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delta institute

5 TO 10-YEAR OPERATIONAL FOREST MANAGEMENT PLAN

DECEMBER 2021

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About Delta Institute

Established in 1998, Delta Institute is a Chicago-based nonprofit organization that collaborates with communities to solve complex environmental challenges across the Midwest. We envision a region in which all communities and landscapes thrive through an integrated approach to environmental, economic, and social challenges.

As a 501c3 nonprofit with a 2021 Platinum Seal of Transparency from GuideStar, Delta serves as a trusted advisor, technical provider, and project implementation expert for partners across the public, private, nonprofit, and community sectors. We rely on both philanthropic and earned revenue, specifically through grants, charitable contributions, and fee-for-service contracts. Our work takes us to cities like Chicago, St. Louis, Gary, and Milwaukee; to Great Lakes coastal towns; and to rural communities with thousands of acres of farmland and waterways.

Visit us online at www.delta-institute.org.

Acknowledgments

This project is funded by a Great Lakes Restoration Initiative grant through the U.S. Department of Agriculture, Forest Service and the U.S. Environmental Protection Agency (EPA).

TABLE OF CONTENTS

INTRODUCTION

Trees provide multiple benefits, in both urban and rural environments. A mature tree (over 8 feet) intercepts approximately 500 stormwater gallons annually, which serves to prevent surface pollutants from entering the watershed via runoff, thereby protecting water quality and the health of natural ecosystems. The gallons retained will decrease the impacts of flooding throughout these watersheds and improve resilience against increased severe rainfall events, which are a product of climate change. Trees planted in communities improve air quality by removing particulate matter and other materials that contribute to increased ozone and smog. By reducing this impact, community health is directly improved, especially in environmental justice communities that experience higher rates of asthma per capita. Additionally, trees decrease the severity of urban heat islands, lowering surface temperatures several degrees on average, improving public health and reducing energy bills. Trees provide habitat to local and migratory birds, which can help regulate insect populations.

To achieve these numerous positive co-benefits, it is critical to establish effective processes around what to plant, where to plant, and from where to procure materials, and to implement ongoing management practices. This 5 to 10-Year Operational Forest Management Plan provides a meaningful starting point toward helping communities achieve this goal, by providing them with information to guide their tree canopy planning and management.

Developed for the Oceana County Stormwater Trees project, through support from the U.S. Forest Service (USFS) Great Lakes Restoration Initiative (GLRI) program, this plan provides communities with guidance and tools for expanding canopy coverage and increasing species diversity, actualizing the co-benefits that arise from urban forestry, and supporting the quality and health of their local tree stock. Specifically, the Plan provides guidelines for achieving these outcomes through the following sections:

Planting Planning

Tree planting projects always start at the planning stage, where communities establish their goals and objectives, evaluate existing conditions, engage stakeholders, and define actions. The Planting Planning section provides guidance on this process. The outcome of this planning exercise, and all the analysis, prioritization, and outreach that it includes, will determine critical factors like planting locations, species distribution, quantities, budget, stock varieties, and forecasted environmental impact.

Planting Best Practices

When embarking on the planting planning process, numerous factors inform decisions around the types of tree species and stock format to plant, and where to plant them. In addition, taking into account the environmental considerations (like soil type and drainage characteristics), aesthetic considerations (such as visibility and appearance across different seasons) and maintenance considerations helps to ensure a planting project simultaneously achieves a high survival rate and accomplishes the project's intended co-benefits (like stormwater management and habitat restoration). The Planting Planning Best Practices section provides planting best practices.

Maintenance Best Practices

To help ensure long-term success, tree maintenance is critical, especially within the first four years of establishment. The Maintenance Best Practices section of this Plan provides municipalities with guidance around watering, mulching, fertilizing, pruning, staking, protection, and monitoring, to support ongoing canopy health.

Tree City USA Recognition

Tree City USA is a recognized standard for a municipality's commitment to community forestry. As a credential earned and maintained by local government units across the country (and overseen by the Arbor Day Foundation), the Tree City USA standard is an effective framework for maintaining and growing community canopy cover. While the capacity to meet Tree City USA guidelines varies by community, the Tree City USA Recognition section of this Plan focuses on the core elements of the standard, which can be pursued as whole or individually from community to community.

Forestry Program Goal-Setting and Assessment

A key starting point for meeting the Tree City USA standard, and for achieving broader goals around community forestry and canopy restoration, is to successfully define a community's intended goals and outcomes; assess its strengths, weaknesses, opportunities, and threats (SWOT); and inventory its budget and operational characteristics, all of which are critical for supporting local tree stock growth and maintenance. The Forestry Program Goal-Setting and Assessment section of this Plan provides an operations assessment section that allows this Plan to be customized for specific municipalities and agencies, to support ongoing program design and management.

Appendix I: Nursery Sourcing List and Planting and Maintenance Contractor Lists

When embarking on tree planting and maintenance initiatives, it can be difficult to deliver projects that simultaneously are economical, promote biodiversity and native species, achieve a high rate of survivability, and emphasize local vendors and contractors. Appendix I of this Plan provides nursery profile lists (which include available species and stock format) as well as local planting and maintenance contractor lists, organized specifically for communities in Oceana County.

Beyond this Plan

While the intent of this document is to guide communities through the process of planning, planting, maintenance and stewardship for canopy growth, it is not a specific planting plan, nor does it provide detailed design guidance. When embarking on these activities, it is recommended that communities work directly with an arborist, forester, or landscape architect, who can provide a detailed canopy and planting plan. These specialists can help identify current coverage, where canopy gaps are, and develop specifications and details that show exactly where to plant what stock, the overall cost, and the maintenance required. The information contained in this plan is intended to assist local governments with a starting point for this process.

Spotlight on Inclusive Community Engagement to Foster Equity

As climate change impacts continue to accelerate, cities and regions throughout the Midwest have increased problems related to flooding, stormwater runoff, and degraded infrastructure—all threatening public health, water quality, economic opportunity, and quality of life. Stormwater runoff carries oils, grease, pesticides, sediment, and excess nutrients (such as phosphorus and nitrogen), into Lake Michigan tributaries while impacting local groundwater, and in turn, drinking water and public health.

These environmental challenges exist for Oceana County, Michigan, as for the rest of the Lake Michigan basin. As a rural county with poverty rates that exceed the state average (15 percent versus 13 percent), and median household income levels below the state average ($50,104 versus $59,584), local governments in Oceana County (and the communities they serve) often lack tax base and financial resources to address climate concerns through resiliency infrastructure and community forestry activities.[1]

To effectively address environmental and economic challenges through activities like community forestry, it is essential to incorporate equity and authentic inclusion of residents impacted by water quality issues into the process of tree planting for stormwater management. Embedded throughout this plan are equity considerations provided by Delta Institute that specify inclusive engagement of all partners, residents, community groups, and municipal agencies (those directly or contextually related to the planned project) to incorporate their voices—and thus inform—each step of the process. Appendix III presents Delta's institutional commitment to inclusive community engagement.

PLANTING PLANNING

Developing impactful tree planting projects starts with the planning stage, which involves establishing project goals and objectives, organizing and analyzing data on existing conditions and stakeholder priorities, and defining actions. It is also a critical point to ensure that all stakeholders are provided with meaningful and accessible ways of engaging in the process.

The planning process for the Oceana County Stormwater Trees project is an example of the methods described in this section. These methods are also illustrated in the project's Planting Plan (included as Appendix II).

Common Goals & Objectives

There are many reasons for a community to prioritize tree canopy planning, restoration and maintenance; often they connect to achieving higher-level outcomes and goals. While the key drivers of community forestry will differ from community to community, common themes include:

- Reducing flooding and improving water quality
- Increasing shade on public rights-of-way
- Reducing heat island effect
- Increasing biodiversity
- Providing wildlife habitat and food sources
- Reducing erosion
- Reducing wind breaks
- Visual screening
- Improving aesthetics (throughout the calendar year)
- Increased property values
- Investing in low to moderate-resourced areas

In addition to these environmental and economic benefits, operationally focused objectives like "ease of maintenance," "low maintenance cost," "pest and debris considerations," and "low impact on surrounding infrastructure" can also be incorporated at the planning phase. The desired benefits that are of greatest importance within a particular community will drive decisions around species selection, planting location, and quantities, for example. After establishing primary goals and objectives, existing conditions can be assessed, which includes data collection, analysis, and stakeholder engagement.

Data Collection, Analysis & Stakeholder Engagement

To ensure that the planning and implementation of a tree planting project delivers on a community's stated goals and objectives, analyzing existing conditions is a fundamental first step in defining areas of greatest need and opportunity, and where the project can prioritize its efforts. Geo-spatial analysis using Geographic Information Systems (GIS) software is an especially effective tool for identifying location-specific conditions and prioritizing areas of focus based on those conditions.

For the Oceana County Stormwater Trees project, partners identified the following three priorities through the project's engagement work:

- Reducing flooding and improving water quality
- Increasing shade on public rights-of-way
- Improving aesthetics (throughout the calendar year)

To address these goals, existing conditions within Oceana County, Michigan, around stormwater and canopy cover need to be understood. An effective method for doing this is to create a geodatabase with the necessary information. A geodatabase can be organized using data from various sources. For this project, a geodatabase has been organized using data from the State of Michigan (Michigan GIS Open Data), University of California-Davis (Soil Properties | California Soil Resource Lab (ucdavis.edu), ESRI (arcgis.com), and the Chicago Region Trees Initiative. Useful data layers include:

- Political Boundaries
- Canopy Coverage
- Early & Current Land Cover
- Watersheds
- Waterways
- Lakes & Ponds
- Wetlands
- Floodplain
- Protected & Managed Lands
- Drainage Characteristics
- Soil texture, depth, holding capacity, organic matter, pH
- Impervious Surfaces
- Median Family Income (by census tract)
- Percentage of residents below the federal poverty line (by census tract)

Synthesis and analysis of these layers provides a data-driven basis for implementation actions within a planting plan. In addition to using GIS to understand existing conditions, communities can also forecast the environmental impact of a planting project, using open source tools like iTree Planting Calculator, which allows users to estimate the impact a project will have on stormwater treatment, greenhouse gas (GHG) sequestration, air quality, and energy conservation, for example.

In addition to geo-spatial data analysis and modeling, identifying priority planting areas through effective community and stakeholder engagement is a critical step in the process. Input gathered from local stakeholders is necessary to gain a ground-level, community-based lens for guiding how a local unit government prioritizes its resources and improvements. GIS mapping outputs can complement these stakeholder engagement efforts, providing visual representation of data that effectively communicates existing conditions, needs, and opportunities to

community members. Stakeholder input in the planting planning process can be effectively captured through various methods, including but not limited to:

- Community Mapping Workshops
- Planting Site Visits
- Stakeholder Surveys

Defining Planting Plan Actions

Once existing conditions and priorities have been identified, the project can move toward defining planting plan's implementation activities, which largely centers on determining the following information, covered in the following sections of this plan:

- Planting locations
- Species distribution
- Quantities
- Stock varieties (ball-and-burlap, container, bare root)

Specific planting recommendations can be geo-coded as points or polygons, to be included in the geodatabase, and shared with potential contractors at the procurement stage, which helps with implementation cost estimation, project delivery, and long-range forestry management.

Equity and Inclusion Considerations in the Planting Planning Process

To ensure that the planting planning process is both equitable and inclusive of low to moderately resourced communities, it is recommended that, as a planting project's lead organization executes the process provided in this section, they pay specific attention to:

1. Capturing the priorities of under-represented stakeholder groups, and

2. Collaboratively identifying solutions and actions with these groups that improve canopy health, reduce flooding, and improve quality of life in their areas.

Geo-spatial analysis plays a key role in identifying specific neighborhoods and community areas where investments in community forestry will benefit low to moderately resourced groups, but this analysis only serves as a starting point. A planting planning project's stakeholder engagement scope serves as the primary phase for educating the public, gathering input on project design, and establishing partnerships around implementation and stewardship.

Stakeholder Mapping

To ensure an engagement process is equitable and representative of community experience and priorities, it is recommended that the project team begin with a stakeholder mapping exercise, to identify existing groups (and specific points of contact). A stakeholder map stands as a database where categories of groups to be engaged are defined by the project team and

its partners. These categories can include neighborhood block clubs, schools, faith-based organizations, and environmental groups, for example, under which specific organizations and individuals can be populated, providing the team with a starting point for the project's engagement work.

It is also important to create additional contextual categories centered around geographic location, primary priorities, and policy stances. These contextual categories lay the future groundwork for using a stakeholder map as a tool for identifying the gaps where additional engagement is needed, to capture diverse views and perspectives. It also serves as the basis for establishing programmatic partnerships during the implementation stage. A stakeholder map serves as an effective starting point in the identification and engagement process. It can continue to be updated, as the project continues to connect with more groups, in service of the primary goal of reaching under-represented groups (who may require additional time or connection points to be successfully reached).

Engagement Planning

With the stakeholder mapping serving as a basis for equitable engagement, the project can execute an engagement program that most closely aligns with the established needs and communication channels for the community's many groups. Whether carried out through in-person workshops, online surveys, or other methods, it is important to design a process that avoids creating barriers towards successful engagement and is respectful of the time and needs of various groups. Common barriers to equitable engagement (and their corresponding solutions) are summarized in Table 1 below.

Table 1. Common Barriers for Stakeholder Engagement [4] [5]

Category	Common Barriers	Solutions
Physical and Sensory	Meeting locations that are only accessible by car	• Hold meetings at sites that are accessible by transit and non-motorized transportation options • Provide a virtual meeting option
	Meeting facilities, information, and materials (advertisements, brochures, surveys, etc.) that are only accessible to individuals without physical disabilities	• Hold meetings at sites that satisfy Universal Design Standards, and at a minimum, meet the standards of the Americans with Disabilities Act (ADA) • Provide a virtual meeting option • Provide meeting information and content that is accessible for individuals with sensory impairments (visual, auditory, etc.)

Category	Common Barriers	Solutions
Linguistic	Information and materials only provided in one language	Provide meeting information and materials in numerous language formats (particular for all that are commonly spoken locally)
	Presentation of information and materials is overly technical, and inaccessible to the non-expert	Provide information and materials for different stakeholder groups, with varying levels of expertise and priorities
Technological	Meeting events that are only hosted using online video conferencing platforms	Provide in-person and virtual meeting options
	Information and materials that are only shared using online platforms (website, social media, etc.)	In addition to using digital platforms, distribute materials using traditional print communication methods (mailer, newspaper, etc.)
Temporal	Meetings that are only scheduled at a specific time of day	• Provide varied meeting dates and times • Provide supportive services at the meeting, such as childcare, refreshments, etc. • Record meetings and make them free and publicly accessible online (with project team contact information provided)
Cultural	The composition of stakeholder groups that are commonly represented at meetings serves to suggest to other groups that they are not as welcome in the engagement process	• Undertake outreach efforts that target attendance and input from commonly under-represented groups • Work to remove the related barriers that reinforce cultural barriers (physical, linguistic, etc.).

