

**ECOLOGICAL ASSESMENT
AND PHOTOGRAPHIC LOG
2010**

for

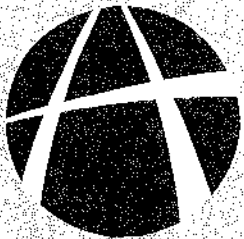
**ARBOR HILLS
CONDOMINIUM ASSOCIATION**

in

**Ann Arbor, Washtenaw County, Michigan
(T02S R06E Section 11)**

Atwell, LLC Project No. 08004831

February 3, 2010



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1.0 INTRODUCTION

Atwell, LLC (Atwell) was contracted by Arbor Hills Condominium Association (AHCA) in December 2009 to provide ecological services to comply with the Master Deed requirements regarding the management of existing natural features surrounding the low impact design of Arbor Hills Condominium development located west of M-23 and south of M-14 in the city of Ann Arbor, Washtenaw County, Michigan (T02S R06E Section 11). A *Site Location Map* is presented in **Appendix I**.

The purpose of this Ecological Assessment is to perform a detailed evaluation of natural wetlands, wetlands used for storm water retention (storm water retention basins), and the mitigated wetland present at the site in order to obtain baseline information and track their status and trends. These tasks are specifically geared to comply with Sections 7.04, 7.05, and 7.06 of the Master Deed requirements to which AHCA wishes to abide.

The completion of this project is seasonally dependant. We began this assessment with an initial site visit and water quality testing of storm water retention basins in December 2009. To assess function and value of all wetlands on site and to reach the project's objectives, please note that additional site visits are required. Baseline information gathered during this initial assessment will aid future vegetation and fauna surveys, as well as consecutive water quality measurements.

Upon completion of wetland inventories and evaluations, Atwell will provide recommendations for management, monitoring, and additional study of all assessed areas. These recommendations will follow the Action Plan Guidelines provided by AHCA.

Atwell anticipates that additional site assessments will occur in 2010 and then continue on a biannual schedule for a number of years set by AHCA.

2.0 WETLAND INVENTORY METHODS

Natural wetlands and wetlands storm water retention basins on site were evaluated using the Michigan Rapid Assessment Method (MiRAM). The MiRAM is a rating system developed by the Michigan Department of Natural Resources and Environment (MDNRE) to compare wetland's functional value in Michigan regardless of their ecological type. The MiRAM offers a relatively rapid assessment that provides a numerical score reflecting the total functional value of a wetland, including a wetland's ecological condition (integrity) and its potential to provide ecological and societal services (functions and values). The numerical score, however, should not be considered an inherent and absolute evaluation of a wetland's quality. Rather, the numeric score must be considered in light of other available information about the nature of the wetland. *MiRAM Quantitative Criteria Summary* is presented in **Appendix II**. A more detailed explanation of individual MiRAM quantitative criteria is given later in this report.

To complement MiRAM metrics, complete fauna and vegetative species surveys will be conducted identifying any species of concern (e.g. invasive species) as well as those of special interest, such as species listed on the State or Federal endangered and threatened species list.

Vegetative species surveys should include percent cover and diversity metrics to assist in determining population changes over time. A general vegetation assessment will take place initially during our first visit to obtain baseline information regarding this metric since identification of many grasses, shrubs and trees is still possible in winter. However, additional, more extensive vegetation surveys and analysis should be performed to accurately document the vegetative community present in each of the wetlands evaluated during the initial visit.

Fauna species surveys will consist of careful habitat inspections to determine wildlife habitat usage. These surveys will focus on indicator species such as macroinvertebrates, avian, amphibian and reptiles, and should be conducted in spring.

Michigan's endangered and threatened species are protected under Part 365 of the Natural Resources and Environmental Protection Act, and Act 451 of the Michigan Public Acts of 1994. Federally listed species are protected under the United States Endangered Species Act of 1973. Special concern species, exemplary natural communities and other unique natural features are not legally protected by the state or federal endangered species legislation, but they are considered to be rare and should be protected to prevent future listing.

As indicated in the MiRAM protocol, a formal online request to the MDNRE was requested on December 23, 2009 to check the AHCA location against known localities for rare species and high quality natural communities, which are recorded in a statewide database. A preliminary result of the MDNRE online database search identified the site as a potential location of unique natural features. A formal written response from the MDNRE was received on January 22, 2010. This result does not guaranty the presence of unique natural features, but represents known historical presence.

Information from the MDNRE indicated a positive match of the AHCA location with known presence of two plant species listed as state endangered, sullivant's milkweed (*Asclepias sullivantii*) and jacob's ladder (*Polemonium reptans*). Sullivant's milkweed occurs primarily in disturbed habitats such as old fields with secondary moist prairies. Jacobs ladder inhabits fens and wet prairies, but in most of its range it is found in moist forested or forest edge habitats, where is known to occur under sugar maple, elm, white ash, hackberry, cottonwood, box-elder, sycamore, and/or Ohio buckeye. This species is sensitive to hydrologic alterations.

Atwell did not conduct direct searches and/or identified the species listed above or other threatened or endangered species during the site visit. Although habitat for these species is very limited within AHCA and the site has been relatively disturbed by development, a survey could be conducted to determine their presence or absence upon approval by AHCA. The *MDNRE TES Response Letter* and *Natural Features Map* are presented in **Appendix III**. It should be noted that a statement of no effect as requested by the MDNRE written response is not needed because Atwell is conducting an ecological assessment and no disturbance to the site is anticipated.

