

College of Lake County

Landscape Management Plan

8-16-2019

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Landscape Management Plan Overview

The College of Lake County (CLC) comprises a total of about 250 acres of land located across the Grayslake, Southlake and Lakeshore campuses. CLC's campuses provide a variety of landscapes, ranging from manicured lawns and gardens, to natural habitat restoration areas on the Southlake and Grayslake Campuses, and from the urban Lakeshore campus location in downtown Waukegan to the campus arboretum and learning farm in Grayslake.

In its Strategic Plan, the College of Lake County identifies sustainability, wellness, and diversity as areas of excellence. The installation and cultivation of native plant materials, restoration and stewardship of natural areas, and integrated pest management together provide safe access for our diverse student body to enjoy the educational and wellness benefits of the natural environment on campus. Goal 4 of the 2019-21 Sustainability Plan recommends that the college "Increase sustainable landscape, integrated pest management, and stormwater best management practices," including the development and implementation of this Landscape Management Plan. Other action items include evaluation of staffing levels, increase in the use of native plants, reforestation of campuses, ecological restoration, and the completion of the Living Lab Trail.

While lawn maintenance and snow removal are often the top priorities of grounds management, the Landscape Management Plan allows for the planning for other important tasks that may be less frequent and are often perceived as less urgent, such as tree and shrub care, or natural areas management. The 2015 tree survey calculates the cumulative value of our existing trees at \$2,393,535 on the Grayslake Campus. Proper pruning, mulching, and other tasks are essential in maintaining these valuable resources and ensuring that they thrive.

Native flowers, grasses, trees, and shrubs connect the college with its unique "sense of place," identifying with our local geography. Native plants contribute to sustainability goals, helping to clean and infiltrate stormwater, sequestering carbon, providing oxygen, and removing toxins from water, air, and soil. Native plants also provide valuable habitat for beneficial wildlife. This habitat has been shrinking over the past 150 years, leaving many species of birds, butterflies, and other pollinators without adequate sources of food and shelter. Pollinators include a wide range of animals: hummingbirds, bats, native bees (~ 4,000+ species in North America), honeybees, wasps, butterflies (~825 species), moths (~12,000 + species), ants, beetles, and flies.

Sustainable landscape practices reduce the negative impacts on human health and the surrounding environment by minimizing unnecessary mowing and trimming and by limiting the use of fertilizers, herbicides, pesticides and irrigation. These sustainable approaches to landscape management not only benefit the environment and people, if managed correctly, will reduce the maintenance costs as well. The area around the campus farm and arboretum have been designated as being free of chemical applications.

The Grounds Department, within Facilities, is responsible for the carrying out of landscape management practices. The Horticulture Department is responsible for the planning of the campus farm and arboretum and for the maintenance of the campus farm. The Biology Department has an ongoing interest in the quality of Willow Lake, the wetlands and prairies, as classes use these natural resources for applied learning experiences. CLC's Sustainability Council and Environmental Action Committee play an advisory role, along with this document, in landscape management planning. Campus grounds provide valuable resources, as a living laboratory for students their instructors.

CLC values its regional partnerships, recognizing that the impacts of landscaping go beyond campus boundaries. CLC works with the Village of Grayslake and Lake County Division of Transportation to facilitate trail connections with area trail resources. CLC participates with the Lake County Stormwater Management Commission in the development and implementation of the Mill Creek Watershed Plan. CLC received grant monies to install bioswales in four of its parking lots on the Grayslake Campus. CLC is furthering collaborative relationships regarding

landscape resources with the Lake County Forest Preserve District, Tree Campus USA, Bee Campus USA, Monarch Watch, the Chicago Region Tree Initiative, Xerces Society, and other organizations.

Landscaping across the three campuses takes into account each location within its watershed. The Grayslake Campus is located within the Mill Creek sub-watershed of the Upper Des Plaines watershed. Stormwater running off the campus flows into the Fremont Ditch and into Third Lake, which then leads to Mill Creek and then the Des Plaines River. The Southlake Campus is located in Vernon Hills in the Lower Des Plaines watershed, near where Indian Creek flows into the Des Plaines River. The Lakeshore Campus in downtown Waukegan overlooks a bluff leading into Lake Michigan, near where the Waukegan River flows into Lake Michigan. It is understood that each campus is a potential site for non-point source pollution. Efforts are taken to minimize potential impacts from fertilizers and road salt on waterbodies downstream. See Appendix B for related Watershed Maps.

Landscaping also takes into account the types of soils found each campus. Soils on the Grayslake Campus include Mundelein, Grays and Markham silt loams. Soils were formed during the last ice age in outwash plains, stream terraces and moraines. These soils are somewhat poorly drained and moderate permeability. Soils are considered non-hydric, with a seasonal high water table and low to medium surface runoff. The soils have been farmed for many years and have been further compacted by re-grading of the terrain. The soil fertility is considered to be prime farmland. See Appendix C for related Soils Maps.

Landscape Maintenance Zones

The 2012 Sustainable Master Plan suggests the establishment of high, medium, and low maintenance zones across the three college campuses. This Landscape Management Plan outlines these types of landscaping and the corresponding maintenance needs of each zone. By assigning different maintenance levels, the college is able to prioritize and reduce its maintenance load.

APPA: Leadership in Educational Facilities identifies six “levels of attention,” degrees of traditional landscape care to be provided by grounds crews on educational campuses. See Appendix D for details. These levels of attention provide an outline of turf care, fertilizer application, irrigation, pruning, litter control, snow removal, repairs, and floral plantings. Levels 2 and 3 seem to fit within the high maintenance zone described below, while levels 3 and 4 overlap a bit with the medium maintenance zone.

According to APPA, the levels of attention suggest that lower levels of maintenance, including irrigation and fertilizer applications, are mostly due to restricted budgets and insufficient staffing. They do not however take into account sustainable landscaping practices or integrated pest management practices, which benefit budgets as well as the environment and human health.

The installation and cultivation of native plant species as sustainable elements of landscape maintenance are present across all three landscape zones. Native plants require dedicated maintenance until they get established, to make sure that they thrive and that weeds do not take over. Once the native plantings get established, these garden beds will require less maintenance as they will shade out competing weeds and will require little-to-no irrigation.

High Maintenance Zones

High Maintenance Zones are located in areas of high visibility and high intensities of use, including entry points to each of the three campuses along roadways and near main building entrances and also the athletic fields.



High Visibility Entrance Area

It is important that CLC maintain a formal appearance for visitors entering the campuses, thus requiring the highest levels of maintenance with regular mowing, trimming, irrigation, and occasional fertilization/herbicide application. Mowing heights are lower than in other zones. The tolerance for weeds in the turf grass is also lower than elsewhere. The Grounds department has reduced the amounts of herbicide being applied over the past several years, while maintaining spring/fall herbicide applications to reduce weed presence in these high visibility areas. Athletic fields have unique maintenance requirements to insure the safety of athletes practicing and competing on them. Fields may require extra fertilizer, herbicide, irrigation, top dressing, aeration, painting or other maintenance services to keep them functional.

Plantings along the roadways must take into account safety concerns of motorists at intersections. Appendix M provides guidelines from the U.S. Department of Transportation “[Vegetation Control for Safety](#)” publication and the Lake County Unified Development Ordinance Intersection Visibility Standards regarding minimum distance visibility standards at roadway intersections. Any vegetation or placement of signage between 3 feet and 10 feet in height along campus roadways should take these visibility standards into account. Given the speed of cars traveling south on Lancer Lane from Washington Street, additional visibility is required to maintain safety for cars exiting University Drive onto Lancer Lane. Parking lot plantings should be maintained in a way that provides safe visibility of pedestrians crossing traffic lanes near building entrances.

One of the higher landscape maintenance zones involves snow removal from the sidewalks and parking lots during the winter. CLC has a policy to reduce snow from all sidewalks, roads and parking lots, rather than to completely eliminate it. It is important for safety to shovel snow and apply salt as much as possible to allow for safe passage for drivers and pedestrians. Lake County provides training for grounds crews about how to reduce our usage of salt while safely clearing snow and ice. Alternatives to sodium chloride include beet juice, calcium chloride and others.

Just as they would in most any garden, native flowers and grasses may be selected for their appropriateness in garden beds in high visibility locations. Many of the flowers and grasses identified in Appendix E Plant Palette would be appropriate in high maintenance zones, given their limited height and less aggressive nature. Native perennials can provide color and texture, while requiring less maintenance, fertilizer or irrigation. While annual flowers are discouraged, they are helpful in adding color to planters near entrances for the entire growing season. Non-native trees, shrubs and perennials have traditionally been chosen for high visibility locations, which can be transitioned to more sustainable native plant material over time, in keeping with this plan.

Medium Maintenance Zones

Most of the landscaping across all three campuses will tend to be medium maintenance, including the largest areas of turf grass. These turf areas are set back away from main walkways and road entrances. Medium maintenance areas may be mowed at higher levels, require less trimming and irrigation, and reduce fertilizer and herbicide application, if any at all. Trees and shrubs still require periodic attention to maintain plant health and human safety. Areas out of direct view from roadways will tolerate more incursion of dandelions and other weeds. Established beds of native perennials, such as prairie or butterfly gardens or bioswales, can be considered medium maintenance. It cannot be overstated that these plantings do require attention to keep weeds out in the first couple of years until the natives get established. Given the limited resources currently allocated to the Grounds Department, landscape companies should be contracted to maintain these beds and bioswales to insure their success.

Low Maintenance Zones

Low maintenance zones include the natural areas of restored prairie, wetlands, ponds, and woodlands. These areas require less frequent maintenance, but will suffer when left untended for years. Low maintenance zone areas will require periodic prescribed burns, selective cutting and herbicide application to control invasive species and to encourage the growth of native species.

Restored natural areas are vulnerable to incursions of invasive species. Invasive species are typically but not always non-native in origin. It generally takes a couple of years for native plants to thrive and be able to outcompete invasive species. See Appendix H for more information.

Natural areas on the campuses have been divided into management units for the purpose of scheduling restoration work on a rotating basis. See the Inventory and Management of Natural Areas below for more information about CLC's prairie, wetlands, ponds, and woodlands.



Low Maintenance Prairie and Wetland Natural Area

Inventory and Management of Natural Areas

Lake County sits at the biome intersection of the great tallgrass prairies of the plains and the eastern hardwood deciduous forests. The College of Lake County manages 66 acres of natural areas, including prairie, wetland, riparian buffer, and woodlands all in various stages of restoration. The management of these natural areas depends on the availability of a combination of grounds staff, volunteers, and hired consultants. Hey and Associates was contracted years ago to conduct burns and herbicide applications. Over the more recent years, staff and faculty have the organized prescribed burns of prairie and wetlands on a less frequent basis.

A regular rotation of prescribed burns and herbicide application is recommended to manage the advancement of invasive species and help guide the ecosystem restoration process. Student, faculty and staff volunteers should be invited to participate in work days and in the activities of the consultants, however they may not be able to change schedules with the weather conditions. The natural areas in various stages of restoration are identified below by Management Unit numbers and the type of ecosystem that they represent. See Appendix H: Native Vegetation Establishment and Invasive Species Control developed for guidelines developed for the 2017 request for bids to conduct this work.

RECOMMENDATION: A budget allocation should be maintained and enhanced with the Grounds department for the management of natural areas in order to hire consultants to carry out this restoration process, or to hire a trained grounds crew member.

Management of Natural Areas: The different Management Units are identified below, with the different areas on the Grayslake Campus and the landscaped and natural resources on the Southlake Campus and the urban landscaping of the Lakeshore Campus. See Appendix A for survey of ground cover on all three campuses.

Management Unit 1 – Willow Lake, Wetland, and Riparian Buffer:



Wetlands and Riparian Buffer around Willow Lake and Ponds

Willow Lake was created in the early 1970s with the development of the original A and B building wings. The Fremont Avon Ditch (aka Mill Creek) widened to serve as a detention pond for the High School Technology Campus built in the late 1970s. The two detention ponds, between Willow Lake and the Avon Fremont Drainage Ditch, were constructed around 2001 before the addition of the Technology Building. The detention pond north of the University Center of Lake County was excavated in 2004, with the construction of the University Center.

Each of the ponds, including Willow Lake, have been created for stormwater detention purposes, as they help manage stormwater runoff from the buildings and parking lots, by reducing flow and the impurities from entering into the Fremont Avon Ditch and Third Lake. Willow Lake, the two adjacent detention ponds, and the surrounding wetlands are protected by deed restrictions set forth in the 2000 Army Corps of Engineers Permit. The wetlands in Management Unit 3 have also been included under the scope of the Army Corps.

The Willow Lake, the ponds, and buffer area identified consist of 29 acres, of which about 13 acres is water. CLC's Horticulture Department developed a list of priority lake and shoreline management items:

- Maintain and enhance native plantings in shoreline buffer areas, see wetland management recommendations
- Conduct full water quality assessment to ascertain reasons for lack of aquatic and marginal vegetation
- Evaluate the re-engineering and repair of weir structure to allow water control (requiring a review from the Army Corps of Engineers)
- Control Canada geese (e.g. coyote decoy, dog contract, grape flavoring spray)
- Repair and restore erosion blowouts adjacent to drainage outfall pipes
- Consider coir-fiber logs (biologs) to address bank under cutting
- Plant newly protected zones with appropriate wetland species tolerate of variable water levels
- Install geo-grid along service road access (north shore of lake, south of library wing) to provide more stable vehicle access and extend buffer plantings closer to building
- Install interpretive signage to explain shoreline area to students and visitors. (See Living Lab Trail below)
- Install trail pathway and consider a boardwalk on a small stretch of shoreline to increase access to shoreline in selected areas, to encourage exploration of shoreline habitat and to deter trampling and compaction from visitors

Management Unit 2 – Prairie:

The College of Lake County has roughly 9 acres of prairie restoration on its Grayslake Campus, located east of Lancer Lane, between the University Center and the Horticulture Building. The prairie restoration began in the 1980s as a living laboratory for environmental biology classes and resource on the CLC Fitness Trail. There are an additional 12 acres of what could be described as scrub grassland on the Glunz and Gwaltney properties, which were acquired in 2013 and 2014, and to the by the geothermal wells on west side of the campus.



Management Unit 2 - Prairie

Prairies are ecosystems considered part of the temperate grasslands, savannas, and shrublands biome by ecologists, based on similar temperate climates, moderate rainfall, and a composition of grasses, forbs, and shrubs, rather than trees, as the dominant vegetation type. While prairies are a predominantly indigenous ecosystem to Lake County, they are threatened by invasive plant species. Prairies must be maintained in a way that helps to simulate pre-settlement conditions. The Lake County Forest Preserve District provides [recommendations](#) for management of natural areas, including [controlled burns](#) that stimulate native prairie plant growth and discourage many invasives and also mowing/cutting invasive weeds before they set seed. Prescribed burns should take place in the colder seasons when wildlife are dormant. See Appendix H: Native Vegetation Establishment and Invasive Species Control for more information.

CLC's Horticulture Department developed a list of priority prairie management items:

- Remove of old sediment fencing and steel posts
- Develop a controlled burn schedule for a five year cycle, randomize block zones with random fall-spring burns
- Purchase burn equipment in order to conduct burns without having to borrow
- Woody plant management – Target buckthorn (*Ramnus*), willows (*Salix*) and junipers (*Juniperus*), among others, for cutting and herbicide

- Herbaceous weed management – Target common reed (*Phragmites*) and purple loosestrife (*Lythrum*), among others, for cutting and herbicide
- Seeding – area of sewer disturbance area needs seeding with basic prairie matrix mix
- Overseeding – mix of more diversified forbs (15-20 species) to enrich grass matrix

Management Unit 3 - Wetlands:

A wetland is a land area that is saturated with water, either permanently or seasonally, with its own distinct ecosystem, with characteristic vegetation, adapted to moist to wet conditions with hydric soils. Wetlands play a number of roles in the environment, principally water purification, flood control, carbon sink and shoreline stability.

Wetlands have been present on the Grayslake Campus since pre-settlement times. From the late 1800s to early 1900s several areas of historic wetlands were drained for farming, however with limited success. With the building out of the campus from the 1970s to 2000, wetland areas were recreated to manage stormwater flow better and to reintroduce habitat for plants and animals.

CLC’s Horticulture Department developed a list of priority wetland management items:

- Removal of old sediment fencing
- Burn schedule for 5 years as noted above in coordination with Management Unit 2
- Woody plant management – several zones of willows (*Salix*) and dogwoods (*Cornus*), among others, should be cut and herbicided
- Weed management – common reed (*Phragmites*) and purple loosestrife (*Lythrum*), among others, with herbicide treatment
- Overseeding – mix of more diversified forbs (12-15 species)

See Appendix H: Native Vegetation Establishment and Invasive Species Control for more information.



Management Unit 3 - Wetlands

Management Unit 4 - Woodlands:

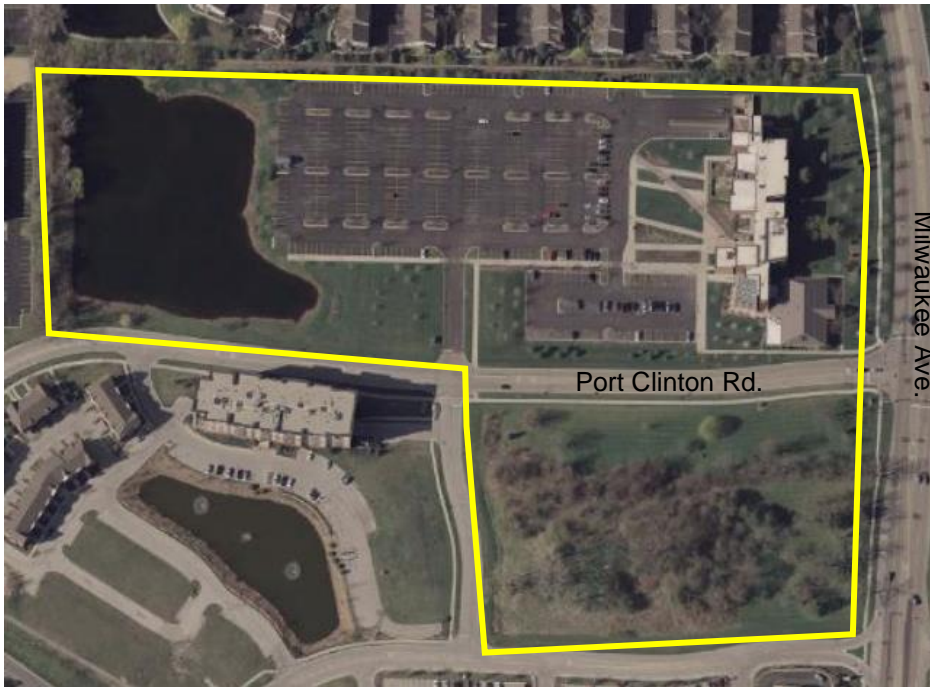
CLC’s woodland area to the south east of the Grayslake Campus and on the south parcel at the Southlake Campus have historically served as locations adjacent to homesteads. The wooded areas expanded slightly with the addition of the Gwaltny property. Mature trees are visible in historic aerial photos dating back to 1939. While the area was likely to have been clear cut in the 1800s, this area contains some of the oldest trees in the area, including a large larch. Unfortunately, with lack of forestry care, they have become overrun with invasive species including European buckthorn (*Rhamnus*), honeysuckle (*Lonicera*), and garlic mustard (*Alliaria petiolata*). The woodland area also suffered from an infestation of the emerald ash borer, as did other areas across the campus, with many of these dead ash trees remaining. Limited funding and competing priorities have left the woodland area unmanaged, yet this highly visible resource remains an opportunity for enhancement and restoration.



Woodlands

Southlake Campus:

CLC’s Southlake Campus in Vernon Hills has several areas that fit within the category of natural areas. The detention pond to the west of the parking lot was dug out of an existing wetland in the 1990s and expanded with the construction of the V Building in 2005. Much of the plantings are established with the Planned Unit Development approved by the Village of Vernon Hills.



