APPENDIX A

NRC
Natural Resources Consulting, Inc.

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December 16, 2008

Bruce Kaniewski
Ruekert-Mielke
W233 N2080 Ridgeview Parkway
Waukesha WI, 53188-1020

Cc. Ryan Werth

RE: Northeast Neighborhood, City of Fitchburg, Dane County, Wisconsin

Dear: Mr. Bruce Kaniewski

An NRC field botanist toured portions of the proposed North East Neighborhood inventory area (as outlined in the attached Figure 4), in addition to areas south of the inventory area during a field committee meeting on October 7, 2008. During this meeting, preliminary observations of species composition and abundance were made for the forested community south of the inventory area. This area is a disturbed mesic forest dominated by black locust (*Robinia pseudoacacia*) and box elder (*Acer negundo*), with abundant common buckthorn (*Rhamnus cathartica*) in the shrub/subcanopy layer. A text box on the attached figure illustrates this area. Dense buckthorn also extends north into the investigation area. An approximate boundary of the extent of the dense buckthorn is illustrated on the attached figure. Buckthorn and other non-native, invasive shrub species are present in many other areas of the investigation area; however this particular area is likely influenced by the disturbed mesic forested located south, and outside of the investigation area.

NRC did not conduct a detailed floristic inventory of the forested areas outside of the investigation area. As such, vegetation observations of these areas are incidental in nature and should not be compared to the qualitative surveys conducted within the investigation area. A thorough floristic inventory is recommended for these areas.

Sincerely,

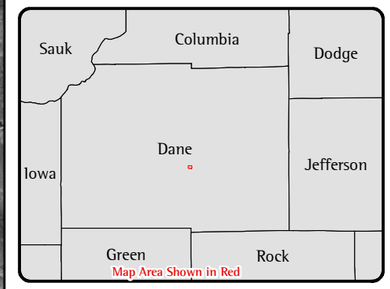
Natural Resources Consulting, Inc.

Melissa Curran

Melissa Curran
Environmental Scientist/ Botanist

Figure 4. Field Data

NE Neighborhood Resource Inventory



Location

SEQ S1, T6N, R9E
Dane County, WI

0 125 250 Feet

Project Information

Project Number : 008-0022-01
Modified September 22, 2008

Legend

- Approximate Inventory Area
- Heritage Trees
- Specimen Trees **
- Natural Spring
- Field Verified Intermittent Stream
- Aerial Delineated Wetlands
- Sample Plots
- Community Boundary
- Transition Zone
- Parcel Boundary
- Section Lines

DNR 24k Hydrography

- Perennial Stream
- Intermittent Stream
- Waterbody

** Larger Specimen Trees, ranging from 33" - 37" DBH

Data Sources include WDNR, USFWS, USGS, WDOA, & WDOT. Orthophotography: 2005

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NE Neighborhood Plan Tree Inventory.mxd Map Created by M. Porzky

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September 25, 2008

Mr. Steve Brunner
Ruekert Mileke
W233 N2080 Ridgeview Pkwy.
Waukesha, WI 53188

RE: Final Report - Northeast Neighborhood Resource Inventory and Analysis, NRC Project # 008-0022-01, City of Fitchburg, Dane County, Wisconsin

Dear Mr. Brunner,

Natural Resources Consulting, Inc. (NRC) is pleased to provide you with the final report for the Resource Inventory and Analysis for the large woodland tract located within the proposed Northeast Neighborhood (Figure 1). NRC has provided detailed information on the ecological resources present within the large woodlot located in the northern portion of the Northeast Neighborhood; hereby referred to as the "Project Area."

The Project Area is located in Section 1, Township 6 North, Range 9 East, in the City of Fitchburg, Dane County, Wisconsin (Figure 1). More specifically, the Project Area is located east of County Road MM, south of East Clayton Road and west of Larsen Road. The Project Area is part of the Southeast Glacial Plains Landscape which is made up of glacial till plains and moraines. The dominant land use within the Northeast Neighborhood planning area is agriculture; however the Project Area consists largely of a closed canopy hardwood forest with scattered residential development. Surface water drainage from the Project Area contributes to the Lake Monona-Yahara River watershed which is part of the Lower Rock River watershed.

This report details the methodology and results obtained from the tree and plant inventory and rare species survey; in addition to an environmental review of the soils, slope and erosion capability, wildlife use/ values, and any landforms present within the Project Area. A final summary is provided which analyzes the findings and the capabilities, and the implications of such analysis to the development and/ or preservation of the woodlot or sections of the woodlot.