In addition to aforementioned methods, storm water retention basins will include an additional assessment. Water quality testing will be performed to obtain base level information for the following parameters: dissolved oxygen, fecal coliforms, pH biochemical demand, temperature, total phosphate, all nitrogen compounds, major ions, turbidity, and total solids.

Water quality analysis for fecal coliforms, biochemical oxygen demand, total phosphate, all nitrogen compounds, major ions, and total solids will be performed by Fibertec Environmental Services in accordance with NELAC Standards. Measurements for pH, turbidity, dissolved oxygen, and temperature will be obtained in the field during our initial site visit utilizing a Horiba Water Quality Checker U-10. Water quality measurements will be repeated once during additional site visits to commence upon approval by AHCA.

3.0 MIRAM QUANTITATIVE CRITERIA

A brief summary of individual MiRAM quantitative criteria (i.e. metrics and sub-metrics) and wetland ecological attributes that were and will be evaluated during our site visits is provided below. Please refer to this section when reading site observations and measurement results. These criteria are associated with wetlands ecological functions such as:

- Flood and Storm Water Control
- Protection of Subsurface Water Resources
- Pollution Treatment and Erosion Control
- Ecological: Wildlife Habitat and Food Cycles
- Scenic, Recreational, and Cultural Values
- Wetland Size
- Amount of Remaining Wetland in a General Area
- Proximity to Waterways

3.1 Wetland Size and Distribution

The size of a wetland is an important metric not only because larger wetlands are generally more resistant to disturbance and are typically more biologically diverse than smaller wetlands, but also because their ecological functions are greater. The distribution of wetlands in this case refers to their "scarcity," an estimation of wetland remaining within a two mile radius of the wetland's center. High value is placed on wetland remnants because their ecological functions.

3.2 Buffers and Intensity of Surrounding Land Use

Wetlands located between uplands and water resources act as agents of water quality control by sediment trapping, chemical detoxification, and nutrient removal when they intercept runoff from land before it reaches open water. Wetlands without upland buffers (i.e. landscape features that protect the biological, physical or chemical integrity of a wetland from surrounding disturbances) or wetlands located in areas of intensive land use are often subject to greater degrees of disturbance and degradation. Buffer areas possible in an urban setting such as the AHCA site include: shrubby margins, forested areas, or lightly managed vegetative areas. Non-buffer areas present at the AHCA site include: roads, road shoulders, houses, impervious surfaces, and mowed lawns. Surrounding land use is evaluated using an aerial photograph to set 1000 ft radius around the evaluated wetland, and then noting the approximate percent contribution of four land use types: maturing forest, shrubland, commercial & industrial, and residential houses and lawns.

3.3 Hydrology

Hydrology is the most important determinant for the establishment and maintenance of specific wetland types and wetland processes. Sources of water, hydrologic connectivity, hydroperiods and the degree in which the wetland's hydrology has been altered by human activity are all factors that influence wetlands functions and values.

3.4 Habitat Alteration and Habitat Structure Development

Fragments of natural habitat within suburban and urban areas provide refuge to a variety of native wildlife and allow residents to experience nature in their immediate surroundings. A good measure of the functionality and value of a wetland is whether it provides quality habitat year round for both resident and migratory species. This metric evaluates alteration of substrate/soil, as well as alteration of natural habitat and its development.

3.5 Vegetation, Interspersion, and Microtopography

This metric evaluates the wetland's vegetation components through a qualitative cover scoring table based on the complexity of the dominant vegetation within 3 types of overlapping layers: Forest overstory, Shurb/Sapling, Herbaceous. In addition, it accounts for the degree of horizontal interspersion (e.g. heterogeneity of the vegetative community that provides ecological complexity), coverage of highly invasive plant species, habitat features present, and open water component.

3.6 Scenic, Recreational, and Cultural Value

Wetlands provide valuable open space for visual and recreational enjoyment and also provide residents with the opportunity to experience nature in their daily lives. This metric evaluates wetlands in terms of their scenic value and recreational opportunities they offer.

3.7 Water Quality

This parameter only applies to storm water retention basins. Water quality refers to parameters of water based on physical, chemical, and biological characteristics. Through their filtering functions, wetlands help indirectly to maintain water quality of streams and lakes. Testing of stormwater retention basins is a way to assess whether the wetland is removing pollutants from the water.

4.0 SITE OBSERVATION AND MEASUREMENTS

Atwell's first site visit took place on December 22, 2009. The primary objectives of this site visit were to locate the wetlands on site, assess each wetland using the MiRAM criteria, conduct a general vegetation assessment, and obtain water samples from storm water retention basins.

Atwell located six natural wetlands, three wetlands used as storm water retention basins, and one mitigated wetland used for storm water retention. Please refer to the *Wetland Location Map* in **Appendix IV** and the *Photographic Log* in **Appendix V** for reference.

