Forest Health Assessment Volume I

for the

North Preserve & South Preserve

of the

Greenbelt Forest Preserve

Prepared for:

THE CITY OF GREENBELT MARYLAND

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DRAFT

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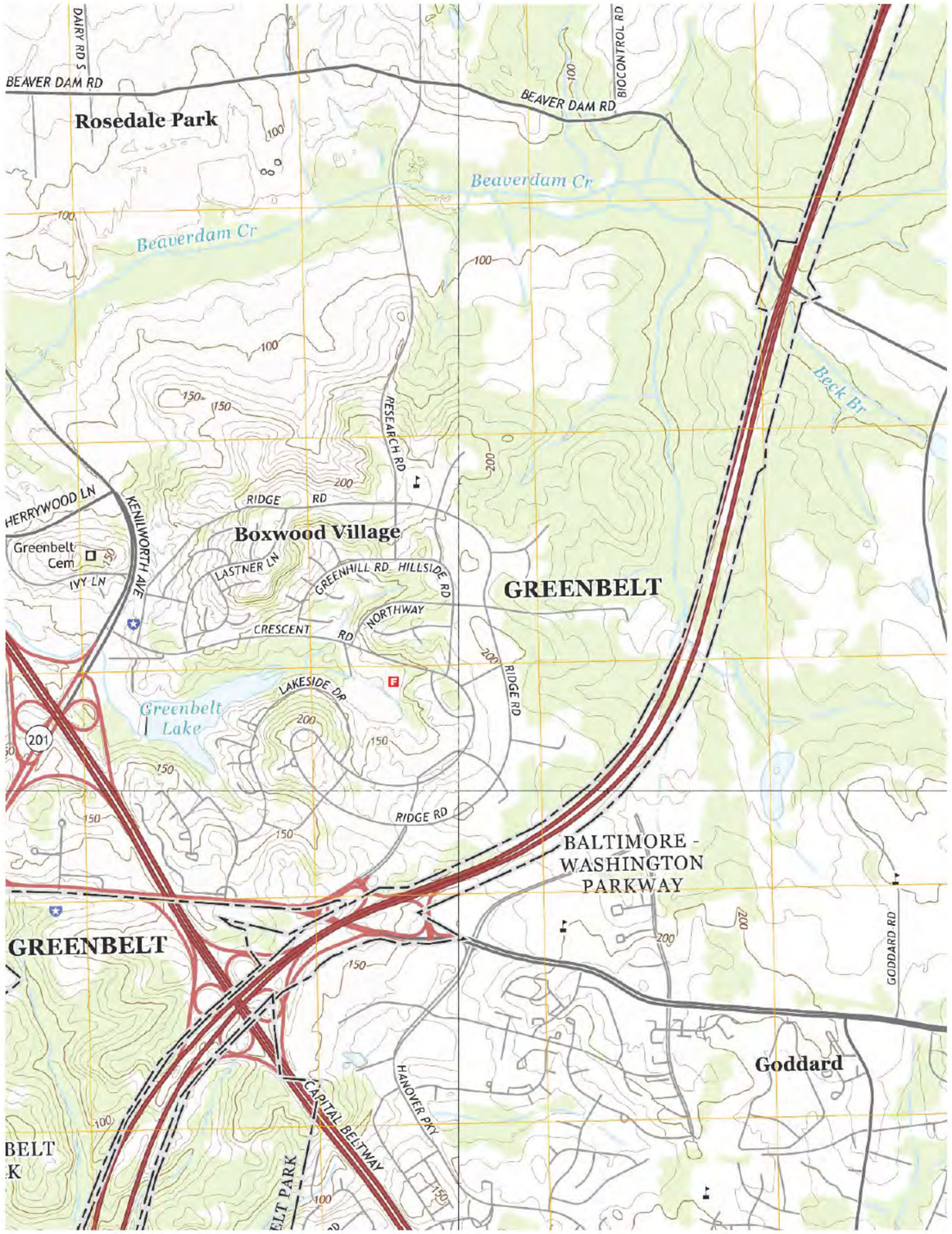

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EXECUTIVE SUMMARY

The approximate 236-acre Study Area, part of the Greenbelt Forest Preserve, consists of a largely deciduous forest with a variety of native plant communities forming the canopy, understory, shrub and herbaceous layers. This forest ecosystem also plays an important role in serving as habitat for native wildlife, which find refuge there from encroaching urbanization. Adjacent to its northern boundary, the open land and forests of the Beltsville Agricultural Research Center link the Forest Preserve with the region's green infrastructure. This infrastructure reaches from the Patuxent Research Refuge to the Northeast Branch of the Anacostia River. The Preserve offers many ecosystem services that are beneficial to the environment, as well as passive recreational opportunities for the community.

Three forest associations commonly found within the Piedmont region are evident within the Study Area, including white and red oak, tulip poplar, and red maple and sweet gum dominated stands. Overall, the stands appear healthy with a diversity of flora found throughout each forest stratum. The presence of different plant species throughout a forest stratum allows for a wide variety of wildlife to benefit from the Forest Preserve, including birds, mammals, reptiles and amphibians. As expected, a number of wildlife species evident on site are common edge dwelling species that thrive along the ecotones between suburban habitat (lawns, fields) and the forest edge. Yet, the size of the forest, particularly the North Preserve still allows for modest forest interior dwelling bird (FIDS) habitat, a habitat in need of conservation throughout Maryland. In combination with forest cover to the north associated with BARC, the Forest Preserve is part of an even larger area of FIDs habitat. There are limited aquatic features associated with the Study Area, namely a larger tributary flowing north to Beaverdam Creek on the eastern side of the North Preserve, and some smaller tributaries that also flow northward from the site to Beaverdam Creek. These tributaries do play a role for some wildlife benefiting from water sources. The few fish species evident are likely to be found within the tributary to Beaverdam Creek.

However, the Preserve is not without biotic and abiotic stresses that affect the health of the forest. The Study Area is largely surrounded by urban pressures, including I-295 and the surrounding Greenbelt communities. The more visible pressures include stormwater runoff, trash, dumping and promotion and spread of non-native invasive plant species along and within the forest. The few stream channels within the study area, situated within highly erodible soils, have become incised undoubtedly from stormwater runoff from the adjacent Greenbelt communities. Trash from the surrounding area, passing cars along I-295, as well as dumping off of Northway Road appears to be an ongoing problem.

As shown within the report, the forest has numerous stands of invasive plant species, typically along developed areas and intruding into the forest. In addition, scattered pockets of invasives are found within the interior of the forest, often in close proximity to the trails evident through the study area. These species, increasingly common to many natural areas, include multiflora rose, Japanese stilt grass, barberry, and oriental bittersweet. In smaller numbers, these species can be tolerated; however, many of the species have aggressive growth patterns, at times growing to the exclusion of other species. One of our forest recommendations focuses on the control of these non-native species.

There is an extensive trail system through both preserves that allows for users to safely traverse the forest ecosystem. In addition, the use of the trails minimizes the trampling of small herbaceous species, saplings as well as some wildlife. The trails do however allow for the introduction of trash, invasive plant species and easy access for those users who may manipulate the forest in a way counter to forest protection (removal of plants, dumping, removal of trees for firewood or hut construction). Our recommendations provide opportunities to continue to encourage proper access and usage of the forest through the trails. There are opportunities to provide education through signage, brochures and other forms of outreach to minimize unintended or unwanted usage of the forest.

The long term health of the Greenbelt Forest Preserve, and its ability to provide habitat and foraging opportunities for a variety of wildlife will benefit from ongoing maintenance and protection. All opportunities to preserve into perpetuity any adjacent forest, either the BARC property or the Greenbelt Development forest immediately west of the Study Area are critically important. In addition, opportunities to minimize trash, dumping and the stormwater runoff should be given high priority. Finally, an annual invasive species eradication program should be developed. Plans to develop a trail maintenance program, including signs, will help to promote passive recreational activities compatible with forest health and protection.

CODES, MANUALS & GUIDELINES

Chapter 12

PARKS AND RECREATION*

* Charter References: Authority to control, etc., parks and recreational facilities, § 3(7).
Cross References: Operation of vehicles on driveway of Greenbelt Youth Center, § 11-26; restrictions on ball games in park, § 16-1.

State Law References: Municipal authority to establish and maintain parks, etc., Anno. Code of Md., Art. 23A, § 2(a)(20); authority to acquire land for such purposes, Anno. Code of Md., Art. 23A, § 2(a)(24).

Art. I. In General, §§ 12-1--12-15

Art. II. Park and Recreation Advisory Board, §§ 12-16--12-35

Art. III. Public Parks, Playgrounds, Etc., Generally, §§ 12-36--12-60

Art. IV. Attick Lake Park (Greenbelt Lake), §§ 12-61--12-99

Div. 1. Generally, §§ 12-61--12-75

Div. 2. Boating Regulations, §§ 12-76--12-90

Div. 3. Permit Parking Area, §§ 12-91--12-99

Art. V. Dog Park, §§ 12-100--12-109

Art. VI. Arts Advisory Board, §§ 12-110--12-120

Art. VII. Trees, §§ 12-121--12-139

Art. VIII Forest Preserve Advisory Board §§ 12-140--12-149

Art. IX Forest Preserve §§ 12-150--12-163

ARTICLE I.

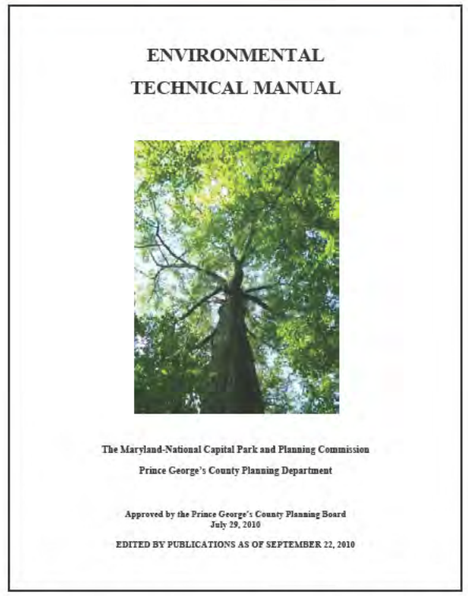
IN GENERAL

Sec. 12-1. Rules and regulations for operation of city swimming pool.

The city manager is hereby authorized to prescribe rules and regulations for the operation of the swimming pool to provide for the safety, health, comfort and convenience of the residents of the city and their invited friends.
(Code 1971, § 13-1)

Secs. 12-2--12-15. Reserved.

Greenbelt City Code Chapter 12



ENVIRONMENTAL
TECHNICAL MANUAL

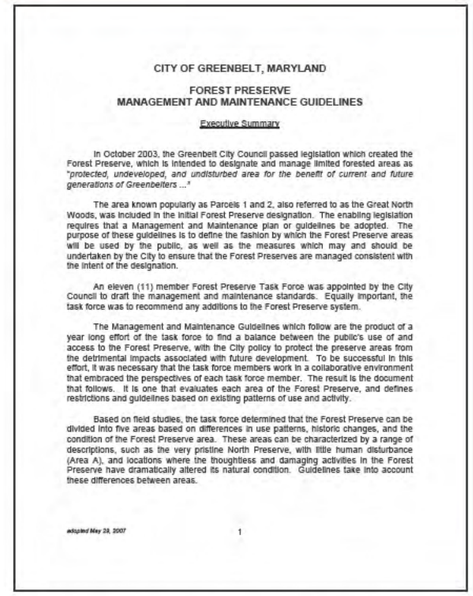
The Maryland-National Capital Park and Planning Commission

Prince George's County Planning Department

Approved by the Prince George's County Planning Board
July 29, 2010

EDITED BY PUBLICATIONS AS OF SEPTEMBER 22, 2010

M–NCPPC Prince George's County Environmental Technical Manual



CITY OF GREENBELT, MARYLAND

FOREST PRESERVE
MANAGEMENT AND MAINTENANCE GUIDELINES

Executive Summary

In October 2003, the Greenbelt City Council passed legislation which created the Forest Preserve, which is intended to designate and manage limited forested areas as *"protected, undeveloped, and undisturbed area for the benefit of current and future generations of Greenbelters ..."*

The area known popularly as Parcels 1 and 2, also referred to as the Great North Woods, was included in the initial Forest Preserve designation. The enabling legislation requires that a Management and Maintenance plan or guidelines be adopted. The purpose of these guidelines is to define the fashion by which the Forest Preserve areas will be used by the public, as well as the measures which may and should be undertaken by the City to ensure that the Forest Preserves are managed consistent with the intent of the designation.

An eleven (11) member Forest Preserve Task Force was appointed by the City Council to draft the management and maintenance standards. Equally important, the task force was to recommend any additions to the Forest Preserve system.

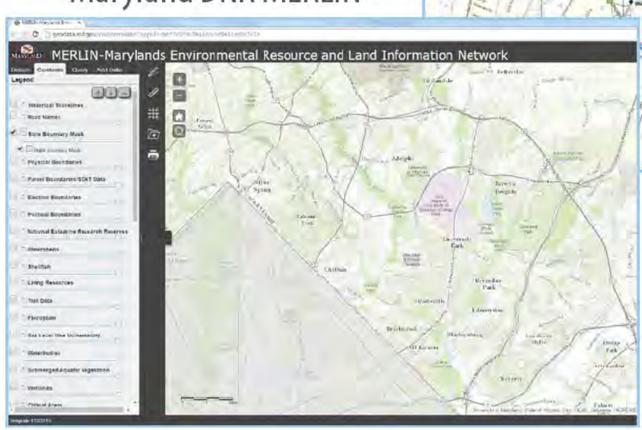
The Management and Maintenance Guidelines which follow are the product of a year long effort of the task force to find a balance between the public's use of and access to the Forest Preserve, with the City policy to protect the preserve areas from the detrimental impacts associated with future development. To be successful in this effort, it was necessary that the task force members work in a collaborative environment that embraced the perspectives of each task force member. The result is the document that follows. It is one that evaluates each area of the Forest Preserve, and defines restrictions and guidelines based on existing patterns of use and activity.

Based on field studies, the task force determined that the Forest Preserve can be divided into five areas based on differences in use patterns, historic changes, and the condition of the Forest Preserve area. These areas can be characterized by a range of descriptions, such as the very pristine North Preserve, with little human disturbance (Area A), and locations where the thoughtless and damaging activities in the Forest Preserve have dramatically altered its natural condition. Guidelines take into account these differences between areas.

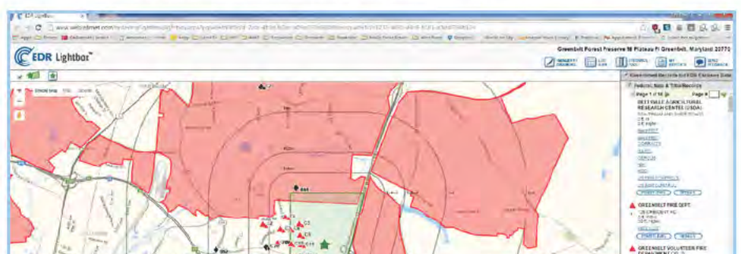
adopted May 28, 2007 1

Forest Preserve Management & Maintenance Guidelines

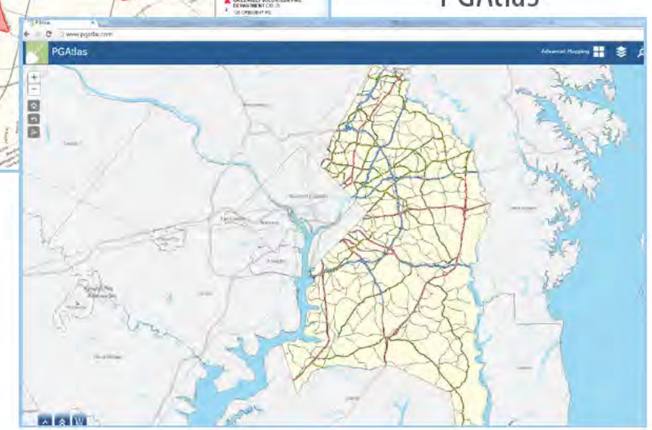
ONLINE DATABASES



Maryland DNR MERLIN



EDR



PGAtlas

METHODOLOGY

The method used for this forest health inventory was derived from an approach originally developed by Prince George's County, and subsequently adopted by the State of Maryland upon passage of the Forest Conservation Act in 1992. A description of Natural Resource Inventory / Forest Stand Delineation (NRI/FSD) procedures can be found in the *Maryland–National Capital Park and Planning Commission, Prince George's County Planning Department Environmental Technical Manual (2010).*

DESKTOP REVIEW

Prior to field investigation, AMT compiled available records of "mappable" features from sources such as PGAtlas, Maryland's Environmental Resource and Land Information Network (MERLIN) and a search of environmental databases performed by Environmental Data Resources, Inc. (EDR). This information was used to create base maps for use during the field investigation. The maps include:

- **ecological features:** Land use, forest cover, soil types, topography, hydrogeological features (e.g. streams, wetlands, hydraulically adjacent steep slopes)
- **man-made elements:** Roadways, buildings, athletic fields, trails, clearing and land disturbance
- **aerial photography:** current aerials, historic aerials, color infrared aerials
- **environmental records:** Potential locations of hazardous substances or contaminants as listed in environmental databases

Additional sources: 2013 DNR Forest Stewardship Plan for the Greenbelt Forest Preserve; City of Greenbelt Forest Preserve Management and Maintenance Guidelines; Greenbelt City Code Chapter 12 Articles VII, VIII, and IX.

ON-SITE ASSESSMENTS

During the data collection period, members of the AMT team initially visited various portions of the forest and the adjacent community to form general impressions of the forest. Then, during October and November of 2015, the team assessed all areas of the North and South Tracts of the Forest Preserve. We recorded 56 sample plots according to the prescribed methods for NRI/FSDs. In addition to recording the location of these sample plots on the base maps, we made additional notes about forest conditions and mapped notable features that we observed. These features included:

- **vegetation:** "Wolf trees" (an indicator of previously open land), special floral composition (i.e. Ground cedar (Lycopodium clavatum), Skunk cabbage (Symplocarpus foetidus), Ostrich fern (Matteuccia struthiopteris), Spicebush (Lindera benzoin)
- **important habitats:** Forest Interior Dwelling Species (FIDS) habitat, hydrological systems (seeps, intermittent and perennial streams, wetlands)
- **abiotic conditions:** Erosion, damage from windstorms, open canopy area (from fallen trees), major disturbed areas and trash (e.g. around the athletic complex, compost pile, I-295 and exit ramp, dumps).
- **cultural features:** Historic road beds, fence lines, Cub Scout "stick huts", invasive species that have escaped from adjacent developed areas, remnants of previous agricultural uses, outdoor classroom, trails, community gardens.

Examples of these features are shown on the next pages.

ON-SITE FIELD ASSESSMENTS (continued)

Assessing the features of each forest stand - its landscape position, composition, diversity, size, age, and health of each species, provides evidence of what occurred in the past as well potential changes in the future.

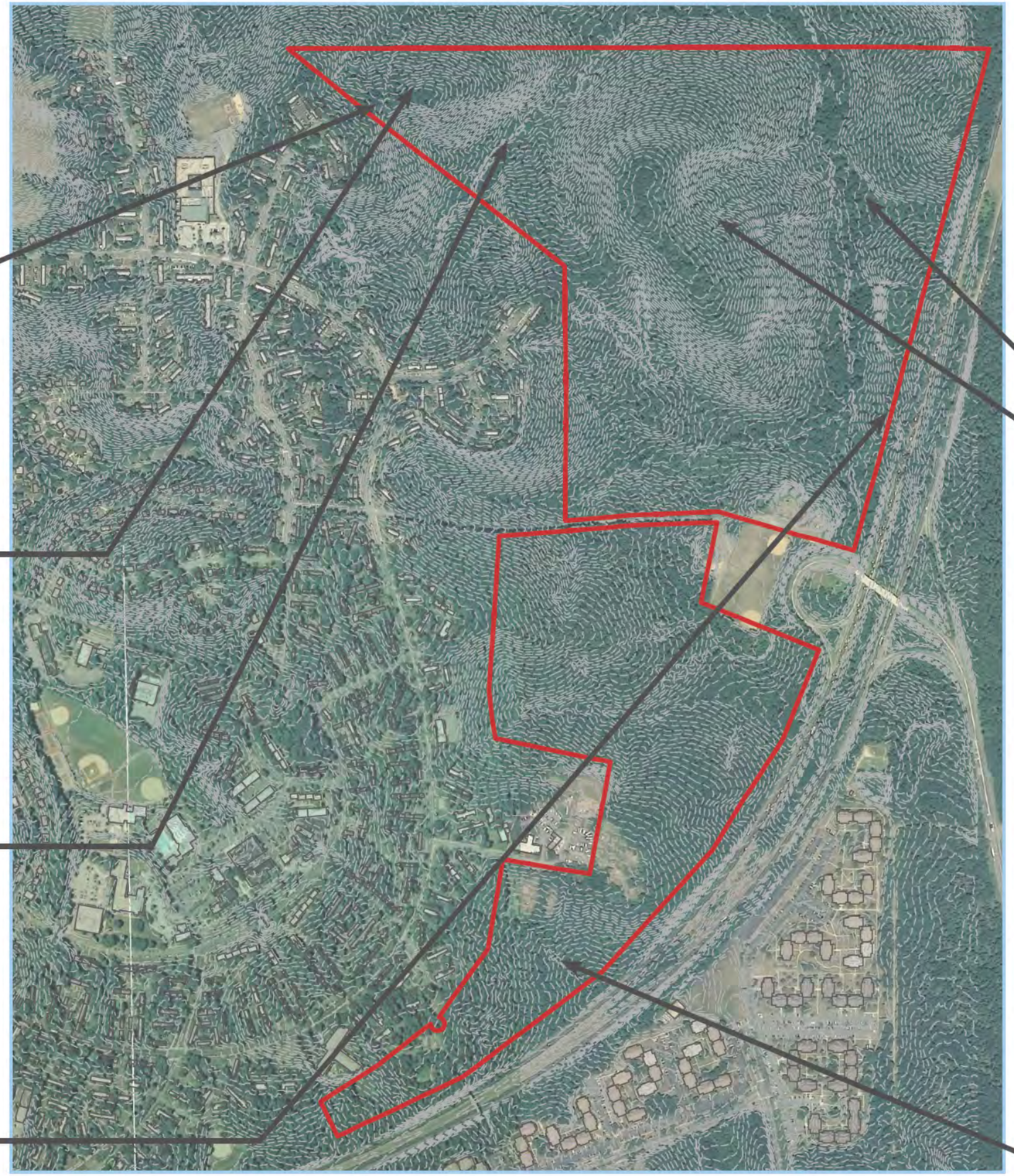
The assessments identified sixteen (16) individual forest stands. They were delineated according to sometimes subtle differences as well as distinct characteristics found in each forest stand. Their boundaries are based upon ecological and geographical judgments of the immediate forest area – including, the prevalence/dominance/sizes of certain tree species, topography, orientation, aspect and elevation. Stand boundaries (as well as all other collected data) were accurately noted on topographic maps by using GPS equipment where practical, and aerial photographic mapping when canopy density prevented the use of GPS. Because of the vastness of the survey area, individual trees were only surveyed, assessed, and measured when occurring within a sample plot.

One-tenth of an acre (1/10 ac.) sample plots were conducted to summarize forest stand areas using qualitative and quantitative data. This sampling of on-site forest resources is conducted by establishing a circle with a 37.5' radius around a fixed sample point. Like the boundaries of the individual forest stands, the fixed sample point (center point of the circle) is shown on the subsequent maps. The plots are representative and indicative of the larger forest stand. Plot data collected included:

- dominant canopy tree species, codominant canopy tree species, size classes and quantities of all canopy trees, common understory species, common herbaceous species, common invasive species, number of standing dead trees ≥6" dbh
- forest association, successional stage, basal area in square feet per acre (a measure of forest density)
- percent canopy closure, percent cover of understory species 3'-20' tall, percent cover of herbaceous/woody plant 0' to 3' tall, percent cover invasive species

At least two (2) sample plots were prepared across each stand to collect data that accurately reflected the composition of each stand. A Cruiser's Crutch (10 BAF) was used to collect basal area data for each sample plot. Descriptions of each stand are included in this report. The forest sample data sheets and photographs are included in the appendix of this report.

Lastly, streams and wetlands were mapped because of their importance to forest ecosystems. This information included perennial and intermittent streams, ephemeral drainage channels, stream condition, quality of riparian buffers and springs/seeps. Evidence of human activity and other disturbances were noted for their impacts on stream and water quality.



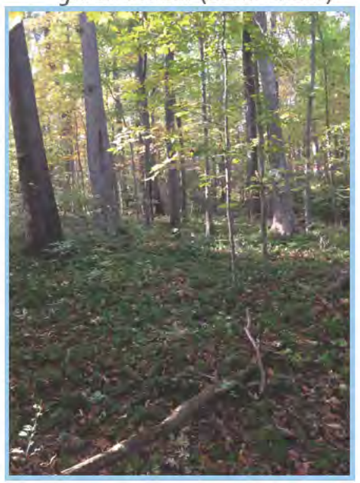
FOREST DYNAMICS

Walking through the forest, it is not uncommon to see dead or fallen trees. Sometimes this is due to a windstorm. A large tree may bring down one or more of its neighbors with it. When they occur, these windthrows leave various size gaps in the canopy, allowing more sunshine to reach the forest floor. These locations bring a flush of new growth, increased diversity, and successional changes to the forest's composition.

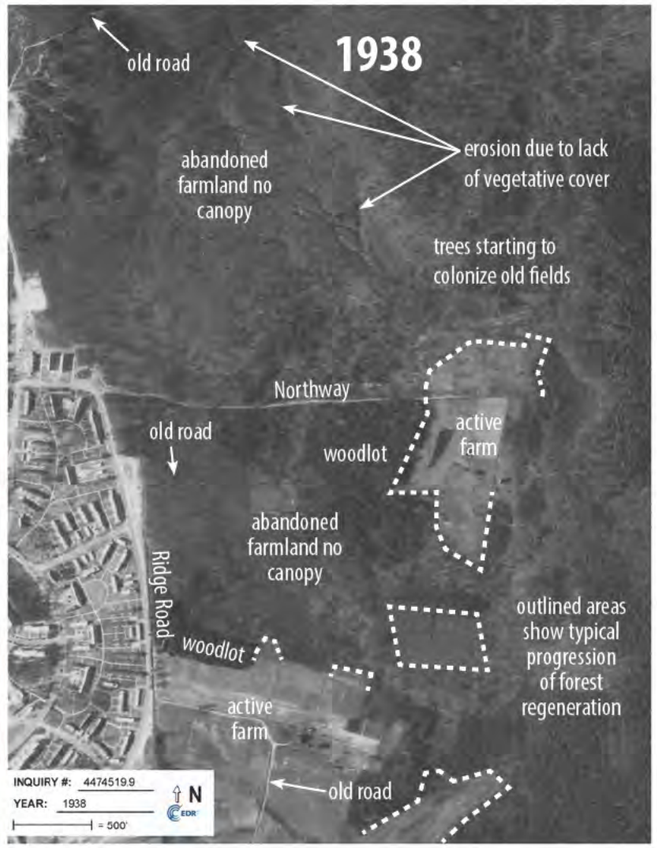
In these sunnier locations, where the roots and soil have been disturbed, you sometimes find seedlings of plants that are alien to forests but common in open, sunny fields and meadows. The wonder is how they got there, with a seed source too far away for them to have been carried here by wind or animals? The explanation is that the seeds are from a former era, when this was farmland, not forest. They have lain dormant for decades and, due to a random event, have encountered the right conditions to germinate and grow.

Most of the forests in the Mid-Atlantic today grow on land that was cleared during colonial times and used for agriculture. After its peak in the 19th Century, the agricultural era waned during the late 1800's and the first few decades of the 20th Century. As shown in the aerial photographs below, when the City of Greenbelt was founded, the land within the Forest Preserve was a combination of active and recently abandoned farmland. Since then, the processes of natural regeneration and succession have led to the forest there now.

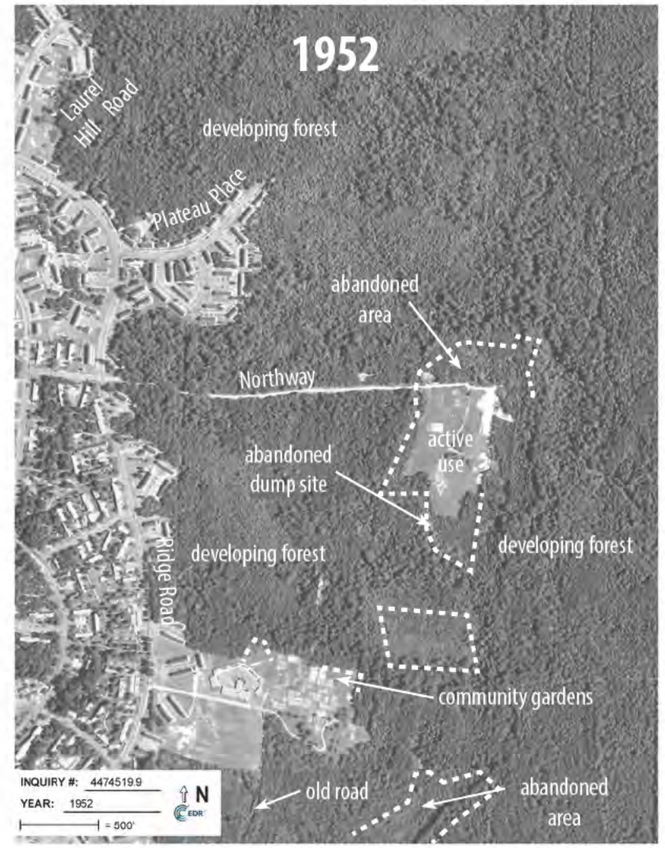
skunk cabbage (S. foetidus) &
sphagnum moss
ground cedar (L. clavatum)



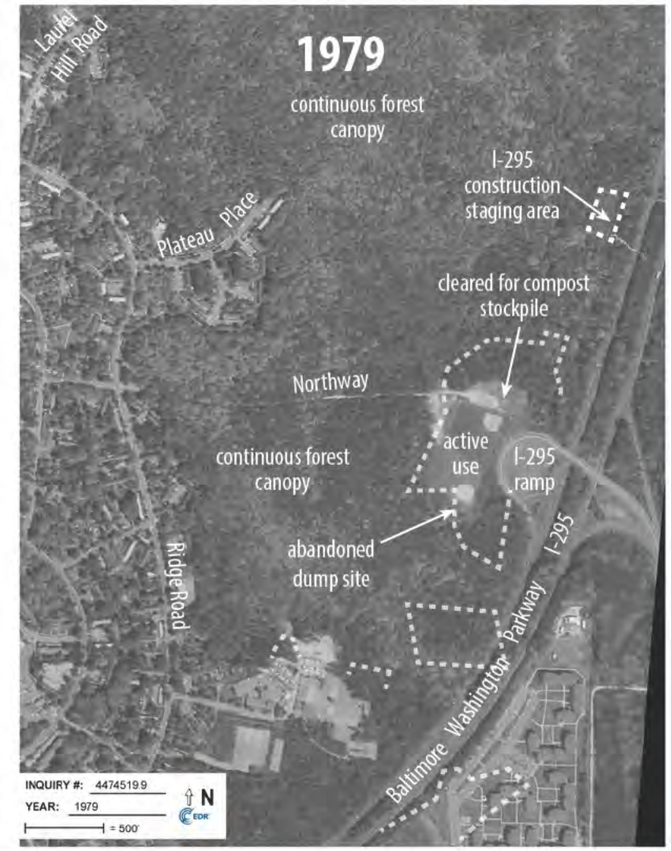
remnants of
agricultural past



abandonment of agricultural fields & natural regeneration of forest ecosystems (early seral species)



City of Greenbelt expansion & continued succession of forest ecosystems (early and mid-seral species)



I-295 construction, associated development & maturation of forest (early, mid- and late seral species)

FOREST COMPOSITION AND HEALTH

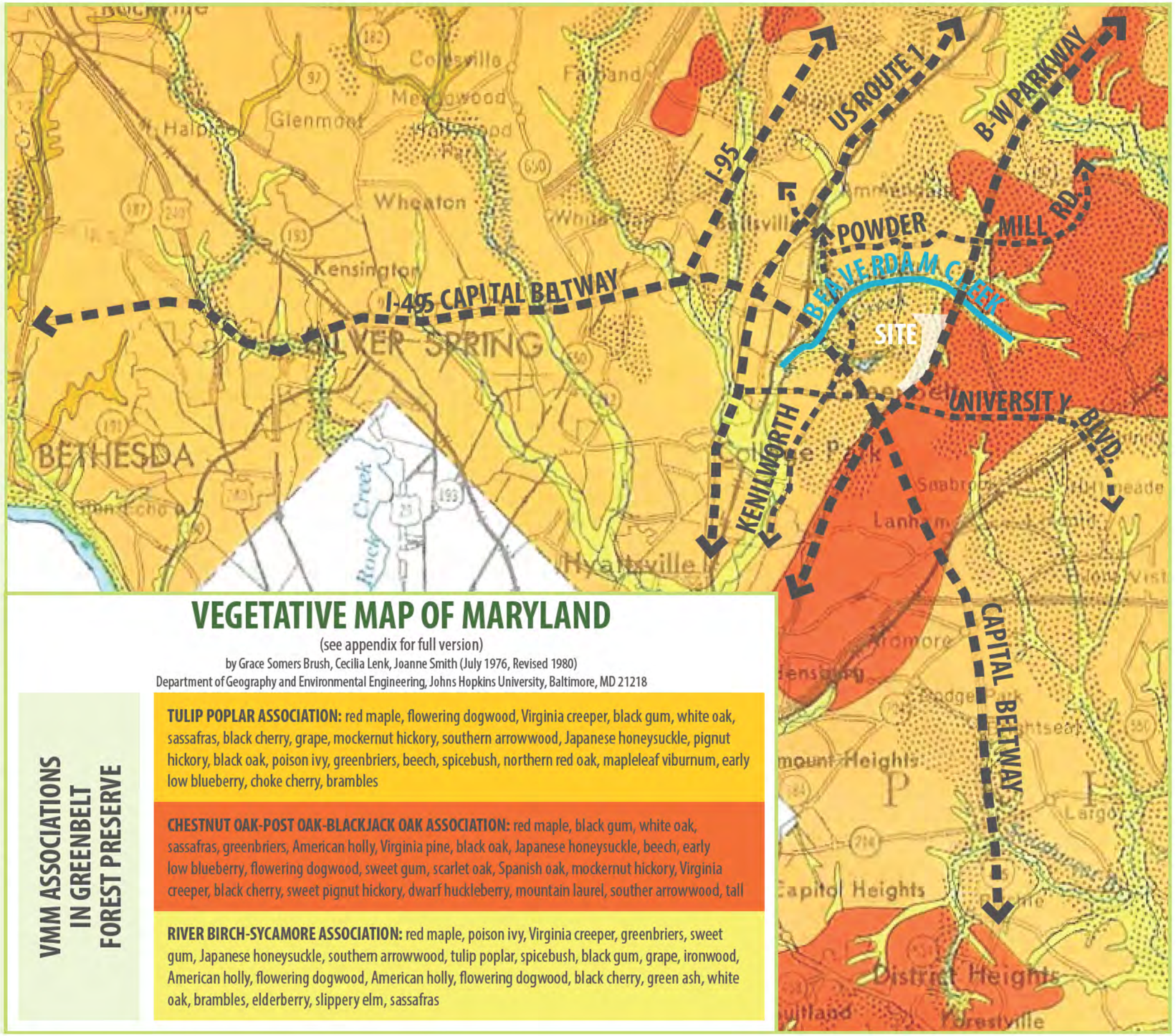
In our forest assessment we identified three forest associations, comparable to those shown on the 1980 Vegetation Map of Maryland (VMM): A White Oak - Red Oak Association (most closely resembles the Chestnut Oak - Post Oak - Blackjack Oak Association), a Tulip Poplar Association; and a Red Maple-Sweetgum Association (most closely resembles the River Birch - Sycamore Association). In addition, a Highly Disturbed and Invasive Species Association was created to identify areas where the forest is largely dominated by non-native invasive species.

The Greenbelt Forest Preserve is approximately 237 acres in size (233 acres are forested). As part of the forest stand delineation, 56 sample plots were conducted. Overall, with the exception of the invasive stands, the forest data plots show an average canopy closure of 70 percent and good diversity in the number of tree species within each plot. Many stands also include some invasives, typically either shrub or herbaceous species. See Appendix H for a list of common invasive species.

The White Oak - Red Oak Association is the most common forest type in the study area, accounting for approximately 131.9 acres. This association grows on well-drained higher areas and on xeric slopes. The Tulip Poplar Association occupies approximately 71.9 acres. It is more commonly found on mesic slopes and in low areas with deep, moist soils. Tulip poplar association is frequently in valleys and on transitional slopes near streams and floodplains. It is also a common early to mid-successional forest in formerly cleared or disturbed areas with mesic soils. Dominant size classes for both of these associations varied considerably within the stands, ranging from 10 to 30 inches dbh, where the forest is in early to mid-successional stages, to more mature, later successional stands with dominant and codominant trees between 18 to 30 inches dbh.

Approximately 19 acres of Red Maple - Sweetgum Association is located along the stream within the North Preserve that flows to Beaverdam Creek. The dominant size class is between 10 and 18 inches dbh. There are approximately 10 acres of Highly Disturbed and Invasive Species Association, most of which, is located around the observatory, composting area and athletic fields. There is another small stand on a site within the North Preserve that was a former construction staging area for I-295. Smaller concentrations of invasive species can be found throughout the entire project area, but they are not of sufficient size to be considered a separate forest or vegetative stand.

The maps on the following pages show the locations of these forest associations and their underlying features. The associations are further divided into individual forest stands, which we describe later in this chapter.



