Findings and Recommendations, Sustainable Grounds Working Team

Executive Summary

This report provides an overview of sustainable landscaping practices and their benefits for both Charlestown and the environment. Sustainable landscaping involves designing, implementing, and maintaining outdoor spaces in a way that minimizes negative environmental impacts, conserves resources, promotes biodiversity, and in many cases saves money.

Key findings include:

1. Water Conservation: Sustainable landscaping strategies significantly reduce water usage, mitigating strain on local water resources and lowering water bills for Charlestown.
2. Fertilizer Usage: Implementing sustainable landscaping practices can substantially reduce the need for chemical fertilizers, saving money, and promoting healthier soil and ecosystems.
3. Soil Health: Sustainable landscaping practices improve soil health, enhancing its ability to retain moisture, nutrients, and support diverse plant life. Negative impacts on the Chesapeake Bay and on local water bodies are also reduced.
4. Biodiversity Enhancement: Incorporating native plants, creating wildlife habitats, and avoiding chemical pesticides fosters biodiversity, supporting local ecosystems and promoting pollinator populations crucial for food production.
5. Carbon Sequestration: Trees and vegetation in sustainable landscapes function as carbon sinks, absorbing CO2 from the atmosphere and mitigating the effects of climate change.
6. Community Engagement: Sustainable landscaping initiatives provide opportunities for Resident involvement through educational programs, volunteer activities, and public green spaces, fostering a sense of environmental stewardship and social cohesion.

Recommendations for Charlestown include:

1. Grassy Areas: Clover Should be added to the seed mix when performing routine overseeding. Native grasses should be used in areas where traditional turf grass is not suitable.
2. Bare and/or eroded areas: Native plants should be utilized in bare areas or in areas prone to erosion. A combination of native plants and brush mattresses in the steepest, most problematic eroded areas, would significantly reduce erosion.
3. Woodlands Management: Routine removal of diseased trees, dead trees, or trees that present a safety risk will open the canopy enough to promote regeneration and healthy growth. Only native tree species should be used for reforestation.
4. Invasive Species: Between the Grounds Crew, the Landscape Contractor, and the Resident Invasive Plant Crew, invasive plants are generally being controlled. This Resident/Staff cooperation should continue to be encouraged.
5. Resident Volunteers: In coordination with the Grounds Department, existing Nature Groups and Resident volunteers should be encouraged to participate in periodic native planting events.
6. Outside Funding (Grants): Grants can provide vital support for important sustainability initiatives, but navigating the complexities and uncertainties associated with pursuing them can pose significant challenges. While outside funding sources should continue to be researched, Charlestown should proceed with caution.
7. Gas Powered Versus Electric Lawn Equipment: Considering all the pros and cons, with the electric technology currently available, gas-powered equipment continues to be the best choice for a facility like Charlestown.
8. Partnering with Colleges and Universities: While there were interesting discussions regarding partnering with Morgan Statue University, UMBC and CCBC, there were no firm commitments. Charlestown should continue to maintain contact with these institutions and attempt to develop future partnerships.
9. Education (Residents & Staff): Traditional educational opportunities such as Sunburst articles and ELLIC classes should be used as appropriate. However, Resident tours would have the greatest positive impact.

Overall, embracing sustainable landscaping not only improves the aesthetics and functionality of our outdoor spaces here at Charlestown, but also contributes to the long-term health and resilience of ecosystems, communities, and the planet.

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Overview - Sustainable horticulture offers a myriad of benefits that extend beyond mere aesthetic appeal, contributing to ecological health and sustainability. By incorporating plants that are naturally adapted to the local climate, soil, and wildlife, sustainable horticulture promotes biodiversity and enhances the overall resilience of ecosystems. Since sustainable horticulture utilizes native plants, there is less need for water, fertilizer, and pesticides compared to non-native species, thereby conserving resources, and reducing environmental impact. Additionally, native plants provide critical habitat and food sources for local wildlife, fostering a balanced and thriving ecosystem. The use of sustainable horticulture, along with sound run-off control measures, can also mitigate soil erosion, improve water quality, and support the preservation of regional identity and cultural heritage. As a sustainable and environmentally friendly approach, sustainable horticulture not only beautifies outdoor spaces but also plays a vital role in fostering harmony between human habitats and the natural world.

Team Members – Mark Buehlman - Conservation Committee; Courtney Baker - Staff Representative; Ron DeAbreu - Finance Committee; John Lorenz - Grounds Committee; Steve Webster - Invasive Plant Crew

Native Grasses (water conservation and reduction of chemical use)

Overview - The cultivation of native grasses promotes biodiversity, conserves water, and enhances soil health, contributing to sustainable ecosystems and resilient landscapes.