As indicated earlier in this report, these assessments are preliminary due to the season and weather conditions in which the site visit took place, impeding complete vegetation and wildlife surveys. A preliminary Vegetation List of herbaceous, shrubby, and woody plant species

identified within all wetlands and their associated uplands was compiled to review in conjunction with MiRAM Scores. *MiRAM Assessment Data, Summary of Categorization, and Vegetation List* from our initial site visit are presented in **Appendix VI**. Please note that categories and scoring “break points” are based on Ohio Rapid Assessment Method (ORAM), an equivalent wetland assessment method used in the State of Ohio. The category scheme is: Category 1: low quality wetlands; Gray Area between Category 1 and 2, Modified Category 2: degraded but restorable Category 2 wetlands; Category 2: medium quality wetlands; Gray Area between Category 2 and 3; and Category 3: high quality wetland.

Wetlands are classified according to dominant vegetation, and can usually be confidently done in any season. The wetlands encountered in the AHCA were classified according to the following categories:

- **Emergent Wetland (EM):** Vegetative classification of a wetland system based on the dominant vegetation consisting of rooted herbaceous plant species that have parts extending above a water surface.
- **Scrub-Shrub Wetland (SS):** Vegetative classification of a wetland system based on the dominant vegetation consisting of woody plants less than 3 inches in diameter but greater than 3 feet in height.

Wooded (Forested) Wetland (PFO): Vegetative classification of a wetland system based on the dominant vegetation consisting of woody plants 3 inches in diameter or greater regardless of height.

4.1 Natural Wetlands

- **Existing Wetland A:** This wetland area is located to the north of Ashburn road within Bayswater Green Commons. This is a small (less than three acre) PFO with scattered SS areas.
- **Existing Wetland B:** This wetland is located to the east of wetland A, within Alwyche Green Commons. This is a very small (less than ¼ acre) PFO.
- **Existing Wetlands C and D:** Both wetlands are adjacent to US-23 and very small (less than ¼ acres). Wetland C is a PFO, and Wetland D is a SS.
- **Existing Wetlands G and J:** Both wetlands are adjacent to US-23. Wetland G is a very small (less than ¼ acre) EM and SS. Wetland J is a small (less than 3 acres) EM.

Based on the scoring breakpoints outlined above, of the six total natural wetlands, three are considered to be Category 2 wetlands, one is considered a degraded but restorable Category 2 wetland, and two are considered to be Category 1 wetlands.

Wetlands A, B, and C are considered to be of medium quality despite their smaller acreage, low interspersions, and proximity to US-23 in the case of Wetland C. Their increased score is primarily related to the forested and shrub/shrub communities they support, which influences not only the buffer surrounding each wetland, but also the amount and quality of habitat features, available. Wetland A in particular is an intermediate to good quality wetland of less than 3 acreages that exhibits a narrow buffer. Wider buffers are ideal but a narrow buffer can still provide protection from anthropogenic activities in adjacent uplands. This appears to be the case for Wetland A, as it has recovered well from past habitat alterations and it currently functions as a good quality PFO and SS wetland that also provides scenic and recreational value to residents.

The MiRAM score of Wetland B increased to a lesser degree also due to the presence of a narrow buffer, the presence of habitat structures, and their esthetic and recreational value for residents.

Wetlands G and J are considered to be low quality wetlands primarily because of their very small size (less than ¼ acre) and location. Both wetlands are adjacent to US-23, which negatively influences the buffer surrounding each wetland, the amount and quality of habitat features present, and the amount of interspersions. Such proximity to US-23 does not protect these wetlands from degradation. This degradation was evidenced in part by the presence of highly invasive species such as common reed (*Phragmites australis*), and reed canary grass (*Phalaris arundinacea*) in both wetlands but to a greater degree in Wetland J.

Wetland D can be classified as degraded but restorable Category 2. Despite its proximity to US-23 and relatively narrow buffer its MiRAM score increased due to its forested component, which in turn increases microtopography. In addition the extent of invasive species was not as evident as in the other two degraded wetlands.

Hydrology in all six natural wetlands was evident even during our winter visit, and exhibited conditions of saturation and inundation. Inundation/Saturation and presence of hydrophilic vegetation are an indication of hydric soils. The USDA Web Soil Survey indicates that the area in which AHCA is located has hydric soils.

4.2 Storm Retention Basins

- Existing Wetland E: This wetland is located to the north of Alwyck commons. This is a medium size (3 to 10 acres) PFO and SS with some emergent vegetation.
- Existing Wetland F: This wetland is located within Ashburham Green Commons and includes a portion of Kilburn Park #1. This is a medium size (3 to 10 acres) PFO and SS.
- Existing Wetland H: This wetland is located in the northernmost section of AHCA within Lochaven Green Commons. This is a medium size (3 to 10 acres) EM with significant amount of open water.

Based on the scoring breakpoints, of the three natural wetlands currently utilized as stormwater retention basins, one is considered to be a Category 3 wetland, one is considered a Category 2 wetlands, and one is considered to be in a Gray Area between Categories 2 and 3.

Wetland F is considered a high quality wetland, which is reflected in its high MiRAM score. This wetland is an extensive SS and PFO system with a wide buffer. The forested component of Wetland F was at least 25% of the total acreage, which increases its ecological function and value because forested wetlands require a long time to recover to their original state after being impacted. Many of the metrics accounted in the MiRAM assessment were similar to Wetland E and H, however, its extent, wide buffer, ability to provide wildlife cover and habitat, hydrologic functions and value increased its overall score.

Wetlands E and H MiRAM score are basically considered of medium quality, with Wetland E having a higher score that places the wetland between Category 2 and 3. The MiRAM score for Wetland E increased because it is approximately 3-10 acres in size with a medium size buffer

around its perimeter. As in the case of natural wetlands, buffers in wetlands used as detention basins also have ecological values and functions.