METHODS

Monitoring events were completed during the months of April, May, and September 2008. An initial reconnaissance survey of the Project Area was performed to identify and map distinct community units. Community units were identified based on general uniformity in density, size distribution and species composition. Community unit boundaries were determined and mapped, and representative photographs for each plant community can be found in Attachment A. The mapped community unit boundaries were

digitized onto aerial photography using GIS technology and can be viewed on the attached Figure 4.

Sample plots were then established within each community unit where more species specific information such as percent cover and density of tree species could be determined. Methodology of plot placement was separated into two general categories, subjective and objective. The category used depended mainly on the size and integrity of each community unit. In areas where only one plot was needed, subjective plot placement was used. That is to say, the plot was placed at a carefully chosen site within the community unit so that the data collected from the plot represents the attributes of the community as a whole. The purpose of this methodology is to characterize the integrity of the community, which sometimes requires deliberately placing plots away from field edges, clearcuts, roadsides, or other anthropogenic disturbances. This was particularly important for Community 3 (Figure 4), where only one sample plot was used to describe the community. In the community units where more than one plot was selected, objective plot placement was used. Here the plots were placed at regular intervals along transects across the entire community. At each sample plot, tree, shrub and herbaceous inventories were conducted following the methodology outlined below.

Tree Inventory

The tree inventory was conducted during the April 2008 monitoring event. The size of each sample plot varied depending on the density of trees within the community. The ideal plot size was estimated by following the zigzag methodology, where the average distance between ten trees was used to determine the appropriate plot radius. Once the ideal plot size was established, it remained the same throughout the community. Twenty sample plots were established in Community 1 (Figure 4) with a radius of 26'4" or $1/20^{th}$ of an acre in size. Two sample plots were established in Community 2 with a radius of 16'8" or $1/15^{th}$ of an acre in size. One sample plots was established in Community 3 with a radius of 26'4" or $1/20^{th}$ of an acre in size. Within the sample plots all trees over 4" diameter at breast height (dbh) were recorded (4.5' feet above grade). Detailed information including the species, health, crown class, and dbh were recorded. Completed data sheets are presented in Appendix B. Data collected from the sample plots was used to determine the relative abundance of each species within the sample plots, average dbh, trees per plot and trees per acre.

In addition to recording all trees greater than 4 inches dbh within the sample plots, NRC identified, recorded and GPS recorded all potential Heritage Trees and larger Specimen Trees within each community. The City of Fitchburg's Parks, Recreation & Forestry Department has defined Heritage Oaks as containing a dbh of at least 38 inches (10-ft circumference) for white and bur oaks and at least 42 inches diameter (11-ft circumference) for pin, black, and red oaks. A meander survey technique was used to locate these trees. Figure 4 illustrates the locations of all Heritage and Specimen Trees and Attachment F provides a key to those trees.

Shrub & Herbaceous Inventory

The shrub and herbaceous inventory took place during the May and September, 2008 sampling event. An approximate percent cover of all shrub species located within the sample plots was recorded. Data collected from this inventory is presented on the Tree Data Sheets in Attachment B.

A quadrat sampling methodology and a meander survey were used to evaluate the herbaceous understory vegetation. The quadrat sampling methodology involved centering four equally positioned square meter quadrats around the sample plot center. Quadrats were placed along each cardinal direction (i.e. north,

south, east and west) approximately 10 feet from the plot center. The percent cover of each species was estimated using 5 % increments.

The average percent cover for each plant species identified was computed for each community, in addition to the average percentage cover for portions of the forested community where/ if noticeable trends existed. The relative frequency for each plant species identified was determined based on the number of quadrats in which the plant was identified.

A comprehensive species list was compiled for each community using a meander survey technique, where the investigator conducted surveys on a controlled intuitive or meander basis. This methodology ensured adequate coverage of the site variations present within each community. The meander surveys were conducted during the months of May and September 2008. A Floristic Quality Assessment was performed for each community using methodology developed by Floyd Swink and Gerald Wilhelm of the Morton Arboretum. This method is based on calculating an average Coefficient of Conservatism (C) and a Floristic Quality Index (FQI) for a site. A predetermined C value was assigned to each identifiable native plant species using locally appropriate values assigned by a panel of botanical expertise. Each native species is assigned a C value which ranges from 0 to 10 and represents an estimated probability that a plant is likely to occur in a landscape relatively unaltered from what is believed to be a pre-settlement condition. C of 0 is applied to a species that demonstrates little fidelity to any remnant natural community; whereas C of 10 is applied to plants that are almost always restricted to pre-settlement remnants. Values lower than 4 generally representing weedy species and values closer to 10 representing more "conservative", rare or disturbance intolerant species.

