum	Tree	FAC	60			X	X
Photinia pyrifolia	red chokeberry	Shrub	FACW	5				
Pinus rigida	pitch pine	Tree	FACU	40-80			X	X
Pinus virginiana	Virginia pine	Tree	FACU	70		X	X	
Platanus occidentalis	American sycamore	Tree	FACW	80			X	X
Prunus serotina	black cherry	Tree, Shrub	FACU	50-60			X	
Quercus alba	white oak	Tree	FAC+	50-70		X	X	X
Quercus coccinea	scarlet oak	Tree	UPL	40-50		X	X	
Quercus ilicifolia	bear oak	Tree, Shrub	--	3-12				
Quercus palustris	pin oak	Tree	FAC, FACW	50-70		X	X	X
Quercus prinus	chestnut oak	Tree	UPL	60-70		X	X	
Quercus rubra	northern red oak	Tree	FACU-	50-70		X	X	X
Quercus stellata	post oak	Tree	UPL	30-40			X	
Quercus velutina	black oak	Tree	UPL	50-60		X		
Rhus copallinum	winged sumac	Tree, Shrub	NI	20-30				
Rhus glabra	smooth sumac	Tree, Shrub	UPL	20-30				
Ribes americanum	American black currant	Shrub	FACW	3				
Ribes triste	red currant	Shrub	OBL	2				
Salix discolor	pussy willow	Tree, Shrub	FACW	20-40			X	
Salix nigra	black willow	Tree	FACW+	50-100			X	X
Sassafras albidum	sassafras	Tree, Shrub	FACU-	30-60		X	X	
Spiraea alba	white meadowsweet	Shrub	FACW	3				
Spiraea tomentosa	steeplebush	Shrub	FACW	4			X	
Taxus canadensis	Canada yew	Shrub	FAC	5			X	
Tilia americana	American basswood	Tree	FACU	50-70			X	

Table 1A – Bergen County con't.

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Vaccinium angustifolium	lowbush blueberry	Subshrub, Shrub	FACU	2		X	X	
Viburnum dentatum	southern arrowwood	Shrub	FACW-	6-15		X		X
Viburnum lentago	nannyberry	Tree, Shrub	FAC	15-20			X	
Viburnum nudum	possumhaw	Tree, Shrub	OBL	6-8			X	
Viburnum prunifolium	blackhaw	Tree, Shrub	FACU	15-20		X	X	

1. See Table 8, pg 33, for Wetland Status Indicator code explanations.

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Table 1B – Recommended Native Plants – Hunterdon County
Trees & Shrubs

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Acer rubrum	red maple	Tree	FAC	40-60		X	X	X
Acer saccharinum	silver maple	Tree	FACW	50-70			X	
Acer saccharum	sugar maple	Tree, Shrub	FACW	90				X
Alnus serrulata	hazel alder	Tree, Shrub	OBL	to 20			X	
Amelanchier canadensis	Canadian serviceberry	Tree, Shrub	FAC	20-30		X		X
Asimina triloba	pawpaw	Tree, Shrub	FAC	15-40	NJ Endangered			
Betula lenta	sweet birch	Tree	FACU	50-55				
Betula nigra	river birch	Tree	FACW	80			X	X
Betula populifolia	gray birch	Tree	FAC	20-25		X	X	
Carpinus caroliniana	American hornbeam	Tree, Shrub	FAC	40-60		X	X	
Carya glabra	pignut hickory	Tree	FACU-	80-135			X	
Ceanothus americanus	New Jersey tea	Subshrub, Shrub	--	3		X		
Celtis occidentalis	common hackberry	Tree, Shrub	FAC	40-60		X	X	X
Cephalanthus occidentalis	common buttonbush	Tree, Shrub	OBL	8			X	X
Cercis canadensis	eastern redbud	Tree, Shrub	UPL, FACU	20-25	NJ Endangered	X	X	
Chamaecyparis thyoides	Atlantic white cedar	Tree	OBL	80			X	X
Chamaedaphne calyculata	leatherleaf	Shrub	OBL	4				
Cornus florida	flowering dogwood	Tree, Shrub	FACU-, FACU	20-40			X	
Cornus sericea	redosier dogwood	Tree, Shrub	FACW+	6-10			X	X
Diospyros virginiana	common persimmon	Tree	FAC-	35-60				
Fagus grandifolia	American beech	Tree	FACU	50-70			X	
Fraxinus americana	white ash	Tree	FACU	50-70		X	X	X
Fraxinus pennsylvanica	green ash	Tree	FACU	40-60		X	X	X
Hamamelis virginiana	American witchhazel	Tree, Shrub	FAC	15-20		X	X	X
Ilex verticillata	common winterberry	Tree, Shrub	FACW+	6-10				X
Juniperus virginiana	eastern redcedar	Tree	FACU+	40-50		X	X	
Lindera benzoin	northern spicebush	Tree, Shrub	FACW	6-12				X
Liquidambar styraciflua	sweetgum	Tree	FAC	60-80			X	X
Liriodendron tulipifera	tuliptree	Tree	FACU	70-90			X	
Morella pensylvanica	northern bayberry	Tree, Shrub	FAC	5-12				

Table 1B – Hunterdon County con't.

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Nyssa sylvatica	blackgum	Tree	FAC	60			X	X
Photinia pyrifolia	red chokeberry	Shrub	FACW	5				
Pinus rigida	pitch pine	Tree	FACU	40-80			X	X
Pinus virginiana	Virginia pine	Tree	FACU	70		X	X	
Platanus occidentalis	American sycamore	Tree	FACW	80			X	X
Prunus serotina	black cherry	Tree, Shrub	FACU	50-60			X	
Quercus alba	white oak	Tree	FAC+	50-70		X	X	X
Quercus coccinea	scarlet oak	Tree	UPL	40-50		X	X	
Quercus ilicifolia	bear oak	Tree, Shrub	--	3-12				
Quercus macrocarpa	bur oak	Tree, Shrub	FAC-	70-80				
Quercus palustris	pin oak	Tree	FAC, FACW	50-70		X	X	X
Quercus prinus	chestnut oak	Tree	UPL	60-70		X	X	
Quercus rubra	northern red oak	Tree	FACU-	50-70		X	X	X
Quercus stellata	post oak	Tree	UPL	30-40			X	
Quercus velutina	black oak	Tree	UPL	50-60		X		
Rhus copallinum	winged sumac	Tree, Shrub	NI	20-30				
Rhus glabra	smooth sumac	Tree, Shrub	UPL	20-30				
Ribes americanum	American black currant	Shrub	FACW	3				
Ribes triste	red currant	Shrub	OBL	2				
Salix discolor	pussy willow	Tree, Shrub	FACW	20-40			X	
Salix nigra	black willow	Tree	FACW+	50-100			X	X
Sassafras albidum	sassafras	Tree, Shrub	FACU-	30-60		X	X	
Spiraea alba	white meadowsweet	Shrub	FACW	3				
Spiraea tomentosa	steeplebush	Shrub	FACW	4			X	
Symphoricarpos albus	common snowberry	Subshrub, Shrub	FACU	3				
Symphoricarpos orbiculatus	coralberry	Shrub	FACU	2				
Taxus canadensis	Canada yew	Shrub	FAC	5			X	
Tilia americana	American basswood	Tree	FACU	50-70			X	
Vaccinium angustifolium	lowbush blueberry	Subshrub, Shrub	FACU	2		X	X	
Viburnum dentatum	southern arrowwood	Shrub	FACW-	6-15		X		X
Viburnum lentago	nannyberry	Tree, Shrub	FAC	15-20			X	
Viburnum prunifolium	blackhaw	Tree, Shrub	FACU	15-20		X	X	

1. See Table 8, pg 33, for Wetland Status Indicator code explanations.

Table 1C – Recommended Native Plants – Morris County
Trees & Shrubs

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Acer rubrum	red maple	Tree	FAC	40-60		X	X	X
Acer saccharinum	silver maple	Tree	FACW	50-70			X	
Acer saccharum	sugar maple	Tree, Shrub	FACW	90				X
Alnus serrulata	hazel alder	Tree, Shrub	OBL	to 20			X	
Amelanchier canadensis	Canadian serviceberry	Tree, Shrub	FAC	20-30		X		X
Arctostaphylos uva-ursi	Bearberry	Subshrub, Shrub	UPL	0.5		X		
Betula lenta	sweet birch	Tree	FACU	50-55				
Betula nigra	river birch	Tree	FACW	80			X	X
Betula populifolia	gray birch	Tree	FAC	20-25		X	X	
Carpinus caroliniana	American hornbeam	Tree, Shrub	FAC	40-60		X	X	
Carya glabra	pignut hickory	Tree	FACU-	80-135			X	
Ceanothus americanus	New Jersey tea	Subshrub, Shrub	--	3		X		
Cephalanthus occidentalis	common buttonbush	Tree, Shrub	OBL	8			X	X
Cercis canadensis	eastern redbud	Tree, Shrub	UPL, FACU	20-25	NJ Endangered	X	X	
Chamaecyparis thyoides	Atlantic white cedar	Tree	OBL	80			X	X
Chamaedaphne calyculata	leatherleaf	Shrub	OBL	4				
Cornus florida	flowering dogwood	Tree, Shrub	FACU-, FACU	20-40			X	
Cornus sericea	redosier dogwood	Tree, Shrub	FACW+	6-10			X	X
Dasiphora fruticosa ssp. floribunda	shrubby cinquefoil	Shrub	--	2.5				
Diospyros virginiana	common persimmon	Tree	FAC-	35-60				
Fagus grandifolia	American beech	Tree	FACU	50-70			X	
Fraxinus americana	white ash	Tree	FACU	50-70		X	X	X
Fraxinus pennsylvanica	green ash	Tree	FACU	40-60		X	X	X
Hamamelis virginiana	American witchhazel	Tree, Shrub	FAC	15-20		X	X	X
Hudsonia tomentosa	woolly beachheather	Subshrub, Shrub	--	1				
Ilex verticillata	common winterberry	Tree, Shrub	FACW+	6-10				X

Table 1C – Morris County con't.

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Juniperus virginiana	eastern redcedar	Tree	FACU+	40-50		X	X	
Ledum groenlandicum	bog Labrador tea	Shrub	OBL	3				
Lindera benzoin	northern spicebush	Tree, Shrub	FACW	6-12				X
Liquidambar styraciflua	sweetgum	Tree	FAC	60-80			X	X
Liriodendron tulipifera	tuliptree	Tree	FACU	70-90			X	
Morella pensylvanica	northern bayberry	Tree, Shrub	FAC	5-12				
Nyssa sylvatica	blackgum	Tree	FAC	60			X	X
Photinia pyrifolia	red chokeberry	Shrub	FACW	5				
Pinus echinata	shortleaf pine	Tree	UPL	100		X		
Pinus rigida	pitch pine	Tree	FACU	40-80			X	X
Pinus virginiana	Virginia pine	Tree	FACU	70		X	X	
Prunus serotina	black cherry	Tree, Shrub	FACU	50-60			X	
Quercus alba	white oak	Tree	FAC+	50-70		X	X	X
Quercus coccinea	scarlet oak	Tree	UPL	40-50		X	X	
Quercus ilicifolia	bear oak	Tree, Shrub	--	3-12				
Quercus palustris	pin oak	Tree	FAC, FACW	50-70		X	X	X
Quercus prinus	chestnut oak	Tree	UPL	60-70		X	X	
Quercus rubra	northern red oak	Tree	FACU-	50-70		X	X	X
Quercus velutina	black oak	Tree	UPL	50-60		X		
Rhamnus alnifolia	alderleaf buckthorn	Shrub	OBL	3				
Rhus copallinum	winged sumac	Tree, Shrub	NI	20-30				
Rhus glabra	smooth sumac	Tree, Shrub	UPL	20-30				
Ribes americanum	American black currant	Shrub	FACW	3				
Salix discolor	pussy willow	Tree, Shrub	FACW	20-40			X	
Sassafras albidum	sassafras	Tree, Shrub	FACU-	30-60		X	X	
Spiraea alba	white meadowsweet	Shrub	FACW	3				
Spiraea tomentosa	steeplebush	Shrub	FACW	4			X	
Symphoricarpos albus	common snowberry	Subshrub, Shrub	FACU	3				
Symphoricarpos orbiculatus	coralberry	Shrub	FACU	2				
Tilia americana	American basswood	Tree	FACU	50-70			X	
Vaccinium angustifolium	lowbush blueberry	Subshrub, Shrub	FACU	2		X	X	

Table 1C – Morris County con't.