Wetland E location between a hydrologic feature, in this case a drainage way flowing northeast, and human land use increases its functional value and MiRAM scoring. Although Wetland H is not connected to a hydrologic feature or waterbody, it is permanently inundated. Permanent inundation made Wetland H functionally very similar to Wetland E, and increased its MiRAM score. The duration of standing water and soil saturation often correlates well with the use of a wetland's open water areas as breeding and nursery pools for many types of wildlife and migratory habitat for birds. Despite having low interspersion, and sparse invasive species coverage, both wetlands provided habitat features that increased their value. In addition, both wetlands added scenic and recreational value to the urbanized landscape, particularly Wetland E which was being used as an ice skating rink.

4.2.1 Water Quality

The assessment of wetlands used as storm water retention basins also included a battery of water quality testing. The parameters tested included: pH, total phosphate, dissolved oxygen, fecal coliforms, biochemical demand, temperature, all nitrogen compounds, major ions, turbidity, and total suspended solids. Field measurements were obtained on December 22, 2009, and results for the laboratory analysis were received on January 7, 2010. A *Sample Location Map* and *Water Quality Results* are presented in **Appendix VII**. A brief discussion of the results obtained for parameters important for aquatic life and considered in the National Pollutant Discharge Elimination System (NPDES) is provided below. Information was obtained from online resources provided by the MDNRE and the Environmental Protection Agency (EPA).

Natural water generally has a pH of 6.5 to 8.5. Rule 53 of the Michigan Water Quality Standards (MWQS) specify that a pH of 6.5 to 9 should be maintained in all waters of the state. While there are natural variations in pH many are the result of anthropogenic influences, particularly fossil fuel combustion products that contain nitrogen and sulfur oxides that are converted to their respective acids in the atmosphere, producing acid rain or snow when in contact with air moisture. Levels of pH in retention basins within the AHCA were within normal range, with the exception of Wetland F and Wetland I. These two wetlands exhibited a lower pH level but not below the biological threshold of pH < 5 to which most aquatic fish and macroinvertebrates are sensitive.

The recommended nutrient level for Total Phosphorus (TP) stipulated by the EPA Ambient Water Quality Criteria Recommendations for Lakes and Reservoirs in Ecoregion VII, which includes Michigan, is 14.75 µg/L. This recommendation should be taken as a reference because storm water retention basins are not a lake or a reservoir. Levels of TP in the retention basins within the AHCA were all well above EPA's recommended level. Given the location and characteristics of retention basins within the AHCA, high TP levels are most likely the result of anthropogenic non-point sources, in this case runoff from lawns and residential areas. Generally, phosphorus is a limiting nutrient in freshwater aquatic systems because it is naturally present in low concentrations. In urban/residential settings such as the AHCA, excessive phosphorus concentrations are not uncommon, however, they can cause extensive growth of aquatic plants and therefore induce negative effects in that particular system.

Dissolved Oxygen (DO) refers to the volume of oxygen dissolved in water. Rule 64 of the Michigan Water Quality Standards (MWQS) states that surface water must meet a minimum of 5 mg/L for the protection of warm water fish and aquatic life. However desired levels are 10 mg/L. Levels of DO in the retention basins within the AHCA are well above safe levels. DO measurements were obtained in winter and they may not accurately reflect conditions at these retention basins. The amount of oxygen that can be held by water depends on water temperature, salinity, and pressure. Gas solubility increases with decreasing temperature, as observed here where water temperatures were not above 3 °C. During warm temperatures, systems high in phosphorus have increased abundance of algae growth and microorganisms decompose organic matter at the bottom of the reservoir consuming available oxygen. Given location and high TP levels of these retention basins, it is anticipated that DO levels would be a significantly lower than they currently are.

Biological Oxygen Demand (BOD) is a measure of the quantity of oxygen consumed by microorganisms during the decomposition of organic matter, and it is the most commonly used parameter for determining the oxygen demand on the receiving water of a municipal or industrial discharge. Elevated levels of BOD therefore decrease levels of DO in a waterbody. There are no MWQS pertaining directly to BOD, but elevated BOD levels represent oxygen depletion and can have detrimental effects to aquatic life. BOD levels in the retention basins within the AHCA were not detected, or were above the reporting levels for Wetlands H and I; levels were poor for Wetland E, and good for Wetland F. Similarly to DO, BOD measurements should be taken during the warm season to accurately represent conditions at each specific retention basin.

Nitrates are essential plant nutrients, but excessive amounts nitrates, especially if coupled with phosphorus, can also cause significant water quality problems including increased growth in aquatic plants and depletion of DO. The natural level of ammonia or nitrate in surface water is typically low (less than 1 mg/L), and the effluent of treatment plants can range up to 30 mg/L. Total Nitrogen is the sum of Nitrate-N and Nitrite-N. The recommended nutrient level for Total Nitrogen (TN) stipulated by the EPA Ambient Water Quality Criteria Recommendations for Lakes and Reservoirs in Ecoregion VII, which includes Michigan, is 0.66 µg/L. TN levels in the retention basins within the AHCA were well above the recommended level for lakes and reservoirs. Given the location and characteristics of retention basins within the AHCA, high TN levels are most likely the result of anthropogenic non-point sources, in this case runoff from fertilized lawns and runoff from wildlife waste deposited on natural areas.