FQI values were developed for each community within the Project Area using the formula:

FQI = Mean C($\sqrt{}$N)

C= Coefficient of Conservatism

N= species richness (Identifiable Native & Non-native)

FQI has traditionally been calculated using C values and species richness of only native species. However; more recently, scientists have been including the non-native species in the calculations, giving all non-native species a C value of "0". This is done because disregarding the non-native species can often give sites falsely elevated mean C and FQI values that do not reflect the presence or abundance of these less desirable species, which influence the overall floristic quality of an area. This methodology better reflects the actual integrity of a site, rather than simply using native species for the FQI analysis, particularly in highly disturbed conditions dominated by non-native taxa. The comprehensive species lists, with associated FQI calculations are presented in Attachment C.

Because it utilizes measures of floristic diversity and quality, the FQI can be used as one tool to evaluate the biological integrity and lack of disturbance in a particular site. FQI, however, should be used in conjunction with other tools (such as functional assessments, assessments of wildlife habitat, etc.) to evaluate the integrity, quality, and value of a site. While FQI results must be carefully interpreted, especially in small sites or stands, which usually result in lower FQI values regardless of species composition, it is generally accepted that an FQI of 35 and/or a mean C value of 4.0 indicates a site with very high floristic quality and integrity, while an FQI of less than 20 and a mean C value of less than 2.5 indicates that the site is degraded (Swink and Wilhelm 1994).

Rare Species

NRC requested a WDNR Natural Heritage Inventory (NHI) review for the Project Area in February, 2008. A response letter dated April 21, 2008 (Attachment D) provided specific information regarding the potential presence of specific rare species and potential impacts those resources. In response to this letter, NRC conducted a rare species survey for the rare plants listed within the NHI review following the methodology outlined below.

NRC conducted an initial desktop review, where specific habitat and ecosystem requirements, along with flowering periods, were collected for each of the species reported within the NHI review as occurring within 1-2 miles of the Project Area. For specific information regarding the species identified in the NHI review please refer to Attachment D. Flowering period and ecosystem requirements were determined in order to maximize the likelihood of detection. This is particularly important for species that are obscure when not in flower, but also aids in searching for more showy plants and can reduce the amount of time spent surveying.

Two field visits were used in order to cover the various blooming periods of the rare plant species. The spring survey event was conducted in May 2008 and the fall survey was conducted in September 2008. A systematic approach using a controlled, meander survey was used to ensure adequate coverage of the site variations present within each community. This approach is particularly suited for detecting rare and significant plant assemblages or community types within the survey area. In general, the methodology is designed to cover areas that appear likely to have rare plants, based on habitat and the judgment of the investigator. The methodology entails a thorough search of potentially suitable habitat based on a species known characteristics, historic records of species occurrences, and existing site conditions.

RESULTS

Three woodland community types were identified within the Project Area (Figure 4). Community 1 is a dry-mesic forest community that occupies the majority of the northern portion of the Project Area, extending from County Hwy MM in the west to Larsen Road in the east. Community 2 is a small red and white pine plantation located in the southeast portion of Community 1. Community 3 is a small disturbed mesic woodland located southeast of Community 2. Results obtained from the tree, shrub and herbaceous inventory, along with results from the rare species searches are presented separately for each community unit.

Community 1 – Dry-Mesic Forest

Community 1 is a Dry-Mesic forest community dominated by large canopy white, red and bur oak trees (*Quercus alba, Q. rubra*, and *Q. macrocarpa*) ranging in size from 3 to 50 inch diameter at breast height (dbh). This closed canopy community has a diverse sub-canopy layer comprised of the same oak species found in the canopy layer, in addition to shagbark hickory (*Carya cordiformis*), black cherry (*Prunus serotina*), black locust (*Robinia pseudoacacia*), hackberry (*Celtis occedentalis*), and quaking aspen (*Populus tremuloides*). Table 1 provides a summary of the tree density by size class within Community 1. Table 2 provides a summary of the relative abundance of trees and their respective mean dbh represented by each species. The location of each sample plot is identified on Figure 4.