Southlake Campus

The Southlake Campus contains the first green roofs to be installed on a public building in Lake County. The original 2007 green roof plantings failed, requiring replacement of drainage layers, growing medium and plants in 2014 and 2015. Students worked with consultants to design and install the new plantings.

Many of the original trees planted throughout the parking lot and around the buildings have failed and are to be replaced with more resilient species. The sidewalk entry landscaping has become a maintenance challenge with dying shrubs, poorly adapted plants, and weed growth. The western part of the campus contains a stormwater detention pond. Much of the

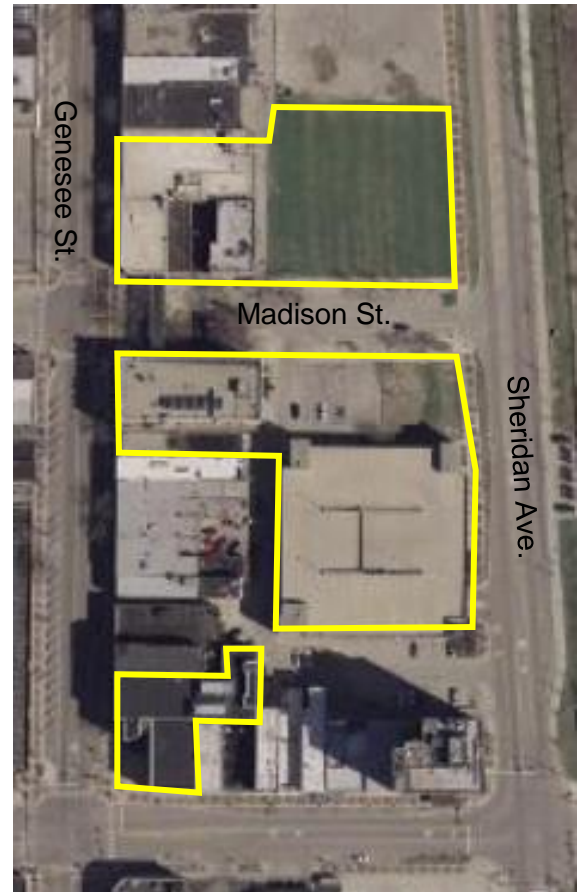
periphery of the pond is overrun with invasive species, including buckthorn, teasel and thistle. The mowing along the steep slopes of the eastern and southern portions of the detention pond should be scheduled for riparian restoration to improve the habitat and reduce the risk for grounds crew.

The wooded parcel south of Port Clinton Road is a lesser utilized part of Southlake Campus. This parcel contains many mature trees that were once part of a farmstead. While it has grown into a woodland habitat, western parts of this parcel are considered to be wetlands. The eastern parts of the parcel are landscaped and used to be part of the farmstead. This wooded area is in need of restoration work, as it is overrun with buckthorn and honeysuckle. The trees in this area that are in need of maintenance. The landscape plan for Southlake is due to be updated. See Appendix H: Native Vegetation Establishment and Invasive Species Control for more information

Lakeshore Campus:

CLC's Lakeshore Campus occupies a central location in downtown Waukegan, including a number of buildings that once housed department stores. The buildings sit on Genesee Street and overlook Sheridan Road and the bluff toward Lake Michigan. The college purchased and rehabilitated buildings beginning in the 1990s and continuing into the 2010s. The former News Sun building at 100 West Madison and former Madison Avenue restaurant at 34 North Sheridan were purchased in 2011 and subsequently razed. Both of these parcels, totaling 0.81 acres, are currently vacant and are covered with turf grass. The block of Madison Avenue, between 33 and 101 North Genesee has been converted to a pedestrian plaza, which is landscaped with trees, shrubs and plantings by the college, but remains right of way governed by the City of Waukegan.

The Sustainable Master Plan calls for redevelopment of the entire Madison Street plaza and a new six-story building on the 34 North Sheridan parcel. The turf at Madison and Sheridan is being reserved for future development and may be fenced in for college purposes.



Lakeshore Campus

Tree Survey and Management Plan

According to the Chicago Region Trees Initiative: “Our regional forest is a critical asset in need of protection. Trees clean our air and water, reduce flooding, improve property values, create habitat for wildlife, and provide significant social and health benefits. Trees improve our quality of life. But trees need our help. Invasive species, including buckthorn and honeysuckle, the death of ash trees due to emerald ash borer, and the lack of funding for proper tree care and attention are having significant impacts on the health and survival of our regional forest.”

(<http://www.mortonarb.org/science-conservation/chicago-region-trees-initiative> downloaded 7/5/2017)

In February, 2016, the College of Lake County in Grayslake, IL retained Bartlett Tree Experts to perform an inventory of trees in the landscaped areas of the Grayslake Campus and to develop a management plan. The Tree Survey and Management Plan are referenced in Appendix J and are available in the Facilities Office and results of the tree survey are available online with the ArborScope™ web-based management system. The survey identified 1,008 trees, including 139 species. The attributes that we collected include tree latitude and longitude, size, age and condition class, and a visual assessment of tree structure, health, and vigor.

Survey data collected:

- Identification of trees with assigned tag and number (Tags 1-900)
- Botanical name and regional common name according to local ISA Chapter Tree Species List
- Tree condition, health, and vigor
- Diameter at breast height (DBH)
- Canopy radius
- Age class
- Height class
- Condition class
- Root zone infringement, based on dripline and estimated grayscape (e.g.,sidewalks) impact on root zone
- Location mapping with GPSr hardware and Geographic Information System (GIS) software, and interactive Bartlett Tree Experts’ ArborScope™ web-based management system

Maintenance Recommendations to promote tree safety, health, appearance, and longevity:

- Priority of tree and shrub work (based on 3-year management plan), including selective pruning
- Need for and inspection of existing structural support systems
- Need for and inspection of existing lightning protection systems
- Need for advanced tree risk assessments (Level 3)
- Soil care and fertilization recommendations, including appropriate mulching
- Plant health care recommendations
- Noted defects/observations
- Observed pests/diseases
- Removals of appropriate trees

In its Tree Maintenance Plan, the College of Lake County intends to continue planting trees, preferring species native to Lake County and the state of Illinois. See Appendix F for a list of recommended tree and shrub species.

Arboretum

The College of Lake County Arboretum was developed by past Horticulture Department faculty and staff to serve the purpose of teaching woody plant identification for various horticulture classes. The arboretum sits at the southeast corner of the Grayslake Campus, north of Brae Loch Road and between Lancer Lane and Rte. 45. Dr. Mark Zampardo, faculty and department chair until 2008, and Barry Wilson, staff horticulturist until 2008, planted an extensive collection of approximately 300+ species and varieties of trees and shrubs, but no formal map or list of these plants was available, nor were the plants placed in any specific design approach. Many were not labeled and many of the labels that were present have been lost. Over the period of 2008-2016, many of the ash trees present were impacted by Emerald Ash Borer (EAB), and other trees were damaged in storms, particularly severe wind storms during July, 2011. Still other trees have become structurally unsound due to their age, as a number of the more mature trees date back to when the property was a farmstead pre-CLC. A “restoration and renewal” plan for the arboretum was needed.

In December, 2015, Rory Klick, horticulture faculty and department chair, proposed including an arboretum renewal plan as part of her sabbatical work for the 2016-2017 academic year. This project utilized the larger campus tree survey and inventory, conducted by Bartlett in 2016, to incorporate permaculture and sustainability standards per the new sustainable agriculture academic track started in 2012.

The goals for the arboretum renewal plan are as follows:

1. Develop an overall plan for the arboretum plantings that reflects an aesthetically pleasing layout of trees, shrubs, perennials, groundcovers, vines and landscape features so as to provide an appealing outdoor destination on the Grayslake campus for all CLC students and staff
2. Incorporate built landscape features such as benches, tables and outdoor classroom space to make the arboretum more usable for classes; include an area that is ADA compliant to allow universal access, and also demonstrate permeable paving options
3. Work with college staff to include trail points for interpretation as part of the larger campus Living Lab Trail
4. Remove diseased, dead, dying or structurally damaged trees and any invasive species
5. Plant the ~40 missing species of trees and shrubs that are part of the horticulture curriculum but not present in the collection
6. Develop a list and placement for additional edible tree and shrub crops (hazelnuts, raspberries, pecans, walnuts, etc.) and fruit trees (apples, pears, plums, etc.) which would support the agriculture courses and expand the campus farm food production
7. Curate the collection so that it is labeled and the information is available to the public
8. Work with college facilities staff to include arboretum issues into the overall landscape/tree management plan of the college; this would include but is not limited to proper mulched tree rings, watering during drought periods, monitoring for pest/disease issues, and structural pruning as needed
9. Work with college facilities staff to apply for designation as a Tree Campus USA. See requirements in Appendix J.
10. Apply for designation as a “Level I Arboretum” per guidelines through the ArbNet Arboretum Accreditation Program. See details in Appendix J.

The most significant challenge to achieving these goals is the lack of staffing to maintain the arboretum. In 2014, the full-time staff horticulturist position that was part of the academic horticulture department was cut, as was the half-time horticultural assistant position. These two positions (60-hours/week) were replaced by one 25-hour/week part-time horticultural assistant. See the Grounds Management Staffing section below for more information.



Campus Arboretum

Donation of Trees and Shrubs

Tree and shrub donations are welcome at the College of Lake County. Such landscaping helps to beautify the campus and promote sustainability by promoting clean air and water. Over the years, the College of Lake County has received requests for tree donations. These donations are typically intended to memorialize someone with a special connection to the college.

This section of the Landscape Maintenance Plan provides specifications and procedures and must be consistent with the College of Lake County Gift Acceptance Policy and Procedures. This policy may be adapted to apply to the donation of shrubs or gardens, however changes to the specifications below may require approval from the Operations and Facilities Commission or other governance entities.

Specifications:

- Any tree donation is subject to approval by the Department of Horticulture and the Facilities Department.
- Donated trees are to be planted within the Grayslake Campus Arboretum.
- Species of trees proposed for donation should be consistent with the list of Recommended Trees, identified in Appendix F of the Landscape Maintenance Plan, that are hardy to our climate, appropriate to the proposed location, and contribute to the biodiversity of the campus.
- Planting should take place during the spring or fall, as determined by the college.
- The fee of \$200, payable to the College of Lake County Foundation, is tax deductible.
- The fee pays for a 1.5-2” caliper tree (or equivalent) and supports the costs of purchasing, planting, and maintaining the tree. The fee also includes a metal tag with identifying information, if desired.
- Exceptions to any of these specifications will require additional review and approval.
- While the college does everything that it can to protect its trees, the permanence of any donated trees cannot be guaranteed beyond one year.

Procedure:

- Individuals or groups wishing to donate a tree should first contact the College of Lake County Facilities Department at 847/543-2080.
- The donor should complete the form found in Appendix G to proceed with the tree donation.
- The donation must meet the specifications identified above.

Grounds Management Staffing

The College of Lake County Grounds and Fleet Department (Grounds) is housed within Facilities in Administrative Affairs. The Supervising Engineer manages one lead and a crew of four to six grounds persons and one to two student workers.

According to the CLC job description, the duties for grounds persons include the following responsibilities:

- Maintain the exterior of the College, including lawn mowing, cultivating flowers and trees, seeding and spraying.
- Repair and maintain college vehicles, including repairing/rebuilding engines as needed.
- Repair and maintain equipment such as lawnmowers, tractors, sprayers, etc.
- Perform all snow removal on campus and the adjoining highways.
- Prepare the athletic fields, including painting the dug-outs and striping the fields.
- Build equipment as needed such as picnic benches, barricades, etc.
- Repair roadways as necessary.
- Assist with the maintenance of the prairie area as needed.
- Transport heavy equipment for other departments as needed.
- Follow all institution and regulatory policies, procedures and standards. Utilize self-appraisal to determine progress in meeting performance management system objectives and career goals.
- Perform other related duties as assigned.

All grounds persons are required to have experience in a wide variety of areas including mechanical repairs, basic carpentry, and grounds care and maintenance. Grounds persons are also required to obtain a valid class “C” CDL driver’s license and a State of Illinois pesticide applicator license.

In its “Operational Guidelines for Educational Facilities: Grounds,” (2011) APPA asserts that there is no way to set a guideline for how grounds departments should be structured, given the vast differences in climate, horticulture, urbanization, population, and size of institutions across the country and even within one region. This assertion includes their reluctance to prescribe a number of staff per acre of landscaped land.

However, APPA describes neglected landscaping as being the result of having insufficient staff available to care and maintain a standard level of maintenance. CLC’s 2016 tree survey reveals that many of the over 900 trees in the landscaped areas of the Grayslake Campus are in need of basic maintenance and care. The woodlands on the southeast side of the Grayslake Campus and in the south parcel of the Southlake Campus require much care to remove dead trees and species including European buckthorn (*Rhamnus*), honeysuckle (*Lonicera*), and garlic mustard (*Alliaria petiolata*). The prairies and wetlands are at risk from encroaching common reed (*Phragmites*) and purple loosestrife (*Lythrum*) species. (<https://fama.uark.edu/resources/documents/appa-grounds-staffing-guidelines.pdf> downloaded 6/21/17)

CLC has planted various native plant gardens in support of the Sustainability Plan. As noted in various locations throughout this Landscape Management Plan, these native plantings will require less maintenance, only if tended to with proper weeding to give the new plants room to grow and fill the space. CLC stakeholders often complain of the “weedy” appearance of these plantings in this high visibility location. The Grounds staff and student workers do perform some weeding as they are available but often that means that garden beds can be left untended over the crucial summer growing months. CLC has installed 2,150 linear feet of bioswales over FY 2016-17. The bioswales will require much attention to make sure that they are maintained weed-free so that the native plants can thrive and

do their job to treat stormwater runoff from the parking lots before entering Willow Lake and the Mill Creek Watershed. See Appendix N for the Bioswale Operations and Management guidelines.

According to FM Link, an online facilities management resource, the average grounds keeping costs are \$3,405 per acre for commercial grounds. (<http://fmlink.com/articles/benchmarking-your-groundslandscaping-2/> downloaded 6/20/17) In FY 2016, the CLC Grounds Department budgeted \$1,465.00 per acre for grounds staff for the 185 acres of landscaped land on the Grayslake Campus. CLC's grounds staff also maintain the plantings in the Madison St. Plaza and the 0.6 acres of turf area at 100 West Madison St. on the Lakeshore Campus. Three full time facilities staff members maintain landscapes and interior facilities at the Southlake Campus.

RECOMMENDATIONS: CLC should demonstrate its educational, environmental, and financial investments in its landscaping, if it truly values the resources on its campuses as a living laboratory of sustainability. Expanded landscape features such as bioswales and native plantings require more weeding maintenance in the first couple of years, but then less work as they get established, but only if they get tended to properly.

- 1) One strategy would be for the college to create a position within the Grounds Department for a Horticultural Specialist/Arborist, with a dedicated workload of tending to trees, shrubs, native plantings, and natural areas. This position would be similar to the Naturalist position created by Oakton Community College, with some limited flexibility to assist the Grounds Department with other routine tasks.
- 2) Another strategy would be to enhance the specialized care of campus landscapes would be to develop different pay grades, opportunities for grounds persons to increase their pay for advancing their learning and skills. The job descriptions would identify the specific training and skills required to perform corresponding tasks. Higher level grounds staff positions would be responsible for performing tree care and management of natural areas.
- 3) Lastly, if staffing levels are not sufficiently expanded consultants should be contracted to perform the seasonal natural areas management tasks of prescribed burns, herbicide application, and eradication of invasive species and also to maintain the bioswales and butterfly prairie gardens.

Integrated Pest Management Plan

Integrated Pest Management (IPM) is a broad-based approach that integrates a broad range of practices for the control of pests, rather than their eradication. IPM programs first work to establish acceptable pest levels, called action thresholds, the point when pests cause economic or unacceptable aesthetic injury. In landscaping, pests include weeds, plant diseases, insects, and more. Threshold levels depend on a variety of conditions, ranging from site conditions to plant species to pest types to the types of interventions being considered. Threshold levels give landscape managers the space to evaluate if those thresholds are being crossed without posing a hazard to humans, domestic animals, or other non-target life forms.

The United Nations Food and Agriculture Organization defines IPM as "the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms."

The US EPA recommends that schools use IPM - a Smart, Sensible and Sustainable approach to pest control:

- Smart because IPM creates a safer and healthier learning environment by managing pests and reducing children's exposure to pests and pesticides.
- Sensible since practical strategies are used to reduce sources of food, water and shelter for pests in school buildings and grounds.
- Sustainable because the emphasis is on prevention, which makes it an economically advantageous approach.

Elimination of pesticides that contain neonicotinoids is an example of an IPM strategy to avoid non-target species such as native and honey bees. CLC works to reduce and eliminate where possible pesticides, focusing rather on prevention of disease and treating the cause with cultural, manual, biological methods of control.

Integrated Pest Management (IPM) focuses on a systematic assessment of conditions contributing to pest development. In landscaping, IPM strategies carefully assess conditions that foster the development of pests to the level of economic or aesthetic injury. Prevention of pests is the goal rather than their eradication. The needs of the site are first considered, then the appropriateness of the plant species, cultural practices, and then the possibility of pesticide application. Pesticide application is a last resort rather than a routine maintenance task, as is typical of traditional pest management strategies. See how IPM turns traditional approaches upside down in Figures 1 and 2 below.

Figure 1. Traditional Pest Management

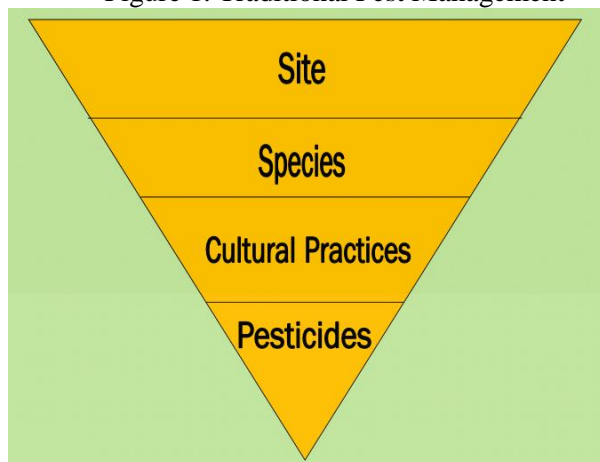
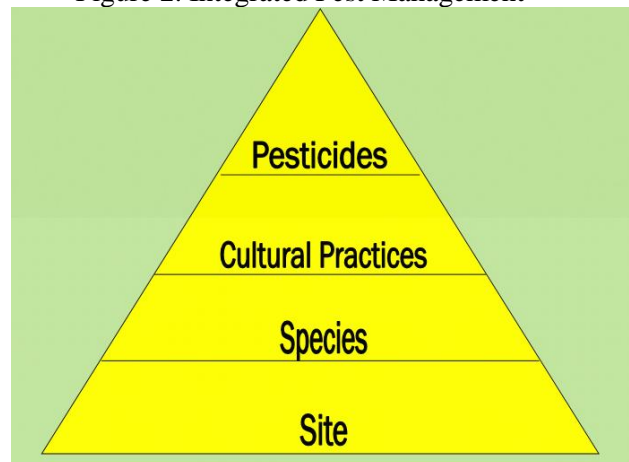


Figure 2. Integrated Pest Management



This Integrated Management Plan also takes a four-tier approach to sustainable management of campus grounds. Breaking down pest management into four tiers helps grounds crews and landscapers to develop IPM strategies, beginning with an evaluation of the overall landscape context before implementing cultural or chemical interventions.

Tier 1: Thresholds based on Site Specifics

Beginning with an assessment of the conditions and needs of the site first, allows for careful planning of interventions. Again, thresholds are limits of pest involvement that impact economic and significant aesthetic interests.

Thresholds are site specific. For example, it may not be acceptable to have dandelions growing along Lancer Lane or at the entrances to the College of Lake County, but weeds can be tolerated in lawn areas set back from direct view. For that reason CLC has developed areas of high, medium, and low maintenance zones.