VEGETATIVE MAP OF MARYLAND

(see appendix for full version)

by Grace Somers Brush, Cecilia Lenk, Joanne Smith (July 1976, Revised 1980)

Department of Geography and Environmental Engineering, Johns Hopkins University, Baltimore, MD 21218

VMM ASSOCIATIONS IN GREENBELT FOREST PRESERVE

TULIP POPLAR ASSOCIATION: red maple, flowering dogwood, Virginia creeper, black gum, white oak, sassafras, black cherry, grape, mockernut hickory, southern arrowwood, Japanese honeysuckle, pignut hickory, black oak, poison ivy, greenbriers, beech, spicebush, northern red oak, mapleleaf viburnum, early low blueberry, choke cherry, brambles

CHESTNUT OAK-POST OAK-BLACKJACK OAK ASSOCIATION: red maple, black gum, white oak, sassafras, greenbriers, American holly, Virginia pine, black oak, Japanese honeysuckle, beech, early low blueberry, flowering dogwood, sweet gum, scarlet oak, Spanish oak, mockernut hickory, Virginia creeper, black cherry, sweet pignut hickory, dwarf huckleberry, mountain laurel, souther arrowwood, tall

RIVER BIRCH-SYCAMORE ASSOCIATION: red maple, poison ivy, Virginia creeper, greenbriers, sweet gum, Japanese honeysuckle, southern arrowwood, tulip poplar, spicebush, black gum, grape, ironwood, American holly, flowering dogwood, American holly, flowering dogwood, black cherry, green ash, white oak, brambles, elderberry, slippery elm, sassafras

FOREST STAND ASSOCIATIONS

TULIP POPLAR ASSOCIATION (most closely represents VMM's "Tulip poplar association"

STAND #	2	5	9	10	13	14	TOTAL
ACRES	7.8	9.4	22.8	4.6	5.3	22	71.9

WHITE OAK-RED OAK ASSOCIATION
(most closely represents VMM's "Chestnut oak-Post Oak-Blackjack Oak association"

STAND #	1	3	4	7	8	11	12	16	TOTAL
ACRES	10.8	15	70.6	3.5	10.1	8.1	9.2	4.6	131.9

RED MAPLE-SWEET GUM ASSOCIATION
(most closely represents VMM's "River birch-Sycamore association"

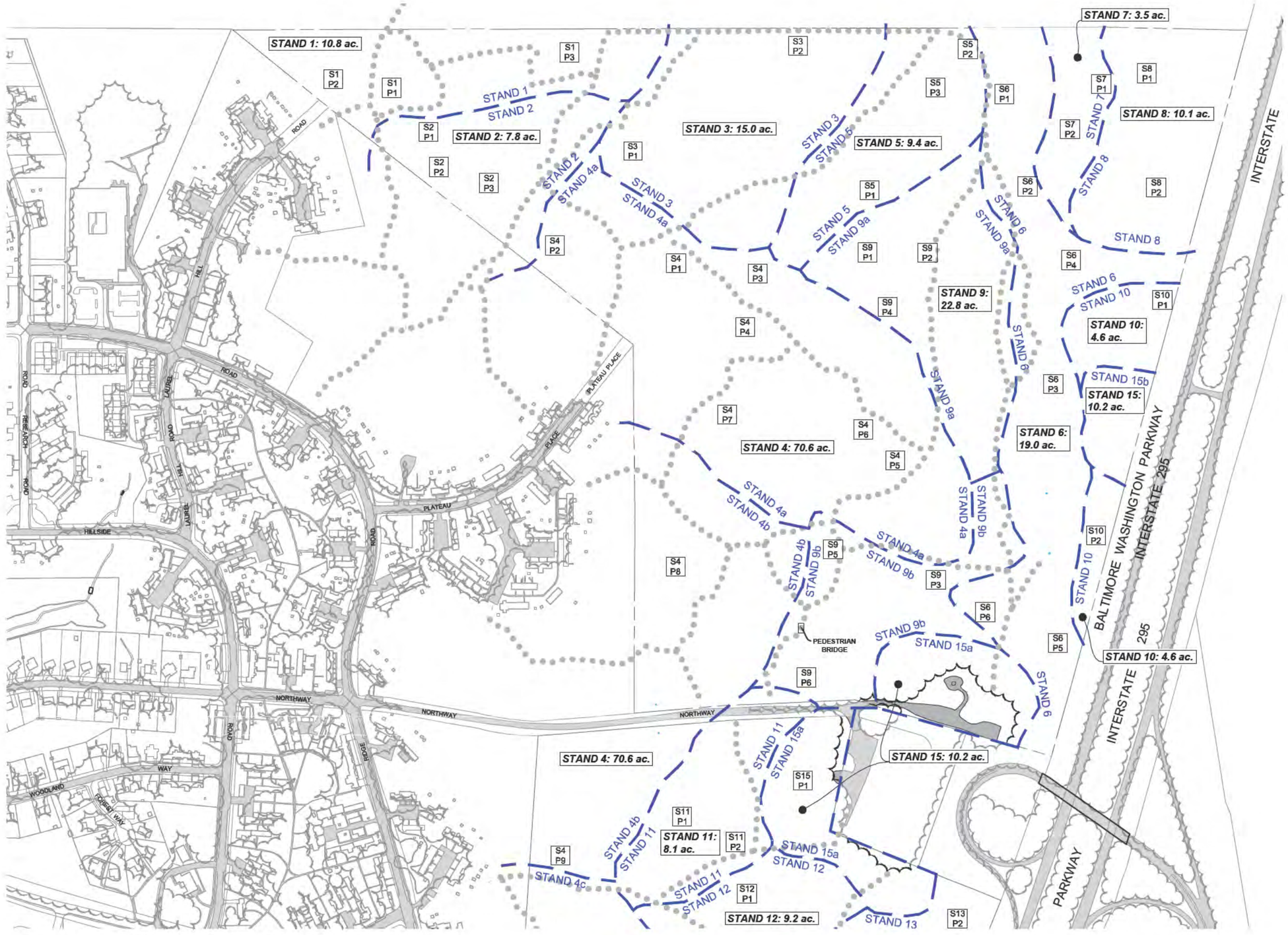
STAND #	6	TOTAL
ACRES	19	19

HIGHLY DISTURBED & INVASIVE SPECIES ASSOCIATION (not included in VMM)

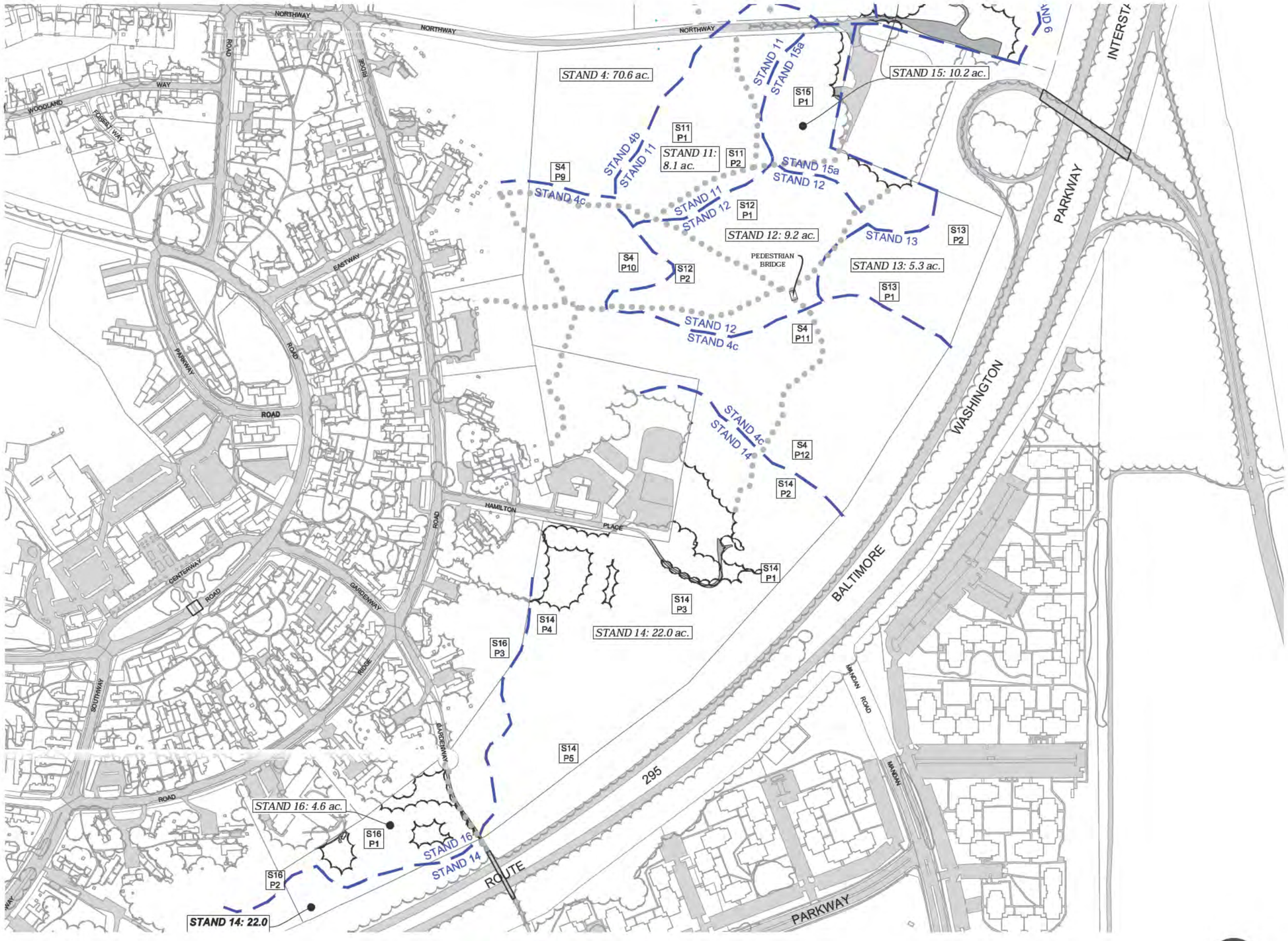
STAND #	15	TOTAL
ACRES	10.2	10.2

LEGEND

- PROPERTY LINE
- TRAIL
- STAND # / STAND # — FOREST STAND BOUNDARY
- S# P# — FSD SAMPLE POINT



NORTH PRESERVE



SOUTH PRESERVE

NORTH

400′ 0′ 100′ 300′ 600′

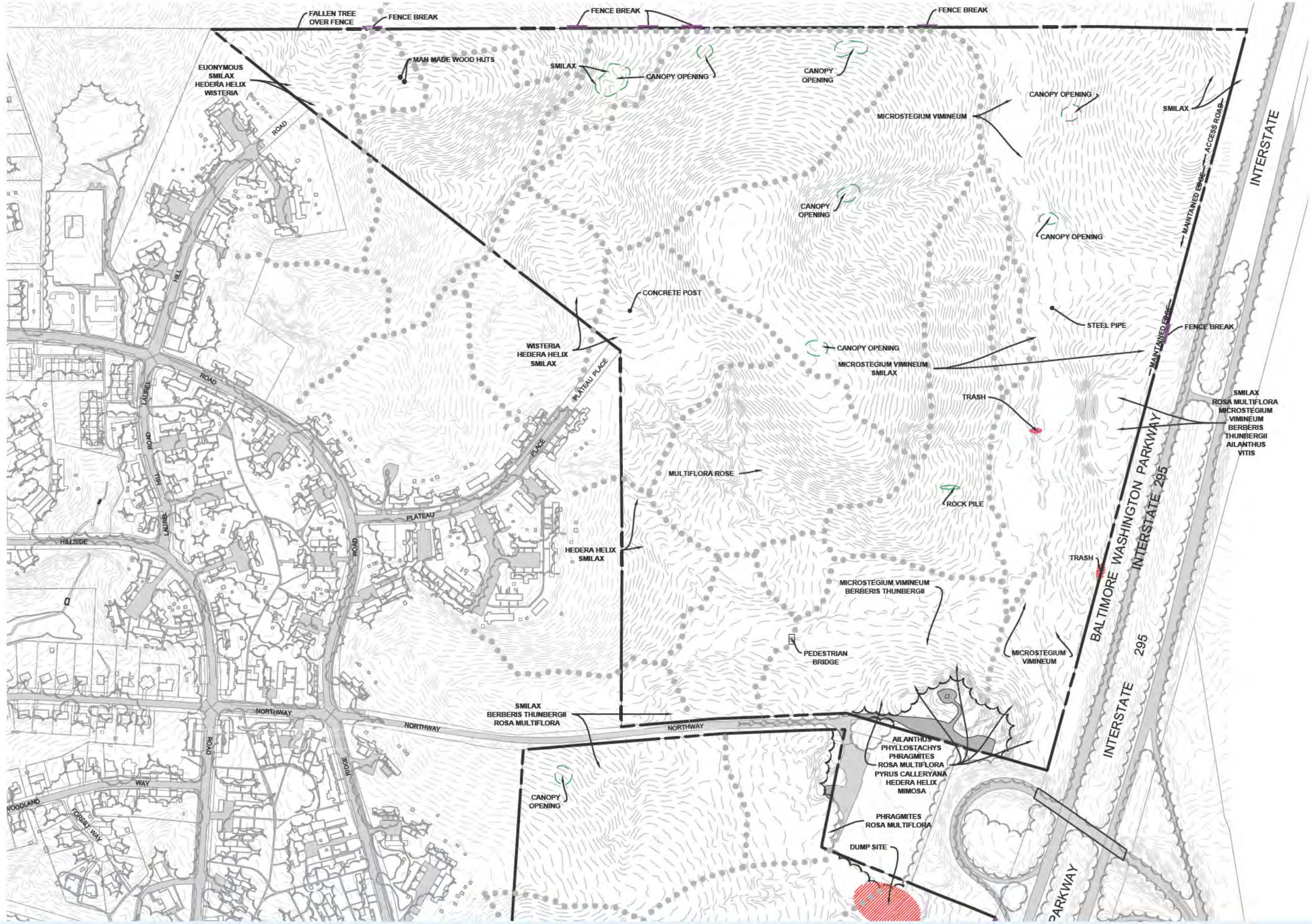
SCALE: 1″ = 400′

FOREST DISTURBANCE MAPPING

AMT mapped forest areas that were damaged or disturbed by users of the site, deposited waste, and biotic factors such as non-native vegetation and open canopy areas.

Invasives species cover approximately 76 acres of the forest.

Invasive species that were identified include: *Smilax, Hedera helix, Berberis thunbergii, Microstegium vimineum, Rosa multiflora, Celastrus orbiculatus, Alliaria petiolata, Morus alba, Lonicera japonica* and many others. More information on these species can be found in the Appendix.



LEGEND

- PROPERTY LINE
- TRAIL
- EXISTING TREE LINE
- BROKEN FENCE OPENING
- CANOPY OPENING
- TRASH PILE

INVASIVE SPECIES CONCENTRATION

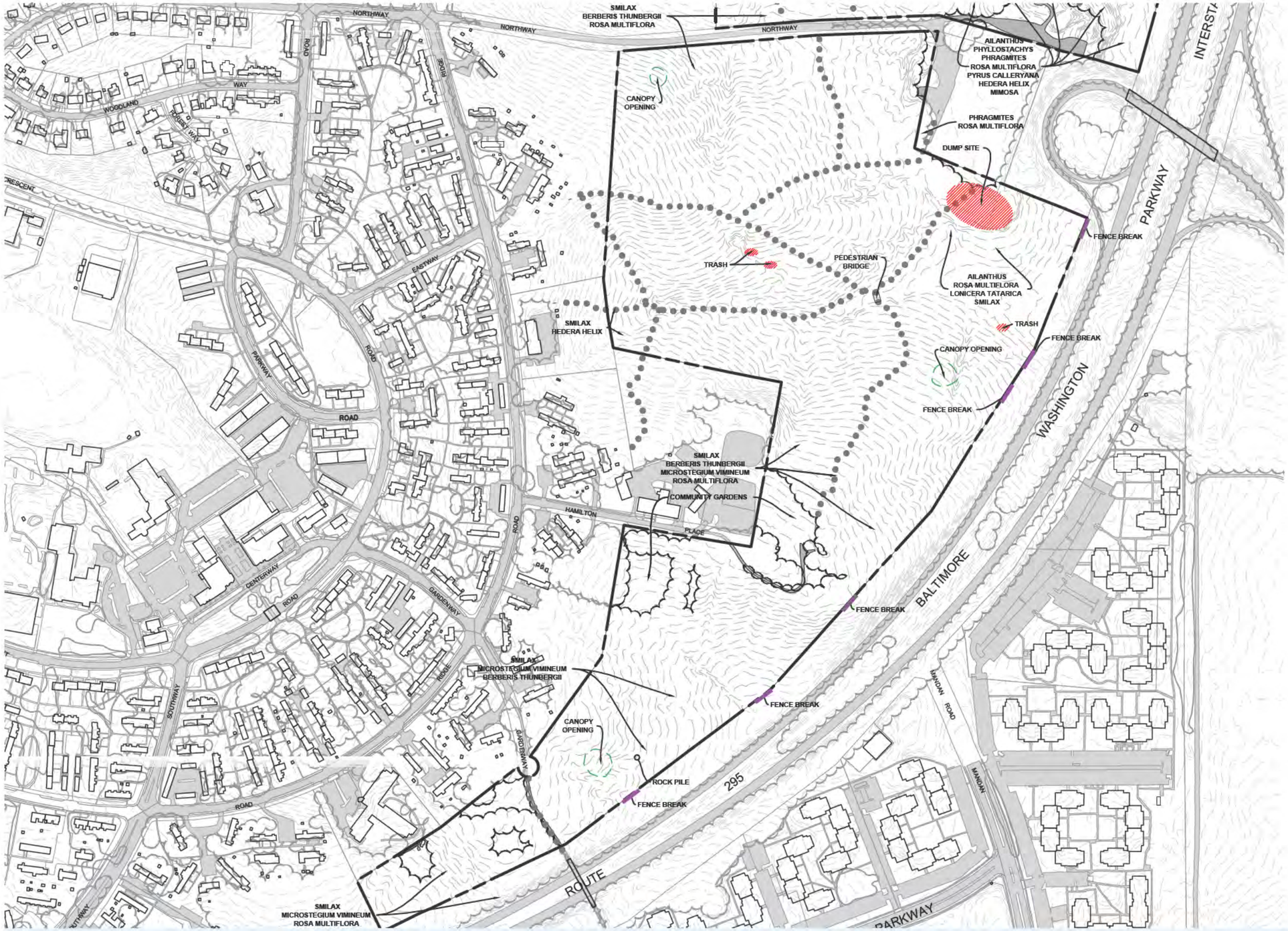
NORTH

400′ 0′ 100′ 300′ 600′

SCALE: 1″ = 400′

EXISTING FOREST DISTURBANCES MAP

NORTH PRESERVE



EXISTING FOREST DISTURBANCES MAP

SOUTH PRESERVE

NORTH

400′ 0′ 100′ 300′ 600′

SCALE: 1″ = 400′

PHYSICAL FEATURES

The shades of green correspond to the elevation on the site, shown at 20′ intervals. The darker the color, the higher up the surface is. The map reveals higher elevations at developed areas and neighborhoods surrounding the forest preserve with lower channels and wetlands within the Study Area.

LEGEND

PROPERTY LINE

76′ - 96′

96′ - 116′

116′ - 136′

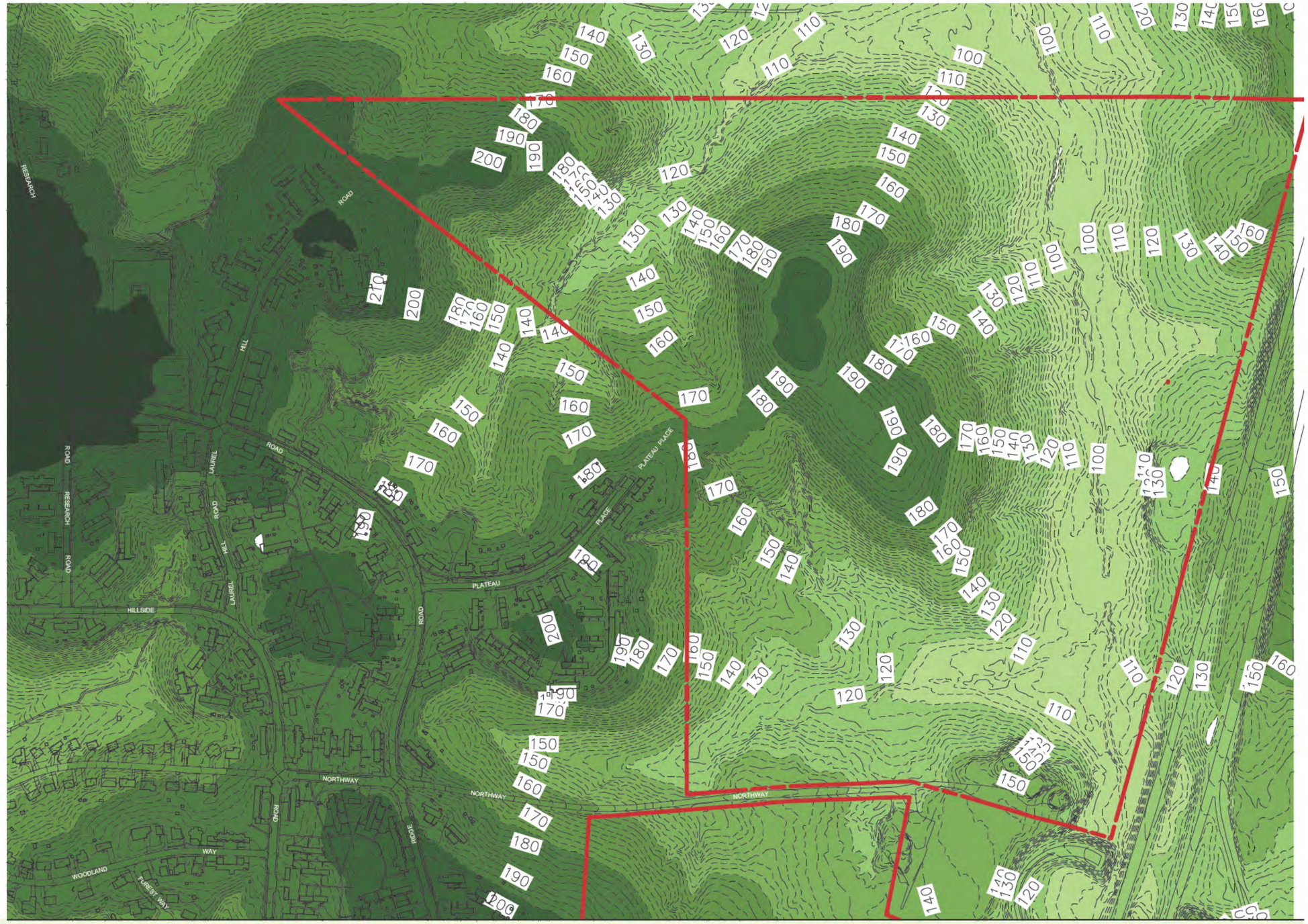
136′ - 156′

156′ - 176′

176′ - 196′

196′ - 216′

216′ - 240′



400′ 0′ 100′ 300′ 600′

SCALE: 1″ = 400′

NORTH

CONTOUR ELEVATION MAP

NORTH PRESERVE

CONTOUR ELEVATION MAP

SOUTH PRESERVE

NORTH

400′ 0′ 100′ 300′ 600′

SCALE: 1″ = 400′

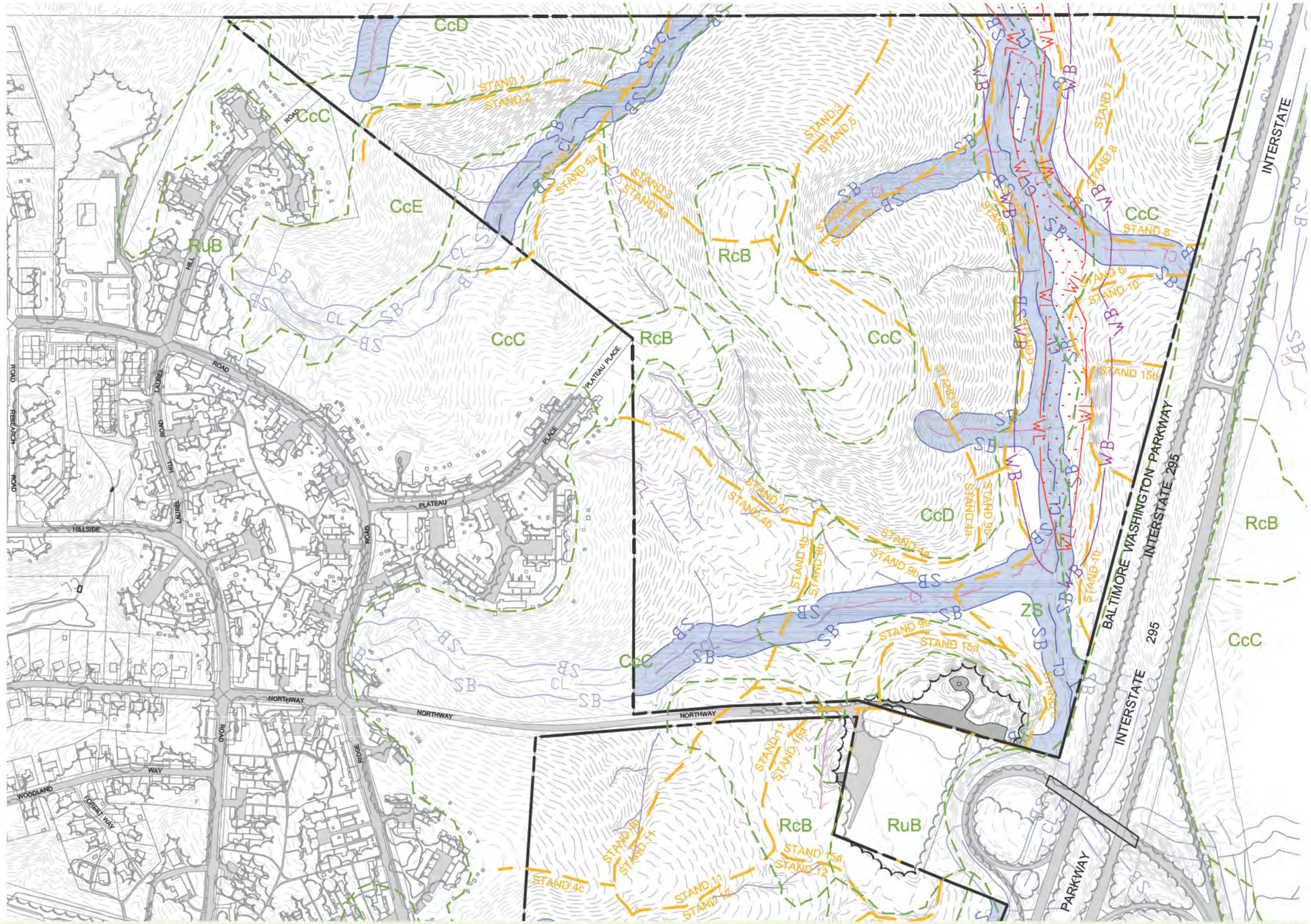
HYDROLOGICAL FEATURES

These exhibits show the existing hydrology and soils within the Study Area. Except for a very small piece of forest in the southern tip, water drains northward to Beaverdam Creek. The majority of the soils are highly erodible and the land and streams are heavily eroded.

The state of Maryland classifies wetlands into two categories, tidal and non-tidal. Tidal wetlands are found along coastlines whereas non-tidal wetlands are commonly known as marshes, swamps, bogs or bottomland forests. The state has identified Wetlands of Special State concern, which contain rare, threatened or endangered species or unique habitats. These wetlands are non-tidal habitats that are under special protection through the state's wetlands regulations. Any development activity which involve clearing of vegetation or grading are regulated within a 100' buffer surrounding the wetlands of special state concern. Other wetlands not deemed a wetland of special state concern require a 25' buffer. These buffers, including the stream buffer for intermittent streams, are established in order to protect Maryland's last remaining wetlands, which according to the Chesapeake Bay Foundation, has seen a loss of almost 60%.

LEGEND

- PROPERTY LINE
- EXISTING 2' CONTOUR
- EXISTING TREE LINE
- WB — 100' WETLAND BUFFER
- WL — WETLANDS OF SPECIAL STATE CONCERN
- SB — 60' STREAM BUFFER
- CL — PERENNIAL STREAM
- CL — INTERMITTENT STREAM
- CL — EPHEMERAL CHANNEL
- RcB / CcC — SOIL TYPE BOUNDARY
- STAND # / STAND # — FOREST STAND BOUNDARY

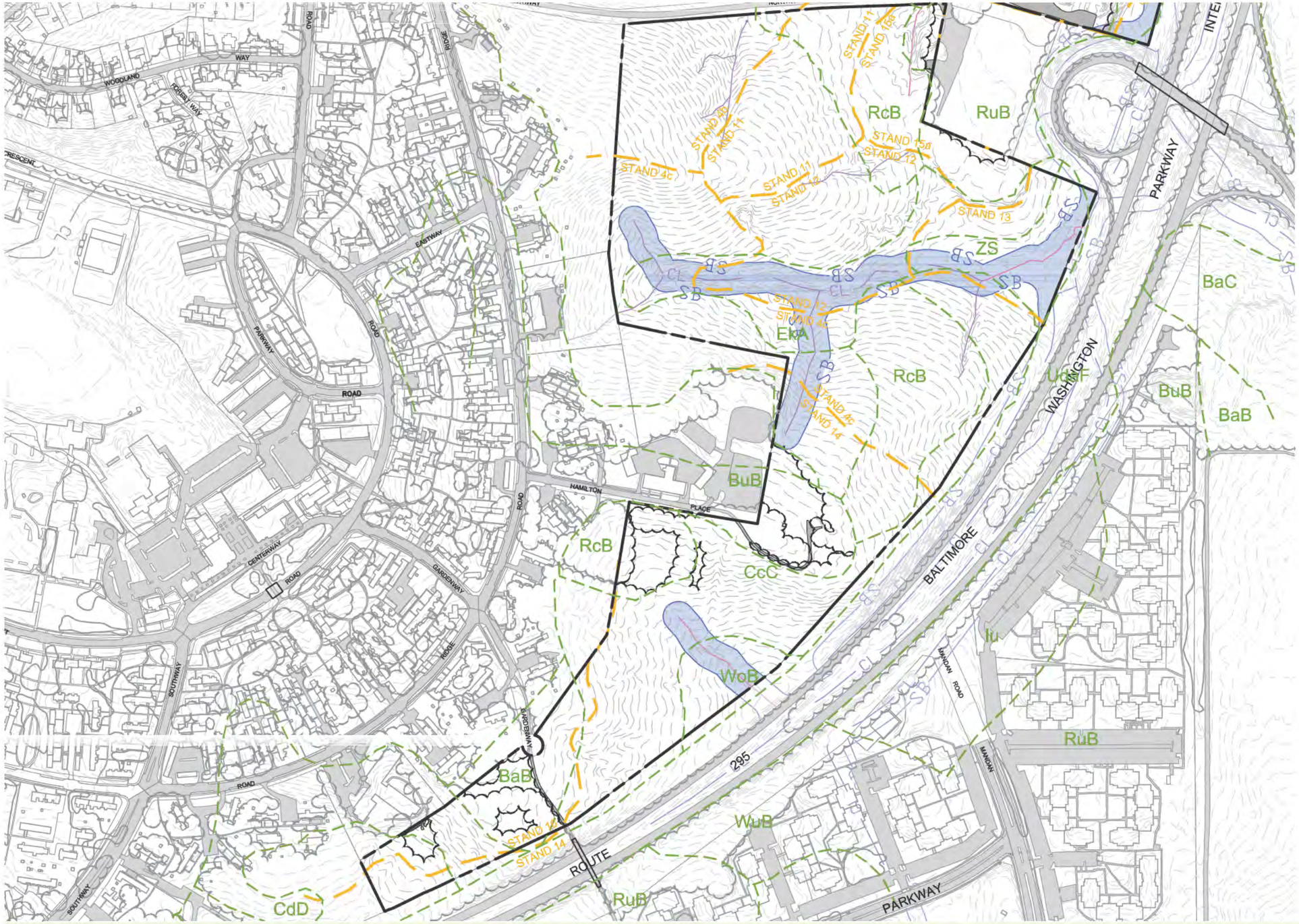


NORTH

HYDROLOGICAL CONDITIONS MAP
NORTH PRESERVE

400' 0' 100' 300' 600'

SCALE: 1" = 400'



HYDROLOGICAL CONDITIONS MAP

SOUTH PRESERVE

NORTH

400′ 0′ 100′ 300′ 600′

SCALE: 1″ = 400′

STEEP SLOPES

The shades of blue correspond to the steepness of the topography. The steeper the slope, the darker the color. Slope steepness can be linked to erosion and incised channels. This map can be used to identify areas that are highly susceptible to erosion. The state designates areas greater than 15% to be steep slopes that require measures to limit disturbance and minimize impacts.

LEGEND

PROPERTY LINE

0-10%

10-15%

15-25%

25% +

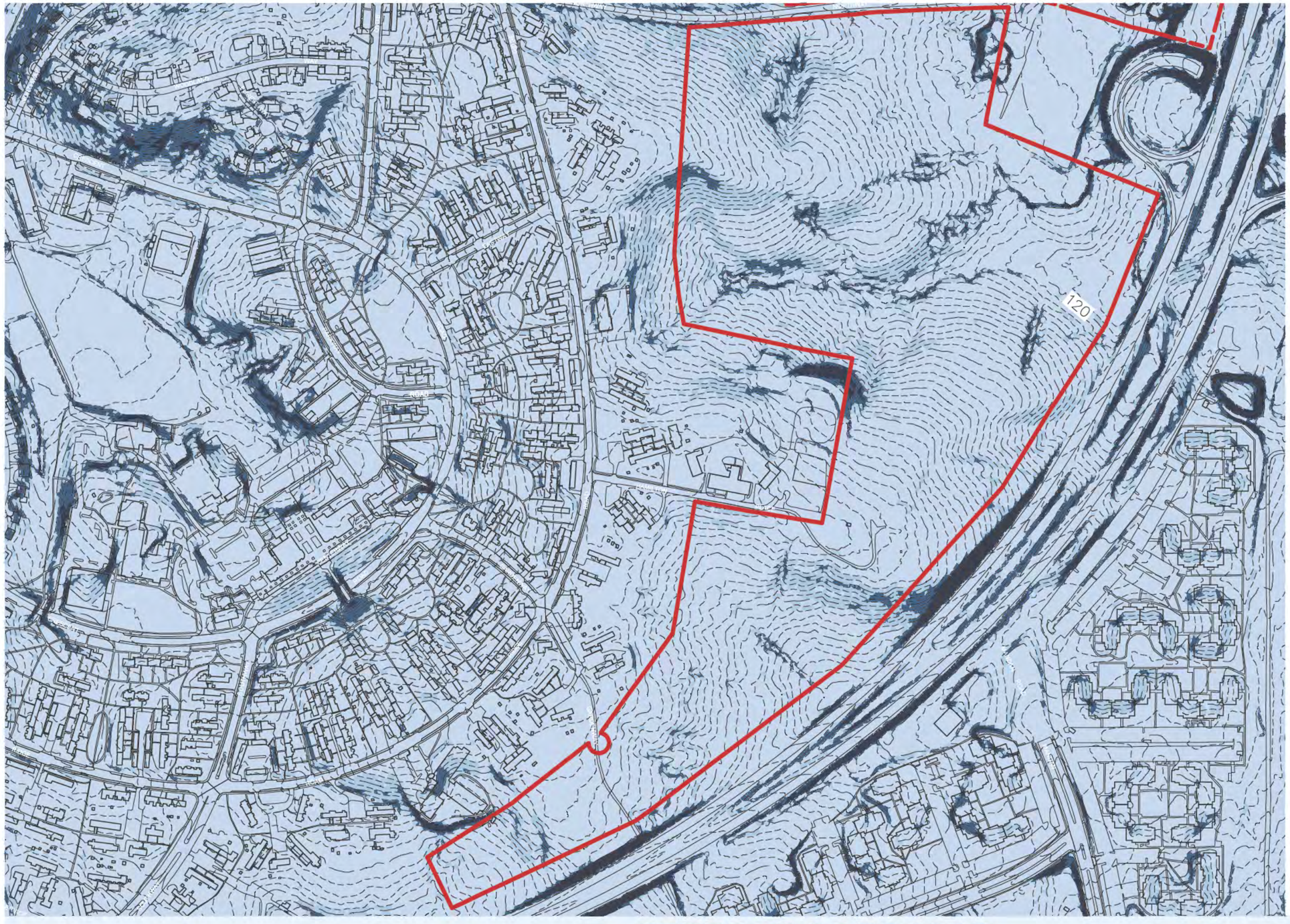
400′ 0′ 100′ 300′ 600′

SCALE: 1″ = 400′

NORTH

STEEP SLOPES MAP

NORTH PRESERVE



STEEP SLOPES MAP

SOUTH PRESERVE

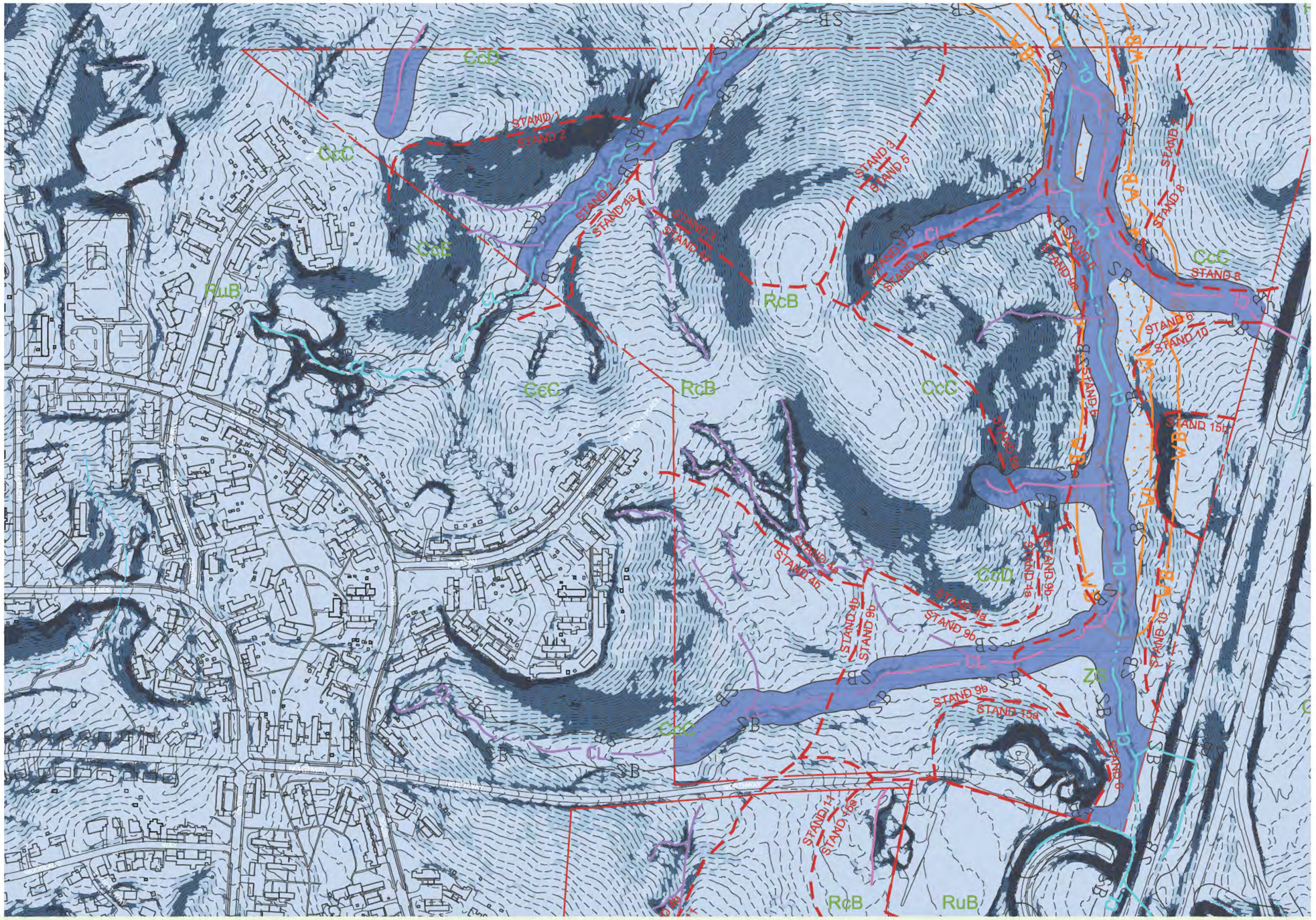
NORTH

400′ 0′ 100′ 300′ 600′

SCALE: 1″ = 400′

SUMMARY FOREST STAND MAPPING

The topography, soils and land use patterns of the North and South Preserve significantly influence the location of forest stands. For example, some stand lines closely follow areas of upland elevations and lowland elevations; other stands are defined by north-, south-, east- or west-facing slopes. Steep side slopes and shallow flat slopes define other stands. Lastly, some stand boundaries closely follow streams and other hydrological features.