Table 1. Community 1 Tree Density by Size Class

Dbh class (inches)	Average Trees/Plot	Average Trees/Acre
4.0 - 14.9	5.1	102
15.0 - 31.9	1.4	28
>32	0	0.45[1]

[1] Total derived from the meander survey rather than the tree survey. Approximately twenty-seven trees greater than 32 inches dbh were recorded in the 60 acre Community 1.

Table 2. Community 1 Tree Species Composition and Average Dbh

Species Name[2]	Common Name	Average Dbh	Relative Abundance[1]
Prunus serotina	wild black cherry	8.8	15%
Quercus alba	white oak	17.8	14%
Carya ovata	shagbark hickory	7.6	12%
Acer negundo	box elder	8.0	12%
ROBINIA PSEUDOACACIA	black locust	9.1	10%
Ulmus americana	American elm	8.5	7%
Carya cordiformis	pig-nut	6.0	6%
Quercus rubra	northern red oak	16.8	6%
Populus tremuloides	quaking aspen	11.2	5%
RHAMNUS CATHARTICA	common buckthorn	4.9	5%
Quercus macrocarpa	bur oak	17.6	2%
Ulmus rubra	slippery elm	9.6	2%
Celtis occidentalis	northern hackberry	9.3	2%
Populus grandidentata	large-toothed aspen	13.7	1%

[1] Calculated by averaging the total number of each species recorded in the sample plots. A total of 130 live trees were recorded in all 20 sample plots.
[2] All capital letters denotes a non-native species

Although the composition and distribution of the tree canopy and sub-canopy is fairly homogenous throughout this community; distinct variations exist within the shrub and herbaceous communities. Attachment E provides a table which illustrates the herbaceous layer quadrat data from Community 1. This table shows that the dominant herbaceous vegetation includes garlic mustard (*Alliaria petiolata*, 25% cover), broad-leaf enchanter's-nightshade (*Circaea lutetiana*, 8.4% cover), wild geranium (*Geranium maculatum*, 7.8% cover), and may-apple (*Podophyllum peltatum*, 3.9% cover), in addition to non-vegetated cover like bare ground and coarse woody debris with a total cover of approximately 48% cover.

Garlic mustard represents the largest percent cover of herbaceous vegetation; however its distribution is fairly cluster based on the observations made during the meander survey. Attachment H provides the raw quadrat data collected in the field with each species estimated percent cover. For example, garlic mustard reaches an average percent cover of approximately 63% at Sample Plots 1-4, 1-5, 1-6, 1-7, 1-20 and 1-19, while all other plots average together only contain approximately 9% cover. This example shows that garlic mustard is restricted mainly to the north-western portion of the Project Area.

Another example of trends within Community 1 includes the presence/ absence of non-native, invasive shrubs such as honeysuckle (*Lonicera X bella*) and buckthorn (*Rhamnus cathartica*). These species are most notable in the northern portion of Community 1 where they reach approximately 64% cover at Sample Plots 1-9, 1-10, 1-11, 1-16, and 1-17. The community average for all other plots is approximately 24% cover. When these shrub species reach this density the health (i.e., abundance and % cover) of the native understory herbaceous plants is often compromised. This can be quantified by averaging the percent cover of the herbaceous understory plants within only those quadrats at the sample plots mentioned above. Here the percent cover of non-vegetated bare ground reaches over 74% cover when compare to the community average of 43 % cover. In essence, the native understory herbaceous plants are unable to compete with the dense shade of the non-native shrub species.

In comparison, where non-native, invasive shrub cover is minimal the herbaceous understory vegetation is plentiful. This is evident in the south-central portions of the Project Area near Sample Plots 1-1 and 1-2 where non-native shrub cover is less than 10%. Here, the greatest density of native understory herbaceous plants is found. When the percent cover of herbaceous vegetation is averaged for only Sample Plots 1-1 and 1-2, approximately 63% cover of wild geranium (*Geranium maculatum*), 15% cover of garlic mustard, 9% cover of broad-leaf enchanter's nightshade and 7% cover of may-apple (*Podophyllum peltatum*) is observed.

The comprehensive species list with associated FQI data for Community 1 is presented in Attachment C. No rare species were found in this community. The FQI value when considering only native species is 24.9, while the FQI value for all species is 21.9. In addition, the mean C value for only native species is 3.5, while the mean C value for all species is 2.7. Based Swink and Wilhelm's range of FQI values and relative community quality these values generally indicate a moderate quality floristic community.

