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BRIGHTMOOR CHRISTIAN CHURCH
PARKING LOT EXPANSION
SP 12-25

BRIGHTMOOR CHRISTIAN CHURCH – PARKING LOT EXPANSION SP12-25

Consideration of the request of Wilson Road Group on behalf of Brightmoor Christian Church for Preliminary Site Plan approval, Special Land Use permit approval, Woodland permit approval, and Stormwater Management Plan approval. Brightmoor Christian Church is located in Section 1, at 40800 Thirteen Mile Road, on the north side of Thirteen Mile Road just west of M-5, in the RA, Residential Acreage District. The subject property is approximately 40.1 acres and the applicant is proposing to expand the existing parking area by 365 spaces to a total of 903 spaces.

Required Action

Approve/deny the Preliminary Site Plan, Special Land Use permit, Woodland permit, and Stormwater Management Plan

REVIEW	RESULT	DATE	COMMENTS
Planning	Approval recommended	06/18/12	• **Woodlands inventory, replacement plan, and tree protection plan to be approved by the City's woodland consultant.** • **Planning Commission to waive the requirement for a Community Impact Statement and a Noise Impact Statement.** • Minor items to be addressed on Final Site Plan.
Wetlands	Approval recommended	05/23/12	Items to be addressed on the Final Site Plan.
Woodlands	Approval recommended	05/31/12	Items to be addressed on the Final Site Plan.
Engineering	Approval recommended	05/22/12	Items to be addressed on the Final Site Plan.
Traffic	Approval recommended	05/18/12	Items to be addressed on the Final Site Plan.
Landscaping	Approval recommended	05/30/12	Items to be addressed on the Final Site Plan.
Fire	Approval recommended	05/14/12	Notes to be added on the Final Site Plan.

Motion sheet

Approval – Special Land Use Permit
In the matter of Brightmoor Church Parking Lot Expansion, SP 12-25, motion to **approve** the Special Land Use permit based on the following findings:

a. Relative to other feasible uses of the site:
   - The proposed use will not cause any detrimental impact on existing thoroughfares *(because the existing use will not change, and its size and scope of operations are not being expanded);*
   - The proposed use will not cause any detrimental impact on the capabilities of public services and facilities *(because the plan adequately addresses management of the increased stormwater volumes);*
   - The proposed use is compatible with the natural features and characteristics of the land *(because the plan does not impact adjacent wetlands and adequately addresses woodland replacement and protection);*
   - The proposed use is compatible with adjacent uses of land *(because the proposed use will not change and the plan adequately buffers the expanded parking lot from adjacent residential uses);*
   - The proposed use is consistent with the goals, objectives and recommendations of the City's Master Plan for Land Use;
   - The proposed use will promote the use of land in a socially and economically desirable manner;
   - The proposed use is (1) listed among the provision of uses requiring special land use review as set forth in the various zoning districts of this Ordinance, and (2) is in harmony with the purposes and conforms to the applicable site design regulations of the zoning district in which it is located.

b. *(additional comments here if any)*

(because the plan is otherwise in compliance with Article 3, Article 4, Article 24 and Article 25 of the Zoning Ordinance and all other applicable provisions of the Ordinance.)

Approval – Preliminary Site Plan
In the matter of Brightmoor Church Parking Lot Expansion, SP 12-25, motion to **approve** the Preliminary Site Plan, subject to the following:

a. Planning Commission waiver of the Community Impact Statement requirement;
b. Planning Commission waiver of the Noise Impact Statement;
c. A revised woodlands inventory, tree replacement plan, and woodlands protection plan to be submitted that addresses the comments of the City's environmental consultant;
d. The conditions and items listed in the staff and consultant review letters being addressed on the Final Site Plan submittal; and
e. *(additional conditions here if any)*

(because the plan is otherwise in compliance with Article 3, Article 4, Article 24 and Article 25 of the Zoning Ordinance and all other applicable provisions of the Ordinance.)

Approval – Woodland Permit

In the matter of Brightmoor Church Parking Lot Expansion, SP12-25, motion to **approve** the Woodland permit, subject to:

a. Compliance with all the conditions and requirements listed in the staff and consultant review letters, particularly the woodlands consultant's review letter;
b. *(additional comments here if any)*

(because the plan is otherwise in compliance with Chapter 37 of the Code of Ordinances and all other applicable provisions of the Ordinance.)

Approval – Stormwater Management Plan

In the matter of Brightmoor Church Parking Lot Expansion, SP12-25, motion to **approve** the Stormwater Management Plan, subject to:

a. The conditions and items listed in the staff and consultant review letters being addressed on the next plan submittal; and
b. *(additional conditions here if any)*

(because the plan is otherwise in compliance with Chapters 11 and 12 of the Code of Ordinances and all other applicable provisions of the Ordinance.)

Denial – Special Land Use Permit

In the matter of Brightmoor Church Parking Lot Expansion, SP 12-25, motion to **deny** the Special Land Use permit for the following reasons...*(because it is not in compliance with the Ordinance.)*

Denial - Preliminary Site Plan

In the matter of Brightmoor Church Parking Lot Expansion, SP 12-25, motion to **deny** the Preliminary Site Plan for the following reasons...*(because it is not in compliance with the Ordinance.)*

Denial – Woodland Permit

In the matter of Brightmoor Church Parking Lot Expansion, SP 12-25, motion to **deny** the Woodland Permit for the following reasons...*(because it is not in compliance with Chapter 37 of the Ordinance.)*

Denial - Stormwater Management Plan

In the matter of Brightmoor Church Parking Lot Expansion, SP 12-25, motion to **deny** the Stormwater Management Plan, for the following reasons...*(because it is not in compliance with Chapters 11 and 12 of the Ordinance.)*

PLANNING REVIEW

cityofnovi.org

PLAN REVIEW CENTER REPORT

June 18, 2012

Planning Review

Brightmoor Christian Church Parking Lot Expansion
SP#12-25

Petitioner
Wilson Road Group, Inc. (David Call)
Brightmoor Christian Church

Review Type
Special Land Use Request and Preliminary Site Plan Review

Property Characteristics

- Site Location: 40800 W. Thirteen Mile Road (north side of Thirteen Mile, just west of M-5)
- Site School District: Walled Lake Consolidated Schools
- Site Zoning: RA, Residential Acreage
- Adjoining Zoning: North: RM-1, Low Density Multiple Family; South (across Thirteen Mile): RA; East (across M-5): OST, Office Service Technology; West: RM-1
- Site Use(s): Brightmoor Christian Church
- Adjoining Uses: North: Lenox Park residential condominiums; South (across Thirteen Mile): Single family, vacant; East (across M-5): Vacant; West: Fox run retirement living
- Site Size: 40.1 acres
- Plan Date: 5/01/201

Project Summary
The applicant is proposing to expand the existing parking lot on the north side of the Brightmoor Christian Church site, resulting in a net increase of 365 parking spaces and a total of 903 spaces. No new buildings or building expansions are proposed. Brightmoor Church is an approved special land use in the RA zoning district. Expansion of a special land use requires a public hearing and special land use approval from the Planning Commission, along with preliminary site plan approval. The proposal also requires approval of the woodlands permit as well as the stormwater management plan.

Recommendation
Approval of the Special Land Use Permit and Preliminary Site Plan is recommended, subject to the applicant submitting a woodland protection and replacement plan satisfactory to the City's environmental consultant. In its recommendation, the Planning Commission will need to consider the standards for Special Land Use consideration of Section 2516.2.c.

Ordinance Requirements

This project was reviewed for conformance with the Zoning Ordinance with respect to Article 3 (RA, Residential Acreage District), Article 4 (R-1 through R-4 Single Family Residential Districts), Article 24 (Schedule of Regulations), Article 25 (General Provisions), and any other applicable provisions of the Zoning Ordinance. Items in **bold** below must be addressed by the Planning Commission. Items that are *italicized* must be addressed on the Final Site Plan submittal.

1. Noise Impact Statement: A noise impact statement is required per Section 402.1.g. Planning Commission has the authority to waive this requirement per Section 2519.10.c.iii. **Given the fact that the proposal is for an expansion of a surface parking lot that already exists and is in use, the limited times that the expanded portion of the parking lot is likely to be used (Sunday late mornings), and the proximity to an ambient noise generator (M-5), Staff recommends the Planning Commission waive the requirement of the noise impact statement.**
2. Community Impact Statement: A community impact statement is required for a Special Land Use over 10 acres. The approving body (in this case the Planning Commission) has the authority to waive this requirement, which the applicant has formally requested in a letter dated May 1, 2012. **Given the fact that the proposed parking lot expansion will not significantly change the existing land use, Staff recommends the Planning Commission waive the requirement of the community impact statement.**
3. Woodlands Permit: The area of the proposed parking lot expansion is within a City-regulated woodland, and the removal of existing trees is subject to the Woodlands Protection Ordinance. The applicant is proposing to remove 63 regulated trees; based on the size of those trees, 97 replacement trees are required according to the applicant's calculations. Please refer to the review letter from the City's environmental consultant for comments on the woodlands inventory, replacement plan, and protection plan for the woodlands to remain.
4. Exterior Lighting: Thirteen new exterior lighting fixtures are proposed to illuminate the expanded parking lot. Section 2511 of the Zoning Ordinance includes general standards for exterior lighting, including lighting adjacent to a residential district. The proposed fixtures appear to meet all standards of Section 2511, including maximum height, fixture type, illumination maximum/minimum/average, spillover/trespass, and specific standards pertaining to exterior lighting where adjacent to a residential use (Section 2511.3.l). *The lighting plan on the final site plan should include manufacturer's detail sheets confirming that the new fixtures are full-cutoff fixtures (cut-off angle of 90° or less). The lighting plan included with the Final Site Plan should also contain notes confirming compliance with Section 2511.3.b and 2511.3.c.* **In the applicant's response letter (discussed below), there should be discussion of when the new lights will be operational, specifically addressing Section 2511.3.g which allows after-hours lighting only for security purposes and limited operations.** Given the adjacent residential uses and the limited times when the expanded portion of the lot is expected to be used (primarily Sunday mornings), it seems unnecessary for the expanded portion to be fully illuminated throughout the night.
5. Pedestrian Access: Though not required, Staff would appreciate the applicant giving due consideration – either now or in the foreseeable future - to providing for a sidewalk connection between the existing pathway along the north side of Thirteen Mile Road and the existing sidewalk along the east side of Lenox Park Drive that dead-

ends at the applicant's north property line. **The applicant's response letter should speak to this possibility.**

Special Land Use Considerations
In the RA District, churches and other religious facilities fall under the Special Land Use requirements of Section 402.1. Section 2516.2.c of the Zoning Ordinance outlines specific factors the Planning Commission shall consider in the review of the Special Land Use Permit request:

- Whether, relative to other feasible uses of the site, the proposed use will cause any detrimental impact on existing thoroughfares in terms of overall volumes, capacity, safety, vehicular turning patterns, intersections, view obstructions, line of sight, ingress and egress, acceleration/deceleration lanes, off-street parking, off-street loading/unloading, travel times and thoroughfare level of service.
- Whether, relative to other feasible uses of the site, the proposed use will cause any detrimental impact on the capabilities of public services and facilities, including water service, sanitary sewer service, storm water disposal and police and fire protection to service existing and planned uses in the area.
- Whether, relative to other feasible uses of the site, the proposed use is compatible with the natural features and characteristics of the land, including existing woodlands, wetlands, watercourses and wildlife habitats.
- Whether, relative to other feasible uses of the site, the proposed use is compatible with adjacent uses of land in terms of location, size, character, and impact on adjacent property or the surrounding neighborhood.
- Whether, relative to other feasible uses of the site, the proposed use is consistent with the goals, objectives and recommendations of the City's Master Plan for Land Use.
- Whether, relative to other feasible uses of the site, the proposed use will promote the use of land in a socially and economically desirable manner.
- Whether, relative to other feasible uses of the site, the proposed use is (1) listed among the provision of uses requiring special land use review as set forth in the various zoning districts of this Ordinance, and (2) is in harmony with the purposes and conforms to the applicable site design regulations of the zoning district in which it is located.

Response Letter
A letter from either the applicant or the applicant's representative addressing comments in this and other review letters is requested **prior to the matter being reviewed by the Planning Commission.**

If the applicant has any questions concerning the above review or the process in general, do not hesitate to contact me at 248.347.0484 or dcampbell@cityofnovi.org.

David Campbell, AICP, Planner

PLANNING REVIEW SUMMARY CHART

Review Date: May 22, 2012
Project Name: Brightmoor Church Parking Lot Expansion
Project Number: SP 12-25
Plan Date: May 1, 2012

Items in **Bold** need to be addressed by the applicant and/or the Planning Commission prior to approval of the Preliminary Site Plan. Underlined items need to be addressed on the Final Site Plan.