LEGEND

- PROPERTY LINE
- EXISTING 2' CONTOUR
- WB — 100' WETLAND BUFFER
- WL — WETLANDS OF SPECIAL STATE CONCERN
- SB — 60' STREAM BUFFER
- CL — PERENNIAL STREAM
- CL — EPHEMERAL STREAM
- CL — INTERMITTENT STREAM
- RcB / CcC — SOIL TYPE BOUNDARY
- STAND # / STAND # — FOREST STAND BOUNDARY

NORTH PRESERVE

NORTH

400' 0' 100' 300' 600'

SCALE: 1" = 400'

SOUTH PRESERVE

NORTH

400′ 0′ 100′ 300′ 600′

SCALE: 1″ = 400′

FOREST STAND 1:

KEY MAP

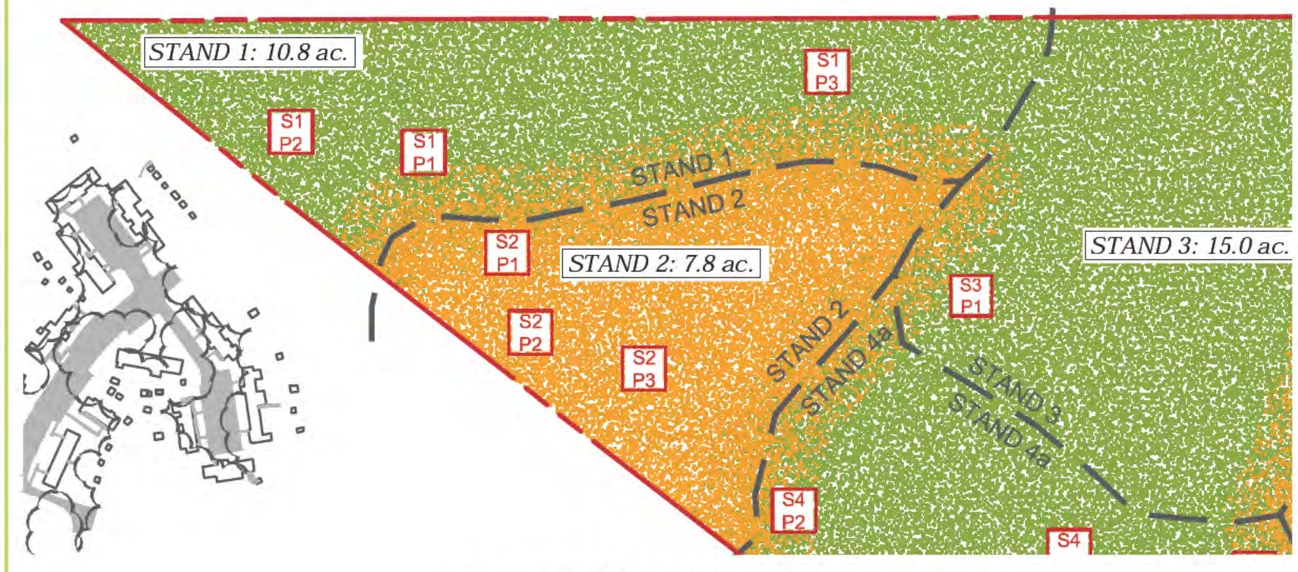
•**Topography:** slopes are fairly uniform throughout S1 and are are primarily <15%
•**Elevation:** 116' to 202' ± above sea level; upland forest; highest point in Northern Preserve is in S1
•**Aspect:** fairly uniform North-facing slopes (although some East-facing slopes are also present); S1 also includes an East-West ridge aligned with Laurel Hill Road; another ridge is present near the western-most property corner of the North Preserve
•**Hydrology:** Although on a ridge, residences and Laurel Hill Road are at elevations higher than S1. Consequently, the S1 forest is subject to impervious area runoff from uphill. Minimal signs of erosion. No wetlands or seeps were observed in the field. A perennial channel (tributary of Beaverdam Creek) originates at Laurel Hill Road, flows through S2 and ultimately extends into the eastern extent of S1. This channel has deeply incised banks. An intermittent channel is also present in S1.
•**Historic imagery notes:** A road is visible in the 1938 photograph. Part of this road was abandoned and has since succeeded with forest species. The presence of this abandoned road bed was confirmed during field investigations. Other, non-abandoned portions of this road eventually became Laurel Hill Road.
•**FIDS habitat:** Present
•**Abiotic factors:** trails, abandoned road, several breaks in BARC fence, stick huts
•**Invasives:** *Wisteria*, English ivy, greenbriar creep in from backyards; forest edge (sunlight) created by Laurel Hill Road creates opportunity for invasives to thrive; other invasives present at the abandoned road and in "open canopy areas" where sunlight reaches the forest floor.
•**Unique habitat notes:** several very dense patches of *Lycopodium*; one *Lycopodium* patch (at eastern edge of S1) includes low/bottomland topography and wet soils, prime for not only *Lycopodium* but also Ostrich fern and Willow oak (*Quercus phellos*).
•**Adjacent uses:** bound by an East-West ridge and S2 to the south; Laurel Hill Road properties to the west; BARC to the north; S3 to the East
•**Forest Structure Value:** 46/60

Forest Stand Summary Sheet

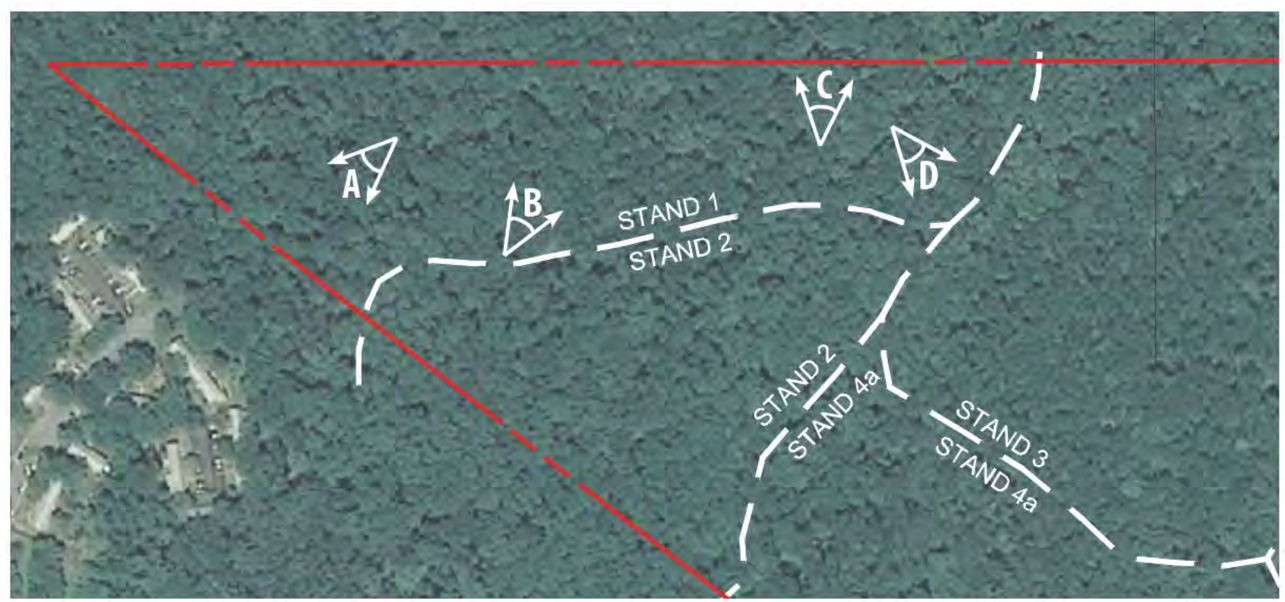
Property Name: *Greenbelt Forest Preserve*
Location: *Greenbelt, MD*

Prepared By: *CML* Date: *2016-10-16*

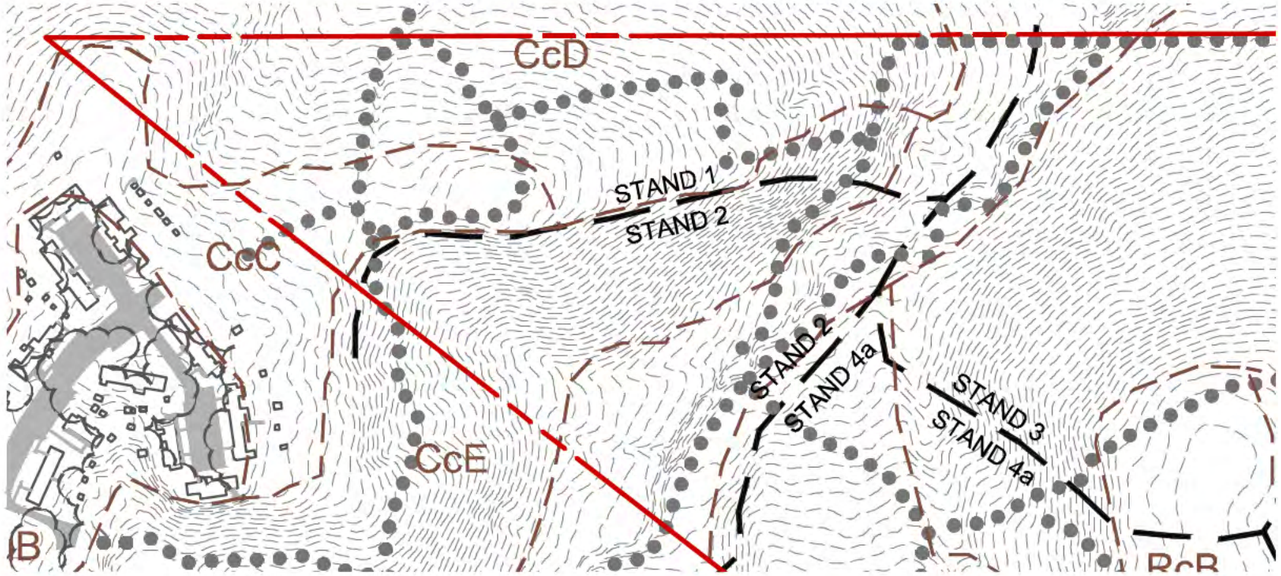
Stand Variable	Stand # *1*
1. Dominant species/Codominant species	*Quercus alba, Quercus rubra, Carya tomentosa, Liquidambar styraciflua, Liriodendron tulipifera*
2. Forest Association	*White oak-Red oak association*
3. Successional stage	*Mid-successional upland forest*
4. Basal area in s.f. per acre	*83*
5. Size class of dominant species	*18-29.9" dbh*
6. Percent of canopy closure	*78%*
7. Number of tree species	*10*
8. Common understory species	*Quercus prinus, Ilex opaca, Cornus florida, Carya tomentosa, Vaccinium angustifolium, Nyssa sylvatica, Liquidambar styraciflua, Lirodendron tulipifera, Kalmia latifolia*
9. Percent of understory cover 3' to 20' tall	*18%*
10. Number of understory species 3' to 20' tall	*9*
11. Common herbaceous species	*Mitchella repens, Lycopodium*
12. Percent of herbaceous & woody plant cover 0' to 3' tall	*21%*
13. List of major invasive plant species & percent of cover	*Euonumous, Smilax, Hedera helix, Vinca, 3%*
14. Number of standing dead trees 6" dbh or greater (average per plot)	*1*
15. Comments Sheet 1 of 1	*Evidence of deer*



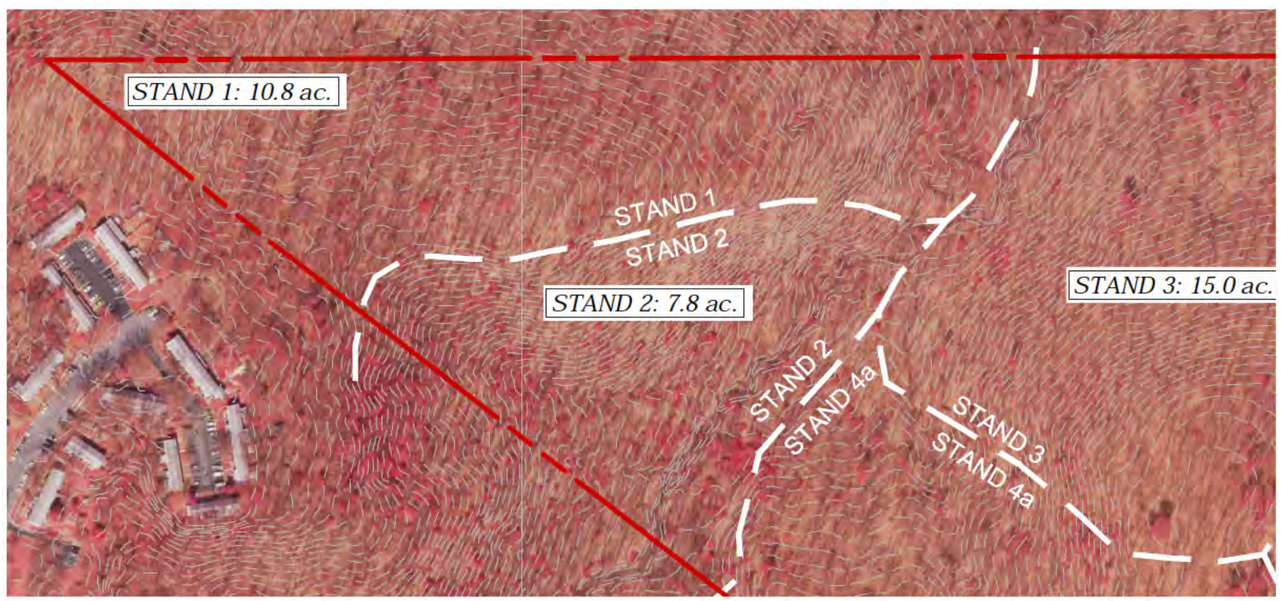
Forest stand boundaries



Color photograph



Contours, trails & soil boundaries



Color infrared photograph

A – Taken at end of Laurel Hill Road, looking back towards Laurel Hill Road. Changes in grade (and the historic aerial photo shown previously) confirm the presence of a road that previously existing in this area.

B – One of several "stick huts" on the plateau within Stand 1.

C – Damage to the fence separating the BARC property and the North Preserve of the Greenbelt Forest Preserve.

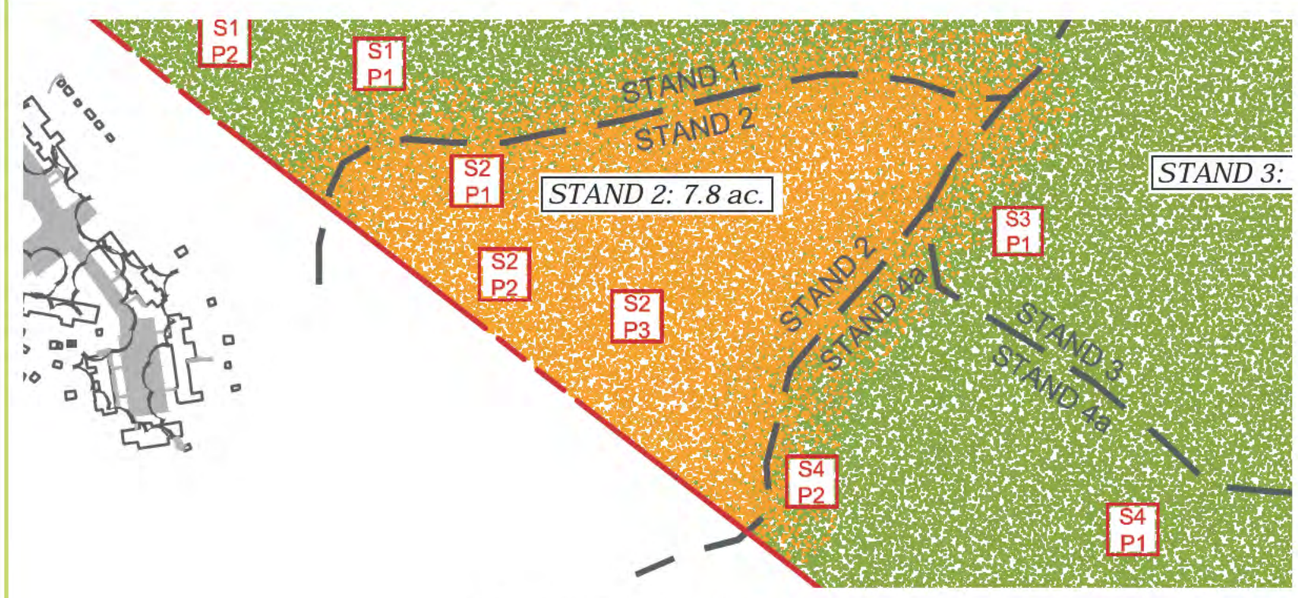
D – *Matteuccia struthiopteris* (Ostrich fern) thrives in this unique habitat area.

FOREST STAND 2:

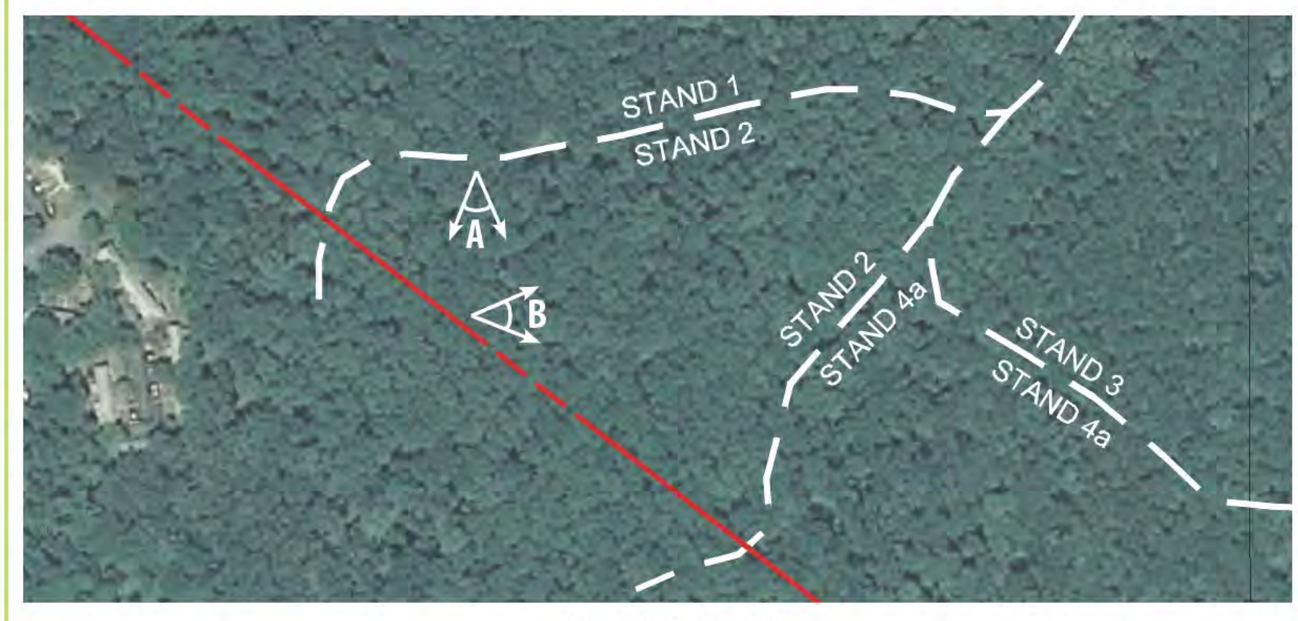
KEY MAP

- **Topography:** slopes are primarily either 10-15% (at bottomland locations) or 15-25% (on the south-facing slopes); due to erosion, the channel includes incised banks with >25% slopes
- **Elevation:** 116′ to 196′ ± above sea level; upland forest
- **Aspect:** about 1/2 of S2 includes south-facing slopes; the other 1/2 is a lowland area that receives drainage (drains to the NE)
- **Hydrology:** Receives drainage from areas between Laurel Hill Road and Plateau Place. Concentrated runoff from uphill impervious areas has resulted in the severely-eroded banks of a perennial stream. This tributary of Beaverdam Creek flows from the SW to SE. This channel originates at Laurel Hill Road.
- **Historic imagery notes:** The stream that essentially serves as the boundary between S2 and S4 is visible in the 1938 photograph.
- **FIDS habitat:** Present
- **Abiotic factors:** Deeply incised channel (eroded stream banks) likely caused by increased stormwater runoff originating at upstream impervious areas
- **Invasives:** relatively few invasives comparable to entirety of Preserve
- **Unique habitat notes:** very distinctive stand of Tulip poplar (*Liriodendron tulipifera*) and American holly (*Ilex opaca*); stand includes a channel (flows to the northeast) that increases habitat diversity
- **Adjacent uses:** Stand 2 is bound by S1's ridge to the north, S3 to the east and S4 to the SE.
- **Forest Structure Value:** 45/60

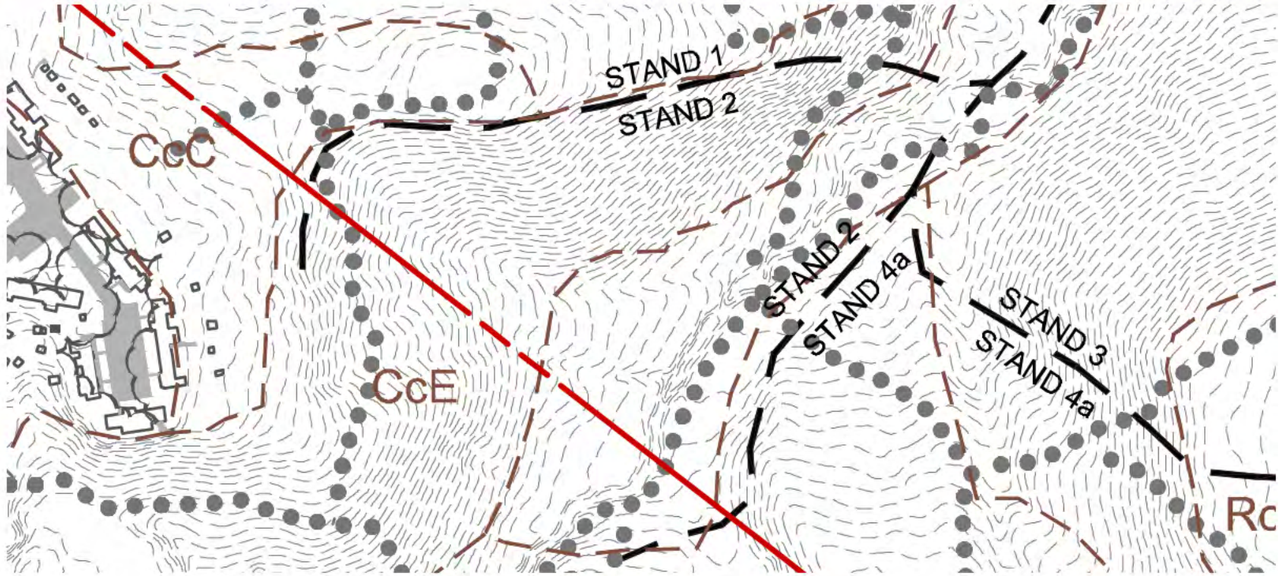
Forest Stand Summary Sheet	
Property Name: *Greenbelt Forest Preserve* Location: *Greenbelt, MD* Prepared By: *CML*	Date: *2016-10-16*
Stand Variable	**Stand # 2**
1. Dominant species/Codominant species	***Liriodendron tulipifera, Liquidambar styraciflua, Ilex opaca***
2. Forest Association	***Tulip poplar***
3. Successional stage	***Mid-successional upland forest***
4. Basal area in s.f. per acre	***97***
5. Size class of dominant species	***18-29.9" dbh***
6. Percent of canopy closure	***77%***
7. Number of tree species	***5***
8. Common understory species	***Carya tomentosa, Liquidambar styraciflua, Ilex opaca, Quercus alba, Quercus prinus, Quercus phellos, Toxicodendron radicans***
9. Percent of understory cover 3' to 20' tall	***21%***
10. Number of understory species 3' to 20' tall	***7***
11. Common herbaceous species	***Polystichum acrostichoides, Rubus flagellaris, Solidago caesia***
12. Percent of herbaceous & woody plant cover 0' to 3' tall	***16%***
13. List of major invasive plant species & percent of cover	***Berberis thunbergii, Hedera helix, Slimax, 14%***
14. Number of standing dead trees 6" dbh or greater (average per plot)	***0.7***
15. Comments Sheet 1 of 1	-



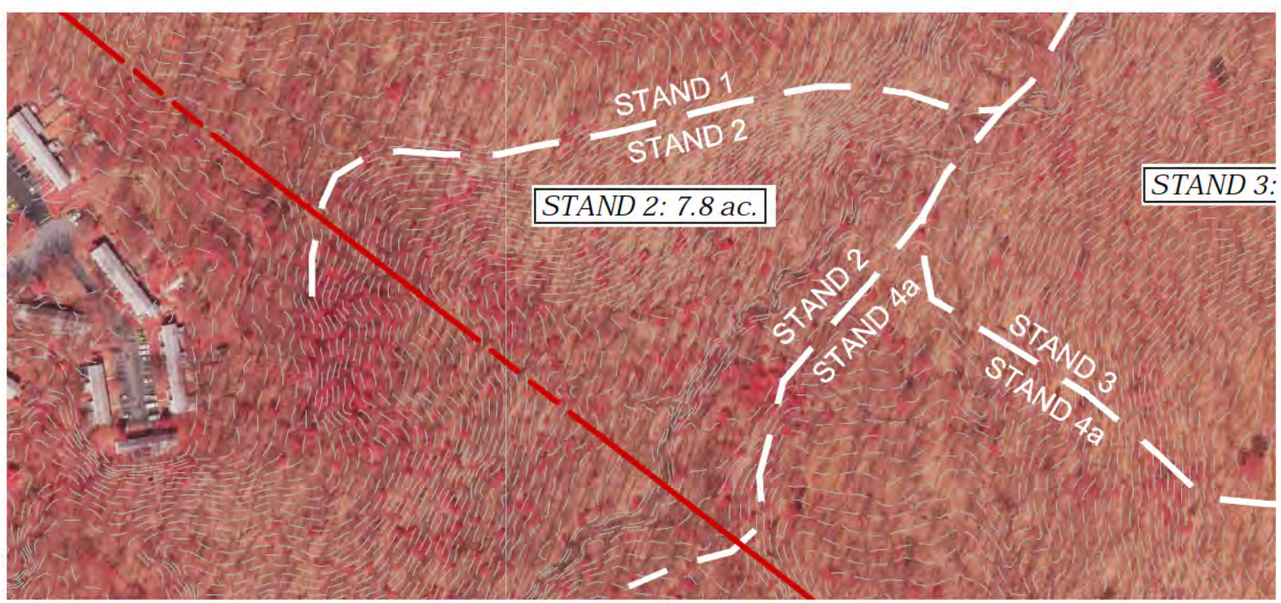
Forest stand boundaries



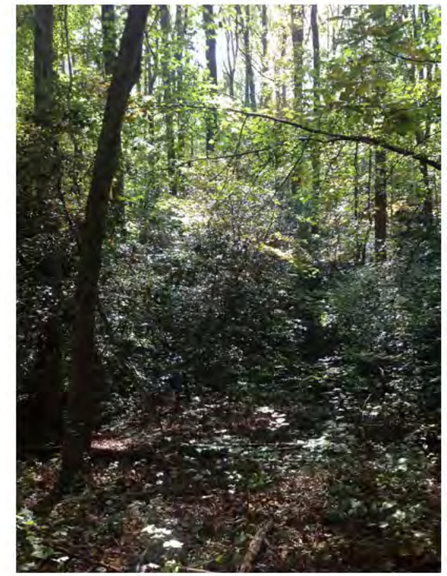
Color photograph



Contours, trails & soil boundaries



Color infrared photograph



A – Stand 2 is defined by a dense coverage of *Ilex opaca* (American holly) in the understory and *Liriodendron tulipifera* (Tulip poplar) in the canopy.

B – Tulip poplars in forests are often characterized by their distinctive arrow-straight trunks.

FOREST STAND 3:

KEY MAP

•**Topography:** The slopes around the high point and North-facing slopes of S3 are primarily <15%; the western-facing slopes of S3 are are as steep as 25%; due to erosion, the channel that divides S3 from S1 includes incised banks with >25% slopes

•**Elevation:** 112' to 198' ± above sea level; upland forest

•**Aspect:** primarily North-facing or NW-facing slopes; S3 also includes some of the highest elevations within the Northern Preserve

•**Hydrology:** High elevations, minimal disturbance and dense canopy/understory/ground-level vegetation keeps erosion potential low. The perennial channel between S3 and S1 includes incised banks - however, this erosion is caused by concentrated stormwater runoff far upstream of S3. An incised ephemeral channel is present near S3's western extent.

•**Historic imagery notes:** Erosion is readily apparent in the 1938 photograph near the intersection of S2, S3, and S4. The results of this erosion are still very much evident, as evidenced by topographic maps and field observations. Fortunately, vegetation has stabilized such eroded areas. The 1938 photograph also reveals very sparse vegetative cover in stand 3. Today, field investigations revealed very small trees relative to other areas of the property.

•**FIDS habitat:** Present

•**Abiotic factors:** It appears that this stand was cleared, used (for perhaps agricultural purposes) and abandoned. After abandonment, this stand is in the process of potentially transitioning back to a forest. The unusually high presence of small-sized (2-5.9" dbh) Black gums (*Nyssa sylvatica*) seems to indicate that this stand was abandoned more recently than other previously farmed areas of the preserve, which have much larger trees present.

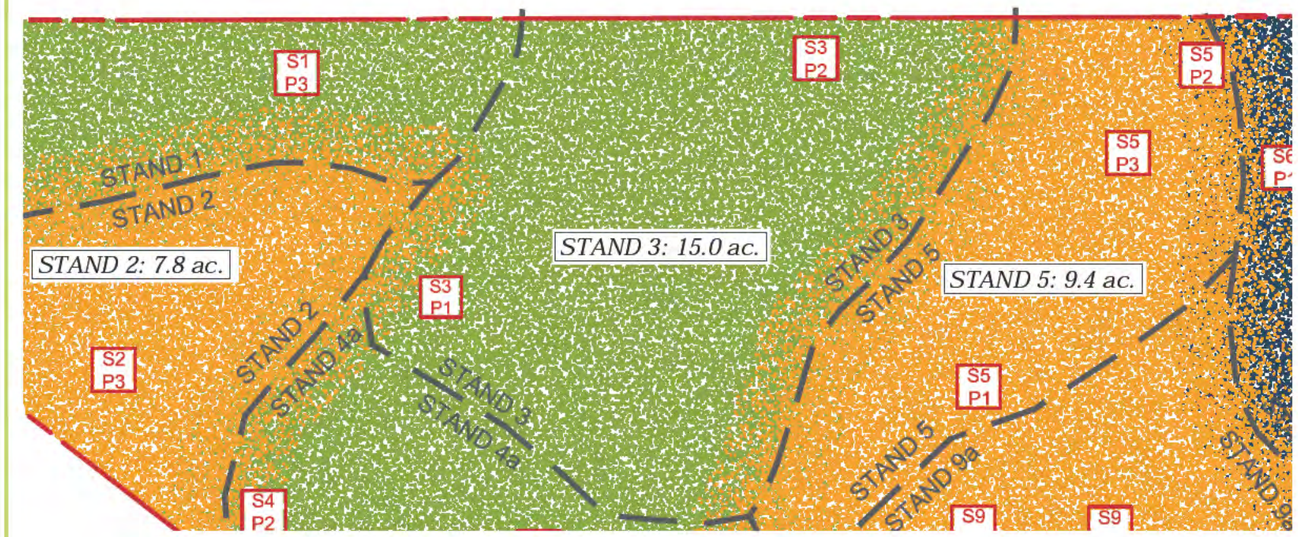
•**Invasives:** relatively few invasives comparable to entirety of Preserve

•**Unique habitat notes:** High abundance of small Black gums defines this stand.

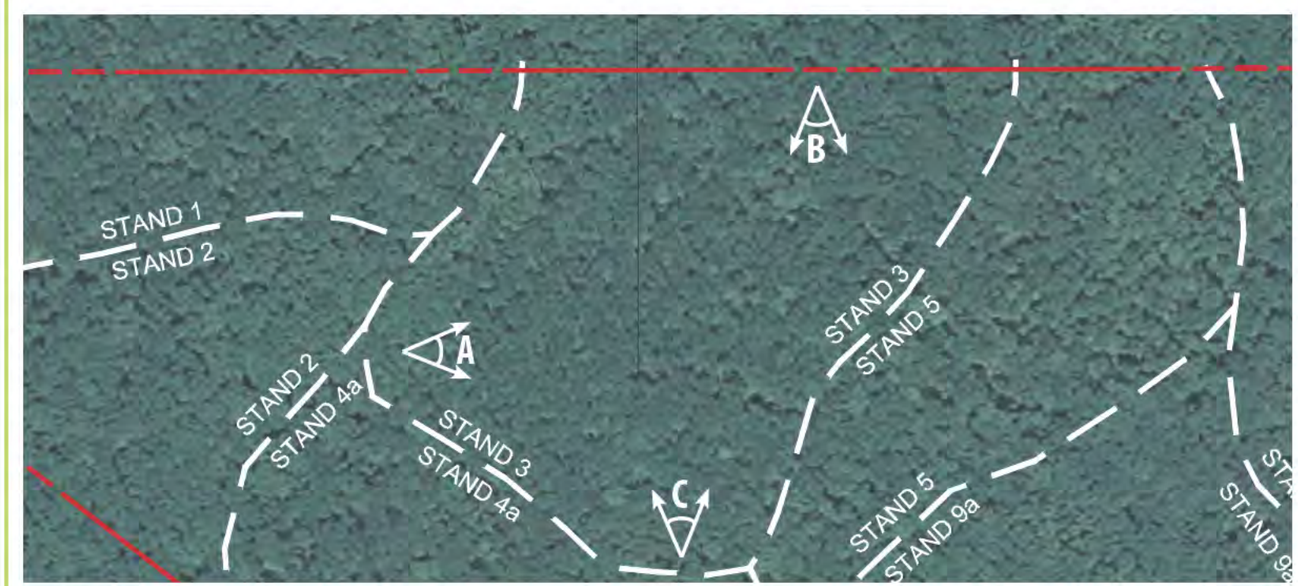
•**Adjacent uses:** Stand 3 is bound by S1 and S2 to the west, S4 to the south, S5 to the north.