Community 2 – Pine Plantation

Community 2 is a small pine plantation dominated by 7-13 inch dbh white and red pine (*Pinus strobus* and *Pinus resinosa*). Overall the community has an open shrub layer except along the perimeter where deciduous shrub and tree species persist. In general, the herbaceous layer is minimal in areas heavily shaded by the overstory pine trees, as evident by the percentage of non-vegetated bare ground illustrated in Table 5 below. The average trees per acre within the pine plantation is approximately 127 trees and comprised of dbh between 4 and 15 inches (Table 3). The percentage of species is essentially evenly distributed between red and white pine (Table 4).

Table 3. Community 2 Tree Density by Size Class

Dbh class (inches)	Average Trees/Plot	Average Trees/Acre
4.0 - 14.9	8.5	127.5
15.0 - 31.9	0	0
>32	0	0

Table 4. Community 2 Species Percentage and Average Dbh

Species Name	Common Name	Average Dbh	Relative Abundance[1]
Pinus strobus	white pine	10.6	59%
Pinus resinosa	red pine	10.2	41%

[1] Calculated by averaging the total number of each species recorded in the sample plots. A total of 17 live trees were recorded in both sample plots.

Herbaceous data collected from the quadrats was summarized into percent cover for each species and relative frequency. The relative frequency for each plant species identified was determined based on the number of quadrats in which the plant was identified. The following table (Table 5) contains a listing of all species recorded in the quadrats and their associated frequency and average percent cover.

Table 5. Community 2 Quadrat Data Summary

Species Name	Common Name	Frequency	Average % Cover
Circaea lutetiana	broad-leaf enchanter's-nightshade	100%	35.0
Bare Ground/ Non-vegetated		100%	56.3
Carya ovata	shagbark hickory	50%	0.5
Rubus idaeus var. strigosus	American red raspberry	50%	2.8
RHAMNUS CATHARTICA	common buckthorn	38%	3.3
Ulmus americana	American elm	38%	0.4
Geum canadense	white avens	25%	0.3
SOLANUM DULCAMARA	bittersweet nightshade	25%	0.8
ARCTIUM MINUS	common burdock	13%	0.1
Arisaema triphyllum	Jack-in-the-pulpit	13%	0.1
Galium aparine	sticky-willy	13%	0.6
Prunus serotina	wild black cherry	13%	0.1
Quercus rubra	northern red oak	13%	0.1
Rubus allegheniensis	Allegheny blackberry	13%	0.6
TARAXACUM OFFICINALE	common dandelion	13%	0.1

A comprehensive species list for this community is shown in Attachment C. No rare species were found in this community. Native understory herbaceous plants represent approximately 40% cover while non-native understory herbaceous plants represent approximately 4% cover. The FQI value when considering only native species is 14.8, while the FQI value for all species is 12.6. In addition, the mean C value for only native species is 3.5, while the mean C value for all species is 2.5. Based on Swink and Wilhelm's range of FQI values and relative community quality these values generally indicate a low quality floristic community. In general, very high quality sites have FQI values near 35 and degraded sites have FQI values of less than 20.

Figure 4 illustrates a transition zone surrounding the northern portion of Community 2. This transition zone largely resembles Community 1 species composition and distribution; however there are scattered white and red pine intermixed. Since the overstory pine trees are not as dense as they are within Community 2 there is an understory assemblage more similar to Community 1.

Community 3

Community 3 is a disturbed mesic forest dominated by dense, poorly formed box elder (*Acer negundo*) trees ranging in size from 5-9 inches dbh (Tables 6 & 7). At the sample point shrub cover of honeysuckle is approximately 5%; however, the meander survey observed areas within this community to contained dense shrub cover of large honeysuckle shrubs. Non-vegetated, bare ground remains the highest cover with approximately 41 % cover, closely followed by buckthorn seedlings with an average percent cover of 23.8.

Table 6. Community 3 Tree Density by Size Class

Dbh class (inches)	Average Trees/Plot	Average Trees/Acre
4.0 - 14.9	12	240
15.0 - 31.9	1	20
>32	0	0

Table 7. Community 3 Species Percentage and Average Dbh

Species Name[2]	Common Name	Average Dbh	Relative Abundance[1]
Acer negundo	box elder	6.9	92%
Acer saccharinum	silver maple	15.5	8%

[1] Calculated by averaging the total number of each species recorded in the sample plots. A total of 13 live trees were recorded at the sample plot.

