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## Tree Management and Circulation in an Underused Section of the Natural Lands at the Morris Arboretum

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An independent study project report by The Walter W. Root Endowed Arboriculture Intern (2014-2015)

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## Tree Management and Circulation in an Underused Section of the Natural Lands at the Morris Arboretum

### Abstract

The Morris Arboretum has developed large and impressive Natural Areas that have been open to the public over the last several years. There is one part of this section south of the entrance meadows but north of the Wissahickon Creek, between Northwestern Avenue and Paper Mill Run, which is largely untraveled by visitors. This area contains some excellent tree specimens and some very interesting ecological groupings, but lacks visitorship. In an attempt to discover why, I did a thorough inventory and assessment of each tree in this section, and a survey of circulation through this area.

Through my assessment, I was able to identify many trees with inherent interest, as well as trees that could use tree work in the form of pruning or removals. Out of this assessment I was able to formulate recommendations for tree work that should be done, and for an improved system of circulation that will have a less harmful impact on the ecosystem, while also bringing visitors to the trees in this section that are really spectacular. Each tree needing work was given a priority level, and each recommendation made for circulation and maintenance was given a short- or long-term goal. It is my hope that these recommendations will be followed to transform this underused section into a natural field site for ecological education.

### Disciplines

Horticulture

### Comments

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**AUTHOR:** Aaron Greenberg  
The Walter W. Root Endowed Arboriculture Intern

**DATE:** March 2015

**ABSTRACT:**

The Morris Arboretum has developed large and impressive Natural Areas that have been open to the public over the last several years. There is one part of this section south of the entrance meadows but north of the Wissahickon Creek, between Northwestern Avenue and Paper Mill Run, which is largely untraveled by visitors. This area contains some excellent tree specimens and some very interesting ecological groupings, but lacks visitorship. In an attempt to discover why, I did a thorough inventory and assessment of each tree in this section, and a survey of circulation through this area.

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**INTRODUCTION**

The Natural Lands section of Morris Arboretum has in recent years become a major attraction for Arboretum visitors. From the Woodland Path through Penn’s Woods to the beautifully constructed wetland and accompanying interpretation, the Natural Lands offer an excellent representation of the natural landscapes of the Southern PA piedmont ecosystem. Educational opportunities here are all the more illuminating in juxtaposition with the more formally maintained horticultural gardens that compose the rest of the Arboretum. However, as well-constructed trails, careful management, and interesting interpretation have brought visitors into many parts of the Natural Lands, other parts remain almost entirely unvisited. Between the entrance gates and Paper Mill Run are two beautifully managed native meadows that draw the visitor into the formal Arboretum. Beyond the southern meadow is a corner of the Natural Lands bordered to the west by Northwestern Avenue, to the south by the Wissahickon Creek, and to the east by Paper Mill Run. This forgotten corner of the Arboretum contains a seasonally wet meadow, a wet swamp dominated by bald cypress, a riparian buffer in need of restoration, and some beautiful large and old upland tree specimens.

**PROJECT GOALS**

The purpose of my intern project as the Arboriculture Intern at Morris Arboretum was to do a survey of this neglected section of the Natural Lands by doing a complete inventory and assessment of every tree. The reason for doing this assessment was twofold. First and foremost the goal was to identify what trees or groups of trees might be present that would serve as points of interest to draw the public back into this area. The second goal was to determine what would need to be done to improve circulation within this area so that it vehicular traffic could have less of an environmentally degrading impact and foot traffic could be brought more effectively into the space. Concurrently, I have used the tree assessment to make recommendations for each tree as to the potential priority for pruning or complete removal. I hope that my project can help highlight the potential for this area as a key component of the Natural Lands, and recommend some of the tree work that can be done to make that possible.

## METHODS

Once the focus area of my project was defined, the bulk of the activity was to conduct a thorough inventory and assessment of every tree in the area. Beginning at the corner of the property where the Wissahickon Creek meets Northwestern Avenue, I surveyed each tree with a caliper of 6" or greater. This resulted in a total of 284 trees. The following Information was collected using the ArcGIS Collector™ application for the iPad:

- ID number - each tree had been tagged with an ID number in previous work done by staff members Anne Brennan, Rebecca Bakker and Tracy Beerley.
- Species – full specific epithet, or just genus when species ID was impractical or unnecessary
- Circumference at Breast Height (CBH) – Trunk circumference at approximately 4 feet, measured in inches. Up to five CBHs were measured for multi-stemmed trees. For trees that could not be measured at breast height, “measured-at” height was recorded.
- Spread – unidirectional measure of the length of canopy cover
- Height – estimated using heights of known objects or “stick trick”\*
- Work Needs – Trees needing pruning given a value of P, trees needing removal given a value of R, trees needing neither given a value of X.
- Pruning Details – For trees marked P, further details noted such as pruning type (deadwooding, hangers, crown cleaning, subordination pruning, structural pruning, etc.) and pruning priority (hazards over the path = high priority, structural pruning = low priority for a natural area)
- Removal details – For trees marked R, further details noted on reason for removal and priority of removal.
- Points of Interest – for trees with particular interest, details noted on the nature of the interest (Specimen tree, habitat tree, tree of particular educational value, etc.)
- Comments – any other relevant details noted
- Coordinates – ArcGIS Collector™ automatically adds a GPS data point to an uploadable map, with an accuracy of only 5 meters.