The barriers and solutions summarized in Table 1 are often inter-related, and depending on the project and the context, the list of barriers that a project team faces will serve to be more specific and perhaps far greater in number. That said, identification of key barriers in the early stages of a project will serve as a critical step towards ensuring equitable engagement. A project that provides a diverse program of opportunities to engage, and successfully removes its barriers toward engagement, will be most successful at receiving diverse input.

Turning Input into Action

Beyond the consideration of equitable engagement methods, a critical component of an equitable planning process is that the opportunities for the community to provide input are meaningful and actionable. In a planting planning project, this can include input around specific planting locations and quantities, as well as species selection. The project team can also use qualitative and quantitative data collected to inform the species and the stock varieties that are selected for plantings in low to moderate resourced).

Effective and equitable engagement during the planning phase establishes ongoing partnerships around community stewardship and future planning projects. Establishing a consistent process of updates throughout a project's implementation phase with previously engaged groups is critical for reinforcing that community priorities were captured and have been incorporated into the project's actions.

Credit: David Bruyndonckx

PLANTING BEST PRACTICES

In the planting planning process, numerous factors inform decisions around what you want to plant and where. They include how a particular tree species contributes to the environment and whether it can succeed in a particular location, due to environmental considerations. Selecting one or more native species (that have been grown within the project's same USDA Hardiness Zone) helps ensure a project's trees meaningfully advance the health of the local ecosystem by providing a food source, habitat, and urban cooling, for example. Native species refers to a "plant that is a part of the balance of nature that has developed over hundreds or thousands of years in a particular region or ecosystem. Note: The word native is always to be accompanied by a geographic qualifier (that is, native to the Great Lakes region [for example])." [2]

As stormwater management is a key priority for the Oceana County Stormwater Trees project, selection of specific tree species and planting locations is critical to maximize a tree's targeted stormwater benefits, which include reducing runoff velocity and volumes, intercepting rainfall, spurring evapotranspiration, and encouraging infiltration and groundwater recharge. Additionally, proper species selection helps ensure the ongoing health and survival of a project's trees within their identified planting locations. This is particularly important when planting in urban rights-of-way, where flooding can occur routinely, tolerance to road salt is a necessity for survival, and parkway size and dimension can serve to constrain the growth of a tree's root structure.[3]

Using Native Species

By using native tree species, a planting program increases the potential the trees will survive, provide benefits to local plants and animals, and not threaten other local species in the area.

Table 2 provides recommended lists of native tree species to be incorporated into local planting projects. These species are native to USDA Hardiness Zone 5 and the Lake Michigan basin, which includes Oceana County.

Table 2: Tree Species Native to Oceana County, Michigan[6]

Type	Common Name	Scientific Name (in same order)
Deciduous	Basswood - American	*Tilia americana*
	Birch - yellow, white	*Betula - alleghaniensis, papyrifera*
	Cherry – black	*Prunus serotina*
	Gum- black	*Nyssa sylvatica*
	Hackberry - northern	*Celtis occidentalis*
	Maple – red, silver, sugar	*Acer – rubrum, saccharinum, saccharum*
	Oak - black, bur, pin, Shumard, swamp white, white	*Quercus - velutina, macrocarpa, palustris, shumardii, bicolor, alba*
	Tulip poplar	*Liriodendron tulipifera*
Coniferous	Eastern red cedar	*Juniperus - virginiana*
	Fir - balsam	*Abies - balsamea*
	Northern white cedar	*Thuja occidentalis*
	Pine - red, white	*Pinus - resinosa, strobus*
	Spruce - white	*Picea - glauca*
	Tamarack	Larix laricina
Small Trees	Downy Serviceberry	*Amelanchier arborea*
	Eastern Redbud	*Cercis canadensis*
	Flowering dogwood	*Cornus florida*
	Hawthorn	*Crataegus*
	Ironwood	*Ostrya virginiana*
	Ohio Buckeye	*Aesculus glabra*

In addition to these suggested species, there are several species to avoid sourcing for planting projects. Table 3 provides a list of species not to use, due to their negative impact on surrounding tree and vegetation communities or the challenges they face around survival rates (because of tree-related diseases and invasive insect populations).

Table 3: Tree Species to be Avoided [7] [8] [9]

Common Name	Scientific Name	Reasoning	Additional Details
Black Locust	*Robinia pseudoacacia*	Invasive	Species overwhelm other native tree populations.
Bradford Pear	*Pyrus calleryana*		
Norway Maple	*Acer platanoides*		
Tree of Heaven	*Ailanthus altissima*		
Black Walnut	*Juglans nigra*	Aggressive	Fruit kills other nearby tree species.
American Beech	*Fagus grandifolia*	Impacted	Beech bark disease
American Elm	*Ulmus americana*		Dutch elm disease (American Hybrid Elm recommended as an alternative)
Ash - black, green, white	*Fraxinus - nigra, pennsylvanica, americana*		Emerald ash borer
Eastern hemlock	*Tsuga canadensis*		Hemlock Wooly Adelgid
Red Oak	*Quercus rubra*		Oak wilt

Matching Tree Species to Site Conditions, Desired Outcomes, and Maintenance Capacity

When selecting one or more tree species for a site, understanding the environmental conditions that the trees will encounter is imperative to helping ensure success. Determining what visual outcomes you want for the site will also help narrow down your choices. And realistically assessing the level of maintenance that can be provided will also help guide selection. Carefully selecting appropriate tree species for a site will pay off down the road, as this will help ensure the tree will thrive and result in maximized benefits. Table 4 provides a summary of the key environmental, aesthetic, and maintenance-related considerations.

Table 4: Planting Site Location Factors [10]

Environmental	Aesthetic	Maintenance
• Sun exposure • Drainage characteristics • Soil characteristics (sandy, loam, clay, etc. • Topography (upland, lowland) • Salt tolerance • Growing space (proximity to other trees, utilities, etc.) • Impact energy use in buildings • Need for shade and reducing urban heat island effect • Benefit to the local ecosystem (as food, habitat, etc.)	• Desired time to full maturity • Seasonal foliage • Seasonal flowering • Visibility of planting location	• Pruning, fertilization, pesticide requirements • Watering requirements • Fruit or nut-bearing clean-up needs

Varying species will be appropriate for certain locations, based on many of the factors listed above. It is recommended that practitioners characterize the site where they will be planting, determine any aesthetic considerations, then select a species that best meets those conditions and can be feasibly maintained over the long term. The following is a summary of preferable tree species specifically for stormwater management, organized based on sun exposure, soil type and moisture, salt tolerance, growing space, local ecosystem benefits, and aesthetics.[11]

Sun Exposure

Different tree species have different levels of tolerance for sun and shade. When inspecting a site, note the amount of sunlight it receives overall and what time of day it is received. A large, open site with no protection from heat or light may require more drought-tolerant species, while an area with morning sun and afternoon shade will likely accommodate a wider range of species, because there will be some shade during the day.

Full Sun (More than 6 hrs)

- Balsam Fir *(Abies balsamea)*
- Black Cherry *(Prunus serotina)*
- Bur Oak *(Quercus macrocarpa)*
- Eastern Red Cedar *(Juniperus virginiana)*
- Pin Oak *(Quercus palustris)*
- Swamp White Oak *(Quercus bicolor)*
- Tamarack *(Larix laricina)*
- White Oak *(Quercus alba)*

Partial Sun/Shade (4 to 6 hours)

- Red Maple *(Acer rubrum)*
- American Basswood *(Tilia americana)*
- Downy Serviceberry *(Amelanchier arborea)*
- Eastern redbud *(Cercis canadensis)*
- Northern white cedar *(Thuja occidentalis)*

Full Shade (Less than 4 hours)

- Flowering dogwood *(Flowering dogwood)*
- Ohio Buckeye *(Aesculus glabra)*
- Sugar Maple *(Acer saccharum)*

Soil Type and Moisture

Soil conditions can significantly impact planting success. Certain species are better acclimated to certain soil types. It is important to also note soil moisture and drainage, as some tree species are more tolerant of poorly drained, wet sites than others.

Soil Type

Sandy (Coarse)

- Bur Oak *(Quercus macrocarpa)*
- Red Pine *(Pinus resinosa)*

Loam (Medium)

- Northern White Cedar *(Thuja occidentalis)*
- White Oak *(Quercus alba)*

Clay (Fine)

- Silver Maple (Acer saccarinium)
- Eastern Red Cedar (Juniperus virginiana)

Soil Moisture

Wet

- Northern White Cedar *(Thuja occidentalis)*
- Pin Oak *(Quercus palustris)*

Moist

- American Basswood *(Tilia americana)*
- Northern Hackberry *(Celtis occidentalis)*
- Silver Maple *(Acer saccarinium)*
- Tulip poplar *(Liriodendron tulipifera)*
- White Oak *(Quercus alba)*

Dry

- Bur Oak *(Quercus macrocarpa)*
- Black cherry *(Prunus serotina)*
- Eastern Red Cedar *(Juniperus virginiana)*

Salt Tolerance

Salt used to de-ice pavements can run off and accumulate in the soil. Salt can dehydrate root systems and impact tree health. Planting locations close to rights-of-way require salt-tolerant species.

Low Tolerance

- American Hophornbeam *(Ostrya virginiana)*
- Pin Oak *(Quercus palustris)*

Medium Tolerance

- Black Gum *(Nyssa sylvatica)*
- Northern Hackberry *(Celtis occidentalis)*

High Tolerance

- Black Cherry *(Prunus serotina)*
- Northern White Cedar *(Thuja occidentalis)*
- Swamp White Oak *(Quercus bicolor)*

Growing Space

Planting locations, especially in urban environments, may have various growing space restrictions. For example, any tree planted must avoid disruptions to overhead utility lines. When determining the available growing space, consider all site features, like nearby buildings, fences, and pavement. It is recommended that the spacing between urban trees and other objects be equivalent to its expected canopy width at full maturity.[12]

Small (Constrained by overhead utilities)

15-25 feet tall

- Balsam Fir *(Abies balsamea)*
- Downy Serviceberry *(Amelanchier arborea)*
- Flowering Dogwood (*Cornus florida)*
- Eastern Redbud *(Cercis canadensis)*

Medium (Near fences and other small spaces)

25-45 feet tall / 20 feet wide

- Black Cherry *(Prunus serotina)*
- Northern White Cedar *(Thuja occidentalis)*
- Eastern Red Cedar *(Juniperus virginiana)*
- Ohio buckeye *(Aesculus glabra)*

Large (To provide shade for large spaces)

Greater than 45 feet tall / Up to 40 feet wide

- Hackberry *(Celtis occidentalis)*
- Silver Maple *(Acer saccharum)*
- Tulip Poplar *(Liriodendron tulipifera)*
- White Oak *(Quercus alba)*
- White Pine *(Pinus strobus)*

Local Ecosystem Benefits

Trees often provide shelter and food for wildlife, including native bird species and small mammals. During the spring and summer months, certain tree species attract butterflies, bees, hummingbirds, and other pollinators.

Pollinators

- Black Cherry *(Prunus serotina)*
- Downy Serviceberry *(Amelanchier arborea)*

Birds & Small Mammals

- Eastern Red Cedar *(Juniperus virginiana)*
- Northern White Cedar *(Thuja occidentalis)*
- Pin Oak *(Quercus palustris)*

Aesthetics

In addition to site-specific characteristics, aesthetic characteristics also need to be considered. In addition to site-specific characteristics, also consider aesthetic outcomes. Before planting, consider the tree's expected year-round appearance. Coniferous trees, like cedars and spruces, retain their needles all year. Deciduous trees, like maples, oaks, and elms, lose their leaves in the fall. This latter group is ideal to plant on the south side of buildings, because they provide shade in summer and allow sunlight through during winter. There are also a variety of trees, like Black Cherry and Downy Serviceberry trees, that flower in the spring and produce fruit in the summer.

Also consider the time it will take to reach full maturity, to ensure that the species will meet any short-term and long-term aesthetic goals.

Slow Growth

- Black Gum *(Nyssa sylvatica)*
- Bur Oak *(Quercus macrocarpa)*
- Flowering dogwood *(Cornus florida)*
- White Oak *(Quercus alba)*
- White spruce *(Picea glauca)*

Moderate Growth

- American Basswood *(Tilia americana)*
- Black Oak *(Quercus velutina)*
- Downy Serviceberry *(Amelanchier arborea)*
- Eastern white pine *(Pinus strobus)*
- Northern Hackberry *(Celtis occidentalis)*
- Sugar Maple *(Acer saccharum)*

Fast Growth

- Black Cherry *(Prunus serotina)*
- Pin Oak *(Quercus palustris)*
- Silver Maple *(Acer saccharum)*
- Tamarack *(Larix laricina)*
- Tulip Poplar *(Liriodendron tulipifera)*

Numerous open source, interactive tools are available to practitioners and property owners, to help identify the appropriate tree species for a site, including the Morton Arboretum's Trees and Plants search engine and the Arbor Day Foundation's Tree Wizard.

Planting Methods

When selecting tree stock, regardless of species, most trees are available as either ball-and-burlap, container, or bare root, all of which have varying strengths and weaknesses. ReLeaf Michigan's Pocket Guide to Planting Trees provides additional instruction on these planting methods. Ratings of the costs, maintenance, and seasonal planting considerations for these different methods.

Table 5: Planting Method Symbol Key

Symbol	Description
$	**Low Cost:** Sourcing: $5 - 100, Planting: $30 -150
$$	**Moderate Cost:** $25 - 150, Planting: $130 - 250
$$$	**High Cost:** Sourcing: $300 - 600, Planting: $300 - 500
Δ	Lowest vulnerability during establishment period
Δ Δ	Moderate vulnerability during establishment period
Δ Δ Δ	High vulnerability during establishment period

Ball and Burlap

Cost: $$$ (Sourcing: $300 - 600, Planting: $300 - 500)

Maintenance: Δ

Planting Seasons: Spring, Summer, Fall

Ball and burlap stock (B&B) is grown with a firm ball of soil surrounding its roots and wrapped in burlap with twine, nails or wiring. B&B stock is very heavy, making it more expensive to transport than bare root or container stock. They are structurally quite sound, however, making them an ideal planting choice for large caliper trees. They can also be planted during any time in the growing season, though supplemental watering after planting is critical during hot and dry weather.