Herbaceous data collected from the quadrats was summarized into percent cover for each species and relative frequency. The relative frequency for each plant species identified was determined based on the number of quadrats in which the plant was identified. The following table (Table 8) contains a listing of all species recorded in the quadrats and their associated frequency and average percent cover. A comprehensive species list for this community is shown in Attachment C.

Table 8. Community 3 Quadrat Data Summary

Species Name	Common Name	Frequency	Average % Cover
Geum canadense	white avens	100%	5.0
RHAMNUS CATHARTICA	common buckthorn	100%	23.8
Viola sororia	door-yard violet	100%	17.5
Bare Ground/ Non-vegetated		100%	41.3
Acer rubrum	red maple	75%	0.8
Circaea lutetiana	broad-leaf enchanter's-nightshade	50%	5.0
ROSA MULTIFLORA	multiflora rose	50%	3.8
Ambrosia trifida	giant ragweed	25%	0.3
Carex rosea	stellate sedge	25%	2.5
Galium aparine	sticky-willy	25%	1.3
Quercus rubra	northern red oak	25%	0.3
TARAXACUM OFFICINALE	common dandelion	25%	0.3
Coarse Woody Debris		25%	2.5

No rare species were found in this community. Native understory herbaceous plants represent approximately 33% cover while non-native understory herbaceous plants represent approximately 28% cover. The FQI value when considering only native species is 16.2, while the FQI value for all species is 13.9. In addition, the mean C value for only native species is 3.0, while the mean C value for all species is 2.2, indicated a very low floristic quality site. Based Swink and Wilhelm's range of FQI values and relative community quality these values generally indicate a low quality floristic community.

ENVIRONMENTAL REVIEW

An initial desktop review of the environmental features present within the Project Area included research on soils, wildlife, wetlands and waterways. A discussion of each is presented below.

Soils

Using the available soil maps (Figure 2), NRC collected detailed information on the soils present within the Project Area. Characteristics associated with the individual soil map units including soil moisture, nutrient regime, slope and erosion capability were also evaluated. The following soil series descriptions are encountered within the Project Area.

The Dodge series consists of deep, well-drained, gently sloping and sloping soils on glaciated uplands. These soils formed under mixed hardwoods in 26 to 36 inches of loess over sandy loam glacial till. These soils have high fertility. The available water capacity is high, and permeability is moderate. The seasonal high water table is at a depth of more than 5 feet. The Dodge silt loam map unit with 6-12% slope (DnC2) is located in the south-central portion of the Project Area. The only limitation of this soil is a sever hazard of erosion. The primary concerns of management are control of erosion and improvement of the organic matter content, tilth of the surface layer, and fertility.

The Kidder series consists of deep, well-drained, gently sloping to very steep soils on glaciated uplands. These soils formed in glacial till under mixed hardwoods. The depth to calcareous glacial till is 24 to 40 inches. These soils have medium fertility. The available water capacity is medium, and permeability is moderate. The Kidder loam map unit with 12-20% slope is found in the western portion of the Project Area. This map unit is on lower side slopes. The hazard of erosion is very severe. The primary concerns of management are improving organic matter content, maintaining tilth, raising the level of fertility, and controlling erosion.

The McHenry soil series consist of deep, well-drained gently sloping to moderately steep soils on glacial uplands. These soils formed in thin loess and sandy loam glacial till under thin stands of mixed hardwoods. The loess is 10 to 15 inches thick over till that is 5 to 20 feet or more thick. The depth to calcareous till is 24 to 40 inches. These soils have a medium level of fertility. The available water capacity is medium, and permeability is moderate. The water table is at a depth of more than 5 feet. Two map units can be found in the Project Area. The McHenry silt loam with 12-20% slope (MdD2) occupies a large area in the western portion of the Project Area. This soil can be found on lower side slopes. This soil has a very severe hazard of erosion. The major concerns of management are improving organic matter content, conserving moisture, maintain tilth, increasing fertility, and controlling erosion. The McHenry silt loam with 6-12% slope (MdC2) can be found in the south-eastern portion of the site (associated with the pine plantation). This map unit is on nearly uniformly shaped middle side slopes. The limitations of this soil are a sever hazard of erosion and a medium available water capacity. The major concerns of management are controlling erosion, conserving moisture, improving the organic matter content and tilth of the surface layer, and increasing fertility.