Item	Required	Proposed	Meets Requirements?	Comments
Master Plan	Single Family	No change proposed	Yes	
Zoning	RA, Residential Acreage	No change proposed	Yes	Existing church is an approved special land use
Use	Principal Permitted Uses – Single-family dwellings, farms, greenhouses, public parks, cemeteries, family daycare Uses Permitted Subject to Special Conditions – Nurseries, dairies, keeping of livestock, all special land uses in R-1 through R-4 (including churches), non-residential uses in historic buildings, bed & breakfasts	Expansion of existing church parking lot	Yes	Existing church is an approved special land use **Expansion of the existing parking lot of an approved Special Land Use will require a public hearing per Section 2516.2.c and Section 3006**
Building Height (Sec. 2400)	2.5 stories, 35 feet	NA	NA	No new building proposed
Building Setback (Sec. 2400)				
Front (south)	The height of the main building or 75 feet, whichever is greater	NA	NA	No new building proposed
Exterior Side (east)	The height of the main building or 75 feet, whichever is greater	NA	NA	No new building proposed
Interior Side (west)	The height of the main building or 75 feet, whichever is greater	NA	NA	No new building proposed

Item	Required	Proposed	Meets Requirements?	Comments
Rear (north)	The height of the main building or 75 feet, whichever is greater	NA	NA	No new building proposed
Parking Setback (Sec. 2400 and Sec. 402.1)				
Front (south)	No front-yard parking is permitted for churches.	No new front-yard parking proposed	Yes	
Exterior Side (east)	The height of the building or 75 feet, whichever is closer	> 75 feet	Yes	
Interior Side (east)	20 feet	> 20 feet	Yes	
Interior Side (west)	20 feet	> 20 feet	Yes	
Rear (north)	35 feet where adjacent to residential (Sec. 402.1e)	40 feet	Yes	
Number of Parking Spaces (Sec. 2505.14)	1 space per 3 seats, plus parking for accessory uses	365 new spaces plus 538 existing spaces (903 total) including 21 barrier-free spaces	Yes	No new seating proposed
Parking Space Dimensions and Maneuvering Lanes (2506)	9' X 19' 90 degree parking spaces with 24 feet wide aisles - Spaces may be reduced to 17' deep from face of curb (4" height) where vehicles overhang landscaping or 7' sidewalk	9'x19' interior spaces and 9'x17' perimeter spaces proposed	Yes	

Item	Required	Proposed	Meets Requirements?	Comments
End Islands (Section 2506.13)	End islands with landscaping and raised curbs are required at the end of all parking bays that abut traffic circulation aisles. The end islands shall generally be at least 8 feet wide, have an outside radius of 15', and be constructed 3' shorter than the adjacent parking stall as illustrated in the Zoning Ordinance.	End islands provided and meet/exceed City dimensional standards	Yes	
Barrier-Free Spaces (Barrier Free Code)	2% of total spaces or 18 spaces	21 spaces, including 2 van accessible	Yes	
Barrier-Free Space Dimensions (Barrier Free Code)	8' wide with a 5' wide access aisle for standard barrier free spaces, and 8' wide with an 8' wide access aisle for van accessible spaces	No new barrier-free spaces required or proposed	NA	
Barrier Free Signs (Barrier Free Design Graphics Manual)	One sign for each accessible parking space.	No new barrier-free signs required or proposed	NA	
Loading Spaces (Section 2507)	Required on all premises where receipt or distribution of materials or merchandise occurs and shall be separate from parking areas	No new loading area required or proposed	NA	

Item	Required	Proposed	Meets Requirements?	Comments
Dumpster (Chapter II, Section 21-145 and Section 2503.2.F)	Screen wall or fence required, must be at least 5' in height, and provided on three sides. Enclosure to match building materials – include protective bollards or similar features	No new dumpster required or proposed	NA	
Dumpster Enclosure (Sections 2503.2.F and 2520.1)	Dumpster enclosure to be located in rear yard, and set back from property line a distance equivalent to the parking lot setback. It is to be located as far from barrier free spaces as possible.	No new dumpster required or proposed	NA	
Exterior lighting (Section 2511)	• Maximum fixture height - 25' • Minimum illumination – 0.2 fc • Avg. to min. ratio – 4/1 • Full cutoff fixtures • Max illumination at property line – 0.5 fc	• Fixture height - 25' • Minimum illumination – 0.3 fc • Avg. to min. ratio – 3.7/1 • All fixtures are full cutoff • Maximum illumination at property line – 0.1 fc	Yes	Manufacturer's fixture details to be provided with Final Site Plan, along with notes verifying compliance with Section 2511 **Applicant's response letter to speak to anticipated hours of new lighting given anticipated use of the expanded parking lot and adjacent residential**
Sidewalks (City Code Section 11-276(b)) Building Code	An 8' wide sidewalk shall be constructed along all major thoroughfares as required by the City of Novi's Pedestrian and Bicycle Master Plan. Building exits must be connected to sidewalk system or parking lot.	No new sidewalks required or proposed	TBD	**Applicant's response letter to speak to the possibility of a sidewalk connection along the east side of Lenox Park Drive between the existing sidewalk on the north side of Thirteen Mile and the existing sidewalk north of the Brightmoor property**

Prepared by Dave Campbell, AICP, (248) 347-0484 or dcampbell@cityofnovi.org

Lighting Review Summary Chart
SP12-25 Brightmoor Christian Church Parking Expansion
Preliminary Site Plan
Date on Lighting Plans: May 17, 2012

Item	Required	Meets Requirements?	Comments
Intent (Section 2511.1)	Establish appropriate minimum levels, prevent unnecessary glare, reduce spillover onto adjacent properties, reduce unnecessary transmission of light into the night sky	Yes	
Lighting plan (Section 2511.2.a.1)	Site plan showing location of all existing and proposed buildings, landscaping, streets, drives, parking areas and exterior lighting fixtures	Yes	
Lighting Plan (Section 2511.2.a.2)	Specifications for all proposed and existing lighting fixtures including: ▪ Photometric data ▪ Fixture height ▪ Mounting & design ▪ Glare control devices ▪ Type and color rendition of lamps ▪ Hours of operation ▪ Photometric plan	Yes	New parking lot lights to match existing
Required conditions (Section 2511.3.a)	Height not to exceed maximum height of zoning district or 25 feet where adjacent to residential districts or uses.	Yes	

Item	Required	Meets Requirements?	Comments
Required Notes (Section 2511.3.b)	- Electrical service to light fixtures shall be placed underground - No flashing light shall be permitted - Only necessary lighting for securify purposes and limited operations shall be permitted after a site's hours of operation.	**No**	**Notes to be added on Final Site Plan**
Required conditions (Section 2511.3.e)	Average light level of the surface being lit to the lowest light of the surface being lit shall not exceed 4:1.	Yes	
Required conditions (Section 2511.3.f)	Use of true color rendering lamps such as metal halide is preferred over high and low pressure sodium lamps.	Yes	
Minimum Illumination (Section 2511.3.k)	- Parking areas- 0.2 min - Loading and unloading areas- 0.4 min - Walkways- 0.2 min - Building entrances, frequent use- 1.0 min - Building entrances, infrequent use- 0.2 min	Yes	
Maximum Illumination adjacent to Non-Residential (Section 2511.3.k)	When site abuts a residential district, maximum illumination at the property line shall not exceed 0.5 foot candles	Yes	
Cut off Angles (Section 2511.3.1(2))	All cut off angles of fixtures must be 90 degrees when adjacent to residential districts	Yes	

WETLAND REVIEW

ECT
Environmental Consulting & Technology, Inc.

May 23, 2012

Ms. Barbara McBeth
Deputy Director of Community Development
City of Novi
45175 West Ten Mile Road
Novi, MI 48375

Re: Brightmoor Christian Church
Proposed Parking Lot Expansion
Wetland Review of the Preliminary Site Plan (SP#12-25)

Dear Ms. McBeth:

Environmental Consulting & Technology, Inc. (ECT) has reviewed the Preliminary Site Plan (Plan) prepared and submitted by Wilson Road Group, Inc. dated May 1, 2012. ECT visited the site on Monday, May 21st in order to verify wetland boundaries. The Plan and supporting documentation were reviewed for conformance with the City of Novi Wetland Ordinance.

The proposed development is located north of Thirteen Mile Road and west of the M-5 Freeway in Section 1. The proposed Plan would expand the northernmost parking lot by 365 spaces and include construction of a screening berm and stone retaining wall across the north side of the proposed parking lot/church property.

What follows is a summary of our findings regarding the current Plan.

Site Comments

An area of wetland (Wetland A) has been indicated on the west side of the proposed parking expansion area (see Attachment Photo 1). In addition to this area of existing wetland, a constructed storm water detention pond is located to the west of the proposed parking lot as well. It should be noted that site storm water from the proposed parking lot will be directed to storm sewer and then routed to the east side of the proposed parking lot, ultimately to an existing 27-inch reinforced concrete pipe sewer. Storm water from the proposed parking lot will not be routed to the existing storm water pond and/or wetland.

Portions of additional wetland (i.e., Wetland B and Wetland C) have been indicated on the Plan to the north of the property boundary; however, these wetland areas are also all located off of the proposed site. The surveyed wetland flags (Wetland C) shown on the Plan appear to be "incomplete" in this area. It is ECT's opinion that existing wetland (i.e., Wetland C) continues to the east while remaining off of the project site. It should be noted however, that the 25-Foot Natural Features Setback (25-foot wetland buffer) associated with these off-site wetlands may extend onto the project site.

Overall, the wetland boundaries that have been indicated on the Plan were found to be accurately depicted. However, as noted above, the wetland areas shown north of the property boundary appear to continue further to the east than currently shown on the Plan. Perhaps the existing wetland boundary has not been completely delineated and/or surveyed in this area.

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In addition, a small area of un-delineated, low-quality wetland was found on the northeast side of the site (i.e., in the area of the 12" corrugated metal culvert inlet, near the existing asphalt emergency drive). This small area contained evidence of hydrology and contained a variety of wetland plants including: spike rush, cattail, grey dogwood, red maple, cottonwood, American elm, and riverbank grape. This small area is considered to be a non-essential wetland by ECT, with little/no storm water storage, habitat, or wildlife function (See Attachment Photo 3).

It should be noted that the current Plan does not indicate or label the boundary of the existing 25-foot wetland setbacks (buffers). It looks as though a very small section of proposed grading and/or proposed berm may impact the wetland setback area on the southwest side of the project (i.e. in the area of Wetland A; wetland flags A2, A3, etc.). See Attachment Photo 2.

If any impacts to the wetland buffer are proposed (permanent or temporary), the project would require a *City of Novi Authorization to Encroach the 25-Foot Wetland Setback.*

Proposed Impacts

While the proposed Plan does not appear to indicate any direct impacts to on-site wetland areas (other than the area of non-essential, un-delineated wetland area on the northeast side of the site), there do appear to be minor impacts to existing 25-foot wetland setbacks (buffers) on the west side of the proposed project, and perhaps to 25-foot wetland buffers associated with the offsite wetlands north of the property boundary.

Temporary (or permanent) minor disturbances to the 25-foot wetland setback on the west side of the proposed parking area appear to be likely for the purpose of grading associated with the parking lot construction.

Because the current plan does not indicate & label all wetland and 25-foot setback boundaries north of the northern property boundary, it is difficult to determine the extent of any proposed impact to the 25-foot wetland setback in this area. Any potential impacts to wetland buffer on the north side of the site will be very minor.

It should be noted that although the submitted *Application for Site Plan and Land Use Approval* form indicates that no impacts will occur to any onsite or offsite wetland buffers, several trees (#'s 1077, 1078, 1083, 1093, and 1094) are indicated in the Tree Removal List as being removed from the 25' natural features setback of Wetland A). If the buffer is to remain without impact, these trees should not be disturbed in any way.

Permits

As noted above, the Plan shows an area of on-site wetland (Wetland A) on the west side of the site as well as Wetland B and Wetland C north of the property boundary. These wetland areas appear to be regulated by the City of Novi but would likely not be regulated by the Michigan Department of Environmental Quality (MDEQ). The Plan does not appear to propose any impacts to these wetlands. The Plan does propose to fill the non-essential, un-delineated wetland that is located on the northeast side of the site.

It is ECT's opinion that the project will not need a City of Novi or MDEQ Wetland Permit.

As previously noted, in addition to wetland areas, the City of Novi regulates a 25-Foot Natural Features Setback around existing wetland areas (i.e. 25-foot wetland buffer). While the proposed Plan does not appear to indicate any direct impacts to on-site wetland areas, there do appear to be minor impacts likely to existing 25-foot wetland setbacks (buffers) on the west side of the proposed project and potential impacts to the 25-foot wetland buffers associated with the offsite wetlands north of the site.

The project will likely require an Authorization to Encroach the 25-Foot Natural Features Setback (i.e., wetland buffer authorization) from the City of Novi for any proposed permanent and/or temporary impacts to the 25-foot wetland setback.

Comments

1. The applicant is urged to avoid impacts to wetland and wetland buffer.

2. The Applicant shall indicate and label all wetland and 25-foot wetland buffer boundaries on the Plan. In addition, please indicate, quantify and label any areas of proposed impact to the 25-foot wetland setback on the Plan (both permanent and temporary), if applicable.

Recommendation

ECT recommends conditional approval of the Preliminary Site Plan with the condition that the above comments be satisfactorily addressed.

If you have any questions regarding the contents of this letter, please contact us.

Respectfully submitted,

ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.

Pete Hill, P.E.
Senior Associate Engineer

cc: David R. Campbell, AICP, LEED GA, City of Novi, Planner
David Beschke, City of Novi, Landscape Architect
Angela Pawlowski, City of Novi, Senior Customer Service

Enclosure: Site Photographs

Site Photographs

Above: Photo 1. Existing Wetland A located on the west side of the project site.
Below: Photo 2. Existing Wetland A, near edge of wetland (i.e., near wetland flags A-2 and A-3, looking east.

Above: Photo 3. Low-quality, un-delineated wetland on northeast side of site (existing 12" CMP located in upper left near silt fence).

WOODLAND REVIEW

ECT
Environmental Consulting & Technology, Inc.

May 31, 2012

Ms. Barbara McBeth
Deputy Director of Community Development
City of Novi
45175 West Ten Mile Road
Novi, MI 48375

Re: Brightmoor Christian Church
Woodland Review of the Preliminary Site Plan (SP#12-25)

Dear Ms. McBeth:

Environmental Consulting & Technology, Inc. (ECT) has reviewed the Preliminary Site Plan (Plan) prepared and submitted by Wilson Road Group, Inc. dated May 1 and May 30, 2012 and the letter prepared and submitted by Mike's Tree Surgeons, Inc. The Plan and supporting documentation were reviewed for conformance with the City of Novi Woodland Protection Ordinance Chapter 37.