While collecting all of this data, notes were also taken on landscape features. For instance, for future planning it was important to note where the riparian buffer was minimal or nonexistent

and needed restoring, and which areas had permanent standing water and so could be considered impassible for circulation.

Once all of this data was collected, each tree could be given a level of priority for pruning or removal, so that the arborist team could begin tree work in this section. Each tree was also given a priority assignment for “Interest” so that trees of high aesthetic or educational value could be highlighted in my circulation plan, and trees of high ecosystem value could be protected.

All tree data collected using Collector was available for mapping using ArcGIS online. In November and December of 2014, Natural Lands Section Leader Tracy Beerley rented a highly accurate GPS tool to map the locations of every tree in all of the natural lands to a 2 cm degree of accuracy. My data was merged with Tracy’s so that I could attach my thorough quantitative and qualitative recorded data with her highly-accurate location points. Using this highly-accurate map I was then able to add the current basic circulation system present in this section. Finally, I was able to use known geographical details and data collected on points of interest to create a recommended circulation path through this back section of the Natural Areas.

## RESULTS

### Points of Interest

By far the most important results of my tree assessment were the number and variety of trees and assemblages of trees in this section that have incredible value as interesting specimens, opportunities for education, and/or provision of key ecosystem services such as wildlife habitat or stream bank stabilization. Specimens include a massive two-stemmed sycamore and a majestic shagbark hickory that are at least 100 years old, and two impressive groves of naturalized bald cypress complete with characteristic cypress “knees.” There are also three magnificent dawn redwoods from the original 1948 introduction of this species to the U.S., and a sizeable grove of the relatively rare Kentucky coffee trees. Trees that could lend themselves easily to educational opportunities include several large hollowed-out ash trees that make excellent wildlife habitat, and a large silver maple with a deer stand in it that could demonstrate the necessity of deer management (especially when noted along with the apparent lack of understory in the forest). For a comprehensive, prioritized list of points of interest identified in this study along with a map that identifies them, see appendix A.

### Tree Work – Removals

From the perspective of a highly-managed landscape, 73 trees were identified that could be removed for various reasons. However, in the context of a natural area, it would be unnecessary to remove most of these, and indeed removing many trees without immediate plans for replanting with more native species would only open up the opportunity for invasive species to infiltrate more easily. For this reason, each tree was given a removal priority level. Priority One trees are primarily invasive species that should be eradicated from a managed natural area. There were only about 20 trees in this section that could be considered invasive, including a cluster of eight Norway maples, several *Paulownia* trees, and a few crab apple and pear species. Also included in Priority One are trees that pose a direct hazard over a defined target. Should my recommendations for moving the truck path through the meadow (see below) be followed, there

would only be two trees in this section that could be considered hazardous enough to warrant removal. These are a walnut and a box elder that are growing towards electrical and communication lines on Northwestern Avenue by the Wissahickon.

Priority Two removals are trees that could be removed to favor superior specimens. This section is dominated by box elders and walnut trees. Should this area be opened to highlight certain points of interest, it may be advisable to remove some box elders or walnuts that are in direct competition with these more desirable trees. Trees blocking the view of a desirable tree could be felled, while trees competing with desirable trees for light or resources could simply be girdled and left standing to provide wildlife habitat.

Priorities Three and Four are trees that could be removed in the future to favor more diverse plantings of native tree species. These are inferior specimens of box elder, walnut and ash that have been identified as particularly ugly or having bad form that would be good candidates for removal should native plants be available to replace them. Without a plan for replanting and maintenance, there would be no reason to remove these trees, and they should be left in place as part of the natural forest structure. For a detailed list of possible removals with accompanying map, see Appendix B.

### Tree Work – Pruning

When doing a tree assessment with a seasoned arborist who specializes in structural pruning, it is easy to see pruning needs on almost any naturalized (unplanted) tree. It was necessary to assign priority ratings to those trees that needed pruning so that the goals of pruning in this natural area could be clear. Priority One pruning jobs include trees that have limbs that could be considered a hazard over the path. Any tree with dead wood, hangers, overextended limbs or limbs with bad branch connections over a path should be pruned to remove the hazard. Priority One also includes clearance pruning for paths. This would be trees on which the crown could be raised or limbs reduced to create clearance. On truck paths the crown should be raised to 12 feet – on pedestrian paths, raising the crown to eight feet is sufficient.