Container

Cost: $$ (Sourcing: $25 - 150, Planting: $130 - 250)

Maintenance: ΔΔ

Planting Seasons: Spring, Summer, Fall

Container tree stock (trees grown in plastic containers) tend to be slightly more expensive to plant than bare root stock, due to their larger size and weight, but they are widely available, can be sourced year round, and can be planted while dormant or leafing. When still in containers, trees require intensive watering (1 to 2 times a day) to prevent the root system from drying out. Root girdling (when the roots grow in a circular form) can also be a problem with container trees, if the tree is kept for too long in its container, which can ultimately lead to the tree's death.

Bare Root

Cost: $ (Sourcing: $5 - 100, Planting: $30 -150)

Maintenance: ΔΔΔ

Planting Seasons: Spring, Fall

Bare root tree stock is often the least expensive choice. They are the smallest and lightest option of the three, which means they are easiest to transport. This makes them a cost-effective choice for planting projects that require many trees. Instead of being cultivated in a soil mixture, bare root trees are typically cultivated by wrapping the root system in a moisture-retaining material, such as sphagnum moss peat, sawdust or wet paper. Bare root tree stock must be planted when completely dormant, which is either the Spring before leaves appear or in Fall after leaves drop (but before the ground freezes). The tree's roots must be kept moist at all times; if the roots dry out, the tree dies. Thus, if these are going to be held for a period of time before planting, regular watering needs to happen. Preserving root system moisture and having a shorter planting season are the primary constraints of using bare root stock.

Equity and Inclusion Considerations in the Planting Process

A key component for incorporating equity and inclusion into a project's planting work is centered around its location, stock, and species-based planting decisions, and how they reflect community priorities, which is captured in Section III (Planting Planning). Additionally, how a project prioritizes Disadvantaged Business Enterprises (DBEs) and other related designations through its procurement process for tree stock and contractor services is also key for incorporating equity into its planting work, which is illustrated in the Nursery & Contractor List Sections.

MAINTENANCE BEST PRACTICES

Like most cultivated plants, trees require regular maintenance throughout their lives. However, trees require extra care immediately following transplant so that they can fully reestablish their root system. Without an established root system, trees experience reduced growth and are susceptible to disease and insects. Newly planted trees should be properly maintained to help reduce stress and encourage root growth.

Watering

Watering bags (i.e., tree gators, either donut-shaped or other types) should be installed at the base of the tree at the time of planting. Watering bags should be checked weekly and filled with water as needed during the first growing season. Bags should be removed during the dormant season to protect the tree from fungus and molds. After the first year, the bags should be checked every two weeks, and should be filled as needed. Watering bags can be completely removed after two growing seasons.

Mulching

Trees (excluding seedlings) must be mulched, at a depth of 2 to 4 inches, at the time of planting. Maintain mulch in a level circular area around the base of each tree. Do not pile or mound mulch near the tree trunk. One year after planting, evaluate the mulch and, if needed, supplement to maintain 2 to 4 inches of depth.

Staking and Tying

Trees planted near large open areas and subject to high winds must be staked to improve firmness against the wind. This is particularly important for larger ball and burlap trees. One year after planting, evaluate trees for firmness and, if stable, remove the stakes. After the second growing season, remove all stakes.

Pruning

If properly cared for prior to installation, newly planted trees should need little pruning. In the first year after planting, remove only dead or broken branches. In subsequent years, remove weakly attached limbs and co-dominant leaders (more than one main trunk that is similar in diameter) to promote healthy trees with good form.

Tree Protection

If mowing occurs adjacent to a newly planted tree, mulch should help protect the base from lawn mower damage, by keeping mowers away from the tree base. However, in areas where wildlife browsing may be an issue, protected trees using plastic mesh fencing or other tree guard products (such as tubes). After tree establishment, the timing of which depends upon the species, remove these structures.[13]

While the aforementioned maintenance activities are critical over the four-year establishment period, their sequencing and duration varies over that time frame, which is captured in Table 6.

Table 6: 4-Year Maintenance Schedule

Practice	Maintenance Timeline			
	Year 1	Year 2	Year 3	Year 4
Watering				
Mulching				
Staking and Tying				
Pruning				
Tree Protection				

Equity and Inclusion Considerations in the Maintenance Process

A primary method for incorporating equity and inclusion into a project's maintenance work is centered around how a project prioritizes DBEs and other related designations in its procurement of contractor services, which is elaborated on in the Planting & Maintenance Contractor List).

Opportunities for including volunteer training around tree care and maintenance (as part of a planting project's community event programming) can also serve to support equity and inclusion priorities, by investing in forestry education for community members and groups and building a stewardship connection between these groups and the project's trees. While volunteer trainings rarely replace the need for municipal contractors to complete the more time, labor, and equipment-intensive aspects of maintenance work, they serve as critical opportunities for skill building and education, which can only serve to improve overall canopy health in under-resourced low to moderately resourced communities.

TREE CITY USA RECOGNITION

How does a municipality or a local unit of government effectively put the fiscal, operational, and programmatic structures in place to support long range community forestry? While there are numerous frameworks for advancing community forestry, Tree City USA is an established standard for institutionalizing these practices within local governments. While attaining official certification as a "Tree City" may not fit every community (based on existing capacity and priorities), the standard nonetheless provides an essential framework for how local governments can advance canopy restoration and management. Provided below is a summary of the program, its requirements, and best practices.

Tree City USA Summary

Tree City USA, one of the Arbor Day Foundation's longest-running programs, provides communities with a four-step framework for guiding forestry activities and making progress toward their forestry-related goals, like increasing canopy cover and beautifying public spaces.

The Tree City USA program, in partnership with the U.S. Forest Service (USFS) and the National Association of State Foresters, also recognizes and celebrates communities that achieve the four program standards for community forestry. Successful communities are provided with flags, signage, and other materials to help educate residents and promote the community's commitment to environmental stewardship through forestry. Click here to view/ download an easy-to-read summary of the program.

Summary of Tree City USA Requirements

1. Establish a tree board or department

Formalize how forestry responsibilities will be delegated among municipal or county personnel. Doing so will allow for the creation of an organized, effective forestry plan and provide accountability for tree-related decision making. It is recommended that both residents and business owners are involved in the process.

Responsibilities can be assigned to a:

- Professional forester
- Arborist
- City department
- Citizen-led tree board
- Combination of the above

A free, online training course, Tree Board University, has been made available through a partnership between USDA Forest Service Urban and Community Forest Assistance Program and the Arbor Day Foundation. The course teaches individuals "about trees, about people, and about serving in a citizen advisory role in your city, town, or village".The course also provides access to an online networking community of tree board members throughout the U.S.

2. Establish a tree ordinance

An effective tree ordinance will assign definitive authority over public trees; provide guidance for tree planting, maintenance, and removal in public spaces; and establish enforcement mechanisms.

Sample ordinances:

- Municipal Tree Ordinance (with Tree Board)
- Municipal Tree Ordinance (without Tree Board)

Additional resources:

- American Society of Consulting Arborists - Tree Ordinances
- Guidelines for Developing and Evaluating Tree Ordinances (International Society of Arboriculture)
- Tree Ordinance Development Guidebook (Georgia Forestry Commission)
- Developing Successful Tree Ordinances (North Carolina State Extension)

3. Allocate at least $2 per capita for community forestry in the annual budget

Establishing a dedicated local funding source, whether through a special levy or as a specific line item in the general operating budget, will provide a critical basis for supporting ongoing planting and maintenance work, as well as a basis for matching larger federal grants. In a community of 50,000, this would entail $100,000 of municipal resources invested towards community forestry initiatives (which includes cash expenditures, personnel time, and equipment, for example). While planning and accountability through tree boards and ordinances precede public investment toward community forestry, many communities already meet this investment. Nonetheless, as the fiscal health of units of government can fluctuate based on economic factors, effective planning and management stands as critical for meeting the $2 per capita benchmark.

4. Pass an Arbor Day observance and proclamation

Demonstrating public support for the forestry program is a relatively simple way to engage community members and increase awareness of local forestry efforts, benefits and priorities. Celebrations can include tree plantings, tree care activities or award ceremonies that honor particularly involved members of the community.

FORESTRY PROGRAM GOAL-SETTING

Setting goals is an important step toward ensuring that forestry programs are implemented in a deliberate manner and are focused on achieving the identified goals. The goal-setting exercise might focus on implementation goals, such as planting a certain number of trees; or environmental and quality-of-life goals, such as decreasing flood events in residential areas. Some agencies or departments might embark on a more focused, near-term goal-setting exercise that identifies the implementation of specific programs to support broader forestry goals, such as establishing a Relative Performance Index to understand the age, health, and condition of publicly owned trees, by species.

USFS, American Forests, and the National Association of Regional Councils have developed a free, online Community Assessment and Goal-Setting Tool to help decision makers and practitioners assess their department's or agency's current forestry program and set achievable goals to align those programs with best practices. This tool can be used to effectively prepare a community for Tree City USA recognition.

Self-Guided Assessment of Forestry Practices

In addition to the resources mentioned above, Delta Institute has developed the following assessment framework for department or agency personnel to assess the goals, outcomes, and existing practices of a forestry program. This self-assessment allows personnel to make decisions about how best to align current (and future) programs with the best practices described above.

Community Goals

Briefly describe the goals that your department or agency have set for forestry-related activities.

Goal 1:

Goal 2:

Goal 3:

Targeted Outcomes

Briefly describe the desired outcomes that will result from reaching the goals described above. How well do the outcomes align with your goals? Are the targeted outcomes quantifiable or qualitative?

Table 7: Potential Forestry Outcomes

Quantitative Outcomes Table	**Investments** • Total local public dollars invested • Total local public dollars leveraged • Total federal public dollars leveraged • Total private dollars leveraged
	Green Infrastructure • Number of trees planted • Number of trees maintained • Number of species planted or maintained • Square feet on new canopy added
	Reduced Environmental Impact • Estimated net reduction in surface temperature • Gallons of runoff treated or captured • Net tons of CO2 emissions sequestered
	Community Benefits • Total jobs created • Total jobs maintained • Total volunteers engaged • Total neighborhoods served
Qualitative Outcomes Table	**Government Initiatives** • Tree board created or maintained • Plans or inventories created • Ordinances created • Initiatives or programs created • Initiatives or programs supported

Existing Programs and Initiatives

- Briefly describe the departments, governing boards, or agencies that oversee and/or implement forestry-related activities. Should additional groups/individuals be involved? If so, which ones? Describe their role.
- Briefly describe any ordinances or guidelines that apply to forestry-related activities conducted by your department or agency. How do these policies and regulations support your goals?
- Briefly describe any events or additional programming used to engage residents or other community groups around forestry-related activities. What's worked well? What lessons can be learned from these activities?

Funding

- Briefly describe how forestry-related activities are currently funded (dedicated local funding, pass-through grants, etc.).
- How much of your department/agency's funding goes towards tree planting and maintenance?
- What are the benefits and drawbacks associated with these sources of funding?

S.W.O.T. Analysis

This exercise will help identify the strengths, weaknesses, threats, and opportunities associated with your department or agency's ability to conduct forestry-related activities.

- **Strengths:** Describe what your organization excels at.
  - Forestry-related:
  - Non-forestry related:

- **Weaknesses:** Describe challenges that your organization faces.

Forestry-related:

  - Non-forestry related:

- **Opportunities:** Describe favorable factors, external to your agency or department, that can provide an advantage to your organization.
  - Forestry-related:
  - Non-forestry related:

- **Threats:** Describe factors that could potentially harm your agency or department.
  - Forestry-related:
  - Non-forestry related:

Considering Equity and Inclusion in the Forestry Goal Setting & Assessment Process

To incorporate DEI principles into the Forestry Goal Setting & Assessment process, consider the following diagnostic questions:

- What forestry-goals in your community specifically benefit low resource communities?
- Of the targeted qualitative and quantitative outcomes illustrated in Table 7, which can be associated with projects occurring within low to moderately resourced communities?
- What ordinances, policies, and guidelines exist that advance forestry (and its benefits) in low to moderate resourced communities?
- Is there programming in your community intended to engage low to moderate income residents around forestry-related activities?
- What funding sources (or existing programs) exist in your community that support tree planting and maintenance in low to moderate resourced neighborhoods?
- What are the Strengths, Weaknesses, Opportunities, and Threats that relate to your department or agency's ability to advance forestry-related activities in low to moderate-resourced neighborhoods, in contrast with the wider community?

While aspects of goal setting and self-assessment are broader than the topic of diversity, equity, and inclusion, incorporating a DEI lens helps to provide a municipality or agency with an understanding of whether their forestry-related activities successfully address environmental health or quality of life concerns in disadvantaged areas.

NURSERY & CONTRACTOR SOURCING LIST (APPENDIX I)

Appendix I contains a Master Nursery & Contractor List for communities within Oceana County. While the contractor list includes vendors based mainly in Western Michigan, the list of identified nurseries extends to adjacent regions in USDA Zone 5, to provide communities with a broader inventory of species and planting formats (ball and burlap, container, and bare root). Projects that require a large number of trees and various species and planting formats will likely have to source their stock from multiple vendors on this list. The nursery sourcing list lays the foundation for identifying trees within a day trip's distance (within 300 miles) from Oceana County, to ensure compatibility between the stock's growing location and planting location, and to establish a basis for supporting local vendors and nurseries, while reducing potential shipping costs. Similar to sourcing tree stock, identifying local contractors that can assist with tree planting and maintenance work will provide Oceana County's municipalities with a basis for supporting local businesses and growing contractor capacity around canopy care.

Considering Equity and Inclusion in the Nursery & Contractor Sourcing Process

A primary method for incorporating equity and inclusion into a project's tree and contractor sourcing is prioritizing DBEs and related designations in the procurement process. Whether through a request for proposals (RFQ), competitive bid, or an alternate method, it is recommended that the selection process prioritize opportunities to source trees and services from DBEs, including minority-owned businesses (MBEs), woman-owned businesses (WBEs), and other similar designations.