Tier 2: Monitor Pests and Identify Host Species:

When diseases, insects, or other pests are identified, it is important to evaluate what plant species are hosting such pests. Some species are prone to disease. Rather than continually apply pesticides to maintain pests below acceptable thresholds other species should be considered that do not readily host such pests.

For example, the crabapple trees in lawn by the PE Center have significant cultural value during spring graduation, but they are prone to scab. For them to look presentable they require regular spraying. The trees are aging and may be approaching the time for replacement. A key IPM consideration is choosing a flowering tree that looks beautiful in mid-May, but is not susceptible to disease.

Correct pest identification is required to determine the best preventive measures and reduce the unnecessary use of pesticides. Additionally, correct identification will prevent the elimination of beneficial organisms. When monitoring for pests, maintain records for each building detailing: monitoring techniques, location, and inspection schedule.

Grounds team staff are trained in horticulture to identify and monitor a variety of pests and other problems. The college consults with the Illinois Farm Bureau for up-to-date pest identification and management strategies.

Tier-3: Prevention through Cultural Methods

Cultural methods of intervention include physical landscaping maintenance tasks, including: mowing, irrigation, coring, pruning, and mulching. For example, avoiding over-irrigation and improving drainage can help prevent fungal infections in turf grass and improve health and vigor, along with coring and compost application.

Pruning damaged trees helps the tree to heal correctly and to minimize opportunities for disease to infest the tree. Broken or rubbing branches, narrow crotched limbs, competing leaders are examples of ways to prevent breakage and opportunities for disease in trees. Cleaning pruning shears can also help prevent spread of infections from one tree or shrub to others.

Preventative maintenance occurs regularly in natural areas including cut-back of invasive species before the set seed. High mowing of areas where native seed is germinating and getting established. When weeds are present, mowing helps the natives to have access to sunlight and room to grow, as they may require more time in the spring to get established and eventually out-compete the weeds.

Tier-4: Methods of Control

If a pest reaches an unacceptable threshold, mechanical methods should be first considered. Mechanical methods include simple hand-picking, barriers, traps, vacuuming and tillage to disrupt breeding. Biological controls include natural biological processes and materials. Biological controls can include the promotion of beneficial insects that

eat or parasitize target pests. Mechanical and biological controls can be very effective, while minimizing any negative environmental impacts or excessive expense.

Pesticide application is an acceptable form of chemical control for pests, but comes as a last resort, rather than as a first approach. After careful evaluation of the site, the pest and host species, and past prevention methods, pesticide application may be necessary to keep pest levels within the acceptable threshold. Pesticides are applied in a targeted manner, where and when it can be most effective. This approach is quite different from the “shotgun” approach where pesticides are applied broadly and risk overexposure.

IPM is not a single pest control method but rather involves integrating multiple control methods based on site information obtained through inspection, monitoring, and reports. Consequently, every IPM program is based on the needs of the site conditions, plant species, and thresholds of pest tolerance.



Sustainable Campus Farm

The College of Lake County hosts its own Campus Farm on the Grayslake Campus. The Campus Farm encompasses almost 27,000 square feet of farm fields, including areas for community garden and campus production. The farm includes two 3,500 square foot hoop houses for season extension and stalls for processing compost. The Campus Farm contracts with Fresh Ideas to grow a variety of leafy greens and vegetables. The food service provider prepares these homegrown ingredients for salads and incorporates them into dishes served at the Café Willow on campus.

The farm coordinator is hired on a part-time basis to manage the crops grown and processed on campus. He also manages the community garden and student volunteers. Potential plans are being discussed for the area northeast of the current campus farm to be developed as a community learning resource. This area will have easy access from US Rte. 45. It is hoped that as the program grows he will be able to be hired full time and a part-time coordinator will be able to manage group visits and the community garden.

The campus apiary hosts a variety of hives just north of the horticulture building. The apiary began as an independent study by a horticulture student working with the department chair and a maintenance engineer who also volunteers as the campus beekeeper. A volunteer program is being developed to assign ongoing responsibilities. Honey harvested from these hives are available in the café and also sold in the campus store.



-  Apiary
-  Sustainable Farm and Horticulture Buildings

The Living Lab Trail



CLC HVAC students meeting with geothermal well drill team

With the building out its Sustainable Master Plan, the College of Lake County boasts its new and renovated buildings designed to USGBC LEED Silver and Platinum standards, with new geothermal well fields, and sustainable landscapes and restored natural areas. These new sustainable features provide excellent educational opportunities for CLC students and community members. By connecting these elements along a Living Lab Trail, students, faculty, staff, and other visitors will be encouraged to explore the benefits of sustainable technology, restored ecological systems, our diverse populations, and opportunities for wellness as well.

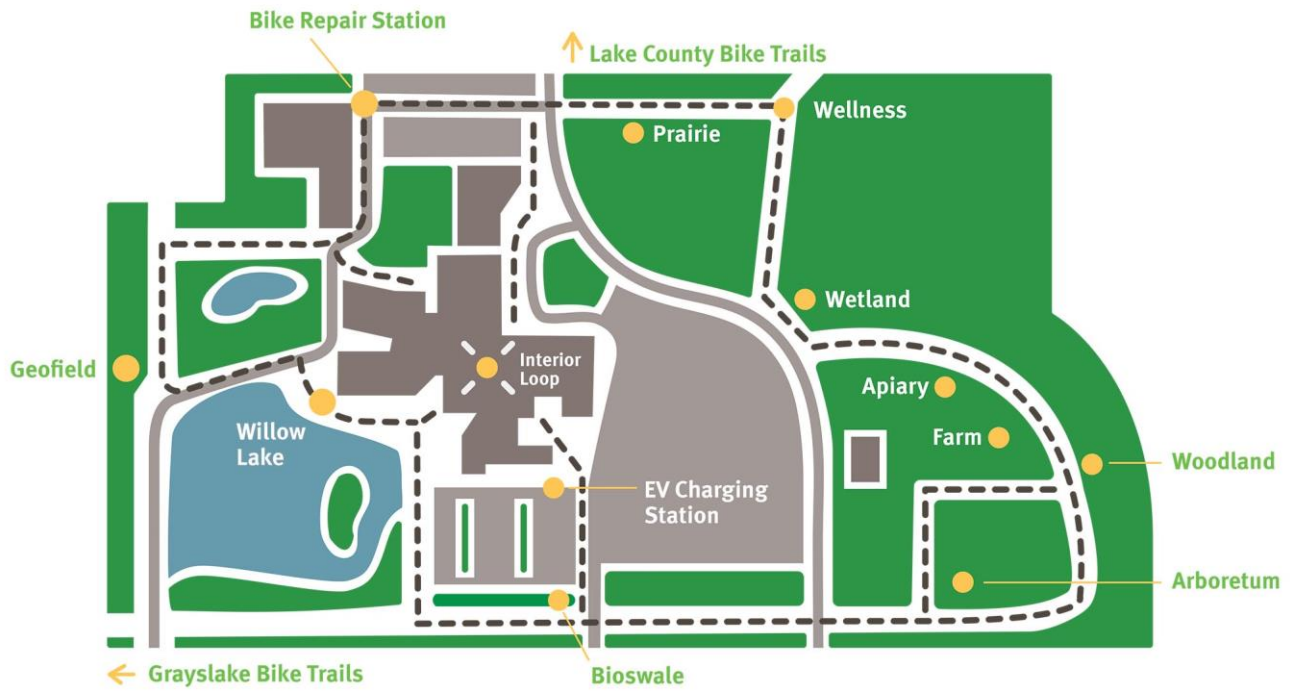
The Living Lab Trail will highlight the college sustainable landscape management practices across the campus grounds, eventually on all three campuses. Trail signage will identify prairie and wetland restoration areas, bioswales on parking lots to manage stormwater runoff, benefits of native plants and associated fauna, and the college apiary, sustainable farm, and arboretum. The trail may also identify the college's integrated pest management strategies.

With a \$10,000 Green Genome award from the AACC SEED Center in 2016, CLC is developing interpretive signage to help in identifying the trail routes and sustainable features across campus. Signage will educate visitors about features such as the geothermal, solar photovoltaic, and solar thermal renewable energy systems and also the restored prairie and wetlands, the sustainable farm, apiary, and campus arboretum. CLC will seek involvement from students to develop language and aspects of design for the signage. CLC will evaluate the possibility of hiring a design firm to develop a comprehensive scheme with images to complement the narrative information. Once designed, the signs will need to be printed, mounted, and installed along the trail. CLC will evaluate developing on-line applications, trail guide pamphlets and/or phone apps to enhance the impact of the trail, both on and off-campus.

Lake County is developing its regional bicycle and walking trail system, integrating resources from its forest preserves, state parks, park districts, schools, and public rights of way across the county. The Grayslake Campus is located in the center of the county and is participating in this connection. In 2013, CLC worked with the Village of Grayslake to connect a neighborhood to its northeast with its trails and a pre-existing connection to the rest of the village's trail system. In 2015, the Lake County Division of Transportation worked with CLC to construct a multi-use trail connecting the campus to the nearby [Lake County Forest Preserve Trails](#) at Rollins Savanna and the countywide Millennium Trail.

The Living Lab Trail will play a significant role in highlighting features across the campus and grounds, educating students and visitors about the benefits of sustainability and green job opportunities, connect our Living Laboratory with the rest of the county.

Living Lab Trail

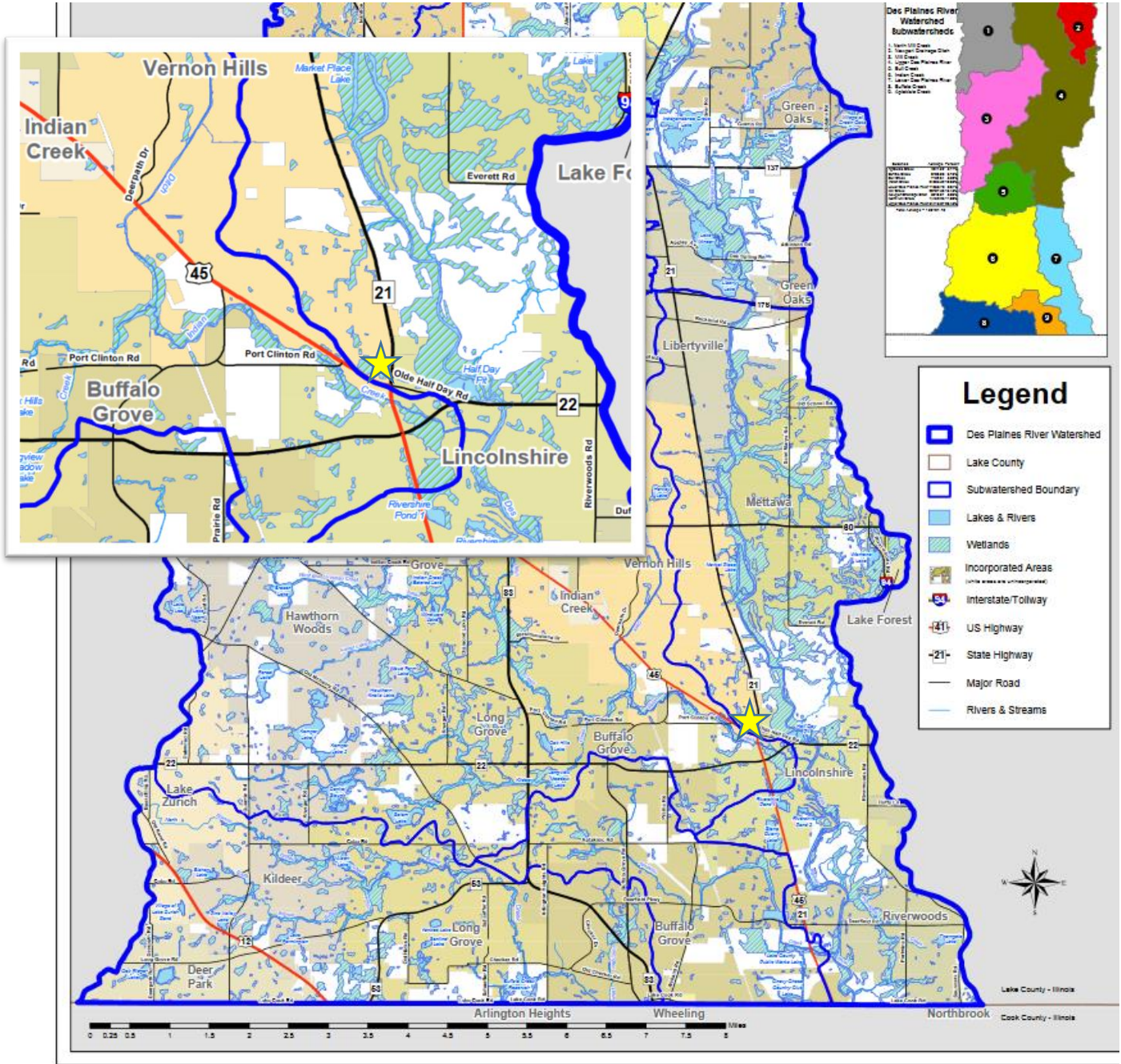


Appendix A: Groundcover and Land Use Table (2017)

Groundcover	Acres by Campus		
	Grayslake	Southlake	Lakeshore
Buildings	11.3	1.0	1.0
Parking Lots	31.7	4.4	1.0
Roads	18.5		
Turf Grass	88.7	4.7	0.8
Sport Fields	16.4		
Arboretum	6.9		
Farm	1.5		
Wetlands	32.7	1.9	
Woodland	5.8	4.9	
Prairie	8.6		
Grassland	12.1		
Willow Lake and Ponds	13.7	1.9	
Gages Lake	16.6		
Campus Sums	264.4	18.9	2.8
TOTAL Acres	286.2		

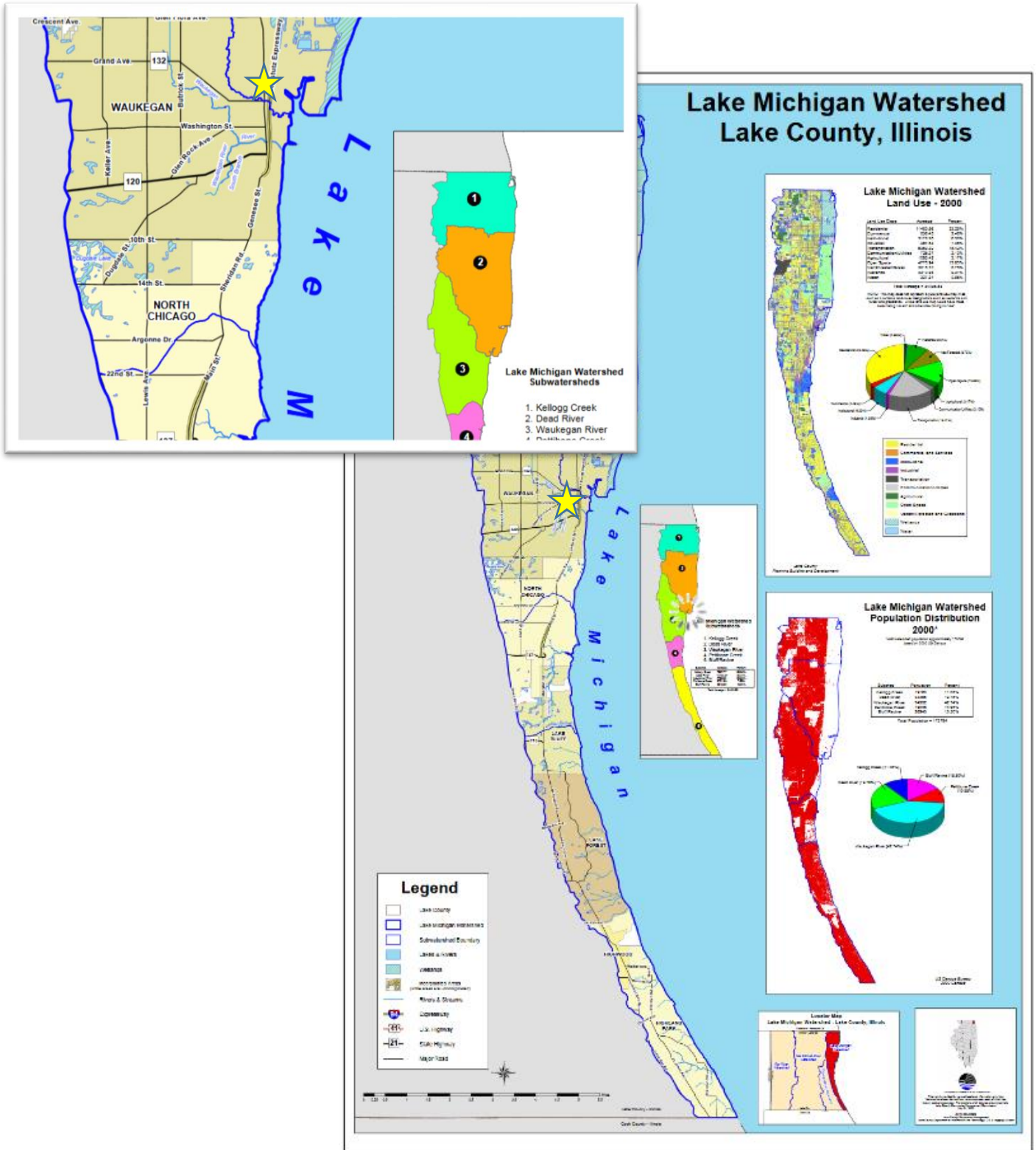
Southlake Campus –
Lower Des Plaines and Indian Creek
subwatersheds

**Des Plaines River
Watershed
Lake County, Illinois**



<http://www.lakecountyil.gov/2376/Des-Plaines-River-Watershed>

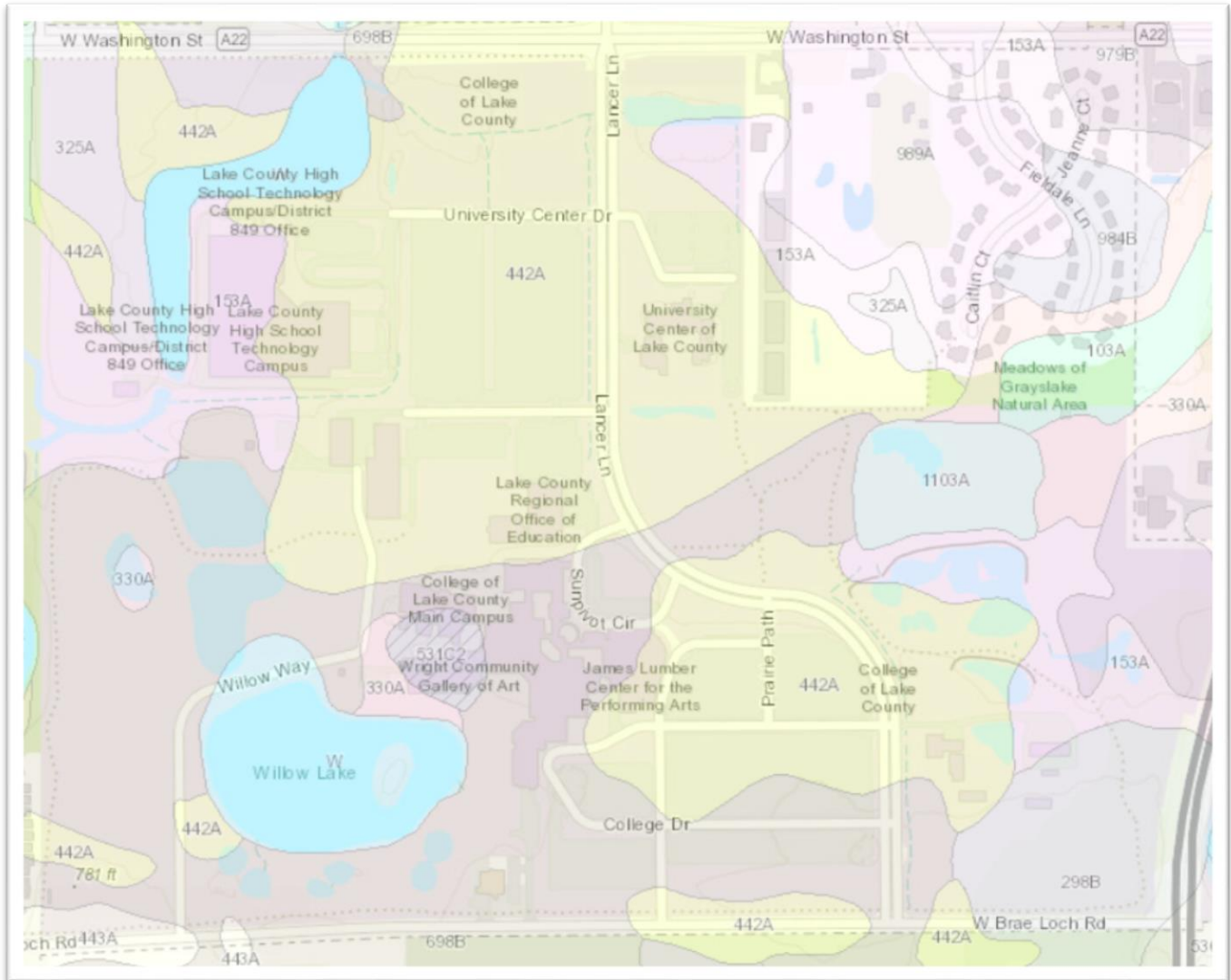
Lakeshore Campus – Lake Michigan Watershed and Waukegan River Subwatershed