Priority Two is pruning vines and surrounding invasive shrubs from trees. Several large trees in this section are covered in vines, some of which are invasive or should be removed. There are also several trees being choked out by invasive honeysuckle, which should also be removed, although careful planning is necessary to prevent opening new areas for reinvasion from new or repeated invasives.

Priority Three is pruning certain trees to favor more desirable trees. This priority level of pruning would only become necessary when paths, benches, or interpretation signs are put in to actually feature some of the trees of interest in this section. At that point, there are many trees (mostly box elders) that compete with more desirable trees for space and could be pruned to give the desirable trees more room to thrive and be viewed by visitors.

Priority Four would be pruning of trees to remove deadwood, structural pruning, crown cleaning, or other pruning practices common in a landscape setting. While it is often important to practice these pruning techniques on landscape trees, this would be a low priority for trees in a natural area, where natural forms and deadwood are desirable to maintain a natural forest



ecology. For detailed information on pruning priorities and an accompanying map, see Appendix C.

## **RECOMMENDATIONS**

### Short-Term Recommendations: What can be done now?

One thing that could be done immediately to improve this section of the Natural Lands is to begin to remove the invasive tree species. Specifically, on a ridged outcrop above the permanently swampy area is a mixed assemblage of mature sycamores and Norway maples. The Norway maples could be removed immediately without fear of opening up edge habitat to invasion, because the sycamores are large enough to dominate the canopy in this area. Likewise, the few crabapple and pear trees could be removed from the understory very easily.

Another easy management step that can be taken immediately is improvement of the vehicle path through the lower meadow. As it stands now, the vehicle path, which is also the only pedestrian path through this area, sweeps the perimeter of the meadow. This brings the path much too close to the stream banks of the Wissahickon Creek and Paper Mill Run, which means that the riparian buffer along these waterways has no chance of being restored. The path also leads over many tree roots, which can lead to soil compaction and subsequent root death and tree health decline. I have proposed a modification of the vehicle circulation path that brings it around the meadow in a more central loop, far away from the riparian zone and adequately far from trees. For a map that shows both the current and proposed vehicle paths, see Appendix D.

These are remedies that could be accomplished immediately with little or no budget and that could have a substantial impact in this area. Removing the invasive Norway maples and crab apples could be accomplished in three days by the arborist crew. Establishing a new vehicle path is as simple as redirecting the mowing operations in the spring and closing off the old path with some limbs (from the Norway maple). Some clearance and hazard pruning will then be necessary along the route of the new path. The invasive tree seedbank will be reduced, and the riparian buffer can begin to be restored.

### Middle-Term Recommendations: Site Improvements to draw in visitors.

With somewhat more effort, a pedestrian path could be built through this section that takes advantage of the natural contours of the land and highlights the trees identified as points of interest. By using my tree data and contour maps, and actually walking the grounds myself, I have created a proposed foot path that will bring visitors away from the main vehicle path and into this section of woods. The path stays mostly on the elevated ridges present in the land, and allows visitors to view the lower bald cypress swamps with their fascinating cypress knees, the grove of Kentucky coffee trees, and each of the other interesting tree specimens identified in my survey. Where points of interest (such as a pair of honey locusts that exhibit variable thorny forms, and the confluence of the two waterways) require visitors to enter the riparian zone, they are brought there with smaller loops or spurs off of the main vehicle path. For a map with my proposed footpath and the points of interest that it highlights, see Appendix E.

As more visitors enter this part of the natural area, it will be important to manage the understory as well. Currently this area is highly accessible to deer who may enter freely from the Wissahickon Creek corridor. As such, there is little forest regeneration, and what understory exists is composed primarily of invasive species. Most notably, Japanese honeysuckle bushes and oriental bittersweet vines dominate. These species should be removed. However, simply removing invasive species without a plan for continual management of understory regeneration will only lead to reinvasion. Concurrent with invasive plant removal should be active deer management, and selective replanting of native species within deer exclosures. Visible deer stands and exclosures, while they may be inappropriate for a garden setting, provide excellent opportunities for education in a natural area. I would also recommend removing the invasive *Paulownia* trees at the north end of this study area and replanting this very open, sunny woodland edge with a variety of native trees and shrubs. This would also necessitate deer protection and consistent maintenance which, funds and time allowing, could be folded into the maintenance schedule of the Natural Areas and the arborist crew.

### Long-Term Recommendations: Nature Education

This tucked-away section of the Natural Areas has incredible potential as an educational tool. There are some very interesting ecological phenomena going on here that could be used for hands-on education, particularly for an older middle school or high school science class. For instance:

- Two honey locusts with two drastically different forms illustrate how through genetic mutation, or breeding two trees of the same species, can have very different characteristics.
- Low wet areas dominated by bald cypress illustrate how trees may adapt to their environment. Wetland species have different adaptations for surviving in wet soil, including the production of “knees” for stability and gas exchange.
- Evident deer exclosures and deer hunting stands illustrate the overpopulation of deer and open up discussion for the effects of deer on forests. Deer overpopulation can be showed as a human-caused problem that now needs a human management solution.
- Access to the point where Paper Mill Run enters the Wissahickon Creek introduces the concept of a watershed, where small tributaries drain into larger ones.