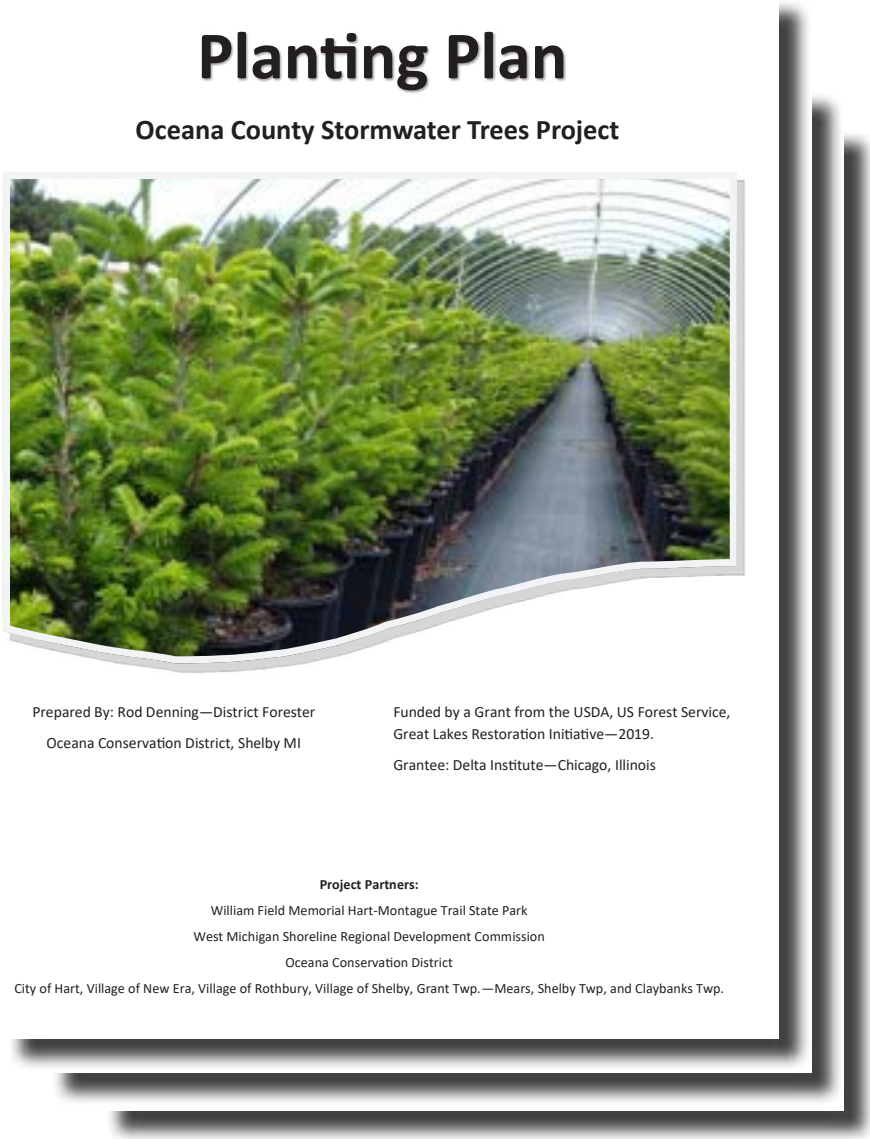
As part of the submission review process, incorporating DBE as a scoring category (along with other common categories such as cost, available stock, scope, vendor responsiveness, and local businesses) serves as an effective method for institutionalizing equity priorities into the procurement process. Documentation of relevant designations can be requested as part of a vendor's formal quote, proposal or bid submission.

Additionally, beyond the state and federally mandated advertising requirements, the project team can share the solicitation across various media platforms that target and serve DBE, MBE, and WBE vendors, which will help ensure the notice reaches these groups.

Beyond a particular planning project, municipalities and public agencies can place greater emphasis on prioritizing DBEs in the procurement process by formally adopting a resolution or ordinance that establishes a scoring bonus for DBE vendors in formal solicitations, or even stipulates percentage requirements around vendor's team composition, in service of equity and inclusion goals. These sorts of requirements are common with federal grants, but less common under state and local guidelines.

PROJECT PLANTING PLAN (APPENDIX II)

Appendix II contains the Project Planting Plan, developed by Oceana Conservation District, in partnership with WMSRDC and the project's participating communities (Claybanks Township, Golden Township, Hart, New Era, Rothbury, Shelby and the Michigan Department of Natural Resources). The plan identifies the planting locations, species distribution, and quantities across the project's 35 planting sites, as well as the replacement planting scope that was implemented in Fall 2021.



Planting Plan

Oceana County Stormwater Trees Project

Prepared By: Rod Denning—District Forester

Oceana Conservation District, Shelby MI

Funded by a Grant from the USDA, US Forest Service, Great Lakes Restoration Initiative—2019.

Grantee: Delta Institute—Chicago, Illinois

Project Partners:

William Field Memorial Hart-Montague Trail State Park

West Michigan Shoreline Regional Development Commission

Oceana Conservation District

City of Hart, Village of New Era, Village of Rothbury, Village of Shelby, Grant Twp.—Mears, Shelby Twp, and Claybanks Twp.

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APPENDIX I: NURSERY & CONTRACTOR SOURCING LIST

Rod Denning, District Forester
Oceana, Newaygo, & Muskegon Conservation Districts

Potential Service Providers

- **Joe Sulak – More Trees! LLC** (Currently the City Forester for Grand Rapids)

Joe has an LLC that provides tree sourcing recommendation for organizations that need large numbers of trees. He could also assist with shipping logistics and planting services if needed. His fee would be based on the total tree costs plus 20%, to pay for his services.

This information was shared with me as I was talking with him regarding City of Grand Rapids tree planting activities and potential recommendations he could provide.

ajsumac@gmail.com
616-490-2157

- **New Life Arboricultural Services**, 1917 Hutchinson Ave., SE, Grand Rapids, MI

www.newlifearbor.com
service@newlifearbor.com
616-889-5595

- **Summit Landscape Management Inc.**, 1379 Comstock St., Marne, MI

www.summitlandscapeinc.com
616-453-1091

- **Muskegon Conservation District**, 4735 Holton Rd., Twin Lake, MI

www.muskegoncd.org
231-828-5097

- **Cardno**, 11181 Marwill Ave., West Olive, MI

616-847-1680

- **GEI Consultants of Michigan, P.C.,** 5225 Edgewater Dr., Allendale, MI

616-384-2710

- **Davey Resource Group**, P.O Box 5193, Kent OH

330-673-5685 or local GR office, Lee Mueller 248-221-0439 or Lee.Mueller@davey.com

Potential Tree Stock Sources

- **Armintrout's Nursery,** 1156 Lincoln Rd., Allegan, MI

www.armintrouts.com
info@armintrouts.com
269-673-6627

Mostly conifers, few deciduous – Balled & burlap and potted stock.

- **West Olive Nursery,** 8661 146th Ave., West Olive, MI

www.wolivenursery.com
wonursery@iserv.net
616-399-1150

Large variety of up to 4" caliper balled & burlapped trees.

- **Native Landscapes LLC,** 33081 E. Red Arrow Hwy., Paw Paw, MI

www.native-landscapes.org
randy.counterman@gmail.com
269-929-3455

Native vegetation, unknown as to what they sell.

- **Cold Stream Farm LLC,** 8585 N. Stephens Rd., Free Soil, MI

www.coldstreamfarm.net
info@coldstreamfarm.net
231-464-5809

Large variety of bare root deciduous and coniferous trees.

- **KP Tree & Nursery**, 9350 Fillmore St., Zeeland, MI

www.kptreeandnursery.com
616-550-9693

Mostly conifers, a few deciduous – Balled & burlapped and potted stock.

- **Winding Creek Nursery**, 1326 126th Avenue, Shelbyville, MI

www.windingcreeknursery.com
269-792-4247

Mostly deciduous – Balled & burlapped. Official dealer for the "treegator" tree watering system.

- **Oceana Conservation District**, 1064 Industrial Park Dr., Shelby, MI

www.oceanaconservation.org
231-861-5600

Annual tree sale is in April 2020. Can supply bare root seedling deciduous and coniferous species.

- **Trains Nursery**, 12173 McClelland Ave., Grant, MI

www.evergreensforsale.com
trees@evergreensforsale.com
231-834-5309

Mostly conifers, maples and river birch – balled and burlapped. Local tree planting services.

- **Alpha Nurseries, Inc**., 3737 65th Street, Holland, MI

www.alphanurseries.com

269-857-7804

Seedlings from Michigan sources. Deciduous and coniferous. Common supplier to Conservation Districts. They have extensive native species availability.

- **Schichtel's Nursery**, 7420 Peters Rd., Springville, NY

www.schichtels.com
info@schichtels.com
716-592-9383

They offer bare root trees at 1.5"- 2" caliper size. Species available?
The City of Grand Rapids uses this source. Something to consider?

- **Possibility Place Nursery**, 7548 W. Monee Manhattan Rd., Monee, IL

www.possibilityplace.com
Terry@possibilityplace.com
708-534-3988

Have deciduous containerized trees 1.5" to 2" caliper. Species are limited, but do have good selection of oak varieties.

- **Mellema Nursery**, 5428 W. 64th St., Fremont, MI

www.mellemanursery.com
231-924-5106

Mostly deciduous, limited conifers. Stock type unknown.

- **Weesies Brothers Landscaping**, 10022 Walsh Rd., Montague, MI

www.weesies.com
231-894-4742

Stock species and type unknown.

- **Newaygo Conservation District Nursery,** 940 W. Rex St, Fremont, MI

Nursery (Newaygo MI)
www.newaygocd.org
Nursery: 231-652-7493

A variety of bareroot deciduous and coniferous trees.

- **Michigan Evergreen Nursery**, 10845 Lake Michigan Dr., West Olive, MI

www.michiganevergreennursery.com
616-846-4406

Variety of deciduous and coniferous trees. Stock type unknown.

- **Vans Pines Nursery**, 14731 Baldwin St., West Olive, MI

www.vanspinesnursery.com
800-888-7337

Large selection of confiers, bareroot seedlings and containerized.

- **Great Lakes Landscape Supply**, 15200 Cedar Springs Ave., Cedar Springs, MI

www.greatlakeslandscaping.com
616-969-5665

Container grown trees, B&B also? Species unknown.

Planting Plan

Oceana County Stormwater Trees Project

Prepared By: Rod Denning—District Forester

Oceana Conservation District, Shelby MI

Funded by a Grant from the USDA, US Forest Service, Great Lakes Restoration Initiative—2019.

Grantee: Delta Institute—Chicago, Illinois

Project Partners:

William Field Memorial Hart-Montague Trail State Park

West Michigan Shoreline Regional Development Commission

Oceana Conservation District

City of Hart, Village of New Era, Village of Rothbury, Village of Shelby, Grant Twp.—Mears, Shelby Twp, and Claybanks Twp.

Table of Contents

This planting plan document identifies the locations of where trees are to be planted as part of the Oceana County Stormwater Trees Project. The following pages describe the characteristics of each site, what needs to be planted at the site, shows a photo of the site, and provides a map of the planting location.

Tree Planting Guidelines (Planting specifications are to follow the International Society of Arboriculture best management practices). Highlights of planting recommendations are below:

- **Keep roots protected and moist** before the tree goes in the ground (B&B and bareroot)
- Often trees come from the nursery with excess soil at the top of the root ball or container, **remove excess soil** to the top of the first root
- **Root flare** is at ground level, root graft is above ground level if present
- Dig a **hole 2X the width** of the root ball, and as deep as the top of the root ball
- Remove the top of the **wire basket** and top of the **burlap** (even if it is biodegradable)
- **Water** the root ball and back filled area **after planting**
- Bareroot seedlings– keep those **roots protected and moist** before planting
- Bareroot seedlings – plant deep enough so you don't create a **J – Root**
- Container grown – notice if they are pot bound. **Loosen root mass if needed, cut encircling roots if needed**
- Layer 2" – 4" of **mulch** over backfilled area of the planting hole, keeping mulch away from the trunk

Appendix – "A Pocket Guide to Planting Trees"

See detailed planting guidelines outlined in the publication developed by Michigan ReLeaf and the Minnesota Department of Natural Resources, at the end of the document.

Site Number and Location: #2 - Village of Rothbury, south of Winston Rd, along HM trail - See Map 2

Trail Right-Of-Way Distance: 50' total, 25' from trail center line (south of Barber Steel building)

Ownership: MDNR (west side of trail) and Barber Steel Foundry Corp., Rothbury

Microclimate Factors: None

Sunlight Levels: Full sunlight

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Probable - along trail edge

Soil Drainage: Good, dry site

Planting Recommendations: 4 white pine saplings, container

Site Number and Location: #3 - Village of Rothbury, north of Winston Rd. along HM trail - See Map 2

Trail Right-Of-Way Distance: 72' total, from trail CL to east ROW edge is 50'

Ownership: Michigan DNR

Microclimate Factors: None

Sunlight Levels: Full sunlight

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Probably, trail edge

Soil Drainage: Good

Planting Recommendations: 8 total - (3) white oak, (3) basswood, (2) red maple - saplings, container


Map 2
Planting Sites
Louis Ave
S Michigan Ave
Grant St
Oceana Dr.
W Winston Rd
3
Village of Rothbury
Bartlett St
Hart Montague
Forest St
Trail
2
Community St
N

Site Number and Location: #4 - Village of Rothbury, north of Winston Rd., along HM trail - See Map 3

Trail Right-Of-Way Distance: 100' total - 50' from trail center line

Ownership: Michigan DNR

Microclimate Factors: Surrounding forest canopy

Sunlight Levels: Partial sun - filtered light

Soil Texture/Type: Benona sand or Grattan sand, excessively drained

Soil Compaction: Probably, trail edge and off road vehicle path nearby

Soil Drainage: Good, dry site

Planting Recommendations: 5 total - (3) white pine (2) white oak - saplings, container

Site Number and Location: #5 - Grant Twp., corner of Westshore Dr. & Meadow Dr. - See Map 3