The proposed development is located north of Thirteen Mile Road and west of the M-5 Freeway in Section 1. The proposed Plan would expand the northernmost parking lot by 365 spaces and include construction of a screening berm and stone retaining wall on the north-central side of the church property.

Onsite Woodland Evaluation

ECT has reviewed the City of Novi Official Woodlands Map and completed an onsite Woodland Evaluation on May 21, 2012. ECT found that the *Topographic Survey* fairly accurately depicts existing site conditions. It appeared that the regulation-sized trees (dbh ≥8") within the remaining onsite regulated woodland had been surveyed. The surveyed trees were marked with numbered metal tree tags and string. ECT did observe several trees reported as silver maple (*Acer saccharinum*) which upon field inspection were actually ash trees (*Fraxinus* spp.), e.g. tree #'s 1103 and 1153. Also, the trees recorded as northern white-cedar were actually eastern redcedar (*Juniperus virginiana*), e.g. tree #'s 1087, 1088, and 1141. Per the Woodland Ordinance, Sec. 37-28(a)4c, "the woodland survey plan shall be accompanied by a separate key identifying by location all trees eight (8) inches d.b.h. and greater, by size, common, genus and species names (i.e. Red Maple/Acer rubrum) and condition. Such information shall be provided by a registered landscape architect, certified arborist, or registered forester, through an on-site inspection, who must verify the contents by seal and/or registration number with signature, whichever applies." The woodland survey plan and key should be revised by an appropriate professional via field review to provide the correct genus, species, and common name of all the regulation-sized trees onsite within the designated woodland.

The entire site is approximately 40 acres with 2.95 acres of regulated woodland remaining along the north-central side of the property. The regulated woodland onsite is moderately disturbed with evidence of past residential and orchard plantings as well as grading associated with a relocated driveway in the southeastern corner. This onsite regulated woodland is part of a larger, 3.85-acre woodland patch that extends north onto the Lenox Park (a.k.a. Deer Ridge RUD) property. Forested/scrub-shrub/emergent wetland complexes occur on the east (near culvert beneath relocated driveway), west, and north sides of the overall woodland patch, providing an intact mosaic of upland and wetland forest and moderately diverse wildlife habitat. Considering the site at a landscape scale, the regulated woodland onsite is a stepping stone of woodland habitat between larger patches of woodland, including a significant patch to the north between the Maples of Novi and Haverhill Farms developments and Lenox Park and Fox Run developments. In their Potential Conservation/Natural Areas Report (July 2002, updated April

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FAX (734) 769-3164

2004) for Oakland County, Michigan Natural Features Inventory (MNFI) identified this swath of contiguous woodland to the north of the project area as a Priority Three Area for conservation, based upon total size, core area size, stream corridor, landscape connectivity, restorability of surrounding lands, vegetation quality, parcel fragmentation, and element occurrences (rare species) criteria (see attached map).

ECT noted that preliminary threatened and endangered species habitat reviews of federally and state listed species at the county level had been conducted per Section 4.0 of the submitted *Brief Preliminary Site Plan Report Brightmoor Christian Church Proposed Parking Lot Expansion* and that the federally and state endangered Indiana bat (*Myotis sodalis*) was on the Oakland County list of federally protected species. ECT is also aware that the state threatened pumpkin ash (*Fraxinus profunda*) is known from the same general area as the proposed project. During the May 21, 2012 field visit, ECT observed several dead or dying overstory trees with peeling bark that could potentially serve as summer roost habitat for the bat. Many ash trees in the overstory, understory, and groundcover of the woodland proposed for impact were also observed, but their identity to species was not verified. Several associated species known to grow with pumpkin ash, including red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), eastern cottonwood (*Populus deltoides*), and swamp white oak (*Quercus bicolor*) were also observed. See attached site photographs. Per the letter provided by Mike's Tree Surgeons, Inc., the identities of five regulation-sized ash trees (tree #'s 813, 1075, 1103, 1115, and 1155) were confirmed to be white ash (*Fraxinus americana*). Threatened and endangered species are protected by the federal Endangered Species Act of 1973 and state Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection. Therefore, the Applicant must consult with the appropriate rare species protection agencies, including the U.S. Fish and Wildlife Service, Michigan Department of Natural Resources, and Michigan Natural Features Inventory, and verify the presence or absence of state and federally listed species on the project site via field review by threatened and endangered species experts.

Woodland Impact Review

Per summary calculations on the *Landscape Planting Details & Notes* (Sheet L-2), the Plan proposes the removal of all 63 trees with dbh greater than or equal to 8 inches surveyed, requiring 97 replacement credits, all of which are to be provided onsite. ECT is concerned that regulated woodland impacts have not been accurately identified and replacements have not been correctly calculated for the proposed project for the following reasons:

1. The limits of grading associated with the project have not been clearly depicted in relation to the regulated tree surveyed locations. No tree protection fencing is depicted on the tree survey plan drawing, so this *Topographic Survey* drawing does not clearly depict in a graphic manner which trees are proposed for removal vs. to be saved. The Tree Removal List on Sheet L-2 indicates that all 63 regulated woodland trees surveyed are proposed for removal. A woodland protection fence must be depicted on the plan showing the regulated woodland tree locations, so regulated woodland tree impacts can be correctly and readily assessed. The note on the *Grading and Erosion Control Plan* sheet references a tree protection fence, but this drawing does not include the locations of the regulated woodland trees onsite. Accurate critical root zones have not been depicted on the site plan for all regulated trees within 50' of proposed grading or construction activities. This makes it difficult to evaluate where construction work will be conducted and what regulated trees will be impacted vs. adequately protected.

2. No dead trees appeared on the Tree Removal List or Tree Inventory. Although they do not require woodland replacement credits, regulation-sized dead trees should be included in these lists and portrayed graphically on the plan drawings. The woodland survey plan and accompanying key should be revised to include survey data of all regulation-sized trees within the designated woodland, regardless of tree condition or intention to impact.

3. Tree #'s 810 and 1090 from the Tree Removal List were not included on the *Topographic Survey* plan drawing, and, therefore, necessity of impact could not be determined.

4. Tree # 1082 was shown on the *Topographic Survey* plan, but information about this tree was not included in the Tree Removal List or the Tree Inventory in the *Brief Preliminary Site Plan Report Brightmoor Christian Church Proposed Parking Lot Expansion.*

5. Although the submitted *Application for Site Plan and Land Use Approval* form indicated that no impacts would occur to any onsite or offsite wetland buffers, tree #'s 1077, 1078, 1083, 1093, and 1094 are indicated in the Tree Removal List as being removed from the 25' natural features setback of Wetland A on the west side of the proposed project area. If the buffer is to remain without impact, these trees should not be disturbed in any way.

6. Several trees located beyond the church's property boundaries were identified in the Tree Removal List and assigned woodland replacement credits, e.g. tree #'s 1080, 1151, 1152, 1153, 1155, and 1161. Regulated woodland tree removal as well as impacts to regulated woodland understory and groundcover vegetation beyond the project's property boundaries should not occur.

7. Regulated woodland tree replacement credits were not calculated correctly per the Woodland Ordinance, especially for multi-stemmed trees. For multi-stemmed trees, the dbh of all stems of regulation size should be summed, divided by 8, and rounded up to the nearest whole credit. ECT made the following corrections to the woodland replacement credit calculations, for a new woodland replacement credit total of 90, assuming the 6 off-property trees identified in item 6 above will not be removed.

    - Tree # 1090 → 1 credit
    - Tree # 1122 → 3 credits
    - Tree # 1128 → 1 credits
    - Tree # 1130 → 3 credits
    - Tree # 1134 → 4 credits
    - Tree # 1136 → 5 credits
    - Tree # 804 → 4 credits
    - Tree # 1144 → 7credits
    - Tree # 817 → 1 credit

ECT believes this woodland replacement credit total is likely to change, once items 1, 3, and 5 above are addressed.

Woodland Replacement Review

Per landscape Sheet L-2, the Plan provides for 97 onsite woodland replacement credits. ECT found that the originally submitted Sheets L-1 and L-2 dated May 1, 2012 propose 16 deciduous trees (16 woodland replacement credits) and 81 evergreen replacement trees (54 woodland replacement credits) to be placed onsite (70 woodland replacement credits total). ECT was concerned with the following issues relating to provision of woodland replacement credits:

1. Tree replacement credits have been calculated incorrectly for evergreen species, and, thus, the Plan falls approximately 20 credits short of providing the required woodland replacement credits. Evergreens must be 6' in height minimum and provided at a ratio of 1.5 evergreen trees to 1 woodland replacement credit (not 1:1), per the Woodland Ordinance.

2. Half of the species proposed as woodland replacement material, including Norway spruce, Douglas fir, and Red Barron crab, are not native to Michigan and are not acceptable as woodland replacement credits. Refer to the Woodland Tree Replacement Chart and Reforestation Credit Table in the Woodland Ordinance for guidance on acceptable native tree species and other types of native woodland vegetation that can count toward woodland replacement credits.

3. The plant material intended to count as woodland replacement credits is not clearly indicated on the plan drawing on Sheet L-1 or in the Plant List & Installation Budget on Sheet L-2. Currently, the tree planting locations on Sheet L-1 are unlabeled. The plan drawing must show which trees are intended for woodland replacement credit vs. other parking lot and landscape screening requirements and specify which species is intended for which replacement planting location. A column should be added to the Plant List & Installation Budget on Sheet L-2 indicating the quantity of trees per species that are being proposed for woodland replacement vs. other parking lot and landscape screening requirements.

4. Plant material size for each species should also be specified in the Plant List & Installation Budget on Sheet L-2 to confirm minimum size requirements will be met. Refer to the Woodland Tree Replacement Chart and Reforestation Credit Table in the Woodland Ordinance for guidance on material size as it relates to replacement credit calculation.

5. The majority of the woodland replacement material is being proposed to be planted less than 10' on center. This spacing is too close to allow for successful long term establishment of the plant material, especially if large evergreen and canopy deciduous trees will be utilized. Refer to the City's Landscape Design Manual for guidance regarding minimum spacing for various types of vegetation. The maximum spacing in this guide is not applicable to woodland replacement plantings—diverse, naturally spaced/clumped native plantings that attempt to replace the woodland ecosystem values and functions be impacted are most desired. Please note that woodland replacement material should not be located 1) within 10' of built structures or the edges of utility easements and 2) over underground utilities or within their associated easements.

Having reviewed the revised Sheet L-2 dated May 30, 2012, ECT found that woodland replacement trees being proposed now consist of acceptable deciduous tree species native to Michigan, provide the full 97 credits stated, are specified as 2.5" caliper to meet the minimum size requirement, and are clearly indicated in a new planting location southeast of the existing parking lot complex. ECT understands that the Applicant has worked with City staff to assure appropriate new woodland replacements will be located as a mass planting as requested by staff and that the City will continue to work with the Applicant on the field placement of the new native species plantings to provide spacing appropriate to the mature size of the proposed plant material. At this time the Applicant has proposed a greater number of woodland replacements than may be necessary, as noted above under the Woodland Impact Review section. Installation of a greater number of trees will be at the Applicant's option.

Site Plan Compliance with Ordinance Chapter 37 Standards

The Plan lacks several items necessary for compliance with the Site Plan standards. The following information must be provided in the Plan:

1. A correct and complete woodland survey plan and accompanying key verified by an appropriate professional identifying all regulation-sized trees by size, common name, genus and species name, condition, and remove vs. save status,

2. Locations of all regulation-size trees on the site in relation to a graphic depiction of the limits of grading/disturbance and woodland protection fence location on one plan drawing that includes a labeled regulated woodland boundary,
3. For regulated trees depicted as being saved within 50' of proposed grading or construction activity boundaries, graphic depiction of the trees' critical root zones relative to the woodland protection fence to show impact will be avoided,
4. Inclusion of a woodland protection fence detail on Sheet L-2,
5. A description of proposed changes to drainage within regulated woodlands, including grade changes and changes in water levels, and
6. Corrected tree removal and replacement values as outlined above.

Recommendation

ECT recommends conditional approval of the Preliminary Site Plan, contingent upon the Applicant satisfactorily addressing the comments outlined above. Significant changes will be required to address the specific issues and corrections outlined above and bring the Plan into compliance with the City of Novi Woodland Protection Ordinance Chapter 37 standards. The woodland survey plan and accompanying key must be corrected and signed by an appropriate professional. Impacts to the regulated woodland, not just regulation sized-trees need to be clarified and depicted graphically via a labeled regulated woodland line, woodland protection fence location, critical root zone locations, tree removal indicators, and limits of construction disturbance. Alterations to regulated woodland should not occur beyond the limits of construction, especially beyond the church's property. The Applicant must consult with the appropriate rare species protection agencies, including the U.S. Fish and Wildlife Service, Michigan Department of Natural Resources, and Michigan Natural Features Inventory, and have a qualified expert conduct threatened and endangered species surveys, as appropriate, to verify the presence or absence of federally and state listed species on the project site and assess the potential for adverse impacts to listed species from the proposed project if listed species are found onsite. In particular, the identity down to genus and species of *all* the ash trees on the property, not just regulation-sized trees per the Woodland Ordinance, must be verified by an expert in tree species identification.