•**Forest Structure Value:** 44/60

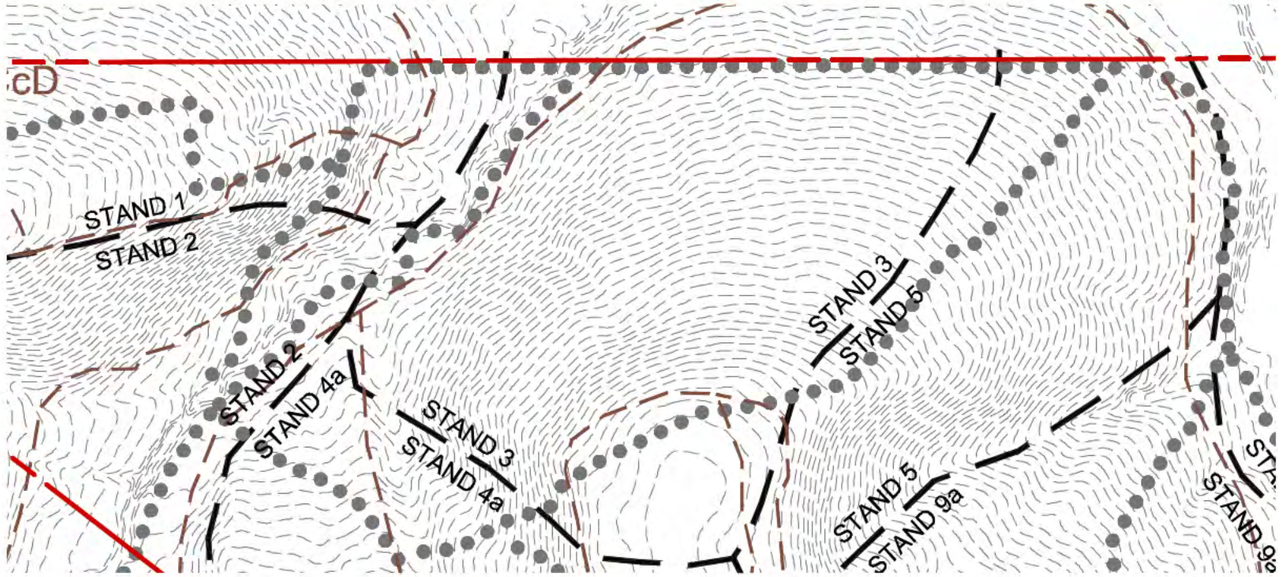
Forest Stand Summary Sheet	
Property Name: *Greenbelt Forest Preserve* Location: *Greenbelt, MD*	
Prepared By: *CML*	Date: *2015-10-16*
Stand Variable	**Stand # 3**
1. Dominant species/Codominant species	*Nyssa sylvatica, Quercus rubra, Quercus alba*
2. Forest Association	*White oak-Red oak association*
3. Successional stage	*Early/Mid-successional upland forest*
4. Basal area in s.f. per acre	*105*
5. Size class of dominant species	*10" – 29.9" dbh*
6. Percent of canopy closure	*77%*
7. Number of tree species	*5*
8. Common understory species	*Vaccinium angustifolium, Quercus alba, Liquidambar styraciflua, Kalmia latifolia, Nyssa sylvatica, Ilex opaca, Sassafras albidum, Vaccinium corymbosum*
9. Percent of understory cover 3' to 20' tall	*16%*
10. Number of understory species 3' to 20' tall	*8*
11. Common herbaceous species	*n/a*
12. Percent of herbaceous & woody plant cover 0' to 3' tall	*17%*
13. List of major invasive plant species & percent of cover	*n/a*
14. Number of standing dead trees 6" dbh or greater (average per plot)	*1.5*
15. Comments Sheet 1 of 1	-



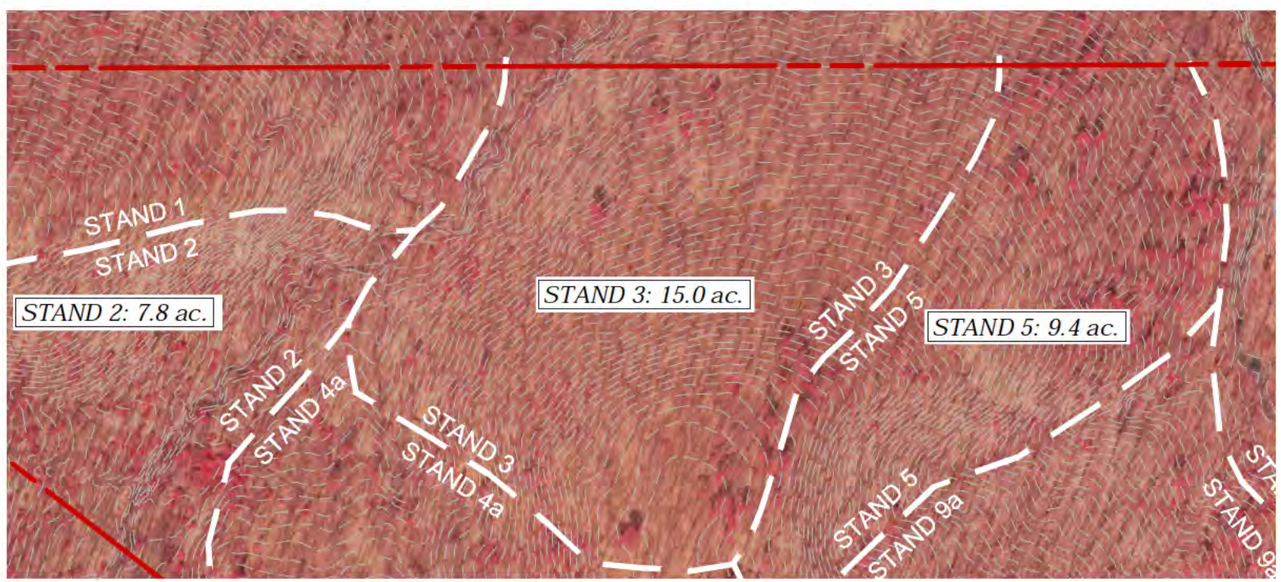
Forest stand boundaries



Color photograph



Contours, trails & soil boundaries



Color infrared photograph

A – The prevalence of *Nyssa sylvatica* (Black gum) and their consistently small size in this area indicate an early successional stage.

B – Several older trees are scattered throughout the stand and amongst the smaller Black gums. *Vaccinium angustifolium* (Lowbush blueberry) is also prevalent.

C – This >30" *Liriodendron tulipifera* (Tulip poplar) exists on the flat plateau within Stand 3. A girdle mark is present on the trunk and is a sign of previous use. The tree is also unique because of its relative size - it is the largest tree in the immediate area, and has a canopy/branching structure that indicates it previously grew in an open area, not a forest.

FOREST STAND 4:

KEY MAP

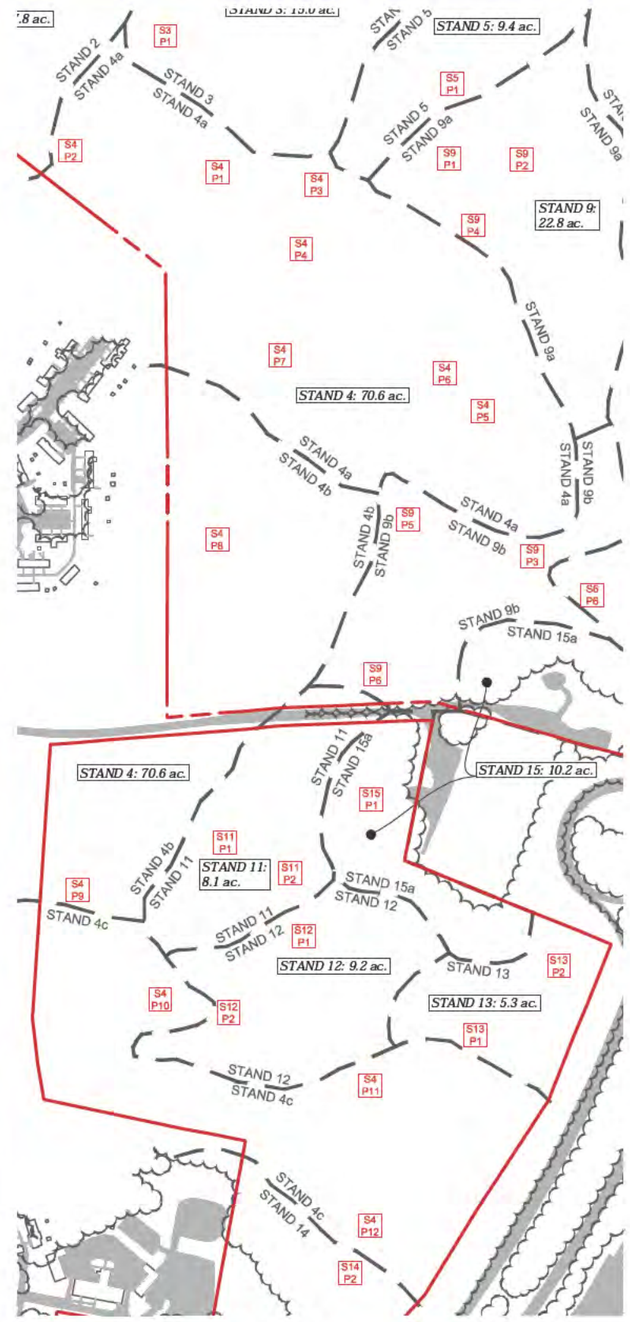
•**Topography:** The vastness of this stand makes it difficult to categorize the slopes of this area. However, S4's slopes are primarily <15%. There are a few areas of upland slopes that are between 15-25%. Some areas exceed 25% because of erosion.
•**Elevation:** highly variable due to the vast size of this stand; 115' to 198' ± above sea level; upland forest
•**Aspect:** Majority of S4 includes south- or east-facing slopes. A small amount of S4 includes north-facing slopes.
•**Hydrology:** Impervious areas on/around Ridge Road and Plateau Place are causing erosion impacts within this stand. S4 includes several intermittent/ephemeral channels, a seep (near the S4/S9 boundary) and a perennial stream (originating at Ridge Road).
•**Historic imagery notes (S4 within the northern parcel):** Erosion is evident throughout the stand (confirmed in field, although former eroded areas are now stabilized by vegetation). The 1938 photo reveals that the western facing slope of S4 appears as a lighter gray color relative to the eastern facing slope of S4 (near the S4/S9A boundary). The agricultural use of this west-facing slope contributed to the aforementioned erosion in the stand. The east-facing slope was likely abandoned at an earlier time, hence the slightly darker gray. The plateau (for which Plateau Place was named) was extensively farmed as evidenced by the 1938 photograph.
•**Historic imagery notes (S4 within the southern parcel):** The 1938 photo reveals and old road which eventually transformed into a walking trail that is still present today.
•**FIDS habitat:** Present
•**Abiotic factors:** trails abundant throughout stand; concrete post found northeast of Plateau Place; several deeply incised eroded areas caused by uphill impervious areas (to the northeast and east of Plateau Place); outdoor classroom in South Preserve; trash present in a few locations throughout the stand; several locations where perimeter fence is broken
•**Invasives:** English ivy, *Wisteria*, Green briar, *Rosa multiflora*, *Berberis thunbergii*, *Smilax* abundant; several openings in forest canopy (caused by fallen trees) allow sunlight to penetrate to forest floor and provide opportunity for non-native invasive species to thrive; invasives are encroaching into the stand from private backyards, Northway, and BW Parkway.
•**Unique habitat notes**: very diverse stratification of native understory and canopy species; dense clusters of *Lycopodium*; formerly eroded areas have been stabilized by American holly (*Ilex opaca*), Mountain laurel (*Kalmia latifolia*), and other various native northern hardwoods (*Quercus sp.*, *Pinus sp.*, *Liquidambar styraciflua*, *Liriodendron tulipifera*); some exceptional areas of very large oaks that contrast typical Stand 4 tree sizes; one area in South Preserve includes Pawpaw (*Asimina triloba*), not found typically throughout the rest of the property; a lowland channel flowing from west to east (north of Northway) increases habitat value, as do two separate channels south of Northway
•**Adjacent uses:** S4 is bound by S2, S3 and S5 to the north; S9, S11 and S12 to the east; and S14 to the south.
•**Forest Structure Value:** 44/60

Forest Stand Summary Sheet

Property Name: *Greenbelt Forest Preserve*
Location: *Greenbelt, MD*

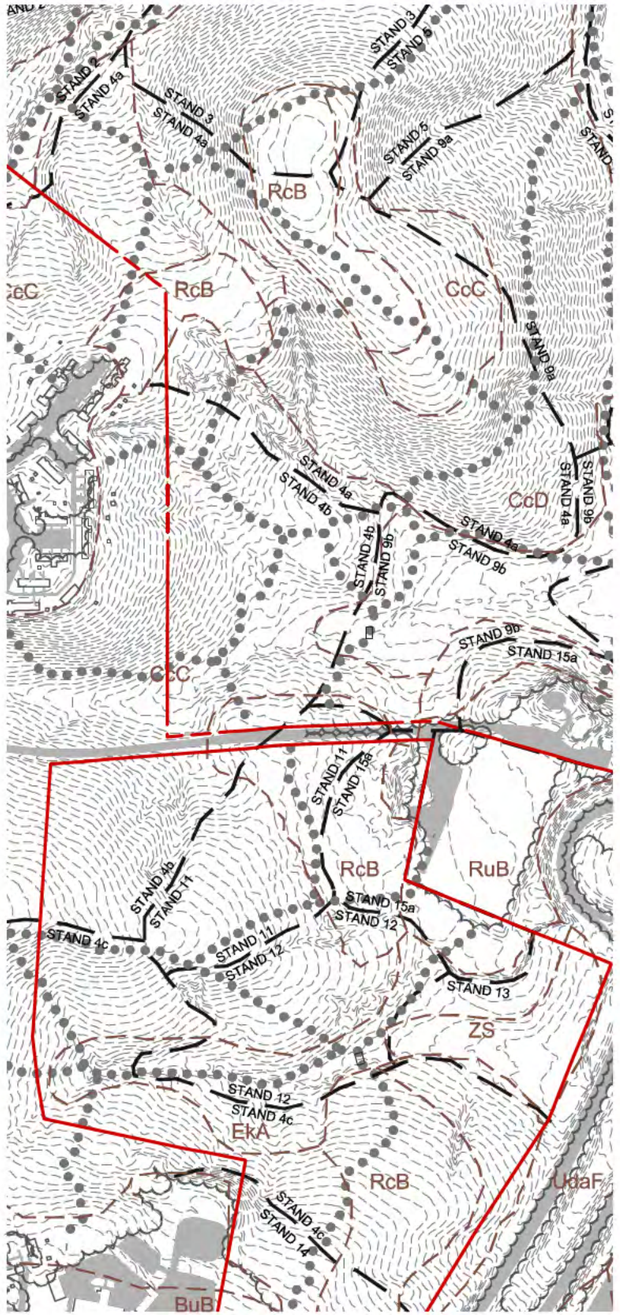
Prepared By: *CML* Date: *10/30/2016*

Stand Variable	Stand # *4*
1. Dominant species/Codominant species	*Quercus falcata, Quercus rubra, Quercus alba, Pinus virginiana, Liriodendron tulipifera, Nyssa sylvatica*
2. Forest Association	*White oak-Red oak association*
3. Successional stage	*Mid-successional upland forest*
4. Basal area in s.f. per acre	*108*
5. Size class of dominant species	*18-29.9" dbh*
6. Percent of canopy closure	*79%*
7. Number of tree species	*14*
8. Common understory species	*Kalmia latifolia, Sassafras albidum, Vaccinium angustifolium, Quercus alba, Acer rubrum, Ilex opaca, Nyssa sylvatica, Carya tomentosa, Liquidambar styraciflua, Vaccinium corymbosum, Quercus prinus, Viburnum dentatum, Betula nigra, Quercus rubra, Carpinus caroliniana, Liriodendron tulipifera*
9. Percent of understory cover 3' to 20' tall	*22%*
10. Number of understory species 3' to 20' tall	*16*
11. Common herbaceous species	*Mitchella repens, Lycopodium, Polystichum acrostichoides*
12. Percent of herbaceous & woody plant cover 0' to 3' tall	*24%*
13. List of major invasive plant species & percent of cover	*Smilax, Microstegium vimineum, Rosa multiflora, 11%*
14. Number of standing dead trees 6" dbh or greater	*0.9*
15. Comments Sheet 1 of 1	*Although S4 varies significantly in topography, elevation and aspect, species density and other factors remain consistent throughout despite the aforementioned differences.*

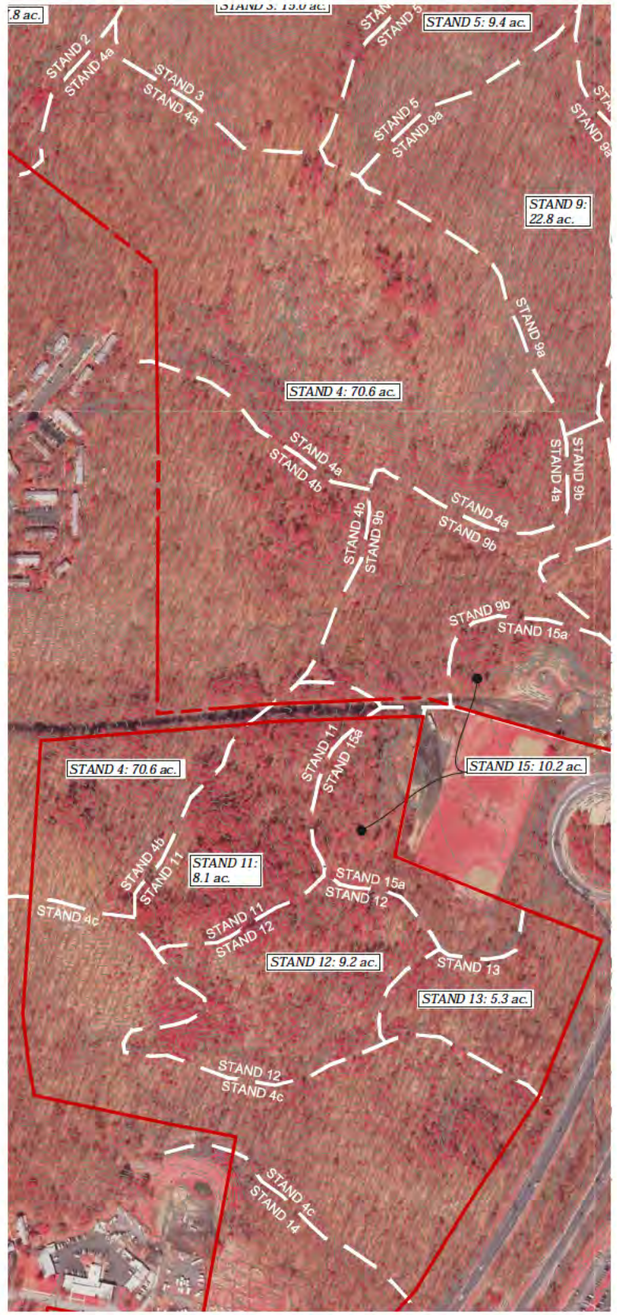


Forest stand boundaries

Color photograph



Contours, trails & soil boundaries



Color infrared photograph

A - This stand includes a very diverse species palette, as well as highly variable topography.

B - *Kalmia latifolia* (Mountain laurel) is common in S4's understory.

C - Abundance of oak saplings represent future growth within S4.

D - incised channel taken near S4P10. This erosion is a result of concentrated stormwater runoff from uphill impervious areas.

FOREST STAND 5:

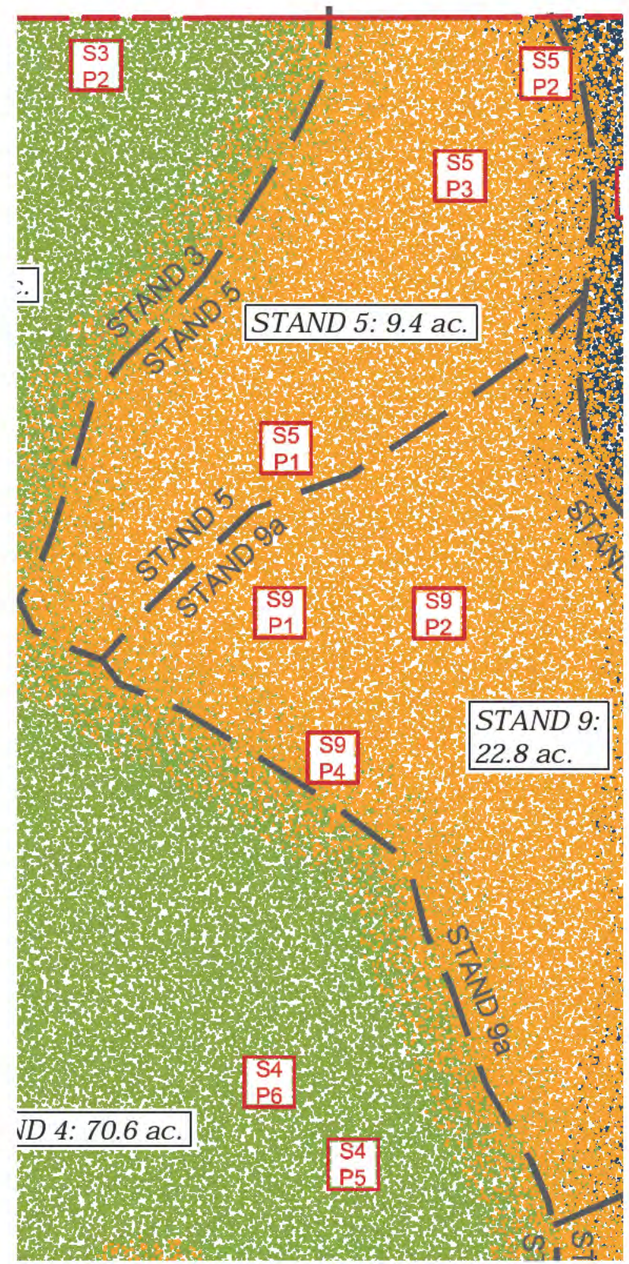
- **Topography:** about 2/3 of this stand is comprised of <15% slopes; the remaining 1/3 is 15-25%
- **Elevation:** 104' to 195' ± above sea level; upland forest
- **Aspect:** slopes very uniformly to the east
- **Hydrology:** S5 receives runoff from the ridge/high point within S3. Erosion is not an issue because of high elevations, minimal disturbance and dense canopy/understory/ground-level vegetation. An intermittent channel is present near the boundary between S5 and S9.
- **Historic imagery notes:** n/a
- **FIDS habitat:** Present
- **Abiotic factors:** Trails present. Few signs of human impact.
- **Invasives:** very few invasives as this stand is well protected from exterior threats (i.e., backyards, roads, etc.)
- **Unique habitat notes:** S5 is a "transitional" stand between S4 (upland topography, young trees) and S6 (lowland topography). Includes species similar to S4, but larger in size, indicating older individuals. One area, near the BARC property, includes a very unique cluster of *Lycopodium*, Hay-scented ferns, and young oak saplings. Lower elevations of this stand transition to more similarly represent species found in S6. A small tributary is present and increases habitat value.
- **Adjacent uses:** S5 is bounded by S3 to the east, S4 to the SW, S9 to the SE and S6 to the east.
- **Forest Structure Value:** 45/60

Forest Stand Summary Sheet

Property Name: *Greenbelt Forest Preserve*
Location: *Greenbelt, MD*

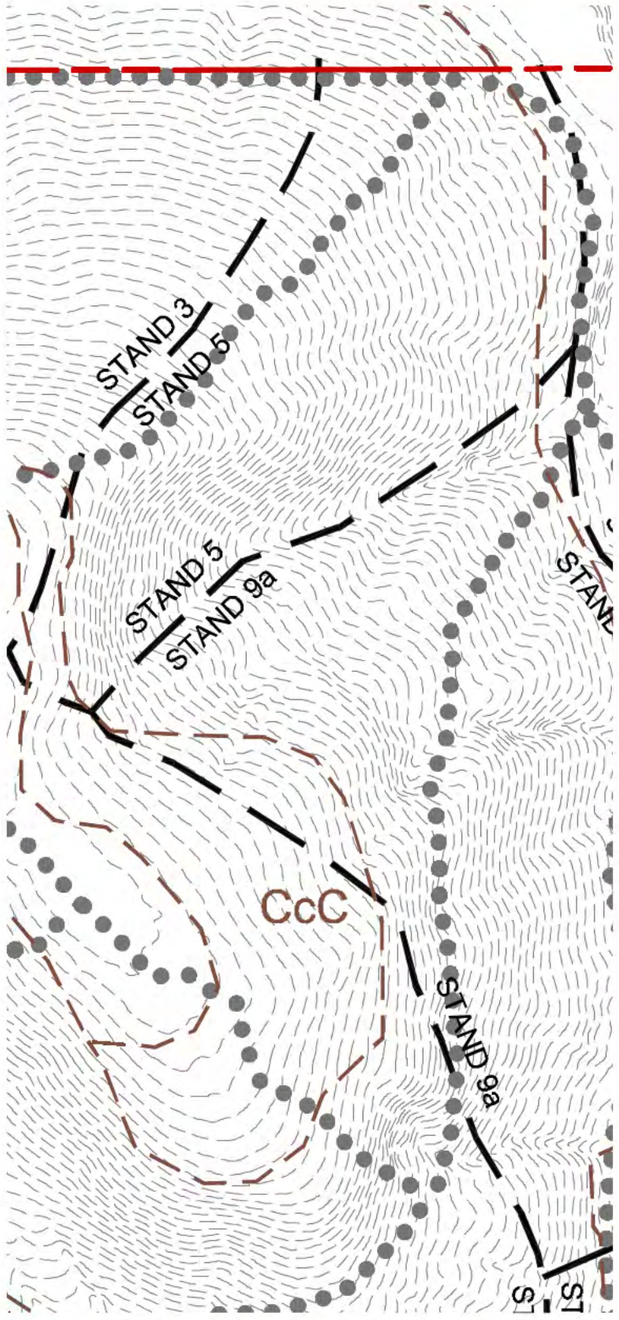
Prepared By: *CML* Date: *2015-10-21*

Stand Variable	Stand # *5*
1. Dominant species/Codominant species	*Liriodendron tulipifera, Quercus alba, Liquidambar styraciflua, Acer rubrum*
2. Forest Association	*Tulip Poplar*
3. Successional stage	*Mid-successional upland forest*
4. Basal area in s.f. per acre	*110*
5. Size class of dominant species	*18-29.9" dbh*
6. Percent of canopy closure	*76%*
7. Number of tree species	*8*
8. Common understory species	*Nyssa sylvatica, Quercus alba, Liquidambar styraciflua, Vaccinium angustifolium, Carpinus caroliniana, Quercus phellos, Acer rubrum, Quercus rubra, Vaccinium corymbosum, Kalmia latifolia, Carya tomentosa, Toxicodendron radicans*
9. Percent of understory cover 3' to 20' tall	*24%*
10. Number of understory species 3' to 20' tall	*12*
11. Common herbaceous species	*Mitchella repens, Lycopodium, Fragaria vesca, Dennstaedtia punctilobula*
12. Percent of herbaceous & woody plant cover 0' to 3' tall	*27%*
13. List of major invasive plant species & percent of cover	*Smilax, Microstegium vimineum, 17%*
14. Number of standing dead trees 6" dbh or greater (average per plot)	*1.7*
15. Comments Sheet 1 of 1	-

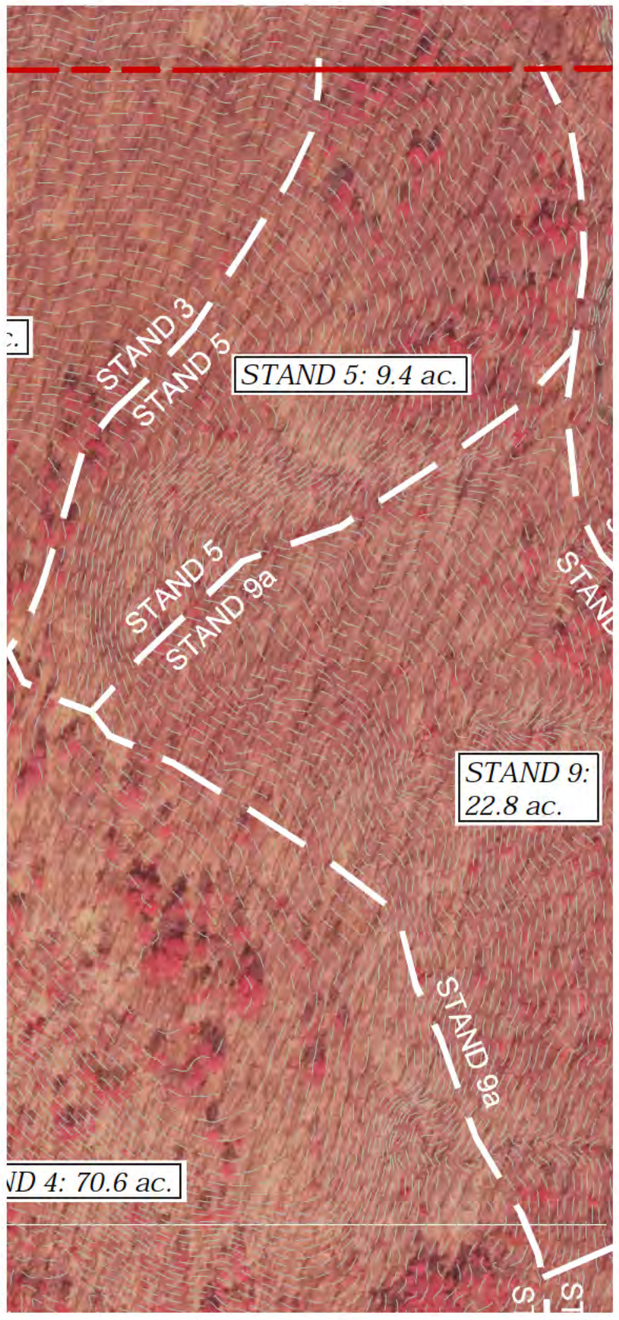


Forest stand boundaries

Color photograph



Contours, trails & soil boundaries



Color infrared photograph

A - The highly invasive *Microstegium vimineum* (Japanese stilt grass) thrives in many areas through the preserve, but especially in areas where sunlight hits the forest floor and in disturbed areas, such as trails. Both occur here.

B - (Ground cedar) is present in many areas throughout the preserve, and especially in this area. Deadwood, whether still standing or fallen onto the ground, provides habitat value but also increases the amount of sunlight on the forest floor. New species (invasive and native) benefit from the new abundant sunlight.

FOREST STAND 6:

KEY MAP

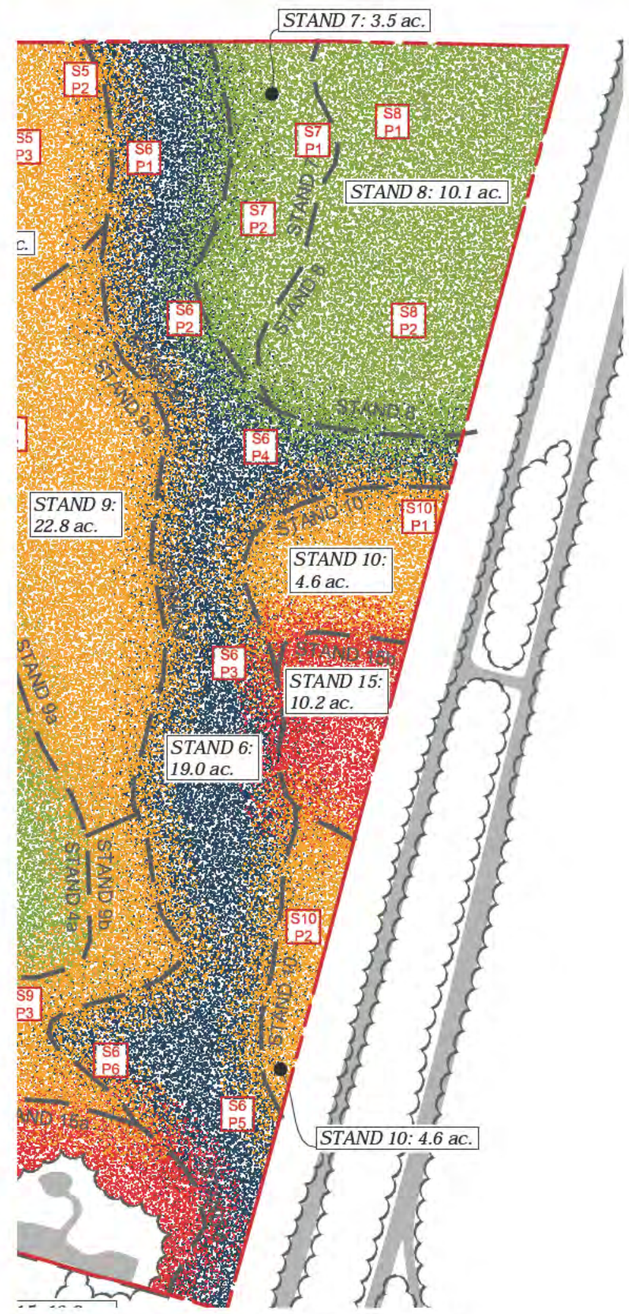
•**Topography:** vast majority of slopes are <10%; due to erosion of the channel, this stand also includes some slopes between 15-25% and some slopes that exceed 25%
•**Elevation:** 94' to 120' ± above sea level; lowland forest
•**Aspect:** this exceptionally-broad bottomland drains to the North
•**Hydrology:** S6 includes a severely eroded perennial stream that drains to the north to Beaverdam Creek. Stands 4, 5, 7, 8, 9a, 9b, 10, and 15 (and the ephemeral/intermittent channels within these stands) drain into S6 and the aforementioned stream.
•**Historic imagery notes:** Although difficult to assess, the 1938 photograph appears to reveal very little forest coverage, especially relative to the apparently increased forest coverage shown in the 1952 photograph.
•**FIDS habitat:** Present
•**Abiotic factors:** Incised channel likely caused by upstream impervious areas that erode stream banks
•**Invasives:** Japanese stilt grass thrives in shady, wet lowlands and covers virtually the entirety of S6's floor; other invasives are also present.
•**Unique habitat notes:** This lowland stand is dominated by Red maple (*Acer rubrum*) and Sweet gum (*Liquidambar styraciflua*); the channel flows to the north, is a tributary of Beaverdam Creek, and includes very incised side slopes. This stand also includes what is typically considered a low, flat floodplain, but because of the channels very high banks, the floodplain likely doesn't flood during notable storms. Wetlands are present west of BW Parkway and include Skunk cabbage, Ostrich fern, and a ~45" DBH Tulip poplar. Wetlands of special state concern are present throughout the entirety of S6.
•**Adjacent uses:** S6 is bound by S5, S9, and S15 to the west; S7, S8, S10, and S15 to the east.
•**Forest Structure Value:** 42/60

Forest Stand Summary Sheet

Property Name: *Greenbelt Forest Preserve*
Location: *Greenbelt, MD*

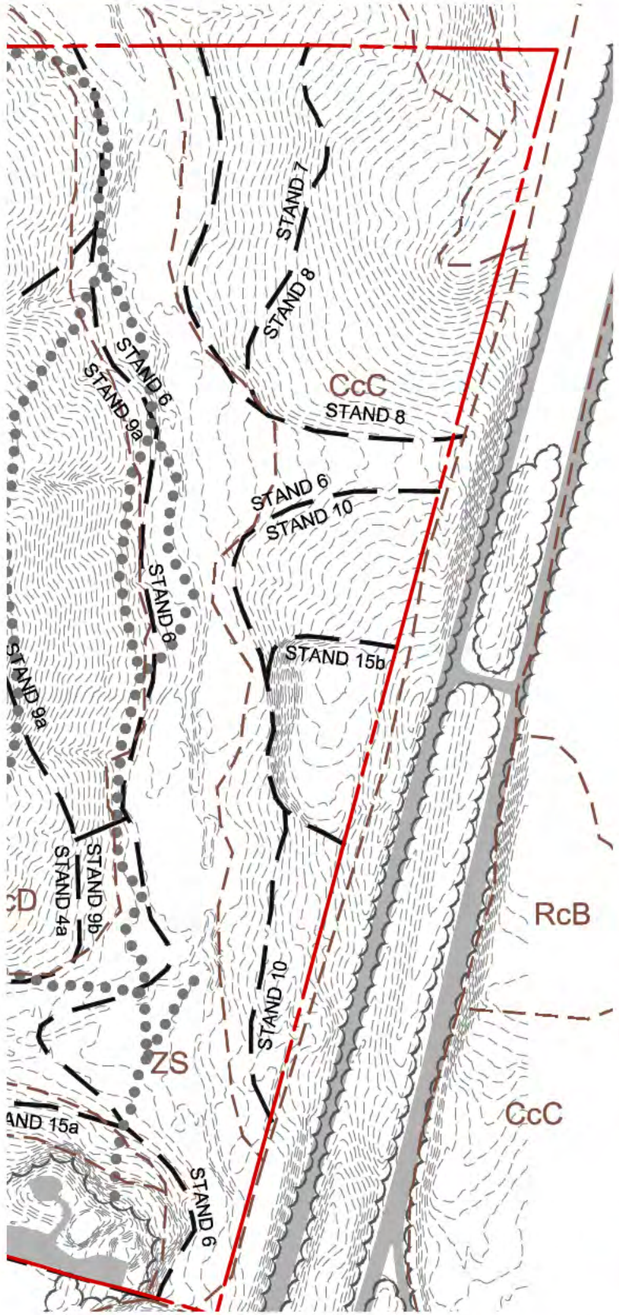
Prepared By: *CML* Date: *2015-10-23*

Stand Variable	Stand # 6
1. Dominant species/Codominant species	*Acer rubrum*
2. Forest Association	*Red maple-Sweet gum association*
3. Successional stage	*Mid-successional lowland forest*
4. Basal area in s.f. per acre	*98*
5. Size class of dominant species	*18-29.9" dbh*
6. Percent of canopy closure	*76%*
7. Number of tree species	*7*
8. Common understory species	*Carya tomentosa, Quercus alba, Lindera benzoin, Quercus phellos, Quercus rubra, Ilex opaca, Liquidambar styraciflua, Toxicodendron radicans, Vaccinium corymbosum*
9. Percent of understory cover 3' to 20' tall	*10%*
10. Number of understory species 3' to 20' tall	*9*
11. Common herbaceous species	*Cinna arundinacea, Dichanthelium clandestinum, Carex lurida, Mitchella repens, Symplocarpus foetidus, Matteuccia struthiopteris, Dennstaedtia punctilobula, Peltandra virginica, Pilea pumila, Woodwardia areolata, Sphagnum, Fragaria vesca, Phytolacca americana, Parthenocissus quinquefolia, Juncus sp., Carex. sp.*
12. Percent of herbaceous & woody plant cover 0' to 3' tall	*23%*
13. List of major invasive plant species & percent of cover	*Microstegium vimineum, Smilax, Celastrus orbiculatus, Berberis thunbergii, Alliaria petiolata, Hedera helix, Morus alba, 68%*
14. Number of standing dead trees 6" dbh or greater (average per plot)	*1.3*
15. Comments Sheet 1 of 1	*Ground densely covered by stiltgrass*