Trail Right-Of-Way Distance: 100' total, 50' from trail center line

Ownership: Michigan DNR

Microclimate Factors: Surrounding tree canopy

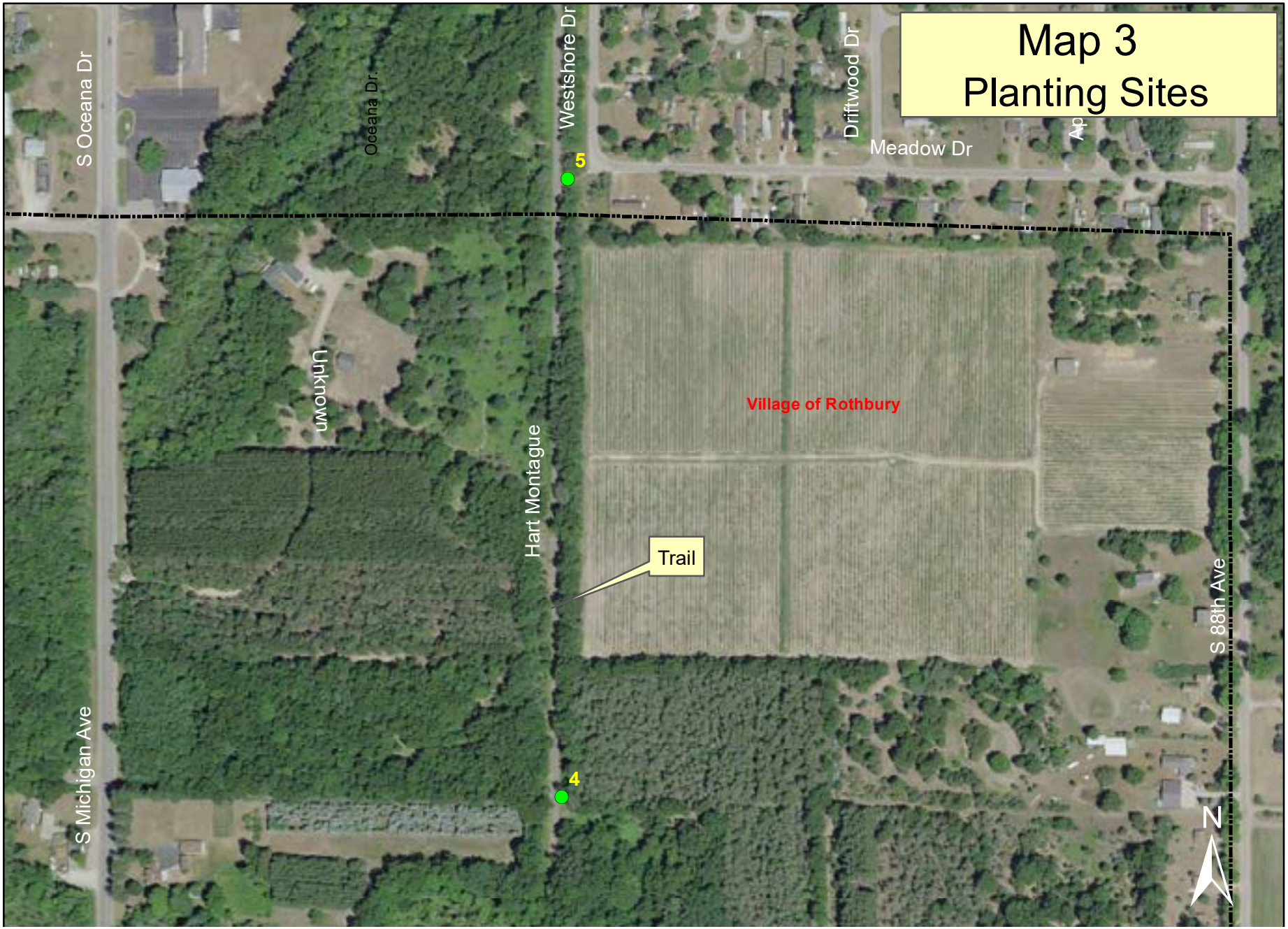
Sunlight Levels: Partial sun

Soil Texture/Type: Grattan sand, excessively drained

Soil Compaction: Probably - extensive foot traffic

Soil Drainage: Good, dry site

Planting Recommendations: 4 total - (2) white pine (2) red maple - saplings, container


Map 3
Planting Sites
S Oceana Dr
Oceana Dr.
Westshore Dr
Driftwood Dr
Meadow Dr
5
Unknown
Village of Rothbury
Hart Montague
Trail
S 88th Ave
S Michigan Ave
4
N

Site Number and Location: #7 - Grant Twp., north and south of Arthur Rd. along HM trail - See Map 4

Trail Right-Of-Way Distance: 100' total, 50' from trail center line

Ownership: Michigan DNR

Microclimate Factors: Trailside trees

Sunlight Levels: Full to partial sun

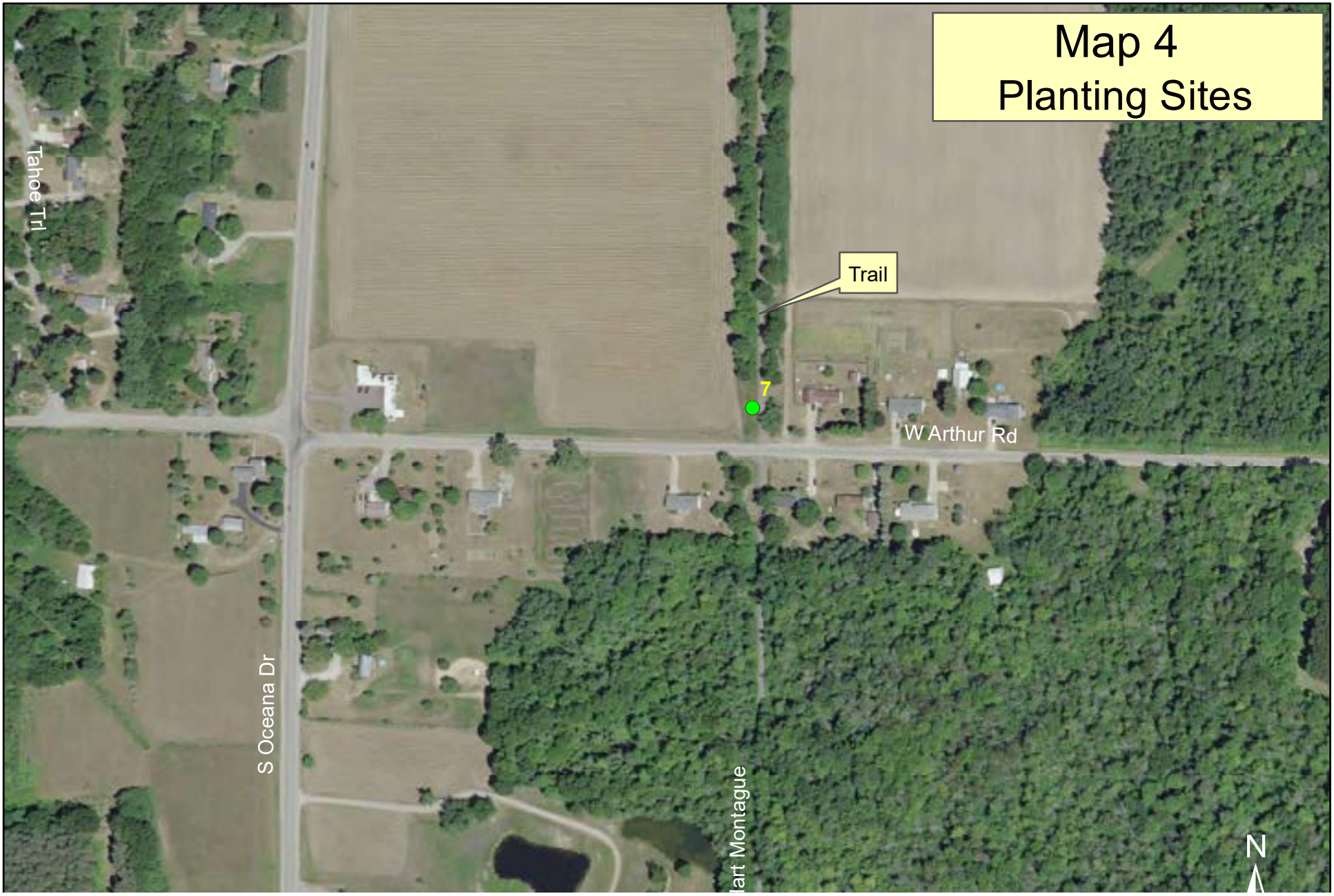
Soil Texture/Type: Coloma sand, somewhat excessively drained

Soil Compaction: Possibly, trail edge

Soil Drainage: Good to poor on north side of Arthur Rd.

Planting Recommendations: 8 total - (4) tamarack (north), (4) white spruce (south) - saplings, container

Photo - south side for white spruce


Map 4
Planting Sites
Tahoe Trl
Trail
7
W Arthur Rd
S Oceana Dr
N

Site Number and Location: #201 - Grant Twp., along HM Trail, just south of Yale Rd. - See Map 4.5

Trail Right-Of-Way Distance: 100' total, 50' from trail CL each side of trail

Ownership: Michigan DNR

Microclimate Factors: n/a

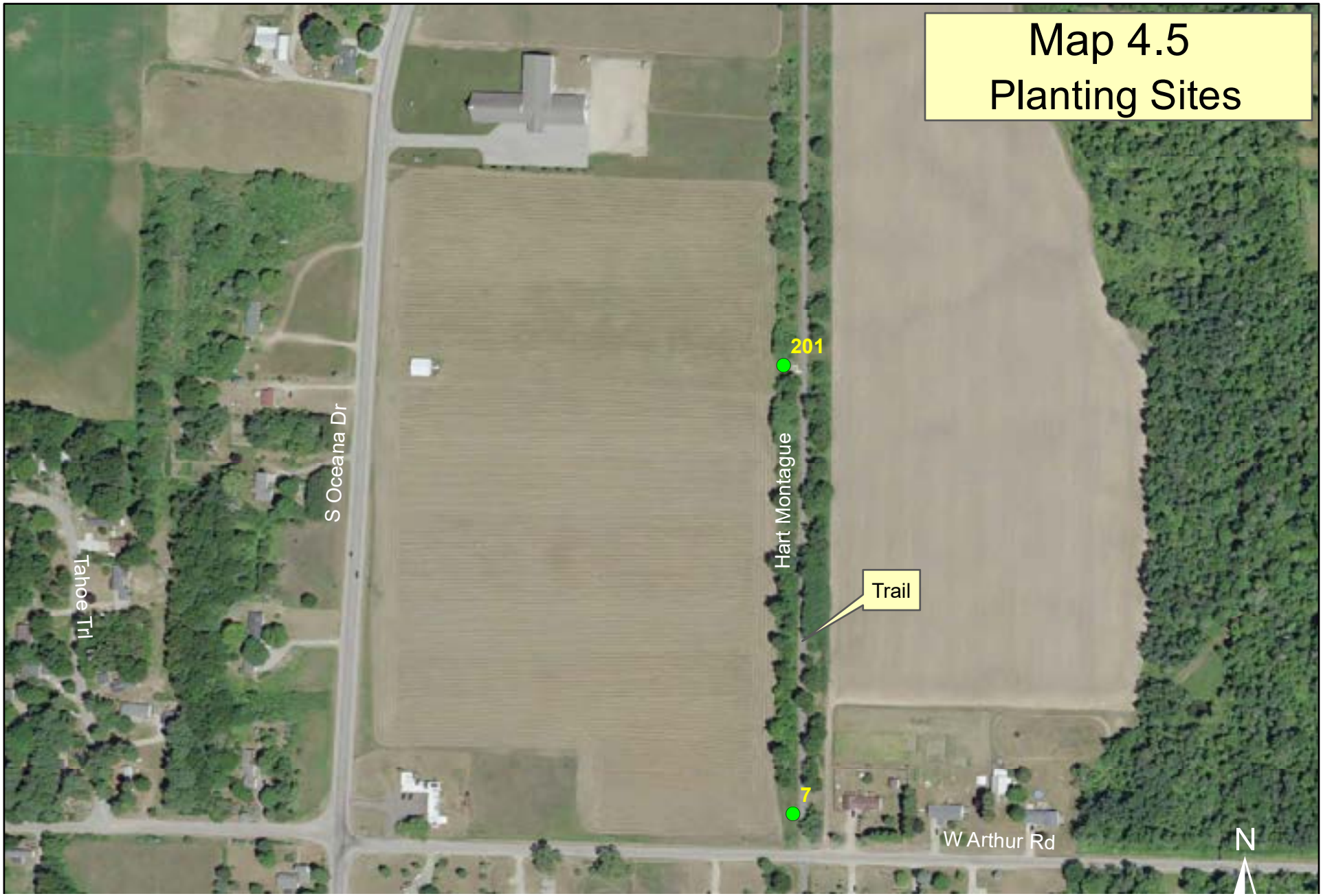
Sunlight Levels: Full sunlight

Soil Texture/Type: Coloma sand, somewhat excessively drained

Soil Compaction: Probably - trail ROW

Soil Drainage: Good

Planting Recommendations: 1 white pine sapling, container


Map 4.5
Planting Sites
201
7
Trail
S Oceana Dr
Hart Montague
Tahoe Trl
W Arthur Rd
N

Site Number and Location: #8 - Village of New Era, south of Garfield Rd., along HM trail - See Map 5

Trail Right-Of-Way Distance: 66' total, 50' from trail center line to east edge of ROW

Ownership: Michigan DNR

Microclimate Factors: Marsh wetland

Sunlight Levels: Full sunlight

Soil Texture/Type: Granby sand, poorly drained

Soil Compaction: No

Soil Drainage: Poor, wet area

Planting Recommendations: (4) Northern white cedar saplings, container

Site Number and Location: #11 - Village of New Era, between HM trail & Carlton Crk. (County drain) - See Map 5

Trail Right-Of-Way Distance: 50' total, from trail centerline to edge of ROW (east side of creek)

Ownership: Michigan DNR - Private west side of trail

Microclimate Factors: Low creek topography

Sunlight Levels: Full to partial sunshine

Soil Texture/Type: Granby sand, poorly drained

Soil Compaction: None

Soil Drainage: Poor - creek floodplain (east), west - also wet drainage

Planting Recommendations: 18 total - (3) swamp white oak, (3) tamarack saplings, container (east side of trail)

(12) American hornbeam or bluebeech (west side of trail) saplings, container

Site Number and Location: #12 - Village of New Era, just south of Ray Ave. & HM trail - See Map 5

Trail Right-Of-Way Distance: 50' to east side of creek, west side - private parcel

Ownership: Michigan DNR (east side)

Microclimate Factors: Low topography, Carlton Crk. floodplain - urban area

Sunlight Levels: Full sunshine

Soil Texture/Type: Grandby sand, poorly drained

Soil Compaction: None

Soil Drainage: Good, but very close to creek

Planting Recommendations: (6) yellow birch saplings, container (east side of trail) - some site preperation required (shrub removal etc.)

Site Number and Location: #13 - Village of New Era, New Era Trailhead off Oceana Dr. - See Map 5

Trail Right-Of-Way Distance: n/a, public parcel

Ownership: Village of New Era

Microclimate Factors: Low topography - Carlton Crk.

Sunlight Levels: Full sunlight

Soil Texture/Type: Grandby sand, poorly drained

Soil Compaction: Possible - landscaped area

Soil Drainage: Good, however close of Carlton Crk.