Bodies of water usually contain a variety of microorganisms including bacteria, viruses, protozoa, fungi, and algae, which rarely present hazards to human health. Coliforms are bacteria that naturally occur in the environment as well as feces; fecal coliforms and E. coli are only associated with human and animal waste. Testing of total fecal coliforms is a standard measure of water quality monitoring to assure the safety of the drinking water supply (e.g. groundwater and well water) and recreational waters (e.g. beaches). Levels of fecal coliforms for drinking water supply must be less than 1 CFU/100 mL; levels for recreational waters can range from 125 to 235 CFU/100 mL and relate to specific protocols. Level of fecal coliforms in the retention basins within the AHCA are acceptable considering the nature of these basins.

Rule 50 of the MWQS for Total Suspended Solids (TSS), includes a “narrative standard” rather than a numerical level stating that waters of the state should not have unnatural physical properties in quantities which are or might become injurious to any designated use: turbidity, color, oil films, floating solids, foam, settleable solids, suspended solids, and deposits. TSS concentrations of > 20mg/L are considered to be clear and the retention basins within the AHCA are well below that level and are therefore acceptable.

4.3 Mitigated Wetland

- Wetland I: This wetland is located in proximity to Kilburn Park #2. This mitigated wetland consists of four basins (one natural and three constructed wetlands) that result in an EM and a PFO system.

Constructed wetlands to be used as storm water detention basins have many of the same functions and potentially the same values as natural wetlands when they are integrated into low impact residential developments such as AHCA and designed properly.

Wetland I meets the intended functions, however, based on the MiRAM metrics, it is considered to be a degraded but restorable Category 2. The MDEQ considers that the function of constructed wetlands can be greatly diminished if the wetland was constructed primarily from upland as part of a development project for the treatment of stormwater and it is dominated by invasive species. Although true for Wetland I, this system has the potential to increase its value because it does provide a narrow buffer, a forested component, and potential wildlife habitat. In addition, Wetland I adds scenic and recreational value to the AHCA community.

5.0 CONCLUSIONS AND RECOMENTATIONS

Our initial site visit took place in December 22, 2009 with seasonal conditions not ideal for ecological assessments. Although preliminary, these results are positive as well as critical for moving forward with the future ecological assessment to be performed in more ideal conditions during spring and summer as they provide baseline information on the wetland communities present on site.

Atwell identified, classified, and assessed ten wetland communities on site using the Michigan Rapid Assessment Method. Three existing wetlands are currently used as storm water retention basins; six existing wetlands are natural and not impacted by storm water; the remaining natural wetland is part of the mitigated (e.g. constructed) wetland system therefore also used as storm water retention basin.

From the baseline information obtained to date, Atwell estimates that six of the ten wetlands on site are in good ecological condition, and are considered medium to high quality. Of the remaining four, two are low quality, and the other two are considered degraded but with good potential for improving their quality.

There are many activities that AHCA could perform to increase the quality of wetlands that were characterized by the MiRAM as low quality wetlands. The low quality of Wetlands J and G can be addressed by conducting rigorous invasive species control, followed by plantings of wetland

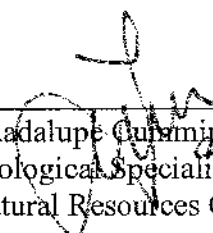
species and placement of habitat structures to provide temporary safety for transient wildlife. Wetlands D and I were characterized as degraded but restorable wetlands, which is very conducive to increasing their quality. Measures applicable for low quality wetlands also apply to Wetlands D and I. In addition, Wetland D could benefit from creating an upland area that connects it to Wetland B, located a short distance to the west, which would involve planting native species and maintaining a buffer for both wetlands. Wetland I, has great potential to become a good quality wetland if in addition to aforementioned measures, an effort is in place to reduce lawn runoff from adjacent properties and Kilburn Park #2.

Wetlands A, B, C, and H were medium quality wetlands. Measures to improve their quality should focus on maintaining the forested and shrub/scrub communities they support, protecting their buffers, controlling invasive species, and actively promoting increased interspersions by planting native wetland plants and monitoring plant diversity. Extra attention should be given to Wetlands B and C due to their small size, proximity to roads, and narrow buffers. Wetlands E and F were good to high quality; however efforts should be in place to maintain such quality, including monitoring for and controlling invasive species, protecting their buffers, maintaining their hydrology, and monitoring native plant diversity.

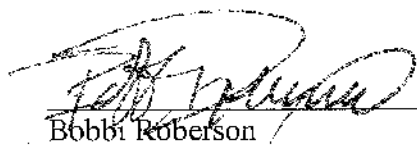
If you have any questions regarding this or any other matter, please feel free to contact our office at (248) 447-2000.