These points and many others are perfect for showing young people both how nature works and how nature *takes* work to manage. While other sections of the Natural Area have interpretation and host school groups, there is no area with a specific focus on education. By looking thoroughly into this one five-acre section of Natural Areas, I have seen splendid examples of ecological processes and potential management practices. With some cooperation between the Arboretum and local secondary schools, this area could provide an excellent environmental curriculum. The first step, however, must be to manage and provide access to this area’s wonderful trees.

## CONCLUSION

It is my sincere hope that my recommendations can be followed to improve visitorship to this section of the Natural Lands. Because I recognize that time and money are limiting factors, I have split my recommendations into short- and long-term goals so that what can be done immediately will be more likely to be done. Should the Arboretum eventually want to invest in this section, I believe my assessment could be a resource to begin that process. I also think that just doing a thorough inventory and assessment of trees using Collector and analyzing the data from that assessment using GIS could be useful for a myriad of applications at the Arboretum and beyond.

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- I would like to thank **Tracy Beerley**, the Natural Lands section leader, for supporting my research and making recommendations in her section, for sharing her accurate GPS data with me, and for providing me with advice and resources. I am especially grateful to Tracy for sharing parts of her Management Plan that pertained to this section with me, and I hope my work and recommendations will help her meet some of those management goals.
- I would like to thank **Jason Lubar** and **Bob Wells** of the Urban Forestry Department for initially teaching me the mechanics and values of doing tree inventories, and for allowing me to use the iPad GIS Collector program to collect my data.

- I would like to thank former Arboriculture Intern **Daniel Weitosh** for encouraging me to pursue this particular project and helping me collect data while quizzing me on tree ID and biology.