The location and species composition of the woodland replacement material have been revised to allow plant material to successfully mature; avoid built structures, underground utilities, and their easements; and provide Michigan native species that will help mitigate for the loss of woodland ecosystem structure and function being impacted by the proposed parking lot expansion. Per Sec. 37-8(h) of the Woodland Ordinance, ECT encourages the Applicant to use a conservation easement to protect the important remaining natural features of the site and the proposed Woodland Tree Replacement Planting Zone. ECT also encourages the Applicant to consider creating a no-mow area as part of the proposed Woodland Tree Replacement Planting Zone and planting native woodland shrub and groundcover species as an alternative means of obtaining the required woodland replacement credits. Refer to the Woodland Tree Replacement Chart and Reforestation Credit Table in the Woodland Ordinance for guidance on acceptable native tree species and other types of native woodland vegetation that can count toward woodland replacement credits. If all woodland replacement credits cannot be placed onsite, the Applicant may consider providing woodland replacement credits via payment to the City of Novi Tree Fund at a value of $400/credit.

If you have any questions regarding the contents of this letter, please contact us.

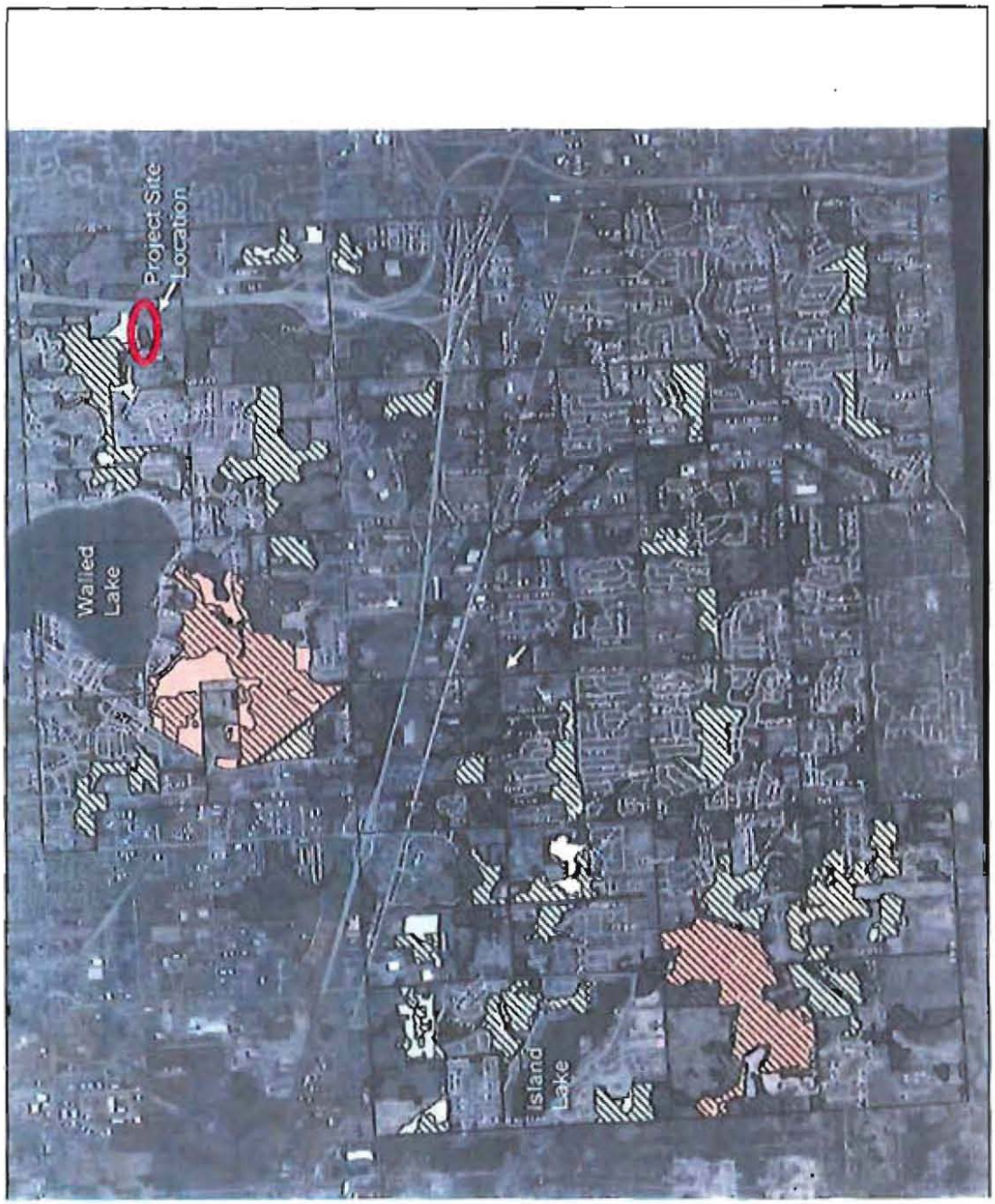
Respectfully submitted,

ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.

Martha Holzheuer

Martha Holzheuer, Licensed Landscape Architect, ISA Certified Arborist, ESA Certified Ecologist
Landscape Ecologist

cc: David Campbell, AICP, LEED GA, City of Novi, Planner
David Beschke, City of Novi, Licensed Landscape Architect
Angela Pawlowski, City of Novi, Senior Customer Service


City of Novi
Natural Areas
Novi Woodland
NaturalAreas2004
Priority One
Priority Two
Priority Three
Project Site Location
Walled Lake
Island Lake

Above: Tree # 1075, ash in the forest overstory, species undetermined due to lack of leaves & twigs within reach
Below: Tree # 1165, ash with peeling bark

Above: Ash in the woodland understory and groundcover
Below: Dead and dying trees with loose bark in Wetland A

ENGINEERING REVIEW

cityofnovi.org

PLAN REVIEW CENTER REPORT

May 22, 2012

Engineering Review

Brightmoor Christian Church Parking Lot Expansion
SP12-25

Petitioner
Wilson Road Group, Engineer

Review Type
Preliminary Site Plan

Property Characteristics

- Site Location: North of 13 Mile, West of M-5
- Site Size: 40.15 acres
- Plan Date: May 1, 2012

Project Summary

- Construction of a 365 parking stall expansion. Site access would be provided existing access off of public roadways.
- Storm water would be collected by a single storm sewer collection system and distributed to detention pond 'B' in the east side of property.

Recommendation
Approval of the Preliminary Site Plan and Preliminary Storm Water Management Plan is recommended.

Comments:
The Preliminary Site Plan meets the general requirements of Chapter 11, the Storm Water Management Ordinance and the Engineering Design Manual with the following items to be addressed at the time of Final Site Plan submittal (further engineering detail will be required at the time of the final site plan submittal):

Additional Comments (to be addressed prior to the Final Site Plan submittal):

General

1. Provide a note on the plans that all work shall conform to the current City of Novi standards and specifications.
2. The City standard detail sheets are not required for the Final Site Plan submittal. They will be required with the Stamping Set submittal.

Storm Sewer

3. Provide a profile for the proposed storm sewer with sumps located at each catch basin and where the difference in invert elevations exceeds two (2) feet.
4. Consider relocating the traffic islands on the south side of the proposed parking lot expansion or the existing catch basins into the curb line due to winter maintenance concerns with structures located in curb drops.

Paving & Grading

5. Provide a detail for the proposed retaining wall.

The following must be submitted at the time of Final Site Plan submittal:

6. A letter from either the applicant or the applicant's engineer must be submitted with the Final Site Plan highlighting the changes made to the plans addressing each of the comments listed above and indicating the revised sheets involved
7. An itemized construction cost estimate must be submitted to the Community Development Department at the time of Final Site Plan submittal for the determination of plan review and construction inspection fees. This estimate should only include the civil site work and not any costs associated with construction of the building or any demolition work. ***The cost estimate must be itemized*** for each utility (water, sanitary, storm sewer), on-site paving, right-of-way paving (including proposed right-of-way), grading, and the storm water basin (basin construction, control structure, pretreatment structure and restoration).

The following must be addressed prior to construction:

8. A pre-construction meeting shall be required prior to any site work being started. Please contact Sarah Marchioni in the Community Development Department to setup a meeting (248-347-0430).
9. A City of Novi Grading Permit will be required prior to any grading on the site. This permit will be issued at the pre-construction meeting. Once determined, a grading permit fee must be paid to the City Treasurer's Office.
10. A Soil Erosion Control Permit must be obtained from the City of Novi. Contact Sarah Marchioni in the Community Development Department (248-347-0430) for forms and information.
11. Construction Inspection Fees to be determined once the construction cost estimate is submitted must be paid prior to the pre-construction meeting.
12. An incomplete site work performance guarantee for this development will be calculated (equal to 1.5 times the amount required to complete the site improvements, excluding the storm water facilities) as specified in the Performance Guarantee Ordinance. This guarantee will be posted prior to TCO, at which time it may be reduced based on percentage of construction completed.

13. A street sign financial guarantee in an amount to be determined ($400 per traffic control sign proposed) must be posted at the Treasurer's Office.

Please contact Adam Wayne at (248) 735-5648 with any questions.

cc: Ben Croy, Engineering
Brian Coburn, Engineering
Dave Campbell, Community Development Department

TRAFFIC REVIEW

May 18, 2012

Barbara McBeth, AICP
Deputy Director of Community Development
City of Novi
45175 W. Ten Mile Rd.
Novi, MI 48375

BIRCHLER ARROYO ASSOCIATES, INC.

SUBJECT: Brightmoor Christian Church – Parking Lot Expansion, SP#12-25, Traffic Review of Preliminary Site Plan and Special Land Use

Dear Ms. McBeth:

At your request, we have reviewed the above and offer the following recommendation and supporting comments.

Recommendation

We recommend approval, subject to the issues shown below in **bold** being satisfactorily addressed on the final site plan.

Project Description

What is the applicant proposing?

1. The applicant, Wilson Road Group, Inc., proposes to add 365 parking spaces at the north end of the main parking lot.

Trip Generation & Traffic Study

How much new traffic would be generated? Is a traffic study required?

2. Although the applicant has stated (in an accompanying letter) that "this project is not adding any traffic generating facilities," we believe that alleviating parking congestion could, in fact, increase site visitation if there is currently spare seating capacity in the building at times of peak occupancy. At this point, however, we have no basis for forecasting a change in the site's trip generation. Also, we are unaware of any existing problems with site access.

3. Per the *City of Novi Site Plan and Development Manual* (Chapter 5, Section 1), a traffic study is not required if a rezoning is not involved and there is no basis for forecasting the generation of at least 75 new peak-hour, peak-direction trips. Based on comment 2, it is reasonable to conclude that a traffic study is not required for this application.

Vehicular Access Locations

Do the proposed driveway locations meet City spacing standards?

4. Not applicable.

Vehicular Access Improvements

Will there be any improvements to the public road(s) at the proposed driveway(s)?

5. No.

Driveway Design and Control

Are the driveways acceptably designed and signed?

6. Not applicable.

Pedestrian Access

Are pedestrians safely and reasonably accommodated?

7. All walking will be in the parking lot aisles.

Parking and Circulation

Are parking spaces appropriately located and designed? Can vehicles safely and conveniently maneuver through the site?

8. The proposed parking lot expansion will result in parking aisles over 400 ft long, which will result in more cars cutting across marked spaces than may be desirable, as well as potentially excessive circulation by vehicles in search of available parking spaces. The latter issue may be less serious for a church than for other uses, however, as arrivals during times of maximum parking load tend to be relatively concentrated in time and adept at finding spaces as close as possible to the building. We are not aware of any applicable standards regarding maximum desirable aisle length by land use. **The Planning Commission may wish to discuss the very long parking aisles with the applicant.**

9. Per our pre-application comments: **"The site plan should indicate where and how the ADA requirement for barrier-free parking spaces will be met with the expanded parking lot. Some existing undesignated spaces near the building may have to be converted to barrier-free."**

10. The parking space dimensions required by Section 2506.2 of the Zoning Ordinance must be referenced to the center of paint stripe or face of curb, as applicable. On the plan under review, parking spaces adjacent to end islands scale 9 ft wide to back of curb, and are therefore 0.5 ft deficient in width. **The islands must be narrowed as necessary to ensure spaces 9 ft wide to face of curb.**

11. **A plan note should be included specifying that the dimensions of parking spaces adjacent to a curb (length as well as width) shall be referenced to the face (not back) of curb.**

12. **Another plan note should be included indicating that all pavement markings and traffic/parking signs shall comply with the design standards and placement guidelines specified in the 2011 *Michigan Manual on Uniform Traffic Control Devices*. In particular, non-barrier-free parking spaces shall be marked in white.**

Sincerely,
BIRCHLER ARROYO ASSOCIATES, INC.

Rodney L. Arroyo, AICP
Vice President

William A. Stimpson, P.E.
Director of Traffic Engineering

LANDSCAPE REVIEW

cityofnovi.org

PLAN REVIEW CENTER REPORT

May 30, 2012

Preliminary Landscape Review

Brightmoor Church

Petitioner

Wilson Road Group, Inc.
Brightmoor Christian Church

Review Type

Special Land Use Request and Preliminary Site Plan Review

Property Characteristics

- Site Location: 40800 W. Thirteen Mile Road
- Site School District: Walled Lake Consolidated Schools
- Site Zoning: RA, Residential Acreage
- Adjoining Zoning: North: RM-1, Low Density Multiple Family; South (across Thirteen Mile): RA; East (across M-5): OST, Office Service Technology; West: RM-1
- Site Use(s): Brightmoor Christian Church
- Adjoining Uses: North: Lenox Park residential condominiums; South (across Thirteen Mile): Single family, vacant; East (across M-5): Vacant; West: Fox run retirement living
- Site Size: 40.1 acres
- Plan Date: 5/30/2012

Recommendation

Approval of the Preliminary Site Plan for Brightmoor Christian Church Parking Expansion SP#12-25 is recommended. Please address the concerns noted below upon subsequent submittal.