Atwell, LLC Project No. 08004831

This report submitted by:



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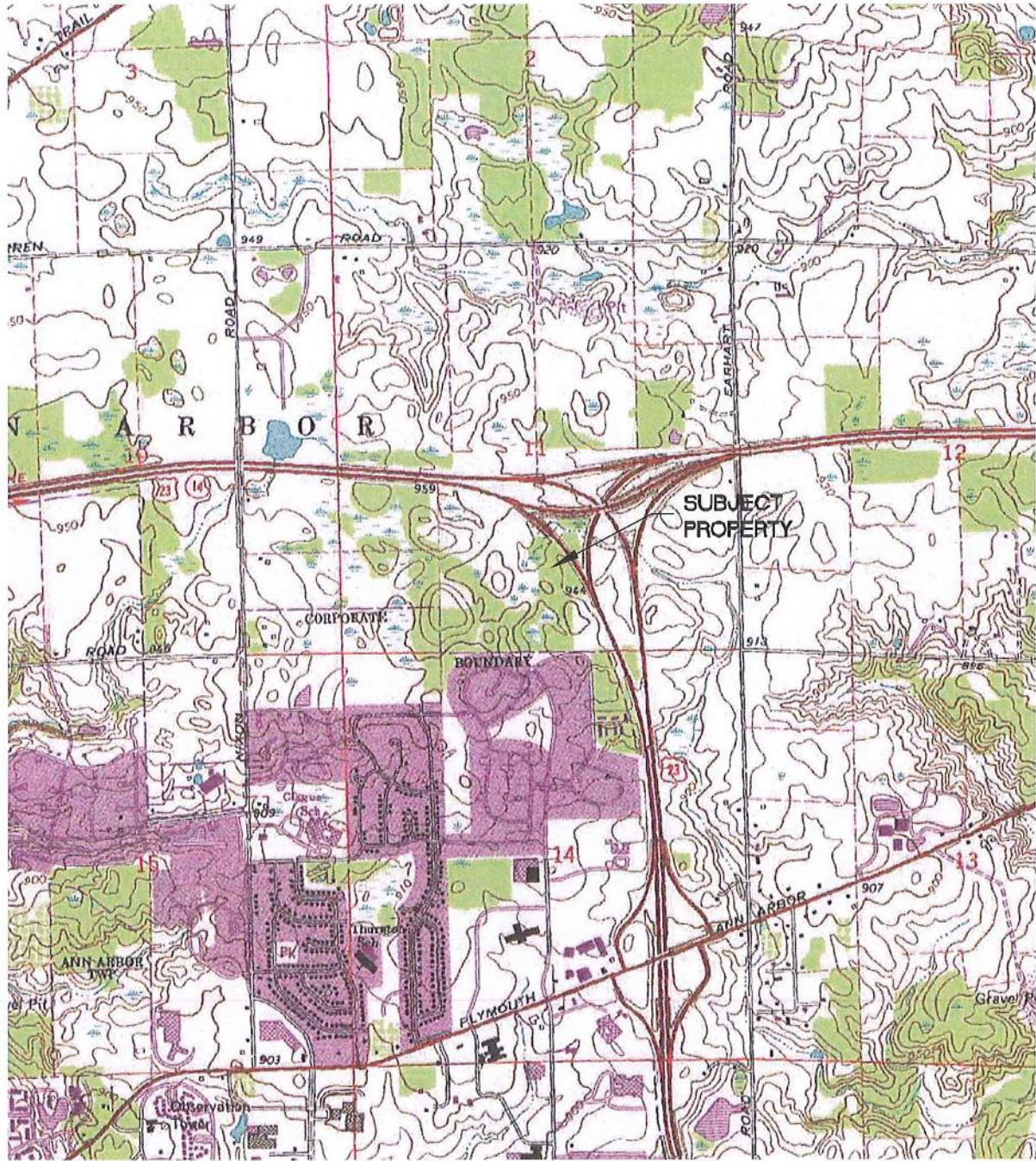
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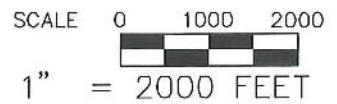
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APPENDIX I

Site Location Map



SITE LOCATION MAP
CITY OF ANN ARBOR
WASHTENAW COUNTY, MICHIGAN



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REFERENCE
USGS 7.5 MIN TOPOGRAPHIC QUADRANGLE
ANN ARBOR EAST, MICHIGAN QUADRANGLE
DATED: 1965, PHOTO REVISIONS: 1983
[T2S R6E SECTION 11]

PROJECT: 08004831
DATE: JANUARY 13, 2010
DRAWN: BWT
CHECKED: GC
CAD FILE: 08004831EC-01



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APPENDIX II

MiRAM Quantitative Criteria

MiRAM Quantitative Criteria

Metric	Title	Submetric	Submetric maximum	Metric maximum
1	Wetland size and distribution	1a. Wetland size	6	9
		1b. Wetland scarcity	3	
2	Buffers and Surrounding land use	2a. Average buffer with around the wetland perimeter	6	12
		2b. Intensity of surrounding land use	6	
3	Hydrology	3a. Sources of water	10	26
		3b. Connectivity	13	
		3c. Duration of Inundation/Saturation	4	
		3d. Alterations to Natural Historic Regime	8	
4	Habitat alteration and habitat structure development	4a. Substrate/Soil disturbance	4	20
		4b. Habitat alteration	9	
		4c. Habitat structure development	7	
5	Special situations	5a. High ecological value	10	10
		5b. Forested wetland	5	
		5c. Low quality wetland	-10	
6	Vegetation, interspersion, and microtopography	6a. Wetland vegetation community	9	20
		6b. Open water component	3	
		6c. Coverage of high-invasive plant species	1	
		6d. Horizontal interspersion	5	
		6e. Microtopography	12	
7	Scenic, recreational, and cultural value		3	3
			Total	100