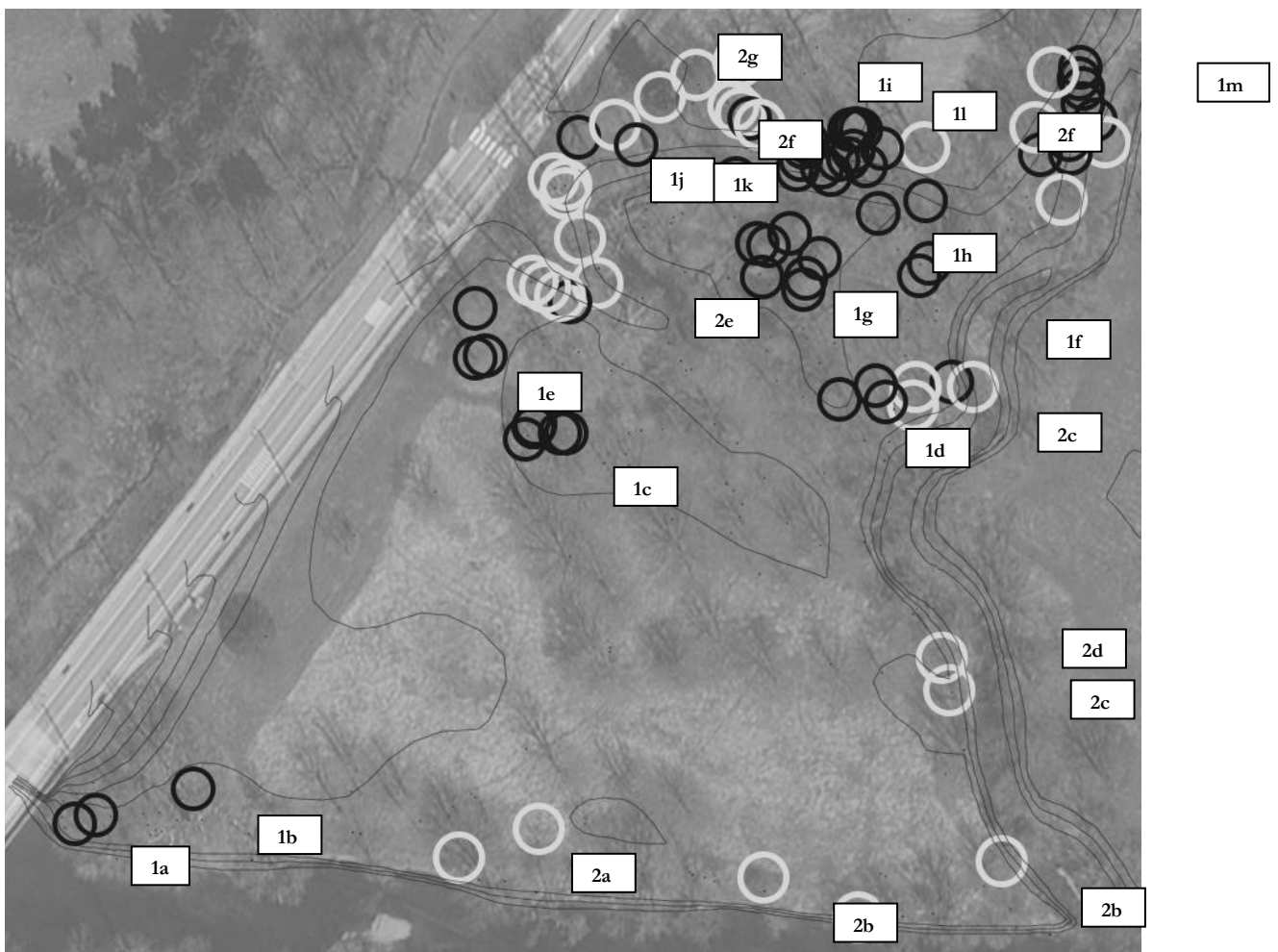
## APPENDIX A - POINTS OF INTEREST

### ○ Primary Interest – trees of particular rarity or special import

- 1a) Pair of *Gleditsia triacanthos*, one with spines and one without. Highlights the variety of forms
- 1b) Enormous two-stemmed *Platanus occidentalis*. Appears on 1909 Atlas
- 1c) Grove of 6 *Diospyros virginiana*. Native fruit tree for humans and animals.
- 1d) Giant *Acer saccharinum* with a deer stand in it. Surrounding trees lean away. Highlights both the importance of deer control and the tendency of small trees to grow away from dominant trees.
- 1e) 3 Large *Metasequoia glyptostroboides*. Excellent tall specimens.
- 1f) A single *Maclura pomifera* tree in idyllic spot overlooking Paper Mill Run
- 1g) A large grove of 12 *Taxodium distichum* with impressive Cypress Knees. Highlights wetland adaptations.
- 1h) Large fallen *Acer negundo* with multiple resprouts lined along it. Highlights tree regeneration.
- 1i) One impressive sprawling *Crataegus*.
- 1j) One giant *Carya ovata* along Northwestern Ave. Appears on 1909 Atlas.
- 1k) Giant hollow snag of an old dead *Fraxinus* that appeared on the 1909 Atlas.
- 1l) A grove of 16 *Gymnocladus dioica* trees. Highlights rare native trees with human uses.
- 1m) A grove of 8 *Taxodium* along Paper Mill Run, this one without knees, but larger trees.

○ Secondary Interest – beautiful native trees that maintain the diversity of the area and should be preserved but do not necessarily need to be highlighted

- 2a) 2 *Betula nigra* in the riparian corridor along the wissahickon
- 2b) 2 Native *Morus rubra* along the wissahickon. In poor shape, but good native fruit shrub.
- 2c) 4 large *Acer saccharinum* along Paper Mill Run.
- 2d) 1 *Catalpa* with bizarre form along Paper Mill Run.
- 2e) 8 Large *Platanus occidentalis* that line a raised ridge leading into the *Taxodium* Swamp.
- 2f) 3 Large *Liriodendron tulipifera* on the high ground north of the swamp. 1-2 appear on the 1909 Atlas.
- 2g) A *Tsuga canadensis*, a *Tilia*, a *Carya cordiformis*, and several *Prunus* along Northwestern Ave.