Ordinance Considerations

The Applicant is proposing an expansion of the existing parking lot on the site. Although regulated woodlands must be disturbed for the project, the Applicant has worked with City staff to assure appropriate new woodland replacements to be located as a mass planting and as requested by staff. The City will continue to work with the Applicant on the field placement of the new native species plantings.

Adjacent to Residential – Buffer (Sec. 2509.3.a.)

1. The project site is adjacent to residential property to the west. This boundary is already buffered by a significant distance and by the existing wooded wetland on the adjacent property. The Applicant has also proposed a small berm and additional landscape plantings to enhance the buffer. This boundary is not adjacent to any residences.

2. The project is adjacent to residential property to the north. The Applicant has also proposed a berm and additional landscape plantings to enhance the buffer. The Applicant has been in contact with the neighboring residents and has agreed to enhance the berm with rowed evergreens and understory plants. Although residences do exist along this boundary, they are separated by considerable distance, existing woodlands and additional plantings on the adjacent property. The proposed treatment will provide for a significant buffer along this property line.

Adjacent to Public Rights-of-Way – Berm (Wall) & Buffer (Sec. 2509.3.b.)

1. No alterations are proposed or required along the public rights-of-way. No landscape modifications are proposed in this area.

Street Tree Requirements (Sec. 2509.3.b.)

1. No alterations are proposed or required in regard to Street Trees.

Parking Landscape (Sec. 2509.3.c.)

1. Calculations have been provided for the required Parking Lot Landscape Area per Ordinance requirement. The Applicant is required to install a total of 8,210 square feet of Interior Parking Lot Landscape Area. The Applicant has met the requirements.
2. A total of 110 Interior Parking Lot Landscape Trees are required. The Applicant has met the requirements.
3. Perimeter Parking Lot Canopy Trees are required at one per 35 LF. Existing healthy trees and trees counted toward interior parking lot landscape may be counted toward this requirement. By virtue of the existing and proposed trees, the Applicant meets the perimeter planting requirement.

Building Foundation Landscape (Sec. 2509.3.d.)

1. No buildings are proposed.

Plant List (LDM)

1. The Plant List meets the requirements of the Ordinance and Landscape Design Manual.

Planting Details & Notations (LDM)

1. Planting Details and Notations meet the requirements of the Ordinance and Landscape Design Manual.

Irrigation (Sec. 2509.3.f.(6)(b))

1. All landscape areas are required to be irrigated. A note has been provided stating that the existing irrigation system will be appropriately modified in the area of the addition.

Woodland Replacement Trees

1. The Applicant should contact staff at Environmental Consulting & Technology, Inc. to verify the exact quantity of woodland replacement credits required. At

This time the Applicant has proposed a greater number of woodland replacements than may be necessary. Installation of a greater number of trees will be at the Applicant's option.

Please follow guidelines of the Zoning Ordinance and Landscape Design Guidelines. This review is a summary and not intended to substitute for any Ordinance. For the landscape requirements, see the Zoning Ordinance landscape section on 2509, Landscape Design Manual and the appropriate items in the applicable zoning classification. Also see the Woodland and Wetland review comments.

Reviewed by: David R. Beschke, RLA

FIRE REVIEW

May 14, 2012

TO: Barbara McBeth, Deputy Director of Community Development

RE: Brightmoor Christian Church - parking lot expansion

SP#: 12-25

Project Description:
Expansion of existing Parking Lot, additional 365 parking spaces total to the North of the site property.

Comments:

1. While no structures are being added to this proposal, this expansion does require construction modifications and may limit access to the Emergency Vehicle – Secondary Access to the Lenox Park Condo Development. All Emergency Vehicle Access must be maintained during construction. No Construction traffic or materials can block this driveway.
2. Proposal calls for an added construction gate on the North East side, spanning across the Secondary Access driveway. As noted on plan sheet SN1 – Gate must be able to be opened for Emergency Vehicle access at any time.

Recommendation:
This plan has been reviewed and is Recommended for **APPROVAL**, pending the above comments #1 & #2 be addressed during construction.

Sincerely,

Andrew Copeland – Inspector/CFPE
City of Novi – Fire Dept.

cc: file

Novi Public Safety Administration
45125 W. Ten Mile Road
Novi, Michigan 48375
248.348.7100
248.347.0590 fax

cityofnovi.org

APPLICANT RESPONSE LETTER

June 20, 2012

WRG
WILSON ROAD GROUP, INC.

Mr. David Campbell, AICP , Planner
City of Novi
45175 West Ten Mile Road
Novi, Michigan 48375

Re: Response to Preliminary Site Plan Comments Received from City Staff and Consultants for the Brightmoor Christian Church Preliminary site Plan Review
SP# 12-25

Dear Mr. Campbell;

I am pleased to submit this response letter outlining the Wilson Road Group's (WRG) response to the review comments received from the City of Novi in preparation of this project proceeding to the Planning Commission for Public Hearing on June 27, 2012. Also included with this letter are the necessary copies of the plans and a colored rendering for use at the Planning Commission meeting. Following are the responses to the various staff and consultants review comments:

- PLAN REVIEW CENTER REPORT, JUNE 18, 2012- PLANNING REVIEW
  - Approval of the Special Land Use Permit and Preliminary Site Plan is recommended, subject to the applicant submitting a revised landscape plan and woodland replacement plan
    - **WRG and its consultants have revised the landscape plan as well as the woodlands replacement plan and have forwarded these to Mr. Campbell in early June**
  - Page 2 #5- In the applicant's response letter there should be a discussion of when the new lights will be operational, specifically addressing Section 2511.3 g which allows after hours lighting only for security purposes and limited operations
    - **Per discussions with the Church Pastor in charge of facilities the indication of after the proposed evening hour lighting would be no later than 11:00 PM. The current operation of the existing parking lot lighting extends to 11:30 PM.**
- PLAN REVIEW CENTER REPORT, MAY 22, 2012- ENGINEERING REVIEW
  - Page 1, #1-Provide a note on the plans that all work shall conform to the current City of Novi standards and specifications
    - **Such a note will be incorporated into the plans**
  - Page 2, #3-Provide a profile for the proposed storm sewer with sumps located at each catch basin and where the difference in invert elevations exceeds two feet.
    - **A profile sheet for the storm sewer will be provided and sumps shall be added as directed by this review.**

303 W. Nepessiug • Lapeer, Michigan 48446
Phone: 810-664-6300 • WilsonRoadGroup.com

- Page 2, #4Consider relocating the traffic islands on the south side of the proposed parking lot expansion or the existing catch basins into the curb line due to winter maintenance concerns with structures located in curb drops.
  - **This matter was reviewed several times in the field and it was found to be impossible to make the structures "line up" in the curb without replacing the existing storm sewer. The Church staff is aware that additional caution will be required in these areas during winter maintenance activities.**
- Page 2, #6-A letter from either the applicant or the applicant's engineer must be submitted with the Final Site Plan highlighting the changes made to the plans addressing each of the comments listed above and indicating the sheets involved.
  - **Such a letter will be prepared outlining the changes made and indicating the sheet(s) involved.**
- Page 2, #7- an itemized construction cost estimate must be submitted to the Community Development Department at the time of Final Site Plan submittal for the determination of plan review and construction inspection fees. The cost estimate must be itemized for each utility (water, sanitary sewer, storm sewer), on-site paving, right-of-way paving (including proposed right-of0way), grading, and the storm water basin (basin construction, control structure, pretreatment structure and restoration).
  - **Such an estimate will be prepared and will accompany the Final Site plan Submittal.**
- **Page 2 & 3,#8-13-All of these construction type issues have been reviewed and will be accomplished as outlined in the engineering review letter.**

- BIRCHLER ARROYO REVIEW, May 18, 2012
  - Page 2, #9 –The site plan should indicate where and how the ADA requirement for barrier-free parking spaces will be met with the expanded parking lot. Some existing undesignated spaces near the building may have to be converted to barrier-free.
    - **We have reviewed the number of barrier-free spaces that current exist and this number of spaces (21) exceeds the requirement of 2% (19) total spaces being designated as barrier-free spaces. A chart so outlining this barrier-free issue will be provided for on the Final Site Plan.**
  - Page 2, #10-The islands must be narrowed as necessary to ensure spaces 9 ft wide to face of curb.
    - **Such requested changes will be made.**
  - Page 2, # 11- A plan note should be included specifying that the dimensions of parking spaces adjacent to a curb (length as well as width) shall be referenced to the face (not back) of curb.
    - **All references to parking space width and length as requested will be referenced to face of curb.**

- Page 2, # 12-Another plan note should be included indicating that all pavement markings and traffic/parking signs shall comply with the *Michigan Manual on Uniform Traffic Control Devices*. In particular, non-barrier-free parking spaces shall be marked in white.
  - **This note shall be added to the plans for Final Site Plan submittal.**

- PLAN REVIEW CENTER REPORT, MAY 30, 2012- PRELIMINARY LANDSCAPE REVIEW
  - Page 2, Woodland Replacement Trees- the Applicant should contact staff at ECT to verify the exact number of Woodland replacement credits required.
    - **Per the revised Woodland tree inventory completed by a certified forester supervised by a registered arborist, new Woodland tree replacements credits will be calculated and provided to the City and ECT with the Final Site Plan submittal.**
- ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC. WOODLAND REVIEW, MAY 30, 2012
  - Page 1, First Paragraph-ECT did observe trees reported as silver maples, which upon field inspection were actually ash trees. Also the trees recorded as northern white-cedar were actually eastern red cedar, e.g. #'s 1087, 1088, and 1141. The Woodland survey plan and key should be revised by an appropriate professional via a field review to provide the correct genus, species, and common name of all of the regulation-size trees onsite within the designated woodland.
    - **A registered forester under the direction of a certified arborist has re-surveyed and inventoried the on-site woodlands. This information has been sent to the Community Development Department.**
  - Page 2, First Paragraph-The applicant must consult with the appropriate rare species protection agencies, including the U.S. Fish and Wildlife Service, Michigan Department of Natural Resources, and Michigan Natural Features Inventory, and verify the presence or absence of state and federally listed species on the project site via field review by threatened and endangered species experts.
    - **Mike's Tree Surgeon (Arborist and Forester Consultant) has assisted WRG in the review of the pumpkin ash issue and has field identified and confirmed that the five (5) trees in question are white ash and not pumpkin ash. This review has been documented in a letter report to the City's Community Development Department. The consultant has re-inspected the Woodlands searching for the environment and habitat that would support the Indiana Bat. A review of this natural habitat does not provide the environment for such support. The research also indicates that no Indiana Bats have ever been documented as to exist in Oakland County since the first reported sighting in Wayne County in 1865. Support documentation relative to the non-existence is included with this report.**
  - Page 2, #1-The limits of grading associated with the project have not been clearly depicted in relation to the regulated tree survey locations. No tree protection fencing is

- depicted on the tree survey drawing. The Tree Removal list on Sheet L-2 indicates that all 63 regulated woodland trees surveyed are proposed for removal. A woodland tree protection fence must be depicted on the plan showing the regulated woodland tree locations, so regulated woodland tree impacts can be correctly and readily assessed.
  - **The limits of grading as well as tree protection fencing will be included on the Final Site Plan.**
- Page 2, #2-No dead trees appeared on the Tree Removal List or tree inventory. Although they do not require woodland replacement credits, regulation-sized dead trees should be included in these lists and portrayed graphically on the plan drawings. The woodland survey plan and accompanying key should be revised to include survey data of all regulation-size trees within the designated woodland, regardless of tree condition or intention to impact.
  - **The dead trees will be shown on the tree survey and tree removal list for the Final Site plan submittal.**
- Page 2, #3-Tree #'2 810 and 1090 from the tree inventory list were not detected on the Topographic Survey plan drawing, and, therefore necessity of impact could not be determined.
  - **This matter will be addressed appropriately at the time of Final Site Plan submittal.**
- Page 3, #4-Tree #1082 was shown on the Topographic Survey plan, but information about this tree was not included in the Tree Removal List or the Tree Inventory…
  - **This matter will be addressed appropriately at the time of Final Site Plan submittal.**
- Page 3, # 5Although the submitted Application for Site plan and Land Use Approval indicated that no impacts would occur to any onsite or offsite wetland buffers, tree #'s 1077, 1078, 1083, 1093, and 1094 are indicated on the Tree Removal List as being removed from the 25' natural features setback of wetland A on the west side of the proposed project area.
  - **This matter will be addressed appropriately at the time of Final Site Plan submittal and these trees will not be included on the Tree Removal list.**
- Page 3, #6- Several trees located beyond the church's property boundaries were identified in the Tree Removal List and assigned woodland tree replacement credits, e.g. tree #'s 1080,1151,1153,1155, and 1161.
  - **This matter will be addressed appropriately at the time of Final Site Plan submittal and these trees will not be included on the Tree Removal list. No trees on private property will be removed.**
- Page 3, #7- Regulated woodland tree replacement credits were not calculated correctly per the Woodland Ordinance, especially for multi-stemmed trees.
  - **This matter will be addressed appropriately at the time of Final Site Plan submittal. And new calculations will be provided.**

- Woodland Replacement Review
  - Page 3, #1-Replacement credits have been calculated incorrectly for evergreen species…..
    - **This matter will be addressed appropriately at the time of Final Site Plan submittal. And new calculations will be provided.**
  - Page 3, #2-Half of the species proposed as woodland replacement material, including Norway Spruce, Douglas Fir, and Red Barron crab, are not native to Michigan and are not acceptable as woodland replacement credits.
    - **This matter has been resolved through a new landscape plan submitted to the City.**
  - Page 4, #'s 3-5-**These three issues have been reviewed and addressed on the revised landscape plan forwarded to the City.**
  - Page 4 Site Plan Compliance with Ordinance Chapter 37 Standards, items # 1-7
    - **These issues have been addressed with the revised landscape submitted to the City**

In this revised report from ECT has reviewed the revised landscape plan and has concluded that the above referenced comments no longer apply and that the replacement trees proposed meet the City's requirements.

- ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC. WETAND REVIEW, MAY 23, 2012
  - Page 2, Second Paragraph-It should be noted that the current plan does not indicate or label the boundary of the existing 25-foot wetland setbacks (buffers).
    - **This matter has been addressed and will be included on the Final Site Plan. No wetland setback impacts are proposed.**
  - Page 2, Proposed Impacts Section- There may be wetland setback impacts to the wetland boundary associated with the off-site wetlands to the north.
    - **This matter has been addressed and will be included on the Final Site Plan. No wetland setback impacts are proposed.**

Should there be any additional clarification or questions addressed please contact me at your earliest convenience.

Respectfully submitted,

David E. Call, P.E.
Wilson Road Group, Inc.

LENOX Park

Condominium Association

Pastor Norm Frechette
Brightmoor Christian Church
40800 W. 13 Mile Road
Novi, MI 48377

Re: Brightmoor Christian Church Parking Lot Expansion

Dear Pastor Norm:

First, we would like to thank you and the members of your Church Building Committee for taking the initiative to meet with us and share your plans to expand your North Parking Lot. It was very helpful to join your design engineer in a walk-thru of our common property line on May 12th to better understand your proposed berm and landscape buffer and the impact to the existing woodland area between our respective properties.

We have also taken the opportunity to review the proposed grading and landscape plans you provided and believe that it achieves the intended buffering goals and objectives.

Lastly, we understand that you are requesting a minor waiver of the berm requirement at the northwest corner of your property to avoid impacting the existing 25' wetland buffer. We wholeheartedly support your request and encourage the Planning Commission to grant the foregoing berm waiver.

On behalf of the Lenox Park Condominium Association, we want to thank you for your proactive communication, sensitivity to our concerns and continued cooperation. We wish you well in your expansion plans and look forward to staying in touch.

Best regards,

John F. Andrews
SECRETARY
5-21-12

Board of Directors
Lenox Park Condominium Association

40000 Grand River, Suite. #100 • Novi • Michigan • 48375
248-888-4700 800-301-0121 248-888-4721 (Fax)
www.kramertriad.com

Mike's Tree Surgeons, Inc.
263 Park St., Troy, MI 48083-2726 • (248) 588-0202 • Fax (248) 588-4824
www.mikestree.com
URBAN FORESTERS AND ARBORISTS DEDICATED TO TREE HEALTH AND PRESERVATION

Wilson Road Group, Inc.
Mr. David E. Call P.E.
303 Nepessing
Lapeer, MI 48446

Re: Ash trees at Brightmoor Church parking lot expansion

Dear Mr. Call,

On Thursday May 24, 2012 I inspected 5 Ash trees – tree #'s 813, 1075, 1103, 1115 and 1155 to determine if they were of the Pumpkin Ash variety. I found all these trees to be White Ash and not Pumpkin Ash. The Pumpkin Ash variety resembles the White Ash they have a couple of distinguishing characteristics that I did not find on these trees. There was no glossiness or dark green color to the leaves, the leaves and leaf stalks (petioles) were not pubescent (fine hairs), leaf size was smaller and there was no presence of a swelling at the base of the trunk, which is common on many Pumpkin Ash trees. The site seemed pretty dry to hold the Pumpkin Ash species. There were no "samaras" (seeds) present on the trees at the time of my visit.

Sincerely,

Mike Barger
Registered Forester – MI-596
Certified Arborist – MI-0003

Land
- Oil, Gas, and Minerals
  - Compliance & Enforcement
  - Mineral Wells
  - Mining
  - Oil & Gas
  - Geology in Michigan
  - GeoWebFace
- Land Cleanup
- Land Redevelopment
- Sand Dunes
- Soil Erosion and Sedimentation Control
- Storage Tanks

About the DEQ

Air

Climate Change

Key Topics

News and Events

Pollution Prevention

Waste

Water

Threatened and Endangered Species

Contact: Geological Survey, 517 241 1515

Links to Information for Determining the Presence Threatened and Endangered Species in Michigan

An oil and gas well applicant is responsible to determine if threatened or endangered (T&E) species will be impacted by drilling and producing an oil or gas well at a specific site. Information developed regarding T&E species is identified in or attached to the Environmental Impact Assessment (form EQP 7200-19). An accurate response to the question of whether T&E species are present in the area will help ensure the application is not delayed or denied because it has a technical deficiency. The Department of Natural Resources is responsible for the protection of state endangered and threatened species under the Natural Resources and Environmental Protection Act of 1994. The Michigan Natural Features Inventory maintains a database on the locations of rare species and natural communities in Michigan. The following sources are available to help determine the presence of T&E species in Michigan:

- The Michigan Natural Features Inventory will supply information on a geographic area or species-specific requests. Requestors will receive a text file listing species name, common name, federal status, state status, element occurrence category, last observed date, township, range and section for all occurrences on a topographic quadrangle. There is a fee for this service based upon the number of quadrangles involved in the request. Expedited responses are available for an additional $25 fee. For instructions and more information go to http://web4.msue.msu.edu/mnfi/ .
- Countywide lists of T&E and Special Concern species are available on the internet at http://web4.msue.msu.edu/mnfi/data/county.cfm . This will list all known T&E and Special Concern species in the county but does not give specific location information.
- Another website hosted by the Department of Natural Resources Wildlife Division is available at http://www.mcgi.state.mi.us/tega/ . This site allows delineation of T&E species on a map view basis. If a site has T&E species known then it is shaded. This link does not identify the T&E species present. From this site, it is possible to make a direct contact to DNR for a formal evaluation; this process takes 30-45 days.
- If you have obtained a state of Michigan oil and gas lease that contains Lease Stipulations, which mention T&E species, then it is likely that drilling and production activities may impact those species. Have a qualified biologist or botanist survey the area to determine if and to what extent species may be impacted. Send the survey to Lori Sargent of the Wildlife Division, DNR, for approval of the survey and plan of development PRIOR to sending in the application to drill.

Alternatively, a direct request may be made to the DNR Wildlife Division by identifying the area where drilling and production is to take place.

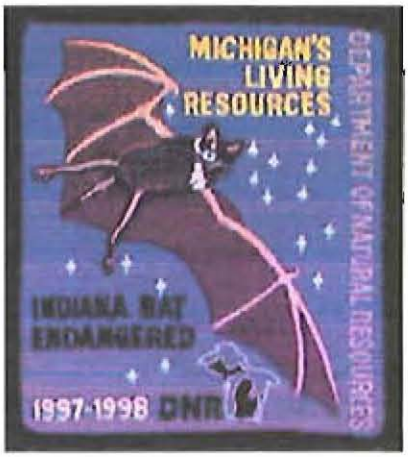
Related Content
- Orphan Wells - getting a permit to operate
- Naming & Numbering of Oil and Gas Wells
- Credit Card or EFT payments
- Weekly Oil & Gas Permit List
- Oil and Gas Permitting Process
- Permit Application Instructions for Oil and Gas Wells
- Bonds for permits to drill oil and gas wells in Michigan - information and forms
- Applying for a Spacing Exception
- Uniform Spacing Plans

www.michigan.gov
(To Print: use your browser's print function)

Release Date: May 02, 2002
Last Update: April 11, 2005

Indiana Bat (*Myotis solidalis*)

Life History



Status: Listed as federal and state endangered.

Size: Weigh in at 7 to 8 grams. Wingspan of 24-27 centimeters.

Habitat: Generally in streamside or forested floodplains under the loose bark of trees.

Hibernation: This bat prefers caves or abandoned mines with temperatures averaging 38 to 43 degrees F with high humidity.

Populations: Less than 400,000 bats remain with 85 percent at 7 hibernation sites in the United States. This concentration at few wintering sites creates a potential for species loss.

Non-DNR Links

Myotis sodalis (University of Michigan, Museum of Zoology)

Species Profile - Indiana Bat (U.S. Fish & Wildlife Service)

Wild File: Indiana Bat (Georgia Wildlife Federation)

Indiana Bat (National Wildlife Federation)

County Element Data

Choose a new county

Oakland County

Current as of 03/15/2012

Scientific Name	Common Name	Federal Status	State Status
Acris crepitans blanchardi	Blanchard's cricket frog		T
Agalinis gattingeri	Gattinger's gerardia		E
Alasmidonta marginata	Elktoe		SC
Alasmidonta viridis	Slippershell		T
Ammocrypta pellucida	Eastern sand darter		T
Ammodramus henslowii	Henslow's sparrow		E
Ammodramus savannarum	Grasshopper sparrow		SC
Amorpha canescens	Leadplant		SC
Angelica venenosa	Hairy angelica		SC
Arabis missouriensis var. deamii	Missouri rock-cress		SC
Aristida longespica	Three-awned grass		T
Asclepias sullivantii	Sullivant's milkweed		T
Asio otus	Long-eared owl		T
Astragalus canadensis	Canadian milk vetch		T
Baptisia lactea	White or prairie false indigo		SC
Bog			
Bouteloua curtipendula	Side-oats grama grass		E
Buteo lineatus	Red-shouldered hawk		T
Calephelis mutica	Swamp metalmark		SC
Carex lupuliformis	False hop sedge		T
Carex richardsonii	Richardson's sedge		SC
Castanea dentata	American chestnut		E
Catinella protracta	A land snail (no common name)		E
Cirsium hillii	Hill's thistle		SC
Clemmys guttata	Spotted turtle		T
Clinostomus elongatus	Redside dace		E
Coastal Plain Marsh	Infertile Pond/marsh, Great Lakes Type		
Coregonus artedi	Lake herring or Cisco		T
Cryptotis parva	Least shrew		T
Cyperus acuminatus	Cyperus, Nut grass		X

Scientific Name	Common Name	Federal Status	State Status
Cypripedium candidum	White lady slipper		T
Dendroica cerulea	Cerulean warbler		T
Dendroica discolor	Prairie warbler		E
Dichanthelium microcarpon	Small-fruited panic-grass		SC
Drosera anglica	English sundew		SC
Dry-mesic Southern Forest			
Emergent Marsh			
Emydoidea blandingii	Blanding's turtle		SC
Epioblasma torulosa rangiana	Northern riffleshell	LE	E
Epioblasma triquetra	Snuffbox	E	E
Erynnis baptisiae	Wild indigo duskywing		SC
Euonymus atropurpurea	Wahoo		SC
Eupatorium fistulosum	Hollow-stemmed Joe-pye weed		T
Flexamia huroni	Huron River leafhopper		T
Floodplain Forest			
Fraxinus profunda	Pumpkin ash		T
Fuirena pumila	Umbrella-grass		T
Galearis spectabilis	Showy orchis		T
Gavia immer	Common loon		T
Gentiana puberulenta	Downy gentian		E
Gentianella quinquefolia	Stiff gentian		T
Great Blue Heron Rookery	Great Blue Heron Rookery		
Hardwood-Conifer Swamp			
Hieracium paniculatum	Panicled hawkweed		T
Hybanthus concolor	Green violet		SC
Hydrastis canadensis	Goldenseal		T
Inundated Shrub Swamp	Shrub Swamp, Central Midwest Type		
Jeffersonia diphylla	Twinleaf		SC
Lampsilis fasciola	Wavyrayed lampmussel		T
Lepyronia angulifera	Angular spittlebug		SC
Ligumia recta	Black sandshell		E
Linum sulcatum	Furrowed flax		SC
Linum virginianum	Virginia flax		T
Liparis liliifolia	Purple twayblade		SC
Meropleon ambifusca	Newman's brocade		SC
Mesic Sand Prairie	Moist Sand Prairie, Midwest Type		

Scientific Name	Common Name	Federal Status	State Status
Mesic Southern Forest	Rich Forest, Central Midwest Type		
Microtus pinetorum	Woodland vole		SC
Morus rubra	Red mulberry		T
Muhlenbergia richardsonis	Mat muhly		T
Nerodia erythrogaster neglecta	Copperbelly water snake	LT	E
Nicrophorus americanus	American burying beetle	LE	X
Notropis anogenus	Pugnose shiner		E
Noturus miurus	Brindled madtom		SC
Oak Barrens	Barrens, Central Midwest Type		
Oarisma poweshiek	Poweshiek skipperling	C	T
Oecanthus laricis	Tamarack tree cricket		SC
Oecanthus pini	Pinetree cricket		SC
Panax quinquefolius	Ginseng		T
Pantherophis spiloides	Gray ratsnake		SC
Papaipema beeriana	Blazing star borer		SC
Platanthera ciliaris	Orange- or yellow-fringed orchid		E
Platanthera leucophaea	Prairie white-fringed orchid	LT	E
Pleurobema sintoxia	Round pigtoe		SC
Poa paludigena	Bog bluegrass		T
Polemonium reptans	Jacob's ladder		T
Poor Conifer Swamp			
Potamogeton vaseyi	Vasey's pondweed		T
Prairie Fen	Alkaline Shrub/herb Fen, Midwest Type		
Prosapia ignipectus	Red-legged spittlebug		SC
Prosartes maculata	Nodding mandarin		X
Ptychobranchus fasciolaris	Kidney shell		SC
Pyrgulopsis letsoni	Gravel pyrg		SC
Rhynchospora scirpoides	Bald-rush		T
Rich Conifer Swamp			
Rich Tamarack Swamp	Forested Bog, Central Midwest Type		
Scirpus clintonii	Clinton's bulrush		SC
Sistrurus catenatus catenatus	Eastern massasauga	C	SC
Southern Hardwood Swamp			
Southern Shrub-carr			

Scientific Name	Common Name	Federal Status	State Status
Southern Wet Meadow	Wet Meadow, Central Midwest Type		
Speyeria idalia	Regal fritillary		E
Sporobolus heterolepis	Prairie dropseed		SC
Submergent Marsh			
Terrapene carolina carolina	Eastern box turtle		SC
Toxolasma lividus	Purple lilliput		E
Trichostema dichotomum	Bastard pennyroyal		T
Trillium sessile	Toadshade		T
Utterbackia imbecillis	Paper pondshell		SC
Valeriana edulis var. ciliata	Edible valerian		T
Villosa fabalis	Rayed bean	E	E
Villosa iris	Rainbow		SC
Viola pedatifida	Prairie birdfoot violet		T
Wet-mesic Prairie	Tallgrass Prairie, Central Midwest Type		
Wilsonia citrina	Hooded warbler		SC

Myotis sodalis
Indiana bat

Key Characteristics

The Indiana bat is a small bat (average length 3.3 in/8.3 cm) with grayish brown fur, dark wing membranes, pinkish undersides, and short, rounded ears. It can be distinguished from similar Myotis species by a distinct elevated ridge or keel on the calcar (i.e., structure extending from the heel to support the back margin of the tail) and hind toe hairs that are shorter than the length of the toenail.