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Viburnum dentatum	southern arrowwood	Shrub	FACW-	6-15		X		X
Viburnum lentago	nannyberry	Tree, Shrub	FAC	15-20			X	
Viburnum nudum	possumhaw	Tree, Shrub	OBL	6-8			X	
Viburnum prunifolium	blackhaw	Tree, Shrub	FACU	15-20		X	X	

1. See Table 8, pg 33, for Wetland Status Indicator code explanations.

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Table 1D – Recommended Native Plants – Passaic County
Trees & Shrubs

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Acer rubrum	red maple	Tree	FAC	40-60		X	X	X
Acer saccharinum	silver maple	Tree	FACW	50-70			X	
Acer saccharum	sugar maple	Tree, Shrub	FACW	90				X
Alnus serrulata	hazel alder	Tree, Shrub	OBL	to 20			X	
Amelanchier canadensis	Canadian serviceberry	Tree, Shrub	FAC	20-30		X		X
Arctostaphylos uva-ursi	Bearberry	Subshrub, Shrub	UPL	0.5		X		
Betula lenta	sweet birch	Tree	FACU	50-55				
Betula nigra	river birch	Tree	FACW	80			X	X
Betula populifolia	gray birch	Tree	FAC	20-25		X	X	
Carpinus caroliniana	American hornbeam	Tree, Shrub	FAC	40-60		X	X	
Carya glabra	pignut hickory	Tree	FACU-	80-135			X	
Ceanothus americanus	New Jersey tea	Subshrub, Shrub	--	3		X		
Celtis occidentalis	common hackberry	Tree, Shrub	FAC	40-60		X	X	X
Cephalanthus occidentalis	common buttonbush	Tree, Shrub	OBL	8			X	X
Chamaecyparis thyoides	Atlantic white cedar	Tree	OBL	80			X	X
Chamaedaphne calyculata	leatherleaf	Shrub	OBL	4				
Cornus florida	flowering dogwood	Tree, Shrub	FACU-, FACU	20-40			X	
Cornus sericea	redosier dogwood	Tree, Shrub	FACW+	6-10			X	X
Dasiphora fruticosa ssp. floribunda	shrubby cinquefoil	Shrub	--	2.5				
Diospyros virginiana	common persimmon	Tree	FAC-	35-60				
Fagus grandifolia	American beech	Tree	FACU	50-70			X	
Fraxinus americana	white ash	Tree	FACU	50-70		X	X	X
Fraxinus pennsylvanica	green ash	Tree	FACU	40-60		X	X	X
Hamamelis virginiana	American witchhazel	Tree, Shrub	FAC	15-20		X	X	X
Ilex verticillata	common winterberry	Tree, Shrub	FACW+	6-10				X
Juniperus virginiana	eastern redcedar	Tree	FACU+	40-50		X	X	
Lindera benzoin	northern spicebush	Tree, Shrub	FACW	6-12				X
Liriodendron tulipifera	tuliptree	Tree	FACU	70-90			X	
Magnolia virginiana	sweetbay	Tree, Shrub	FACW	10-30			X	
Morella pensylvanica	northern bayberry	Tree, Shrub	FAC	5-12				

Table 1D – Passaic County con't.

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Nyssa sylvatica	blackgum	Tree	FAC	60			X	X
Photinia pyrifolia	red chokeberry	Shrub	FACW	5				
Pinus rigida	pitch pine	Tree	FACU	40-80			X	X
Platanus occidentalis	American sycamore	Tree	FACW	80			X	X
Prunus serotina	black cherry	Tree, Shrub	FACU	50-60			X	
Quercus alba	white oak	Tree	FAC+	50-70		X	X	X
Quercus ilicifolia	bear oak	Tree, Shrub	--	3-12				
Quercus macrocarpa	bur oak	Tree, Shrub	FAC-	70-80				
Quercus palustris	pin oak	Tree	FAC, FACW	50-70		X	X	X
Quercus prinus	chestnut oak	Tree	UPL	60-70		X	X	
Quercus rubra	northern red oak	Tree	FACU-	50-70		X	X	X
Quercus velutina	black oak	Tree	UPL	50-60		X		
Rhus copallinum	winged sumac	Tree, Shrub	NI	20-30				
Rhus glabra	smooth sumac	Tree, Shrub	UPL	20-30				
Ribes americanum	American black currant	Shrub	FACW	3				
Ribes triste	red currant	Shrub	OBL	2				
Salix discolor	pussy willow	Tree, Shrub	FACW	20-40			X	
Salix nigra	black willow	Tree	FACW+	50-100			X	X
Sassafras albidum	sassafras	Tree, Shrub	FACU-	30-60		X	X	
Spiraea alba	white meadowsweet	Shrub	FACW	3				
Spiraea tomentosa	steeplebush	Shrub	FACW	4			X	
Symphoricarpos albus	common snowberry	Subshrub, Shrub	FACU	3				
Symphoricarpos orbiculatus	coralberry	Shrub	FACU	2				
Taxus canadensis	Canada yew	Shrub	FAC	5			X	
Tilia americana	American basswood	Tree	FACU	50-70			X	
Vaccinium angustifolium	lowbush blueberry	Subshrub, Shrub	FACU	2		X	X	
Viburnum lentago	nannyberry	Tree, Shrub	FAC	15-20			X	
Viburnum prunifolium	blackhaw	Tree, Shrub	FACU	15-20		X	X	

1. See Table 8, pg 33, for Wetland Status Indicator code explanations.

Table 1E – Recommended Native Plants – Somerset County
Trees & Shrubs

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Acer rubrum	red maple	Tree	FAC	40-60		X	X	X
Acer saccharinum	silver maple	Tree	FACW	50-70			X	
Acer saccharum	sugar maple	Tree, Shrub	FACW	90				X
Alnus serrulata	hazel alder	Tree, Shrub	OBL	to 20			X	
Amelanchier canadensis	Canadian serviceberry	Tree, Shrub	FAC	20-30		X		X
Baccharis halimifolia	eastern baccharis	Tree, Shrub	FACW	5-12			X	
Betula lenta	sweet birch	Tree	FACU	50-55				
Betula nigra	river birch	Tree	FACW	80			X	X
Betula populifolia	gray birch	Tree	FAC	20-25		X	X	
Carpinus caroliniana	American hornbeam	Tree, Shrub	FAC	40-60		X	X	
Carya glabra	pignut hickory	Tree	FACU-	80-135			X	
Ceanothus americanus	New Jersey tea	Subshrub, Shrub	--	3		X		
Celtis occidentalis	common hackberry	Tree, Shrub	FAC	40-60		X	X	X
Cephalanthus occidentalis	common buttonbush	Tree, Shrub	OBL	8			X	X
Cercis canadensis	eastern redbud	Tree, Shrub	UPL, FACU	20-25	NJ Endangered	X	X	
Cornus florida	flowering dogwood	Tree, Shrub	FACU-, FACU	20-40			X	
Cornus sericea	redosier dogwood	Tree, Shrub	FACW+	6-10			X	X
Diospyros virginiana	common persimmon	Tree	FAC-	35-60				
Fagus grandifolia	American beech	Tree	FACU	50-70			X	
Fraxinus americana	white ash	Tree	FACU	50-70		X	X	X
Fraxinus pennsylvanica	green ash	Tree	FACU	40-60		X	X	X
Hamamelis virginiana	American witchhazel	Tree, Shrub	FAC	15-20		X	X	X
Ilex opaca	American holly	Tree, Shrub	FACU	15-20		X		X
Ilex verticillata	common winterberry	Tree, Shrub	FACW+	6-10				X
Juniperus virginiana	eastern redcedar	Tree	FACU+	40-50		X	X	
Lindera benzoin	northern spicebush	Tree, Shrub	FACW	6-12				X
Liquidambar styraciflua	sweetgum	Tree	FAC	60-80			X	X
Liriodendron tulipifera	tuliptree	Tree	FACU	70-90			X	
Magnolia virginiana	sweetbay	Tree, Shrub	FACW	10-30			X	
Morella pensylvanica	northern bayberry	Tree, Shrub	FAC	5-12				
Nyssa sylvatica	blackgum	Tree	FAC	60			X	X

Table 1E – Somerset County con't.

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Photinia pyrifolia	red chokeberry	Shrub	FACW	5				
Pinus rigida	pitch pine	Tree	FACU	40-80			X	X
Pinus virginiana	Virginia pine	Tree	FACU	70		X	X	
Platanus occidentalis	American sycamore	Tree	FACW	80			X	X
Prunus serotina	black cherry	Tree, Shrub	FACU	50-60			X	
Quercus alba	white oak	Tree	FAC+	50-70		X	X	X
Quercus coccinea	scarlet oak	Tree	UPL	40-50		X	X	
Quercus ilicifolia	bear oak	Tree, Shrub	--	3-12				
Quercus palustris	pin oak	Tree	FAC, FACW	50-70		X	X	X
Quercus prinus	chestnut oak	Tree	UPL	60-70		X	X	
Quercus rubra	northern red oak	Tree	FACU-	50-70		X	X	X
Quercus velutina	black oak	Tree	UPL	50-60		X		
Rhus copallinum	winged sumac	Tree, Shrub	NI	20-30				
Rhus glabra	smooth sumac	Tree, Shrub	UPL	20-30				
Ribes americanum	American black currant	Shrub	FACW	3				
Salix discolor	pussy willow	Tree, Shrub	FACW	20-40			X	
Salix nigra	black willow	Tree	FACW+	50-100			X	X
Sassafras albidum	sassafras	Tree, Shrub	FACU-	30-60		X	X	
Spiraea alba	white meadowsweet	Shrub	FACW	3				
Spiraea tomentosa	steeplebush	Shrub	FACW	4			X	
Symphoricarpos albus	common snowberry	Subshrub, Shrub	FACU	3				
Symphoricarpos orbiculatus	coralberry	Shrub	FACU	2				
Tilia americana	American basswood	Tree	FACU	50-70			X	
Vaccinium angustifolium	lowbush blueberry	Subshrub, Shrub	FACU	2		X	X	
Viburnum dentatum	southern arrowwood	Shrub	FACW-	6-15		X		X
Viburnum lentago	nannyberry	Tree, Shrub	FAC	15-20			X	
Viburnum prunifolium	blackhaw	Tree, Shrub	FACU	15-20		X	X	

1. See Table 8, pg 33, for Wetland Status Indicator code explanations.

Table 1F – Recommended Native Plants – Sussex County
Trees & Shrubs

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Acer rubrum	red maple	Tree	FAC	40-60		X	X	X
Acer saccharinum	silver maple	Tree	FACW	50-70			X	
Acer saccharum	sugar maple	Tree, Shrub	FACW	90				X
Alnus serrulata	hazel alder	Tree, Shrub	OBL	to 20			X	
Amelanchier canadensis	Canadian serviceberry	Tree, Shrub	FAC	20-30		X		X
Arctostaphylos uva-ursi	Bearberry	Subshrub, Shrub	UPL	0.5		X		
Asimina triloba	pawpaw	Tree, Shrub	FAC	15-40	NJ Endangered			
Betula lenta	sweet birch	Tree	FACU	50-55				
Betula nigra	river birch	Tree	FACW	80			X	X
Betula populifolia	gray birch	Tree	FAC	20-25		X	X	
Carpinus caroliniana	American hornbeam	Tree, Shrub	FAC	40-60		X	X	
Carya glabra	pignut hickory	Tree	FACU-	80-135			X	
Ceanothus americanus	New Jersey tea	Subshrub, Shrub	--	3		X		
Celtis occidentalis	common hackberry	Tree, Shrub	FAC	40-60		X	X	X
Cephalanthus occidentalis	common buttonbush	Tree, Shrub	OBL	8			X	X
Chamaecyparis thyoides	Atlantic white cedar	Tree	OBL	80			X	X
Chamaedaphne calyculata	leatherleaf	Shrub	OBL	4				
Cornus florida	flowering dogwood	Tree, Shrub	FACU-, FACU	20-40			X	
Cornus sericea	redosier dogwood	Tree, Shrub	FACW+	6-10			X	X
Dasiphora fruticosa ssp. floribunda	shrubby cinquefoil	Shrub	--	2.5				
Diospyros virginiana	common persimmon	Tree	FAC-	35-60				
Fagus grandifolia	American beech	Tree	FACU	50-70			X	
Fraxinus americana	white ash	Tree	FACU	50-70		X	X	X
Fraxinus pennsylvanica	green ash	Tree	FACU	40-60		X	X	X
Hamamelis virginiana	American witchhazel	Tree, Shrub	FAC	15-20		X	X	X
Ilex verticillata	common winterberry	Tree, Shrub	FACW+	6-10				X
Juniperus virginiana	eastern redcedar	Tree	FACU+	40-50		X	X	
Ledum groenlandicum	bog Labrador tea	Shrub	OBL	3				

Table 1F – Sussex County con't.

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Lindera benzoin	northern spicebush	Tree, Shrub	FACW	6-12				X
Liriodendron tulipifera	tuliptree	Tree	FACU	70-90			X	
Morella pensylvanica	northern bayberry	Tree, Shrub	FAC	5-12				
Nyssa sylvatica	blackgum	Tree	FAC	60			X	X
Photinia pyrifolia	red chokeberry	Shrub	FACW	5				
Pinus rigida	pitch pine	Tree	FACU	40-80			X	X
Pinus virginiana	Virginia pine	Tree	FACU	70		X	X	
Platanus occidentalis	American sycamore	Tree	FACW	80			X	X
Prunus serotina	black cherry	Tree, Shrub	FACU	50-60			X	
Quercus alba	white oak	Tree	FAC+	50-70		X	X	X
Quercus coccinea	scarlet oak	Tree	UPL	40-50		X	X	
Quercus ilicifolia	bear oak	Tree, Shrub	--	3-12				
Quercus macrocarpa	bur oak	Tree, Shrub	FAC-	70-80				
Quercus palustris	pin oak	Tree	FAC, FACW	50-70		X	X	X
Quercus prinus	chestnut oak	Tree	UPL	60-70		X	X	
Quercus rubra	northern red oak	Tree	FACU-	50-70		X	X	X
Quercus velutina	black oak	Tree	UPL	50-60		X		
Rhamnus alnifolia	alderleaf buckthorn	Shrub	OBL	3				
Rhus copallinum	winged sumac	Tree, Shrub	NI	20-30				
Rhus glabra	smooth sumac	Tree, Shrub	UPL	20-30				
Ribes americanum	American black currant	Shrub	FACW	3				
Ribes triste	red currant	Shrub	OBL	2				
Salix discolor	pussy willow	Tree, Shrub	FACW	20-40			X	
Salix nigra	black willow	Tree	FACW+	50-100			X	X
Sassafras albidum	sassafras	Tree, Shrub	FACU-	30-60		X	X	
Spiraea alba	white meadowsweet	Shrub	FACW	3				
Spiraea tomentosa	steeplebush	Shrub	FACW	4			X	
Symphoricarpos albus	common snowberry	Subshrub, Shrub	FACU	3				
Symphoricarpos orbiculatus	coralberry	Shrub	FACU	2				
Taxus canadensis	Canada yew	Shrub	FAC	5			X	
Tilia americana	American basswood	Tree	FACU	50-70			X	

Table 1F – Sussex County con't.