The reduction of water consumption and use of chemicals in the maintenance of Charleston's signature beautiful outdoor spaces are important goals of sustainability. The reduction of the amount of grass/turf that covers a significant percentage of the campus would help to achieve these goals.

Maintenance of the green appearance and health of the grass around campus, especially during our Maryland summers, requires substantial amounts of water, fertilizer, and pesticides, not to mention fuel for the mowing that must be done regularly and at some cost to the community. Standard grass lawns are hard on the environment. Some grasses require 1-5 inches of water a week to survive and require regular mowing. According to one estimate, 17 million gallons of gasoline are spilled annually in the US just in the refilling of the tanks of gas-powered mowers, and of course, emissions from these mowers add to air pollution.

Alternatives - There are several low-cost options for replacing grass around Charlestown. *Ornamental grasses* are one of those options. They require little or no maintenance, are drought-resistant, and do not require mowing.

Another option is *sweet woodruff*, which is an edible herb that tastes like vanilla. It requires no mowing or watering, produces star-shaped, lacy white flowers, and is weed resistant. Woodruff works best in shady areas.

Moss, of which there are dozens of types in terms of texture and appearance, is also suitable for shady areas. Like the other options, moss does not require mowing and is drought resistant.

A fourth option is *clov*er, perhaps the best because of its versatility. There are several types of clover, including micro clover, which has smaller leaves and can be mixed with several types of sustainable grasses such as fescue. Dutch clover, often seen in fields and meadows, is perfect for heavily used areas.

Clover is a natural soil conditioner and does not need watering, mowing, or fertilizers. It is, in fact, highly drought resistant. Clover is particularly good for areas that are hard to reach with a mower such as slopes and hillsides.

Given the several options for replacing turf/grass around campus with low cost, low maintenance, attractive alternatives that would reduce water consumption, the use of chemicals, and mowing needs, our recommendations are as follows:

Recommendations – Clover should be added to the seed mix when performing routine overseeding. In addition, evaluating one or more of these alternatives in select areas around campus would be worthwhile. The test areas should be behind Cross Creek, the steeper slopes along Erickson Way, and areas around the lake, e.g., to the right on the way in. The costs should be minimal, with seed and labor totaling $1,000 or less.

Runoff and Erosion Control

Overview - Effective erosion control measures safeguard against soil loss, preserving fertile topsoil, preventing water pollution, and maintaining the stability of landscapes.

Charlestown has many areas with no or sparse groundcover. During rain events, soil particles, and excess nutrients (nitrogen and phosphorous), wash off and become suspended in the rainwater. If the draining water does not evaporate or soak into the ground where it can be filtered, it flushes straight into local creeks, rivers, and the Chesapeake Bay, adversely affecting water quality and aquatic life.

Alternatives – In most cases ground cover for erosion and runoff control is preferrable to engineered solutions such as french drains, silt fences, retaining

walls, and gabions. Ground cover traditionally is less costly and does not have the ongoing maintenance requirements of engineered solutions. By gripping the soil with their more extensive roots, certain native plants can do a better job at erosion control than turf grass, especially in shade areas where grass grows poorly.

For best and fastest results, plants should be chosen that spread quickly, either by underground suckering, runners, or by self-seeding. Depending on the area, shade tolerance and the ability to withstand foot traffic need to be considered. This is often referred to as “right plant - right place.” A few examples of native Maryland erosion control ground covers are:

Maryland Native Ground Covers

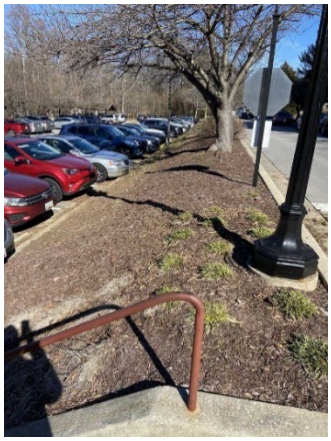
Creeping phlox (Phlox stolonifera), Juniper (Juniperus horizontalis), Moss phlox (Phlox subulata), Partridgeberry (Mitchella repens), and Sedums (Sedum spp.)