Planting Recommendations: 3 total - (1) serviceberry, (1) Eastern hophornbeam, (1) American hornbeam


Map 5
Planting Sites
Hart Montague
1st St
Oceana Dr.
3rd St
Hillcrest Dr
13
Ray Ave
James St
12
2nd St
Trail
Blair Ave
Elm St
Village of New Era
11
Bingham St
Garfield Rd.
8
N
0
250
500
1,000 Feet

Site Number and Location: #17 - Shelby Twp., Country Dairy along HM trail - See Map 7

Trail Right-Of-Way Distance: 100' total, 50' from trail center line

Ownership: Michigan DNR

Microclimate Factors: Wind, SW winds impact location

Sunlight Levels: Full sunlight

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Probably, trail edge

Soil Drainage: Good

Planting Recommendations: 3 total - white spruce saplings, container

Site Number and Location: #18 - Shelby Twp., Country Dairy, along the HM trail - See Map 7

Trail Right-Of-Way Distance: 100' total, 50' from trail center line, after trail curve ROW is mostly east side of trail

Ownership: Michigan DNR

Microclimate Factors: Wind, SW winds impact location

Sunlight Levels: Full sunlight

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Probably, trail edge

Soil Drainage: Poor in places, especially near white birch

Planting Recommendations: 7 total - (4) flowering dogwood, (3) American hornbeam, stabilize trees with stakes.

Site Number and Location: #19 - Shelby Twp., just northeast of Country Dairy along HM trail - See Map 7

Trail Right-Of-Way Distance: 100' total, 50' from trail center line, before trail curve ROW is mostly east side of trail

Ownership: Michigan DNR

Microclimate Factors: Wind, SW winds impact location

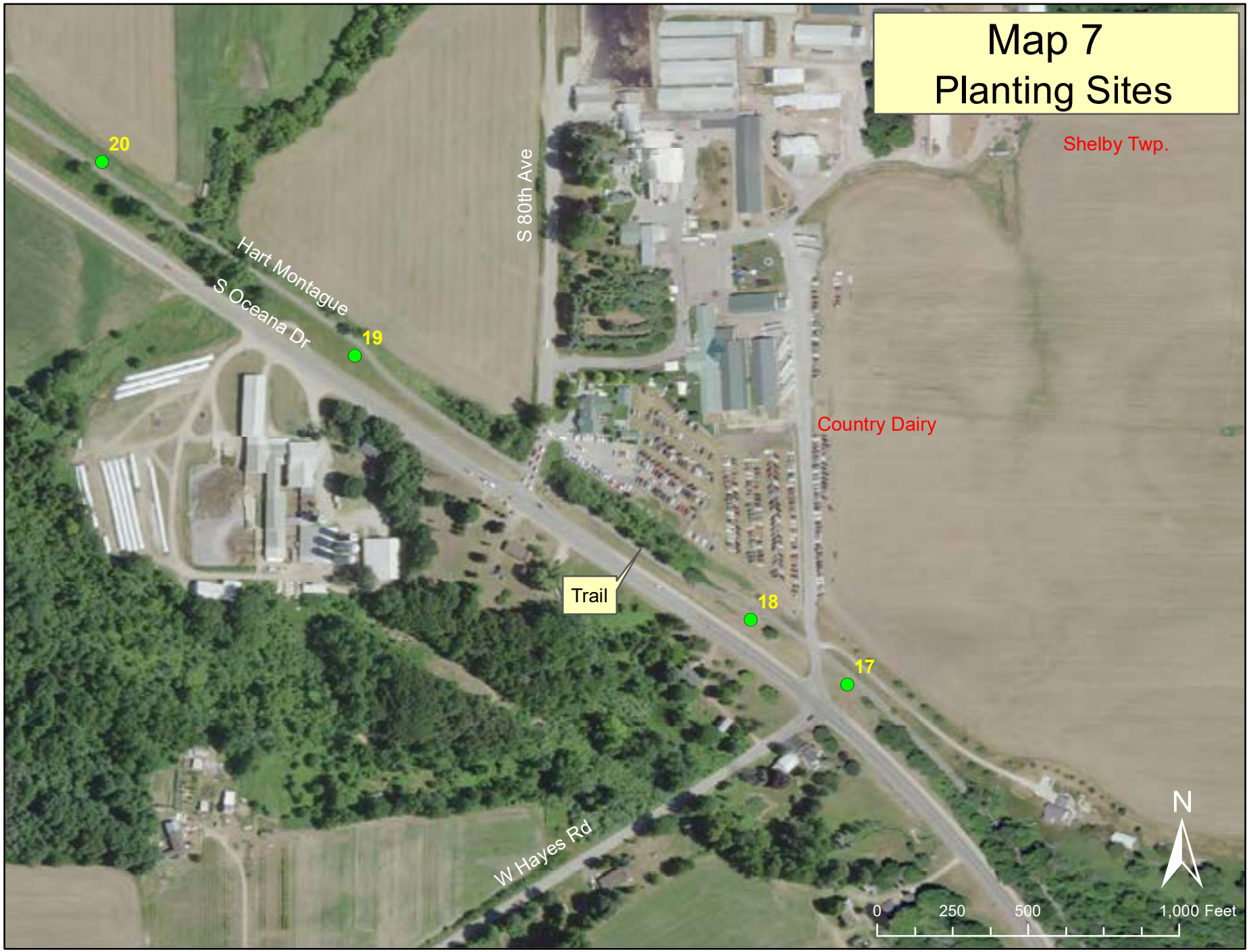
Sunlight Levels: Full sunlight

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Probably, trail edge

Soil Drainage: Good

Planting Recommendations: 20 total - (3) red maple, (3) yellow birch, (3) basswood, (3) sugar maple, (3) tulip poplar, (2) American chestnut, (3) Northern hackberry, saplings, container. Stabilize trees with stakes.


Map 7
Planting Sites
Shelby Twp.
20
19
18
17
S 80th Ave
Hart Montague
S Oceana Dr
Country Dairy
Trail
W Hayes Rd
N
0
250
500
1,000 Feet

Site Number and Location: #20 - Shelby Twp., just northeast of Country Dairy along HM trail - See Map 8

Trail Right-Of-Way Distance: 100' total, 50' from trail center line

Ownership: Michigan DNR

Microclimate Factors: Wind, SW winds impact location

Sunlight Levels: Full sunlight

Soil Texture/Type: Thetford loamy fine sand, somewhat poorly drained

Soil Compaction: Probably, trail edge

Soil Drainage: Good, however ditch and low area at edge of ROW

Planting Recommendations: 20 total - (10) red maple, (10) Northern white cedar, saplings, container

Stabilize trees with stakes.

Site Number and Location: #21 - Shelby Twp., northeast of Country Dairy along HM trail - See Map 8

Trail Right-Of-Way Distance: 100' total, 50' from trail center line

Ownership: Michigan DNR

Microclimate Factors: Wind, SW winds impact location

Sunlight Levels: Full sunlight

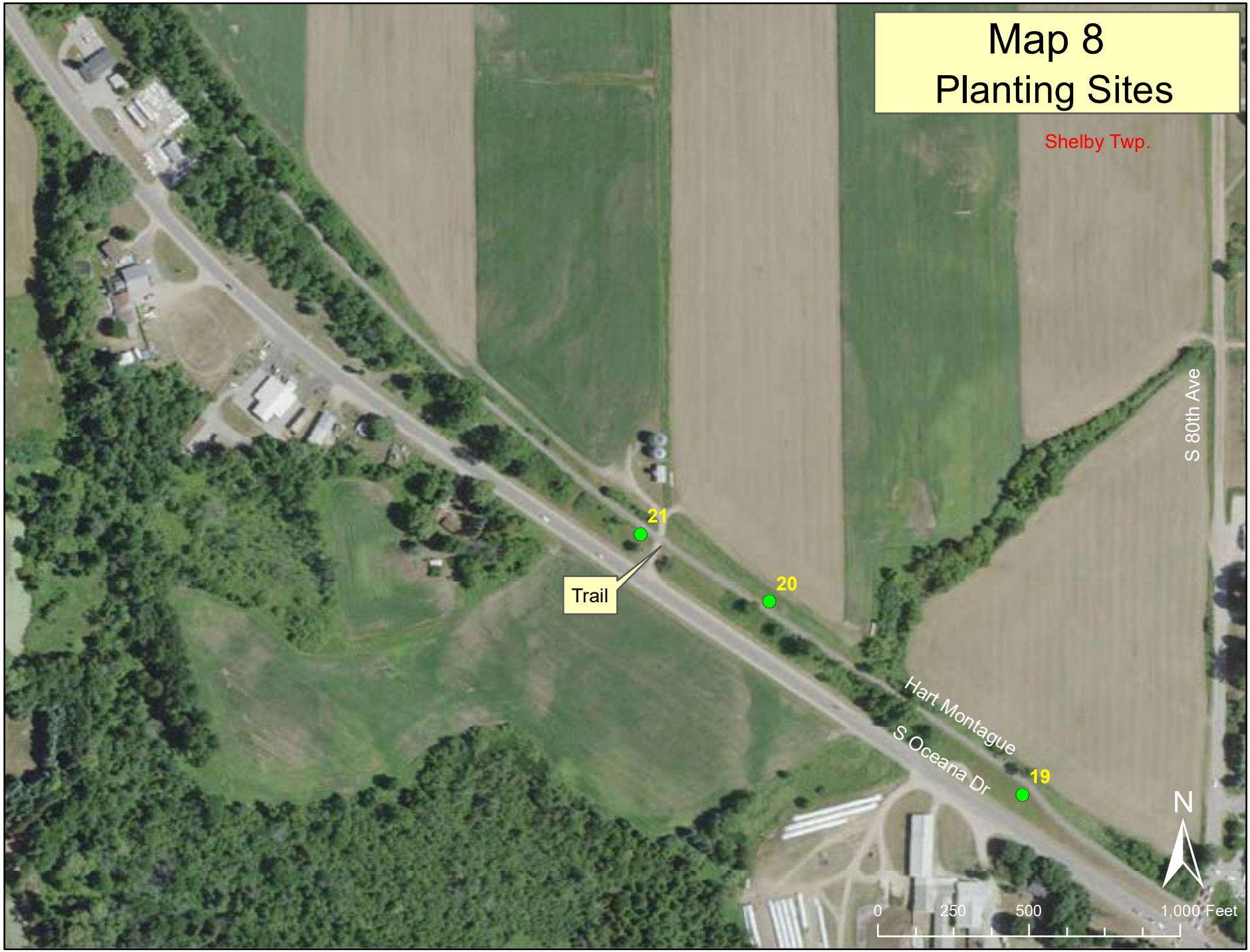
Soil Texture/Type: Spinks-Okee complex, well drained

Soil Compaction: Probably, near driveway to farm field

Soil Drainage: Good

Planting Recommendations: 2 red maple, saplings, container

Stabilize trees with stakes


Map 8
Planting Sites
Shelby Twp.
S 80th Ave
21
20
19
Trail
Hart Montague
S Oceana Dr
N
0
250
500
1,000 Feet

Site Number and Location: #200 - Shelby Twp., along HM Trail, just south of Baker Rd. - See Map 8.5

Trail Right-Of-Way Distance: 100' total, 50' from trail CL each side of trail

Ownership: Michigan DNR

Microclimate Factors: n/a

Sunlight Levels: Full sunlight

Soil Texture/Type: Spinks-Benona complex, well to excessively drained

Soil Compaction: Probably - trail ROW

Soil Drainage: Good

Planting Recommendations: 2 total - (1) sugar maple, (1) red maple, saplings, container


Map 8.5
Planting Sites
Shelby Twp.
Trail
W Baker Rd
W Baker Rd
200
S Oceana Dr
Hart Montague
N
0
250
500
1,000 Feet

Site Number and Location: #23 - Village of Shelby, behind Emergency Services building - See Map 10

Trail Right-Of-Way Distance: 100' total, 50' from trail CL, behind building and south, west side of trail ROW is only 15'

Ownership: Michigan DNR and Oceana Co. (562 S. State St., Shelby)

Microclimate Factors: None

Sunlight Levels: Full sunlight

Soil Texture/Type: Benona sand, with disturbed gravelly soils nearby, excessively drained

Soil Compaction: Probably, trail edge

Soil Drainage: Good

Planting Recommendations: 20 total - (5) white pine, (5) red maple, (5) tulip poplar, (5) American basswood, saplings, containers

Site Number and Location: #24 - Village of Shelby, HM trail crossing of Oceana Dr.(south side), See Map 10

Trail Right-Of-Way Distance: n/a, small parcel is 50' from rd-trail intersection, width is 40', plant here

Ownership: Michigan DNR - do not plant on road ROW

Microclimate Factors: Re-reflected heat load from Oceana Dr.

Sunlight Levels: Full sunlight

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Probably, trail edge

Soil Drainage: Good

Planting Recommendations: 2 serviceberry, saplings, container. Stabilize trees with stakes.