APPENDIX III

*MDNRE TES Result Letter
And
Natural Features Map*



STATE OF MICHIGAN
 DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENT
 LANSING

JENNIFER M. GRANHOLM
 GOVERNOR

REBECCA A. HUMPHRIES
 DIRECTOR

January 22, 2010

Ms. Guadalupe Cummins
 Atwell, LLC
 Two Towne Square, Suite 700
 Southfield, MI 48076

RE: Arbor Hills Ecological Assessment

Dear Ms Cummins:

The location of the proposed project was checked against known localities for rare species and unique natural features, which are recorded in a statewide database. This continuously updated database is a comprehensive source of information on Michigan's endangered, threatened and special concern species, exemplary natural communities and other unique natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features at a site. The absence of records may mean that a site has not been surveyed. The only way to obtain a definitive statement on the presence of rare species is to have a competent biologist perform a field survey.

Under Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection, "a person shall not take, possess, transport, ...fish, plants, and wildlife indigenous to the state and determined to be endangered or threatened," unless first receiving an Endangered Species Permit from the Department of Natural Resources, Wildlife Division. *Responsibility to protect endangered and threatened species is not limited to the list below. Other species may be present that have not been recorded in the database.*

The presence of threatened or endangered species does not preclude activities or development, but may require alterations in the project plan. Special concern species are not protected under endangered species legislation, but recommendations regarding their protection may be provided. Protection of special concern species will help prevent them from declining to the point of being listed as threatened or endangered in the future.

The following is a summary of the results for the project in Washtenaw County, section 11, T2S R6E.

The following list includes unique features that are known to occur on or near the site(s) and may be impacted by the project.

<u>common name</u>	<u>status</u>	<u>scientific name</u>
Sullivant's milkweed	state threatened	<i>Asclepias sullivantii</i>
Jacob's ladder	state threatened	<i>Polemonium reptans</i>

Sullivant's milkweed has been known to occur in the project area. Sullivant's milkweed occurs primarily in disturbed habitats such as old-fields with secondary prairies, and moist, grassy rights-of-way. At one site in St. Clair County, Sullivant's milkweed grows in an undisturbed small lakeplain wet prairie remnant. Soils are typically moist sandy clay or sandy loam. Elsewhere in its range, *A. sullivantii* is primarily a plant of moist prairies. Flowering occurs by

mid-July with fruits maturing through August.

Jacob's ladder has been known to occur in the vicinity of the project site. Jacob's ladder most frequently inhabits fens and wet prairies in Michigan. It has also been found in moist forested or forest-edge habitats, where it is known to occur under sugar maple, elm, white ash, hackberry, cottonwood, box-elder, sycamore, and/or Ohio buckeye. In much of its range, this is primarily a forest species. This is a perennial species which flowers in Michigan during May or early June. Since Jacob's ladder occurs in both open and shaded situations, it is probably less vulnerable to shading by woody species than many other fen and prairie plants. It is undoubtedly sensitive to hydrologic alterations, however.

In summary, the project site may include suitable habitat for the above listed species. Potential impacts might include direct destruction of species and disturbance of critical habitat. **Clearance from this office in the form of a "No Effect" statement will be needed before land altering activities on this project begin.** To obtain an evaluation for project clearance, please provide at least one of the following to this office:

1. Description of the project area with regard to the species habitat type(s) described above. A recent photo of the project site and a map that shows habitat type(s) and location(s) of the proposed project will be necessary. This can be done by the landowner, other responsible party, or knowledgeable source (i.e. botanist, ecologist, biologist, experienced birder, etc.). This level of evaluation will only define the presence or absence of available habitat. If this office determines that there is no significant available habitat, the project may be cleared at this point. If potential habitat does exist, the next level of evaluation must be undertaken (see options 2 or 3 below).

OR

2. A statement from a knowledgeable source stating that suitable habitat is or is not present and why the project will not impact the species or habitat(s) identified above.

OR

3. Results from a complete and adequate survey by a knowledgeable source showing whether or not the above listed species are present in the affected project area. Guidelines for conducting surveys and a list of consultants who may be able to help conduct surveys can be accessed at: <http://www.michigan.gov/dnrenreview> For additional information, including consultation with biologists, please contact me at the e-mail or phone number below.

In most situations, the most efficient, thorough, and expeditious evaluation of the project and its impacts results from option 3. Please provide information **in writing** to the mailing address or e-mail provided below.

Michigan Department of Natural Resources
Wildlife Division – Natural Heritage Program
PO Box 30180
Lansing, MI 48909

Thank you for your advance coordination in addressing the protection of Michigan's natural resource heritage. If you have further questions, please call me at 517-373-1263 or e-mail at SargentL@michigan.gov.