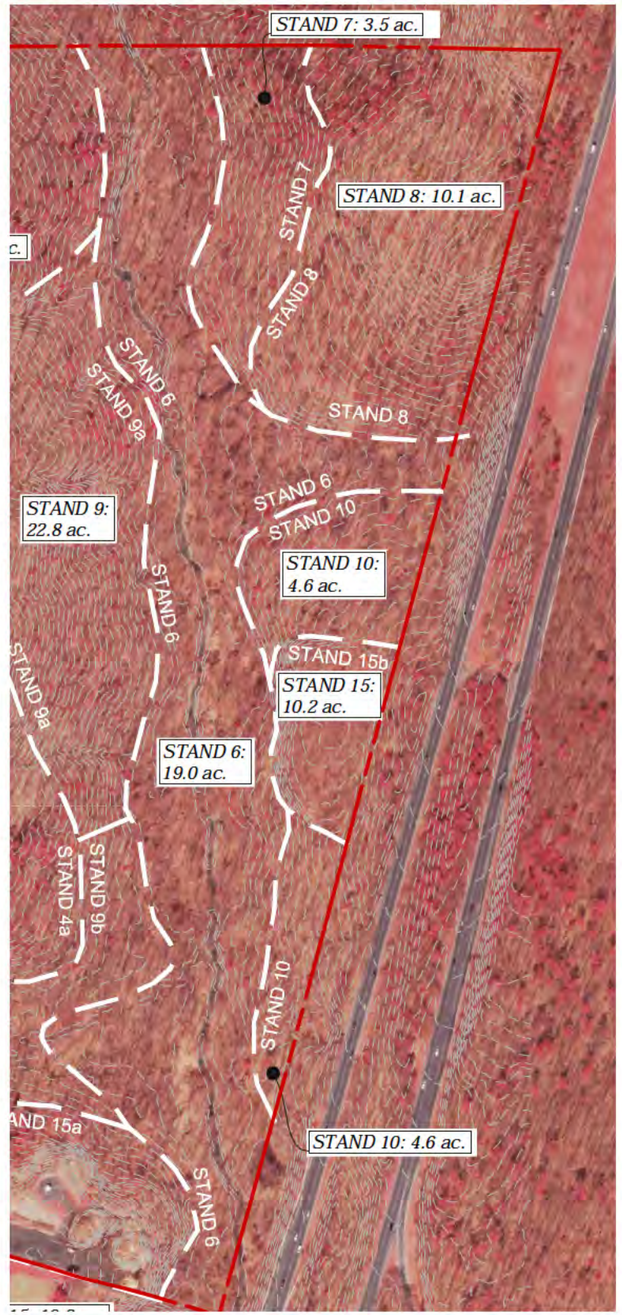


Forest stand boundaries

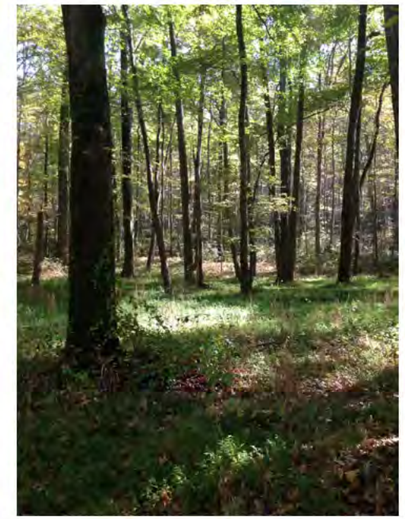
Color photograph



Contours, trails & soil boundaries



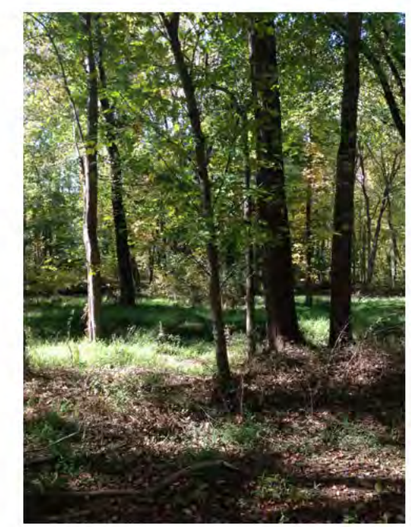
Color infrared photograph



A - This picture is very typical of S6 - *Microstegium vimineum* (Japanese stilt grass) and other invasives cover the floor; *Liquidambar styraciflua* (Sweet gum) and *Acer rubrum* (Red maple) are the most prevalent tree species.

B - Stormwater runoff from impervious upstream development incises stream channels. Stream banks are eroded and sediment carried downstream.

C - Broken fence atop Beaverdam Creek tributary



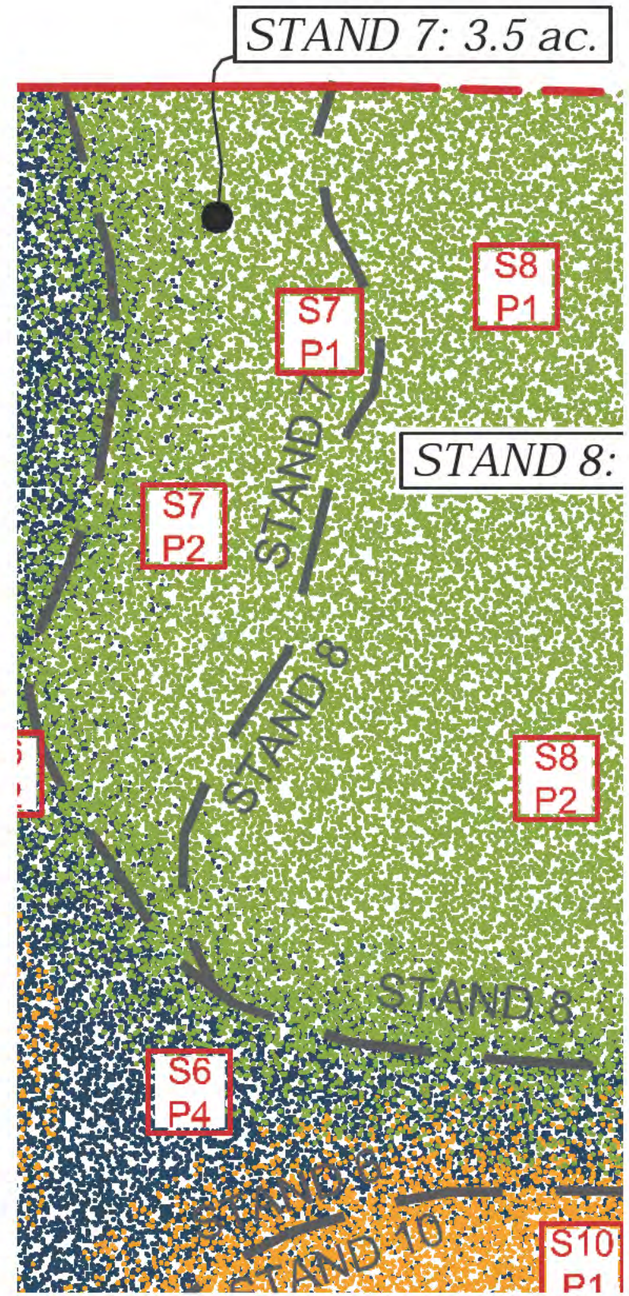
D - Japanese stilt grass covers the floodplain.

FOREST STAND 7:

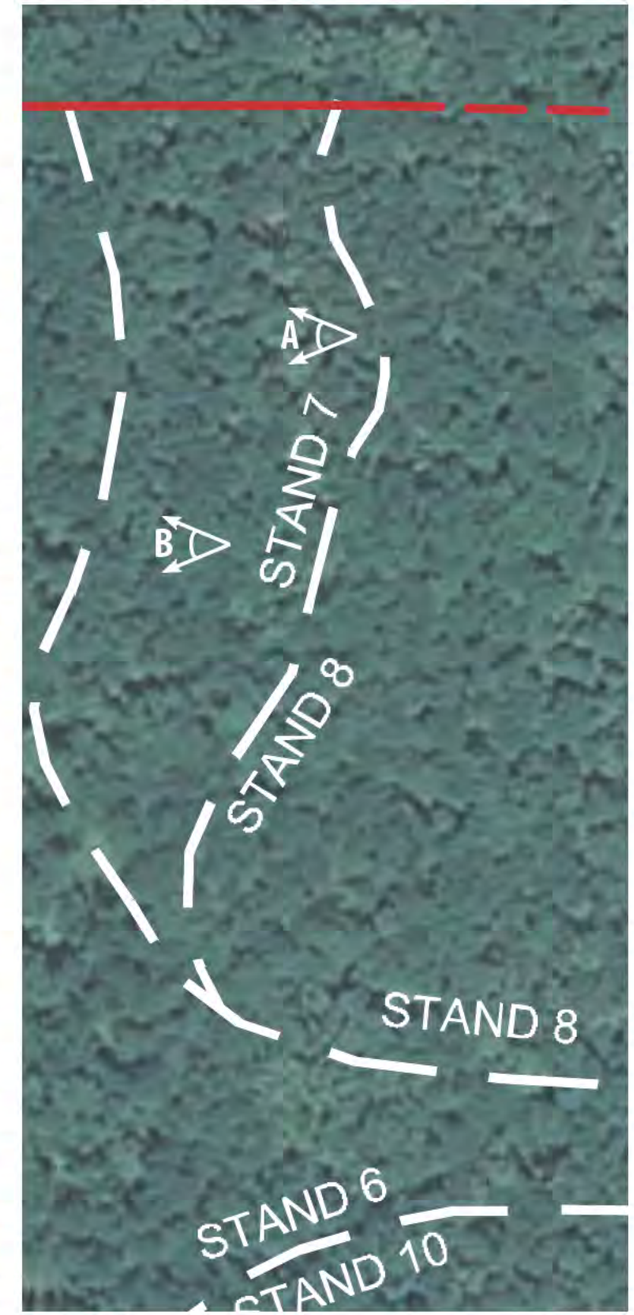
- **Topography:** slopes are primarily <10% or 10-15%; ~5% of this stand includes 15-25% slopes
- **Elevation:** 101' to 133' ± above sea level; upland forest
- **Aspect:** slopes very uniformly to the west
- **Hydrology:** S7 receives runoff from Stand 8. Erosion is not an issue because of high elevations, minimal disturbance and dense canopy/understory/ground-level vegetation. No streams, channels, wetlands, or seeps are present.
- **Historic imagery notes:** n/a
- **FIDS habitat:** Present
- **Abiotic factors:** Very few signs of human disturbance.
- **Invasives:** Very few invasives, despite the proximity to BW Parkway and the highly-invasive S6.
- **Unique habitat notes:** Like S5, S7 is a "transitional stand" between S6 and S8. This area stands in stark contrast to the low species diversity of lowland S6 but not quite as diverse as the upland S8. S7 contains wetland buffers of the wetlands of special state concern.
- **Adjacent uses:** S7 is bound by S6 to the west and S8 to the east.
- **Forest Structure Value:** 42/60

KEY MAP

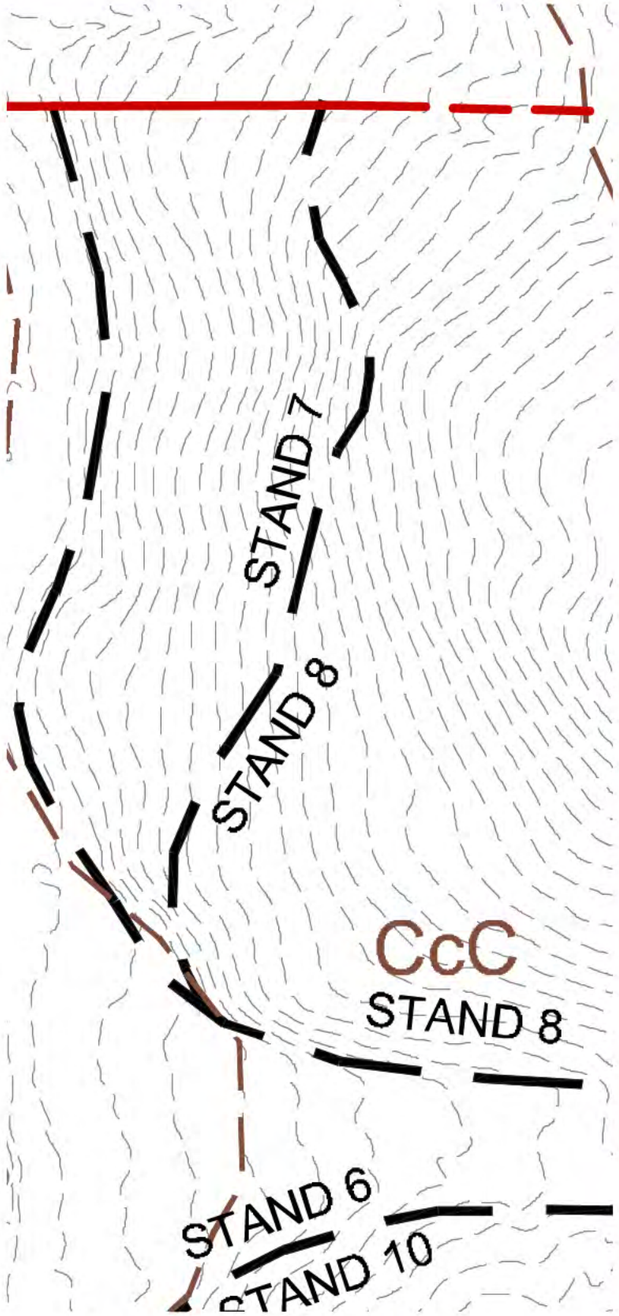
Forest Stand Summary Sheet	
Property Name: *Greenbelt Forest Preserve*	
Location: *Greenbelt, MD*	
Prepared By: *CML*	Date: *2015-10-21*
Stand Variable	**Stand # 7**
1. Dominant species/Codominant species	*Liquidambar styraciflua, Nyssa sylvatica, Pinus virginiana, Quercus alba*
2. Forest Association	*White oak-Red oak association*
3. Successional stage	*Mid-successional upland forest*
4. Basal area in s.f. per acre	*105*
5. Size class of dominant species	*10" – 29.9" dbh*
6. Percent of canopy closure	*60%*
7. Number of tree species	*9*
8. Common understory species	*Quercus rubra, Ilex opaca, Kalmia latifolia, Vaccinium angustifolium, Liriodendron tulipifera, Quercus phellos, Liquidambar styraciflua, Nyssa sylvatica, Quercus prinus*
9. Percent of understory cover 3' to 20' tall	*17%*
10. Number of understory species 3' to 20' tall	*9*
11. Common herbaceous species	*Lycopodium, Mitchella repens*
12. Percent of herbaceous & woody plant cover 0' to 3' tall	*31%*
13. List of major invasive plant species & percent of cover	*Smilax, 12%*
14. Number of standing dead trees 6" dbh or greater (average per plot)	*4*
15. Comments Sheet 1 of 1	-



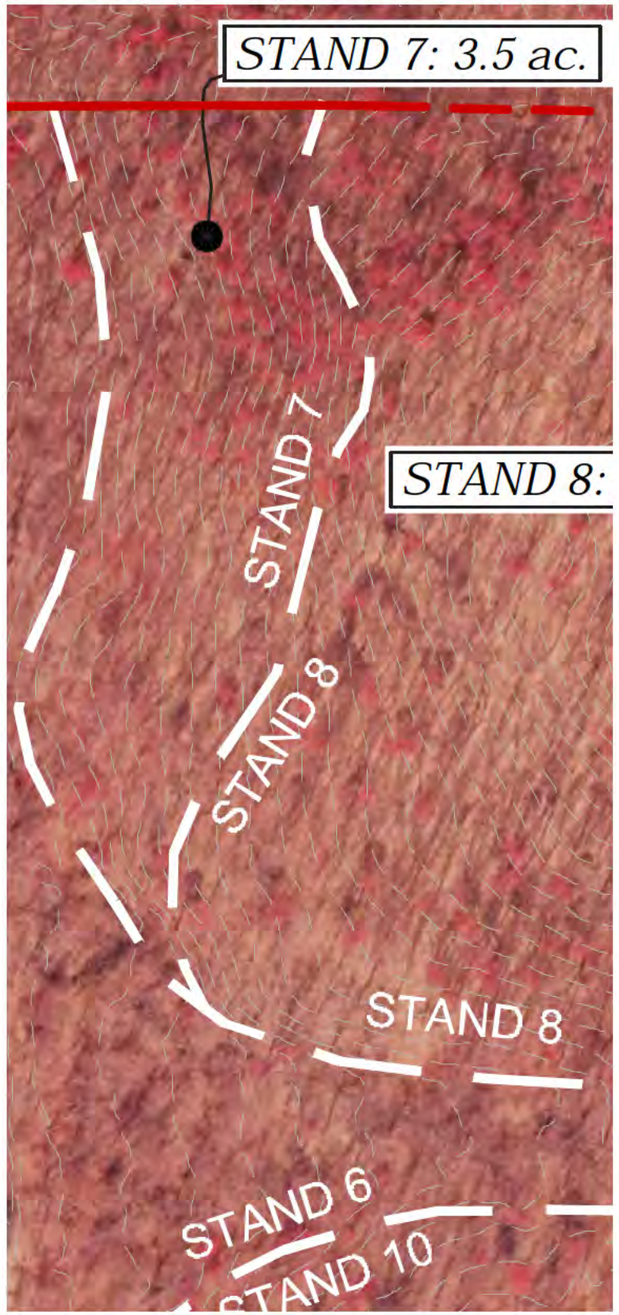
Forest stand boundaries



Color photograph



Contours, trails & soil boundaries



Color infrared photograph

A - Very dense understory of several native species.

B - This picture, looking towards S6, shows the "fuzzy edge" between S6 and S7. Some invasives are creeping up the hill from S6 towards S7. Tree species have changed from Red maple and Sweet gum (in S6) to Oaks and Pines in S7.

FOREST STAND 8:

•**Topography:** like Stand 7, this stand includes fairly consistent slopes, mostly <10% or 10-15%; although rare, 15-25% slopes are also present in this stand
•**Elevation:** 107 to 162' ± above sea level; upland forest
•**Aspect:** slopes mostly uniformly to the west; some south-facing slopes
•**Hydrology:** Erosion is not an issue because of high elevations, minimal disturbance and dense canopy/understory/ground-level vegetation. No streams, channels, wetlands, or seeps are present.
•**Historic imagery notes:** n/a
•**FIDS habitat:** Present
•**Abiotic factors:** trails; maintenance access along BW Parkway ROW fence
•**Invasives:** invasive species (primarily Greenbriar) creeping into S8 from the BW Parkway
•**Unique habitat notes:** Similar to S7; very robust understory of native species; some areas dominated by Oaks (*Quercus sp.*) and Lowbush blueberry (*Vaccinium angustifolium*)
•**Adjacent uses:** S8 is bound by S7 to the west, S6 to the south and the BW Parkway to the east.
•**Forest Structure Value:** 45/60

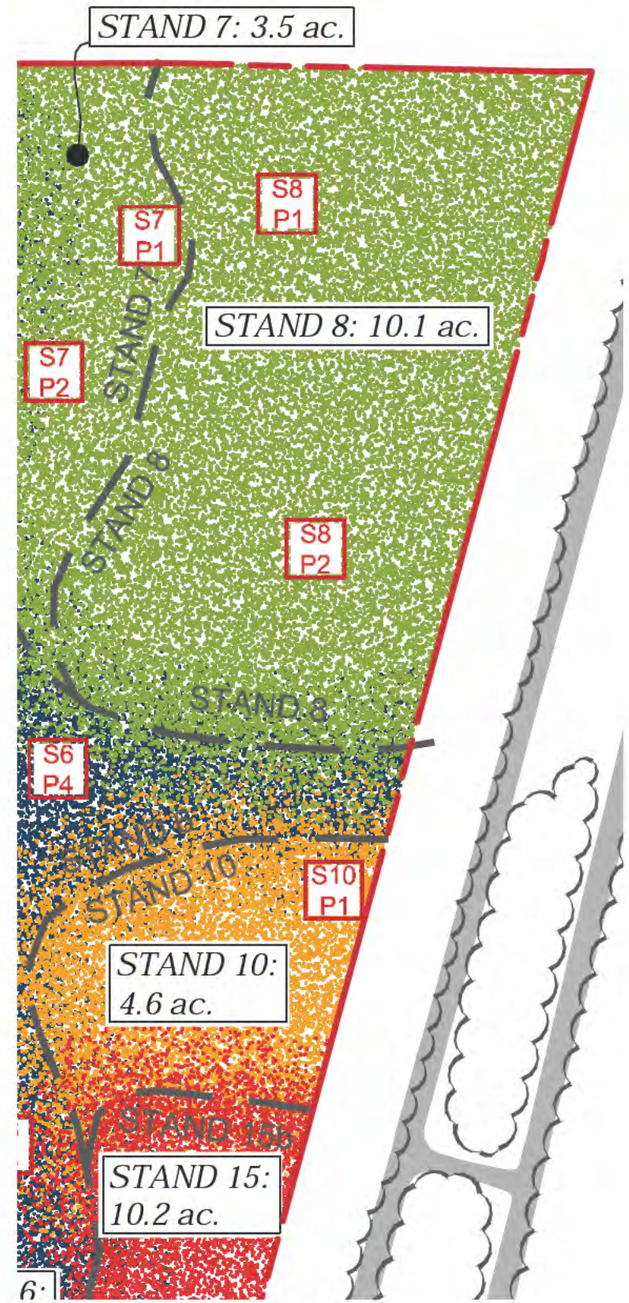
KEY MAP

Forest Stand Summary Sheet

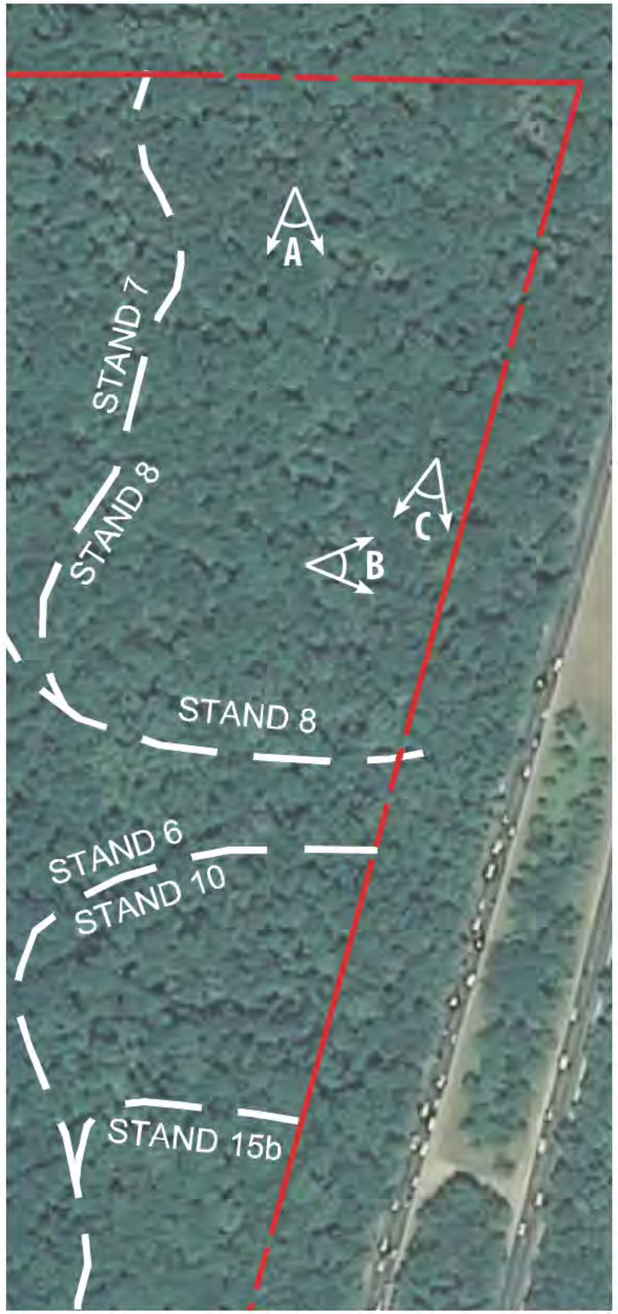
Property Name: *Greenbelt Forest Preserve*
Location: *Greenbelt, MD*

Prepared By: *CML* Date: *2015-10-21*

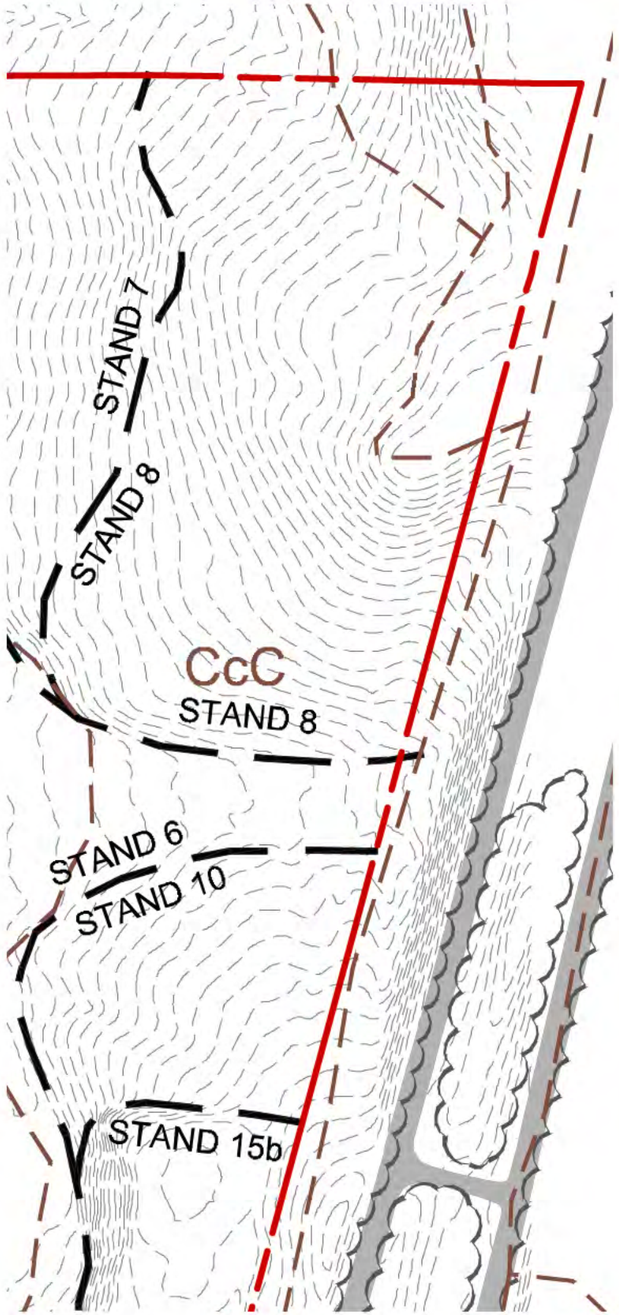
Stand Variable	Stand # 8
1. Dominant species/Codominant species	*Quercus rubra, Quercus alba*
2. Forest Association	*White oak-Red oak association*
3. Successional stage	*Mid-successional upland forest*
4. Basal area in s.f. per acre	*105*
5. Size class of dominant species	*10" – 29.9" dbh*
6. Percent of canopy closure	*77%*
7. Number of tree species	*6*
8. Common understory species	*Vaccinium angustifolium, Quercus alba, Quercus rubra, Liquidambar styraciflua, Sassafras albidium, Quercus prinus, Ilex opaca*
9. Percent of understory cover 3' to 20' tall	*10%*
10. Number of understory species 3' to 20' tall	*7*
11. Common herbaceous species	*Mitchella repens*
12. Percent of herbaceous & woody plant cover 0' to 3' tall	*36%*
13. List of major invasive plant species & percent of cover	*Smilax, 1%*
14. Number of standing dead trees 6" dbh or greater	*1*
15. Comments Sheet 1 of 1	-



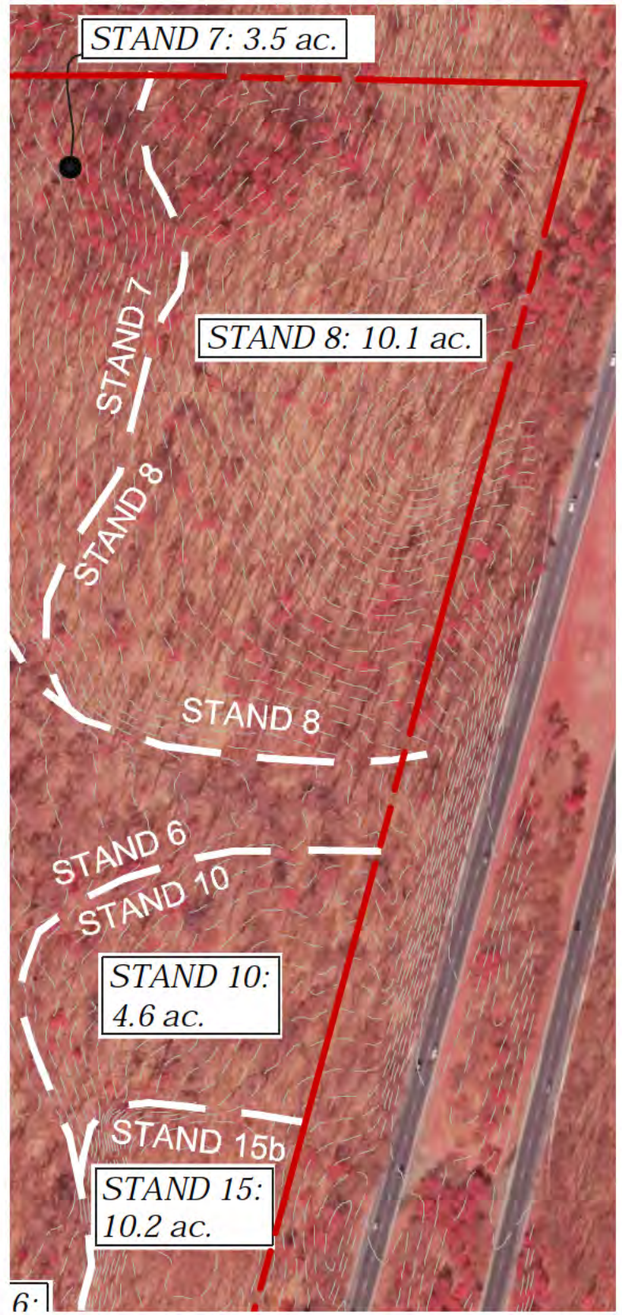
Forest stand boundaries



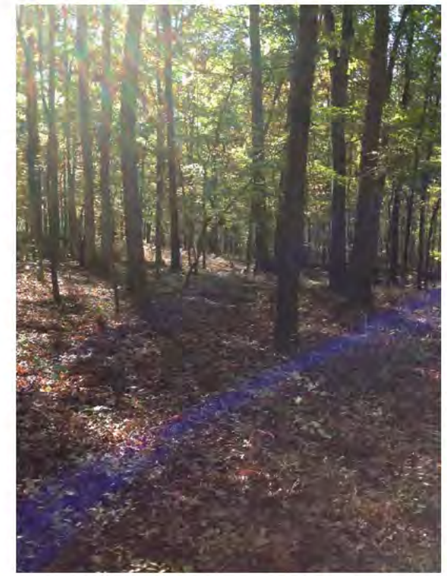
Color photograph



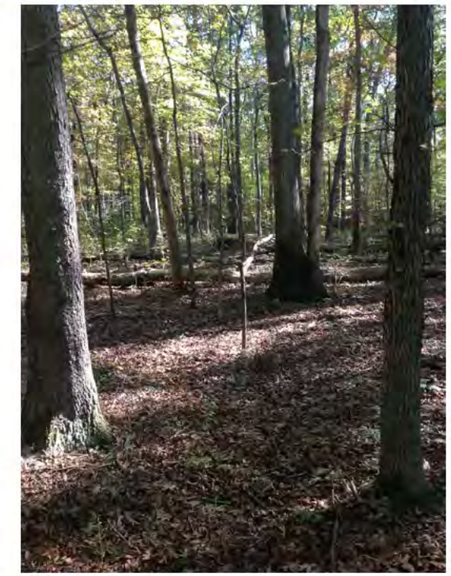
Contours, trails & soil boundaries



Color infrared photograph



A - Stand 8 rises uphill towards the BW Parkway.



B - The understory greenery in the background of the above picture are invasive species encroaching into the preserve from the BW Parkway right-of-way.

C - Access road that parallels the BW Parkway right-of-way.