Status and Rank

- State Status: E - Endangered (legally protected)
- US Status: LE - Listed Endangered
- State Rank: S1 - Critically imperiled
- Global Rank: G2 - Imperiled

Occurrences

County Name	Number of Occurrences	Year Last Observed
Barry	1	1963
Branch	1	1991
Calhoun	1	2005
Cass	1	2005
Clinton	1	1974
Eaton	2	1993
Hillsdale	2	1980
Ingham	1	1974
Jackson	4	2005
Lenawee	3	2007
Livingston	2	1995
Manistee	1	2001
St. Joseph	3	2005
Van Buren	1	2005
Washtenaw	3	2005
Wayne	1	1865

Updated 03/15/2012. Information is summarized from MNFI's database of rare species and community occurrences. Data may not reflect true distribution since much of the state has not been thoroughly surveyed.

Habitat

Indiana bats roost and form maternity colonies under loose bark or in hollows and cavities of mature trees in the floodplain forest. In Michigan, savanna habitats adjacent to riparian corridors may have been historically important for roost sites, as the bats are thought to prefer sun-exposed trees for maximum warmth at the northern limit of their range. In winter, Indiana bats primarily hibernate in caves in Kentucky, Indiana, and Missouri, although a new hibernacula site has been found in northern Michigan at a hydroelectric facility.

Specific Habitat Needs

Snag/cavity needed in Southern hardwood swamp, Floodplain forest, Bur oak plains, Oak openings

Natural Community Types

- Bur oak plains
- Floodplain forest
- Oak openings
- Southern hardwood swamp

Management

Floods, cave ceiling collapses, mortality during severe winters, and human disturbances (e.g. vandalism, caving, and indiscriminant collecting) have severely disrupted local populations at their hibernacula. The Indiana bat requires large blocks of mature floodplain forest, including standing snags and other suitable living roost sites. A primary limiting factor in their summer range has been the deforestation of riparian habitats, which usually occurs from the cutting of large, dead trees for firewood. Stream channelization, bank modification, and agricultural development along stream banks also have contributed to habitat destruction. Riparian habitat can be maintained by protecting mature, wooded areas, leaving large, dead trees standing, and maintaining wide vegetation buffer strips. Cutting of snags, canopy removal, and general land clearing activities along streams and rivers for development, agriculture, utility corridors, river or drain dredging and other purposes should be avoided. The species would likely benefit from restoration of floodplain forests and adjacent savannas through tree planting efforts.

Active Period

Active from fourth week of March to fourth week of November

Migration from fourth week of April to fourth week of May

Parturition from first week of June to first week of July

Breeding from first week of October to second week of October

Survey Methods

Mist nets should be set perpendicular to travel corridors such as streams, rivers, and logging trails. A typical net setup is 23-30 feet (7-9 meters) high and up to 66 feet (20 meters) wide. Surveys should consist of a minimum of 1 net site per 0.6 mile (1 kilometer) of habitat corridor and 2 sites per 247 acres (1 square kilometer) of habitat. Mist netting at a site should be conducted for four nights and in at least two different locations within a site. Nets should be checked every 20 minutes from sunset to sunrise. The species is most active 25 minutes after sundown to four hours after sundown.

- Mist netting
    - Survey Period: From second week of May to second week of August
        - Time: Evening
        - Time: Night

Page Citation

Michigan Natural Features Inventory. 2007. Rare Species Explorer (Web Application). Available online at http://mnfi.anr.msu.edu/explorer [Accessed Jun 18, 2012]

References

Survey References

- Kunz, T.H., ed. 1988. Ecological and Behavioral Methods for the Study of Bats. Smithsonian Institution Press, Washington D.C. 533pp.

- Kurta, A. 1980. Status of the Indiana bat, Myotis sodalis, in Michigan. Michigan Academy of Science 13:31-36.

- Wilson, D.E., F.R. Cole, J.D. 1996. Measuring and Monitoring Biological Diversity - Standard Methods for Mammals. Smithsonian Institution Press. Washington D.C.

Technical References

- Baker, R.H. 1983. Michigan Mammals. Michigan State University Press, East Lansing.

- Evers, D.C. 1994. Endangered and Threatened Wildlife of Michigan. The University of Michigan Press, Ann Arbor. 412pp.

- Kurta, A. 1995. Mammals of the Great Lakes Region. The University of Michigan Press, Ann Arbor.

Fish + Wildlife

The Indiana bat (Myotis sodalis) is one of two mammals on the federal list of endangered species that consistently breed in Michigan. Most Indiana bats from Michigan winter in southern Indiana or Kentucky, but a few hibernate at Tippy Dam in northern Lower Michigan; warm-season records (April-October), in contrast, exist for 12 counties in southern Lower Michigan. Births typically occur in mid-to-late June, and lactation lasts 3-5 weeks. Eighty-nine percent of adult females are reproductive (pregnant, lactating, or postlactating) , and 11% of all adults are male. We discovered 69 roost trees used by females and young in six different counties, and most species of tree are typical of lowlands, such as various ash (Fraxinus, 45%), maple (Acer, 36%), and elm (Ulmus, 12%). As a means of avoiding direct "take," resource managers often allow cutting of potential roost trees while Indiana bats are hibernating; however, we recommend that clusters of high-quality, potential roosts not be removed before verifying wheth er they are used by the bats.

INTRODUCTION

The Indiana bat (Myotis sodalis) is a small (7-10 g), insectivorous species that lives only in the eastern United States (Thomson 1982). During winter, most Indiana bats hibernate in mines or caves, primarily in Illinois, Indiana, Kentucky, and Missouri. In spring, these bats disperse from their hibernacula, with most animals, especially females, migrating 100-5 00 km northward to the northern parts of Illinois, Indiana, Ohio, and Missouri, as well as southern Michigan (Gardner and Cook 2002; Kurta and Murray 2002). Females in summer gather in small maternity colonies of less than 100 animals, whereas males typically lead a solitary life. Both males and females, however, usually roost under the exfoliating bark of dead trees (Gardner et al. 1991; Kurta et al. 2002).

The species was declared endangered in the United States under the Endangered Species Preservation Act of 1966, because of declining populations at known hibernacula and a perceived lack of critical habitat in winter (Clawson 2002). Initially biologists believed that declines were caused by human disturbance and/or alteration of microclimates at mines and caves that were used during hibernation, but despite protection of all major hibernacula, the number of Indiana bats continued to decrease. The ongoing decline suggested that this species also was experiencing problems on its summer range, perhaps related to habitat loss or use of pesticides (O'Shea and Clark 2002). Beginning in the 1990s, the plight of this bat received considerable attention from resource managers and environmentalists, and the species became known as the "spotted owl of the East," as disputes over its protection led to court-ordered shut-downs of logging on national forests from North Carolina to Missouri to Pennsylvania.

The Indiana bat is of particular concern to citizens of Michigan, because this bat is one of only two species of mammal on the federal list of endangered species that consistently breeds within the state. Although the first Indiana bat from Michigan was taken in the 1860s (Kurta et al.

1993), there were only 29 additional records prior to 1980 (Kurta 1980b). Eight bats were museum specimens collected between 1946 and 1974, five records represented animals that were banded in Kentucky and recovered in Michigan from 1963 to 1971, and 16 animals were mist-netted over streams in 1978 and 1979. Since 1979, however, we have captured over 100 additional Indiana bats in the state. The purpose of this paper is to synthesize information concerning the seasonal and geographic distribution of Indiana bats in Michigan, as well as their roosting requirements and reproductive events. Such information is essential for proper management of the species and to insure that continued alteration of the landscape does not impact su rvival of this endangered mammal on the northern edge of its range.

METHODS

Southern Lower Michigan

We extracted information from a previous report (Kurta 1980b) on Indiana bats in southern Lower Michigan and supplemented it with new data obtained by mist-netting and radiotracking since 1979 (e.g., Kurta et al. 1993, 1996, 2002). Fieldwork most often occurred between late May and mid-to-late August, although a few observations were made earlier or later. After locating a roost tree through radiotracking, we generally recorded the species of tree, diameter at breast height, height of tree, and height of the bats' exit, which we assumed approximated the height at which bats roosted. In addition, we estimated number of hours of sunlight striking the roosting area, using categories of low (0-5 h), medium ([greater than or equal to]5 but <10 h), and high (10 h), and the amount of exfoliating bark present, also using categories of low (<10%), medium ([greater than or equal to]10 but <25%), and high (25%), following Gardner et al. (1991). Not all parameters were measured for every tree, generally because of proble ms with landowner permission or other logistical difficulties. Pregnancy of captured animals was determined by palpation, and lactation was determined by condition of the nipples and ability to express milk (Racey 1988). Age (juvenile vs. adult) was assigned based on degree of ossification of the phalangeal epiphyses (Anthony 1988).

Tippy Dam

In addition to animals summering in southern Lower Michigan, we also captured Indiana bats that were using the spillway at Tippy Dam for autumn swarming and winter hibernation (Kurta and Teramino 1994; Kurta et al. 1997). Tippy Dam is a hydroelectric facility near Wellston, in Manistee Co., in the northern Lower Peninsula. The spillway is the only significant hibernaculum for bats in the Lower Peninsula, sheltering about 19,000 hibernating individuals. Most (>99%) are little brown bats (Myotis lucifugus) and northern bats (Myotis septentrionalis), although eastern pipistrelles (Pipistrellus subflavus) and Indiana bats are also present (Kurta et al. 1997). During swarming, we captured bats with a harp trap (Kunz and Kurta 1988), and during hibernation, they were taken by hand or with a long-handled net. Aging bats through phalangeal ossification often becomes unreliable in late summer, and we did not attempt to do so at Tippy Dam.

Marking Bats

Beginning in 1994, most Indiana bats were banded (Kurta and Murray 2002), whereas those captured before 1994 were punch-marked (Bonaccorso and Smythe 1972) for future recognition. Punch-marking allowed recognition of individuals for only a few weeks, whereas banding provided an ability to distinguish individuals over multiple years. Our bands were inscribed with a unique four-digit number and the letters "EMU YPSI MI."

RESULTS AND DISCUSSION

Tippy Dam

To date, we have captured 15 Indiana bats, eight females and seven males, at Tippy Dam. Eleven Indiana bats were found between November and Mareh during hibernation, and the other four were caught during swarming in late August or September. The internal shape of the spillway prevented us from approaching most hibernating bats (Kurta et al. 1997), and identification of such tiny mammals from a distance was not practicable. Consequently, it was not possible to count the Indiana bats that hibernated there, although Kurta et al. (1997) estimated that the maximum number of Indiana bats was 65. Our subsequent visits to the dam reinforced the original conclusion that the population of Indiana bats at Tippy Dam was very small. Indiana bats, nevertheless, consistently have been found in the spillway, with at least one individual encountered in seven of eight years (1994-2001) since the species was discovered there on 25 February 1994.

Although the first Indiana bat located at the dam was not banded, the other 14 individuals were, and two of these were recaptured in subsequent years. A male initially caught on 24 August 1995 was recaptured on 13 September 1997 and again on 11 September 1999, whereas a female banded on 18 March 1995 was seen again on 14 February 1998. These recoveries, along with the consistent presence of Indiana bats over an eight-year period, suggested that Tippy Dam sheltered an established population and that our initial captures were not simply wayward animals that accidentally located the hollow spillway, only to perish or move on the next year.

Where do Indiana bats from Tippy Dam spend the summer? A mist-netting survey in 1985 at 46 sites, including many netting sites within 150 km of the dam, failed to capture any Indiana bats (Kurta et al. 1989). In addition, a survey during 1999-2000 at 27 sites in the Manistee National Forest, which surrounds Tippy Dam, did not yield an Indiana bat (Kurta 2000). This lack of success could indicate that the bats summer far from the dam; however, the sampling effort in both studies was not sufficient to rule out presence of an uncommon species within such large geographic areas.

Indiana bats hibernating at Tippy Dam, like bats at other sites, could migrate in any direction for summer. The Indiana bat, however, is essentially a southern species, and those hibernating at Tippy Dam are the northernmost representatives of the species in the Midwest. Consequently, we hypothesize that Indiana bats from Tippy Dam will summer near the coast of Lake Michigan and suggest that future surveys be concentrated there. The lake has a moderating effect on local climate that extends only a short distance, perhaps 30-50 km from the coast, and within this narrow zone, there exists a thermal environment very similar to that of southern Lower Michigan (Keen 1993), where we commonly find these bats. For example, the growing season (number of

days between freezing temperatures in spring and autumn) is similar between Manistee, on the coast only 30 km west of the dam, and Jackson, which is more than 225 km farther south. Migrating only 50-150 km away from the lake would yield significantly cooler temperature s that could reduce food supplies (flying insects) in spring, forcing the bats into prolonged torpor with resulting delays in embryonic and! or juvenile development (Humphrey et al. 1977; Racey 1982).