Recommendations – The areas for native plantings for runoff and erosion control should be chosen by the Grounds Supervisor. Solutions need to be customized for specific areas, since the quality and chemical composition of Charlestowns’ soils vary greatly. There are, however, some areas that should be prioritized:

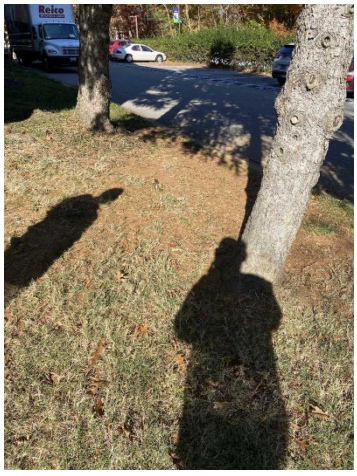
1. The steep bank behind Harbor View, where the slope is currently covered with English Ivy and Canada Thistle, both invasives. The invasives should be removed and replaced with native plants well-suited to the area.

2. The steep bank between the front of Harbor View and Erickson Way should be planted in prairie grasses that can tolerate significant direct sunlight.

3. The berms, bordering the Saint Charles parking lot and Charlestown Square, should be converted to the appropriate meadow grasses. This will create “living water bars,” reducing erosion and providing an additional benefit of less dirt and debris splashing onto adjacent automobiles.

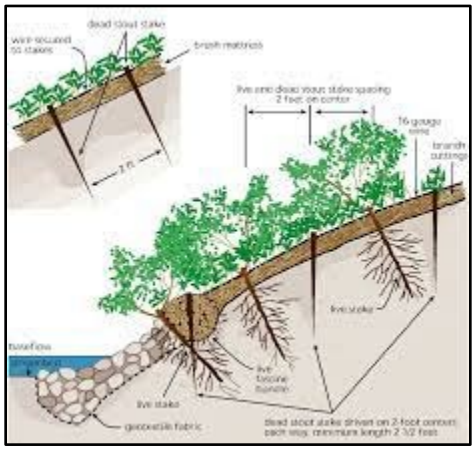


4. Throughout the campus there are many bare areas around both conifer and deciduous trees. The proper plantings for these areas will vary depending on the amount of shade, the soil pH, soil composition and slope. In most cases the choice will be a nitrogen fixer, plants which are able to convert atmosphere nitrogen into nitrogen compounds usable by the plants. Certain sedges may succeed, but there are a variety of clovers that may also work. This will not only slow the decline of the trees and the lawn but will stabilize the soil as well.



5. The steep banks surrounding the Nature Trail, especially on the Saint Charles side, are particularly problematic. The recommended approach would be to use a combination of live plantings and brush mattresses or fascines.

6. The steeps banks between Erickson Way and the Lake also present significant problems. Many of the trees are non-native and survive well even with heavy Deer browsing. In addition to removing the current invasive trees, when appropriate, these slopes would also benefit from a combination of live plantings and brush mattresses or fascines



Brush Mattresses or Fascines

7. The area at the end of the Chapel Court parking lot has little vegetation, especially since two large trees were removed. There has been a limited amount of milkweed and bluestem prairie grass planted, but these plantings should be significantly expanded.

Woodlands Management

Overview - Managing forests sustainably ensures a myriad of ecological, economic, and social benefits, including carbon sequestration, biodiversity conservation, watershed protection, and a stable supply of timber resources.

Charlestown has woodlands scattered throughout the campus, with the most significant located on the Cross Creek side. The forests are composed of many native trees but due to the history and the development of the campus, there are scattered non-native trees. Most of the forests are moderately stressed from the effects of fragmentation, deer browsing and poor soil conditions. There are scattered wetlands throughout and these woodlands serve as homes to a multitude of animals and birds.

Alternatives – Managing woodlands involves various strategies aimed at promoting biodiversity, sustainability, and ecological health. One approach is implementing sustainable logging practices, such as selective harvesting to maintain the integrity of the ecosystem and minimize habitat disruption. Controlled burns can even be utilized to regenerate certain tree species and enhance soil fertility. Reforestation projects help replenish tree populations and restore degraded areas.

Recommendations – When this study began, there was concern about not only the health of the forested areas, but also the amount of canopy cover in certain areas. After walking and studying the woodlands, we would recommend a no action alterative. The management alternatives discussed above would be costly, disruptive, and would not significantly improve the health of the forests. The routine removal of diseased trees, dead trees, or trees that present a safety risk will help to open the canopy where needed. We would recommend, however, that only native tree species be used for reforestation.

Invasive Species

Overview - Removing invasive plants helps restore native ecosystems by reducing competition for resources, enhancing biodiversity, and promoting the overall health and resilience of the environment.