The Military series consists of moderately deep, well-drained, sloping to steep soils on glaciated uplands. These soils are in areas of shallow glacial drift where sandstone bedrock is exposed. They formed in sandy loam glacial till and sandstone bedrock. The upper part of the soil formed in weathered glacial till about 28 inches thick. The lower part formed in residuum weathered from sandstone. These soils have medium fertility. The available water capacity is medium or low, and permeability is moderate. The root zone is slightly restricted because of the depth of these soils, which ranges from 20 to 40 inches. The water table is at a depth of more than 5 feet. The Military loam with 6-12% slope (MhC2) can be found only in the far southern portion of the Project Area. This map unit is on middle and lower side slopes on uplands. The major limitations to the use of this soil are a sever hazard of erosion and medium available water capacity.

The Sable series is a hydric soil and consists of deep, nearly level and gently sloping, poorly drained soils on low benches in stream valleys. These soils formed under sedges in deep silty material more than 4 feet thick. Neutral sandy outwash underlies the silt in most places. Sable soils have high fertility. The available water capacity is high, and permeability is moderate. The seasonal high water table is between the surface and a depth of 1 foot. The Sable silty clay loam with 0-3% slope can be found in the northeast portion of the Project Area.

The St. Charles series consist of deep, nearly level to moderately steep, well drained and moderately well drained soils on glaciated uplands. These soils formed in deep loess and loamy glacial till under mixed hardwoods. They formed in 40 to 60 inches of loess and in the underlying loamy outwash or sandy loam till. Slope commonly is 0 to 15 percent but ranges from 0 to 30 percent. These soils have high fertility. The available water capacity is high and permeability is moderate. The seasonal high water table is below a depth of 3 feet, and is usually is below a depth of 5 feet. Two map units can be found in the Project

Area. The St Charles silt loam with 2-6% slope (ScB) is found in a narrow portion of the south-east corner of the Project Area. This soil is characteristically found on ridgetops and upper side slopes. This map unit has moderate hazard of erosion. The St Charles silt loam with 6-12% slope (ScC2) occupies a large are in the central portion of the Project Area. This soil is characteristically found on nearly uniformly shaped middle side slopes. The major concerns for management are controlling erosion. (Both are woodland suitable)

The Troxel series contains possible hydric inclusions and consists of deep, gently sloping well drained and moderately well drained soils in draws, on fans, and in drainageways. They are below steeper, silty soils. Troxel soils have high fertility. The available water capacity is very high, and permeability is moderate. The soils are strongly acid to neutral. The water table is below a depth of 3 feet, and it is generally below a depth of 5 feet. Flooding is frequent. The Troxel silt loam with 1-4% slope can be found in the northwestern portion of the Project Area. This map unit is subject to frequent flooding of short duration. The hazard of erosion is moderate. Gullying is especially difficult to control. The main concerns of management are control of flooding and erosion and maintenance of the organic matter content and tilth of the surface layer. Grassed waterways or mechanical structures help to prevent gullying.

The Virgil series contains possible hydric inclusions and consists of deep, nearly level and gently sloping, somewhat poorly drained soils on low benches on uplands and in stream valleys. These soils formed in deep loess and glacial till or sand and gravel outwash under mixed hardwoods and an understory of grasses. These soils are high fertility. The available water capacity is high, and permeability is moderately slow. The seasonal high water table is above a depth of 1 to 3 feet in spring. The Virgil silt loam with 1-4% slope can be found in the north-central portion of the Project Area, adjacent to the Sable series. The limitations to use of this soil are a moderate hazard of erosion and moderate wetness. Protection from runoff from higher lying areas and removal of excess subsurface water help to control erosion and reduce wetness.

The Wacousta series is a hydric soil and consists of deep, nearly level, poorly drained soils on low benches in old lake basins. These soils formed under sedges in silt that has a few very thin layers if very fine sand. These soils have low fertility. Available water capacity is high, and permeability is moderately slow. The seasonal high water table is at a depth of 1 foot or less. Because these soils are alkaline throughout the profile, available phosphorus is deficient. The Wacousta silty clay loam (Wa) map unit is found only in the northeast corner of the Project Area.

Wetlands/Waterways

The Wisconsin Wetland Inventory (WWI) identifies one wetland (Figure 3) located within the northeast portion of the Project Area. NRC also aerially delineated a wetland in the same general area as the WWI data. Field investigations yielded a perennial spring located in the north-central portion of the Project Area (Figure 4) which contributes to the base flow of a perennial/ intermittent waterway extending north into the wetland area.