Site Number and Location: #25 - Village of Shelby, HM trail crossing of Oceana Dr.(north side), See Map 10

Trail Right-Of-Way Distance: 66' total, 48' from trail center line to east edge of ROW

Ownership: Michigan DNR

Microclimate Factors: West slope aspect

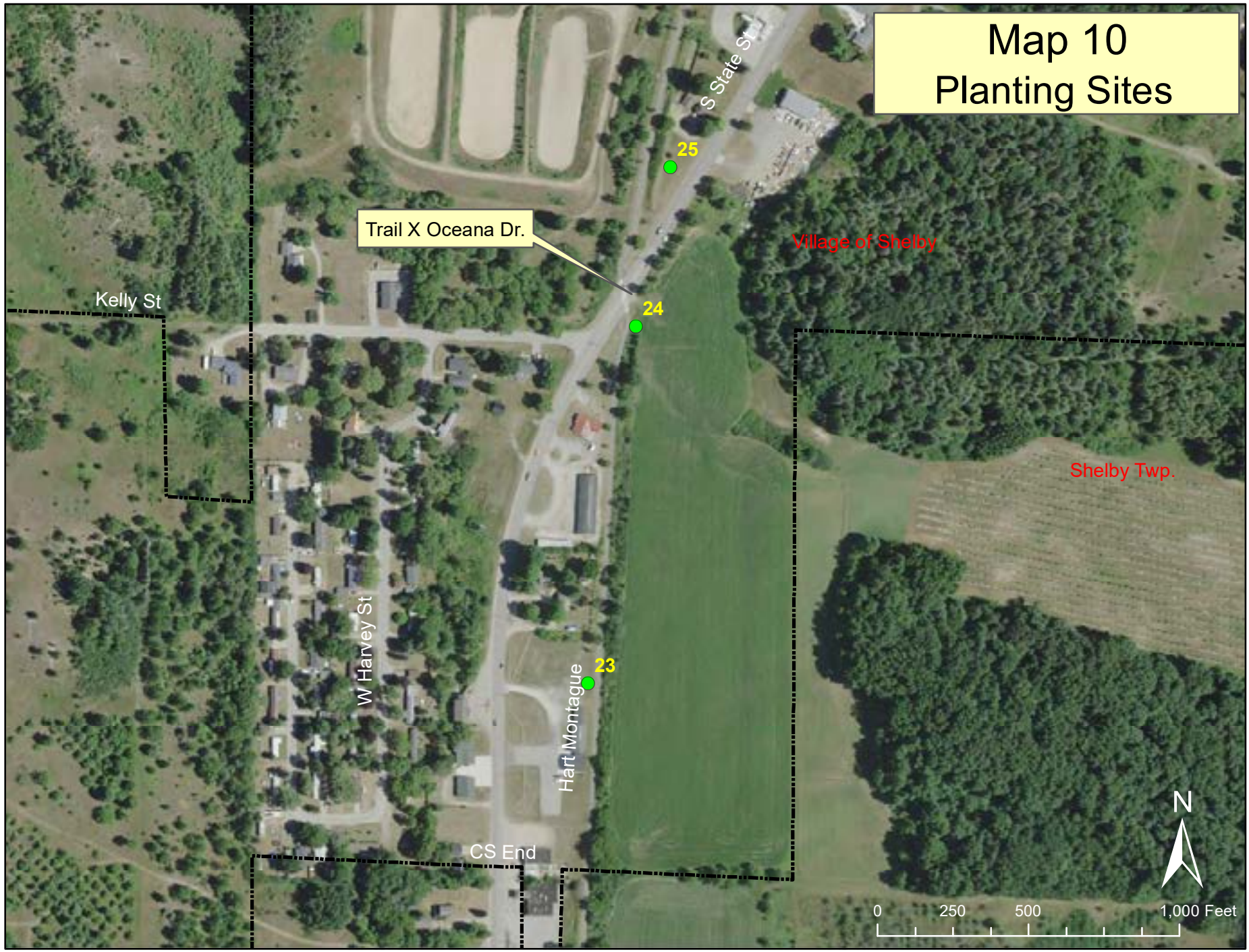
Sunlight Levels: Full sunlight

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Possibly, landscaped area

Soil Drainage: Good

Planting Recommendations: 7 total - (4) flowering dogwood, (3) serviceberry, saplings, container. Use tree guards to protect from wildlife damage. Stabilize trees with stakes.


Map 10
Planting Sites
S State St
25
Trail X Oceana Dr.
Village of Shelby
Kelly St
24
Shelby Twp.
W Harvey St
23
Hart Montague
CS End
N
0
250
500
1,000 Feet

Site Number and Location: #26 - Village of Shelby, near Oceana Foods and along HM trail - See Map 11

Trail Right-Of-Way Distance: 66' total, 48' from trail center line to east edge of ROW

Ownership: Michigan DNR

Microclimate Factors: None

Sunlight Levels: Full sunlight

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Potentially heavy, lots of heavy equipment movement nearby

Soil Drainage: Good

Planting Recommendations: 15 total - (5) white pine, (5) Northern white cedar, (5) sugar maple, saplings, container. Use tree guards to protect from wildlife damage.

Site Number and Location: #27 - Village of Shelby, Horseshoe Park, Lincoln St., - See Map 11

Trail Right-Of-Way Distance: n/a

Ownership: Village of Shelby

Microclimate Factors: None

Sunlight Levels: Full to filtered sunlight

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Probably, landscaped area

Soil Drainage: Good

Planting Recommendations: 20 total - (5) sugar maple, (5) American basswood, (5) white pine, (5) tulip poplar saplings, container


Map 11
Planting Sites
Elliott St
1st St
Pine St
Village of Shelby
Trail
Bevier St
Oceana Dr.
S Michigan Ave
Hart Montague
Bennett St
27
Horseshoe Park
Lincoln St
S State St
Grant St
Oceana Foods
26
Rankin St
N
0
250
500
1,000 Feet

Site Number and Location: #28 - Village of Shelby, @ W. 3rd St and HM trail - See Map 12

Trail Right-Of-Way Distance: 40' total, most all of it is east side of trail

Ownership: Michigan DNR

Microclimate Factors: Re-reflected heat load

Sunlight Levels: Full sunlight

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Probable, landscape and roads nearby

Soil Drainage: Good

Planting Recommendations: 17 total - (1) dotted hawthorn, (8) flowering dogwood, (8) serviceberry, saplings, container

Site Number and Location: #29 - Village of Shelby, Shelby Station Trail Head - See Map 12

Trail Right-Of-Way Distance: 15' total trail ROW, plus village parcel

Ownership: Michigan DNR and Village of Shelby

Microclimate Factors: Landscaped area

Sunlight Levels: Full sunlight

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Probably, landscaped area

Soil Drainage: Good

Planting Recommendations: 20 total - (10) flowering dogwood, (10) serviceberry, saplings, container

Site Number and Location: #30 - Village of Shelby, between 4th & 5th St., along HM trail - See Map 12

Trail Right-Of-Way Distance: 66' total, 33' Village of Shelby, 33' HM trail

Ownership: Michigan DNR and Village of Shelby

Microclimate Factors: Landscaped area

Sunlight Levels: Full sunlight

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Possible, landscaped area

Soil Drainage: Good

Planting Recommendations: 6 flowering dogwood, saplings, container


Map 12
Planting Sites
Village of Shelby
W Woodrow Rd
Dewey St
Trail
W 5th St
E 5th St
Elliott St
30
Maple St
Elm St
Cherry St
N State St
Walnut St
W 4th St
E 4th St
Pine St
Shelby Station Trail Head
N Michigan Ave
29
Deming Rd
W 3rd St
E 3rd St
28
Hart Montague
White St
N
0
250
500
1,000 Feet

Site Number and Location: #33 - Village of Shelby, along Industrial Park Dr. - See Map 13

Trail Right-Of-Way Distance: Unknown - planting is between trail and road area

Ownership: Village of Shelby

Microclimate Factors: Re-reflected heat load from road

Sunlight Levels: Full to partial sunlight

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Probably, next to road

Soil Drainage: Unknown

Planting Recommendations: 10 total - (5) sugar maple, (5) red maple, saplings, container

Interplant with new seedlings already planted


Map 13
Planting Sites
Village of Shelby
Trail
Industrial Park Dr
33
Hart Montague
W Woodrow Rd
W 6th St
N Apricot Ln
Elliott St
Pine St
Dewey St
N Michigan Ave
N
0
250
500
1,000 Feet

Site Number and Location: #34 - Mears community, Taylor Rd. (north side) and HM trail - See Map 14

Trail Right-Of-Way Distance: 70' total, 45' from trail center line, plant on east side of trail

Ownership: Michigan DNR

Microclimate Factors: None

Sunlight Levels: Full to partial sunlight

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Possibly, trail edge

Soil Drainage: Good

Planting Recommendations: 3 white pine saplings, container

Site Number and Location: #35 - Mears community, just east of 56th Ave. and HM trail - See Map 14

Trail Right-Of-Way Distance: 30' total, 15' from trail center line

Ownership: Michigan DNR

Microclimate Factors: None

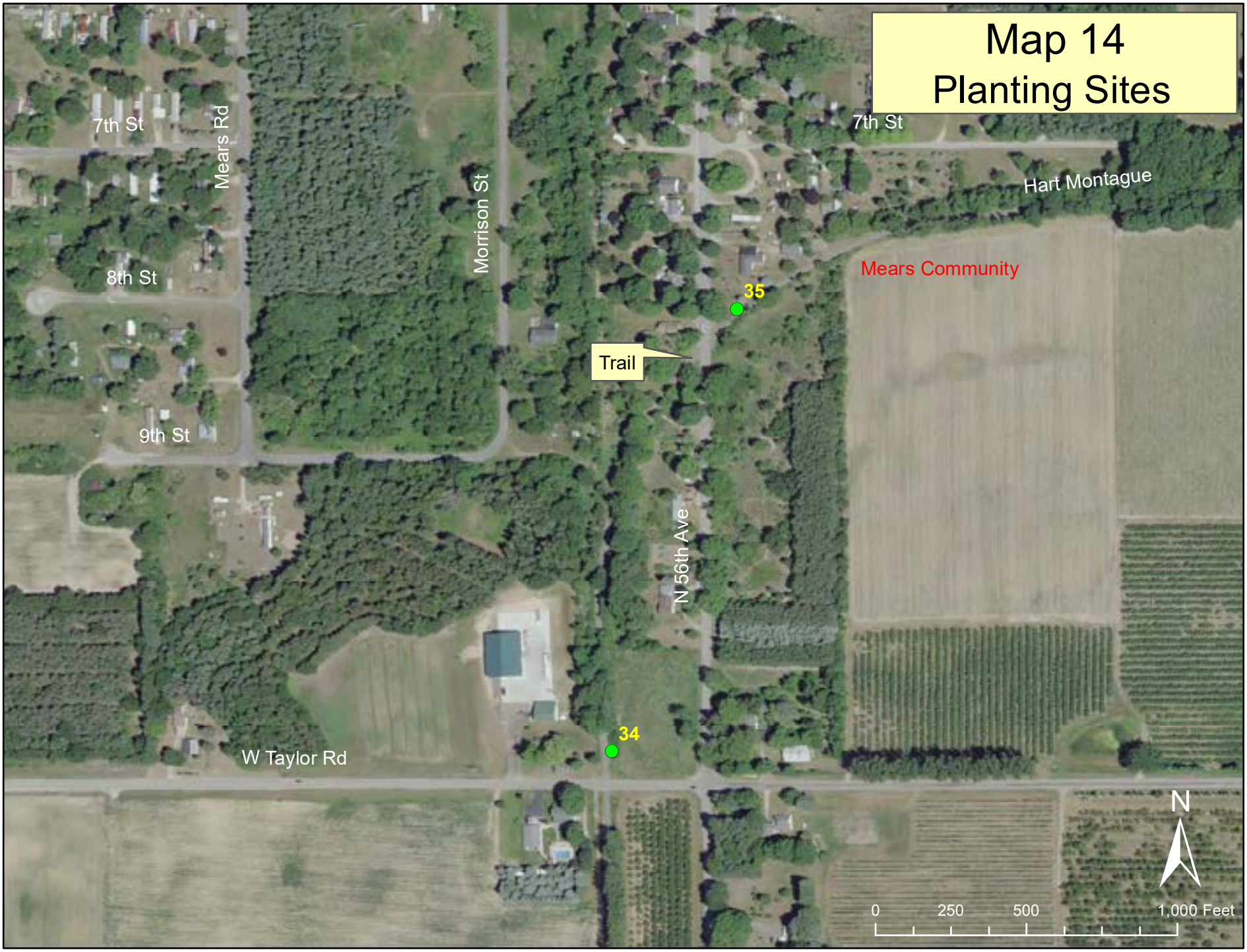
Sunlight Levels: partial sunlight to shade

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Probably

Soil Drainage: Good

Planting Recommendations: 12 total - (6) white pine, (6) red maple, saplings, container


Map 14
Planting Sites
7th St
Mears Rd
Morrison St
7th St
Hart Montague
8th St
Mears Community
35
Trail
9th St
N 56th Ave
34
W Taylor Rd
N
0
250
500
1,000 Feet

Site Number and Location: #36 - Mears/Golden Twp., along HM trail between 56th Ave. & 64 Ave., See Map 15

Trail Right-Of-Way Distance: 60' total, 30' from trail CL to south side ROW edge (planting area)

Ownership: Michigan DNR

Microclimate Factors: None

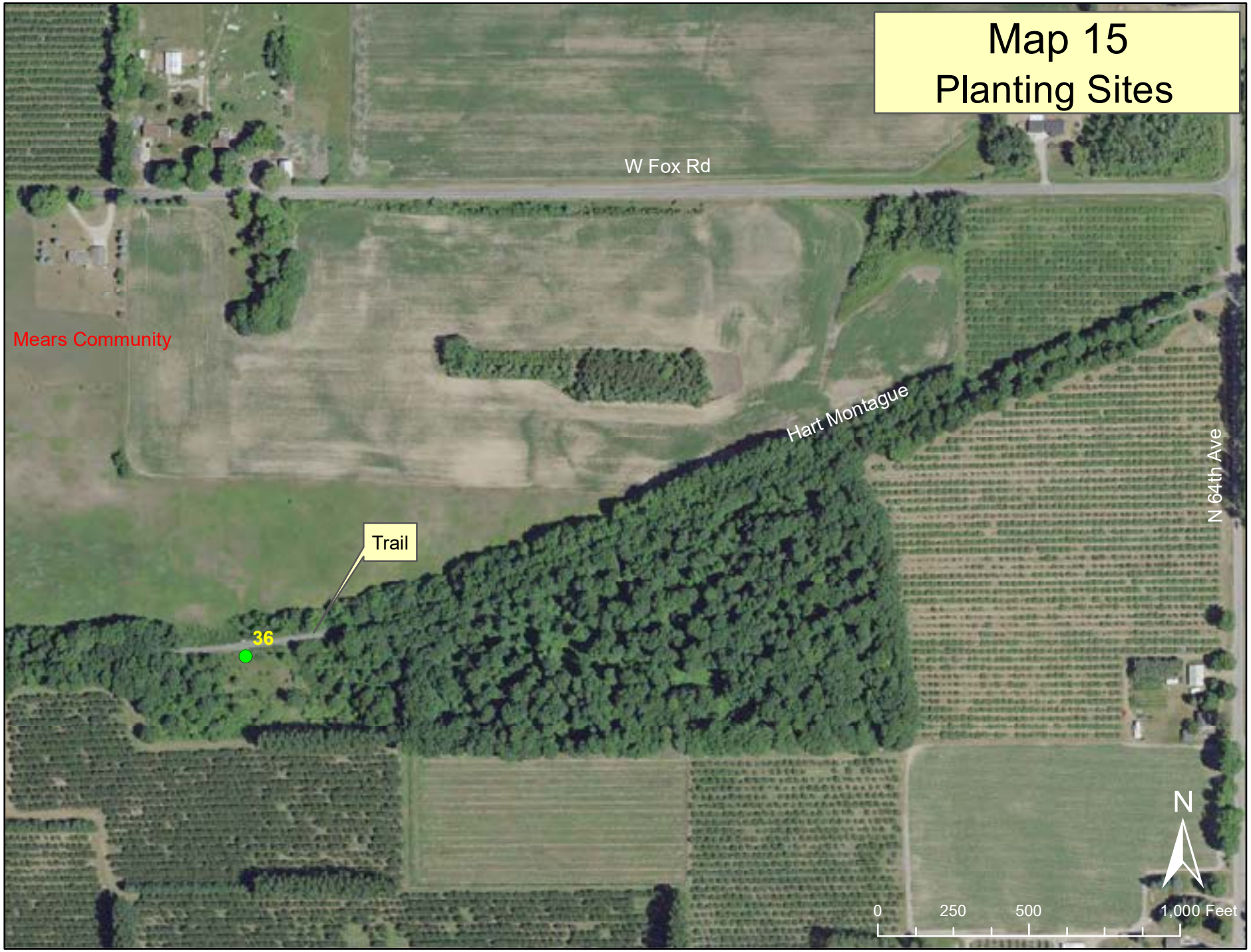
Sunlight Levels: Full sunslight

Soil Texture/Type: Spinks-Remus-Fern complex, well drained

Soil Compaction: None

Soil Drainage: Good

Planting Recommendations: 7 total - (2) sugar maple, (3) American basswood, (2) tulip poplar