Charlestown has many invasive plants such as: English Ivy, Garlic Mustard, Multiflora Rose, Mile-a-Minute, Wild Grape Vine, Virginia Creeper, and Porcelain Berry located throughout the campus. These invasive plants possess robust reproductive strategies, rapidly spreading through seeds, rhizomes, or vegetative propagation, which complicates eradication efforts. Furthermore, these plants often outcompete native species for resources, altering ecosystems and creating ecological imbalances that further hinder control measures.


English Ivy


Purple Loosestrife


Multiflora Rose

Alternatives – Controlling invasive plants requires a multifaceted approach to prevent their spread and mitigate their impact on native ecosystems. Manual removal methods such as pulling, cutting, or digging out invasive plants can be effective for small infestations, but larger areas may require mechanical or chemical control methods. Biological control using natural predators or pathogens can also be employed cautiously. Additionally, implementing measures to prevent

further spread, such as cleaning equipment and controlling seed dispersal, is essential. Continuous monitoring and adaptive management are vital components to ensure long-term success in managing invasive plant species.

Recommendations – Currently the resident run Invasive Plant Crew augments the work of the Grounds Department and landscaping contractor by manually removing invasive plants around the campus. Six to nine residents work on Saturday mornings year-round in the wooded areas of Charlestown as well as the bushes and shrubs around the residential buildings, the Chapel, Caton Woods, the Corporate Office Building, the Sulpician Retirement Building, and along the roadways. The crew also removes English Ivy from trees on properties adjoining the Charlestown property, for example along the Trolley Trail. In the past, an outside conservation group, Patapsco Heritage Greenway, has joined on a Saturday morning to jointly pull Garlic Mustard. The crew also thins out volunteer saplings and prunes trees and shrubs as needed.

After some study, we would recommend a no action alternative. Since no herbicides are used, eliminating invasive plants is nearly impossible on the Campus, but between the three groups invasive plants are generally being controlled. The work of the Invasive Plant Crew demonstrates the value of Resident volunteers. Additional opportunities for Resident involvement will be discussed in the next section of this report.

Resident Volunteers

Overview – Senior Residents volunteering not only contribute valuable skills and experience to our Community but also enhanced mental well-being, social connection, and a sense of purpose, fostering a more active and fulfilling retirement.

Recommendations – The Residents' Council Grounds Committee, the Nature Trail Club and the Invasive Plant Crew have all expressed interest in helping to beautify the outdoor spaces at Charlestown. The first step would be to identify those areas that would most benefit from native plants. As discussed in some of the earlier sections of this report, these areas could include, but not be limited to slopes alongside Erickson Way, the area behind the Cross Creek lobby, the Nature Trail, the Saint Charles berm, and other areas that would benefit from increased curb appeal.

The second step would be to choose dates for these Resident planting events. Because of the timing, we would suggest only one event in 2024. April 25, 2024, in conjunction with Nature Fest is an alternative, as is Earth Day, April 22, 2024. In future years more events could be planned in March or early April. These events would be publicized so other Residents, in addition to the forementioned three groups, could sign-up and participate.

The third step would involve the actual site preparation and planting. In coordination with the Grounds Department, tools, gloves, and the planned plants, trees, shrubs, or grasses would need to be staged. Much of this cost could be covered by the existing Grounds budget, and there is a chance for additional funding from a Nature Trail donation.

The fourth step would be the follow-up. After the plantings had matured and possibly flowered, The Residents' Council Grounds Committee, the Nature Trail Club, and the Invasive Plant Crew, along with other interested Residents, would check on their condition. These three groups, along with the Grounds Department, would provide continuing care for the plants.

In addition, There are open space areas, away from residential buildings, which would benefit from birdhouses. This would attract more birds to nest here and allow Residents to view the many birds on the Charlestown Campus. Residents in the woodshop have offered to build the birdhouses, and they could be installed and maintained by interested Residents.

Outside Funding (Grants)

Overview - Grant sources for sustainable planting initiatives can be diverse, catering to various aspects of environmental stewardship and community development. Non-profit organizations such as the Arbor Day Foundation, the Sustainable Agriculture Research and Education (SARE) program, the Maryland Department of Agriculture, and the Chesapeake Bay Trust provide grants for tree planting projects and education for sustainable land use. Additionally, corporate entities often invest in sustainable planting through corporate social responsibility (CSR) initiatives, offering grants to support reforestation efforts and community gardens. These grant sources play a crucial role in fostering sustainable planting practices, promoting biodiversity, enhancing ecosystem services, and building resilient communities.