<http://www.lakecountyil.gov/2418/Lake-Michigan-Watershed>

Appendix C: Soil Maps and Related CLC Campuses

Grayslake Campus – Soils Map



Yellow: 442A—Mundelein silt loam, 0 to 2 percent slopes

Grey: 698B—Grays silt loam, 2 to 4 percent slopes

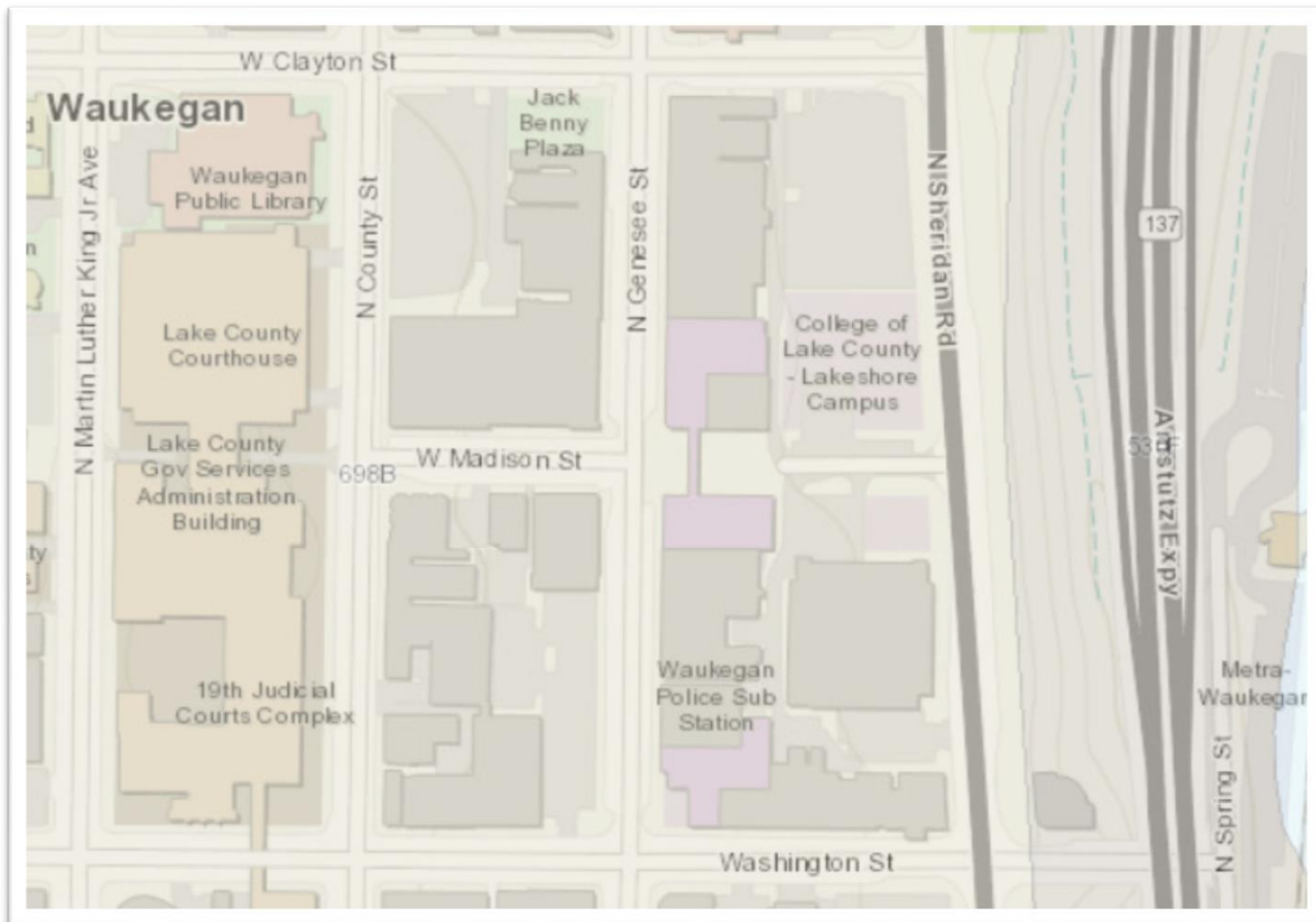
Hashed Grey: 531C2—Markham silt loam, 4 to 6 percent slopes, eroded

Southlake Campus – Soils Map



Yellow: 442A—Mundelein silt loam, 0 to 2 percent slopes
Purple: 153A—Pella silty clay loam, 0 to 2 percent slopes
Peach: 330A—Peotone silty clay loam, 0 to 2 percent slopes

Lakeshore Campus – Soils Map



Grey: 698B—Grays silt loam, 2 to 4 percent slopes

Appendix D: APPA Levels of Attention for Grounds Management

APPA: The Association of Higher Education Facilities Officers has quantified workload measures into five standardized 'levels of attention.'

LEVEL 1

State-of-the-art maintenance applied to a high-quality diverse landscape. Associated with high-traffic urban area, such as public squares, malls, government grounds, or college/university campuses.

- **Turf Care:** Grass mowed according to species and variety, at least once every 5 days, as often as every 3 days. Aeration required not less than 4 times per year. Reseeding as needed. Weed control to no more than 1% of surface.
- **Fertilizer:** Adequate fertilizer applied to plant species according to their optimum requirements.
- **Irrigation:** Sprinkler irrigated by electronic automatic controls. Frequency follows rain fall, temperature, season length and demands of individual plant species.
- **Litter Control:** Minimum of once per day, seven days per week. No overflowing receptacles.
- **Pruning:** Frequency dictated by species, length of growing season, design concept also a controlling factor i.e., using clipped method vs. natural-style hedges.
- **Disease and Pest:** Controlling objective to anticipate and avoid public awareness of any problem.
- **Surfaces:** Sweeping and cleaning frequency as such that at no time does accumulation of debris distract from look or safety of the area.
- **Repairs:** Done immediately when problems are discovered.
- **Inspections:** A staff member to conduct inspections daily.

LEVEL 2

High-level maintenance. Associated with well-developed public areas, malls, government grounds, or college/university campuses. Recommended level for most organizations.

- **Turf Care:** Grass cut once every 5 days. Aeration required no less than 2 times per year. Reseeding when spots are present. Weed control to no more than 5% of surface.
- **Fertilizer:** Adequate fertilizer level to ensure all plants are healthy and growing vigorously.
- **Irrigation:** Sprinkler irrigated by electronic automatic controls. Frequency follows rain fall, temperature, season length and demands of individual plant species.
- **Litter Control:** Minimum of one per day, 5 days per week. Accumulation depends on size of container available to public.
- **Pruning:** Usually done at least once per season, species planted may dictate more frequent attention.
- **Disease and Pest Control:** Done when disease or pest are inflicting noticeable damage or reducing vigorous plant material growth.
- **Surfaces:** Should be kept clean, repaired or replaced when their condition has noticeable deterioration.
- **Repairs:** Done whenever safety, function or appearance is in question.
- **Inspections:** A staff member to conduct inspections daily when regular staff is scheduled.

LEVEL 3

Moderate-level maintenance. Associated with locations that have moderate to low levels of development or visitation, or with operations that, because of budget restrictions, cannot afford a high level of maintenance.

- **Turf Care:** Grass cut at least once every 10 days. Normally not aerated unless turf indicates need. Reseeding done only when major bare spots appear. Weed control to no more than 15% of surface.
- **Fertilizer:** Applied only when plant vigor seems to be low. Low-level application done once per year.

- **Irrigation:** Depends on climate. Areas with more than 25 inches per year rely on natural rainfall. Areas with less than 25 inches per year have some form of supplemental irrigation, normally 2 to 3 times per week.
- **Litter Control:** Minimum service of 2 to 3 times per week.
- **Pruning:** When required for health of reasonable appearance.
- **Disease and Pest Control:** Done only to address epidemics or serious complaints.
- **Surfaces:** Cleaned on complaint basis. Repaired or replaced as budget allows.
- **Repairs:** Done whenever safety or function is in question.
- **Inspections:** Inspections are conducted once per week.

LEVEL 4

Moderate to low-level maintenance. Associated with locations affected by budget restrictions that cannot afford a high level of maintenance.

- **Turf Care:** Low-frequency mowing schedule based on species. Low growing grasses may not be mowed, high grasses receive periodic mowing. Weed control limited to legal requirements for noxious weeds.
- **Fertilizer:** No fertilization.
- **Irrigation:** No irrigation.
- **Litter Control:** Once per week or less, complaints may increase level above one servicing.
- **Pruning:** No regular trimming. Safety or damage from weather may dictate actual work schedule.
- **Disease and Pest Control:** None, except where the problem is epidemic and epidemic conditions threaten resources or the public.
- **Surfaces:** Replaced or repaired when safety is a concern and budget is available.
- **Repairs:** Done whenever safety or function is in question.
- **Inspections:** Conducted once per month.

LEVEL 5

Minimum-level maintenance. Associated with locations that have severe budget restrictions.

- **Turf Care:** Low-frequency mowing schedule based on species. Low growing grasses may not be mowed, high grasses receive periodic mowing. Weed control limited to legal requirements for noxious weeds.
- **Fertilizer:** No fertilization.
- **Irrigation:** No irrigation.
- **Litter Control:** On demand or complaint basis.
- **Pruning:** No pruning unless safety is involved.
- **Disease and Pest Control:** No control except in epidemic or safety situations.
- **Surfaces:** Serviced only when safety is a consideration.
- **Repairs:** Done whenever safety or function is in question.
- **Inspections:** Inspections are conducted once per month.

LEVEL 6

Natural area that is not developed.

- **No maintenance** unless there is a complaint or safety concern
- **Inspections:** Inspections are conducted once per month.

Appendix E: Preferred Forbs and Graminoids and Seeding Rates

Plant species installed on the College of Lake County campuses should include perennials that are indigenous to Lake County and to the northeastern Illinois region. Forbs include flowering herbaceous plants with broad leaves while graminoids include grasses, sedges, and rushes with narrow leaves. Implementing native flowers will reduce the need for fertilizers and pesticides, which benefit pollinators and other lepidoptera. Many native and sustainable species can be adaptable to formal plantings, while others would be best be suited to natural settings.

Planting to reinforce native woodland and shady savanna areas would benefit from the planting of plugs. The following list identifies forbs and graminoids native to Lake County that would serve both restoration and ornamental purposes.

Forbs and Graminoids – Part Sun to Shade, Medium to Moist Soils

• <i>Anemone canadensis</i> – Canada Anemone	• <i>Elymus hystrix</i> – Bottlebrush Grass
• <i>Asarum canadense</i> – Wild Ginger	• <i>Eutrochium purpureum</i> – Joe Pye Weed
• <i>Carex grayii</i> – Gray’s Sedge	• <i>Geranium maculatum</i> – Wild Geranium
• <i>Carex pennsylvatica</i> – Penn Sedge	• <i>Phlox divaricata</i> – Woodland Phlox
• <i>Carex rosea</i> – Curly-Styled Wood Sedge	• <i>Solidago flexicaulis</i> – Zig Zag Goldenrod

Prairie and Savanna

Habitat restoration and ornamental planting in sunny to part-sun locations on all three campuses would benefit from the plants identified below. The plant lists below provide a palette of preferred species separated by their soil moisture preferences for either dry-mesic or wet-mesic conditions. Each plant has seed specifications for rates of de novo seeding and overseeding. The amount of bulk seed identified shall be equivalent to the full weight of Pure Live Seed (PLS) calculated to 98.50% purity and 90.00% germination rates.

Overseeding Procedures

Sites to be overseeded must be properly prepared. Weeds will need to have been sufficiently treated with a regimen of prescribed burn, herbicide application, and/or mow prior to initiation of seeding. The areas to be seeded shall be mowed to a maximum height of three inches immediately prior to overseeding. Overseeding shall be accomplished by Truax style no-till seed drill, or equivalent equipment, to uniformly drill highly diverse native grasses and forb seed, or other method as approved by the Project Manager. Broadcast method may only be used for small or exceptionally difficult areas, with approval of Project Manager. Such broadcast seeded areas shall be lightly raked to provide a thin soil covering and rolled at right angles to the runoff with an approved type roller or cultipacker to compact the seedbed and place the seed in contact with the soil. All areas shall be seeded in at least two directions or with equipment that drops seed randomly rather than in rows. Seed cover shall be ¼ inch.

See also Appendix N-1 for a list of plants to be used in the bioswales. See Appendix I for information about Bee Campus USA. Plants are identified below by their preferred habitat conditions, in terms of amount of sun and soil moisture.

Forbs and Graminoids – Dry Mesic Prairie:

Botanical Name	Common Name	seeds/lb	de Novo seeds/ac	Overseed seeds/ac
<i>Allium cernuum</i>	Nodding Onion	128,000	16,000	8,000
<i>Amorpha canescens</i>	Leadplant	310,000	38,750	19,375
<i>Anemone cylindrica</i>	Thimbleweed	500,000	31,500	15,750
<i>Asclepias tuberosa</i>	Butterfly Weed	88,000	22,000	11,000
<i>Asclepias verticillata</i>	Whorled Milkweed	200,000	25,000	12,500
<i>Bouteloua curtipendula</i>	Side Oats Gramma	105,000	210,000	105,000
<i>Carex Bicknellii</i>	Bicknells Sedge	445,000	55,625	27,813
<i>Carex brevior</i>	Shorter Sedge	430,000	53,750	26,875
<i>Chamaecrista fasciculata</i>	Partridge Pea	55,000	27,500	13,750
<i>Coreopsis lanceolata</i>	Lanceleaf Coreopsis	190,000	95,000	47,500
<i>Dalea purpurea</i>	Purple Prairie Clover	300,000	18,900	9,450
<i>Drymocallis arguta</i>	Prairie Cinquefoil	3,200,000	99,200	49,600
<i>Echinacea pallida</i>	Pale Purple Coneflower	100,000	12,500	6,250
<i>Echinacea purpurea</i>	Purple Coneflower	115,000	57,500	28,750
<i>Elymus virginicus</i>	Virginia Wild Rye	92,000	92,000	46,000
<i>Eryngium yuccifolium</i>	Rattlesnake Master	142,000	17,750	8,875
<i>Heliopsis helianthoides</i>	Early Sunflower	110,000	13,750	6,875
<i>Lespedeza capitata</i>	Roundhead Bushclover	175,000	10,850	5,425
<i>Liatris aspera</i>	Blazing Star	248,000	15,376	7,688
<i>Monarda fistulosa</i>	Wild Bergamot	1,120,000	16,800	8,400
<i>Parthenium integrifolium</i>	Wild Quinine	200,000	25,000	12,500
<i>Penstemon digitalis</i>	Foxglove Beardtongue	1,800,000	27,000	13,500
<i>Rudbeckia subtomentosa</i>	Sweet Black Eyed Susan	740,000	11,100	5,550
<i>Schizachyrium scoparium</i>	Little Bluestem	250,000	250,000	125,000
<i>Silphium integrifolium</i>	Rosinweed	30,000	7,500	3,750
<i>Symphyotrichum laeve</i>	Smooth Aster	1,100,000	69,300	34,650
<i>Symphyotrichum oolentangiense</i>	Sky Blue Aster	1,400,000	88,200	44,100
<i>Tradescantia ohiensis</i>	Ohio Spiderwort	146,000	9,198	4,599
<i>Verbena stricta</i>	Hoary Vervain	530,000	66,250	33,125
<i>Zizia aurea</i>	Golden Alexander	200,000	12,600	6,300

Forbs and Graminoids – Wet Mesic Prairie Wetland Mix:

Botanical Name	Common Name	seeds/lb	de Novo seeds/ac	Overseed seeds/ac
<i>Acorus americanus</i>	Sweet Flag	111,000	13,875	6,938
<i>Asclepias incarnata</i>	Marsh Milkweed	90,000	22,500	11,250
<i>Bidens frondosa</i>	Common Beggarstick	84,000	10,500	5,250
<i>Boltonia asteroides</i>	False Aster	4,450,000	66,750	33,375
<i>Carex bebbii</i>	Bebbs Sedge	1,800,000	113,400	56,700
<i>Carex scoparia</i>	Pointed Broom Sedge	1,400,000	175,000	87,500
<i>Carex vulpinoidea</i>	Fox Sedge	1,555,000	194,375	97,188
<i>Elymus virginicus</i>	Virginia Wild Rye	92,000	92,000	46,000
<i>Eutrochium perfoliatum</i>	Common Boneset	3,150,000	47,250	23,625
<i>Glyceria striata</i>	Fowl Manna Grass	2,450,000	154,350	77,175
<i>Iris virginica shrevei</i>	Blue Flag Iris	17,000	4,250	2,125
<i>Juncus tenuis</i>	Slender Rush	48,000,000	720,000	360,000
<i>Juncus torreyi</i>	Torreys Rush	38,000,000	570,000	285,000
<i>Liatris pycnostachya</i>	Prairie Blazing Star	164,000	51,332	25,666
<i>Lobelia siphilitica</i>	Great Blue Lobelia	11,000,000	165,000	82,500
<i>Oligoneuron riddellii</i>	Riddells Goldenrod	1,900,000	58,900	29,450
<i>Physostegia virginiana</i>	Obedient Plant	231,000	28,875	14,438
<i>Pycnanthemum virg.</i>	Mountain Mint	4,500,000	67,500	33,750
<i>Ratibida pinnata</i>	Yellow Coneflower	510,000	63,750	31,875
<i>Sagittaria latifolia</i>	Common Arrowhead	1,200,000	37,200	18,600
<i>Schoenoplectus pungens</i>	Chairmakers Rush	225,000	28,125	14,063
<i>Symphotrichum nov. ang.</i>	New England Aster	1,400,000	43,400	21,700
<i>Verbena hastata</i>	Blue Vervain	1,800,000	55,800	27,900
<i>Vernonia fasciculata</i>	Ironweed	470,000	58,750	29,375
<i>Veronicastrum virginicum</i>	Culvers Root	14,000,000	210,000	105,000
<i>Zizia aurea</i>	Golden Alexander	200,000	25,000	12,500

Appendix F: Palette of Recommended Trees and Shrubs

Canopy Trees:

Native	Street	Botanic – Common Name	Habitat
Illinois	Yes	<i>Acer nigrum</i> – Black Maple	(Full to Part Sun/Medium Moisture)
Lake		<i>Acer saccharum</i> – Sugar Maple	(Full to Part Sun/Medium Moisture)
Lake	Yes	<i>Aescalus glabra</i> – Ohio Buckeye	(Full Sun to Part Shade/Medium Moisture)
Illinois		<i>Betula nigra</i> – River Birch	(Full Sun to Part Shade/Medium to Wet)
Lake		<i>Carpinus caroliniana</i> – American Hornbeam	(Full to Part Shade/Medium Moisture)
Lake	Yes	<i>Carya cordiformis</i> – Bitternut Hickory	(Full Sun to Part Shade/Medium to Wet)
Illinois		<i>Carya illinoensis</i> – Pecan	(Full Sun to Part Shade/Medium Moisture)
Lake	Yes	<i>Carya glabra</i> – Pignut Hickory	(Full Sun to Part Shade/Medium Moisture)
Lake		<i>Catalpa speciosa</i> – Northern Catalpa	(Full Sun to Part Shade/Medium to Wet)
Lake	Yes	<i>Celtis occidentalis</i> – Hackberry	(Full Sun to Part Shade/Medium to Wet)
Lake		<i>Crataegus coccinea</i> – Scarlet Hawthorn	(Full Sun/Medium Moisture)
Lake	Yes	<i>Crataegus crus-galli</i> – Cockspur Hawthorn	(Full to Part Sun/Well Drained)
Lake		<i>Crataegus mollis</i> – Downy Hawthorn	(Full Sun to Part Shade/Medium Moisture)
Illinois	Yes	<i>Gymnocladus dioica</i> – Kentucky Coffeetree	(Full Sun/Medium Moisture)
Lake		<i>Juglans cinerea</i> – Butternut/White Walnut	(Full to Part Sun/Medium Moisture)
Lake	Yes	<i>Juglans nigra</i> – Black Walnut	(Full Sun/Medium Moisture)
Illinois		<i>Larix laricina</i> – Tamarack	(Full Sun/Medium Moisture to Wet)
Illinois		<i>Liquidambar styraciflua</i> – Sweet Gum	(Full Sun/Medium Moisture)
Illinois	Yes	<i>Nyssa sylvatica</i> – Tupelo/Sour Gum	(Full Sun/Medium Moisture)
Lake	Yes	<i>Ostrya virginiana</i> – Ironwood	(Full to Part Sun/Medium Moisture)
Lake		<i>Pinus strobus</i> – Eastern White Pine	(Full to Part Sun/Medium Moisture)
Lake	Yes	<i>Platanus occidentalis</i> – Sycamore	(Full to Part Sun/Medium to Wet)

Lake		<i>Prunus serotina</i> – Black Cherry	(Full Sun/Dry to Medium)
Lake	Yes	<i>Quercus alba</i> – White Oak	(Full Sun/Medium Moisture)
Lake	Yes	<i>Quercus bicolor</i> – Swamp White Oak	(Full Sun/Medium to Wet)
Lake	Yes	<i>Quercus macrocarpa</i> – Burr Oak	(Full Sun/Medium Moisture)
Lake		<i>Quercus muehlenbergii</i> – Chinquapin Oak	(Full to Part Sun/Medium Moisture)
Lake	Yes	<i>Quercus rubra</i> – Northern Red Oak	(Full to Part Sun/Medium Moisture)
Illinois		<i>Taxodium distichum</i> – Bald Cypress	(Full Sun/Wet)
Lake	Yes	<i>Tilia americana</i> - Am. Basswood/ Linden	(Full Sun to Part Shade/Medium Moisture)

Understory/Ornamental Trees:

Lake		<i>Amelanchier arborea</i> – Serviceberry	(Part Sun/Medium Moisture)
Lake		<i>Amelanchier laevis</i> – Allegheny Shadblow	(Part Sun/Medium Moisture)
Illinois		<i>Cercis canadensis</i> – Red Bud	(Full to Part Sun/Medium Moisture)
Lake		<i>Cornus alternifolia</i> – Pagoda Dogwood	(Full Sun to Part Shade/Medium Moisture)
Lake		<i>Hamamelis virginiana</i> – Witch Hazel	(Full Sun to Part Shade/Medium Moisture)
Lake		<i>Prunus americana</i> – American Plum	(Full Sun/Dry to Medium)
Lake		<i>Prunus pumila</i> – Sand Cherry	(Full to Part Sun/Medium Moisture)
Lake		<i>Prunus virginiana</i> – Chokecherry	(Full Sun to Part Shade/Medium Moisture)

Shrubs:

- *Aronia arbutifolia* - Red Chokeberry (Full Sun to Part Shade/Medium to Wet)
- *Aronia melanocarpa* – Black Chokeberry (Full Sun to Part Shade/Medium to Wet)
- *Amorpha canescens* – Lead Plant (Full Sun to Part Shade/Dry to Medium)
- *Ceanothus americanus* – New Jersey Tea (Full Sun to Part Shade/Medium Moisture)
- *Cephalanthus occidentalis* – Buttonbush (Full Sun to Part Shade/Medium to Wet)
- *Cornus sericea* – Red Osier Dogwood (Full Sun to Part Shade/Medium to Wet)
- *Corylus americana* – Hazelnut (Full Sun to Part Shade/Medium Moisture)
- *Diervilla lonicera* – Bush Honeysuckle (Full Sun to Part Shade/Medium Moisture)
- *Hydrangea arborescens* – Smooth Hydrangea (Full Sun to Part Shade/Medium Moisture)
- *Ilex verticillata* – Winterberry (Full Sun to Part Shade/Medium to Wet)

Shrubs (continued):

- *Juniperis horizontalis* – Trailing Juniper (Full Sun to Part Sun/Dry, Well Drained)
- *Lindera benzoin* – Spicebush (Full Sun to Part Shade/Medium to Wet)
- *Potentilla fruticosa* – Shrubby Cinquefoil (Full Sun to Part Sun/Dry to Medium)
- *Rhus aromatica* – Fragrant Sumac (Full Sun to Part Shade/Medium Moisture)
- *Rhus copallina* – Shining Sumac (Full Sun /Dry, Well Drained)
- *Rhus glabra* – Smooth Sumac (Full Sun/Dry, Well Drained)
- *Sambucas Canadensis* – Elderberry (Full Sun to Part Sun/Dry to Medium Moisture)
- *Symphoricarpos alba* – Snowberry (Full Sun to Part Shade/Medium Moisture)
- *Symphoricarpos orbiculatus* – Coralberry (Full Sun to Part Shade/Medium Moisture)
- *Viburnum dentatum* – Arrowwood (Full Sun to Part Shade/Medium Moisture)
- *Viburnum lentago* – Nannyberry (Full Sun to Part Shade/Medium Moisture)

Problematic trees not to be considered:

SCIENTIFIC NAME	COMMON NAME	PROBLEM OR LIMITATION
<i>Acer negundo</i>	Boxelder	Fast growing, weak wooded
<i>Acer platanoides</i>	Norway Maple	Verticillium wilt
<i>Acer saccharinum</i>	Silver/Soft Maple	Subject to rot/storm damage
<i>Ailanthus altissima</i>	Tree of Heaven	Weak wooded, aggressive
<i>Betula spp</i>	Birches	Environmental stress, borers, ice storm damage
<i>Elaeagnus angustifolia</i>	Russian Olive	Invasive, form, disease
<i>Gleditsia spp</i>	Honeylocust	Serious disease/insect problem
<i>Juglans spp</i>	Walnut	Littering fruit
<i>Juniperus spp</i>	Juniper	Disease, Form – visibility hazard
<i>Liquidamber styraciflua</i>	Sweetgum	Littering fruit
<i>Liriodendron tulipifera</i>	Tuliptree	Deadwood, lightning strikes
<i>Malus spp</i>	Common Apple	Littering fruit, disease
<i>Morus spp</i>	Mulberry	Littering fruit (female)
<i>Paulownia tomentosa</i>	Royal Paulownia	Weak wood, littering fruit
<i>Populus spp</i>	Poplar	Fast growing, weak wooded
<i>Pyrus calleryana</i>	Bradford Pear	Poor branch structure
<i>Pyrus commonus</i>	Common Pear	Littering fruit
<i>Robinia psuedoacacia</i>	Black Locust	Shallow rooted, borers
<i>Salix spp</i>	Willow	Weak wooded, aggressive
<i>Sorbus species</i>	Mountain Ash	Short lived
<i>Ulmua pumila</i>	Siberian Elm	Weak wooded, disease

Appendix G: College of Lake County – Tree Donation Form

Tree donations are welcome at the College of Lake County. Trees help beautify the campus and promote sustainability, by helping to clean the air and water. This form identifies donation specifications and procedures, consistent with the College of Lake County Gift Acceptance Policy and Procedures and the Landscape Maintenance Plan.

Specifications:

- Any tree donation is subject to approval by the Department of Horticulture and the Facilities Department.
- Donated trees are to be planted within the Grayslake Campus Arboretum.
- Species of trees proposed for donation should be consistent with the Palette of Recommended Trees and Shrubs, identified in Appendix F of the Landscape Maintenance Plan, or otherwise recommended by the Horticulture Department, that are hardy to our climate, appropriate to the proposed location, and contribute to the biodiversity of the campus.
- Planting should take place during the spring or fall, as determined by the College.
- The fee of \$200, payable to the College of Lake County Foundation, is tax deductible.
- The fee pays for a 1.5-2” caliper tree (or equivalent) and supports the costs of purchasing, planting, and maintaining the tree. The fee also includes a metal tag with identifying information, if desired.
- Exceptions to any of these specifications will require additional review and approval.
- While the College does everything that it can to protect its trees, the permanence of any donated trees cannot be guaranteed beyond one year.

Procedure:

- Individuals or groups wishing to donate a tree should first contact the College of Lake County Facilities Department at 847/543-2080 and then the Horticulture Department at 847/543-2320.
- The donor(s) should complete this form to proceed with the tree donation.

I/We _____
would like to purchase a tree for donation to the College of Lake County and agree to the specifications identified above.

I/We wish to include a memorial metal sign/tag to acknowledge that this tree is being planted in commemoration of _____

I/We can be reached by phone at _____ or by email _____

Signed: _____

Date: _____

Appendix H: Native Vegetation Establishment and Invasive Species Control

Native Vegetation Establishment Plan

The College of Lake County seeks to restore and enhance prairie, wetland, woodland, and pond and buffer ecosystems as part of an ongoing ecosystem restoration plan. Restoration efforts will foster growth of flora and fauna indigenous to Lake County and the northeastern Illinois/southwestern Wisconsin region.

The Native Vegetation Establishment Plan provides an appropriate mechanism to monitor and conduct remedial measures as required to insure the vitality of the natural systems. The Consultant shall coordinate with the college's Project Manager over a three year period of time to coordinate the eradication of invasive plant species with a concerted effort of prescribed burns, herbicide application, high mowing, and cutting and removal. Installation and monitoring procedures will focus primarily on the assessment of native plant establishment in stormwater management facilities and buffers. These procedures may be modified if the property owner deems it necessary to respond to special circumstances such as weather, season, invasive species, or other considerations. Site monitoring visits will be performed at least once during each growing season. The Project Manager shall maintain records of maintenance history, including the dates of maintenance visits and the specific work performed.

1st Season: Fall 2017 – Summer 2018

The consultant shall conduct prescribed burns beginning in Management Unit 1, followed by seeding, in fall 2017. An appropriate seed mix shall be applied to prairie and wetland areas, subject to approval of the Project Manager. Herbicide application and removal of invasive woody species shall take place in all three Management Areas in fall-winter.

Prescribed burns in Management Units 2 and 3 shall take place in early spring, with approval from CLC's project manager. Spring temperatures and emergence of hibernating animals shall effect the ability to conduct these burns. Selective herbicide application and further cutting and removal shall take place across all Management Units as needed throughout spring and summer.

2nd Season: Fall 2018 – Summer 2019

Weed growth in the second season may be treated by selective weed wicking, hand pulling, or mowing, although wicking can be more challenging as native species density increases. The appropriate protocol will be determined by the ecological consultant in conjunction with the Project Manager and the installation and maintenance contractor, possibly including additional seeding if necessary. If less than 95% of the target herbaceous and woody species have been effectively killed after the initial re-sprout treatment, additional re-sprout treatment(s) shall occur.

3rd Season: Fall 2019 – Summer 2020

During the third growing season, weed growth is expected to be less than in previous years, and control measures will be incorporated on an as needed basis. One primary on-site monitoring visit will be performed during the third season by the ecological consultant.

By the end of the third growing season:

- no area greater than one square meter shall be devoid of vegetation (except emergent/open water)
- the naturalized areas will have an FQAI of 20 or greater
- the naturalized areas will have a mean C value of 3.0 or greater
- mesic prairie and emergent areas between normal and high water levels will have a dominant (>50%) native matrix (estimated by visual observation)

Invasive Species Control Plan

Control of undesirable invasive plant species will require a variety of approaches depending on the species, their growth stage, and site conditions. The stages of plant growth and site conditions can be critical in choosing method of control. Hand-pulling shall include the removal of all above and below ground stems, roots and flower masses prior to the development of seeds.

Selective weed wicking will also be incorporated as deemed necessary for weed control. Weed wicking allows for control of weed growth without resorting to more extensive applications of herbicides. Systemic herbicides are generally used because they are absorbed through the plant tissues and work their way into the root system effectively killing the plant. Such herbicides are not transmitted to other plants and do not pass into the soil; they break down into a non-toxic form within a matter of days. Upland areas will be treated with “Roundup” or a similar approved product. Detention pond will be weed wicked using a systemic such as “Rodeo” or a similar product specifically designed for wetland and aquatic systems.

Weed growth can be controlled by periodic mowing with an adjustable-height blade to a height of 6 to 10 inches during the growing season, for up to three years. Weeds tend to grow faster than many natives in spring and early summer. In the early years of establishment, native plants tend to keep a lower profile, while establishing root systems. Plant installation specifications will outline maintenance required during the initial three-year establishment period. The determination to mow will be made by an ecological consultant in conjunction with the Project Manager and the approved installation and maintenance contractor.

Weed control can be achieved by a controlled burn, 3 years after seeding. Prescribed burning is recommended as a best practice every three to five years, especially for the control of woody invasive species. An IEPA permit must be obtained prior to a controlled burn.

Invasive woody plant species include, but are not limited to, following:

- *Acer negundo* (Box elder)
- *Juniperus virginiana* (Eastern red cedar)
- *Lonicera* spp. (nonnative honeysuckles)
- *Ramnus cathartica* (Buckthorn)
- *Rosa multiflora* (Multiflora rose)
- *Salix interior* (Sandbar willow)

Important herbaceous species to be targeted include, but are not limited to:

- *Alliaria petiolata* (Garlic mustard)
- *Cirsium* sp. (Canada and bull thistles)
- *Dipsacus fullonum* (Teasel)
- *Lotus corniculatus* (Bird’s foot trefoil)
- *Lythrum salicaria* (Purple loosestrife)
- *Melilotus* sp. (Sweet clover)
- *Phalaris arundinacea* (Reed canary grass)
- *Phragmites australis* (Common Reed)

Appendix I: Bee Campus USA Accreditation Criteria

The College of Lake County (CLC) is committed to doing its part to support and protect pollinators, both native bees and European honey bees. This appendix, with the seven points outlined below, demonstrate CLC's completion of the requirements for its application to BEE CAMPUS USA program.

1. The College of Lake County (CLC) maintains a Landscapes Subcommittee of the Environmental Action Committee, charged with reviewing the BEE CAMPUS USA commitments. This subcommittee is comprised of the Sustainability Manager, Grounds Manager, Facilities Director, Horticulture Department Chair, Biology Department (and other) faculty, and students. This subcommittee is charged with developing and maintaining this Landscape Management Plan, which includes Appendix E: Palette of Preferred Forbs and Graminoids and Appendix F: Palette of Recommended Trees and Shrubs. Appendices C and D contain lists of locally native, pollinator-friendly plants that will help the college to meet its goal to develop and preserve pollinator habitats across its three campuses. Included in this Landscape Management Plan is CLC's integrated pest management (IPM) plan which outlines CLC's commitment to minimize use of herbicide and fertilizer use wherever possible. The preferred plant lists and IPM plan are publicized with this report, which is made available on the [Greening our Campus webpage](#).
2. CLC hosts events throughout the year to raise awareness of the importance of pollinators, planting pollinator-friendly gardens and natural areas, and reducing herbicide application throughout the year. Regular annual events include Climate Week, the One Earth Film Festival, and Earth Week. Each of these events will present visitors with opportunities to learn about pollinators and CLC as a partner with BEE CAMPUS USA.
3. CLC sponsors and tracks student service-learning projects to enhance pollinator habitats on-and off-campus each year. Events are sponsored through the Horticulture Department and the Horticulture Club.
4. CLC provides workshops on pollinator ecology and integrates integrated pest management and landscaping for pollinators into several of its horticulture courses, including HRT 150 Landscape Maintenance and HRT 285 Sustainable Landscapes.
5. CLC is developing its Living Lab Trail to educate the campus and broader community about the sustainable practices on campus. See the description of the program identified in this Landscape Management Plan. Signage on CLC's Living Lab Trail will highlight CLC's apiary, native landscaping, and sustainable practices that benefit pollinators.
6. CLC shares educational and community service activities on its [Greening our Community webpage](#) with its sustainability community calendar.
7. CLC agrees to apply for renewal of its designation as part of BEE CAMPUS USA and will submit a brief report of the previous year's BEE CAMPUS USA activities in the appropriate format.

Appendix J: Tree Campus USA Standards and Tree Care Plan

The College of Lake County has met the following accreditation standards which qualify it for accreditation with the Tree Campus USA program.

Standard 1 - Campus Tree Advisory Committee:

CLC's Environmental Action Committee (EAC) and its Landscapes Subcommittee serve as the Campus Tree Advisory Committee. The EAC meets monthly during the academic year and hosts the Natural Areas and Landscapes Subcommittee which meets periodically to consider policies and actions to promote sustainable care of landscaping. EAC membership includes representatives from faculty, staff, facilities, purchasing, satellite campuses, the Illinois Green Economy Network, and other community entities. The EAC is convened by the director of facilities and co-chaired by the sustainability manager and a faculty member.

Standard 2 - Campus Tree Care Plan:

See Below

Standard 3 – Campus Tree Program with Dedicated Annual Expenditures:

The grounds department has an annual allocation for the maintenance of the campus landscaping, including the planting and care of trees.

Budget Items	FY 2016 Expenditures
5% of Grounds Crew Salaries for Tree Care	\$15,000
Tree/Shrub Replacement	\$4,000
Tree Maintenance - Contractual	\$5,000
Hardwood Mulch	\$2,000
Rental Chipper and Grinder	\$2,000
ArborScope Annual Licensing Agreement	\$1,500
Arboretum Supplies	\$2,000
Horticulture Faculty/Adjunct Tree Care Instruction	\$6,000
TOTAL	\$37,500
Student Enrollment – Full Time Equivalents (FY16)	8,365
Tree related expenditures per student	\$4.48

Standard 4 – Arbor Day Observance:

CLC observes Arbor Day annually with tree planting and restoration work days during Earth Week to educate the campus community on the benefits of the trees on campus and in the community and about the needs of trees and threats from invasive species. Arbor Day celebrations are advertised on events calendars and recorded with stories and photographs. Community members are invited to these invited to join students, faculty and staff in these activities.

Standard 5 – Service Learning Project:

The Service Learning Project should be an outreach of the spirit of the Tree Campus USA initiative. This project should provide an opportunity to engage the student population with projects related to trees and can be part of a campus or community initiative. The project must be done within the course of the year application is submitted.

Rory Klick, chair of the Horticulture Department at the College of Lake County, took a half-time sabbatical to study the campus arboretum and recommend the development of a formal arboretum care plan. Professor Klick is recommending that the arboretum apply for recognition as a Level 1 Arboretum. See the Appendix K below for more information.

CLC horticulture students use the arboretum as its living laboratory. Students of the HRT 125 Tree and Shrub Identification class use the Bartlett Tree Experts' ArborScope™ web-based tree survey and management system as part of their coursework. HRT 150 Landscape Maintenance students practice proper pruning methods within the arboretum.

The Morton Arboretum hosted a Chicago Region Trees Initiative (CRTI) Basic Urban Forestry class within the CLC arboretum, most recently in April 2016. The University of Illinois Extension periodically visits the arboretum for training and education.