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Vaccinium angustifolium	lowbush blueberry	Subshrub, Shrub	FACU	2		X	X	
Viburnum dentatum	southern arrowwood	Shrub	FACW-	6-15		X		X
Viburnum lentago	nannyberry	Tree, Shrub	FAC	15-20			X	
Viburnum nudum	possumhaw	Tree, Shrub	OBL	6-8			X	
Viburnum prunifolium	blackhaw	Tree, Shrub	FACU	15-20		X	X	

1. See Table 8, pg 33, for Wetland Status Indicator code explanations

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Table 1G – Recommended Native Plants – Warren County
Trees & Shrubs

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Acer rubrum	red maple	Tree	FAC	40-60		X	X	X
Acer saccharinum	silver maple	Tree	FACW	50-70			X	
Acer saccharum	sugar maple	Tree, Shrub	FACW	90				X
Alnus serrulata	hazel alder	Tree, Shrub	OBL	to 20			X	
Amelanchier canadensis	Canadian serviceberry	Tree, Shrub	FAC	20-30		X		X
Arctostaphylos uva-ursi	Bearberry	Subshrub, Shrub	UPL	0.5		X		
Betula lenta	sweet birch	Tree	FACU	50-55				
Betula nigra	river birch	Tree	FACW	80			X	X
Betula populifolia	gray birch	Tree	FAC	20-25		X	X	
Carpinus caroliniana	American hornbeam	Tree, Shrub	FAC	40-60		X	X	
Carya glabra	pignut hickory	Tree	FACU-	80-135			X	
Ceanothus americanus	New Jersey tea	Subshrub, Shrub	--	3		X		
Celtis occidentalis	common hackberry	Tree, Shrub	FAC	40-60		X	X	X
Cephalanthus occidentalis	common buttonbush	Tree, Shrub	OBL	8			X	X
Chamaedaphne calyculata	leatherleaf	Shrub	OBL	4				
Cornus florida	flowering dogwood	Tree, Shrub	FACU-, FACU	20-40			X	
Cornus sericea	redosier dogwood	Tree, Shrub	FACW+	6-10			X	X
Dasiphora fruticosa ssp. floribunda	shrubby cinquefoil	Shrub	--	2.5				
Diospyros virginiana	common persimmon	Tree	FAC-	35-60				
Fagus grandifolia	American beech	Tree	FACU	50-70			X	
Fraxinus americana	white ash	Tree	FACU	50-70		X	X	X
Fraxinus pennsylvanica	green ash	Tree	FACU	40-60		X	X	X
Hamamelis virginiana	American witchhazel	Tree, Shrub	FAC	15-20		X	X	X
Ilex opaca	American holly	Tree, Shrub	FACU	15-20		X		X
Ilex verticillata	common winterberry	Tree, Shrub	FACW+	6-10				X
Juniperus virginiana	eastern redcedar	Tree	FACU+	40-50		X	X	
Lindera benzoin	northern spicebush	Tree, Shrub	FACW	6-12				X
Liriodendron tulipifera	tuliptree	Tree	FACU	70-90			X	
Morella pensylvanica	northern bayberry	Tree, Shrub	FAC	5-12				

Table 1G – Warren County con't.

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Nyssa sylvatica	blackgum	Tree	FAC	60			X	X
Photinia pyrifolia	red chokeberry	Shrub	FACW	5				
Pinus rigida	pitch pine	Tree	FACU	40-80			X	X
Pinus virginiana	Virginia pine	Tree	FACU	70		X	X	
Platanus occidentalis	American sycamore	Tree	FACW	80			X	X
Prunus serotina	black cherry	Tree, Shrub	FACU	50-60			X	
Quercus alba	white oak	Tree	FAC+	50-70		X	X	X
Quercus coccinea	scarlet oak	Tree	UPL	40-50		X	X	
Quercus ilicifolia	bear oak	Tree, Shrub	--	3-12				
Quercus palustris	pin oak	Tree	FAC, FACW	50-70		X	X	X
Quercus prinus	chestnut oak	Tree	UPL	60-70		X	X	
Quercus rubra	northern red oak	Tree	FACU-	50-70		X	X	X
Quercus stellata	post oak	Tree	UPL	30-40			X	
Quercus velutina	black oak	Tree	UPL	50-60		X		
Rhamnus alnifolia	alderleaf buckthorn	Shrub	OBL	3				
Rhus glabra	smooth sumac	Tree, Shrub	UPL	20-30				
Ribes americanum	American black currant	Shrub	FACW	3				
Ribes lacustre	prickly currant	Shrub	FACW	3				
Ribes triste	red currant	Shrub	OBL	2				
Salix discolor	pussy willow	Tree, Shrub	FACW	20-40			X	
Salix nigra	black willow	Tree	FACW+	50-100			X	X
Sassafras albidum	sassafras	Tree, Shrub	FACU-	30-60		X	X	
Spiraea alba	white meadowsweet	Shrub	FACW	3				
Spiraea tomentosa	steeplebush	Shrub	FACW	4			X	
Symphoricarpos albus	common snowberry	Subshrub, Shrub	FACU	3				
Symphoricarpos orbiculatus	coralberry	Shrub	FACU	2				
Taxus canadensis	Canada yew	Shrub	FAC	5			X	
Tilia americana	American basswood	Tree	FACU	50-70			X	
Vaccinium angustifolium	lowbush blueberry	Subshrub, Shrub	FACU	2		X	X	
Viburnum dentatum	southern arrowwood	Shrub	FACW-	6-15		X		X
Viburnum lentago	nannyberry	Tree, Shrub	FAC	15-20			X	

Table 1G – Warren County con't.

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Height (ft.)	Legal Status	Drought Tolerant	NJ Stormwater BMP Manual	NRCS Riparian Forest Buffer Conservation Practice Std.
Viburnum nudum	possumhaw	Tree, Shrub	OBL	6-8			X	
Viburnum prunifolium	blackhaw	Tree, Shrub	FACU	15-20		X	X	

1. See Table 8, pg 33, for Wetland Status Indicator code explanations.

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Table 2 – Recommended Native Plants
Highlands Region – Herbaceous

Scientific Name	Common Name	Plant Type	Hydrologic Zone[1]	Wetland Indicator[2]	Inundation Tolerance	Commercial Availability	Native Plant Society of NJ
Acorus americanus	Sweetflag	Perennial	1,[2,3]	OBL	Yes	Plants, Seed	
Agrostis gigantea	Grass, redtop	Grass	[2,3,],4	FACW	Yes	Seed	
Althaea officinalis	Marsh-mallow, common	Perennial	[1,2,3]	FACW+	Yes	Plants, Seed	
Ammophila breviligulata	Beachgrass, American	Grass	4[5,6]	FACU-	No	Dormant culms Plants	
Andropogon virginicus	Broomsedge	Grass	[4,5],6	FACU	No	Seed	X
Andropogon gerardii	Bluestem, big	Grass	[4,5],6	FAC	No	Seed, Plants	
Andropogon glomeratus	Broomsedge, lowland	Grass	[2,3],4	FACW+	Yes	Plants	
Aquilegia canadensis	Columbine, wild	Perennial	[3,4],5	FAC	No	Plants, Seed	X
Arisaerna triphyllurn	Jack-in-the-pulpit, swamp	Perennial	[2,3],4	FACW	Seasonal	Plants	X
Asclepias incarnata	Milkweed, swamp	Perennial	2,3	OBL	Saturated	Plants, Seed	X
Asclepias tuberosa	Butterflyweed	Perennial	[5,6]	NI	No	Plants, Seed	X
Bidens connata	Beggars-tick	Annual	[2,3],4	FACW+	Yes	Seed	X
Bidens frondosa	Beggars-tick	Annual	2,[3,4]	FACW	Yes	Seed	X
Calamagrostis canadensis	Reedgrass, bluejoint	Grass	1,[2,3]	FACW+	6", saturated	Seed, Plants	X
Caltha palustris	Marsh marigold	Perennial	3,4	OBL	6", saturated	Plants, Seed	X
Carex annectens	Sedge, yellow-fruit	Grass-like	[2,3]4	FACW+	Yes	Plants, Seed	
Carex comosa	Sedge, bearded	Grass-like	[1,2],3	OBL	6" , saturated	Plants, Seed	X
Carex crinita	Sedge, fringed	Grass-like	[1,2],3	OBL	Yes	Plants, Seed	X
Carex intumescens	Sedge, bladder	Grass-like	1,[2,3]	FACW+	Yes	Plants, Seed	
Carex lacustris	Sedge, lakebank	Grass-like	[1,2],3	OBL	Sat. 0-2	Plants, Seed	X
Carex lupulina	Sedge, hop	Grass-like	[1,2],3	OBL	Yes	Seed	X
Carex lurida	Sedge, shallow	Grass-like	[1,2],3	OBL	Yes	Plants, Seed	X
Carex pennsylvanica	Sedge, pennsylvania	Grass-like	[5,6]	NI	No	Plants	
Carex scoparia	Sedge, broom	Grass-like	[3,4],5	FACW	Yes	Plants, Seed	
Carex stipata	Sedge, awl	Grass-like	[4,5],6	NI	No	Plants, Seed	X
Carex stricta	Sedge, tussock	Grass-like	[1,2],3	OBL	Sat, 0-6"	Plants, Seed	X
Carex vulpinoidea	Sedge, fox	Grass-like	[1,2],3	OBL	Sat. 0-6"	Plants, Seed	X
Ceratopliyilurn dernersurn	Hornwort, common	Perennial	[1,21,3	OBL	5-Jan	Plants	
Chelone glabra	Turtlehead, white	Perennial	[1,2],3	OBL	Yes	Plants, Seed	X
Cinna arundinacea	Reedgrass, wood	Perennial	2,[3,4]	FACW+	Yes	Plants, Seed	X

Table 2 con't.

Scientific Name	Common Name	Plant Type	Hydrologic Zone[1]	Wetland Indicator[2]	Inundation Tolerance	Commercial Availability	Native Plant Society of NJ
Coreopsis lanceolata	Coreopsis, lance-leaved	Perennial	5,6	FACU	No	Seed, Plants	X
Coreopsis rosea	Coreopsis, pink	Perennial	2,[3,4]	FACW	Yes	Seed, Plants	X
Cyperus esculentus	Nutsedge/ chufa	Grass-like	[2,3],4	FACW	Yes	Seed, Plants	
Dichanthelium clandestinium	Grass, deertongue	Grass	[2,3],4	FAC+	Seasonal	Seed	X
Distichlis spicata	Saltgrass, seashore	Grass	[2,3,],4	FACW+	Salt, edge	Plants	X
Dulichium arundinaceum	Sedge, three-sided	Grass-like	1,[2,3]	OBL	Yes	Plants, Seed	X
Eleocharis obtusa	Spikerush, blunt	Grass-like	[1,2],3	OBL	0-6"	Plants	
Eleocharis palustris	Spikerush, creeping	Grass-like	[1,2],3	OBL	Seasonal	Plants,Seed	X
Eleocharis quadrangulata	Spikerush, square-stem	Grass-like	[1,2],3	OBL	0-1'	Plants	
Elymus virginicus/riparius	Virginia/riparian wild rye	Grass	2,[3,4]	FACW-	Yes	Seed & Plants	X
Equisetum hyemale	Horsetail, rough	Fern-like	[2,3],4	FACW	Yes	Plants	X
Eragrostis spectabilis	Lovegrass, purple/tumble	Grass	[5,6]	NI	No	Plants, Seed	
Eupatorium perfoliatum	Boneset	Perennial	[2,3],4	FACW+	Yes	Plants, Seed	X
Festuca ovina	Fescue, sheeps	Grass	[4,5],6	NI	No	Seed	
Festuca rubra	Fescue, red	Grass	[4,5]	FACU	No	Seed	
Glyceria canadensis	Managrass, rattlesnake	Grass	[1,2],3	OBL	0-1'	Plants, Seed	X
Glyceria grandis	Managrass, American	Grass	[1,2],3	OBL	Yes	Plants, Seed	
Glyceria obtusa	Managrass, Atlantic	Grass	[1,2],3	OBL	0-1'	Plants, Seed	X
Glyceria striata	Managrass, fowl	Grass	[1,2],3	OBL	Seasonal	Plants, Seed	X
Helenium autumnale	Sneezeweed, common	Perennial	[2,3],4	FACW+	Yes	Seed	X
Hibiscus moscheutos	Mallow, swamp rose	Perennial	2,3	OBL	0-3"	Plants	X
Iris pseudacorus	Iris, yellow flag	Perennial	[3,4],5	FAC	No	Plants, Seed	
Iris versicolor	Iris, blue flag	Perennial	[1,2],3	OBL	0-6"	Plants, Seed	X
Juncus canadensis	Rush, Canada	Grass-like	[1,2],3	OBL	Yes	Plants, Seed	
Juncus effusus	Rush, soft	Grass-like	[2,3],4	FACW+	0-1	Plants, Seed	X
Juncus gerardili	Rush, blackgrass	Grass-like	[2,3],4	FACW+	Yes, saltedge	Plants, Seed	X
Juncus militaris	Rush, bayonet	Grass-like	[2,3],4	OBL	Yes	Plants, Seed	
Kosteletzkya virginica	Mallow, Virginia seashore	Perennial	[1,2],3	OBL	Yes, saltedge	Plants	X
Leersia oryzoides	Cutgrass, rice	Grass	[1,2],3	OBL	0-6"	Plants, Seed	
Lespedeza capitata	Bushclover, roundheaded	Legume	4,5,6	FACU	No	Seed, Plants	X

Table 2 con't.