Alternatives - Grant funding offers numerous benefits for organizations and communities engaged in various projects and initiatives. Firstly, grants provide financial support that enables recipients to pursue their goals and objectives without the need for immediate repayment, thereby reducing financial strain and facilitating long-term planning. Moreover, grants often come with prestige and validation, enhancing the credibility and visibility of the recipients and their projects. Additionally, grant funding can foster collaboration and networking opportunities, connecting recipients with other stakeholders, experts, and resources within their field. However, grant funding also presents challenges and limitations. Competition for grants can be intense, requiring considerable time and effort in the application process, with no guarantee of success. Furthermore, grant requirements and restrictions may impose limitations on project scope, implementation timelines, and budget allocations, potentially hindering flexibility, and creativity. Additionally, grants typically come with reporting and compliance obligations, necessitating careful monitoring and documentation throughout the project lifecycle. Despite these drawbacks, the benefits of grant funding often outweigh the challenges, providing crucial support for innovation, research, and community development efforts.

Recommendations – Charlestown currently does not have staff dedicated to pursuing grants. As discussed above, the process can be daunting and fraught with potential problems. The process of applying for grants can be time-consuming and labor-intensive, requiring significant effort in researching funding opportunities, crafting compelling proposals, and adhering to strict guidelines. Additionally, competition for grants is often fierce, with many applicants vying for limited funding, leading to low success rates. Stringent reporting requirements and administrative burdens may divert resources away from core activities. Relying heavily on grants can create financial instability, as funding sources may fluctuate or dry up entirely, leaving projects or programs vulnerable to sudden disruptions. While grants can provide vital support for important initiatives, navigating the complexities and uncertainties associated with pursuing them can pose significant challenges. Our recommendation would be to be aware of and continue to research these funding sources but proceed with caution.

Gas Powered Versus Electric Lawn Equipment

Overview - Gas-powered lawn equipment, historically dominant, relies on fossil fuels for combustion, offering robust power but emitting pollutants and requiring regular maintenance. In contrast, electric lawn equipment, powered by rechargeable batteries or plugged into an outlet, is gaining traction due to its quieter operation, lower emissions, and reduced maintenance needs. While gas tools typically deliver more power and endurance for larger yards, electric counterparts offer convenience, eco-friendliness, and quieter operation, making them increasingly popular for smaller properties and environmentally conscious users.

Alternatives - Electric lawn equipment, whether corded or battery-powered, presents several advantages and drawbacks compared to their gas-powered counterparts.

Pros:

1. **Environmental Friendliness:** Electric equipment produces zero emissions at the point of use, reducing air and noise pollution, and contributing to cleaner air quality.

2. **Lower Operating Costs:** With electricity generally being cheaper than gasoline, electric equipment tends to have lower operating costs over time, especially as gas prices fluctuate.
3. **Ease of Use:** Electric equipment typically starts with the push of a button or trigger, eliminating the need for pull-start mechanisms. They are also generally lighter and easier to maneuver than gas-powered equivalents.
4. **Reduced Maintenance:** Electric tools require less maintenance compared to gas-powered ones since they have fewer moving parts and do not need oil changes or fuel stabilization.

Cons:

1. **Limited Runtime:** Battery-powered equipment has a limited runtime, depending on battery capacity and the task's intensity, requiring recharging, or having spare batteries on hand for extended use.
2. **Power Output:** While improving, electric tools often have less power compared to gas equivalents, limiting their effectiveness for heavy-duty tasks or large properties.
3. **Charging Time:** Recharging batteries can take hours, which may interrupt tasks or require planning to ensure continuous operation.
4. **Initial Cost:** Electric equipment can have a higher upfront cost compared to gas-powered alternatives, although this can be offset by lower operating costs over time.

Recommendations – Overall, the choice between gas and electric lawn equipment depends on factors such as property size, budget, environmental concerns, and the user's preference for power versus convenience. For a property the size of Charlestown, gas powered equipment continues to be the best choice until the electric lawn equipment technology improves.