The Sustainability Department is working with Facilities and Horticulture to expand opportunities for volunteers to participate regular work days, planting and maintaining trees and with restoring natural habitat areas in FY 2018.

<https://www.arborday.org/programs/treecampususa/standards.cfm>

Tree Campus USA - Standard 2: College of Lake County Arboricultural Specifications and Tree Care Plan

In February, 2016, the College of Lake County retained Bartlett Tree Experts to perform an inventory of trees in the landscaped areas of the Grayslake Campus and to develop a management plan. The Tree Survey and Management Plan are available in the facilities office and results of the tree survey are available online with the [ArborScope™](#) web-based management system. The survey identified 1,008 trees, including 139 species. The attributes that we collected include tree latitude and longitude, size, age and condition class, and a visual assessment of tree structure, health, and vigor. The Tree Survey and Management Plan is referenced in the above section of this Landscape Management Plan. The Facilities grounds and sustainability departments have the responsibility of carrying out these plans, with advice of the Environmental Action Committee. The sustainability manager works with colleagues in facilities to heighten awareness about policies and procedures as well as the goals of the institution.

I. PURPOSE

This Arboricultural Specifications and Standards Plan is designed to supplement and support the College of Lake County Landscape Maintenance Plan. The objective of this plan is to present the best tree planting, maintenance, protection, and removal techniques based on accepted arboricultural standards. The guidelines and standards presented in this manual apply to trees on the Grayslake, Lakeshore and Southlake Campuses. The Environmental Action Committee, facilities director and grounds manager have the authority to maintain and modify this manual any time that experience or new research indicate that improved methods or circumstances make it advisable.

II. PLANTING

A. Plant Materials

- 1) All trees shall be grown in a nursery located within similar temperature zones as Urbana, Illinois and licensed by the respective State.
- 2) All trees shall conform to the “American Standard for Nursery Stock” as approved by the American National Standards Institute, Inc., and issued as the most current edition of ANSI Z60.1 (See Appendix J-2). Available online at www.anla.org/applications/Documents/Docs/ANLStandard2004.pdf.
- 3) Trees to be planted near streets and parking lots shall have a minimum trunk diameter of 1.5 inches, as measured 6 inches above the root flare, unless the grounds manager grants permission to allow planting of smaller trees.
- 4) Trees selected for planting on any campus shall be healthy and free of insects, diseases, bark bruises, and scrapes on the trunk or limbs, before and after planting. Trees shall be single-stemmed and have a central leader that can be pruned so the lowest limb is at least 6 feet above ground, with the exception of ornamental trees such as serviceberries. All trees shall have a balanced crown, and a well-developed root system.
- 5) Trees shall have their north orientation marked with a painted dot by the nursery prior to digging.
- 6) Unless a tree is to be transplanted by mechanized tree spade, all tree roots shall be containerized or ball and burlap. Nylon twine shall not be used for balling. Minimum ball size must conform to the most current

edition of ANSI Z60.1. Root balls shall be intact at the time of planting. Bare root plantings are discouraged, but may be suitable for planting in the arboretum.

- 7) The root flare of ball and burlap trees shall be within the top 1/2 inch of the root ball, and the structural roots shall be within the top 3 inches of the soil surface. (See Figure 1)

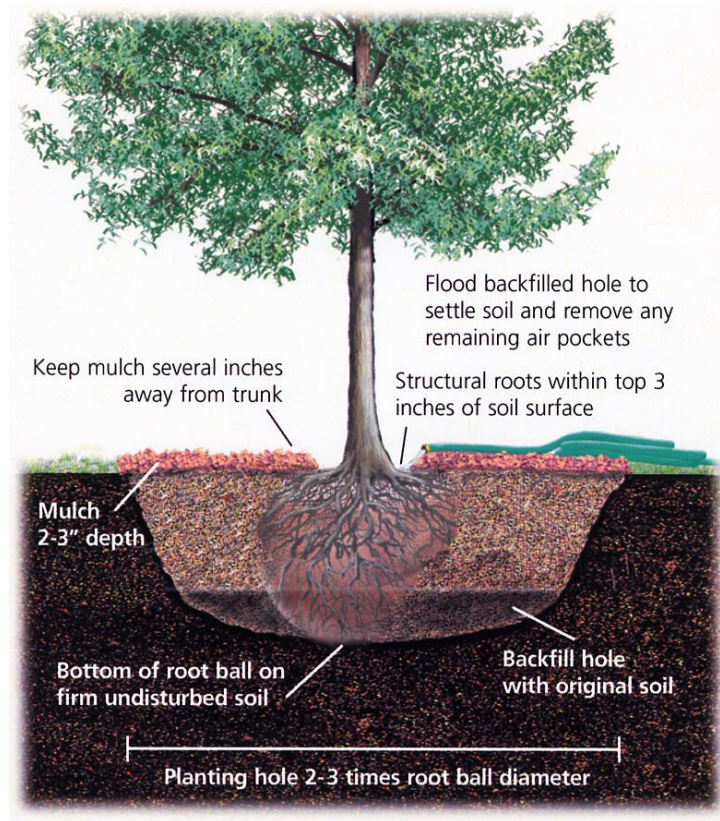


Figure 1 – Tree Planting Detail

B. Transportation and Handling

- 1) Trees shall be covered during transport to the planting site.
- 2) Plant material shall be handled in a manner that causes the least amount of damage during the planting process.
- 3) Ball and burlap plants shall always be handled by the soil ball. Under no circumstances shall they be dragged, lifted or pulled by the trunk or foliage.
- 4) Plants shall be handled, secured, or covered to prevent damage from wind and vibration. Plants shall never be allowed to drop, but shall always be lowered in a controlled manner.
- 5) Plant material shall be planted the day it is taken to the planting site, or it shall be watered and/or covered, and placed in a shady area to prevent drying out or freezing.

C. Planting Techniques

The spring planting season shall begin when the ground has sufficiently thawed and end approximately one week before buds begin to break. Spring planting may be extended through the end of May as long as the trees have been dug at the nursery before bud break and stored properly until planting. The fall planting season will begin early to mid-September and end by mid-November or with the onset of prolonged freezing temperatures.

- A.** It is preferable that tree holes be dug manually, but may be machine dug if necessary. If the existing lawn is damaged by contractor, it shall be the responsibility of the contractor to restore the lawn to its original condition.
- B.** The planting hole shall be a minimum of twice the diameter of the ball (3 times wider in compacted soil), with sides sloping inward toward the bottom of the root ball (see Figure 1). The planting hole shall not be dug to a depth deeper than the depth of the root flare. The root ball must be placed on undisturbed sub grade. The resulting hole shall place the structural roots within the top 3 inches of the soil surface when measured laterally at 4 inches from trunk, unless special drainage needs are approved by the grounds manager.
- C.** Excavated planting pits that are open when work is not in progress pose a hazard to pedestrians and shall be adequately barricaded with approved warning devices. No planting pit may remain open in excess of 24 hours.
- D.** Generally the tree shall be planted so that the root collar is at or slightly (no more than 1 inch) above grade unless structural root depth (see letter "C" above) dictates otherwise or if extraordinary drainage needs exist.
- E.** The tree shall be placed plumb and in the center of the planting hole.
- F.** All ropes, strings, nails, burlap wrapping, root bag material and wire baskets shall be removed from the upper $\frac{2}{3}$ the root ball after the tree has been placed in the planting hole.
- G.** In most instances, the backfill around the ball shall be the same soil as that which was removed from the hole; however, in cases where rocks, stones, etc., are encountered, top soil shall be used, and in cases of highly compacted clay soil, existing soil may be amended with 25% compost.
- H.** When approximately $\frac{2}{3}$ to $\frac{3}{4}$ of the planting pit has been backfilled, the hole shall be watered to settle the soil around the roots. After the water has been absorbed, the planting pit shall be filled with the planting soil, tamped lightly to grade, and watered thoroughly again. Any further settlement shall be brought to grade with additional planting soil.
- I.** A shallow soil berm, approximately 3 to 4 inches high, can be formed just inside the edge of the planting hole to serve as a water reservoir if the planting area is located on a slope.
- J.** After planting, planting contractors shall apply a 2 to 3 inch layer of wood chips or other approved organic mulch to the top of the planting hole to within approximately 3 to 4 inches of the trunk. No mulch shall be placed in direct contact with the trunk of the tree, above the tree collar.

- K. Any excess soil, debris, or trimming shall be removed from the planting site immediately upon completion of planting.
- L. The trunk of the tree shall not be wrapped. Any existing trunk wrapping materials shall be removed and disposed of.
- M. All tags, wires, and plastic ties shall be removed from each tree unless otherwise specified.
- N. Trees shall only be staked if located in loose sandy soils or windy areas. Rubber cords/tubing or flat straps shall be used to avoid girdling the tree. Hose and wire combinations are prohibited. Staking should allow some trunk movement.

D. Planting Locations and Spacing

- 1) Spacing of trees shall be determined by the grounds manager according to the local site conditions, the species used and growth characteristics of the tree to be planted. General specifications are as follows:

Tree Size	Center to Center Spacing	Minimum planting distances
Large Tree	35 feet	33 feet
Medium tree	35 feet	33 feet
Small tree	25 feet	25 feet

- 2) When planting a new tree next to an existing tree of a different size class, the minimum spacing should be calculated by averaging the spacing requirements for the two size classes. For example, a new small tree planted next to an existing large tree, should be planted at a distance of 30 feet.
- 3) Trees planted near any road sign shall be placed in a manner not to obstruct the visibility of any part of the sign at time of planting or in the future. In the event that a sign will be moved to accommodate a tree, the sign shall be moved before the time of planting.
- 4) When overhead wires are present above planting strips, only shrubs or small trees listed in Appendix F: Palette of Recommended Trees and Shrubs shall be considered. Exceptions may be made at the discretion of the grounds manager.
- 5) Guidelines for planting near above ground and below ground objects:

Above Ground	Minimum tree planting distance	
	Large and Medium Trees	Small Trees
Object		
Street light	Fifteen (15) feet	Ten (10) feet
Utility pole	Fifteen (15) feet	Ten (10) feet
Driveway entrance	Fifteen (15) feet	Fifteen (15) feet
Building or permanent structure	Fifteen (15) feet	Fifteen (15) feet

Existing/proposed parkway tree	Thirty-five (33) feet	Twenty-five (25) feet
Cross walk	Ten (10) feet	Ten (10) feet
Street Intersection	Fifty (50) feet	Fifty (50) feet

Below Ground	Minimum tree planting distance	
	Medium and Large Trees	Small Trees
Water line	Ten (10) feet	Ten (10) feet
Sewer line	Ten (10) feet	Ten (10) feet
Water Sewer mains	Ten (10) feet	Ten (10) feet
Sanitary Line	Ten (10) feet	Ten (10) feet
Storm Sewer	Ten (10) feet	Ten (10) feet

- 6) The minimum spacing standards outlined above may be modified by the grounds manager for new plantings, particularly where openings in pavement are required to establish planting sites. In these areas, trees may be planted closer together, recognizing the limited availability of planting spaces, and the advantages of allowing trees greater access to larger volumes of soil through cluster plantings.

E. Tree Species

Lists of allowed tree species and/or their acceptable varieties have been compiled and approved by the grounds manager and the Environmental Action Committee. See Appendix F: Palette of Recommended Trees and Shrubs for details.

Native tree species should be considered where appropriate, as defined in *Flora of the Chicago Region: A Floristic and Ecological Synthesis* Gerould Wilhelm (2017), the Morton Arboretum and the Lake County Forest Preserve District. Native trees provide much needed habitat for beneficial insects, birds, and mammals. The arboretum contains a wider variety of species in order to support the educational mission of the college. See Appendix K: Arboretum Level I Certification.

It is important to match the planting site limitations with the right tree for that location. Each site must be evaluated and possible restrictions of tree species noted. These restrictions include rooting space, soil texture, soil pH, drainage, exposure, overhead wires, and surrounding building surfaces.

To protect campus trees from the spread of disease and insect infestations, the Environmental Action Committee recommends limiting planting tree species that are over 6% of the overall street tree population and/or immediate management area/s street tree population. Tree species falling in the preceding categories may only be planted under the guidance and approval of the grounds manager.

Undesirable tree species are identified in Appendix F: Palette of Recommended Trees and Shrubs and shall not be planted on campus, except in special locations where, because of characteristics of adaptability or landscape effect, they can be used to public advantage.

The Environmental Action Committee, in conjunction with the grounds manager, shall review at least once every 5 years the species and varieties listed in Appendix F: Palette of Recommended Trees and Shrubs to determine whether any should be removed or whether certain new species or varieties of proven adaptability and value should be added.

III. EARLY MAINTENANCE

A. General

Newly-planted trees, shrubs and other plants require special maintenance for the first 3 growing seasons following planting. All maintenance practices shall follow approved arboricultural standards.

B. Staking

Staking a tree is not recommended except in situations where the tree will not stand on its own, such as in loose sandy soils or windy locations. If staking is used, rubber cords/tubing or flat straps shall be used to avoid girdling the tree. Hose and wire combinations are prohibited. All staking should be removed after 1 year so the tree can naturally strengthen with wind movement.

C. Watering

Correct soil moisture shall be maintained following planting. The amount of water given to newly-planted trees should be carefully measured by slowly applying at least 1 gallon of water for each diameter inch of trunk every 5 to 7 days when there has been less than 1/2 inch of rain during that week. Hot, dry periods (90 plus degrees) or sandy soils may require watering trees every 3 to 5 days to keep soil sufficiently moist. Containerized trees grown in bark mix readily dry out and may require frequent light watering throughout the week during summer months. Adding more than 1 gallon of water per diameter inch is not recommended as this can lead to overwatering, which can drown tender roots. A soil probe can be used to check the moisture in the soil ball and/or backfill.

Utilizing a watering bag drip irrigation system can also be an effective way to protect tree roots from over/under watering. There are two types of watering bags. Pinhole type watering bags (e.g. Treegator) will release water over several days and should be filled as described above. Emitter type watering bags (Ooze tube and others) can take several weeks to release water, depending on soil structure. They should be filled after 3/4 of the water has been drained since they never drain entirely.

D. Fertilization

Fertilization of newly-planted trees and shrubs is not recommended. Adequate quantities of the essential nutrients should be available for new root growth in existing soils. However, proper drainage and adequate moisture of the backfill and soil ball is essential. To increase vigor of established trees (3 years and older), a pre-approved fertilizer may be applied in the fall or early spring.

E. Pruning

Pruning of newly-planted trees should be limited to dead or broken limbs for the first 3 years since foliage helps regenerate the root system. Water sprouts should be removed when they reach the diameter of a pencil.

Pruning shall be practiced as often thereafter as needed to develop proper branch scaffolding and adequate clearance. Newly-planted trees are to be inspected after 3 years of establishment for corrective pruning.

IV. GENERAL MAINTENANCE

A. Mulching

Mulches provide many benefits for trees and shrubs. They moderate soil temperatures, reduce soil moisture loss, reduce soil compaction, provide nutrients, improve soil structure, keep mowers and string trimmers away from the trunk. These benefits result in more root growth and healthier plants. When applying mulch the following guidelines should be observed:

- 1) The best mulch materials are wood chips, bark nuggets, composted leaves or pine needles. Plastic, stone, sawdust, finely shredded bark, and grass clippings should be avoided. Do not use redwood or walnut mulch due to allelopathic effects.

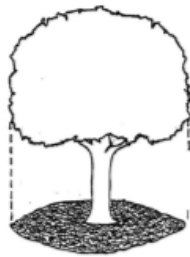


Figure 1. Mulch should be applied from the trunk to the dripline.



Figure 2. Mulch layer should be 2-4 inches thick and not be against the trunk.

- 2) Mulch should be applied from the dripline to the trunk (Figure 2). If this is not practical, minimum mulch circle radii should be 3 feet for small trees, 8 feet for medium trees and 12 feet for large trees.
- 3) When applying mulch it is not necessary to kill or remove existing ground cover. However, turf should be mowed very short and clippings removed prior to application. Mulch should be applied directly to the soil surface, do not use landscape fabric to separate the mulch from the soil.
- 4) Mulch layer should be 2-4 inches thick depending on tree species and mulch (Figure 2).
- 5) Additional mulch should be added to maintain a 2-4 inch depth.
- 6) Mulch should not be placed against the trunk (Figure 2). Mulch will retain too much moisture against the trunk, potentially resulting in disease problems.

<https://www.bartlett.com/resources/Mulch-Application-Guidelines.pdf>

B. Pruning

For tree pruning contracts issued by the college, bid specifications shall include minimum or maximum diameter branches to be removed. Pruning objectives will also be stated to provide a clear understanding of

the results desired by the college. Detailed pruning specifications are contained in the “Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (ANSI A300, most current edition) published by the American National Standards Institute, Inc. and the most current edition of “Best Management Practices – Tree Pruning” published by the International Society of Arboriculture. These standards are to be followed in all pruning activities performed on college trees.

C. Pruning Specifications

All tree work shall be approved by the grounds manager and performed in accordance with the latest ANSI A-300 pruning standards and ANSI Z133.1 safety standards.

How much to prune:

Energy reserves are stored in branches, stems, trunk and roots. Energy reserves shall be preserved by removing the fewest number of live branches necessary to accomplish the desired objective. Generally no more than 10 to 15 percent of a trees foliage should be removed in one growing season. Special circumstances such as street clearance or safety reduction may be approved by the grounds manager for the removal of up to 25 percent of a trees foliage.

When to prune:

Removal of dead, dying, diseased, broken, rubbing, and compromised limbs can be accomplished anytime of the season. All other pruning should first be considered to be accomplished during the dormant season if possible and can be scheduled for all other times of the season if necessary with some exceptions. Oak trees located in areas known to have oak wilt and American Elms shall not be pruned after April 1st or before October 1st without consultation from a Certified Arborist.

- 1) Pruning for Structure may be utilized on young to medium-aged trees to help create a sustainable trunk and branch scaffolding and on large-maturing trees to reduce defects, space main branches along one dominant trunk and subordinate or remove co-dominant stems. Pruning for structure can take ten to twenty years or more to accomplish.
 - a. Clean the canopy by removing dead, broken, diseased, dying and rubbing branches
 - b. Prune to develop a dominant leader or leaders in a multi-stemmed tree
 - c. Select and establish the lowest permanent scaffold limb (only if tree is mature enough to allow adequate clearance)
 - d. Select and establish scaffold limbs by subordinating and or removing competing stems or branches.

- 2) Pruning to Clean may be utilized for selective removal of dead, diseased, detached, damaged and broken branches.
 - a. Fine Prune for trees 8 inches in diameter or less or trees of significance such as “Notable” or “Legacy Trees” as determined by the grounds manager.
 - b. Medium Prune for trees in excess of 8 inches but less than 25 inches or any other tree as determined by the grounds manager.
 - c. Coarse Prune for trees in of 25 inches in diameter or any other tree as determined by the grounds manager.