Scientific Name	Common Name	Plant Type	Hydrologic Zone[1]	Wetland Indicator[2]	Inundation Tolerance	Commercial Availability	Native Plant Society of NJ
Lobelia cardinalis	Cardinal flower	Perennial	1,[2,3],4	FACW+	Yes	Plants, Seed	X
Lobelia siphilitica	Blue lobelia	Perennial	1,[2,3],4	FACW+	Yes	Plants, Seed	X
Mertensia virginica	Bluebells, Virginia	Perennial	[2,31,4	FACW	Yes	Plants, Seed	X
Mimulus ringens	Monkey-flower	Perennial	[1,2],3	OBL	Yes	Plants, Seed	X
Mitchella repens	Partridge-berry	Groundcover	[4,5],6	FACU	No	Plants	
Monarda didyma	Beebalm	Perennial	3,[4,5]	FAC+	Saturated	Plants, Seed	X
Monarda fistulosa	Bergamot, wild	Perennial	[4,5,6]	UPL	No	Plants, Seed	X
Nelumbo lutea	Lotus, American	Perennial	[1,2],3	OBL	1-5'	Plants, Seed	X
Nuphars luteum	Water-lily, yellow (spatterdock)	Perennial	[1,2],3	OBL	1-3'	Plants	X
Nymphaea odorata	Water-lily, white	Perennial	[1,2],3	OBL	1-3'	Plants	X
Oenothera biennis	Primrose, evening	Perennial	4,[5,6]	FACU-	No	Seed	X
Onoclea sensibilis	Fern, sensitive	Fern	[2,3],4	FACW	Saturated	Plants, Seed	X
Orontium aquaticum	Club, golden	Perennial	[1,2],3	OBL	Yes	Plants	X
Osmunda cinnamomea	Fern, cinnamon	Fern	[2,3],4	FACW	Saturated	Plants	X
Osmunda regalis	Fern, royal	Fern	[1,2],3	OBL	Saturated	Plugs	X
Panicum virgatum	Switchgrass	Grass	2,[3,4],5	FAC	Seasonal	Seed & Plants	X
Penstemon digitalis	Beardtongue	Perennial	3,4,5	FAC	No	Plants, Seed	
Phlox maculata	Phlox, meadow	Perennial	[2,3,4]	FACW	Yes	Plants	
Physostegia virginiana	Dragon-head, false (obedient plant)	Perennial	2,[3,4],5	FAC+	Saturated	Plants, Seed	
Poa palustris	Bluegrass, fowl	Grass	[2,3],4	FACW	Yes	Seed	X
Poa trivialis	Bluegrass, rough	Grass	2,[3,4],5	FACW	Seasonal	Seed	
Polemonium reptans	Jacob's ladder	Perennial	[4,5],6	FACU	No	Seed	
Polygonatum biflorum	Solomon's-seal, small	Perennial	[4,5],6	FACU	No	Plants	X
Polygonum pensylvanicum	Pennsylvania smartweed	Annual	[2,3]	FACW	0-6"	Plants, Seed	X
Pontederia cordata	Pickerelweed	Perennial	2,3	OBL	0-1'	Plants, Seed	
Potamogeton nodosus	Pondweed, long-leaf	Perennial	[1,2]	OBL	1' min-6'	Plants	
Puccinellia distans	Grass, alkali	Grass	[1,2],3	OBL	Yes	Seed	
Pycnantheinum tenuifolium	Mountain-mint, slender	Perennial	[2,3,4]	FACW	Yes	Plants, Seed	X
Ranunculus flabellaris	Butter-cup, yellow water	Perennial	[2,3,4]	FACW	Yes	Plants	X
Rudbeckia fulgida	Coneflower, orange	Perennial	[3,4],5	FAC	No	Seed	

Table 2 con't.

Scientific Name	Common Name	Plant Type	Hydrologic Zone[1]	Wetland Indicator[2]	Inundation Tolerance	Commercial Availability	Native Plant Society of NJ
Rudbeckia laciniata	Coneflower, cut-leaf	Perennial	[2,3],4	FACW	Yes	Seed, Plants	
Rudbeckia triloba	Coneflower, brown-eyed	Perennial	4,[5,6]	FACU	No	Plants, Seed	
Sagittaria graminea	Arrowhead, grass-leaf	Perennial	[1,2],3	OBL	0-1'	Plants	
Sanguisorba canadensis	Burnet, Canada	Perennial	4,[5,6]	FACW+	Yes	Plants	X
Saururus cernuus	Lizards tail	Perennial	2,3,4	OBL	0-1'	Plants	X
Schizachyrium scoparium	Bluestem, little	Grass	6	FACU	No	Seed, Plants	X
Scirpus atrovirens	Bulrush, green	Grass-like	[1,2,],3	OBL	Yes	Plants, Seed	X
Scirpus cyperinus	Woolgrass	Grass-like	[2,3],4	FACW	Yes	Plants, Seed	X
Solidago bicolor	Goldenrod, silverrod	Perennial	5,6	NI	No	Plants, Seed	X
Solidago patula	Goldenrod, roughleaf	Perennial	1,[2,3,]	OBL	Yes	Seed	X
Solidago rugosa	Goldenrod, wrinkleleaf	Perennial	3,[4,5]	FAC	No	Plants, Seed	X
Solidago sempervirens	Goldenrod, seaside	Perennial	[2,3],4	FACW	Yes	Plants, Seed	X
Sorghastrum nutans	Indiangrass	Grass	5,6	UPL	No	Seed, Plants	
Sparganium americanum	Burreed, American	Emergent Perennial	[1,2],3	OBL	0-1'	Plants, Seed	
Sparganium eurycarpum	Burreed, giant	Emergent Perennial	[1,2],3	OBL	Yes	Plants, Seed	X
Spartina alterniflora	Cordgrass, saltmarsh	Grass	[1,2],3	OBL	Salt, edge	Plants, Seed	X
Spartina cynosuroides	Cordgrass, big	Grass	[1,2],3	OBL	Tidal-fresh	Plugs	X
Spartina patens	Cordgrass, saltmeadow	Grass	1,[2,3],4	FACW+	Salt, edge	Plants	X
Spartina pectinata	Cordgrass, prairie	Grass	[1,2],3	OBL	Tidal-fresh	Plants, Seed	X
Thalictrum pubescens	Meadow-rue, tall	Perennial	[2,3,4]	FACW+	Yes	Seed, Plants	X
Thelypteris noveboracensis	Fern, New York	Fern	[3,4],5	FAC	Saturated	Plants, Seed	X
Triadenum virginicum	St. John'swort, marsh	Perennial	[1,2],3	OBL	Yes	Seed	X
Tripsacum dactyloides	Gamagrass, eastern	Grass	2,[3,4],5	FACW	Yes	Seed	
Utricularia macrorhiza	Bladderwort, common	Perennial	[1,2],3	OBL	Yes	Plants	X
Vallisneria americana	Celery, wild	Perennial	[1,2],3	OBL	Yes	Plants, Seed	X
Veratrum viride	False-hellebore, American	Perennial	[2,3,4]	FACW+	Yes	Plants, Seed	X
Verbena hastata	Vervain, blue	Perennial	[2,3]4	FACW+	Yes	Plants, Seed	X
Vernonia noveboracensis	Ironweed, New York	Perennial	[2,3],4	FACW+	Yes	Plants, Seed	X

Source: New Jersey Stormwater Best Management Practices Manual - Chapter 7: Landscaping - February 2004 (modified)

1. See Table 9, pg 33 for Hydrologic Zone descriptions.
2. See Table 8, pg 33, for Wetland Status Indicator code explanations.

Table 3
Trees Recommended for Planting along Public Streets and Highways
in Locations Where Low Maintenance, Hardy Specimens with High Canopies are Required

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Bergen	Hunterdon	Morris	Passaic	Somerset	Sussex	Warren	Height (ft.)	Category
Acer rubrum	red maple	Tree	FAC	X	X	X	X	X	X	X	50-60	Shade
Acer saccharum	sugar maple	Tree, Shrub	FACU-	X	X	X	X	X	X	X	50-70	Shade
Carpinus caroliniana	American hornbeam	Tree, Shrub	FAC	X	X	X	X	X	X	X	40-60	Ornamental
Celtis occidentalis	common hackberry	Tree, Shrub	FACU	X	X		X	X	X	X	25-50	Shade
Cercis canadensis	eastern redbud	Tree, Shrub	UPL, FACU	X	X	X		X			20-25	Ornamental
Crataegus crus-galli	cockspur hawthorn	Tree, Shrub	FACU			X		X		X	15-25	Ornamental
Crataegus phaenopyrum	Washington hawthorn	Tree, Shrub	FAC		X			X			20-25	Ornamental
Fraxinus americana	white ash	Tree	FACU	X	X	X	X	X	X	X	45-65	Shade
Fraxinus pennsylvanica	green ash	Tree	FACW	X	X	X	X	X	X	X	40-50	Shade
Gleditsia triacanthos	honeylocust	Tree, Shrub	FAC		X	X		X	X		40-45	Shade
Liquidambar styraciflua	sweetgum	Tree	FAC	X	X	X		X			60-80	Shade
Prunus virginiana	chokecherry	Tree, Shrub	FACU		X	X	X	X	X	X	20-25	Ornamental
Quercus coccinea	scarlet oak	Tree	UPL	X	X	X		X	X	X	70-75	Shade
Quercus palustris	pin oak	Tree	FAC, FACW	X	X	X	X	X	X	X	60-70	Shade
Quercus rubra	northern red oak	Tree	FACU-	X	X	X	X	X	X	X	60-75	Shade
Tilia americana	American basswood	Tree	FACU	X	X	X	X	X	X	X	50-70	Shade

1. See Table 8, pg 33, for Wetland Status Indicator code explanations.

Table 4
Trees Recommended for Use within Interior of Site

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Bergen	Hunterdon	Morris	Passaic	Somerset	Sussex	Warren	Height (ft.)	Category
Amelanchier canadensis	Canadian serviceberry	Tree, Shrub	FACU, FAC	X	X	X	X	X	X	X	6-20	Ornamental
Amelanchier laevis	Allegheny serviceberry	Tree, Shrub				X	X	X	X	X	25-30	Ornamental
Betula nigra	river birch	Tree	FACW	X	X	X	X	X	X	X	40-70	Ornamental
Betula papyrifera	paper birch	Tree	FACU	X	X		X		X	X	30-40	Ornamental
Liriodendron tulipifera	tuliptree	Tree	FACU	X	X	X	X	X	X	X	70-90	Shade
Pinus strobus	eastern white pine	Tree	FACU	X	X	X	X	X	X	X	50-100	Evergreen
Quercus alba	white oak	Tree	FACU-	X	X	X	X	X	X	X	50-80	Shade
Quercus bicolor	swamp white oak	Tree	FACW+	X	X	X	X	X	X	X	50-60	Shade
Tsuga canadensis	eastern hemlock	Tree	FACU	X	X	X	X	X	X	X	60-75	Evergreen

1. See Table 8, pg 33, for Wetland Status Indicator code explanations.

Table 5
Upright Shrubs Recommended for Screening, Hedges and Specimen Planting

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Bergen	Hunterdon	Morris	Passaic	Somerset	Sussex	Warren	Height (ft.)	Category
Cornus alternifolia	alternateleaf dogwood	Tree, Shrub	FAC	X	X	X	X	X	X	X	15-20	Deciduous
Hamamelis virginiana	American witchhazel	Tree, Shrub	FACU, FAC-	X	X	X	X	X	X	X	20-30	Deciduous
Ilex opaca	American holly	Tree, Shrub	FACU	X				X		X	40-50	Evergreen
Rhus glabra	smooth sumac	Tree, Shrub	UPL	X	X	X	X	X	X	X	20-30	Deciduous
Thuja occidentalis	arborvitae	Tree	FACW	X					X	X	4-15	Ornamental
Viburnum dentatum	southern arrowwood	Tree, Shrub	FAC	X	X	X		X	X	X	6-15	Deciduous
Viburnum lentago	nannyberry	Tree, Shrub	FAC	X	X	X	X	X	X	X	15-20	Deciduous
Viburnum prunifolium	blackhaw	Tree, Shrub	FACU	X	X	X	X	X	X	X	12-16	Deciduous

1. See Table 8, pg 33, for Wetland Status Indicator code explanations.

Table 6
Spreading Shrubs Recommended for Low Borders, Parking Lot Islands and Ground Covers

Scientific Name	Common Name	Growth Habit	Wetland Status[1]	Bergen	Hunterdon	Morris	Passaic	Somerset	Sussex	Warren	Height (ft.)	Drought Tolerant	NJ Stormwater BMP Manual
Arctostaphylos uva-ursi	Bearberry	Subshrub, Shrub	UPL	X		X	X		X	X	0.5	X	
Ceanothus americanus	New Jersey tea	Subshrub, Shrub	--	X	X	X	X	X	X	X	3	X	
Chamaedaphne calyculata	leatherleaf	Shrub	OBL	X	X	X	X		X	X	4		
Dasiphora fruticosa ssp. floribunda	shrubby cinquefoil	Shrub	--	X		X	X		X	X	2.5		
Hudsonia tomentosa	woolly beachheather	Subshrub, Shrub	--			X					1		
Ledum groenlandicum	bog Labrador tea	Shrub	OBL			X			X		3		
Photinia pyrifolia	red chokeberry	Shrub	FACW	X	X	X	X	X	X	X	5		
Rhamnus alnifolia	alderleaf buckthorn	Shrub	OBL			X			X	X	3		
Ribes americanum	American black currant	Shrub	FACW	X	X	X	X	X	X	X	3		
Ribes aureum var. villosum	golden currant	Shrub	--								3		
Ribes lacustre	prickly currant	Shrub	FACW							X	3		
Ribes triste	red currant	Shrub	OBL	X	X		X		X	X	2		
Smilax walteri	coral greenbrier	Shrub, Vine	OBL								1		
Spiraea alba	white meadowsweet	Shrub	FACW	X	X	X	X	X	X	X	3		
Spiraea tomentosa	steeplebush	Shrub	FACW	X	X	X	X	X	X	X	4		X
Symphoricarpos albus	common snowberry	Subshrub, Shrub	FACU		X	X	X	X	X	X	3		
Symphoricarpos orbiculatus	coralberry	Shrub	FACU		X	X	X	X	X	X	2		
Taxus canadensis	Canada yew	Shrub	FAC	X	X		X		X	X	5		X
Vaccinium angustifolium	lowbush blueberry	Subshrub, Shrub	FACU	X	X	X	X	X	X	X	2	X	X