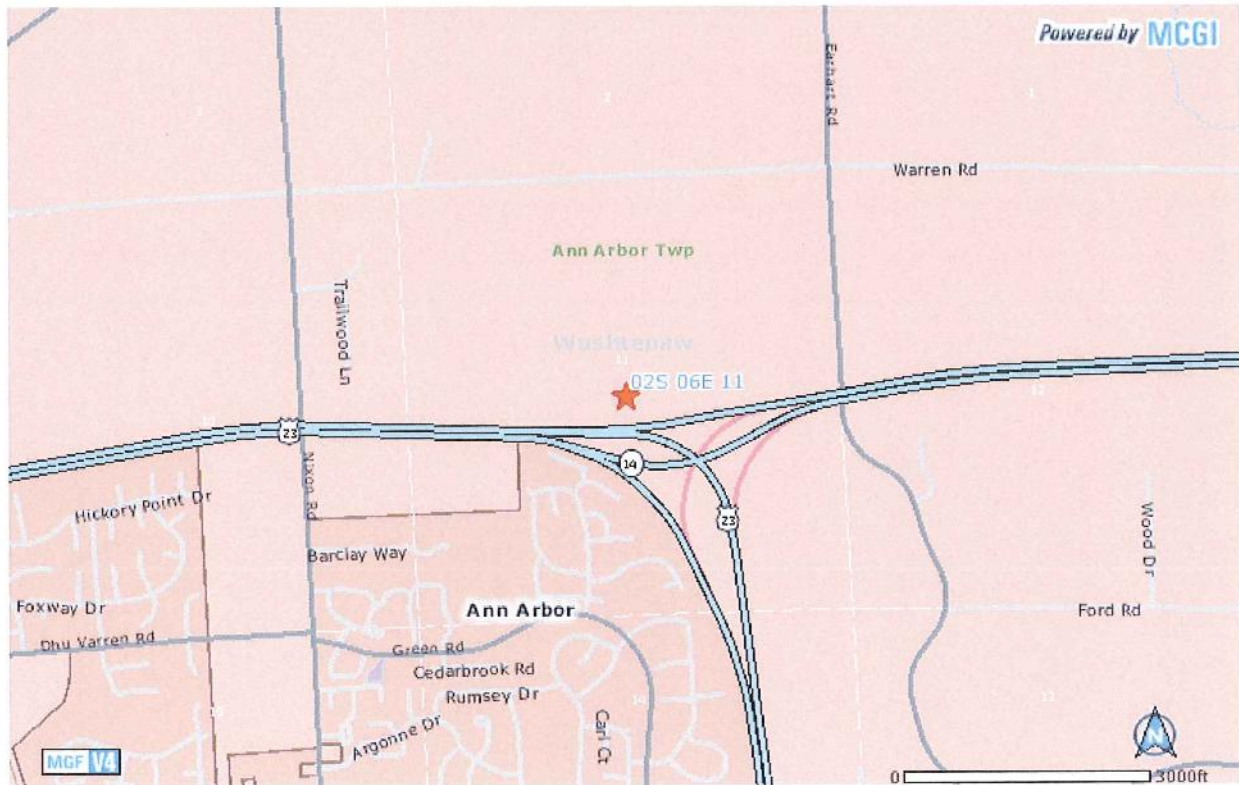
Sincerely,



Lori G. Sargent
Endangered Species Specialist
Wildlife Division

ENDANGERED SPECIES ASSESSMENT

1/5/2010



Disclaimer: No warranty, expressed or implied is made and no liability is assumed by the State of Michigan in general or the Michigan Center for Geographic Information in specific as to the accuracy or usability of this data.

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APPENDIX IV

Wetland Location Map



ATWELL
 866.850-4200 | www.atwell-group.com
 OFFICES IN NORTH AMERICA AND ASIA



PROJECT: 08000-4831
DATE: JANUARY 13, 2010
DRAWN BY: RWT
CHECKED BY: GC
SCALE: 1" = 300' SEE SHEET 02

WETLAND LOCATION MAP
 CITY OF ANN ARBOR
 WASHINGTON COUNTY, MICHIGAN
 REFERENCE
 A-1-03-03-000000-0000
 2005 AERIAL PHOTOGRAPHY
 AERIAL PHOTOGRAPHY, ALL RIGHTS RESERVED
 WASHINGTON COUNTY, MICHIGAN



LEGEND: — APPROXIMATE WETLAND BOUNDARY

APPENDIX V

Photographic Log

PHOTOGRAPHIC LOG



1) Wetland A: Natural PFO and SS wetland within Bayswater Green Commons



2) Wetland B: Natural PFO wetland in the vicinity of Alwyck Green Commons

PHOTOGRAPHIC LOG



3) Wetland C: Natural PFO wetland adjacent to US-23



4) Wetland D: Natural SS wetland adjacent to US-23

PHOTOGRAPHIC LOG



5) Wetland E: Storm water wetland north of Alwych Green Commons showing PFO, and SS areas



6) Wetland E (2): Storm water wetland north of Alwych Green Commons showing SS and EM areas

PHOTOGRAPHIC LOG



7) Wetland F: Storm water wetland within Ashburham Green Commons showing an extensive SS and PFO system



8) Wetland G: Natural SS wetland adjacent to US-23 showing emergent vegetation including invasive species

PHOTOGRAPHIC LOG



9) Wetland H: Storm water wetland within Lochaven Green Commons showing a EM and open water system and forested buffer



10) Wetland H (3): Storm water wetland within Lochaven Green Commons showing habitat use by Muskrat

PHOTOGRAPHIC LOG



11) Wetland I: Mitigated wetland in the vicinity of Kilburn Park #2 showing one of three retention basins and water intake



12) Wetland I (2): Mitigated wetland in the vicinity of Kilburn Park #2 showing emergent vegetation within a greater SS system

PHOTOGRAPHIC LOG



13) Wetland I (3): Mitigated wetland in the vicinity of Kilburn Park #2 showing one of three retention basins and EM system



14) Wetland J: Natural wetland adjacent to US-23 showing EM vegetation including invasive species