- 3) Pruning to Thin may be utilized for limited purposes for selective removal of small live branches (1/4" to 1" in diameter) to reduce crown density. Larger diameter branches and or branches on the lower two-thirds of a stem shall not be targeted for thinning to avoid large gaps in the crown and adverse effects on the tree from lion tailing. Percentage of removed foliage shall be limited to ten to fifteen percent for any one pruning. Special circumstances can justify removal of up to 25 percent of the foliage for thinning with grounds manager approval. Thinning shall be focused on the outside edge of the crown, retain crown shape and provide an even distribution of foliage throughout the crown. Thinning can include sucker removal from base of tree and some water sprouts on the interior. Care shall be exercised to not remove all water sprouts as excessive removal of water sprouts often produces more water sprouts.
- 4) Pruning to Raise may be utilized for selective removal of branches to provide clearance over streets and street signs, sidewalks, driveways, buildings and other. Excessive removal of lower limbs shall be avoided to limit adverse effects to trunk taper, decay and unbalanced weight distribution. Live crown ratio (the ratio of crown length to total tree) should be no less than 66 percent when raising is complete. Special circumstances can justify a crown ratio of between 66 and 50 percent with grounds manager approval. Structural pruning should be considered along with raising the crown.
- 5) Pruning to Reduce may be utilized when above pruning methods are insufficient for eliminating failure and clearance issues. Reduction pruning is to be selective removal of branches to minimize risk of failure, reduce tree height or spread for utility line clearance, buildings or other structures. If the entire crown is to be reduced the reduction shall be accomplished with reduction cuts rather than heading cuts. When a limb on a mature tree is cut back to a lateral, no more than one-fourth (1/4) of its foliage shall be removed. Reduction pruning of mature trees should target small branches between 1 to 4 inches in diameter. Not all tree species can tolerate reduction pruning and tree health and species shall be considered by grounds manager before approval of reduction pruning work.
- 6) Pruning to Restore may be utilized for restoration of damaged trees. Pruning shall be the selective removal of branches, sprouts and stubs from trees that have been severely topped, severely headed, vandalized, lion-tailed, broken or otherwise damaged. The goal of restoration is to improve a tree's structure, form or appearance. Selective sprout removal/retention may be used to rebuild the structure of broken or headed branches. Generally no more than 1/3rd of the sprouts on damaged limbs are to be removed in any one growing season if the damaged limb is to be preserved.
- 7) Topping of trees shall not be allowed outside of the arboretum for educational purposes. Topping is the cutting of branches/stems to areas between established lateral branches, and creates stubs, spoils good tree architecture, increases tree maintenance needs and is extremely damaging to shade trees.
- 8) Pruning Cuts and treatment
 - a. *Branch Removal Cut (thinning cut)* – Is the removal of a branch at its point of origin on a trunk, stem or larger branch. Cuts shall be made as close to parent limb or trunk as possible without cutting into branch bark ridge or branch collar and without leaving a stub. Large or heavy branches should be removed using three cuts. The first cut undercuts the limb 1 to 2 feet out from parent limb to reduce the potential for tearing bark as limb is removed. The second cut is a top cut which is to be made slightly farther out from the undercut or on small limbs directly

above the undercut. The third and final cut is to remove the remaining stub carefully without tearing the bark below the cut. With dead branches the final cut shall be made just outside the collar of living tissue. Large trees may need to have branches lowered rather than dropped to reduce damage to tree, property, pavement, buildings, signs, landscape and or other objects below.

- b. *Reduction Cut (cutting to a lateral, lateral cut, Drop-crotch cut)* – Is the shortening of limbs or branches back to a lateral branch that is of similar size to one half the diameter of the removed limb. Reduction cuts shall not be made when remaining lateral branches are less than one third the size of the removed limb. Tree species and tree condition should be considered when utilizing reduction cuts. Old and or stressed trees may decline if too much foliage is removed.
 - c. *Heading Cut (topping cut, lopping cut)* - is a cut made between branches. Heading cuts are not allowed.
 - d. *Wound Dressing* is generally not required or recommended. However in certain circumstances a non-phytotoxic wound dressing may be required to reduce the likelihood of borer infestation and the spread of oak wilt and Dutch elm disease in specific trees. The grounds manager shall determine when wound dressing would be required for covering pruning cuts and for what trees. Wound dressings with sprout inhibitors can also be utilized for deterring sprout production in certain tree species.
- 9) Pruning tools shall be adequate for the size of cuts being made and sharp to make clean cuts without jagged edges or stubs. Equipment and work practices that damage living tissue and bark beyond the scope of work shall be avoided. Climbing spurs are not to be used to climb trees for pruning operations. It is recommended to disinfect pruning tools between cuts when disease is suspected or known to exist. Rubbing alcohol, Listerine, Lysol and 10% solution of bleach can be utilized for a disinfectant.

V. TREE PROTECTION

Because of limited available space, urban trees frequently encounter other elements of the infrastructure such as curbs and sidewalks. Tree roots can sometimes cause damage to existing hardscape. On other occasions, construction of new curbs or sidewalks, or repair to existing curbs or sidewalks, can damage trees. It is important to the college that solutions be developed to minimize these conflicts so that the health of the urban forest is maintained, while providing economically feasible alternatives for maintaining safe roads and sidewalks.

Improper excavation of soil adjacent to trees can result in severe damage to the structural roots that support the tree. Roots that are broken and splintered by power equipment such as backhoes serve as entry ports for decay-producing fungi that further weaken the support of the tree. If the damage from excavation is severe, the tree is in danger of being uprooted in a wind storm.

A. Critical Root Zone

To prevent unnecessary damage to existing public trees during construction, proper tree protection guidelines must be followed, particularly in the root zone where major support roots securely hold the tree in the soil. This Critical Root Zone (CRZ) is defined as the entire ground area within the vertical projection of the crown of a tree. This is also commonly referred to as the area within the drip line of a tree.

Heavy excavating equipment such as backhoes should not be used to excavate soil or dig trenches in the Critical Root Zone. All soil excavation needed within the Critical Root Zone should first be attempted by hand. Exceptions to the above shall include emergency utility repair, exceptionally rocky conditions or open access for tunneling equipment when there are no reasonable alternatives. Other exceptions shall be granted only with written permission from the grounds manager.

Tree/Shrub Protection

The contractor shall be responsible for protecting all trees and shrubs located on the campuses of the College of Lake County. Existing trees/shrubs subject to construction activity shall be boxed, fenced or otherwise protected before any work is started. The trees/shrubs to be protected, the method of protection, and the dimensions involved shall follow the guidelines of the grounds manager. Once assembled, no boxing, fencing or other protection device shall be removed without prior approval of the grounds manager and there shall be no construction activity or material within the enclosure.

Shrubs and small trees shall be boxed or fenced in such a manner as to encompass the entire drip line area of the tree (Figure 1). In no case shall the enclosure be less than 2 feet from the center line of the tree. Medium to large trees shall be boxed or fenced in a manner to encompass as much of the drip line area of the tree as possible (Figure 2). In no case shall the protective device be closer than 10 feet from the center line of the tree except in those portions bordered by the sidewalk or curb, in which case the protective device shall be offset 1 foot wherever possible.

Tree Diameter	Distance of <u>fencing</u> from tree trunk *
Up to 2 inches	Min 2 feet
2.1 – 4 inches	Min 4 feet
4.1 – 9 inches	Min 6 feet
9.1 – 14 inches	Min 10 feet
14.1 – 19 inches	Min 12 feet
19.1 and greater	Min 15 feet

*Minimum distances listed are required unless waived by grounds manager. If available space permits greater distances for tree protection a distance of one foot from tree trunk for every one inch in tree diameter is preferred but not required.

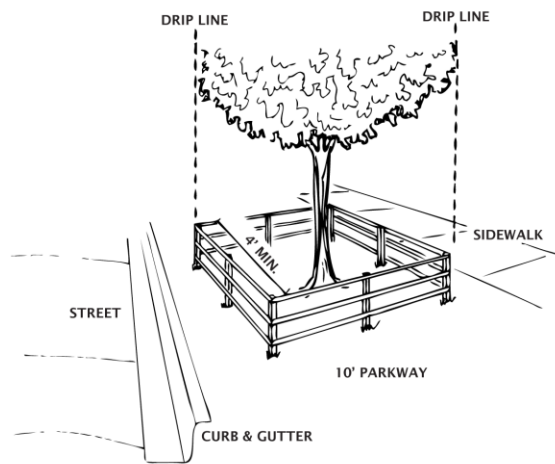


FIGURE 1 - SMALL TREES
MINIMUM FENCING REQUIREMENTS

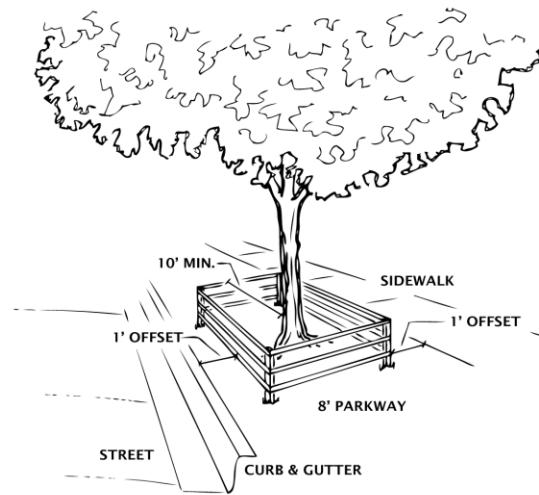


FIGURE 2 - MEDIUM TO LARGE TREES
MINIMUM FENCING REQUIREMENTS

B. Root Pruning

1. Pre-Construction Root Pruning

During construction activities there may be times when in the opinion of the facilities director or designee, it is not possible to entirely avoid trenching or excavation within the Critical Root Zone. In such instances the facilities director may require the contractor to perform pre-construction root pruning. This shall be accomplished according to the following standards:

- Trenches shall be in line with tree trunk whenever possible
- All sides of trench likely to have bisecting roots shall be targeted for pre excavation root pruning.
- Roots shall be pruned 6 inches closer to the tree than the limits of excavation.
- Depth of pruning shall be at least 18 inches but ideally 24 inches, however, pruning shall be no deeper than the depth of the planned excavation.
- Roots shall be cut off cleanly by hand, or using power equipment specifically designed to cleanly cut roots such as a stump grinder (shredding or ripping roots damages root tissue and hinders regeneration).
- Roots shall be pruned during the dormant season whenever possible.
- Trenches shall be immediately backfilled to prevent drying out of roots.

2. Root Pruning During Construction

All tree roots greater than 2 inch in diameter that are encountered in any construction process shall be cut cleanly with an appropriate saw or pruning shear or other tool specifically designed for cutting wood. Axes or other such chopping tools should not be used, nor should shovels or other tools designed for digging.

C. Tree Protection in Construction Areas

It is the responsibility of the person or organization who holds a construction permit, as a condition of permit, to protect all public trees located on the adjacent public right-of-way that may reasonably be expected to be affected or damaged by construction activities. All unpaved ground on campus property within the

Critical Root Zones of existing trees subject to construction damage shall be boxed, fenced, or otherwise protected before any work. If pavement such as a sidewalk is within the Critical Root Zone, unpaved public property on both sides of the pavement shall be protected with fencing without blocking the right-of-way. The grounds manager shall determine which trees need to be protected, the method of protection, and the dimensions involved. Once assembled, no boxing, fencing, or other protection device shall be removed without prior approval of the grounds manager, and there shall be no construction activity or material including storage, stockpiling, and equipment access within the enclosure.

D. Curb Installation

The installation of new or replacement curbs requires the excavation of soil. When soil excavation occurs inside the Critical Root Zone of a tree, the following guidelines shall be used:

- Excavation shall not disturb the soil beyond 12 inches from the back side of the curb to be installed. This allows sufficient room for a 12-inch bucket to be used on a backhoe, for a back form to be installed, and for curb installation equipment to operate.
- All tree roots greater than 2 inch in diameter that are encountered in the excavation process shall be cut cleanly as described in Section 2 above.
- Pre-construction root pruning may be required as specified in Section 2 above.

Curb replacement adjacent to significant trees, as designated by the grounds manager, may be installed without the use of a typical wood back form. Options may include metal angle irons placed on top of the adjacent undisturbed ground as a back form. A front form may be another option in those instances when conventional curb installation techniques might cause unacceptable damage to a significant tree's root system.

E. Sidewalk and Driveway Installation and Replacement

When conflicts arise between tree roots and existing pavement, it is advisable to look for solutions that minimize damage to tree roots while providing a smooth walking surface for pedestrians. Removal of large support roots should be avoided. Without adequate support from structural roots, trees become increasingly at risk of falling, particularly during heavy winds. Removal of large roots may also severely stress an otherwise healthy tree, increasing the risk of disease or pest infestation. The mitigation of uneven sidewalks in a manner that produces additional hazards in the form of structurally unsound trees is not acceptable.

When large roots are present at the surface, it may be possible to raise the grade in the location of the replacement sidewalk. Adding a ramp of soil along the edges of the replacement sidewalk that slopes to the grade of adjacent turf will prevent tripping on or falling off of the new sidewalk.

Other alternatives include using smaller panels of concrete with expansion joints or narrowing the width of the sidewalk pavement in the area of the root crown. However, pavement must be of sufficient width (minimum of 4 feet wide) to accommodate a wheelchair.

Whenever possible, replacement or installation of pavement that requires cutting of tree roots should be conducted in early spring and concluded by mid-Summer to allow maximum root recovery before dormancy.

F. Changes to Existing Grade

Changes to original grade inside the Critical Root Zone shall be avoided when there are reasonable alternatives. If such changes are unavoidable, consideration should be given to installation of retaining walls on cuts or wells in fills. This will minimize root cutting and keep the base of the trunk at the original ground level.

G. Safety Requirements

In all operations related to public tree planting, maintenance, and removal, safety of workers, citizens, and the general public shall be of primary importance. Contractors are required to follow the safety requirements for tree care operations as presented in the most current edition American National Standards Institute ANSI Z133.1

VI. REFERENCES

Dirr, Michael A. Manual of Woody Landscape Plants. 5th ed. Champaign: Stipes Publishing, 1998.

Wilhelm, Gerould. Flora of the Chicago Region: A Floristic and Ecological Synthesis. Conservation Research Institute, 2017.

Arboricultural Specifications and Standards Manual, City of Urbana (downloaded April 2018)

<https://www.urbanaininois.us/boards/tree-commission>

Arboricultural Specifications Manual, City of Aurora (downloaded April 2018) [https://www.aurora-](https://www.aurora-il.org/DocumentCenter/View/514)

[il.org/DocumentCenter/View/514](https://www.aurora-il.org/DocumentCenter/View/514)

American Standard for Nursery Stock, ANSI Z601

[www.anla.org/applications/Documents/Docs/ANLStandard2004.pdf]

Safety Requirements for Tree Care Operations, the American National Standards Institute, Inc. ANSI Z133.1

- www.isa-arbor.com/publications/pdfs/zpart1.pdf
- www.isa-arbor.com/publications/pdfs/zpart2.pdf
- www.isa-arbor.com/publications/arbnews/pdfs/zpart3.pdf

Tree, Shrub, and Other Woody Plant Maintenance - Standard Practices for Tree Care Operations, the American National Standards Institute ANSI A300 [www.tcia.org/Public/gov_standards_a300.htm]

Additional Websites:

- Chicago Botanic Garden [www.chicagobotanic.org]
- International Society of Arboriculture [www.isa-arbor.com]
- Lake County Forest Preserve District [www.lcfpd.org]
- The Morton Arboretum [www.mortonarb.org]

Appendix K: Arboretum Level I Certification Criteria

The ArbNet Arboretum Accreditation Program was created by the Morton Arboretum to establish and share a widely recognized set of industry standards for the purpose of unifying the arboretum community and providing a mechanism for benchmarking and guidelines for professional development.

A [Level I Arboretum](#), the most basic level of accreditation requires achievement of the following standards:

- An arboretum plan: documentation of some sort, such as an organizational plan, strategic plan, master plan, or other, that defines the purpose of the arboretum, its audience(s), the types of plants that are to be grown to achieve that purpose and serve those audiences, provisions for the maintenance and care of the plants, and provisions for the continuing operation of the organization through time with a clear succession plan.
- An arboretum organizational group of people or governing board or authority that is dedicated to the arboretum plan and its continuation beyond the efforts of a single individual. Such an organizational group can affirm fulfillment of standards and authorize participation as an accredited arboretum.
- An arboretum collection with a minimum number of 25 kinds (species or varieties) of trees or woody plants that have been planted and are growing in accordance with the arboretum plan. Plants in the arboretum collection must be labeled in some way as to identify them taxonomically, including scientific name and cultivar if applicable, and documented in some way so that information on their acquisition (source or origin, date of acquisition, etc.) is available for access.
- Arboretum staff or volunteers who ensure fulfillment of the arboretum plan and provide for the basic needs of the arboretum collection and functions of the arboretum.
- An arboretum public dimension that includes some level of public access, and at least one public event or educational program each year focused on trees or arboretum purposes (for example, an Arbor Day observance).

<http://arbnet.org/accreditation/levels-accreditation/level-i-criteria>

Appendix L: Monarch Conservation

Each fall, hundreds of millions of monarch butterflies migrate from overwintering areas in Mexico and California where they wait out the winter until conditions favor a return flight in the spring to the United States and Canada where they find their summer breeding range.

Pressures from land development and the widespread use of herbicides are significantly impacting the presence of milkweeds (*Asclepias* sp.) across North America. Milkweeds are essential for the survival of Monarch butterflies. Without milkweeds monarchs would not be able to produce the successive generations that culminate in the migration each fall. Similarly, without nectar from flowers these fall migratory monarch butterflies would be unable to make their long journey to overwintering grounds in Mexico. All monarch and butterfly populations around the world need for host plants for larvae and energy sources for adults.

Monarch Waystations are places that provide resources necessary for monarchs to produce successive generations and sustain their migration. The College of Lake County joined [Monarch Watch](#) received its certificate #183720 in spring 2017, for pledging to create and maintain a monarch habitat.

CLC is also working with the Illinois Green Economy Network, to help promote similar programs among community colleges across the State of Illinois. IGEN is working with the [Monarch Joint Venture](#) and affiliated educational, research, and conservation organizations to develop the IGEN Monarch Migration Network to help promote conservation and preservation of monarch habitats.



Appendix M: Intersection Visibility Code

Safety has to be the primary concern on campus roadways and at road intersections. Plantings and signage along roadways should not inhibit visibility of traveling vehicles. The Intersection Visibility Code cited below provides a framework for a minimum distance that plantings and signage, between 3 feet and 10 feet in height, can be placed in proximity to roadway intersections. The U.S. Dept. of Transportation recommends an intersection sight distance of 140 feet for cars traveling at 30 mph, and increased distances for faster travel speeds. ([Vegetation Control for Safety](#), pg. 21)

Lake County Unified Development Ordinance


§ 151.172 INTERSECTION VISIBILITY.

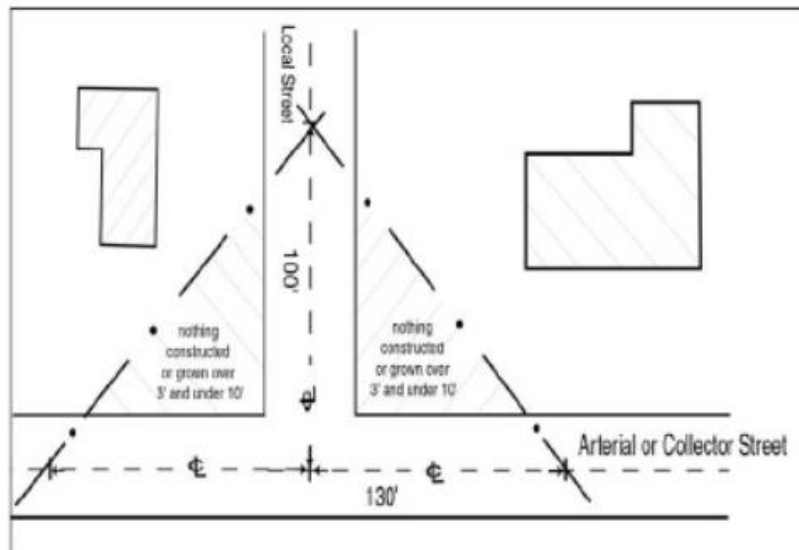
(A) Notwithstanding any other standard of this chapter, nothing shall be erected, placed, planted, or allowed to grow in such a manner as to impede or obstruct vision between a height of three feet and ten feet above the road crown within an imaginary area formed by a point on each street centerline located:

(1) One hundred feet from the intersection of local street centerlines and a third line connecting the two points;
or

(2) One hundred thirty feet from the intersection of collector or higher category street centerlines and a third line connecting the two points.

(B) This provision may be modified by the Planning, Building and Development Director after consulting with the subject highway authority. (See Figure 151.172(B).)