FOREST STAND 9:

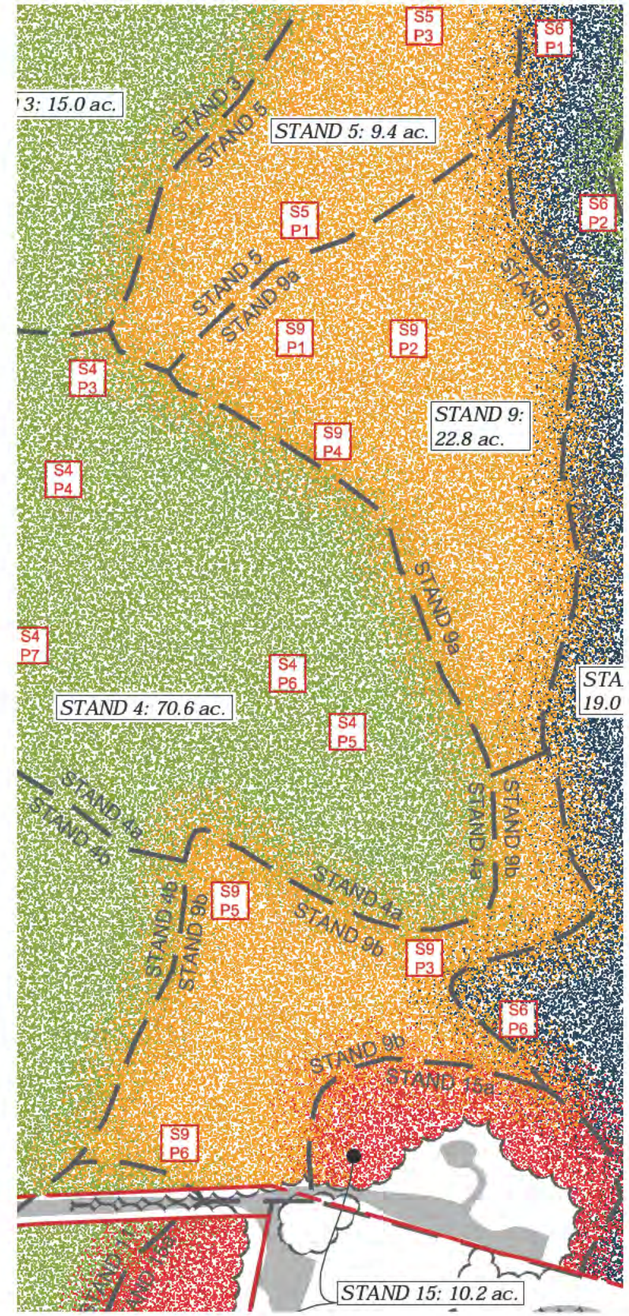
•**Topography:** About 1/3 of Stand 9A is comprised of 15-25% slopes; the remaining 2/3 of Stand 9A include <10% slopes or 10-15% slopes. In the lowlands of Stand 9B, slopes are primarily <10%.
•**Aspect:** Stand 9A slopes very uniformly to the east; the broad bottomland of 9B drains to the east
•**Hydrology:** Stand 9A receives runoff from the Stand 4 ridge. Erosion is not an issue because of high elevations, minimal disturbance and dense canopy/understory/ground-level vegetation. Stand 9B, receives a very large drainage area, but like 9A, includes well-established vegetation that manages runoff and reduces erosion. S9 includes several intermittent and ephemeral channels and seeps.
•**Historic imagery notes:** n/a
•**FIDS habitat:** Present
•**Abiotic factors:** trails, foot bridge, minor signs of erosion
•**Invasives:** few invasives are currently present (the highest abundance of invasives currently within S9 are near the S9/S6 boundary. However, invasives are threatening to "creep into" S9 from S15, S4 and Northway.
•**Unique habitat notes:** S9 represents a vegetation transitional area between S4 (to the north and west) and S6 (to the east). The change in topography also defines S9 from the upland S4 and lowland S6. While S9B and S6, as well as S9A and S4, are similar in terms of topography/elevation, their differences in vegetation discern each stand from the other. The majority of S9 was quite dry during the time of assessment. S9B includes an abundance of Sweet gum and Red maple; S9A includes a higher abundance of Oaks and Tulip poplar. Spicebush is prevalent near the S9/S6 border.
•**Adjacent uses:** S9 is bound by S5 to the north; S4 to the west; S11 and S15 to the south; and S6 to the east
•**Forest Structure Value:** 44/60

Forest Stand Summary Sheet

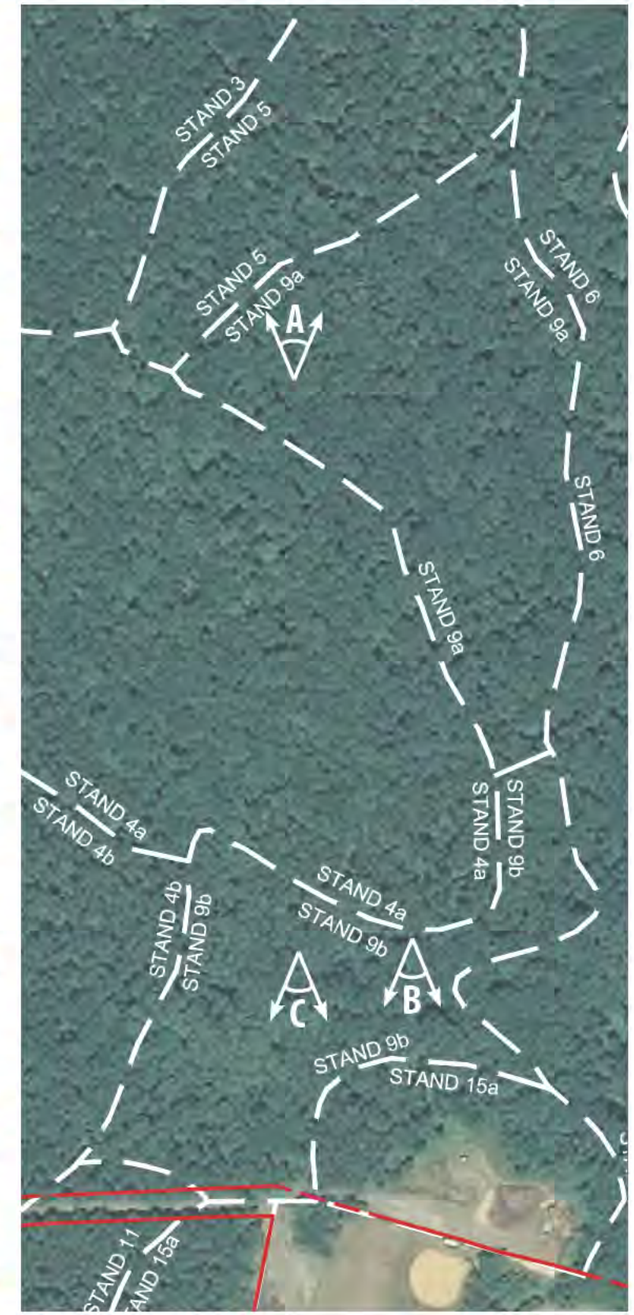
Property Name: *Greenbelt Forest Preserve*
Location: *Greenbelt, MD*

Prepared By: *CML* Date: *2015-10-21*

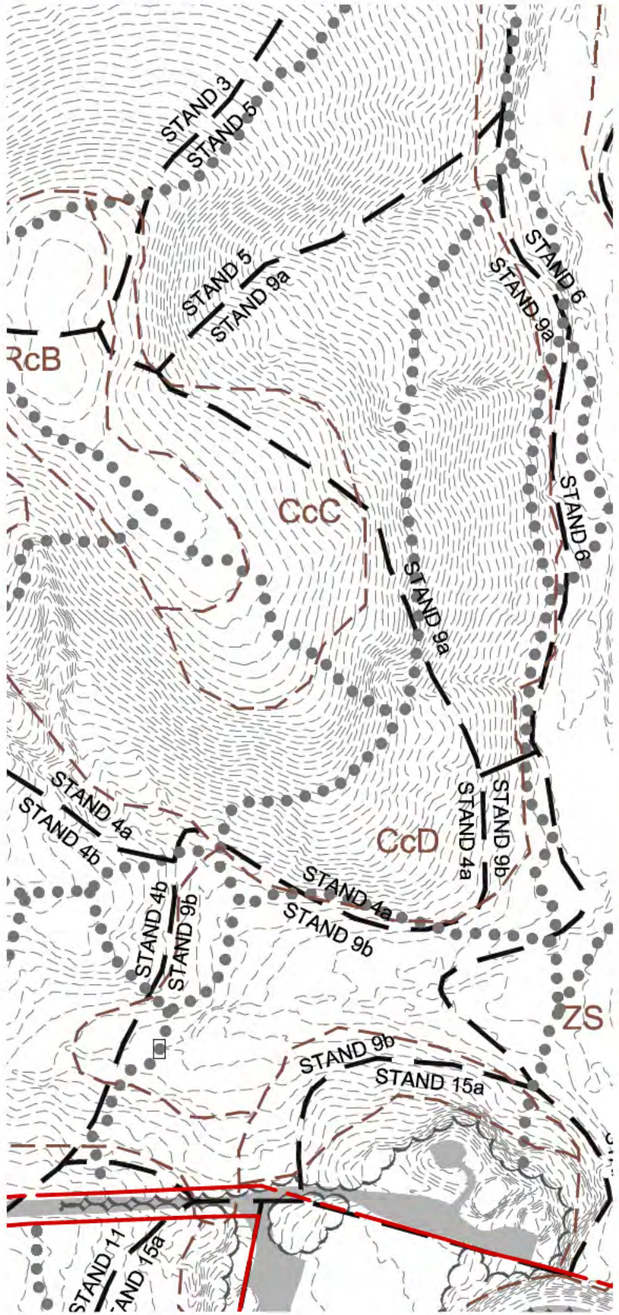
Stand Variable	Stand # 9
1. Dominant species/Codominant species	*Liriodendron tulipifera, Quercus alba, Quercus rubra, Liquidambar styraciflua*
2. Forest Association	*Tulip poplar*
3. Successional stage	*Mid-succesional upland/lowland forest*
4. Basal area in s.f. per acre	*107*
5. Size class of dominant species	*18-29.9" dbh*
6. Percent of canopy closure	*74%*
7. Number of tree species	*12*
8. Common understory species	*Quercus alba, Quercus rubra, Quercus phellos, Liquidambar styraciflua, Ilex opaca, Nyssa sylvatica, Carya tomentosa, Carpinus caroliniana, Vaccinium angustifolium, Fagus grandifolia, Acer rubrum, Viburnum dentatum, Kalmia latifolia, Vaccinium corymbosum, Lindera benzoin, Toxicodendron radicans*
9. Percent of understory cover 3' to 20' tall	*28%*
10. Number of understory species 3' to 20' tall	*16*
11. Common herbaceous species	*Lycopodium, Polystichum acrostichoides, Mitchella repens, Fragaria vesca, Dennstaedtia punctilobula*
12. Percent of herbaceous & woody plant cover 0' to 3' tall	*43%*
13. List of major invasive plant species & percent of cover	*Smilax, Microstegium vimineum, Rosa multiflora, 17%*
14. Number of standing dead trees 6" dbh or greater (average per plot)	*1.2*
15. Comments Sheet 1 of 1	*Many young juvenile sweet gum saplings and dense lycopodium floor (P4)* *Although S9 varies significantly in topography, elevation and aspect, species density and other factors remain consistent throughout despite the aforementioned differences*



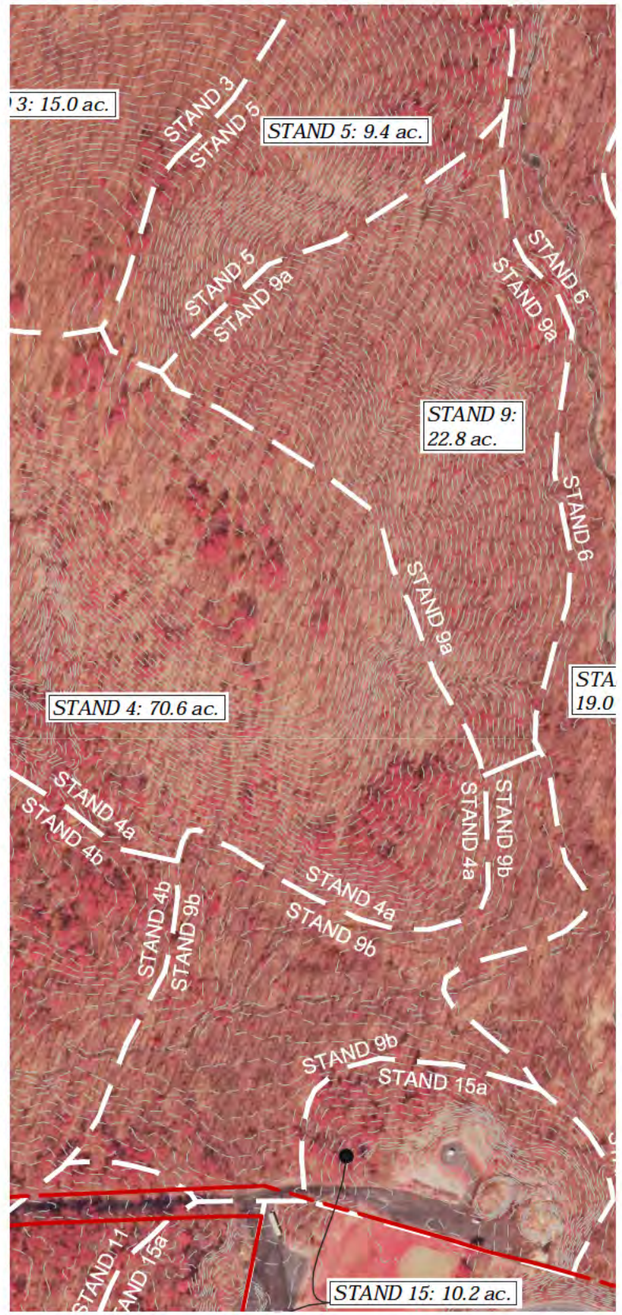
Forest stand boundaries



Color photograph



Contours, trails & soil boundaries



Color infrared photograph

A - *Lycopodium sp.* (ground cedar) on the forest floor.

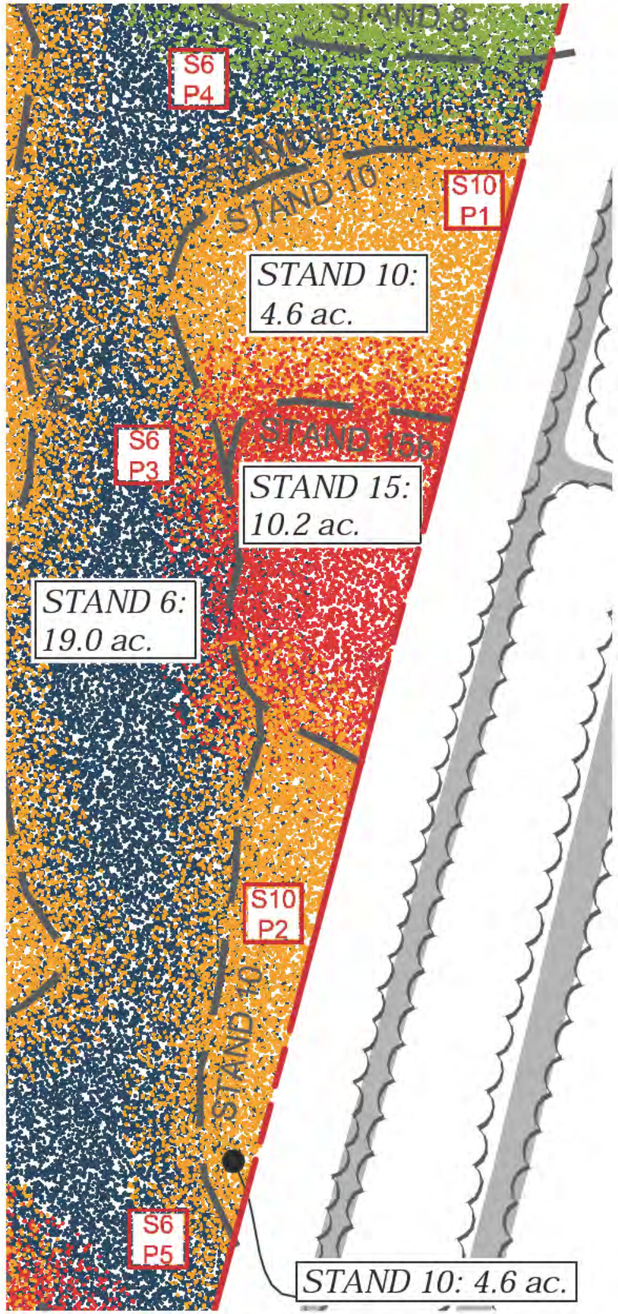
B - S9 includes very flat topography and especially high species diversity in this area. This picture is taken lowland (valley) near the transition between S9 and S6.

C - Bridge over channel in lowland of S9.

FOREST STAND 10:

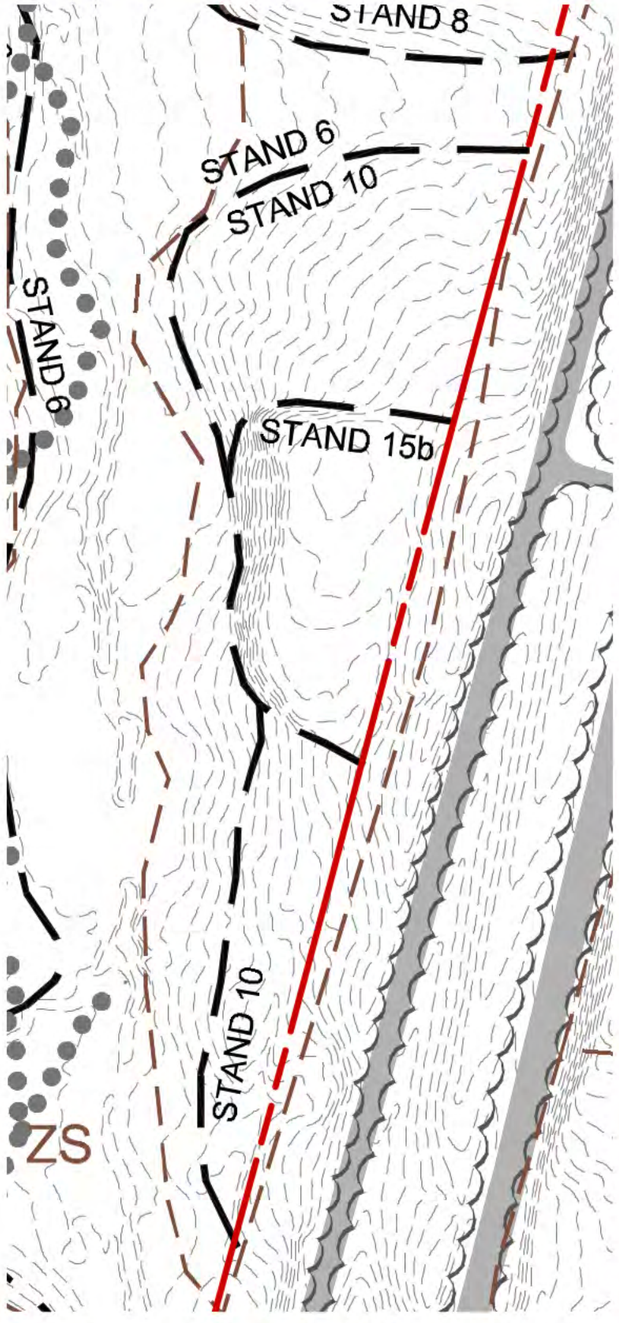
•**Topography:** Primarily <10% or 10-15%; slopes increase to 15-25% near the Stand 15 boundary
•**Elevation:** 110′ to 132′ ± above sea level; upland forest
•**Aspect:** slopes from the high elevations of the adjacent BW Parkway downhill to the west
•**Hydrology:** Erosion is not an issue because of high elevations, minimal disturbance and dense canopy/understory/ground-level vegetation. No streams, channels, wetlands, or seeps are present.
•**Historic imagery notes:** The dark gray color in the 1938 color indicates older trees and more extensive canopy coverage than adjacent stands. This corresponds to the field-delineated stand line.
•**FIDS habitat:** Not present
•**Abiotic factors:** Trash from BW Parkway, mass land grading disturbances from adjacent BW Parkway construction stockpile/staging area within S15. Maintained fenceline along BW Parkway right-of-way.
•**Invasives:** The current presence of invasive species (Japanese stilt grass, *Smilax sp.*) in S10 was likely exacerbated by the construction of the BW Parkway and its construction stockpile/staging area, which includes *Rosa multiflora*, *Microstegium vimineum*, *Berberis thungbergii*, and *Ailanthus altissima*, among others. These invasive species will continue to spread into S10. Japanese stilt grass likely also spread into S10 from S6.
•**Unique habitat notes:** S10 is bisected into a northern section and a southern section by S15. Prior to the construction of the BW Parkway, S10 likely continued along the higher elevations east of S6 to include present-day S10 and S15. This is evidenced by the similar species/forest composition on S10 north and south of S15.
•**Adjacent uses:** S10 is bounded by S6 to the west and south, S15 to the north, and the BW Parkway to the east.
•**Forest Structure Value:** 44/60

Forest Stand Summary Sheet	
Property Name: *Greenbelt Forest Preserve* Location: *Greenbelt, MD* Prepared By: *CML* Date: *2015-10-23*	
Stand Variable	**Stand # *10***
1. Dominant species/Codominant species	***Liriodendron tulipifera, Acer rubrum, Liquidambar styraciflua, Nyssa sylvatica, Pinus virginiana***
2. Forest Association	***Tulip Poplar***
3. Successional stage	***Mid-successional upland forest***
4. Basal area in s.f. per acre	***90***
5. Size class of dominant species	***18-29.9" dbh***
6. Percent of canopy closure	***71%***
7. Number of tree species	***11***
8. Common understory species	***Quercus alba, Quercus rubra, Quercus phellos, Vaccinium angustifolium, Sassafras albidum, Ilex opaca, Kalmia latifolia, Viburnum dentatum, Carpinus caroliniana, Betula nigra, Sassafras albidum***
9. Percent of understory cover 3' to 20' tall	***30%***
10. Number of understory species 3' to 20' tall	***11***
11. Common herbaceous species	***Mitchella repens, Lycopodium***
12. Common herbaceous & woody plant cover 0' to 3' tall	***30%***
13. List of major invasive plant species & percent of cover	***Microstegium vimineum, Smilax, Berberis thunbergii, 14%***
14. Number of standing dead trees 6" dbh or greater (average per plot)	***1.5***
15. Comments Sheet 1 of 1	-

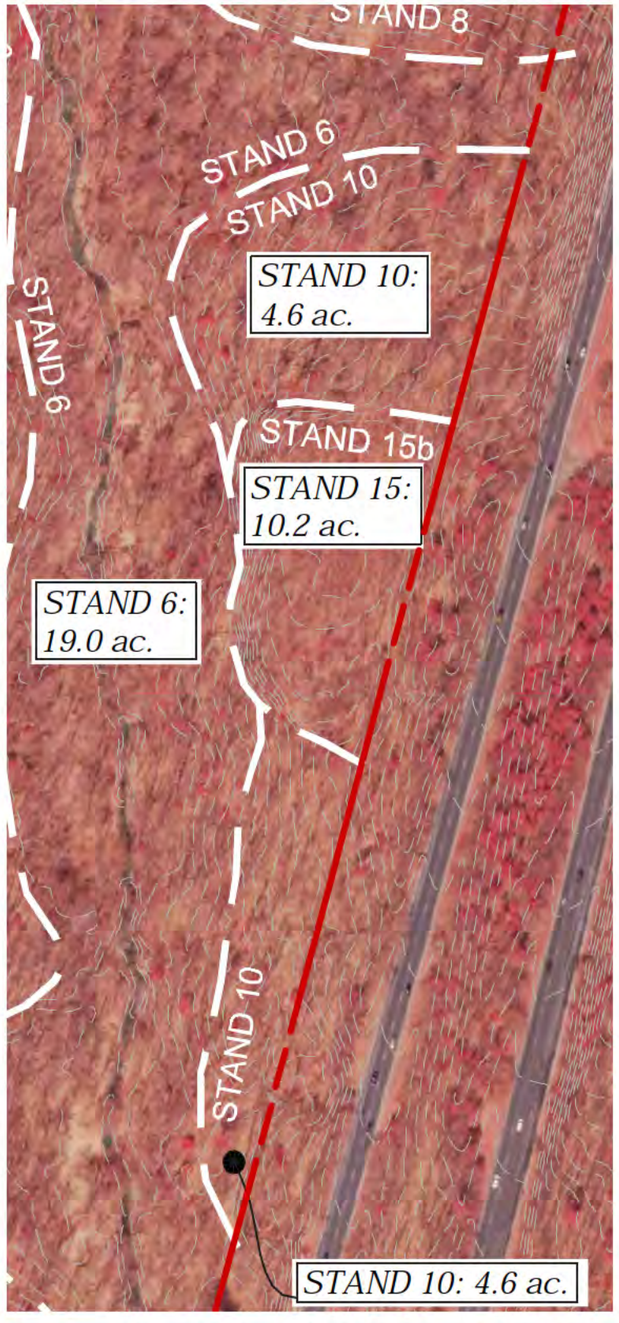


Forest stand boundaries

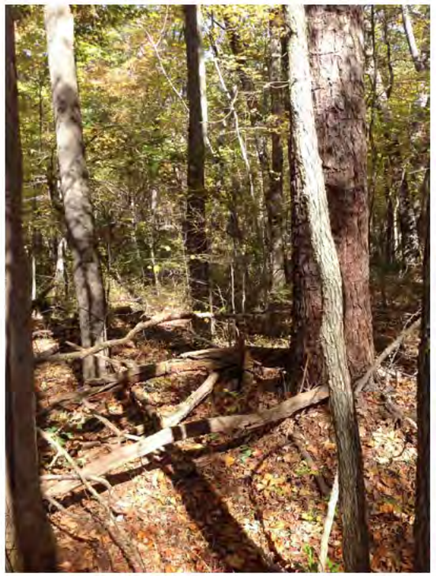
Color photograph



Contours, trails & soil boundaries



Color infrared photograph



A - Invasives are prevalent at this stand, partly because of the stand's proximity to the BW Parkway. Coniferous trees are also in abundance here.

B - This sample plot location was previously "connected" to S10P1. However, a construction staging area was established during the the construction of the BW Parkway. This staging area included mass grading and clearing and eventually became the highly disturbed S15. As a result, S10P1 and S10P2 are physically separated but are otherwise quite similar in structure, health, species and the like.

FOREST STAND 11:

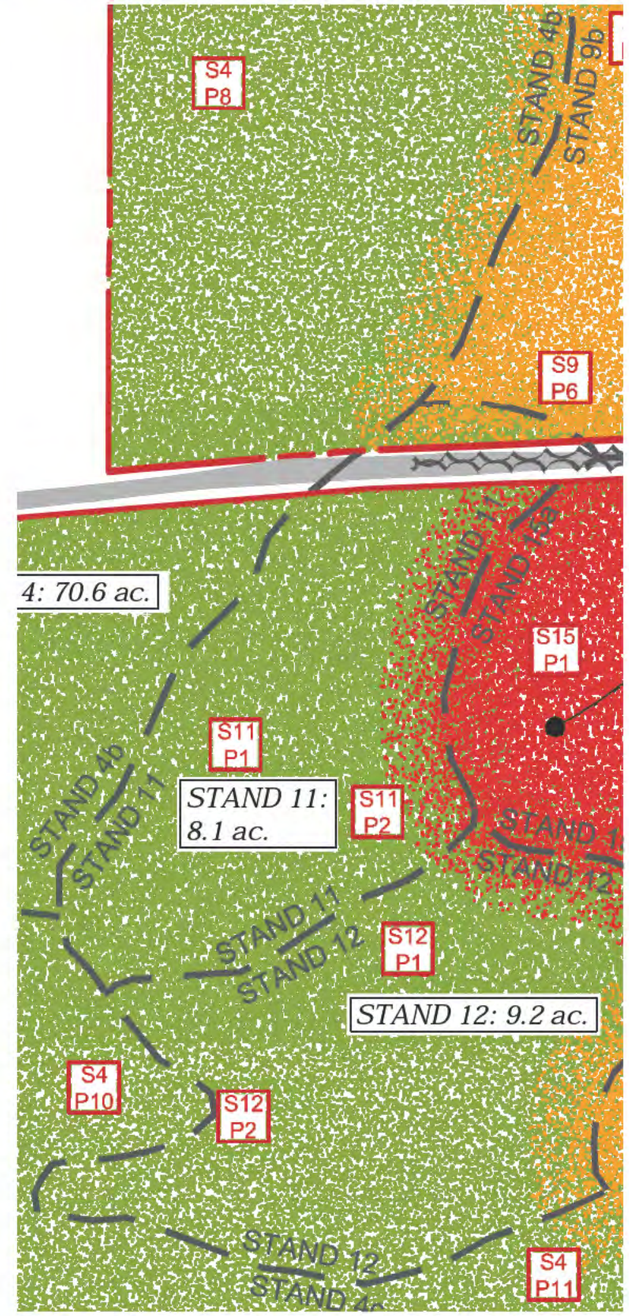
- **Topography:** primarily <10%
- **Elevation:** 130′ to 178′ ± above sea level; upland forest
- **Aspect:** slopes primarily to the NE
- **Hydrology:** S11 receives runoff from the Stand 4. Erosion is not an issue because of high elevations, minimal disturbance and dense canopy/understory/ground-level vegetation. No streams, channels, wetlands, or seeps are present.
- **Historic imagery notes:** The 1938 photo reveals an old road which eventually transformed into a walking trail that is still present today.
- **FIDS habitat:** Present
- **Abiotic factors:** n/a
- **Invasives:** *Smilax, Berberis thungbergii, Rosa multiflora* are creeping into S11 from forest edge associated with Northway Road.
- **Unique habitat notes:** S11 is defined by an abundance of native coniferous tree species that distinguish the stand against the deciduous dominated surrounded stands. Stand also contains a slightly eroded channel that drains to the north, towards Northway Road (this channel was dry during time of assessment).
- **Adjacent uses:** S11 is bound by S9 to the north, S4 to the west, S15 to the east, and S12 to the south.
- **Forest Structure Value:** 45/60

Forest Stand Summary Sheet

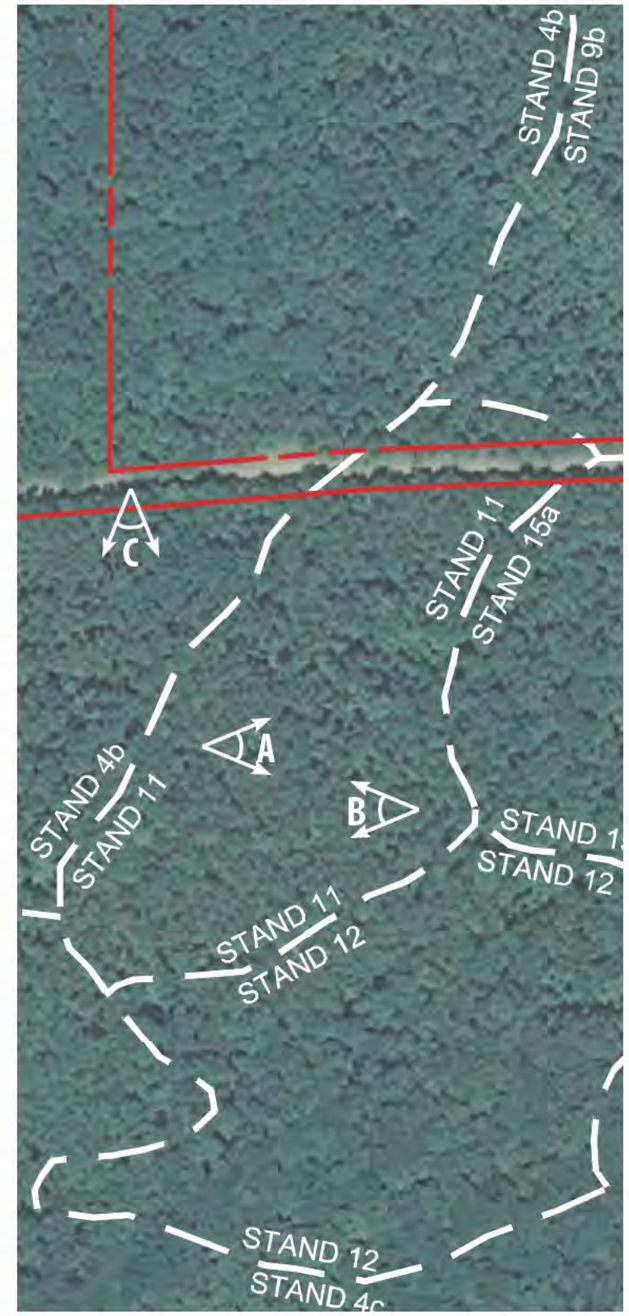
Property Name: *Greenbelt Forest Preserve*
Location: *Greenbelt, MD*

Prepared By: *CML* Date: *2015-10-30*

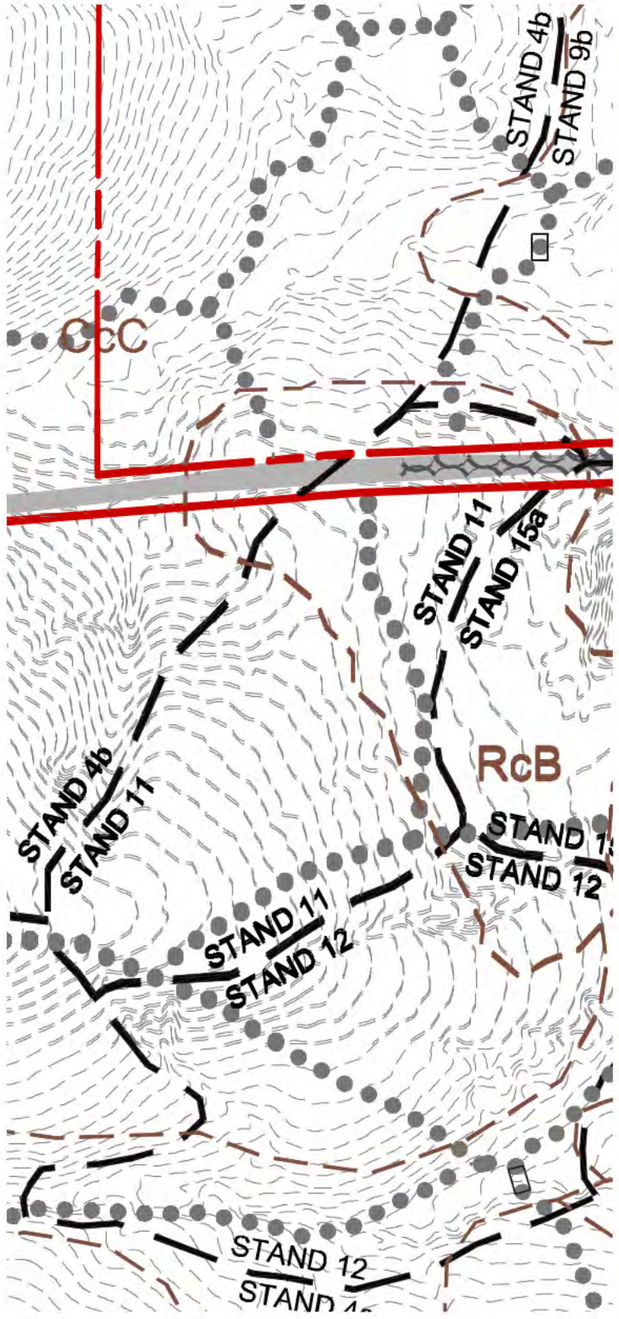
Stand Variable	Stand # *11*
1. Dominant species/Codominant species	*Pinus virginiana*
2. Forest Association	*White oak-Red oak association*
3. Successional stage	*Mid-successional upland forest*
4. Basal area in s.f. per acre	*145*
5. Size class of dominant species	*18-29.9" dbh*
6. Percent of canopy closure	*58%*
7. Number of tree species	*8*
8. Common understory species	*Liquidambar styraciflua, Ilex opaca, Quercus rubra, Quercus phellos, Vaccinium angustifolium, Carpinus caroliniana, Quercus alba, Toxicodendron radicans*
9. Percent of understory cover 3' to 20' tall	*26%*
10. Number of understory species 3' to 20' tall	*8*
11. Common herbaceous species	*Lycopodium*
12. Common herbaceous & woody plant cover 0' to 3' tall	*42%*
13. List of major invasive plant species & percent of cover	*Smilax, Rosa multiflora, 32%*
14. Number of standing dead trees 6" dbh or greater (average per plot)	*1*
15. Comments Sheet 1 of 1	-



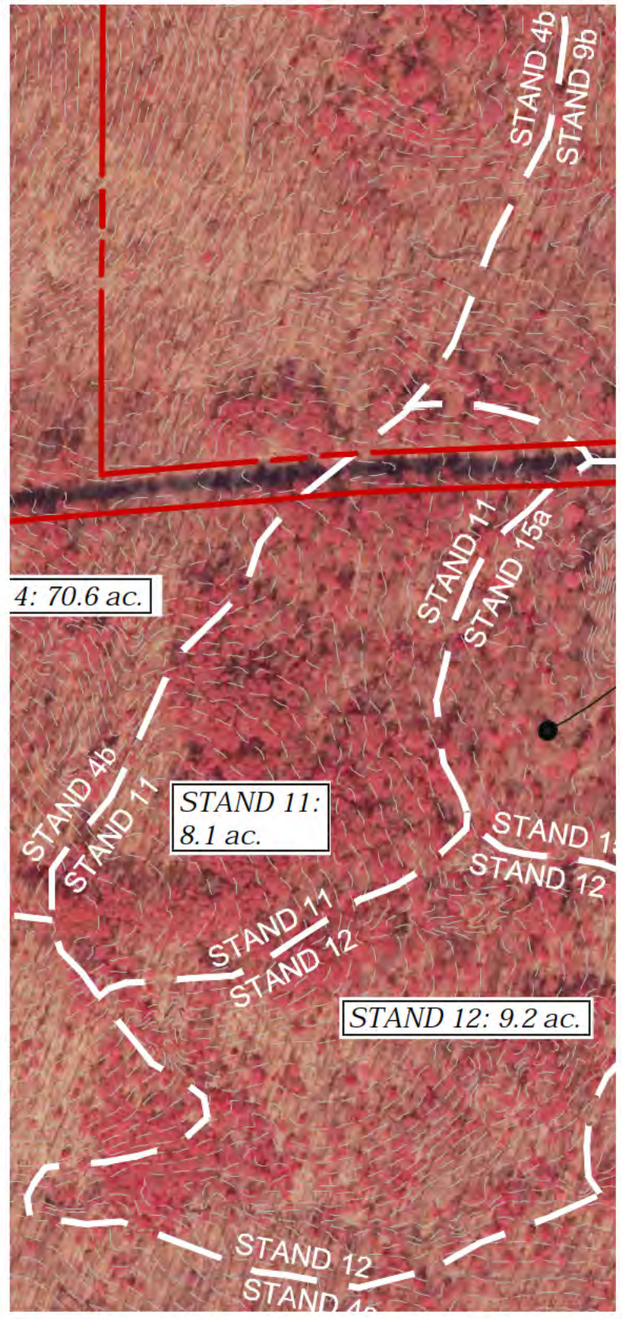
Forest stand boundaries



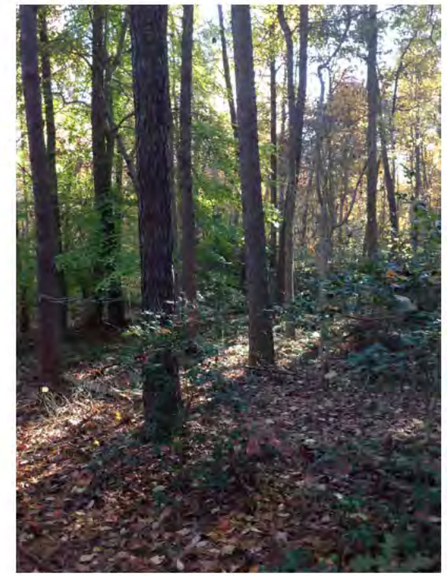
Color photograph



Contours, trails & soil boundaries



Color infrared photograph



A - This stand is characterized by an abundance of coniferous trees, as indicated by the infrared photograph and verified in the field.

B - As with most stands near areas of prior human disturbance, this stand includes some areas with a forest floor covered in invasive species.

C - This photo, actually taken within Stand 4, is indicative of Northway's typical roadside condition within Stand 11. The roadside ditch isn't stabilized with vegetation, which otherwise would provide erosion control and runoff control.