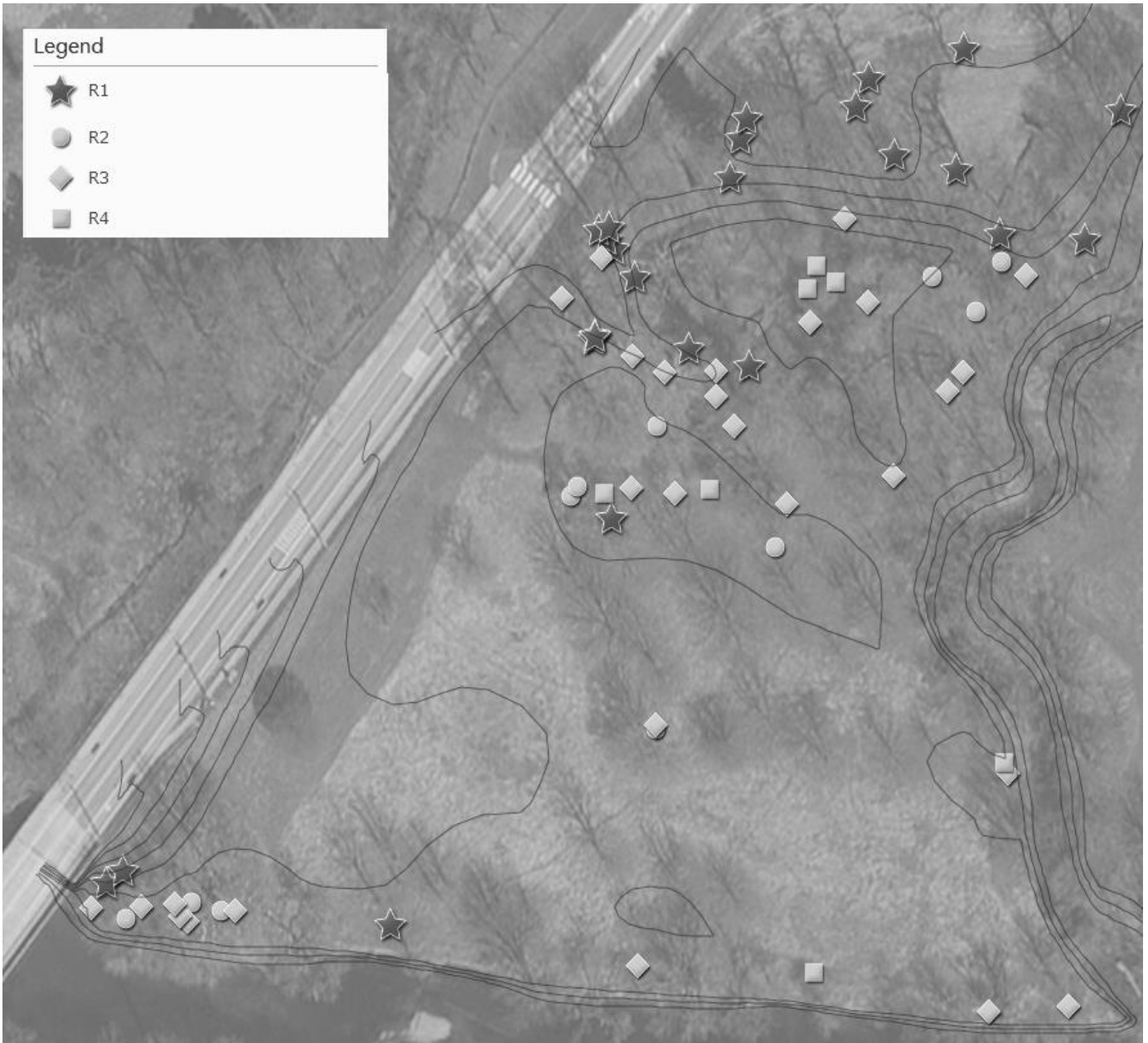




## APPENDIX B – REMOVALS

ID Number	Species	CBH1	Sprd	Ht	Work	Removal
165	acer negundo	34	20	45	R2	r for willow
168	Acer negundo	36	18	40	R3	Top dead, ugly understory
187	Acer sp.	21	8	12	R4	Dead- remove for replanting
190	Acer negundo	24	25	13	R3	Eventual removal, neighbor stabilizes bank
195	Juglans nigra	44	35	45	R3	Eventual R- poor specimen
196	Acer negundo	37	25	20	R3	Eventual removal for replanting
209	malus sp.	18	16	15	R1	invasive
216	ulmus parvifolia	27	26	20	R1	invasive
227	Pyrus sp.	34	33	40	R1	invasivs
228	acer negundo	21	12	40	R3	remov to highlight taxo and KCG
238	Paulownia tomentosa	24	24	40	R1	invasive
239	Paulownia tomentosa	45	32	40	R1	invasive
245	Acer platanoides	4	16	55	R1	Invasive
246	Acer negundo	19	17	30	R3	Remove to favor view of better trees
251	Acer negundo	29	24	25	R3	Ugly- remove to improve view to sycamores and woods
257	Acer negundo	32	25	20	R3	R for replant
258	Acer negundo	22	28	15	R3	R for replant
260	Acer platanoides	26	0	0	R1	Invasive
264	Acer negundo	52	32	50	R3	Eventual R
268	Acer negundo	18	16	30	R3	Eventual R for replanting
283	acer negundo	40	41	55	R2	could R- growing up into willows and taxos
289	acer negundo	43	27	50	R3	fine, but maybe eventual R for taxodium
295	acer saccharinum	39	28	50	R4	potential removal for taxodium
296	Fraxinus sp.	32	17	55	R4	cracked- could fail on cypress- remove?
303	Malus sp	20	10	10	R1	Dead and non native
1431	Juglans nigra	26	19	25	R2	Remove to favor other w better form & small hicko
1450	Juglans nigra	22	15	35	R1	Close to wires, eventual removal
1467	Juglans nigra	19	32	25	R3	Eventual R for replanting
2322	acer negundo	23	30	20	R3	R for replanting
2324	Acer negundo	16	17	30	R3	Ugly small mostly dead
2325	Acer negundo	19	18	30	R3	Eventual
2326	fraxinus sp.	22	8	25	R4	potent remov for PMRTAX
2330	Acer negundo	19	24	12	R3	Eventual for replanting
2331	Acer negundo	20	18	22	R2	Eventual to favor walnut
2333	Acer negundo	23	12	25	R3	Eventual R for replant
2338	Diopteris virginiani	19	15	40	R4	Remove to favor sister persimmon
2339	Acer negundo	23	18	22	R3	Eventual for replant
2341	Diopteris virginiana	17	22	35	R2	The one to remove