1. See Table 8, pg 33, for Wetland Status Indicator code explanations.

Table 7 – Recommended Native Species for Planting Meadows

Scientific Name	Common Name	Plant Type	Hydrologic Zone[1]	Wetland Indicator[2]	Inundation Tolerance	Commercial Availability
Asclepias incarnata	Milkweed, swamp	Perennial	2,3	OBL	Saturated	Plants, Seed
Asclepias syriaca	Milkweed, common	Perennial		NI		Plants, Plugs, Seed
Asclepias tuberosa	Butterflyweed	Perennial	[5,6]	UPL	No	Plants, Seed
Baptisia tinctoria	Horsefly week	Perennial		NI		Plants, Plugs
Coreopsis lanceolata	Coreopsis, lance-leaved	Perennial	5,6	FACU	No	Seed, Plants
Echinacea purpurea	Eastern puple coneflower	Perennial		FACU		Plants, Plugs
Eupatorium perfoliatum	Boneset	Perennial	[2,3],4	FACW+	Yes	Plants, Seed
Eupatorium purpureum	Spotted joe pye week	Perennial		FAC		Plants, Plugs
Euthamia graminifolia	Flat-top goldentop	Perennial		FAC		Plants, Plugs, Seed
Heliopsis helianthoides	Smooth oxeye	Perennial		NI		Plants, Plugs, Seed
Liatris spicata	Dense blazing star	Perennial		FAC+		Plants, Plugs, Seed
Monarda fistulosa	Bergamot, wild	Perennial	[4,5,6]	UPL	No	Plants, Seed
Panicum virgatum	Switchgrass	Grass	2,[3,4],5	FAC	Seasonal	Seed & Plants
Rudbeckia fulgida	Coneflower, orange	Perennial	[3,4],5	FAC	No	Seed
Rudbeckia hirta	Black-eyed susan	Perennial	4,[5,6]	FACU-	No	Plugs, Seed
Rudbeckia laciniata	Coneflower, cut-leaf	Perennial	[2,3],4	FACW	Yes	Seed, Plants
Rudbeckia triloba	Coneflower, brown-eyed	Perennial	4,[5,6]	FACU	No	Plants, Seed
Schizachyrium scoparium	Bluestem, little	Grass	6	FACU	No	Seed, Plants
Solidago nemoralis	Goldenrod, gray	Perennial		NI		Plugs
Solidago sempervirens	Goldenrod, seaside	Perennial	[2,3],4	FACW	Yes	Plants, Seed
Sorghastrum nutans	Indiangrass	Grass	5,6	UPL	No	Seed, Plants

Source: Pinelands Nursery - Pollinator Meadow Mix (modified)

1. See Table 9, pg 33 for Hydrologic Zone descriptions.
2. See Table 8, pg 33, for Wetland Status Indicator code explanations.

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Table 8 – Wetland Indicator Categories

Indicator Code	Indicator Status	Designation	Comment
OBL	Obligate Wetland	Hydrophyte	Almost always occur in wetlands
FACW	Facultative Wetland	Hydrophyte	Usually occur in wetlands, but may occur in non-wetlands
FAC	Facultative	Hydrophyte	Occur in wetlands and non-wetlands
FACU	Facultative Upland	Nonhydrophyte	Usually occur in non-wetlands, but may occur in wetlands
UPL	Obligate Upland	Nonhydrophyte	Almost never occur in wetlands

Note: 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.

Table 9 – Hydrologic Zones

Zone	Zone Description	Hydrologic Conditions
Zone 1	Deep water pool	1-6 feet deep permanent pool
Zone 2	Shallow water bench	6 inches to 1 foot deep
Zone 3	Shoreline fringe	Regularly inundated
Zone 4	Riparian fringe	Periodically inundated
Zone 5	Floodplain terrace	Infrequently inundated
Zone 6	Upland slopes	Seldom or never inundated

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Table 10 – Nurseries with Natives

Name	Address	Phone Number	Website	Whole sale, Retail, or Both	Percentage of Stock that is native	Grown onsite or brought in	Notes
Allegiance Landscape & Garden Center	104 Main Street, Helmetta	732-238-8756	www.AllegianceLandscaping.com	Retail	*	Brought in	Some
Arrowwood Native Plant Nursery Inc.	961 Clark Ave., Franklinville, NJ	856-697-6045	No website	Wholesale	90%	?	
Atlantic Nursery, Inc.	3072 Cologne Avenue, Mays Landing	609-965-2553	www.atlanticnurserynewjersey.com/	Both	*	Both	*Depends on the season
Atlock Farm	545 Weston Canal Road, Somerset, NJ	732-356-3373	No website	Retail	"small selection"	Both	
Barton Nursery	949 New Durham Road, Edison, NJ	732-287-5222	www.bartonnurseries.com	Both	"large selection"	Both	This company is part of a large network and says it will get you what you want.
Bill Kolvek Perennials	5 Desalvo Court, Chestnut Ridge, NY 10977	845-735-2904	www.bkperennials.com	Both	25-30%	Both	
Bramblewood Tree Farm	133 Millville Ave., Milmay, NJ	856-457-2200	No website	Wholesale	5%	Onsite	
Brock Farms	4189 Route 9, Freehold, NJ	732-308-0498	www.brockfarms.com	Both	?	Grown in S. Jersey	
Budtown Nursery	441 Issac Budd Road, Southhampton, NJ	609-859-1412	No website	Wholesale		Onsite	
Caliper Farms & Nursery	447 Griggstown Road, Belle Mead, NJ	908-904-9446	www.caliperfarms.com	Both	25%	Onsite	
Cavano's Perennials, Inc.	6845 Sunshine Ave., Kingsville, MD 21087	410-592-8077	www.cavanos.com	Wholesale*	33%	Onsite	*Retail operations held on Saturdays only during April, May and June
Cedar Hill Nursery	10 Whitney Road, Mahwah, NJ	201-891-7775	www.cedarhillnursery.com	Wholesale	5%	Brought in	
Centerton Nursery	345 Woodruff Road, Bridgeton, NJ	856-455-0926	www.centertonnursery.com	Wholesole	20%	Onsite	
Chesterfield Gardens Inc.	PO Box 7 - 576 Pine Road, Hammonton, NJ	609-351-8732	www.chesterfieldnursery.com	Wholesale	20%	Onsite	
Chesterfield Gardens Inc.	615 Chesterfield-Arneytown Rd., Chesterfield, NJ	609-298-2726	www.chesterfieldgardensnursery.com	Both	5%	Both	
Cicconi Farms	1005 Farmingdale Rd., Jackson, NJ	732-363-1420	www.cicconifarms.com	Both	2%	Onsite	
Clemenson Farms Native Nursery	108 Linwood Ave, Estell Manor, NJ	609-476-3903	www.clemensonfarmsnativenursery.com	Wholesale	100%	?	
Coastal Nursery, LLC	50 Vanderveer Road, Freehold, NJ	732-303-6700	www.coastalnurserynj.com	Wholesale	15%	Onsite	
Condursos	96 River Road, Montville, NJ	973-263-8814	www.Condursos.com	Both	5%	Brought In	
Croshaw Nursery	113 Mill Lane, Columbus, NJ	609-298-0477	No website	Wholesale	75%	Onsite	
D&R Greenway Native Plant Nursery	One Preservation Place, Princeton, NJ 08540	609-924-4646	www.drgreenway.org	Retail	100%	Onsite	25% discount for conservation and school projects
Dean's Evergreens, Inc.	542-1 Elk Road - Cty. Route 538, Monroeville	856-881-3496	www.deansevergreens.com	Wholesale	20%	Onsite	
Earth First Native Plant Nursery & Gift, LLC	2501 Tilton Road, Egg Harbor Twp., NJ	609-287-5090	www.Earthfirstnatives.com	Retail	100%	Onsite	
Edge of the Woods Native Plant Nursery, LLC	2415 Route 100, Orefield, PA 18069	610 395 2570	www.edgeofthewoodsnursery.com	Retail	80-100%	Onsite	
Fernbrook Nursery, Inc	150 Bordentown-Georgetown Rd, Chesterfield, NJ	609-298-8282	www.fernbrooknursery.com	Wholesale	20%	Onsite	Native deciduous Azaleas

Table 10 con't.

Name	Address	Phone Number	Website	Whole sale, Retail, or Both	Percentage of Stock that is native	Grown onsite or brought in	Notes
Four Seasons Nursery & Landscape Co., LLC	299 Woodward Road, Englishtown, NJ	732-792-9890	www.4seasonsnurserynj.com	Wholesale	5%	Onsite	
Franz Fuertges Landscape Nursery	109 Ford Road, Denville, NJ	973-625-0077	No website	Wholesale	5%	Onsite	Hardy native ferns only
Galloway Wholesale Nursery	1121 Aloe Street, South Egg Harbor	609-965-2071	www.gallowaynursery.com	Both	*	Both	*Stock a good selection
Glenwild Garden Center	104 Glenwild Ave, Bloomingdale, NJ	973-838-0174	www.glenwildgardens.com	Retail	25%	Brought in	
Hionis Greenhouses & Garden Center	4 Coddington Road, Whitehouse Station, NJ	908-534-7710	www.hionisgreenhouses.com	Both	2%	Brought in	
Hopewell Nursery, Inc.	308 Woodruff Road, Bridgeton	856-451-5552	www.hopewellnursery.com	Wholesale	*	Onsite	*Some native plants are grown
J.G. Akerboom Nurseries, Inc.	700 Main Street, Cedarville, NJ	856-447-3346	www.Akerboom.com	wholesale	60%	Onsite	
Johnson Farms	1633 Rt. 77, Deerfield, NJ	856-358-1123	www.johnsonfarmsinc.com	Wholesale	25%	Both	
Kale's Nursery & Landscape Services, Inc.	133 Carter Road, Princeton	609-921-9248	www.kalesnursery.com	Wholesale		Onsite	
Kuperus Farmside Gardens	19 Loomis Ave, Sussex, NJ	973-875-3160	www.farmsidegardens.com	Retail	20%	Onsite	
Mapleton Nurseries	140 Mapleton Road, Kingston, NJ	609-430-0366	www.mapletonnurseries.co	Wholesale	50%	Onsite	
New Moon Nursery, LLC	975 Barretts Run Road, Bridgeton, NJ	888-998-1951	www.NewMoonNursery.com	Wholesale	90%	Both	
Overdevest Nurseries	578 Bowentown Road, Bridgeton, NJ	856-451-3179	www.Overdevestnurseries.com	Wholesale	*	Onsite	*Large and expanding selection
Pinelands	323 Island Road, Columbus, NJ	800-667-2729	www.pinelandsnursery.com	Wholesale	100%	Onsite	
Plant Detectives	45 Route 206, Chester, NJ	908-879-6577	www.plantdetectives.com	Retail	20-25%	Brought in	They'll find it if you want it.
Pleasant Run Nursery	93 Ellisdale Road, Allentown, NJ	609-259-8585	www.pleasantrunnursery.com	Wholesale	25%	Onsite	
Potts Nurseries LLC	427 Ontelaunee Dr., Shoemakersville, PA	888-806-9093	www.pottsnurseriespa.com	Both	5%	Onsite	
Quinton Nursery, LLC	842 Salem-Quinton Rd, Salem, NJ	856-935-7503	No website	Wholesale	50%	Onsite	
Rare Find Nursery	957 Patterson Road, Jackson, NJ	732-833-0613	www.rarefindnursery.com	Both	?	?	
Rutgers Landscape & Nursery	1051 US Hwy. Route 202 North, Ringoes, NJ	800-422-6008	www.rutgersln.com	Both	30-40%	Both	
Scott Farm Nursery	1554 Tanyard Road, Sewell	856-464-0530	No website	Wholesale	20%	Both	
Sepers Nursery	1003 Columbia Avenue, Newfield, NJ	856-691-0597	www.sepersnursery.com	Both	10-15%	Onsite	
Steve Kristoph Nursery	9 Roberts Road, Millstone Township, NJ	732-446-1440	www.pstevenkristoph.com	Both	15%	Onsite	
The Perennial Farm	12017 Glen Arm Road, Glen Arm, MD	800-567-9913	www.WhatsNative.com	Both	25-100%	Both	
Toadshade Wildflower Farm	53 Everittstown Rd., Frenchtown, NJ	908-996-7500	www.toadshade.com	Retail	100%	Onsite	
Tuckahoe Nurseries, Inc.	2 Tarkiln Road, Woodbine, NJ 08270	609-861-0533	www.tuckahoenurseries.com	Wholesale	20%	?	Trees & Shrubs
Village Nurseries, Inc.	818 York Road, Hightstown, NJ	609-448-0436	www.villagenurseriesnj.com	Retail	5%	Both	
Visconti Nursery & Aquatics	1459 Centerton Road, Pittsgrove, NJ 08318	856-358-6644	No website	Both	90%	Onsite	Natives for rain gardens, ponds, & conservation
Waterford Gardens	74 East Allendale Road, Saddle River, NJ	201-327-0721	www.waterford-gardens.com	Retail	25%	Both	Large selection of aquatic plants
Wild Ridge Plants	Pohatcong, NJ	609-651-2705	www.wildridgeplants.com	Both	100%	Onsite	

Source: The Native Plant Society of New Jersey - www.npsnj.org (updated July 2016)

Table 11 – References

Sources	Information
Landscaping for Water Conservation – A Guide for New Jersey, Rutgers NJAES Cooperative Extension njaes.rutgers.edu/pubs/publication.asp?pid=E341	Listing of drought tolerant plants that can be used for improving outdoor water use efficiency
Native Plant Society of NJ www.npsnj.org	Source of native tree and shrub list by county and nursery information
NJ Stormwater BMP Manual www.nj.gov/dep/stormwater	Chapter 7 (Landscaping) - Provides information on vegetation and landscaping for stormwater management measures
Jersey-Friendly Yards – Landscaping for a Healthy Environment www.jerseyyards.org/	Resources for homeowners, searchable plants database by region, where to buy native plants
Pinelands Nursery & Supply www.pinelandsnursery.com	Plant availability, wetland indicator status, height
Upper Deerfield Township, NJ Landscaping Ordinance www.upperdeerfield.com/ordinances.htm	Recommend plant lists for landscaping
USDA NRCS PLANTS Database www.plants.usda.gov	General plant information, wetland indicator status, images