FOREST STAND 12:

KEY MAP

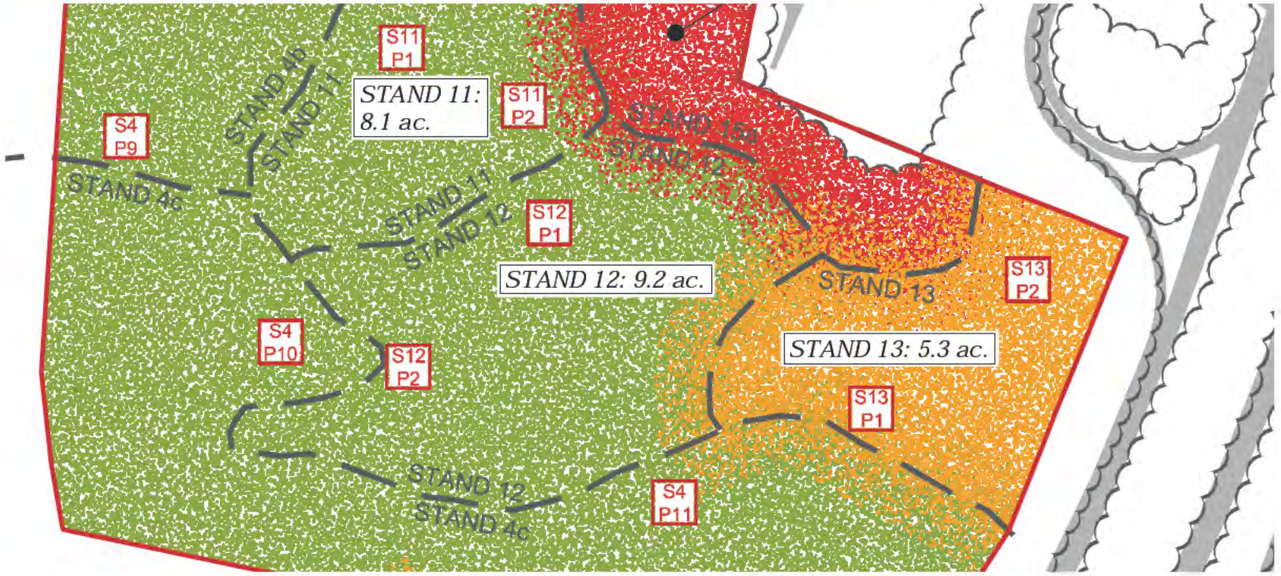
- **Topography:** at the higher elevations of this stand, slopes are <10% or 10-15%; due to erosion, some drainage channels include eroded banks with 15-25% slope or slopes that exceed 25%
- **Elevation:** 125' to 168' ± above sea level; upland forest
- **Aspect:** higher elevations within this stand are east- or southeast-facing slopes; lower elevations, including drainage channels drain to the east
- **Hydrology:** Erosion issues associated with impervious runoff coming from Ridge Road. Runoff from Hamilton Place may also be contributing to erosion of low-lying valleys. S12 includes several ephemeral channels.
- **Historic imagery notes:** n/a
- **FIDS habitat:** Present
- **Abiotic factors:** Several eroded areas likely caused by this area's agricultural past; two distinct piles of trash within one such eroded area
- **Invasives:** This interior stand does not include an abundance of invasive species.
- **Unique habitat notes:** Stand is defined by a dense understory created by *Ilex opaca* and dense canopy coverage provided by *Quercus sp.* Previously eroded areas are stabilized by dense native vegetation and create interested "micro-habitats."
- **Adjacent uses:** S12 is bound by S11 and S15 to the north, S4 to the west and south and S13 to the east.
- **Forest Structure Value:** 44/60

Forest Stand Summary Sheet

Property Name: *Greenbelt Forest Preserve*
Location: *Greenbelt, MD*

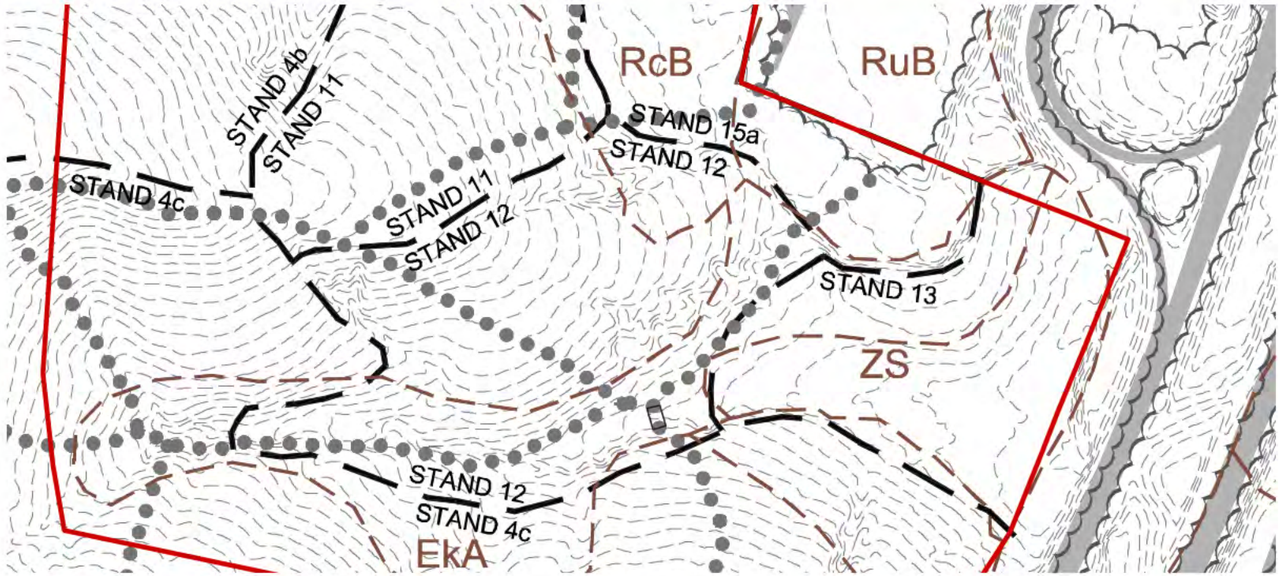
Prepared By: *CML* Date: *2015-10-30*

Stand Variable	Stand # 12
1. Dominant species/Codominant species	*Pinus virginiana, Quercus alba, Quercus rubra*
2. Forest Association	*White oak-Red oak association*
3. Successional stage	*Mid-successional upland forest*
4. Basal area in s.f. per acre	*125*
5. Size class of dominant species	*10" - 29.9" dbh*
6. Percent of canopy closure	*74%*
7. Number of tree species	*10*
8. Common understory species	*Sassafras albidum, Quercus rubra, Nyssa sylvatica, Ilex opaca, Quercus alba, Vaccinium angustifolium, Carya tomentosa, Liquidambar styraciflua, Cornus florida, Fagus grandifolia*
9. Percent of understory cover 3' to 20' tall	*55%*
10. Number of understory species 3' to 20' tall	*10*
11. Common herbaceous species	*Lycopodium, Mitchella repens, Dennstaedtia punctilobula*
12. Common herbaceous & woody plant cover 0' to 3' tall	*16%*
13. List of major invasive plant species & percent of cover	*Smilax, 4%*
14. Number of standing dead trees 6" dbh or greater (average per plot)	*1*
15. Comments Sheet 1 of 1	*Dense Ilex opaca understory and Quercus canopy*

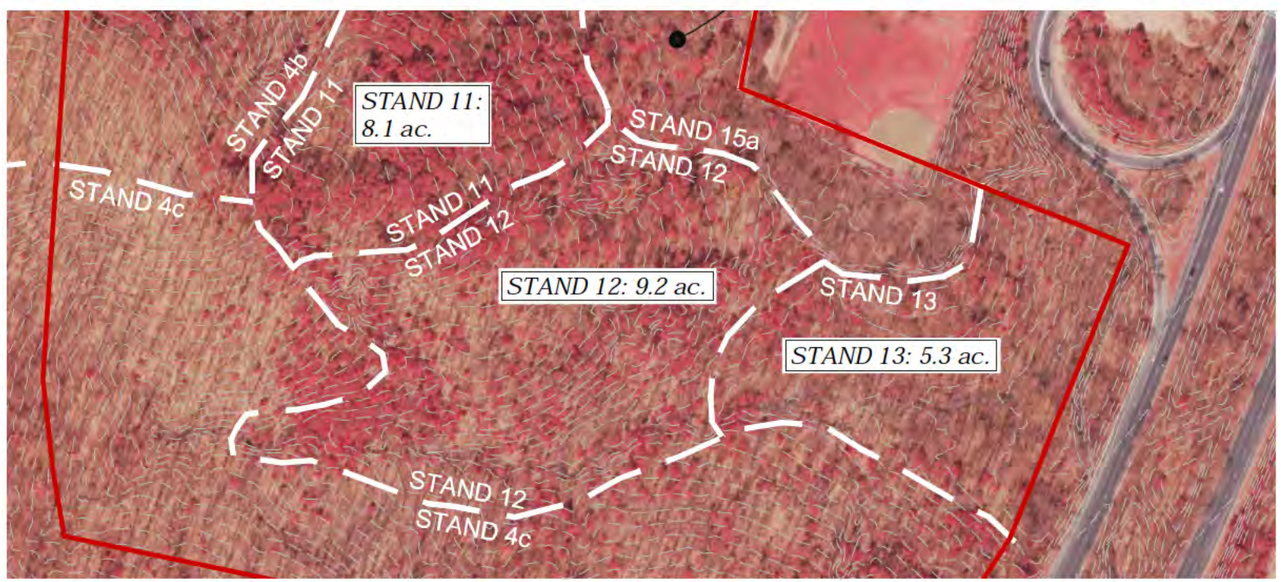


Forest stand boundaries

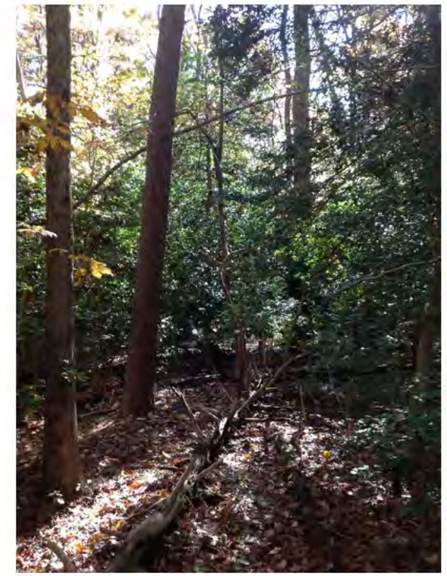
Color photograph



Contours, trails & soil boundaries



Color infrared photograph



A - This stand includes several deep channels that were likely created during/after the area's agricultural past. However, American hollies (*Ilex opaca*) and other conifers have since stabilized such eroded areas.

B - The density of hollies often obscures the presence of eroded channels.

FOREST STAND 13:

KEY MAP

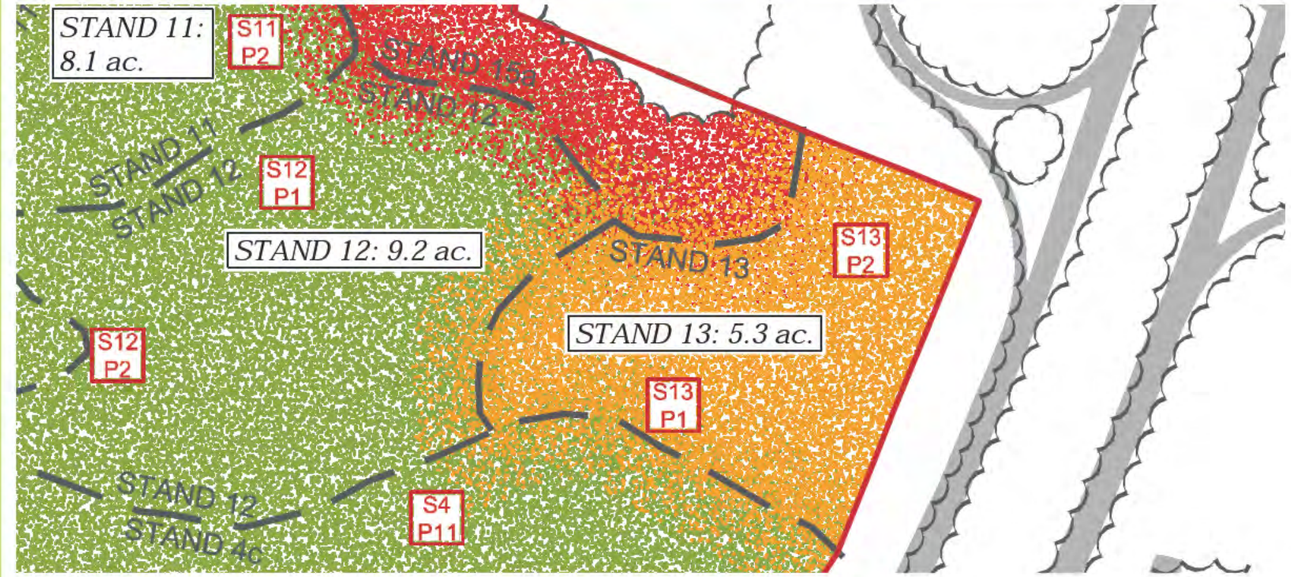
- **Topography:** primarily <10%
- **Elevation:** 110 to 128' ± above sea level; upland/lowland forest
- **Aspect:** broad bottomland area drains to the east
- **Hydrology:** S13's drainage area includes parts of S4, 11, 12, 14, and 15. Runoff drains towards the ephemeral channel running through S13. This channel has a very broad floodplain.
- **Historic imagery notes:** n/a
- **FIDS habitat:** Present
- **Abiotic factors:** BW Parkway right-of-way fence; bank erosion/highly incised channel that parallels the BW Parkway; pile of palettes are present near the S13/S4 boundary.
- **Invasives:** *Ailanthus altissima, Rosa multiflora, Lonicera tatarica, Smilax sp.* are spreading into S13 from the dump site area within S15.
- **Unique habitat notes:** Outstanding habitat of *Lindera benzoin* (Spicebush) in S13's lowland area. Sweet gum, Red maple are also highly prevalent. Very flat bottomland area includes an especially shallow channel that flows from west-east. S13 receives drainage from S4, S11, S12, S13, and S14.
- **Adjacent uses:** Bound by S15 and the BW interchange ramp to the north, S12 to the west, S4 to south and the BW Parkway to the east.
- **Forest Structure Value:** 43/60

Forest Stand Summary Sheet

Property Name: *Greenbelt Forest Preserve*
Location: *Greenbelt, MD*

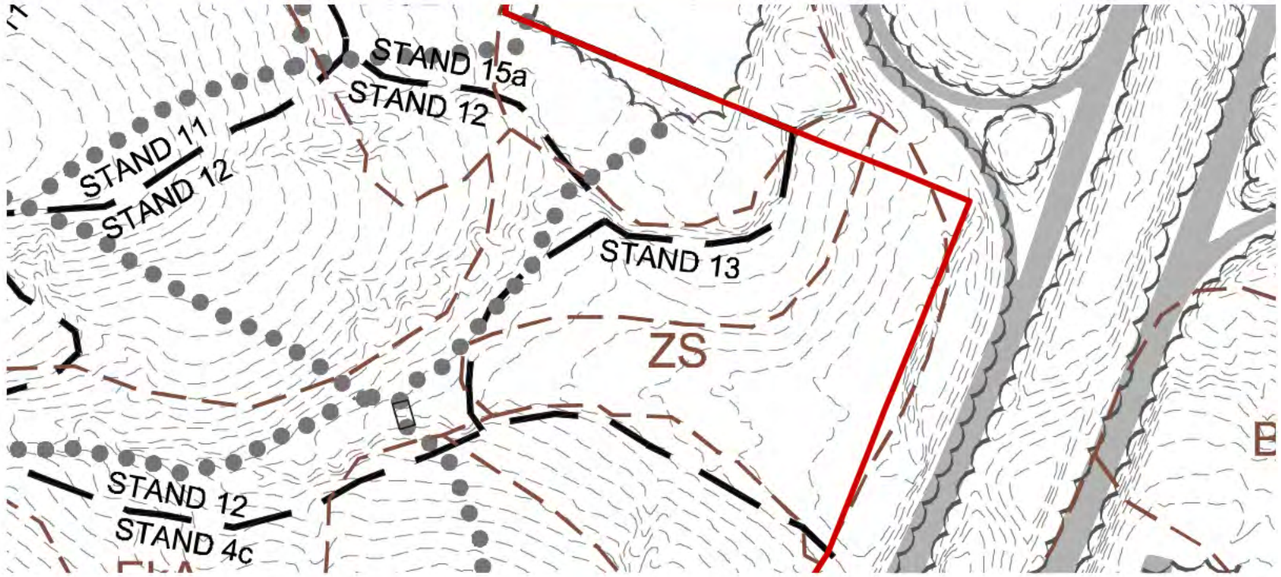
Prepared By: *CML* Date: *2015-10-30*

Stand Variable	Stand # *13*
1. Dominant species/Codominant species	***Acer rubrum, Liquidambar styraciflua***
2. Forest Association	***Tulip Poplar***
3. Successional stage	***Mid-successional upland/lowland forest***
4. Basal area in s.f. per acre	***135***
5. Size class of dominant species	***18-29.9" dbh***
6. Percent of canopy closure	***83%***
7. Number of tree species	***6***
8. Common understory species	***Ilex opaca, Viburnum prunifolium, Lindera benzoin, Toxicodendron radicans***
9. Percent of understory cover 3' to 20' tall	***32%***
10. Number of understory species 3' to 20' tall	***4***
11. Common herbaceous species	***Fragaria vesca, Dennstaedtia punctilobula, Polystichum acrostichoides***
12. Common herbaceous & woody plant cover 0' to 3' tall	***4%***
13. List of major invasive plant species & percent of cover	***Microstegium vimineum, Berberis thunbergii, Smilax, Hedera helix, 12%***
14. Number of standing dead trees 6" dbh or greater (average per plot)	***0.5***
15. Comments Sheet 1 of 1	***Understory is predominantly Lindera benzoin (P1)*** ***Although S13 varies in topography, elevation and aspect, species density and other factors remain consistent throughout despite the aforementioned differences***



Forest stand boundaries

Color photograph



Contours, trails & soil boundaries

Color infrared photograph

A - This bottomland stand includes a dense cover of Spicebush (*Lindera benzoin*) with yellow leaves in the fall. The open sky in the background of this picture is the "break" in the canopy provided by the BW parkway.

B - Several clusters of large trees are present in this stand, here shown in an area slightly uphill from Photo A. The BW Parkway right-of-way chain link is visible in the background of this photograph.

C - An incised channel flows from the Preserve, beneath the chain-link fence and into the BW Parkway right-of-way fence.

FOREST STAND 14:

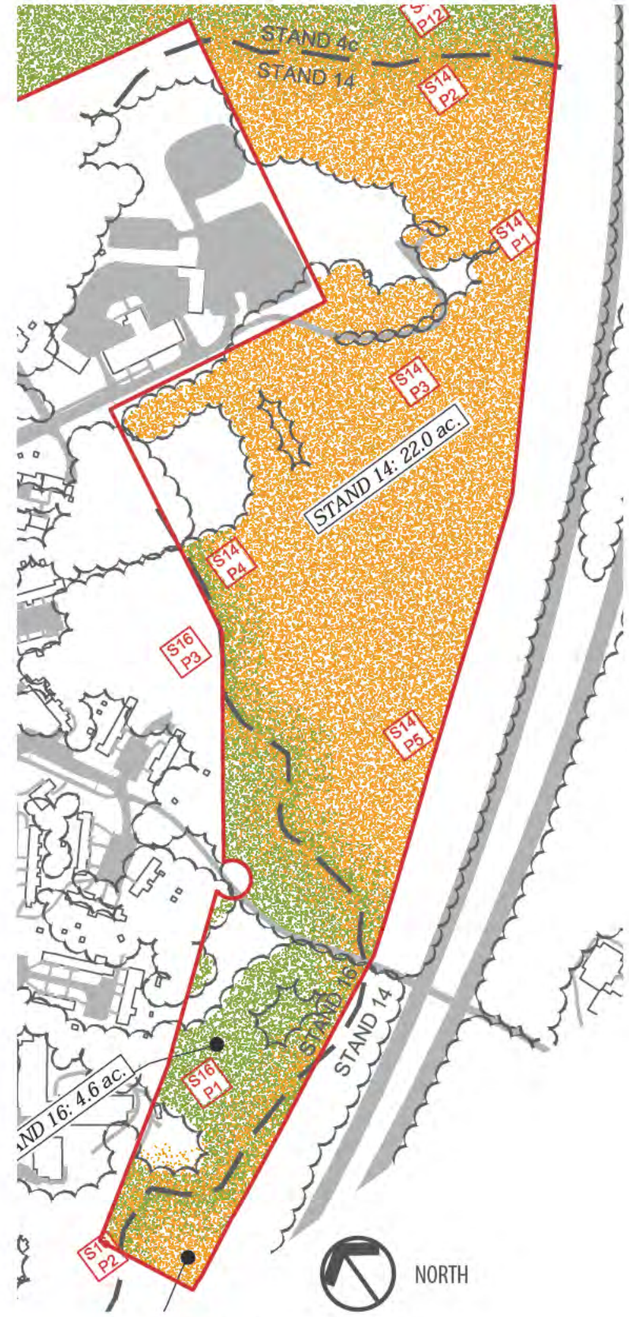
•**Topography:** primarily <10%; some slopes are 10-15% on the south-facing slope immediately south of the community garden area; a drainage channel (draining to a culvert under I-295) includes some slopes 15-25% or >25% due to erosion
•**Elevation:** 150' to 194'± above sea level; upland forest
•**Aspect:** primarily south- or southeast-facing slopes
•**Hydrology:** Although in very close proximity to the community garden, very few signs of erosion are present. A culvert extends beneath the BW Parkway receives water from an intermittent stream. S14 receives drainage from Hamilton Place and the northeast-facing slopes of S16.
•**Historic imagery notes:** The 1938 photo reveals that S14 is almost entirely agriculture. The 1952 photo reveals the abandonment of such agriculture and the resulting coverage of early seral species. Today, S14 is dominated by Sweet gums and Red maples, two species that frequently "pioneer" abandoned fields. A north-south road is visible in the 1938 photograph. This road is obscured by increased canopy coverage in the 1952 photo; however, the "scar" of this road is still visible, both in the 1952 photograph and present day field investigations. Cleared areas in the 1938 photo made was for community gardens by 1952. By 1979, forest succession occurred in some areas south and west of community gardens.
•**FIDS habitat:** Not present
•**Abiotic factors:** Trash associated with the community garden. S14 includes disturbance/evidence associated with a former road (since abandoned), as well as agricultural relics (concrete, farm equipment, rock piles). Highly disturbed stand.
•**Invasives:** Very high abundance of invasive species are spreading into S14 as a result of the forest edge condition created by the community garden. Areas further away from the community garden (to the north) are less impacted by invasive species. Invasives are also creeping in from the BW Parkway.
•**Unique habitat notes:** North of the community garden and Hamilton Cemetery, the understory is dominated by many young, juvenile Red maples and Sweet gum; some larger Black gum, Oak and Red maple canopy trees, as well. The forest south of the community garden is more diverse and more representative of the species associated with the entirety of the Southern and Northern Preserves (includes Oaks, Red maple, American holly, Sweet gum, and Beech).
•**Adjacent uses:** S14 is bound by S4 to the north, community association buildings to the west, BW Parkway to the E/SE and S16 to the west.
•**Forest Structure Value:** 40/60

Forest Stand Summary Sheet

Property Name: *Greenbelt Forest Preserve*
Location: *Greenbelt, MD*

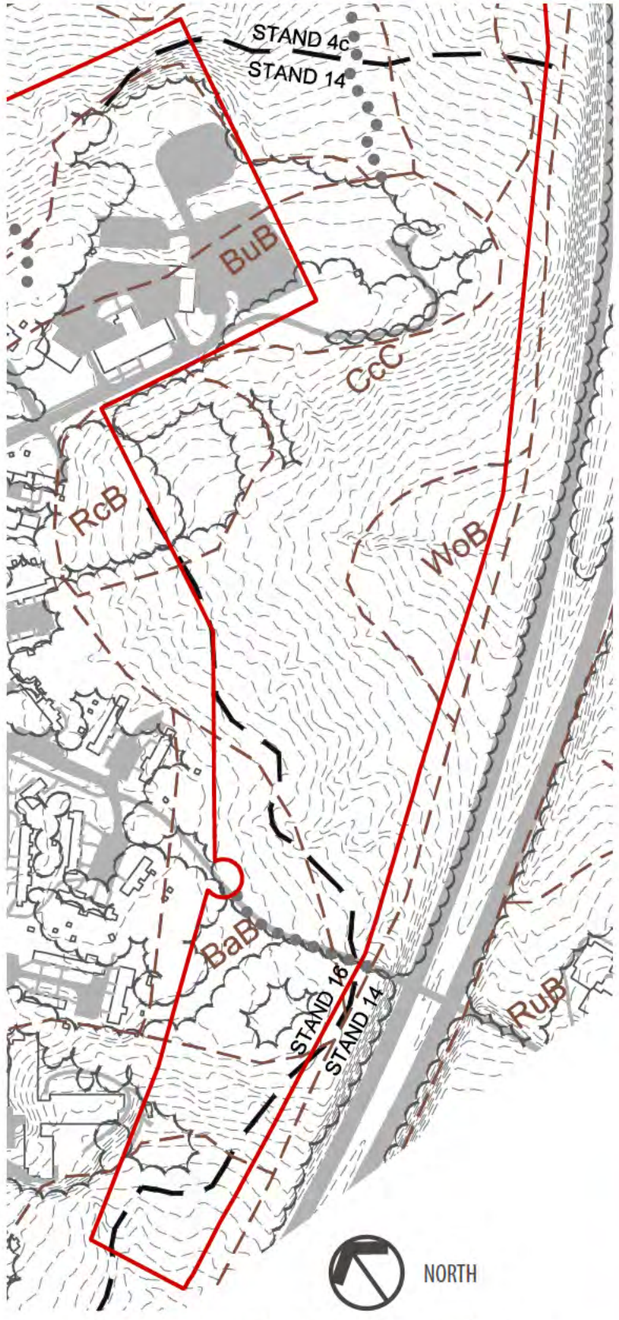
Prepared By: *CML* Date: *October/November 2015*

Stand Variable	**Stand # 14**
1. Dominant species/Codominant species	*Acer rubrum, Liquidambar styraciflua*
2. Forest Association	*Tulip Poplar*
3. Successional stage	*Early/Mid-successional upland forest*
4. Basal area in s.f. per acre	*122*
5. Size class of dominant species	*18-29.9" dbh*
6. Percent of canopy closure	*75%*
7. Number of tree species	*9*
8. Common understory species	*Fagus grandifolia, Prunus serotina, Liquidambar styraciflua, Vaccinium angustifolium, Vaccinium corymbosum, Ilex opaca, Quercus alba, Prunus serotina, Quercus prinus, Quercus rubra, Toxicodendron radicans, Vitis sp.*
9. Percent of understory cover 3' to 20' tall	*10%*
10. Number of understory species 3' to 20' tall	*12*
11. Common herbaceous species	*Allium sp., Mitchella repens*
12. Common herbaceous & woody plant cover 0' to 3' tall	*5%*
13. List of major invasive plant species & percent of cover	*Wisteria, Microstegium vimineum, Berberis thunbergii, Smilax, Rosa multiflora 55%*
14. Number of standing dead trees 6" dbh or greater (average per plot)	*0.8*
15. Comments Sheet 1 of 1	*Area seems highly disturbed. Many small standing trees attribute to a higher basal count; however it appears to be less dense (P3)*



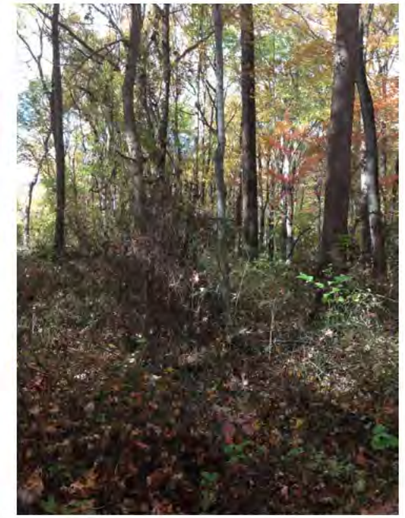
Forest stand boundaries

Color photograph



Contours, trails & soil boundaries

Color infrared photograph



A - Invasive species creep into the preserve after establishing in disturbed areas. Invasive species take advantage of sunlight on the forest floor, provided canopy openings provided by the community garden and the BW parkway.

B - S14 includes several indications of the prior use and the resulting impacts on the landscape. This erosion is located in close proximity to abandoned agricultural relics.

C - The unnatural topography seems to indicate an abandoned road that once ran through this area. Historic aerial photographs confirm the presence of old farm roads.

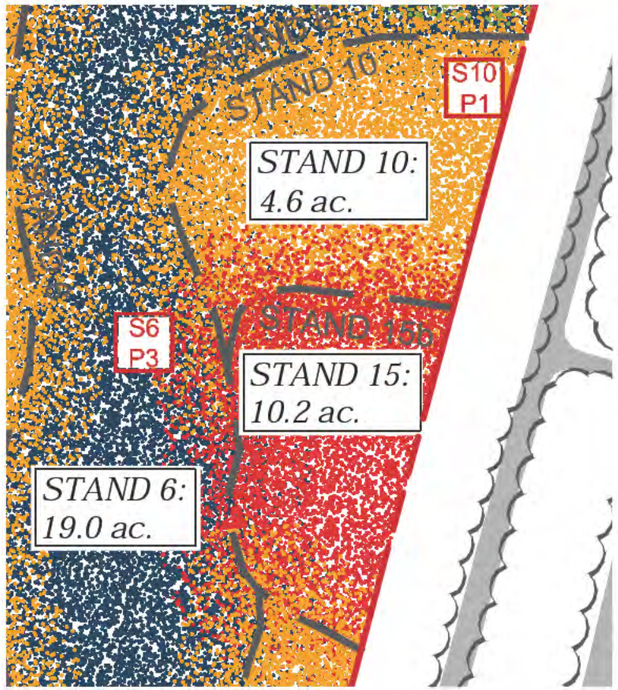
D - Abandoned concrete, metal and tools, in addition to eroded channels, similarly indicate prior uses and human impacts on the landscape. Such insights reveal glimpses into the Preserve's cultural history.

FOREST STAND 15:

KEY MAP

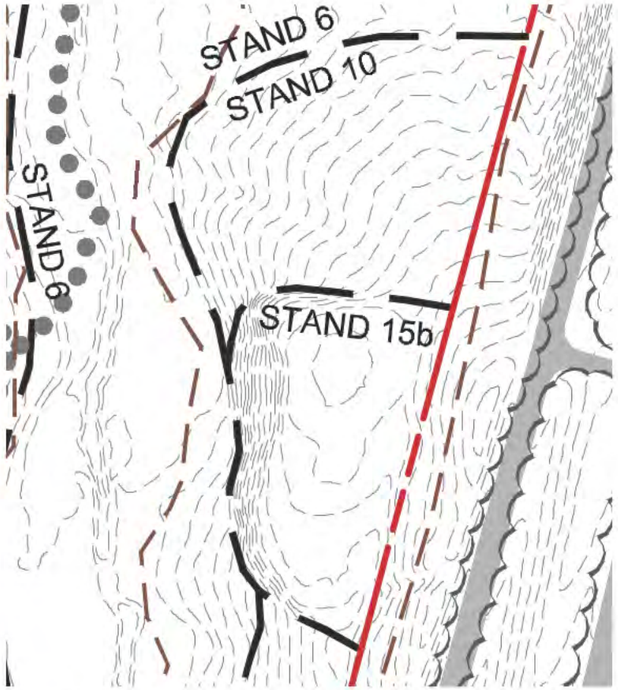
- **Topography:** irregular landforms and highly variable slopes due to destructive nature of prior uses
- **Elevation:** 108 to 154'± above sea level; upland forest
- **Aspect:** irregular landforms and highly variable slopes due to destructive nature of prior uses; western-facing slopes at the BW Parkway construction staging site; north-facing slopes at the composting area; west facing-slopes at the asphalt millings stockpile; south-facing slopes at the trash dump south of the athletic fields
- **Hydrology:** Erosion potential is very high due to the destructive past/present uses. Runoff from the compost pile is particularly harmful for the adjacent channel within S6. Standing water present west of the asphalt millings stockpile. Runoff from the dump site (south of the athletic facility) drains directly into Stand 13. An incised channel is present west of the asphalt millings pile.
- **Historic imagery notes (near I-295 construction stockpile):** S15 in this area is defined by the construction staging/stockpile visible in the 1979 photograph. An access road leads from I-295 to this staging area. A change in forest structure is clearly visible in the 1979 photograph.
- **Historic imagery notes (near present-day compost pile & athletic fields):** Agriculture shown in the 1938 photograph (farm buildings, clearing, farm pond) contributed to highly disturbed areas still evident today. Forest was cleared towards S13, eventually making way for the trash dump pile and a severely disturbed landscape that still exists today. A woodlot is visible in the 1938 photograph (west of the 1938 farm pond), as evidenced by dark gray color. The 1979 photograph reveals forest clearing that would ultimately make way for composting visible in the 2011 photograph. See the following pages for more information.
- **FIDS habitat:** Not present
- **Abiotic factors:** highly disturbed - BW Parkway stockpile/staging area, dump site, abandoned farm pond, erosion, mass grading, BW Parkway fence and maintained edge
- **Invasives:** major abundance of invasives (Green briar, Japanese stilt grass, *Ailanthus altissima, Pyrus calleryana, Hedera helix, Mimosa, Berberis thungbergii*, Tartarian honeysuckle, *Rosa multiflora, Phragmites*, among others). Invasives have thrived on past land disturbances and forest edges.
- **Unique habitat notes:** n/a
- **Adjacent uses:** In the BW Parkway staging/stockpile area, S15 is bound by S10 to the north and south, the BW Parkway to the east, and S6 to the west. When adjacent to the athletic fields, S15 is bound by S11 to the west, S12 and S13 to the south, the BW Parkway interchange ramps to the east, and S6 to the north.
- **Forest Structure Value:** 43/60

Forest Stand Summary Sheet	
Property Name: *Greenbelt Forest Preserve* Location: *Greenbelt, MD*	
Prepared By: *CML*	Date: *2015-10-30*
Stand Variable	**Stand # *15***
1. Dominant species/Codominant species	***Acer rubrum***
2. Forest Association	***Highly disturbed-highly invasive association***
3. Successional stage	***Mid-successional upland forest***
4. Basal area in s.f. per acre	***110***
5. Size class of dominant species	***10-17.9" dbh***
6. Percent of canopy closure	***78%***
7. Number of tree species	***5***
8. Common understory species	***Ilex opaca, Sassafras albidum, Prunus serotina, Viburnum dentatum, Liriodendron tulipifera, Vaccinium corymbosum, Liquidambar styraciflua, Toxicodendron radicans***
9. Percent of understory cover 3' to 20' tall	***28%***
10. Number of understory species 3' to 20' tall	***8***
11. Common herbaceous species	***Lycopodium, Polystichum acrostichoides, Mitchella repens***
12. Common herbaceous & woody plant cover 0' to 3' tall	***24%***
13. List of major invasive plant species & percent of cover	***Smilax, Rosa multiflora, 26%***
14. Number of standing dead trees 6" dbh or greater (average per plot)	***1***
15. Comments Sheet 1 of 1	***This stand includes sites that are adjacent to the athletic facility, composting area and the asphalt millings stockpile. This stand also encompasses the area previously used as a farm pond and a BW Parkway construction stockpile/staging area. The landscape, and consequently the forest stand/forest structure is highly disturbed throughout the area. For example, the area south of the athletic fields is a dump site for non-biodegradable waste.***

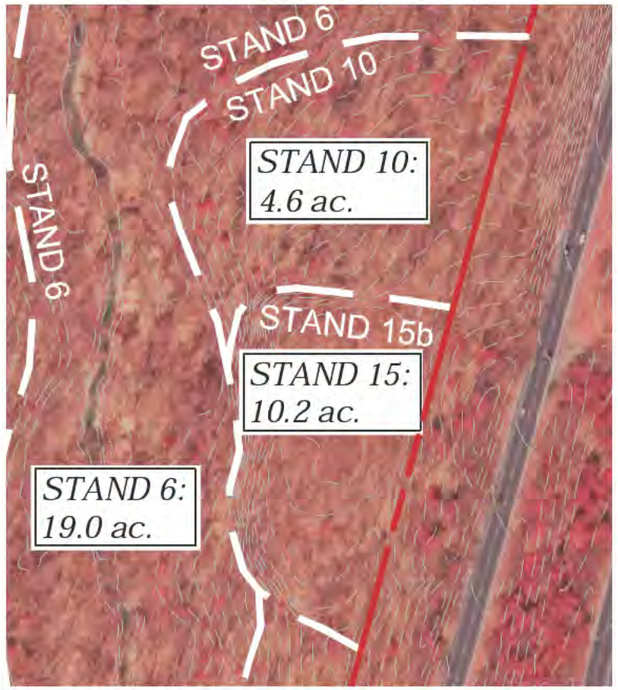


Forest stand boundaries

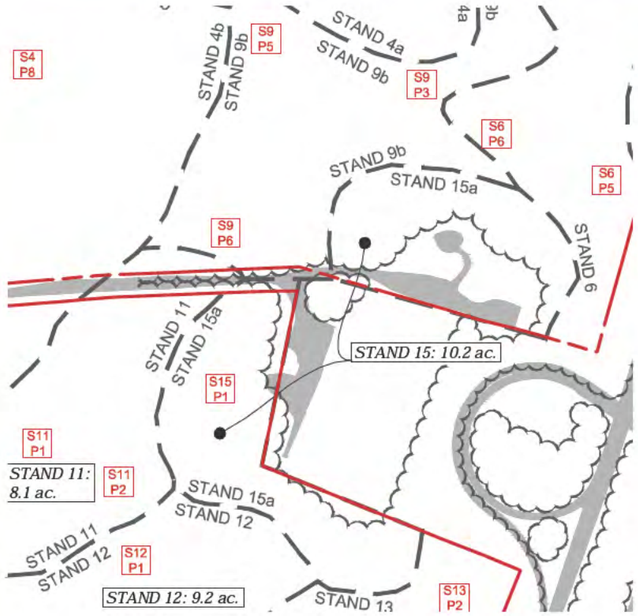
Color photograph



Contours, trails & soil boundaries



Color infrared photograph



Forest stand boundaries

Color photograph

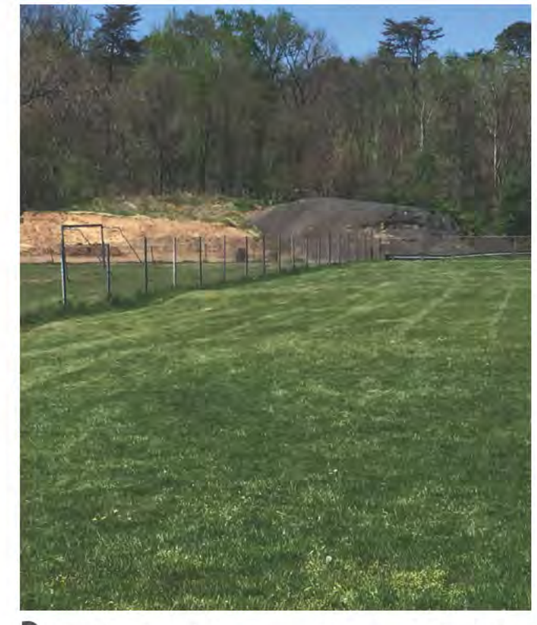
A - This stand is characterized by a highly disturbed landscape, including but not limited to invasive species and unnatural grading, shown here.