Map 15
Planting Sites
W Fox Rd
Mears Community
Hart Montague
N 64th Ave
Trail
36
N
0
250
500
1,000 Feet

Site Number and Location: #38 - City of Hart, just north of Hart Trailhead along HM trail - See Map 17

Trail Right-Of-Way Distance: 100' total, 50' from trail center line

Ownership: Michigan DNR

Microclimate Factors: None

Sunlight Levels: Full sunlight

Soil Texture/Type: Covert sand, moderately well drained

Soil Compaction: Probably, landscaped area

Soil Drainage: Good, however may be wet

Planting Recommendations: 10 total - (5) flowering dogwood, (5) serviceberry, saplings, container

NOTE: 3 phase electric corridor, remain clear of corridor

Site Number and Location: #39 - City of Hart, south of Enterprise Dr. along HM trail - See Map 17

Trail Right-Of-Way Distance: 60' total, mostly all of the ROW is on the south and east side of trail

Ownership: City of Hart

Microclimate Factors: None

Sunlight Levels: Full sunlight

Soil Texture/Type: Covert sand, moderately well drained

Soil Compaction: Probably, landscaped area

Soil Drainage: Good

Planting Recommendations: 2 serviceberry saplings, container


Map 17
Planting Sites
N Creek Dr
S Creek Dr
US Bike Route 35
Enterprise Dr
39
38
City of Hart
Trail
Hart Montague
Hart Trailhead
Parmington Ave
S State St
W Polk Rd
Industrial Park Dr
Young Rd
Waterloo Rd
N
0
250
500
1,000 Feet

Site Number and Location: #43 - City of Hart, along Woodlawn Ave. - See Map 18

Trail Right-Of-Way Distance: n/a

Ownership: Michigan DNR - NOTE: planting here will impact viewshed of Hart Lake

Microclimate Factors: None

Sunlight Levels: Full sunlight

Soil Texture/Type: Covert sand, moderately well drained

Soil Compaction: Probably, landscaped area

Soil Drainage: Good

Planting Recommendations: 2 total - (1) sugar maple, (1) American basswood, saplings, container


Map 18
Planting Sites
Katheryn St
City of Hart
43
Hart Lake
N State St
E Mechanic St
W Mechanic St
N Courtland St
Trail
W Main St
Woodlawn Ave
Eastern Park Rd
E Main St
N Water St
S Courtland St
S State St
Griswold St
Washington St
Hart St
Union St
Dryden St
Lincoln St
Church St
N
0
250
500
1,000 Feet

Site Number and Location: #100 - Golden Twp. Hall, 5527 W. Fox Rd., Mears - See Map 19

Trail Right-Of-Way Distance: n/a

Ownership: Golden Twp.

Microclimate Factors: Urban

Sunlight Levels: Full sunlight

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Probably, landscaped area

Soil Drainage: Good

Planting Recommendations: 5 total - (3) flowering dogwood, (2) Eastern redbud, saplings, container


Map 19
Planting Sites
2nd St
N 56th Ave
3rd St
Center St
Morrison St
W Fox Rd
100
Golden Twp. Hall
5th St
7th St
N
Hart Montague
0
250
500
1,000 Feet

Site Number and Location: #101 - Mears Cemetery, 6189 W. Fox Rd., Mears - See Map 20

Trail Right-Of-Way Distance: n/a

Ownership: Golden Twp.

Microclimate Factors: n/a

Sunlight Levels: Full to partial sunlight

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Probably, landscaped area

Soil Drainage: Good

Planting Recommendations: 10 total - (2) sugar maple, (2) red maple, (2) white pine, (4) American basswood, saplings, container


Map 20
Planting Sites
W Fox Rd
Mears Cemetery
5th St
101
N
0
250
500
1,000 Feet

Site Number and Location: #102 - Golden Twp. Park, 8499 Silver Lake Rd., Mears - See Map 21

Trail Right-Of-Way Distance: n/a

Ownership: Golden Twp.

Microclimate Factors: n/a

Sunlight Levels: Full sunlight

Soil Texture/Type: Covert sand, moderately well drained

Soil Compaction: Probably, landscaped area

Soil Drainage: Good

Planting Recommendations: 8 total - (2) sugar maple, (2) red maple, (2) white pine, (2) tulip poplar, saplings, container. Stabilze trees with stakes.


Map 21
Planting Sites
Silver Lake
Leisure Rd
Aspen St
N Harbor St
W Emeral
W Hazel Rd
Scenic Dr
N Shore Dr
102
Private
Silver Lake Rd
Golden Twp. Park @ Silver Lake Sand Dunes
Unknown
N
0
250
500
1,000 Feet

Site Number and Location: #202 - Claybanks Twp. Park, 6407 S. Scenic Dr. - See Map 22

Trail Right-Of-Way Distance: n/a

Ownership: Claybanks Twp.

Microclimate Factors: n/a

Sunlight Levels: Full to partial sun

Soil Texture/Type: Benona sand, excessively drained

Soil Compaction: Camping area, probably

Soil Drainage: Good

Planting Recommendations: 25 total - (13) sugar maple, (12) red maple, saplings, container


Map 22
Planting Sites
Childs St
Evans St
Claybanks Township Park
W Cleveland Rd
202
Scenic Dr
N
0
250
500
1,000 Feet

Before Planting

1) Select the correct tree for site:
   mndnr.gov/treecare
2) Contact MISS DIG at 811 or 800-482-7171 before digging

After Planting

Mulching

Applying mulch, such as wood chips, around a tree has many benefits.

- Improved growing conditions
  - › Retains moisture
  - › Controls weeds and grasses
  - › Adds nutrients
  - › Insulates soil
- Protection of trunk and roots

Mulch that is applied too deeply and against the tree (mulch volcano) is harmful. It can rot the tree's bark and roots, lead to insect and disease problems, and deprive roots of oxygen. Use a thin layer of mulch on poorly drained soils to avoid pooling of water.

Watering

Watering a tree is critical to its survival during the first three years. Until the ground freezes, provide 15-25 gallons of water per week when it hasn't rained. After the first few years, continue to water trees during dry times. Tree water bags may make watering easier.

Tree Guards

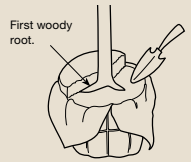
A plastic or metal mesh tree guard can be installed around the tree's trunk to protect it from animal, mower, and trimmer injury. The tree guard must be removed or replaced as the tree grows.

Credits

Project Manager
Jennifer Teegarden, MN DNR Forestry
Graphic Designer
Amy Beyer, MN DNR Creative Services

How to Plant a Balled and Burlapped Tree

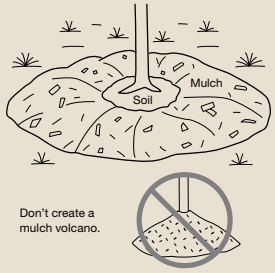
1. Keep root ball moist at all times. Dry roots die.
2. Loosen top of burlap and remove excess soil to top of first woody root.



3. Dig a hole two times the width of root ball and as deep as distance from bottom of root ball to top of first woody root.
4. Carefully place tree in hole, making sure it stands straight and top of first woody root is at ground level.

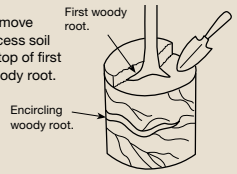
5. Backfill hole halfway up root ball and then cut and remove visible portions of wire basket and burlap without disturbing the root ball.

6. Finish backfilling hole to top of first woody root, leaving no exposed burlap.
7. Heel in soil with foot over entire backfill area to remove air pockets from the soil.
8. Water root ball and entire backfill area.
9. Layer 2"–4" of mulch over backfilled area, keeping mulch away from trunk.

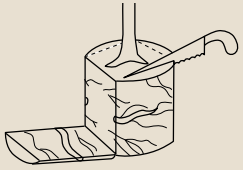


How to Plant a Containerized Tree

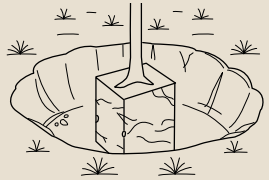
1. Keep root ball moist at all times. Dry roots die.
2. Remove tree from container by holding trunk with one hand and pushing away or down on container with other hand.
3. Remove excess soil to top of first woody root.



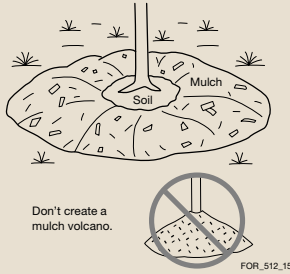
4. If encircling woody roots (pencil size or larger) are found, remove by sawing off sides of root ball.



5. Dig a hole two times the width of root ball and as deep as distance from bottom of root ball to top of first woody root.
6. Carefully place tree in hole, making sure it stands straight and top of first woody root is at ground level.



7. Backfill hole to top of first woody root.
8. Heel in soil with foot over entire backfill area to remove air pockets in the soil.
9. Water root ball and entire backfill area.
10. Layer 2"–4" of mulch over backfilled area, keeping mulch away from trunk.



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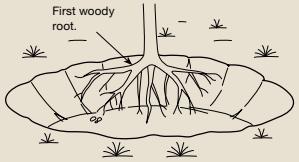
How to Plant a Bareroot Tree

1. Keep roots moist at all times. Dry roots die.
2. Dig a hole twice as wide as and slightly deeper than root length.
3. Place roots in hole so top of first woody root is within 1" of soil surface.

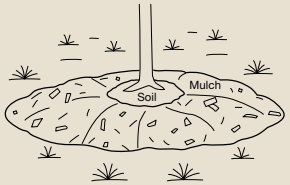


4. Distribute roots evenly, making sure roots are straight and not doubled over or "J" rooted.

Don't create a "J" root.

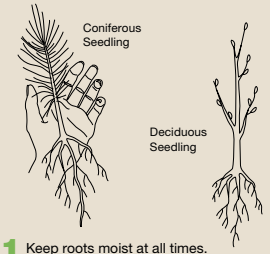
5. Keeping tree straight, backfill hole up to top of first woody root.

6. Heel in soil with foot over entire backfill area to remove air pockets from the soil.
7. Water entire backfill area.
8. Layer 2"–4" of mulch over backfilled area, keeping mulch away from trunk.

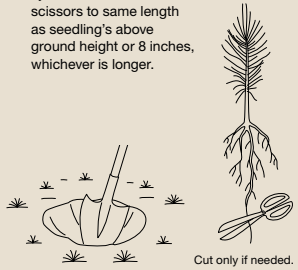


Don't create a mulch volcano.

How to Plant a Bareroot Seedling



1. Keep roots moist at all times. Dry roots die.
2. Dig a hole twice as wide as and slightly deeper than root length.
3. If hole cannot be dug deep enough to fit entire root system, trim roots with scissors to same length as seedling's above ground height or 8 inches, whichever is longer.



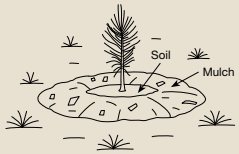
Cut only if needed.

4. Place roots in hole so top of first root is slightly below surface level.

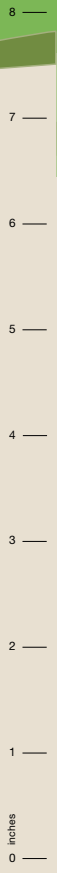
5. Distribute roots evenly, making sure roots are straight and not doubled over or "J" rooted.

Don't create a "J" root.

6. Backfill hole to slightly above top of first root.
7. Heel in soil with foot to remove air pockets from the soil.
8. Water entire backfill area.
9. When feasible, place mulch around seedling, keeping mulch away from trunk.



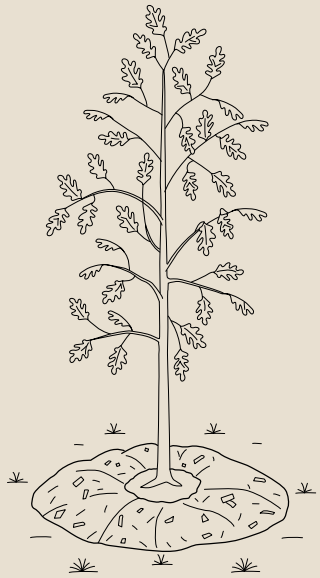
Don't create a mulch volcano.



MNDNR

ReLeaf Michigan

A Pocket Guide to Planting Trees



Healthy Trees, Healthy Communities

www.ReLeafMichigan.org

APPENDIX III: DELTA'S COMMITMENT TO INCLUSIVE COMMUNITY ENGAGEMENT

Disproportionate consequences have been borne by communities that have not historically had a voice, capacity, or resources to change or challenge the environmental and economic problems they face—and that have likely been forcefully imposed upon them. Collaborating and addressing community-defined goals to eliminate or reduce these social ills have been a cornerstone of Delta Institute's work since 1998.

We have found through our work that directly engaging partners, residents, community groups, and municipal agencies to participate in both strategy and facilitation ensures that solutions are collaborative, not prescriptive, and achieve their self-created goals.
This process centers the community members and organizations as the experts and decision makers to uncover the culture, priorities, and assets of the community. The communities are given space to be heard, lead, and co-create sustainable development strategies, while benefiting from the technical expertise, research, management, and meditation provided by project partners.

It is through this lens of resilience and inclusion that we work, so that we are a deliberate and authentic guest in the more than 200 communities we work in on a near annual basis throughout the Midwest.

You may learn more about our Commitment to Diversity, Equity, and Inclusion by visiting our website at delta-institute.org/diversity-equity-and-inclusion/, which informs and guides all our organizational endeavors.

Photo courtesy of Cardno

delta institute

Delta Institute works with communities throughout the Midwest to solve complex environmental challenges. We envision a region in which all communities and landscapes thrive through an integrated approach to environmental, economic, and social challenges.

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DeltaGreatLakes

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Delta Institute is a 501c3 nonprofit with a 2021 Platinum Seal of Transparency from GuideStar.

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