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3.0 Appendices

APPENDIX A: NATIVE PLANT PHOTOS

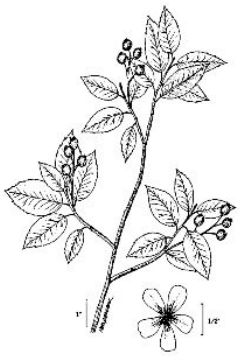
Acer rubrum; Red Maple

Acer saccharinum; Silver Maple

Acer saccharum; Sugar Maple

Alnus serrulata; Hazel Alder

Amelanchier canadensis; Canadian Serviceberry



Amelanchier laevis; Alegheny Serviceberry

Arctostaphylos uva-ursi; Kinnikinnick

Asimina triloba; Pawpaw

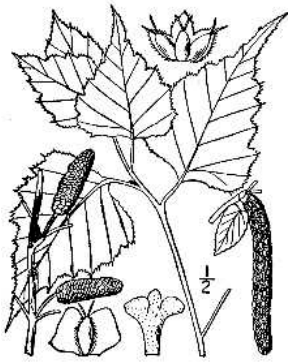
Baccharis halimifolia; Eastern Baccharis

Betula lenta; Sweet Birch

Betula nigra; River Birch

Betula papyrifera; Paper Birch

Betula populifolia; Gray Birch



Carpinus caroliniana; American Hornbeam

Carya glabra; Pignut Hickory

Ceanothus americanus; New Jersey Tea

Celtis occidentalis; Common Hackberry

Cephalanthus occidentalis; Common Buttonbush

Cercis canadensis; Eastern Redbud

Chamaecyparis thyoides; Atlantic White Cedar

Chamaedaphne calyculata; Leatherleaf

Cornus alternifolia; Alternateleaf Dogwood

Cornus canadensis; Bunchberry Dogwood

Cornus florida; Flowering Dogwood

Cornus sericea; Redosier Dogwood

Crataegus phaenopyrum; Washington Hawthorn

Dasiphora fruticosa ssp. Floribunda; Shrubby Cinquefoil

Diospyros virginiana; Common Persimmon

Fagus grandifolia; American Beech

Fraxinus americana; White Ash

Fraxinus pennsylvanica; Green Ash

Gleditsia triacanthos; Honeylocust

Hamamelis virginiana, American Witchhazel

Hudsonia tomentosa; Wooly Beachheather

Ilex opaca; American holly

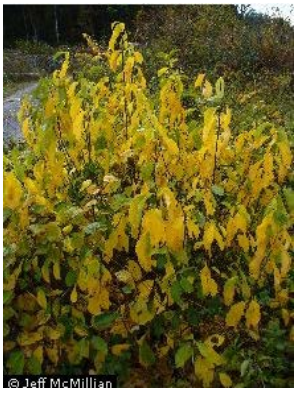
Ilex verticillata; Common Winterberry

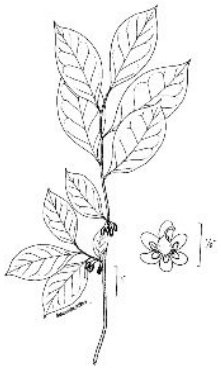
Juniperus virginiana; Eastern Red Cedar

Kalmia polifolia; Bog Laurel

Ledum groenlandicum; Bog Labrador Tea

Lindera benzoin; Northern Spicebush





Liquidambar styraciflua; Sweetgum

Liriodendron tulipifera; Tulip Tree

Magnolia virginiana; Sweetbay

Morella pensylvanica; Northern Bayberry

Nyssa sylvatica; Blackgum

Photinia pyrifolia; Red Chokeberry

Pinus echinata; Shortleaf Pine

Pinus rigida; Pitch Pine

Pinus virginiana; Virginia Pine

Platanus occidentalis; American Sycamore

Prunus serotina; Black Cherry

Quercus alba; White Oak

Quercus coccinea; Scarlet Oak

Quercus ilicifolia; Bear Oak

Quercus macrocarpa; Bur Oak

Quercus palustris; Pin Oak

Quercus prinus; Chestnut Oak

Quercus rubra; Northern Red Oak

Quercus stellata; Post Oak

Quercus velutina; Black Oak

Rhamnus alnifolia; Alderleaf Buckthorn

Rhododendron atlanticum; Dwarf Azalea

Rhus copallinum; Winged Sumac

Rhus glabra; Smooth Sumac

Ribes americanum; American Black Currant

Ribes aureum var. villosum; Golden Currant

Ribes lacustre; Prickly Currant

Ribes triste; Red Currant

Salix discolor; Pussy Willow

Salix nigra; Black Willow

Sassafras albidum; Sassafras

Smilax walteri; Coral Greenbriar

Spiraea alba; White Meadowsweet

Spiraea tomentosa; Steeplebush

Symphoricarpos albus; Common Snowberry

Symphoricarpos orbiculatus; Coralberry

Taxus canadensis; Canada Yew

Thuja occidentalis; Arborvitae

Tilia americana; American Basswood

Vaccinium angustifolium; Lowbush Blueberry

Viburnum dentatum; Southern Arrowwood

Viburnum lentago; Nannyberry

Viburnum nudum; Possumhaw

Viburnum prunifolium; Blackhaw

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APPENDIX B:
SUSTAINABLE LANDSCAPING IN THE HIGHLANDS REGION

Sustainable Landscaping

Prepared by the State of New Jersey Highlands Water Protection and Planning Council in Support of the Highlands Regional Master Plan

August 2016

The purpose of this document is to provide Highlands municipalities with sample regulatory language and background information for use in developing sustainable landscaping plans, ordinances, and/or guidance materials. Although this document is provided in the format of a municipal ordinance,* it is important to note that development and adoption of landscaping ordinances is ***not*** a requirement of Highlands Plan Conformance. Should a municipality choose to implement such an ordinance, this document should be tailored accordingly, following the instructions found below the table of contents.

**This document is based on a Sustainable Landscaping Ordinance developed by the York County Planning Commission, York County Conservation District, Penn State Extension – York County, Pennsylvania, January 2014.*

Table of Contents

Instructions:

Key Red Text – Municipality to customize the text.

Blue Italics Discussion Text – Delete all paragraphs before adopting language.

Red Additional Text – Add text in red if the situation pertains to the municipality.

Section 001 Purpose

The purpose of this Ordinance is to enhance the health, safety, and quality of life of residents of the Municipality. These regulations provide for screening and buffering; aid in the reduction of noise, heat, and glare; minimize erosion and sedimentation; enhance aesthetics; and contribute to a healthy environment.

These regulations are designed to promote sustainable landscapes within the Municipality, thereby conserving and restoring healthy soils, reducing the use of irrigation, improving the quality of surface waters, enhancing the quality and quantity of groundwater recharge, reducing energy consumption, providing wildlife habitat, and protecting and restoring Native Plant communities.

Section 002 Scope

This Ordinance sets forth landscaping requirements that shall be incorporated into Applications for Development submitted to the municipality seeking approval of major subdivisions and major and minor site plans. It addresses the types of plantings to be provided, prohibited species use, plant density and spacing when included as part of a landscape buffer or parking plan, protection of trees and other plantings existing on-site pre-development, and installation of street trees in association with public rights-of-way.

Section 003 Definitions

A. Application for Development: The application form and all accompanying documents required by ordinance for approval of a subdivision plat, site plan, planned development, conditional use, zoning variance, or direction of the issuance of a permit pursuant to section 25 or section 27 of P.L.1975, c.291 (C.40:55D-34 or C.40:55D-36).

B. Bioretention: An excavated shallow surface depression planted with specially selected Native Plants to capture and treat runoff.

C. Critical Root Zone (CRZ): Portion of the root system that is the minimum necessary to maintain vitality or stability of a tree. Encroachment or damage to the critical root zone will put the tree at risk of failure. The CRZ equals 12 inches of radius from the trunk for each inch of trunk diameter measured at four and one-half (4.5) feet above ground level.

D. Diameter Breast Height (DBH): The diameter of a tree trunk in inches, at four and one-half (4.5) feet above ground level.

E. Dripline: An area on the ground defined by the outermost circumference of tree canopy.

F. Hedgerow: A row of dense vegetation in a linear design, used for such purposes as buffering, windbreaks, provision of food and habitat for wildlife (including pollinators), and limiting spray drift.

G. Invasive Plant: A non-indigenous plant that rapidly and aggressively migrates into natural or human altered plant communities as designated by the New Jersey Invasive Species Council (www.nj.gov/dep/njisc/index.htm). (Refer to "Overview of Non-Indigenous Plant Species in New Jersey" at www.nj.gov/dep/njisc/InvasiveReport.pdf for additional information on invasive plants)

H. Landscape: The area not occupied by structures, roads or parking. It includes existing and proposed plant materials, such as trees, shrubs, and perennials; natural materials, such as rocks, earthen berms and water; and man-made materials, such as sculpture, art, walls, fences, paving materials, and outdoor furniture.

I. Meadow: An area containing Native grasses and flowering herbaceous plants that serve an ecological function. Meadows may not contain species determined to be invasive in the state of New Jersey. See Invasive Plant definition.

J. Municipal Landscape Professional: A graduate of a four-year college with a degree in forestry,

arboriculture, ornamental horticulture, landscape architecture or the equivalent, a New Jersey Certified Tree Expert, or a person who has been continuously employed in the practice of arboriculture for at least five years. Ideally, the Municipal Landscape Professional should hold a current certificate in Landscape Management. This individual can be employed directly by the municipality or contracted as a consultant.

K. Native Plant: For the purposes of this ordinance, a plant species that occurred in New Jersey prior to European settlement. The native status of plants may be confirmed through the www.plants.usda.gov web site, using the Native Status Maps for each species. For purposes of this ordinance, Native Plant shall include Native Shade Tree, Native Street Tree, Native Shrub, Native Groundcover, Native grass, and Native perennial.

L. Noxious Weed: Any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health, or the environment.

M. Rain Garden: An excavated shallow surface depression planted with specifically selected Native Plants to treat and capture stormwater runoff.

N. Riparian Buffer: An undeveloped area adjacent to water bodies, which provides ecological services such as filtration of runoff, flood water storage, shade for cooling, and improved surface water quality.

O. Screening: Restriction of objectionable views to intensive use or utility elements of a site by landscape plantings, berms, walls, and fences according to Section 011. The Screening is located at or near the element to be screened.

P. Sustainable Landscape: A landscape that balances the needs of people, the economy, and the environment by minimizing long-term water and energy consumption, and protecting or enhancing soils, Native Plant communities, and surface water quality.

Q. Land Use Buffer: A separation between dissimilar land uses, employing both horizontal distance and landscape elements, to reduce the impacts of one use upon the other by enhancing aesthetics, blocking artificial light, assisting in muffling noise, reducing spray drift, and restricting views.

Section 004 Landscape Plans

A. A Landscape Plan, consistent with the provisions of this Ordinance, shall be required as a condition of any completeness determination for an Application for Development covered under this Ordinance.

B. All land areas within a subdivision or land development not containing existing buildings or structures, impervious surfaces, or other improvements which preclude landscaping, shall be included in the Landscape Plan.

C. The Landscape Plan shall be drawn at a scale of not less than one (1) inch equals 100 feet. It shall contain the following information in addition to all other inclusions required by this Ordinance:

1) Certification, including signature, seal, and date, by a Landscape Architect registered by the State of New Jersey.

2) The location of all existing and proposed structures, fences and walls; streets; parking/loading areas; utilities; lighting; rights-of-way; and easements.

3) The location of all existing and proposed outdoor storage and trash receptacle areas.

4) Adjacent land uses and zoning classifications.

5) The location and general type of existing vegetation. Any existing vegetation to be removed shall be noted on the Plan.

6) A plant list or schedule, indicating scientific and common names, required and proposed quantities, spacing, Native Plant status, and size of all proposed landscape materials at the time of planting. The plant list or schedule shall include any plant symbols used on the Plan drawing and the expected mature spread of each plant.

7) Existing soil types and proposed topography.

8) Proposed protection of existing trees to remain, and details of same.

9) Location and description of other landscape improvements, such as earthen berms, walkways, raised beds, sculptures, fountains, street furniture, lights, and paved areas.

10) Planting and installation details as necessary to ensure compliance with the provisions of the American Standard for Nursery Stock, most recent edition (www.americanhort.org/documents/ANSI_Nursery_Stock_Standards_AmericanHort_2014.pdf).

11) Details as to proposed tree protections for newly planted trees, to provide protection throughout any remaining construction activity as well as to prevent damage from wildlife prevalent in the vicinity (e.g., whitetail deer) until trees reach sufficient size and maturation to survive on their own.

Section 005 Topsoil

A. The Landscape Plan must meet the requirements of County Conservation District standards for soil erosion and sediment control related to removal, stockpiling, redistribution, application and stabilization of topsoil.

B. No topsoil may be removed from the site until a minimum of five (5) inches of topsoil has been redistributed over all areas to be landscaped in accordance with "The Standards for Soil Erosion and Sediment Control in New Jersey", most recent addition (www.nj.gov/agriculture/divisions/anr/pdf/2014NJSoilErosionControlStandardsComplete.pdf).

C. Areas to be landscaped shall not be used for incompatible uses, such as waste dumps or parking areas, during construction. Any construction debris shall be removed prior to the placement of topsoil.

D. Topsoil properties shall be suitable for the installation of native plant material. As such, at least two (2) soil tests shall be performed on the topsoil to be redistributed/applied, including organic material percent and pH. Results and recommendations shall be furnished to the Municipal representative and landscape contractor before plants arrive on site, or permanent turf is seeded. Amendments may be required to improve the suitability of the topsoil. The local Rutgers New Jersey Agricultural Experiment Station Cooperative Extension county office can be contacted for details on soil testing, fertilization and pest control recommendations (see http://njaes.rutgers.edu/county/).