B - Old appliances, such as washing machines and refrigerators were dumped here. These items are are still present today and now surrounded by invasive species.

Contours, trails & soil boundaries

Color infrared photograph

C - This composting pile is present at the top of a steep slope. Rainfall moves excess nitrogen and phosphorous from the compost pile down the slope and into the "wetlands of special state concern." This has the potential to result in nutrient overloading and other negative consequences detrimental to the health of the downstream aquatic system.



D- Stockpiles for asphalt millings and soil encroach into the forest.

FOREST STAND 16:

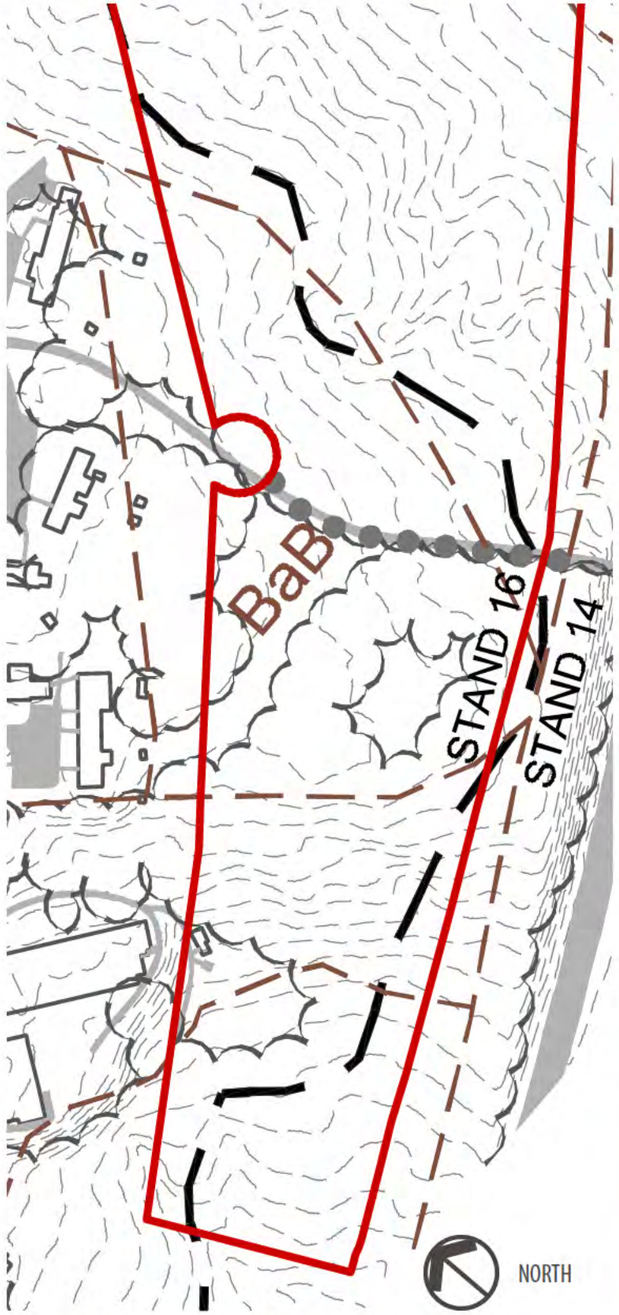
- **Topography:** primarily <10%
- **Elevation:** 168′ to 196′ ± above sea level; upland forest
- **Aspect:** very broad ridge with equal parts east-facing, SE-facing, and SW-facing slopes
- **Hydrology:** This Stand encircles a small and shallow ridge. Few, if any, signs of erosion are present. No streams, channels, wetlands, or seeps are present.
- **Historic imagery notes:** n/a
- **FIDS habitat:** Not present
- **Abiotic factors:** forest edge created by clearing (to allow for lawn/turf area)
- **Invasives:** invasives (*Hedera helix, Smilax, Berberis thunbergii, Rosa multiflora, Lonicera japonica*) are spreading into S16 from forest edges
- **Unique habitat notes:** Older (larger) trees are primarily *Quercus sp.*; younger juvenile species such as *Liquidambar styraciflua* (Sweet gum) are filling in and will ultimately replace the older Oaks in this stand.
- **Adjacent uses:** S16 is bound by S14 and the BW Parkway to the east and south; and residential areas to the west and north.
- **Forest Structure Value:** 41/60

KEY MAP

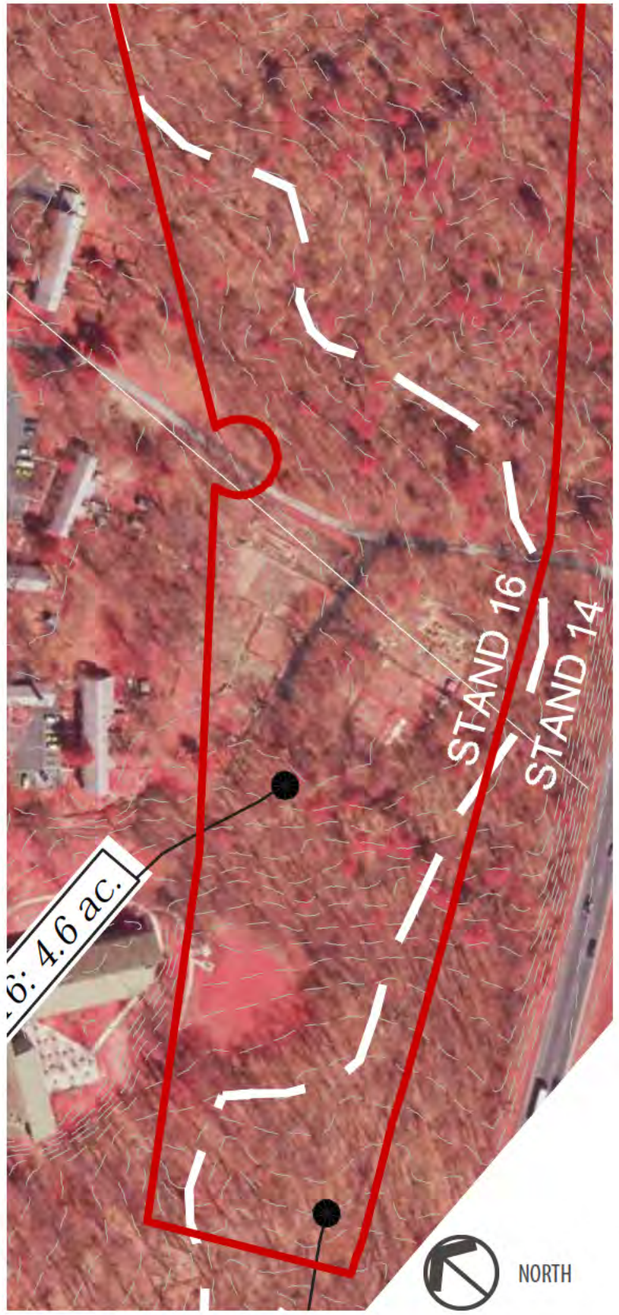
Forest Stand Summary Sheet	
Property Name: *Greenbelt Forest Preserve* Location: *Greenbelt, MD*	
Prepared By: *CML*	Date: *2015-11-06*
Stand Variable	**Stand # *16***
1. Dominant species/Codominant species	*Quercus alba, Quercus phellos, Quercus rubra, Quercus falcata, Liquidambar styraciflua*
2. Forest Association	*White oak-Red oak association*
3. Successional stage	*Early-/Mid-successional upland forest*
4. Basal area in s.f. per acre	*97*
5. Size class of dominant species	*10" - 29.9" dbh*
6. Percent of canopy closure	*66%*
7. Number of tree species	*10*
8. Common understory species	*Ilex opaca, Fagus grandifolia, Prunus serotina, Vaccinium angustifolium, Quercus alba, Liquidambar styraciflua, Vaccinium corymbosum, Toxicodendron radicans*
9. Percent of understory cover 3' to 20' tall	*20%*
10. Number of understory species 3' to 20' tall	*8*
11. Common herbaceous species	*Allium sp.*
12. Common herbaceous & woody plant cover 0' to 3' tall	*8%*
13. List of major invasive plant species & percent of cover	*Hedera helix, Smilax, Berberis thunbergii, Rosa multiflora, Celastrus orbiculatus, Lonicera japonica, 22%*
14. Number of standing dead trees 6" dbh or greater (average per plot)	*1.3*
15. Comments Sheet 1 of 1	*Older trees are all Quercus. Young Liquidambar styraciflua saplings are filling in (P2)*

Forest stand boundaries

Color photograph



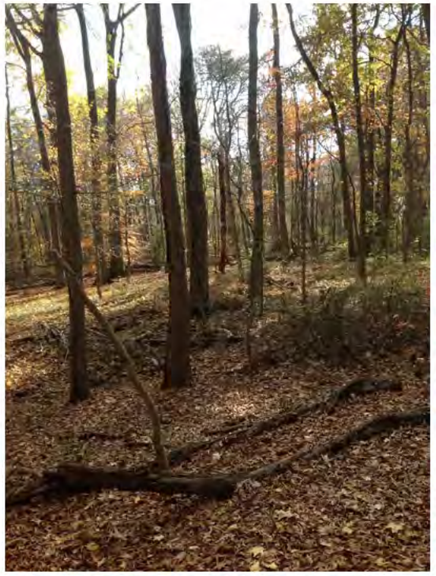
Contours, trails & soil boundaries



Color infrared photograph

A - Invasives species encroach into wooded areas after establishing at forest edges (open turf areas).

B - A notable amount of large, well-established oaks are present and surrounded by younger pioneer tree species.



C - Some areas of this stand include an especially low density of trees.

WILDLIFE

Diverse terrestrial wildlife, including birds, mammals, reptiles and amphibians are associated with both the North and South Preserves. Fish species diversity appears limited, due to the small number and limited variety of water bodies and low quality of in-stream habitat within the Forest Preserve. The diversity of terrestrial species is influenced by several factors, including the size and structural diversity of forest in both tracts. Wildlife habitat within the project area benefits from a forest consisting of mostly deciduous native species with a well-stratified composition of mature, dominant and codominant trees, understory trees, large and small shrubs, saplings and herbaceous ground covers. The North Preserve displays greater diversity, with its larger size and contiguous forested habitat to the north. The North Preserve serves as a link between the City of Greenbelt and the forest, open fields and wetlands on the Beltsville Agricultural Research Center (BARC). On a regional level, wildlife and habitat in the study area benefits from connectivity and synergies with the extensive natural resources at BARC, Goddard Space Center and the Patuxent Wildlife Refuge. The connection of the Forest Preserve to adjacent riparian and terrestrial forest cover is part of a larger green infrastructure that wildlife use for travel, habitat, food sources and migration opportunities. The forest in the southern portions of the Study Area are significantly less well-stratified and diverse overall, but it still provides beneficial wildlife habitat for many species.

Fauna surveys within the project area were conducted in Spring of 2016. Techniques used to identify the presence of wildlife included direct visual/audible observations and indirect observations such as the presence of tracks, cavities, nests, fecal material, carcasses, etc. In addition, information was obtained from the Maryland Department of Natural Resources (DNR) on potential species likely to be identified within the project area. Other sources included the Patuxent Wildlife Refuge's List of Suspected or Known Species and various field guides.

Despite the high human population density and surrounding suburbanization, the project area appears capable of supporting a wide range of wildlife species. Common species include a variety of land birds found along the forest edge as well as within the forest interior and include hawks, owls, woodpeckers, flycatchers, warblers, sparrows, chickadees, and other songbirds. Mammals common to the area are likely to include gray (Urocyon cinereoargenteus) and red fox (Vulpes fulva), opossum (Didelphis marsupialis), raccoon (Procyon lotor), bats, white-tailed deer (Odocoileus virginianus), eastern cottontail (Sylvilagus floridanus), eastern chipmunk (Tamias striatus), groundhog (Marmota monax), eastern gray squirrel (Sciurus carolinensis), shrews, mice, moles and skunk (Mephitus mephitis). Herptofauna likely to be present include frogs (bullfrog, green, leopard, peepers) toads, skinks, salamanders, snakes (garter, rat, black) and turtles (predominately box turtle).

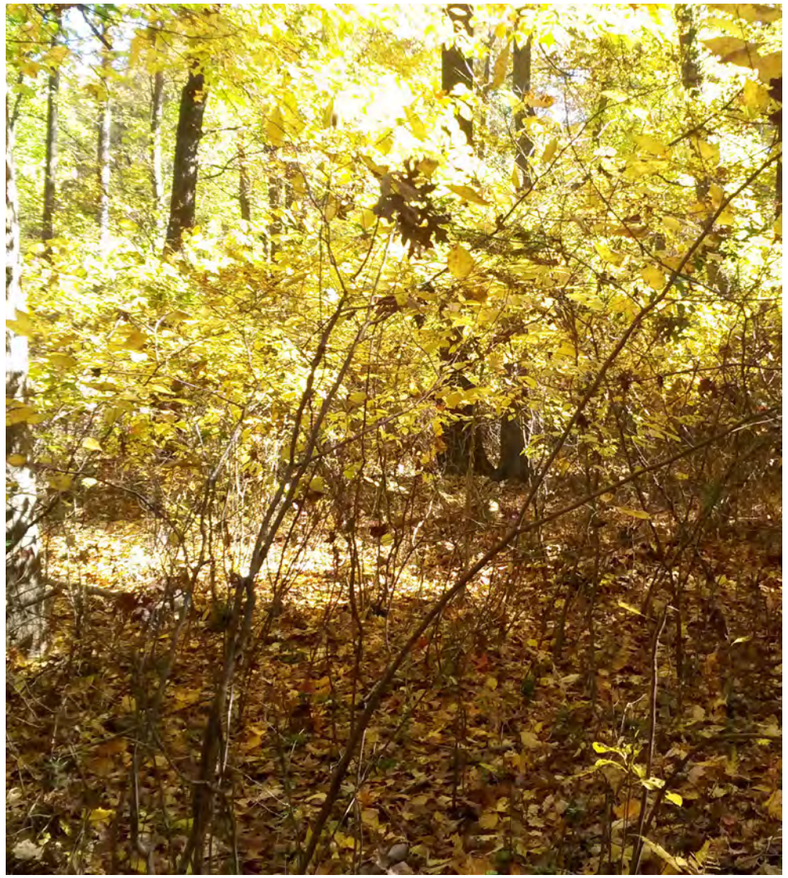
The forest assessment identified a diversity of native forest species within all the vegetative strata, including a variety of oak species, flowering dogwood, American holly, highbush blueberry and partridge berry. The majority of the project area provides strong plant diversity, as well as varying topography that offers wetland, mesic, and dry habitats. This allows for a myriad of desirable wildlife species to be sheltering, foraging, and migrating through the Study Area. The value of the habitat and the variety of species potentially found within the preserve is further increased by the abundance of nearby open space, forest, floodplains, wetlands, and streams.

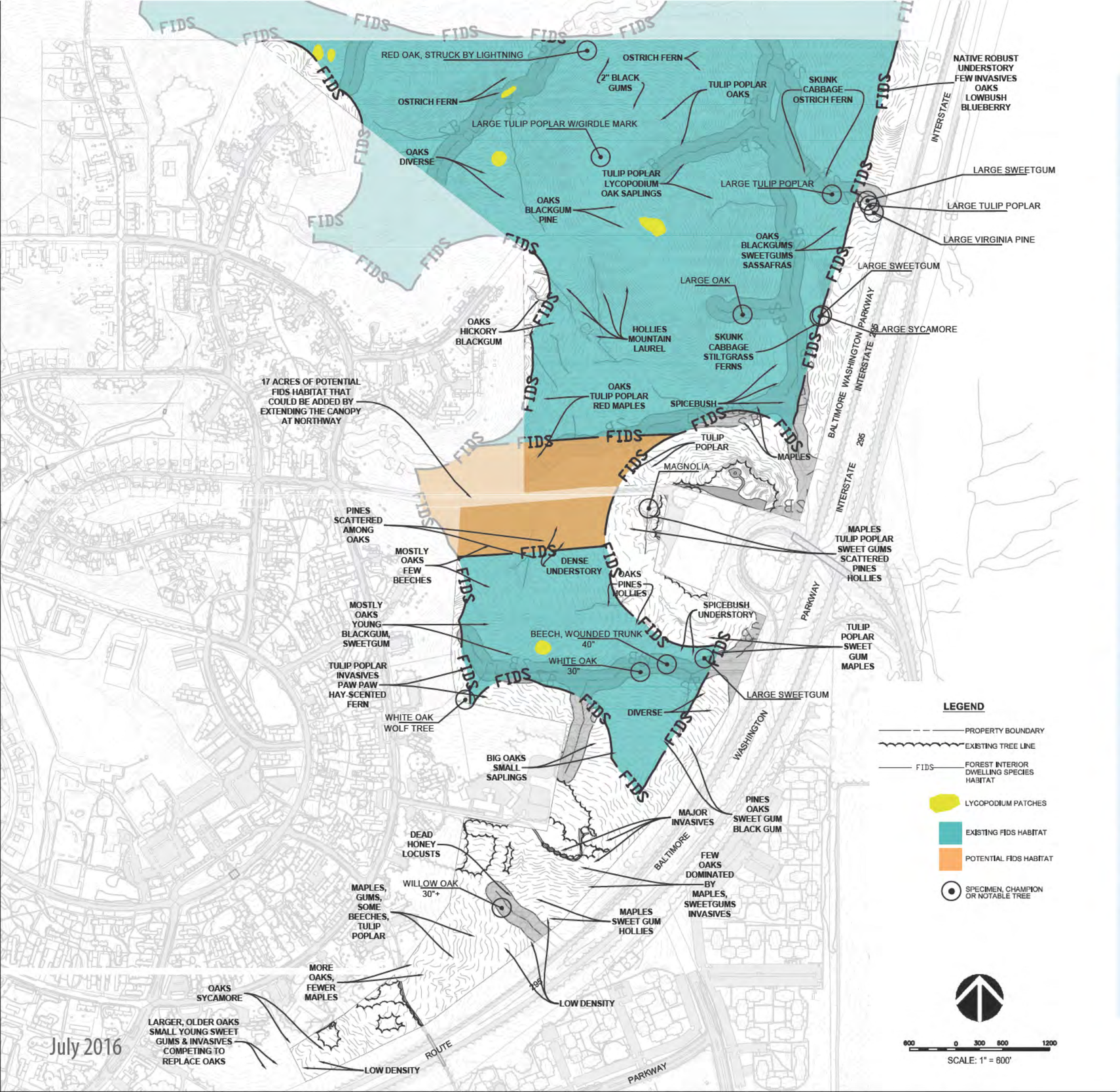
However, there is pressure from surrounding urbanization. Fragmentation of forests and isolation of many remaining forest stands has led to an increase in the amount of edge habitat in the region. As previously noted, Stands 14, 15 and 16 in the southern part of the study area have less forest richness and diversity, but still provide good wildlife habitat, particularly for edge dwelling species. A wide variety of species are attracted to forest edges and many species that are better adapted to forest edges, such as white-tailed deer, red fox and groundhog, profit from it. There you will find many generalist bird species whose life history requirements are broad and whose tolerance of human disturbance is high. Avian species may include brown headed cowbird (Molothrus ater), northern mockingbird (Mimus polyglottos), chipping sparrow (Spizella passerina), northern cardinal (Cardinalis cardinalis), common grackle (Quiscalus quiscula), house finch (Carpodacus mexicanus), European starling (Sturnus vulgaris), house sparrow (Passer domesticus), mourning dove (Zenaida macroura), and Carolina wren (Thryothorus ludovicianus).

While edge habitat and wildlife prosper, other species are declining. One group in particular, whose numbers are declining in Maryland and throughout the Eastern U.S. is forest interior dwelling bird species (FIDS). These include neotropical migratory songbirds, such as scarlet tanagers (Piranga olivacea), warblers, wood thrush (Hylocichla mustelina), and vireos (Vireo spp.), and red-shouldered and broad-winged hawks (Buteo spp.), barred owl (Strix varia) and various woodpeckers. These species depend upon large, contiguous forest stands in order to successfully breed and produce sustainable populations. As confirmed by Maryland DNR and by our forest assessments (see letter in Appendix D), the study area contains interior forest (defined below) that is well-stratified and of sufficient size and maturity to provide suitable (FIDS) habitat. DNR strongly encourages conservation of this habitat.

Downstream of the Forest Preserve, the wetlands of Beaverdam Creek are classified as Wetlands of Special State Concern (WSSC). Although there are no records of Rare, Threatened or Endangered Species (RTEs) in the Study Area, six of these RTEs are known to occur in Beaverdam Creek. Because of this valuable wetland, the tributary to Beaverdam Creek in the eastern part of the North Preserve is also classified as a WSSC wetland. The mainstem of this tributary is in poor condition. Runoff from almost the entire study area and upstream portions of its watershed flows through this tributary. Therefore, its condition is a significant ecological concern.

Although there are no RTEs in the Study Area, during the forest assessment we found indications of vernal pools and, based on the topography of both the North and South Preserves, vernal pools may be present within the forest communities. A vernal pool is a contained, seasonal depression with a seasonal source of water. Numerous species use vernal pools for various parts of their life cycle, but most predominantly for the breeding season. Species that use vernal pools that may be found within the study area include several species of mole salamanders (family Ambystomatidae), wood frogs (Rana sylvatica), spring peeper (Pseudacris crucifer) and American toad (Bufo americanus).



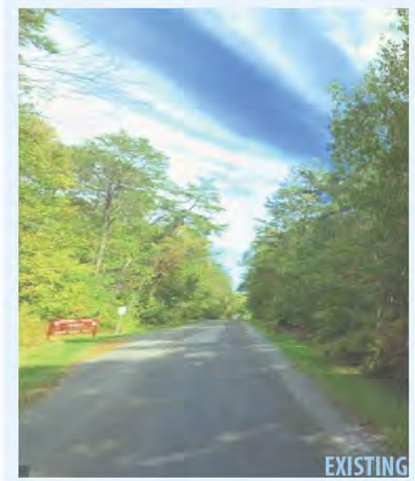


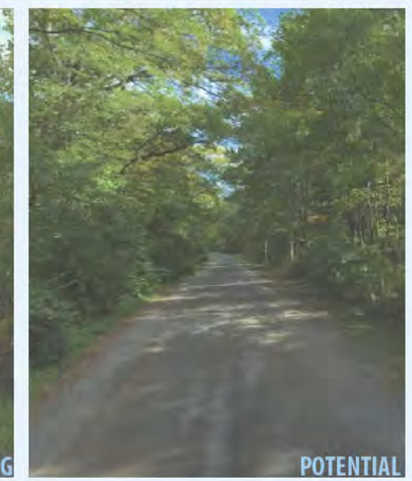
FOREST INTERIOR DWELLING SPECIES (FIDS)

FIDS habitat may be present in smaller forest tracts or absent in larger ones, and depends on a number of factors including surrounding land use, age, size, and forest type. The Critical Areas Commission for the Chesapeake and Atlantic Coastal Bays issued guidance that is commonly used to evaluate whether a forest community may be suitable habitat for FIDS. Common criteria for potential FIDS habitat include:

- Forests of at least 50 acres in size with ten acres or more of forest interior habitat that is at least 300 feet from a forest edge.
- Riparian forests of at least 50 acres in size, with an average width of at least 300 feet.
- The majority of trees within the forest tract should have a dbh of five inches or larger, or have a closed canopy.

Based on these guidelines there is approximately 169 acres of FIDS habitat in the Study Area. Anything that results in permanent breaks in the canopy of 30 to 50 feet, such as Northway, is considered an edge and causes two forested tracts to be disconnected. If the canopy along Northway were extended to reduce or eliminate this gap, this would add another 17 acres of FIDS habitat.





NORTHWAY

Canopy and FIDS

Northway currently cuts the forest interior dwelling species (FIDS) habitats in two parcels and greatly reduces the potential for FIDS to grow. The existing FIDS habitat on site is approximately 169 acres. If Northway had a full canopy, this could add an additional 17 acres of FIDS.

IMPACT OF ABIOTIC FACTORS

WASTE / HAZARDOUS MATERIALS CONCERNS

There is a large waste dump just south of the athletic fields, along with several other trash piles found sporadically within the forest. Some of the trash found can be attributed to users while other piles have been left by stormwater flows carrying debris from offsite and depositing it within the incised channels and eroded stream beds. There is trash along the edges of the forest, common for forests surrounded by major traffic routes (I-295) and general urbanization. Air pollution stresses forests, and it can be quite high along roads such as I-295. Noise and lights also disturb wildlife and decrease the recreational value of the forest.

The Study Area was not listed in any of the databases searched by EDR to identify known hazardous waste sites. The Beltsville Agriculture Research Center (BARC) is listed on the National List for Cleanup Sites under the Superfund Program. It is not known whether the project area is affected by its proximity to the BARC property.

SOIL EROSION & STREAM CONDITIONS

The majority of the soils present on site are highly erodible and have been prone to erosion, as per data provided by the USDA Soils Survey (See Appendix A and Appendix B). The Study Area was heavily eroded during the period of time it was cleared and used for agriculture. This is particularly true along the lower slopes and channels. These sediments were deposited in the valleys downstream. With development of the City of Greenbelt, increased amounts of impervious areas and runoff have been captured by storm drains and routed to outfalls that discharge directly into the forest. These comparatively recent and chronic conditions have caused extensive erosion on the forest floor. Downstream this has led to incised channels and eroded streambanks, poor water quality, and lack of in-stream habitat. There are several "headcuts" within these incised channels where the incisions are likely to continue moving upstream and the incised channels will become deeper.

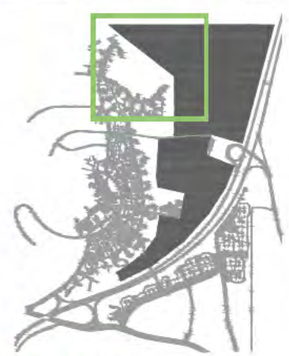
There are also signs of compaction of the soil along the numerous trails throughout the forest. In some locations runoff flowing down the trail is causing erosion. Poor trail design and location such as this can cause excessive and avoidable damage. The popularity of mountain bikes and ATVs has risen dramatically in recent years. Noise from cyclists were observed within the forest. These have the potential to cause considerable trail erosion and damage to adjacent forest.

EROSION & HEAD CUTTING

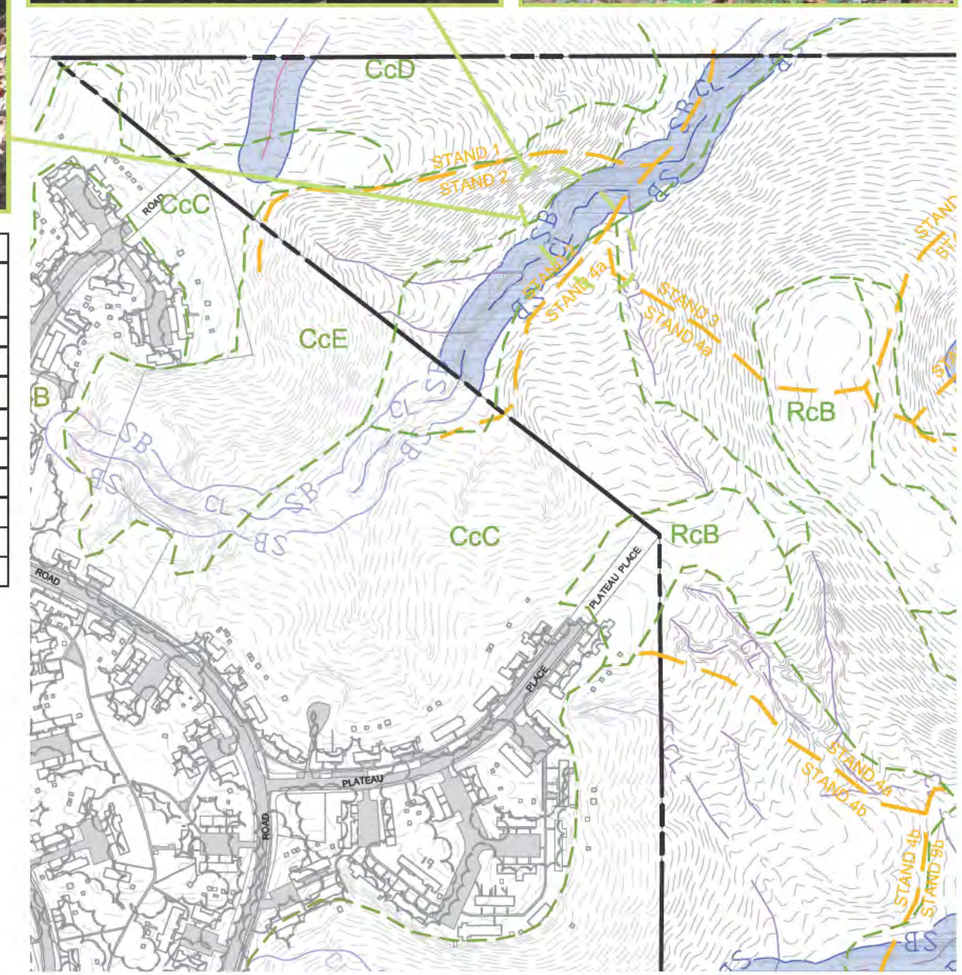
INCISED CHANNELS

ERODED PATHS

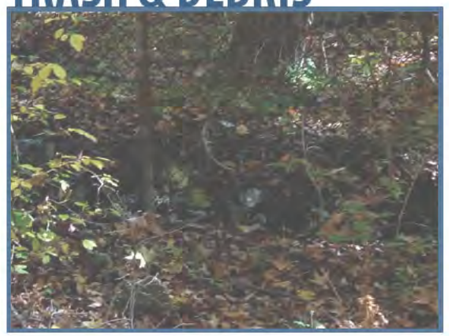
SOILS TABLE		
MAP UNIT SYMBOL	MAP UNIT NAME	HIGHLY ERODIBLE
BaB	BELTSVILLE SILT LOAM, 2-5% SLOPES	yes
CcC	CHRISTIANA-DOWNER COMPLEX, 5-10% SLOPES	yes
CcD	CHRISTIANA-DOWNER COMPLEX, 10-15% SLOPES	yes
CcE	CHRISTIANA-DOWNER COMPLEX, 15-25% SLOPES	yes
CdD	CHRISTIANA-DOWNER-URBAN LAND COMPLEX, 5-15% SLOPES	-
EkA	ELKTON SILT LOAM, 0-2% SLOPES	yes
RcB	RUSSETT-CHRISTIANA COMPLEX, 2-5% SLOPES	no
RuB	RUSSETT-CHRISTIANA-URBAN LAND COMPLEX, 0-5% SLOPES	-
Zs	ZEKIAH AND ISSUE SOILS, FREQUENTLY FLOODED	yes



KEY MAP



TRASH & DEBRIS



INVASIVE SPECIES

MAN-MADE STRUCTURES

INVASIVE PLANT CONCENTRATIONS

DUMP SITE

IMPACT OF ADJACENT LAND USES

The forest is potentially impacted in several ways by adjacent land uses and by the users. These potential impacts, very common for forests surrounded by urbanization, include:

- Accidental or even intentional fire starts or spreads
- Household pets that are allowed access to the forest. These "subsidized predators" (cats are a notable example) can have a significant detrimental impact on wildlife
- Alterations to trees or other vegetation by users
- Fertilizer, herbicides and insecticides applied by homeowners, oils, heavy metals and other particulate contaminants from roadways, and other toxic material discarded where it is carried by runoff into the forest and streams of the Forest Preserve
- Dumping of yard clippings and solid waste
- Introduction of invasive species

In general, the forest stands throughout the project area are not typically considered candidates for fire outbreak. This is under the assumption that the area receives normal rain falls. However, there is the possibility of fire spreading under very dry growing season conditions. Sources might be lightning strikes, accidental spread of fire from surrounding property owners from dumping coals from grills, burning leaves, etc., or users of the forest building campfires that accidentally escape. In addition to allowing their pets to wander freely throughout the forest, resulting in fecal droppings, hunting of birds and other small animals within the forest, residents may release unwanted pets such as snakes or turtles in the forest. Lastly, there is the concern with the alteration of the forest vegetation or wetland and streams by users building structures, such as the stick huts observed present within the project area. Some users may remove dead trees or even live trees to construct huts or other shelters. Others may consider placing structures in the streams, such as creating dams, that may result in additional erosion and sediment laden waters.

GOALS & RECOMMENDATIONS

Goals and recommendations for the Forest Preserve, the Forest Preserve Advisory Board & Forest Preserve Articles of Chapter 12, and the Forest Preserve Management & Maintenance Guidelines can be found in Volume Two of the Forest Preserve Health Assessment report.

KEY MAP

Forest Health Assessment Report
of the
Greenbelt Forest Preserve

Prepared for: City of Greenbelt Department of Planning and Community Development
15 Crescent Road
Prepared by: A. Morton Thomas & Associates, Inc.

April 2016, revised July 2016

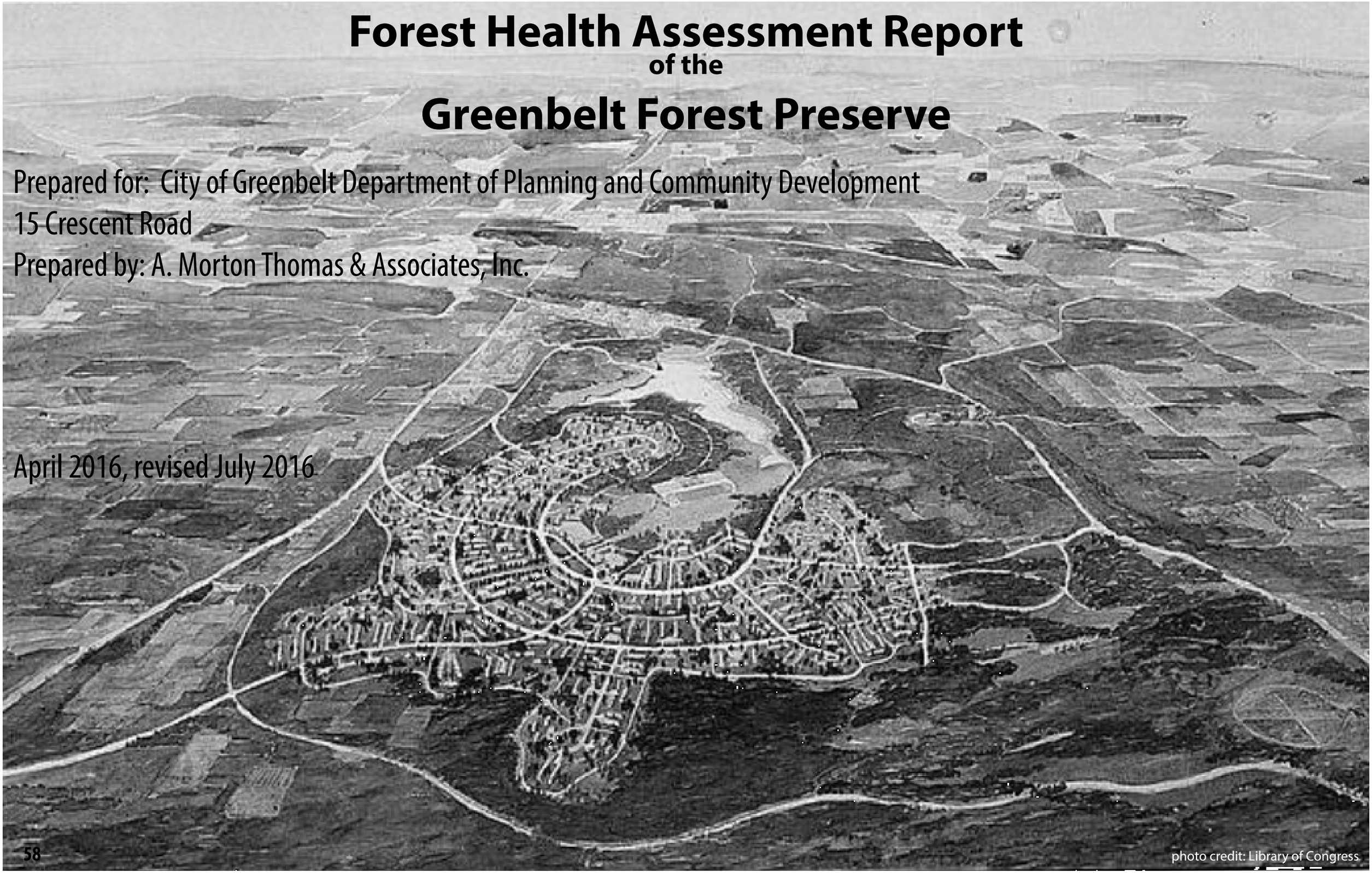


photo credit: Library of Congress