2343	Acer negundo	44	27	35	R2	Eventual R to favor persimmon
2345	paulownia tomentosa	50	33	40	R1	Invasive
2346	Acer negundo	50	60	40	R3	Eventual R for replanting?
2347	Acer negundo	29	23	40	R2	Removal to favor other negundo or better specimen
2352	Larix	43	20	50	R1	Hazard over path
2354	Acer negundo	24	34	45	R3	Eventual R for replanting
2356	Acer negundo	24	26	40	R2	Remove to favor 2355. Competes w plane limb
2358	Acer negundo	24	8	25	R3	Eventual R for replanting
2360	Acer negundo	22	12	30	R3	Eventual
2361	Acer negundo	38	27	35	R3	Eventual for replanting
2362	Acer negundo	19	10	30	R2	Too close to sycamore
2363	Acer negundo	17	12	25	R1	Possible Removal,too close to road
2365	Acer negundo	30	20	45	R2	Eventual R or reduction to favor Gleditsia
2367	Acer negundo	21	10	10	R3	Leaning, exposed roots, on bank, eventual removal
2370	Acer negundo	25	28	30	R3	Possible eventual removal for replanting
2378	Acer negundo	22	41	20	R3	Eventual R
2379	Acer platanoides	34	46	50	R1	Remove- invasive
2380	Acer platanoides	18	23	30	R1	Remove- invasive
2381	Acer platanoides	29	21	35	R1	Invasive
2382	Acer platanoides	26	23	55	R1	Invasive
2384	Acer platanoides	29	14	60	R1	Invasive
2385	Acer platanoides	28	20	55	R1	Invasive
2386	malus sp.	23	25	30	R1	invasive
2394	acer negundo	14	12	25	R3	little negundo remove for view of taxodium
2401	paulownia tomentosa	92	40	50	R1	invasive
2402	paulownia tomentosa	104	40	65	R1	invasive
2406	malus sp.	14	8	10	R1	invasive
2506	Mora rubra	22	26	30	R4	Possible R - not in great shape
2511	Fraxinus sp.	55	50	65	R3	Eventual R
2546	Acer negundo	20	22	25	R3	Eventual for canopy
2547	Acer negundo	20	20	25	R3	Remove w honeysuckle for replanting
2618	acer negundo	21	30	35	R2	remove to favor taxo and laying negundo
1984-100-C	Zelkova serata	60	44	40	R4	Maybe doesn't belong in natural area - non-native and could be considered invasive
2006-142-H	taxodium distichum	22	18	15	R4	eventual remove for path?
2613	Paulownia tomentosa	47	35	55	R1	Invasive





- R1 – Invasive / Hazardous
- R2 – Remove to favor superior specimens
- R3 – Removals to favor future plantings
- R4 – Removal possible but not necessary