Partnering with Colleges and Universities

Overview - When like-minded sustainability groups unite, their collective impact amplifies, fostering a formidable force for positive change. Collaboration allows for the pooling of resources, expertise, and advocacy efforts, enabling them to tackle complex environmental challenges more effectively. Additionally, partnerships

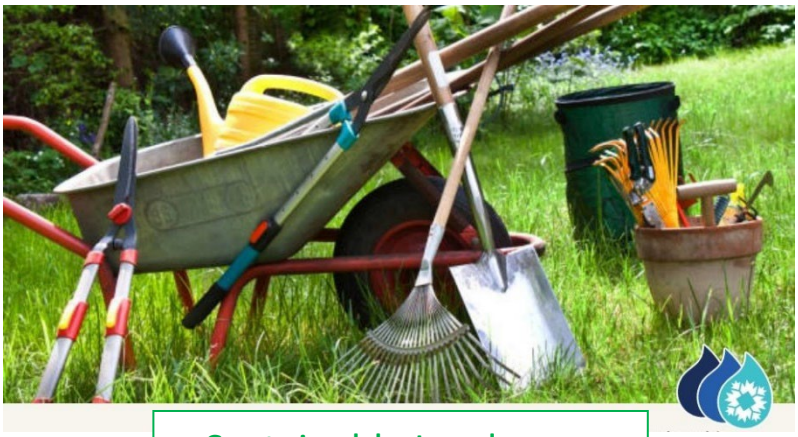
enhance knowledge sharing and innovation, leading to the development of more comprehensive solutions to pressing sustainability issues.

Alternatives – We contacted Morgan State University, the University of Maryland, Baltimore County (UMBC) and the Community College of Baltimore County (CCBC) – Dundalk Campus and spoke with staff members involved in sustainability. While there was interest in partnering either in the design or implementation of sustainable horticulture practices at Charlestown, we were unable to get a firm commitment.

Recommendations – We recommend that Charlestown continue to maintain contact with these institutions and try and develop a partnership in the future.

Education (Residents & Staff)

Overview - Education about sustainable landscape practices is invaluable in empowering Charlestown to create environmentally friendly and resilient living spaces. By teaching residents and staff about techniques such as xeriscaping, composting, and natural lawn care, individuals gain the knowledge and skills to reduce water consumption, minimize chemical use, and enhance biodiversity in their surroundings. This education fosters a sense of environmental responsibility and stewardship, inspiring Charlestown Residents to take proactive steps towards conserving resources and mitigating environmental impacts. Additionally, learning about sustainable landscape practices encourages collaboration and engagement within the community, as neighbors work together to implement green initiatives and beautify shared spaces. Ultimately, education about sustainable landscaping not only promotes environmental sustainability but also cultivates a sense of pride and connection to the natural world, fostering healthier and more vibrant communities for generations to come.



Sustainable Landscape Workshop

Alternatives – There are already many opportunities to help educate Charlestown Residents about the benefits of sustainable landscaping, Including Sunburst articles, ELLIC classes, 972 presentations, Residents' Council Grounds and Conservation Committee meetings and Nature Fest. Resident tours would offer an opportunity for Residents to observe native plantings and erosion control features first-hand.

Recommendations – While all the educational opportunities presented above should be used as appropriate, Resident tours would have the greatest positive impact. These tours could either be walking tours for Residents that are highly mobile, otherwise the tours would use traditional Charlestown transportation. These tours could be treated like any other Charlestown organized trip, with Residents signing up through the Transportation Department. The tours could be led by knowledgeable Residents, with initial training provided by the Grounds Supervisor.

White-Tailed Deer Control

Overview - Deer control plays a vital role in maintaining ecological balance and safeguarding both wildlife habitats and human safety. White-tailed deer are selective herbivores, primarily consuming herbaceous vegetation during the growing season and the buds and twigs of palatable trees during the winter months. Once the terminal buds of trees grow beyond deer browsing height (~ 2.1-m tall), the severity of browsing is decreased, which makes seedlings, saplings, and native plants the most vulnerable to damage and death.

Alternatives - Maintaining a stable ecosystem requires managing deer population levels. As previous recommendations have documented, lethal deer harvesting is crucial for a healthy deer herd balance.

Recommendations – The current bow hunting program should be continued until a healthy population density is reached (no greater than ~ 15 deer per square

mile). Unless a healthy population level is reached, little forest regeneration will take place and few of the native plantings, as recommended in earlier sections of this report, will succeed.

Specialty Landscape Contractor Approval

Overview – Few large landscape contractors, such as Rupert or Brightview, have the specialty knowledge necessary for any large-scale native plantings or natural rainwater control structures such as rain gardens or bio-swales.

Alternatives – The current approval process for landscape contractors, other than the contractor covered under the current Charlestown contract, can be tedious and time consuming.

Recommendations – At least one landscape contractor that specializes in native plantings and natural erosion control methods should be pre-approved.