Section 006 Existing Tree Preservation and Protection

A. Every effort shall be made to preserve mature trees over six (6) inches in caliper and significant existing vegetation on a development site and to incorporate these existing plants into an overall planting design. Every effort shall be made to retain as much of any wooded area as possible of a

size and configuration that will promote its natural growth and regeneration particularly where it adjoins other woodlands.

B. An existing tree shall be considered preserved if there is no disturbance within the tree's dripline, or Critical Root Zone, whichever is greater. Disturbance includes earth disturbance, earth compaction, vehicular and foot traffic, material stockpiling, and/or the construction of any proposed improvements and utilities.

C. The following conservation practices are mandatory and shall be noted on the grading and soil erosion and sedimentation control plan, and employed in order to preserve existing trees. In addition to the other requirements specified in this Section, these conservation practices shall be undertaken during land development activities. Prior to any clearing or site disturbance, the applicant and/or site contractor shall meet with the Municipality to further determine methods to minimize tree loss. For this meeting, the Municipality shall appoint a qualified landscape professional to act on its behalf.

1) All trees and other vegetation to be preserved shall be protected from equipment damage by temporary snow fencing or other effective barriers approved by the Municipality. Fencing or barriers around trees shall be placed outside the dripline. Tree protection installation must be approved by the Municipal landscape professional prior to the start of any clearing, grading, or other earth disturbance and monitored periodically. The tree protection fencing shall be maintained by the applicant while in place. It shall be removed after all earth moving and construction activities that may impact tree roots are completed, including contractor worker parking.

2) When disturbance within the Critical Root Zone is unavoidable, applicants shall minimize encroachment and use the best available methods as approved by the Municipal Landscape Professional to minimize damage and preserve trees. These methods may include utility tunneling, use of geo-textiles, mulching, hand root pruning, and soil aeration.

D. Should any mature viable trees on the site not scheduled to be removed and counted as required Landscape Plantings be irreparably damaged during site preparation activities, and, as a consequence thereof, die or decline as determined by the appointed Municipal Landscape Professional within 18 months of the conclusion of construction activities, such trees shall be replaced with nursery grown material, in accordance with the following requirements:

1) For deciduous trees greater than six (6) inches and up to 12 inches DBH, one (1) inch of new tree caliper shall be provided for every six (6) inches of existing tree diameter cut or removed.

2) For deciduous trees greater than 12 inches and up to 24 inches DBH, one (1) inch of new tree diameter for three (3) inches of existing tree diameter cut or removed.

3) For deciduous or evergreen trees greater than 24 inches DBH, one (1) inch of new tree diameter for every one (1) inch of existing tree diameter cut or removed.

Section 007 Plant Material

Unless otherwise specified, nursery-grown plant materials shall conform to requirements listed in the "American Standard for Nursery Stock", ANSIZ60.1, current edition (www.americanhort.org/documents/ANSI_Nursery_Stock_Standards_AmericanHort_2014.pdf), published by AmericanHort (formerly known as the American Nursery and Landscape Association (ANLA)). Recommended native plant lists for the Highlands Region and associated tables can be found in *Recommended*

Native Plants for the Highlands Region, Section 2.0, June 2019. The following guidelines are the minimum required for all nursery-grown plant materials as required in this Section:

A. Plants for landscaping shall have been grown in USDA Hardiness Zone 6a or 6b, and/or within 250 miles of Name of County. A nursery stock certificate and plant material invoice shall be provided to the Municipality indicating the location of the nursery(s). (References such as The Native Plant Society of New Jersey (www.npsnj.org) provide listings of nurseries with plants meeting these requirements.)

B. All trees, shrubs, and plants shall be sound, healthy, and vigorous, and shall be free from disease, insects, insect eggs and larvae.

C. Neither Invasive Plants (see definition) nor Noxious Weeds (see definition) shall be included in Plant Material. Plants used to fulfill the requirements for Native Plants shall be per the definition of Native Plant.

D. The type(s) and locations of plantings shall be combined so as to ensure the public safety, both at the time of planting and throughout plant life expectancy. Landscape plans shall be designed to avoid interference with public street rights-of-way and associated signage, drainage infrastructure, and sight triangles at intersections of streets and/or driveways, as well as above- and below-ground utilities, such as overhead wiring, below-grade gas, electric, water, and/or sewer lines. Potential hazards include, but are not limited to, low hanging branches, excessive shallow root mass, poisonous or toxic plants, and plants with thorns, nettles and spikes.

E. The locations, dimensions, and spacing of required plantings shall be adequate for their proper growth and maintenance, taking into account the sizes of such plantings at maturity and their present and future environmental requirements, such as soil moisture and sunlight.

F. Shade Trees are defined as deciduous trees with spreading canopies that provide dense shade after leafing out in the spring and until leaves drop in the fall. Shade Trees for all requirements, except Riparian Buffers, shall have a minimum caliper of two inches (2") at the time of planting. Shade Trees for Riparian Buffers shall have a minimum caliper of one inch (1") at the time of planting. All Shade Trees shall be Native Plants.

G. Large Street Trees are defined as trees planted adjacent to rights-of-way that have a mature height of greater than 30 feet. Large Street Trees shall have a minimum caliper of two (2) inches at the time of planting. All of the Large Street Trees shall be Native Plants. (See *Recommended Native Plants for the Highlands Region*, Section 2.0, Table 1, June 2019)

H. Small Street Trees are defined as trees planted adjacent to rights-of-way that have a mature height of less than 30 feet. Small Street Trees shall have a minimum caliper of one and one-half (1.5) inches at the time of planting. Multiple-trunk trees should be identified as such in the plant list. Multiple-trunk trees shall be counted as one (1) tree. All Small Street Trees shall be Native Plants. (See *Recommended Native Plants for the Highlands Region*, Section 2.0, Table 1, June 2019)

I. Evergreen Trees shall have a minimum height of six (6) feet at the time of planting. All Evergreen Trees shall be Native Plants. (See *Recommended Native Plants for the Highlands Region*, Section 2.0, Table 1, June 2019)

J. Shrubs shall be spaced according to their size, growth characteristics and intended use. Shrubs shall comply with the following requirements:

1) Large Shrubs are defined as shrubs naturally growing to a height of more than four (4) feet; and shall be a minimum size of two (2') feet in height at the time of planting. All of the Large Shrubs shall be Native Plants. (See *Recommended Native Plants for the Highlands Region*, Section 2.0, Table 1, June 2019)

2) Small Shrubs are defined as shrubs naturally growing to a height of less than four (4) feet; and shall be a minimum size of 18 inches in height or in spread, depending on variety. All Small Shrubs shall be Native Plants. (See *Recommended Native Plants for the Highlands Region*, Section 2.0, Table 1, June 2019)

K. Ground Cover is defined as plantings to prevent soil erosion and may include Small Shrubs, herbaceous perennials, Meadows, bulbs and annuals (see *Recommended Native Plants for the Highlands Region*, Section 2.0, June 2019). Plants shall be spaced appropriate to type and size, with consideration given to growth habit and anticipated size at maturity. Ground Cover plants shall be spaced and seeding rates sufficient so that 100% of Ground Cover designated areas are covered after three (3) years' growth.

L. Landscape designs shall incorporate a variety of plant species to avoid monocultures, to encourage long-lived species, and to promote wildlife habitat. Satisfactory compliance with this requirement shall be determined by the Municipal Landscape Professional.

M. To allow for design flexibility, plant material substitutions from the requirements may be permitted at the discretion of the reviewing board or municipal official, with input and recommendations from the Municipal Landscape Professional. In such cases, the applicant must demonstrate to the satisfaction of the Municipality that the general intent of these provisions is achieved.

N. Trees, shrubs, and perennials that produce food for human consumption, or can be harvested for medicinal properties, may be substituted for any plant material required by this Ordinance, as long as the tree, shrub, or perennial meets the screen, shade, safety, and/or engineering objective of the planting. No Invasive Plants or noxious weeds may be utilized under this section.

Section 008 Street Trees

The location of Street Trees and the surrounding soil conditions should drive the decision on Street Tree species. Trees selected for use outside of the right-of-way in lawn areas will have more root space, grow faster, and develop to a larger size than trees placed in a tree pit surrounded by sidewalk and road pavements.

Trees growing in tree pits in sidewalk have an approximate 20-year life cycle, shorter than trees growing in other soil conditions. The trees will generally not reach full canopy width or height during the shorter life cycle. The smaller size should be a consideration in tree spacing.

The Native Plant requirement for Street Trees is lower, to allow for selection of trees to meet urban soil conditions, microclimates, and height restrictions under utility lines. Even in urban situations, the use of Native Plant material is important. The leaves and fruit move downstream through storm sewers, and affect the outfall ecosystem. If Street Trees are moved to alternative locations such as forming Hedgerows, the trees should meet the requirements for Shade Trees.

A. Street Tree standards include:

1) Trees must meet the requirements of Section 007 Plant Material, for Large and Small Street Trees.

2) Trees must be balled and burlapped with the native soil in which the tree had been growing.

3) Trees shall have a minimum 24-inch diameter root ball when planted.

4) Tree straightening mechanisms such as staking and guying may be used in situations of high winds or loose soil.

5) Large Street Trees shall be spaced a maximum of 50 feet apart. Small Street Trees shall be spaced a maximum of 30 feet apart.

6) *(The following setback provisions are recommended, however modifications should be made to suit the municipality, with consideration given to whether trees are to be located within or outside of public street rights-of-way.)* Trees shall be planted so as not to interfere with the installation and maintenance of streets, sidewalks, street signs, lighting, utilities and all such appurtenances.

   a) Trees shall be planted at least ten (10) feet from the edge of the improved cartway and at least five (5) feet from sidewalks, but in no case between the cartway and sidewalk.

   b) Trees shall be set back at least ten (10) feet from underground utilities and tree canopies or crowns at maturity shall not interfere with overhead utilities. Small Street Trees may be placed beneath overhead utilities if the mature size of the tree will not interfere with the lines.

7) Species shall be selected to ensure similar height and spread for trees located along the same street line, including both sides, if applicable.

8) Existing trees to remain may count towards the required number of Street Trees if the trees are between the right-of-way line and the building setback line, are at least four (4) inches in diameter as measured at 12 inches above the ground, and are limbed up to a minimum height of six (6) feet.

9) Hedgerows, clusters or other alternative arrangements of Street Trees may be permitted where conditions warrant, subject to the approval of the municipal review authority and upon recommendations of the Municipal Professional. Alternative arrangements may include a mixture of trees and shrubs, as well as use of compatible perennial (including Meadow) plantings between the trees.

10) *(The language herein is an optional addition, appropriate where the municipality does not have a program in place to monitor and care for public street trees located within the right-of-way.)* Street trees are the property and responsibility of the owner of the property upon which they are situated. Maintenance of street trees, including watering, pruning, pest control, and removal if necessary, is the responsibility of the property owner. If street trees die, they shall be removed and replaced by the owner, with the same size and specie of tree indicated on the development plan, or alternate size and species on approval of the Municipality.

Section 009 Parking Lot Landscaping

All parking lots with six (6) or more spaces shall be designed and effectively landscaped with trees and shrubs to:

1) Provide shade in order to reduce the amount of reflected heat.

2) Reduce the visual impact of glare, headlights and parking lot lighting.

3) Facilitate pedestrian circulation and safety.

4) Facilitate vehicular circulation by delineating driving lanes and defining rows of parking.

5) Provide a minimum of one (1) Shade Tree within the parking lot, either in islands or divider strips for every ten (10) car parking spaces in the lot, or portion thereof. (See Subsections B. and C.) These

trees count toward the requirements of island and divider strip landscaping and are not in addition to those requirements.

6) Provide a minimum of one (1) Shade Tree for every five (5) truck, recreational vehicle, or semi-trailer parking spaces in the lot, or portion thereof. The location shall be approved by the Municipality. To accommodate turning maneuvers of large vehicles, trees may be located outside of the parking area in groups, infiltration areas, or fence rows.

7) Provide filtering of impervious surface runoff to one or more Stormwater Infiltration Best Management Practices (BMPs) contained in the NJDEP Stormwater BMP Manual (www.nj.gov/dep/stormwater/bmp_manual2.htm).

B. Planting islands (see diagram below) shall conform to the following standards:

1) Planting islands shall be distributed throughout the parking lot, so that one (1) planting island, a minimum of ten (10) feet wide by 18 feet long, shall be located at the end of each parking row and at intervals of no greater than every ten (10) parking spaces. The island shall separate the last parking space from the drive aisle on each end of an interior parking row.

2) In a 90° double bay parking row, the islands shall be a minimum of ten (10) feet wide and 36 feet long. Angled parking lot islands must have a minimum average of ten (10) feet width.

3) Each planting island shall contain at least one (1) Shade Tree plus Small Shrubs, Ground Cover, and/or perennials to cover the entire area at maturity. A minimum of 50% of all trees, shrubs and perennials shall be Native Plants as defined in this Ordinance. Shrubs shall not exceed two (2) feet in height.

4) The placement of light standards shall be coordinated with the Landscape Plan to avoid a conflict with electric lines and provide adequate lighting.