## APPENDIX C – PRUNING

ID Number	Species	CBH1	Sprd	Ht	Work	Pruning
169	Acer negundo	71	57	75	P1	DWP haz
170	Maclura pomifera	28	25	30	P1	Lower dead breakout
178	Juglans nigra	28	24	35	P4	DWP, Reduce wounded limb
179	Acer negundo	38	42	45	P4	DWP above stream bank to replanting in bare spot
182	Juglans nigra	43	40	40	P1	CP, DWP
184	Juglans nigra	79	51	55	P1	DWP, CP
185	Acer negundo	82	37	35	P1	CP
188	Catalpa sp.	20	25	25	P2	V
189	Acer saccharinum	50	28	50	P2	DWP, subordinate, V
191	Juglans nigra	80	50	65	P1	CP, Endweight reduction
194	Moras rubra	24	20	12	P2	V, SP
195	Juglans nigra	44	35	45	P2	V, DWP
220	Gymnocladus dioicus	41	15	55	P2	V- Pi
235	carya cordiformis	36	24	50	P1	CP over road
236	prunus serrotina	43	38	55	P1	SP- reduce over path
249	Platanus x acerifolia	34	37	60	P4	GR
255	Acer negundo	26	16	25	P2	V, CR
262	Fraxinus sp.	128	50	85	P2	V
263	Juglans nigra	29	32	50	P4	SP
264	Acer negundo	52	32	50	P2	Honeysuckles and vines all around, side dead red
267	Acer negundo	38	34	30	P1	CP, haz over path
274	Acer negundo	64	39	70	P2	V
279	fraxinus sp.	43	29	60	P4	DWP lower, little lead cut, otherwise s fine tree
281	acer negundo	50	38	50	P3	prune away from taxo
304	Fraxinus sp.	26	19	45	P2	V
306	Fraxinus sp.	31	21	50	P2	V
424	Fraxinus sp.	30	27	46	P4	Possible reduction on aggressive lateral, CR
478	Fraxinus sp.	114	50	65	P1	DWP for lower haz, reduce lead over path
480	Fraxinus sp.	130	46	42	P1	Hazard prune off path
1440	Juglans nigra	61	55	45	P1	SP , EWR, hazards over path
1443	Juglans nigra	34	25	40	P2	V
1451	Juglans nigra	37	26	55	P4	GR
1453	Juglans nigra	45	53	64	P1	Path prune
1455	Juglans nigra	34	20	53	P1	DWP - Prune Off path
1457	Juglans nigra	40	38	49	P2	DWP, V
1458	Juglans nigra	24	23	33	P1	DWP, SP for dominance, CR for path
1459	Juglans nigra	25	32	47	P4	Remove center lead and side lead
1460	Juglans nigra	26	28	50	P4	Prune out middle lead, reduce r lead
1461	Juglans nigra	18	20	32	P4	Lightn
1462	Juglans nigra	22	28	45	P1	Prune out one lead(middle), eventually just keep1
1463	Juglans nigra	91	60	80	P3	Prune off birch, DWP
1469	Juglans nigra	34	35	36	P1	Reduce lower lat. CR for path
1473	Juglans nigra	24	27	45	P4	Hanger
1475	Juglans nigra	33	25	49	P4	Hanger. CR, reductions on laterals
1476	Juglans nigra	32	43	40	P1	CP off path
1477	Juglans nigra	42	48	35	P4	DWP, sub aggressive lead
1479	Juglans	31	32	25	P4	Formative prune, subord
1481	Juglans nigra	32	29	35	P4	SP
1488	Juglans nigra	31	26	30	P1	Hazard prune, SP
1488	Juglans nigra	31	24	40	P1	Haz over path, reduce codom
2325	Acer negundo	19	18	30	P2	V
2333	Acer negundo	23	12	25	P4	DWP
2334	Acer negundo	19	11	25	P1	Sub side lead over path
2343	Acer negundo	44	27	35	P3	Prune off to favor persimmon
2346	Acer negundo	50	60	40	P4	Heavy reduction?
2348	Juglans nigra	67	46	64	P1	Prune off new path
2349	Juglans nigra	28	25	35	P3	Prune off neighbor? SP
2350	Betula nigra	24	35	37	P1	CR for path, reduce aggressive laterals
2353	Fraxinus sp.	78	42	57	P1	Hazard removal
2355	Acer negundo	35	35	45	P3	DWP - away from Platanus , cut base suckers
2356	Acer negundo	24	26	40	P4	Reduce lead at first to limit competing
2360	Acer negundo	22	12	30	P4	DWP
2361	Acer negundo	38	27	35	P4	DWP
2363	Acer negundo	17	12	25	P4	DWP
2364	Gleditsia triacanthos	29	16	50	P1	DWP, V, little competing lead Lean twds rd
2366	Gleditsia triacanthos	28	25	45	P4	GR, DWP, cut spines to 6 ft?
2369	Acer negundo	24	20	30	P4	Prune codom, DWP
2371	Fraxinus sp.	34	22	35	P2	V
2373	Salix nigra	18	36	25	P4	3 leads. Prune lower dead. Select best?
2374	Fraxinus sp.	52	43	30	P1	CR for mower, SP
2393	Fraxinus sp.	22	12	30	P2	V
2405	platanus occidentalis	68	31	55	P2	invasive viburnum below
2501	Acer negundo	13	10	12	P2	Big vines
2504	Acer negundo	108	54	50	P1	Hazard prune, endweight reduction on laterals DWP
2505	Acer negundo	70	40	45	P4	Upper lead decayed- reduce fail likelihood.offwal
2506	Mora rubra	22	26	30	P4	SP,
2507	Acer negundo	56	23	30	P3	Prune off mulberry?
2509	Juglans nigra	30	32	35	P1	SP, CP
2512	Fraxinus sp.	20	18	20	P2	V
2515	Acer negundo	32	25	30	P1	CP
1432 / 265	Juglans nigra	45	42	50	P1	CP over path
1954-0838-A	quercus rubra	146	41	60	P1	DWP haz over exclus and PMRTAX
1954-1096-A	Platanus occidentalis	115	100	95	P1	DWP, CP? EWP?
1984-100-C	Zelkova serata	60	44	40	P1	15 H,Xcavate,StructuralPruning,GirdlingRoot
2006-142-I	taxodium distichum	40	22	50	P4	hanger



- P1 – Hazards / Clearance for Path
- P2 – Vines / surrounding invasives
- P3 – Favor superior specimens
- P4 – Structural Pruning / Deadwooding

**APPENDIX D – MAP OF CURRENT AND PROPOSED VEHICLE PATH**



**APPENDIX E – MAP OF PROPOSED FOOTPATH**