Wildlife Description

As part of the overall environmental review an effort was made to identify wildlife species that are likely to inhabit the Project Area. This evaluation was made by comparing the habitat present within the Project Area to the habitat requirements for species known to reside in or frequent this geographic range. Also, wildlife species observed while conducting the vegetation/tree inventory and other site visits, were

documented. Descriptions of the habitat are presented in the preceding sections of this document. Based on the primarily forested habitat present within the Project Area the list of species potentially present is somewhat limited to those species having an affinity to such habitat. Anecdotal observations of wildlife species and/or indications of their presence include: white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), gray squirrel (*Sciurus carolinensis*), American robin (*Turdus migratorius*), gray catbird (*Dumetella carolinensis*), wild turkey (*Meleagris gallopavo*), common crow, (*Corvus brachryhynochos*) blue jay (*Cyanocitta cristata*), white-breasted nuthatch (*Sitta carolinensis*), and downy woodpecker (*Picoides pubescens*). An in depth list of additional species that could potentially reside on or seasonally inhabit the Project Area can be found in Attachment G

SUMMARY

NRC has completed the resource inventory and analysis for the large woodland tract located within the northern portion of the proposed Northeast Neighborhood planning area. The following summary highlights the primary findings of this environmental assessment exercise and offers insight to the potential limitations of implementing development within the Project Area or portions of the area, and/or the challenges of restoring and managing the integrity of this natural community. Table 9 below provides a summary of the floristic quality for each community unit within the Project Area.

Table 9. Floristic Quality within the Northeast Neighborhood planning area

Community Unit	Native vs. All Species	Species Richness	Mean C Value	FQI
Community 1	Native	51	3.5	24.9
	All Species	66	2.7	21.9
Community 2	Native	18	3.5	14.8
	All Species	25	2.5	12.6
Community 3	Native	30	3.0	16.2
	All Species	41	2.2	13.9

As discussed in more detail above in the results section, Community 1 is considered moderate in floristic quality. However, unlike Communities 2 and 3, the age structure and spatial distribution of the dominant oak canopy suggests a forest which has persisted for at least 100 years. While the canopy tree species have remained unaltered for quite some time, the relatively recent invasions of non-native plant species like garlic mustard, buckthorn, and honeysuckle have significantly altered the native understory plant assemblages. As a result, there is great restoration potential for this community. However restoring the native understory plant assemblages could prove challenging given the nature of the invasive species in question and the challenges with various landowners.

The wildlife habitat and wildlife species composition within the Project Area is not unique to this geographic area. However, within this rapidly developing landscape, the Project Area provides a relatively large tract of moderate quality contiguous habitat. As a result, there is an abundance of white-tailed deer, wild turkey, squirrels and other species occupying this parcel. Deterioration of the existing habitat by encroachment of non-native species has, and will continue to reduce the habitat diversity and ultimately the numbers of each species this habitat can support. Restoration and maintenance of this woodland community would help to maintain, and potentially increase the diversity and number of wildlife species occupying the Project Area.

Development within Community 1 has the potential to impact the health of the mature overstory canopy. Communities 2 and 3 are likely much younger stands with significantly lower floristic quality. If development were to occur in these two areas, there would be limited impacts to the floristic diversity within these communities. Also, development would reduce the quality and quantity of habitat available for wildlife. This would cause certain species, such as deer and turkey that are less tolerant of human activity, to be displaced to other available habitat in the general area.

Further challenges to development relate to the topography and hydrology within the Project Area. For example, the southern and western portions of the Project Area exhibit severe to very severe hazards of erosion based on the available soil data and field observations. In addition, the northern portion of the Project Area is subject to frequent flooding and gullying if erosion in upland areas is not controlled. The current vegetation cover helps mediate this erosion potential by stabilizing the soil and buffering the effects of significant rain events. Long-term stormwater management and erosion control measures will be of great importance in any development scheme for this area.

LITERATURE CITED

Swink, F. and G. Wilhelm. 1994. *Plants of the Chicago Region*. 4th ed. Indiana Academy of Science, Indianapolis. 921 pp.

Sincerely,

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Enclosures:

Figures:
Figure 1: Project Location and Topography
Figure 2: NRCS Soil Survey Data
Figure 3: WI Wetlands Inventory Data
Figure 4: Field Data
Attachment A: Photographs
Attachment B: Tree Data Sheets
Attachment C: Species Lists
Attachment D: WDNR NHI Review Letter
Attachment E: Community 1 Herbaceous Layer Quadrat Data Summary
Attachment F: Heritage and Specimen Trees
Attachment G: Wildlife Species
Attachment H: Raw Quadrat Data