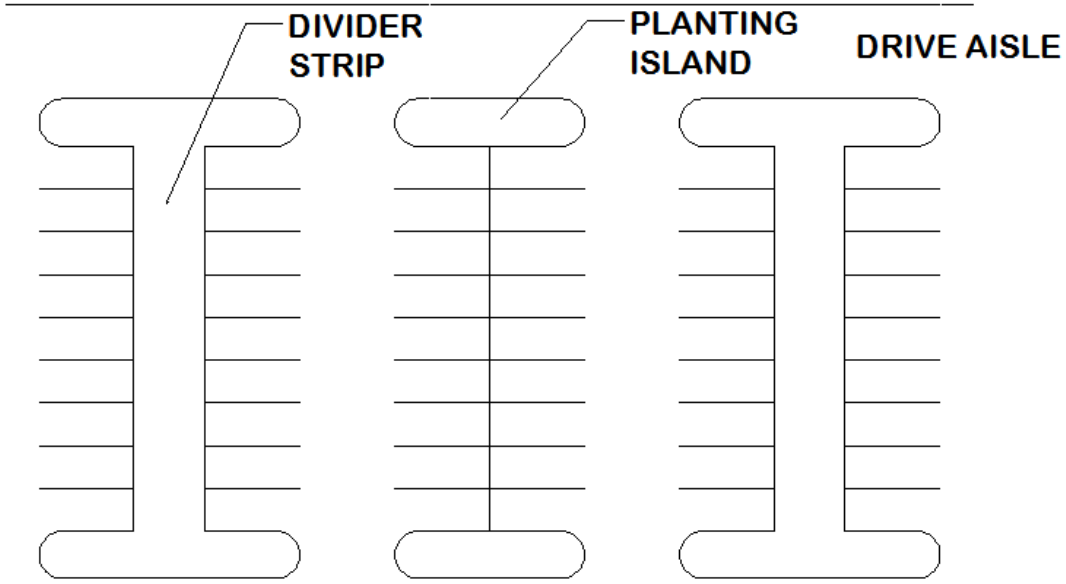
C. Divider strips shall conform to the following standards (see diagram below):

1) Divider strips shall be placed between every other bay of parking running the length of the rows of parking and landscaped with plantings of Shade Trees, Large and/or Small Shrubs, and Ground Cover to cover the entire area at maturity. A bay of parking is the width of pavement needed to accommodate either one (1) or two (2) rows of parking stalls plus one (1) access lane. Stormwater Infiltration BMPs shall be utilized within divider strips, where geologic conditions are appropriate, and in accordance with the Municipal Stormwater Control Ordinance.

2) Divider strips shall be a minimum of ten (10) feet wide unless a sidewalk is proposed within the divider strip. If a sidewalk is proposed within the strip, the sidewalk must be placed to one side and the divider strip shall be increased in width by five (5) feet to accommodate it.

3) A minimum of one (1) Shade Tree and three (3) Large or Small Shrubs shall be required for each 30 feet of divider strip length. The plants need not be spaced evenly apart; however, the maximum spacing shall be 50 feet. Shrubs near the ends of divider islands shall not exceed two (2) feet in height at maturity so as not to block sight lines. This shall not preclude the use of taller shrubs elsewhere within the divider island. All divider island plants shall be Native Plants. Native Ground Cover, perennials or shrubs shall be installed over the remainder of the divider island to stabilize the soil and slopes.

Parking Lot Illustration



D. Parking lot perimeter landscaping shall be provided to visually screen parking lots, limit glare from headlights and enhance the community streetscape character, in conformance with the following standards:

1) The landscape strip shall have a minimum width of ten (10) feet.

2) Within the landscape strip, the Screening shall consist of a combination of trees, shrubs, ground cover and/or earthen berms to provide a minimum screen height four (4) feet.

3) Parking lot perimeter landscaping shall be broken only at points of vehicular and/or pedestrian access and shall be designed to ensure clear sight triangles.

4) Parking lot screening shall be designed to provide an immediate visual screen of at least 50%, with an effective visual screen of 75% achieved within three (3) years.

E. Plantings shall be placed between car parking lots and buildings to break up long stretches of façade, shade the building, and provide a more comfortable pedestrian environment.

1) Plantings are required for all sides of a building facing car parking areas. Plantings are not required along the sides of buildings containing service or loading areas. If part of a side of the building faces parking, only that portion is subject to these requirements. Loading areas must be appropriately screened according to the requirements of Section 011 Screening.

2) The minimum planting requirement for areas between building facades and parking areas shall include one (1) Shade Tree or Small Street Tree and ten (10) Large or Small Shrubs for every 50 feet in length of the adjacent building façade.

3) At least 60% of the plantings shall be evergreen and all shall be Native Plants.

Section 010 Landscape Buffers

Landscape buffers shall be designed to provide visual screening, light reduction, and where applicable, noise abatement. Buffers must include landscape plantings, and may include berms, walls, and fences.

A. General Buffer Requirements:

1) Existing plants may be used to meet buffer requirements, as long as the buffer width, opacity and minimum evergreen requirements are met.

2) Plants may be grouped into beds and shall be installed such that, even at maturity, they do not encroach on neighboring properties.

3) Plant material shall meet the requirements of Section 007 Plant Material.

4) Buffer areas not planted with trees and shrubs shall be stabilized with perennial Ground Cover or Meadow. Meadow areas shall meet the requirements of Section 013 Meadows. Where adjacent to agricultural uses, buffers shall provide Ground Cover that meets the requirements of Section 013 Meadows.

5) Berms are encouraged and shall conform to the following standards:

a) Berms shall be a minimum of two (2) feet in height, and shall not be steeper than three (3) feet of horizontal distance for every one (1) foot of vertical rise (3:1).

b) Berms shall be located to work in conjunction with vegetation, fences and/or natural features and shall be designed to replicate naturally occurring landforms and to appropriately manage stormwater flows.

B. Types of Buffer Strips:

1) Buffer Planting Strip A is designed to block 50% of the view to a height of six (6) feet at maturity during the summer months, through the use of trees and shrubs. At least 25% of the plant material must be evergreen. This buffer strip is a minimum of 20 feet wide, and must contain the following plants for every 100 feet of buffer length, or portion thereof:

a) Two (2) Shade Trees;

b) One (1) Evergreen Tree; and

c) 20 Large Shrubs

2) Buffer Planting Strip B is designed to block 75% of the view to a height of six (6) feet at maturity, through the use of trees and shrubs. At least 50% of the plant material must be evergreen. This buffer strip is a minimum of 25 feet wide and must contain the following plants for every 100 feet of buffer length, or portion thereof:

a) Three (3) Shade Trees;

b) Five (5) Evergreen Trees; and

c) 25 Large Shrubs

3) Buffer Planting Strip C is designed to block 100% of the view to a height of six (6) feet within five (5) years, through the use of shrubs, trees, and other structural elements as needed. At least 50% of the plant material must be evergreen. The use of higher berms or a fence or wall is recommended. The buffer strip is a minimum of 40 feet wide, and must contain the following plants for every 100 feet of buffer length, or portion thereof:

a) Three (3) Shade Trees;

b) Three (3) Small Street Trees;

c) Eight (8) Evergreen Trees; and

d) 30 Large Shrubs

4) Buffer Planting Strip D is designed to block 100% of the view to a height of six (6) feet, through the use of a six-foot high fence or wall in combination with a dense planting of trees and shrubs in a 20-foot wide buffer strip. At least 50 percent (50%) of the plant material must be evergreen. The plants shall be located to produce the greatest reduction of light, noise and views. The buffer must contain the following plants for every 100 feet of buffer length, or portion thereof:

a) Two (2) Shade Trees;

b) Eight (8) Evergreen Trees; and

c) 24 Large Shrubs

C. Buffer Planting Strips shall be provided in the locations and circumstances as required by the municipal zoning and subdivision ordinances, with selection of one of the four (4) types of buffers listed above, to be determined by the reviewing entity on the advice of the Municipal Landscape Professional, in consideration of the specifics of the proposed development project and its relationship to adjoining land uses and/or uses permitted by the zoning ordinance.

Section 011 Screening

Screening is required for outdoor storage, off-street loading, trash collection areas, and outdoor mechanical and fuel equipment. Screening shall be designed to provide visual shielding, light reduction, and where applicable, noise abatement.

A. Screening may include evergreen landscape plantings, berms, walls, and fences.

B. Existing plants may be used for the Screening, as long as the height, opacity and evergreen requirements are met.

C. Screening height, depth, and plant content shall be determined based on the dimensional characteristics of the area to be shielded. At minimum however, screening shall provide a 100% visual barrier to a height of four (4) feet at the time of installation, with a height of six (6) feet to be attained within two (2) years. Landscape plants shall be placed in multiple staggered rows.

Section 012 Meadows

Meadows provide ecological services of soil enhancement, soil erosion control, and wildlife and pollinator habitat. They usually contain a mix of Native grasses and flowering perennials, and occasionally Native trees or shrubs. Meadows provide different specific ecological services by the specific mix of grasses and flowering plants they contain.

Meadows require fewer soil inputs of fertilizer, and less energy to maintain. Meadow plants are usually taller than turf, and may be maintained by mowing once or twice per year. To promote biodiversity, and pollinator habitat, Meadows are designed for less maintenance, cutting, weeding, and watering. Meadows do not appear the same as manicured gardens, and dead seed heads are left standing for the winter to benefit wildlife.

Meadows provided as the Ground Cover in Hedgerows provide the shelter, food, and reproduction areas necessary for native bees to support agriculture. Not compacting the soil by mowing, leaving stems standing through the winter, and selection of Native Plants helps both native bees and European Honeybees.

Meadows may be used in place of Groundcover (see Section 007 Plant Material) or turf in any area required to be landscaped, according to the following:

A. All plants installed in a Meadow shall be Native Plants (see definition). Neither Invasive Plants nor Noxious Weeds (see definitions) shall be included in a Meadow.

B. Meadows shall consist of a minimum of three (3) grass species and four (4) flowering perennial species. (See recommended species listing in *Recommended Native Plants for the Highlands Region*, Section 2.0, Table 7, June 2019) Meadows may be installed using seed or plants.

C. The mature height and/or extent of any Meadow used for landscaping of parking areas, driveways, or drive aisles must meet all requirements for maintenance of clear vehicular sight lines.

D. Meadows may not be mown more than twice per year; once in March or April to cut stems that were left standing through the winter, and once more if needed to control invasive species.

Section 013 Guarantee and Maintenance

The estimated, or if known, actual cost of all landscape materials depicted on the approved Landscape Plan and installation costs shall be provided and be financially secured, guaranteed and maintained consistent with the following subsections.

A. All landscape improvements shall be installed and maintained by accepted practices as recognized by the ANLA. Planting and maintenance of vegetation shall include, as appropriate, but not necessarily limited to, provisions for surface mulch, staking and guying, tree straightening, irrigation, fertilization, insect and disease control, pruning, mulching, weeding, and watering. It is recommended that trees and shrubs be planted between September 15 and November 1 or between March 1 and May 1.

B. Many trees and shrubs planted in the Highlands Region of New Jersey are subject to varying degrees of damage by deer. Browsing or buck rubbing can severely injure, deform or kill the plants. The severity of browsing is affected by surrounding habitat, number of deer and presence of alternate browse species. Methods of deer protection including fencing, individual plant barriers and the application of repellents must be considered and included as appropriate, in the Landscape Plan.

C. All landscape improvements installed pursuant to this Ordinance shall be maintained in a healthy and/or sound condition, or otherwise be replaced by equivalent improvements. Landscape improvements shall be guaranteed for a minimum period of 18 months following installation, except as may otherwise be required by this Section.

D. After installation and prior to commencement of the guarantee period, the Municipal Landscape Professional shall perform an inspection of the finished site for compliance with the approved Landscape Plan. Provided the finished site is found to be in compliance, the 18-month guarantee period shall commence five (5) days from the date of inspection. Final inspection of the site following the 18-month period will be made by the Municipality.

E. Plants found to be in poor health during the 18-month guarantee period shall be replaced with nursery-grown plants, in accordance with the approved Landscape Plan. If the original plants declined due to poor species selection, substitute plants, determined by the municipality on the advice of its landscape professional to be more suitable for the site's environmental conditions or planting scheme, shall be used, and a modified Landscape Plan shall be filed with the municipality. Replacement plants shall be inspected by the municipality after installation. All replacement plants shall be subject to a new 18-month guarantee period and inspections by the municipality as prescribed in Subsections B. and C. above.

F. Where accidental damage or vandalism of plants occurs, the property owner/operator shall replace the damaged plant material in accordance with the original or an approved modified Landscape Plan.

G. The applicant shall be required to post financial security for the maintenance and/or replacement of landscape plantings equal to 110% of the amount of the cost estimate submitted with the approved Landscape Plan. In addition, financial security shall be required for existing trees to remain where

soil disturbance is within the dripline, if the trees are counted toward any requirement of this Ordinance. Financial security is not required for existing preserved trees outside the construction limits or for material not being used to satisfy the minimum requirements of this Ordinance.

H. The applicant shall make arrangements acceptable to the Municipality for the long-term landscape maintenance of common lands and facilities. The applicant shall provide the names, addresses and telephone numbers of those persons or organizations who will be assuming such responsibilities. Landscape improvements required by this Ordinance shall be the subject of suitable restrictive covenants and, if practicable, rules and regulations governing the use and maintenance of common land and facilities, which covenants, rules and regulations shall be in form and substance acceptable to the Municipal Solicitor and, in the case of covenants, recorded as encumbrances running with the land on which the improvements are installed. The covenants, rules and regulations shall, without limiting the forgoing, require the maintenance and replacement, and prohibit the destruction or removal, of all landscape materials and improvements depicted on the approved Landscape Plan, empower the Municipality to enforce said obligations, and prohibit the amendment or termination of any of the mandatory terms thereof without the express joiner of the Municipality.

Section 014 Right of Entry

Upon presentation of proper credentials, municipal inspectors may enter upon any property within the municipality to inspect the condition of the landscape in regard to any aspect regulated by this Ordinance.

APPENDIX A

REFERENCES

AmericanHort, *American Standard for Nursery Stock* (ANSIZ60.1 most recent edition). (www.americanhort.org/documents/ANSI_Nursery_Stock_Standards_AmericanHort_2014.pdf)

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New Jersey Department of Agriculture (NJDA), *Noxious Weed Seed Regulations* (most recent version). (www.state.nj.us/agriculture/divisions/pi/prog/noxious.html)

NJDA and New Jersey Soil Conservation Districts, *The Standards for Soil Erosion and Sediment Control in New Jersey* (most recent edition). (www.nj.gov/agriculture/divisions/anr/pdf/2014NJSoilErosionControlStandardsComplete.pdf)

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York County Planning Commission et.al, *York County Sustainable Landscaping Model Ordinance* (January 2014).