 *Figure 151.172(B): Intersection Visibility*



[http://library.amlegal.com/nxt/gateway.dll/Illinois/lakecounty_il/titlexvlandusage/chapter151unifieddevelopmentordinance?f=templates\\$fn=default.htm\\$3.0\\$vid=amlegal:lakecounty_il\\$sanc=JD_Chapter151](http://library.amlegal.com/nxt/gateway.dll/Illinois/lakecounty_il/titlexvlandusage/chapter151unifieddevelopmentordinance?f=templates$fn=default.htm$3.0$vid=amlegal:lakecounty_il$sanc=JD_Chapter151)

**COLLEGE OF LAKE COUNTY (CLC)
PARKING LOT BIOSWALES
FAA#3191506**

**OPERATIONS & MAINTENANCE PLAN
FOR CLC PARKING LOTS 2, 3, 6, & 7 BIOSWALES**

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MEAI Project No. 02-15-14-018

Date: 6/28/16

College of Lake County
Landscape Management Plan - Appendix

MAINTENANCE PLAN NARRATIVE

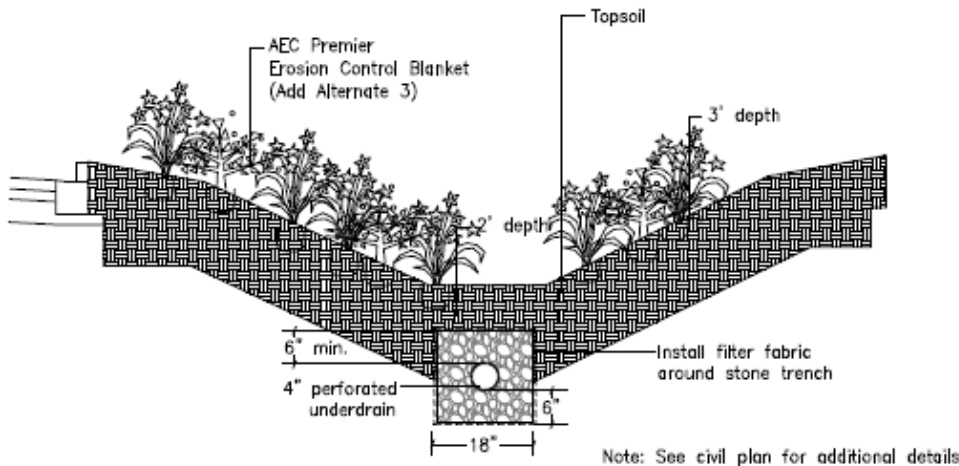
The College of Lake County (CLC) installed parking lot bioswales as Best Management Practices (BMPs) to reduce nonpoint source pollution in Willow Lake, which feeds into Third Lake before reaching Mill Creek. Willow Lake is located on the College of Lake County Grayslake Campus between Willow Way and Brae Loch Road, Grayslake, Illinois. The Illinois Environmental Protection Agency (Illinois EPA) provided grant funds through the Clean Water Act Section 319 Nonpoint Source Pollution Reduction Program for installation of the bioswales and requires a minimum 10-year obligation to maintain the project area in accordance with an approved Operations & Maintenance (O&M) Plan, which in this case is designed to cover the time frame from 2017-2027.

The project included the installation of 2,150 linear feet of parking lot bioswales in four existing parking lots (2, 3, 6, & 7) on the College of Lake County campus in Grayslake, Illinois. Parking lots 7 and 7A were reconstructed (2016) into one newly configured parking lot 7, with the adjacent construction of the new science building.

BIOSWALES:

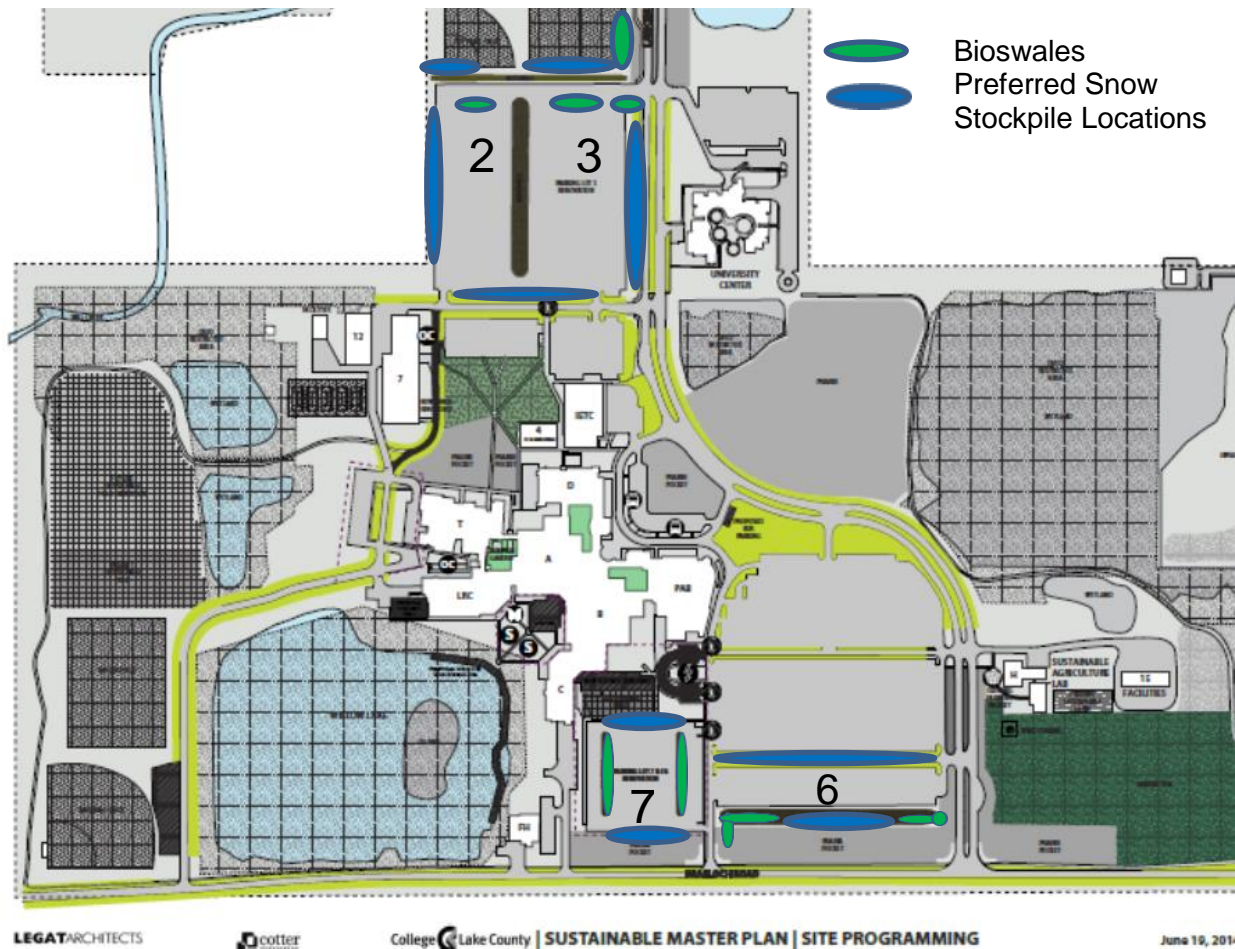
Bioswales are long, narrow depressions or channels designed with absorbent soils and planted with deep-rooted vegetation. They provide a way to filter, retain, and route excess stormwater away from where it is not wanted (United States Environmental Protection Agency, 2015). Parking lots are a significant source of nonpoint source pollution impacting waters downstream and are good locations for the installation of bioswales. See **Figure 1** for the Bioswale Cross Section. Bioswales with deeply rooted native plants improve water quality by reducing the stormwater flow velocity, increasing infiltration, and removing impurities from parking lot runoff.

FIGURE 1: Bioswale Cross Section (with optional underdrain pipe)



The exact locations of the bioswales for lots 2 and 3 are still being evaluated with the CLC grounds department, in order to respond to plans for renovation and to maximize efficiency. CLC will adhere to the agreed upon total linear feet for parking lot bioswales identified in the Section 319 grant agreement. See **Figure 2** for a map of the CLC Grayslake Campus Parking Lot Bioswales & Snow Stockpiling Map. An updated map of the locations of parking lots 2 & 3 bioswales will be added to the O&M Plan when finalized.

FIGURE 2: CLC Grayslake Campus – Parking Lot Bioswale Locations & Snow Stockpiling Map



PURPOSE:

The bioswales shall be designed to filter runoff so as to remove suspended sediment, heavy metals, oil and grease, nutrients, and other suspended and soluble nonpoint source pollutants, as well as reduce runoff volume and velocity while providing other beneficial hydrologic functions. The bioswales will be constructed and maintained in a way that collects and infiltrates the stormwater runoff from the parking areas, roadways and adjoining areas. As a center for sustainability learning in Lake County, College of Lake County’s (CLC) parking lot bioswales will provide a highly visible example of stormwater Best Management Practices (BMPs) for students and members of the community.

The short term maintenance program (years 1-2) and the long term maintenance program (years 2-10+) list the bioswales stormwater infrastructure elements, their inspection periods, and possible repair and maintenance activities to be performed. The long term maintenance plan includes items that could not be addressed adequately in the short term maintenance plan and consisting of more extensive maintenance and repair or replacement as required, depending on the wear and tear of the parking lot bioswales.

PLANT MATERIAL:

Plants installed in the bioswales include forbs, grasses, and sedges that are native to the region and that have been shown to be reasonably salt tolerant. Shrubs and trees were included in the parking lot bioswales landscaping. Bioswales for parking lot 7 was seeded in the fall 2016, plugs were planted in parking lot 6 in summer 2017, and parking lots 2 and 3 were seeded in summer 2017.

CLC staff and consultants utilized plant material that can be found in the Practice Standards of the [Illinois Urban Manual, Table A](#). Grass, forb, and sedge species selected for low maintenance areas utilized the [Illinois Native Plant Guide](#) and other resources such as the [Lake County Forest Preserve District](#). The plant list for parking lots 6 and 7 bioswales are included in **Attachment L-1**. While plugs were planted in the bioswales, a seed list for over-seeding has been included by McClure Engineering.

CLC's grounds maintenance staff of the facilities department will be responsible for maintaining the bioswales with technical training from CLC's horticulture department faculty and Sustainability Manager. Maintenance will include the items included in the short-term and long-term maintenance program.

RESPONSIBILITIES:

CLC's Sustainability Manager and the Grounds Supervisor of the Facilities Department are responsible for both short and long term overall maintenance of the parking lot bioswale BMPs. CLC may elect to contract with other firms/organizations to perform certain maintenance/monitoring services to ensure proper management of the bioswales. As with the CLC Grounds Department staff, any contracted landscaping company would receive training on proper monitoring and maintenance practices from CLC horticulture faculty and/or the Sustainability Manager.

MAINTENANCE CONSIDERATIONS:

The CLC Sustainability Manager will be working in conjunction with horticulture professors and educated students to perform in-class and hands-on trainings with the CLC grounds maintenance staff. All trainings and some of the initial maintenance activities will be overseen and supervised by the Sustainability Manager. The grounds staff is currently being trained on native plant maintenance in other areas of the CLC campus.

Cleaning and repairing bioswale outflow pipes, grates, outlet structures and manholes is particularly important. If these subsurface elements become clogged, then water may flood the pavement surface and may cause extensive erosion damage or water flow blockage. The bioswale, outflow pipes, grates and manhole cleaning will be a routine maintenance activity that is scheduled several times a year, and may also need to be carried out on an as needed basis. Experience will show the required cleaning frequencies for specific drainage structures.

COST CONSIDERATIONS:

Regular monitoring and maintenance and repair/replacement needs and costs will be part of CLC's annual Facilities Department budget. Frequent maintenance program work execution will lead to less frequent and less costly long term maintenance and repair, possibly requiring replacement. The attached short term and long term maintenance provisions may need to be adjusted based on experience recorded over the initial period of occupancy.

RECORD KEEPING:

Separate and distinct records shall be maintained by the CLC Sustainability Manager to record the specific activities thereof for the short term and the long term maintenance plan implementation. The records shall include the dates of maintenance visits, specific work performed, and associated costs if repair or replacement is required.

INTERPRETATION AS TO REQUIREMENTS UNDER THIS MAINTENANCE PLAN:

The requirement for this maintenance plan is part of the Illinois EPA Section 319 grant for the 10 year O&M period. Therefore, the interpretation of the maintenance requirements set forth in this maintenance plan shall be interpreted on the basis of the intent and requirements of said grant requirement. Specific areas for concern are identified in the following sections of this maintenance plan.

**SHORT TERM MAINTENANCE PROGRAM
(Years 1-2)**

The prescribed periodic inspections for the short term maintenance program are to be supplemented by additional inspections and maintenance work on an as-need basis such as at times following periods of substantial rainfall or high winds.

Infrastructure Elements	Inspection Timing	Concerns to Address	Repair Work
General – All Areas	March - November	Disturbed surface areas	Seed grass area, mulch protection
Manholes/Grates	March - November	Branches, leaf litter, trash	Collect and dispose
	Monthly	Displaced covers/lids	Reset covers/lids
Curb Cuts	March - November	Branches, leaf litter, trash	Clear out and dispose
		Disturbed surfaces	Provide erosion protection
Outlet Control	March - November	Branches, leaf litter, trash	Collect and dispose
			Check for adequate flow
Bioswales	March - November	Vegetation	Control/remove invasive species
			Replace native plants as needed
	Monthly	Branches, leaf litter, trash	Clear and dispose
		Pathways made thru vegetation	Add plants and signage, or consider stepping stone installation
	Weekly (during first growing season)		Water as needed
Annually (before start of each growing season)		Remove dead plant material	

**LONG TERM MAINTENANCE PROGRAM
(Years 2-10+)**

Long range maintenance activities are necessary when a stormwater infrastructure element could not be addressed adequately in the short term maintenance plan work and/or normal wear and tear, or advertent or inadvertent acts, have adversely and substantially impacted the parking lot bioswales. The maintenance inspection periods for may need to be adjusted on an as-need basis.

Stormwater Infrastructure Elements	Inspection Timing	Repair Work (as needed or as specified)
General – All Areas	Bi-annually	Seed Grass Area, Mulch Protection
Tree Trimming	Annually	Trim/Prune
Sewer/Swale Outfalls	Annually	Remove Siltation, Re-seed
Flared End Sections	Annually	Repair/Restore/Replace
Bioswales	3-5 Year Intervals	Re-plant Native Plants
		Prescribed Burn (if possible)
	Annually	Mowing – To remove dead vegetation at the beginning of the growing season
		Remove Siltation, Herbicide Application by State-Licensed Applicator
Stone	Annually	Re-stabilize/Replace
Manholes	Annually	Repair/Replace

ON-GOING BIOSWALE OPERATIONS & MAINTENANCE ACTIVITIES

VEGETATION:

Prepare adequate seed bed with relatively smooth topsoil, free from stones, clods, sticks, and other debris.

Follow germination requirements and establishment practices according to each separate native plant species to be planted, whether by seed, or live planted, or by rootstock. Generally rootstock and live plants shall be planted between the date of the last frost and mid-June. Seeding can be performed in the spring between March 1 and May, and after November 15 in the fall, for dormant seeding. Seeding in July and August requires adequate irrigation. If initial seeding is followed by a dry period, irrigation may be required until the plants are fully established, and can withstand a drought. Irrigate in a manner that does not erode the soil.

Most native species do not require any traditional fertilization to become established, and fertilization is discouraged, as it promotes the growth of undesirable weeds.

Any landscaping company contracted to maintain BMPs will have training in identifying native and invasive species and also training in this O&M plan, prior to commencing work. As with the CLC grounds department staff, any contracted landscaping company would receive training from CLC horticulture faculty and/or Sustainability Manager.

If any invasive species are found, they may be controlled with selective herbicide application, to prevent from overtaking the desired planted material, apply herbicide in accordance to BMP's, consistent with the label indications, and in a manner which does not impact other nearby plants. A licensed applicator must be used for herbicide applications.

Prescribed burning over time will promote the desired native species and reduce many of the non-fire adaptive species. Prescribed burning requires an Open Burning Permit from the Illinois EPA as well as permission from the local fire department, and other contingencies.

Mowing may be used to control some invasive species, in order to reduce weed competition in the early stages. Native vegetation establishment areas should be mowed during March and/or August once or twice per year with a mower height of 6 inches to 12 inches.

In instances where visibility of oncoming traffic becomes inhibited by the growth of vegetation, plants may be cut within 4 feet of the curb. Lower profile plants may need to be planted in this area to keep visibility open and maintain stormwater bio-infiltration function.

STORMWATER INFRASTRUCTURE ELEMENTS:

Monitor and maintain a protective measure, such as a cell or compartment of plastic or nylon mesh, as a technique to prevent depredation of vegetation due to wildlife eating the plant material.

Consider cover crop (reduces invasive species during establishment), mulch, or an erosion blanket to hold and stabilize the soil, until the described permanent vegetation is established.

WINTER MAINTENANCE:

CLC ground department staff will avoid storing plowed snow in the swales whenever possible, rather, snow will be piled on the periphery of parking lots away from bioswales. See Figure 2 for location of preferred snow removal stockpile areas.

CLC grounds department staff apply salt as needed to melt ice and avoid safety hazards. A policy is being developed that will specify how salt will be applied to parking lots and sidewalks only as much as necessary, in order to avoid excessive application.

DOCUMENTATION:

Take representative photographs. Establish permanent photograph locations so photographs can be reviewed over time.

ATTACHMENT L-1: BIOSWALE PLANT LIST

Parking Lot 6	
Plants: (Containers)	Common Name:
<i>Asclepias incarnata</i>	Red Milkweed
<i>Bouteloua curtipendula</i>	Side Oaks Gramma
<i>Carex stricta</i>	Tussock Sedge
<i>Iris virginica</i>	Blue Flag Iris
<i>Pycnanthemum virginianum</i>	Mountain Mint
<i>Schizachrium scoparium</i>	Little Bluestem
<i>Spirea alba</i> (shrub)	Meadow Sweet
<i>Carex lupulina</i>	Hop Sedge
<i>Hibiscus moscheutos</i>	Swamp Rosemallow
<i>Monarda fistulosa</i>	Wild Bergamot
<i>Oligoneuron ridellii</i>	Ridell's Goldenrod
<i>Physostegia virginica</i>	Obedient Plant
Parking Lots 2, 3, and 7	
Forbs: (Seed)	Common Name:
<i>Allium cernuum</i>	Nodding Wild Onion
<i>Asclepias incarnata</i>	Red Milkweed
<i>Cacalia atriplicifolia</i>	Pale Indian Plantain
<i>Echinacea purpurea</i>	Purple Coneflower
<i>Eupatorium maculatum</i>	Joe Pye Weed
<i>Eupatorium perfoliatum</i>	Boneset
<i>Helenium autumnale</i>	Dogtooth Daisy
<i>Heliopsis helianthoides</i>	Ox Eye Sunflower
<i>Iris versicolor</i>	Blue Flag Iris
<i>Liatris pycnostachya</i>	Prairie Blazing Star
<i>Liatris spicata</i>	Dense Blazing Star
<i>Monarda fistulosa</i>	Wild Bergamot
<i>Ratibida pinnata</i>	Yellow Coneflower
<i>Rudbeckia hirta</i>	Black-Eyed Susan
<i>Rudbeckia subtomentosa</i>	Sweet Black-Eyed Susan
<i>Solidago ohioensis</i>	Ohio Goldenrod
<i>Solidago rigida</i>	Stiff Goldenrod
<i>Symphyotrichum laeve</i>	Smooth Blue Aster
<i>Veberna hastata</i>	Blue Vervain
<i>Vernonia fasciculata</i>	Ironweed
<i>Zizia aurea</i>	Golden Alexander
<i>Cassia hebecarpa</i>	Wild Senna
<i>Desmodium canadense</i>	Canada Tick Trefoil
Grasses, Sedges, Rushes: (Seed)	Common Name:
<i>Bouteloua curtipendula</i>	Side Oats Gramma
<i>Carex hystericina</i>	Porcupine Sedge
<i>Carex scoparia</i>	Broom Sedge
<i>Carex stipata</i>	Awl Fruited Sedge
<i>Carex vulpinoidea</i>	Fox Sedge
<i>Elymus virginicus</i>	Virginia Wild Rye
<i>Schizachrium scoparium</i>	Little Bluestem