Alternatively, Indiana bars at the dam may migrate more than 190 km to Lansing or farther south for warm temperatures, where they would mingle with Indiana bats that are known to hibernate in Indiana and Kentucky (Kurta 1980b; Kurta and Murray 2002). This distance (190 km) is well within the migratory abilities of the species, and we already know that even Indiana bats from the same summer colony do not necessarily hibernate in the same location (Kurta and Murray 2002). We question, however, why the bats would fly such long distances when suitable climate arid unoccupied habitats are available only a short distance from Tippy Dam.

Geographic Distribution in Southern Lower Michigan

Kurta (1980b) concluded that the Indiana bat was a widespread summer resident of southern Lower Michigan, and our new information (Figure 1) supports that statement. Records of the Indiana bat currently exist for 12 southern counties, an increase of three counties since 1980, with the addition of Branch, Jackson, and Lenawee counties. Since 1980, Indiana bats also have been captured at new localities in Hillsdale, St. Joseph, and Washtenaw counties, as well as at a previously discovered site in Eaton Co.

Indiana bats migrate up to 532 km from hibernacula to summer quarters (Gardner and Cook 2002; Kurta and Murray 2002). Based on this distance, location of hibernacula in Indiana and Kentucky (Gardner and Cook 2002; United States Fish and Wildlife Service 1996), and capture localities in Michigan (Figure 1), we believe that Indiana bats could occur anywhere that suitable habitat exists within the southern three rows of counties in Michigan and perhaps farther north, especially on the western side of the state. Although records of the Indiana bat do not exist for seven of 19 counties in the southern three tiers of counties, we attribute these gaps in distribution to lack of fieldwork by biologists trained to capture bats. For example, to our knowledge, no one has ever attempted to capture foraging bats, of any species, in Macomb and Oakland counties. In addition, only limited mist-netting has taken place in Berrien, Cass, and Van Buren counties (Kurta 1980a), with none occurring in the past 22 years.

Seasonal Distribution in Southern Lower Michigan

The earliest seasonal record of an Indiana bat from southern Lower Michigan is an adult male found in Washtenaw Co. on 11 May 1965 (Kurta 1980b), although there are eight other records from May as well. In addition, as part of a long-term study of a maternity colony in Eaton Co. (Viele 1994; Viele et al. 2002), biologists observed evening emergence of bats from trees to which Indiana bats had been radiotracked during the previous year. Bats that were presumed to be Indiana bats left these trees as early as the night of 28 April. Most female Indiana bats leave southern hibernacula during early and mid-April (Cope and Humphrey 1977), and only 9 days are needed to travel from caves in Kentucky to southern Michigan (Davis 1964; Kurta 1980b).

Consequently, Indiana bats from southern hibernacula probably begin arriving in Michigan no later than mid-to-late April, and this timing is supported by the observation from Eaton Co. (Viele 1994; Viele et al. 2002).

The latest seasonal record is a female found in Lansing on 11 October 1974 (Kurta 1980b). In addition, bats left known roost trees in Eaton Co. as late as 10 September 1991 and 12 September 1992, and there also are three older records from September (Kurta 1980b). Mating by Indiana bats occurs at hibernacula primarily in September and early October (Barbour and Davis 1969; Cope and Humphrey 1977), and any bat still in southern Lower Michigan is missing such opportunities. However, many juveniles of temperate species of bat do not breed in their first autumn (Gustafson 1975; Racey and Entwistle 2000; Schowalter et al. 1979), and they typically arrive at hibernacula later than do adults (Thomas et al. 1979). Consequently, the October record and perhaps the September records may represent individuals that were born that summer. In any event, October seems late for these bats to remain in southern Lower Michigan, whether they are juveniles or adults, because nighttime temperatures frequently fall below 10[degrees]C during October. Such low temperatures greatly reduce the number of flying insects (food), and it is not clear why a healthy bat would delay its migration and remain in southern Michigan under such circumstances.

Presence of Adult Males in Southern Lower Michigan

Data on age and reproductive condition are not available for Indiana bats taken in Michigan prior to 1978. However, since 1977, we have captured 87 Indiana bats in southern Lower Michigan--64 adult females, 8 adult males, and 15 juveniles. Although males typically remain near hibernacula during summer (Gardner and Cook 2002; Whitaker and Brack 2002), 11% of our adult captures are males, indicating that substantial numbers of both sexes migrate over 400 km each year (Kurta and Murray 2002). Our value of 11% probably underestimates the proportion of adult males in the summer population, because our netting preferentially occurs near maternity roosts (Kurta et al. 1996,2002), and male Indiana bats, as in many other species, often do not roost with females during the maternity period (Gardner et al. 1991).

Reproduction in Southern Lower Michigan

Fifteen adult females were recaptured one or more times after initial banding, so the 64 adult females were caught a total of 84 times. For determining the timing of reproductive events, we treated each capture as an independent event because we had no control over which individuals were recaptured, or at what time of year, and because banding and recapture usually occurred in different years. Pregnant Indiana bats were caught on 23 occasions; lactating females, 32 times; and postlactating individuals, 11 times. Eleven bats caught in spring were not palpably pregnant, and seven adult females netted in summer appeared nonreproductive.

Indiana bats become pregnant soon after leaving hibernation through the process of delayed fertilization (Guthrie 1933) and presumably enter southern Michigan already pregnant. Palpation can not reliably detect an embryo during the first half of pregnancy, and palpably pregnant bats were not identified until 22 May (Figure 2). The last pregnant bat was detected on 3 July, but juveniles began entering the volant population as early as 15 July. Lactating females, in contrast,

were captured as early as 21 June and as late as 25 July. Although Kurta (1980b) reported a lactating female on 15 August, a review of the original field notes indicated that that statement was an error. Hence, most births probably occurred in mid-to-late June, with lactation occurring throughout July and lasting 3-5 weeks. Timing of reproductive events in Michigan was essentially identical to that in south-central Indiana (Humphrey et al. 1977), despite longer migrations and cooler ambient temperatures for northern populations.

Knowing the proportion of the population that is reproducing is important for management of any endangered species, especially one, such as the Indiana bat, in which females produce only a single young each year. We limited our analysis to bats captured after 15 June to eliminate not-palpably-pregnant females, which may or may not have been pregnant. Using this restricted sample, we calculated that 89% of 63 captures of adult females represented reproductive individuals (pregnant, lactating or postlactating).

Reproductive rates of the closely related little brown bat often exceed 95%, but location and stochastic events, such as amount of rainfall and temperature, can lead to lower rates (Humphrey and Cope 1976; Grindal et al. 1992). Although our estimate for Indiana bats is within the range of observed values for its non-endangered congener, there are no comparable data for Indiana bats from other parts of the country. This is unfortunate, because there are large regional differences in the decline of Indiana bats, as indicated by counts at hibernacula. Populations in Missouri, for example, have decreased by 79% since 1980, whereas those hibernating in Indiana increased slightly (Clawson 2002). Knowing whether declines at various hibernacula corresponded with reduced rates of reproduction on the summer range could be helpful in determining the cause of the decline in population size. We encourage investigators in other states to determine reproductive rates by analyzing their accumulated data for comparison.

Roost Trees Used by Maternity Colonies

Radiotracking adult females or juveniles led to discovery of 69 roost trees that were used during the maternity season (Table 1). Most roosts were found in Eaton (Kurta etal. 1993,1996) and in Jackson and Washtenaw (Kurta et al. 2002) counties, where we performed concentrated, multi-year studies. Nevertheless, roost trees also were located in Branch, Lenawee, and St. Joseph counties.

Indiana bats in Michigan most often roost under the loose bark of dead trees, although narrow crevices (as opposed to tree hollows or woodpecker cavities) are used occasionally (Table 1). Peeling bark usually covers 25% or more of the tree, although amount of exfoliating bark on roost trees is similar to that of nearby, randomly selected trees (Kurta et al. 1996, 2002). A typical roost tree has a diameter of 41 cm (Table 1) and is larger than neighboring trees that are available to the bats (Kurta et al. 1996, 2002). Average height of a tree is 21 m, and on average, bats roost halfway up the tree, as indicated by the exit height. Most roosts receive 10 or more hours of sun each day.

Roost trees in Michigan belonged to at least eight species, and most were typical of lowland areas (Table 1), such as various ash (Fraxinus, 45%), maple (Acer, 36%), and elm (Ulmus, 12%). Although Indiana bats in southern states (Callahan et al. 1997; Gardner et al. 1991) frequently

used oaks (Quercus) and shagbark hickories (Carya ovata), these species were not important in Michigan. We never radiotracked an adult female or juvenile to an oak, and we located only three shagbark hickories that were used as roosts. Each shagbark hickory, however, was a heavily shaded, living tree, and each was found by radiotracking a postlactating female--one bat in Jackson Co. and another in St. Joseph Co. Maximum number of bats at each hickory was only 2-5, whereas focal roost trees (sensu O'Donnell 2000) used by pregnant and lactating Indiana bats typically sheltered 15-50 bats in Michigan (Kurta et al. 2002).

Although Callahan et al. (1997) call for preservation of oak-hickory forests as a means of maintaining roosts for maternity colonies of Indiana bats, current data do not support this tactic as a management strategy in Michigan. The difference between Missouri and Michigan, however, may be due partly to a difference in availability of various trees. Elm-ash-cottonwood associations, for example, are typical of lowland forests in many parts of southern Michigan, and they are more prevalent in counties with records of reproductively active Indiana bats in Michigan than in any other state (G. Gardner in litt.; United States Fish and Wildlife Service 1996). On the other hand, there may be regional differenees in roost-site selection, with Indiana bats in Michigan actively selecting lowland sites (Kurta et al. 2002). We suggest that biologists locate and study intensively (e.g., Kurta et al. 1996, 2002) new maternity colonies in different areas of Michigan, to determine whether this apparent preference for lowlands and lowland species of trees is consistent across the southern part of the state and not an artifact of our sampling or availability of different habitats.

Such studies are urgently needed, especially in light of the introduction of the emerald ash borer (Agrilus planipennis). This Asian insect was first identified in North America in July 2002, although it likely arrived a few years before that (McCullough and Roberts 2002). In North America, this beetle currently is known only from southeastern Michigan and adjacent Ontario. The emerald ash borer has decimated local populations of ash trees (including green and black ash), and the infestation likely will spread soon to other parts of the Indiana bat's range. Although actions of this beetle temporarily may increase available roosting habitat for Indiana bats, by rapidly increasing the number of dead trees, the long-term effects are uncertain. Large-diameter elms that could be used as roosts are already uncommon in southern Michigan, due to Dutch elm disease (Barnes 1976; Barnes and Wagner 1981), and the emerald ash borer may cause a similar long-term decline in availability of large-diameter ash.

Roosts of Adult Males in Southern Lower Michigan

We also located nine roost trees used by four adult males (Table 2). Two roosts were identified when male Indiana bats were captured in nets placed near maternity roosts, but the other seven trees were found by radiotracking three males. All males roosted under exfoliating bark, and as with the females, most trees were dead elm, ash, or maple. In addition, one male was radiotracked to a living red oak (Quercus rubra), where the bat rested under bark, on a dead branch, near the trunk; the branch, which was only 10 cm in diameter, was below the thick canopy, and no direct sunlight struck the roosting site.

Cutting Potential Roost Trees

The U. S. Fish and Wildlife Service often allows potential roost trees to be cut after Indiana bats leave for hibernation in order to make way for developments such as new bridges, highways, and housing projects. This policy understandably is intended to allow human developments to proceed while preventing direct "take" of Indiana bats. This practice, however, should be limited, because it destroys potential roost trees without establishing whether they actually are used by Indiana bats, which may leave the bats with no shelter when they return in spring in an energetically stressed condition. Upon returning, the bats have just completed 6-7 months of hibernation and an extensive migration, and they arrive already pregnant and at a time when air temperatures are low and food (flying insects) is scarce. Excessive precipitation and/or colder-than-average temperatures drastically reduce reproductive success of temperate bats (Grindal et al. 1992; Lewis 1993), and such negative effects likely would occur even dur ing normal weather if Indiana bats do not have adequate shelter.

We acknowledge that a colony of Indiana bats uses a large number of trees each year (Callahan et al. 1997; Kurta et al. 1996, 2002) and that some roost trees fall over or otherwise become unsuitable for bats through natural means on a regular basis (Gardner et al. 1991; Kurta 1994; Kurta and Foster 1995; Kurta et al. 2002). Roost trees, however, are clustered, rather than randomly spread throughout the landscape (Kurta et al. 1996, 2002), and our concern is that a single new shopping center or highway re-alignment could simultaneously destroy all high-quality roosts used by a particular colony. Although cutting of isolated trees used as alternate roosts may do little harm, we recommend that clusters of high-quality, potential roosts (loose bark, unimpeded access, high solar exposure, etc.) not be removed until it is shown that they are not actually used by Indiana bats.

If trees that are suitable as roosts must be removed, we suggest that cutting be limited to a period between 1 November and 31 March of each year. The population of hibernating bats at Tippy Dam reaches winter levels by mid-October and remains high until mid-April (Kurta et al. 1997); hence, any Indiana bats that hibernate there would not be affected directly by tree-removal during that time. In addition, a no-cut period from 1 April to 31 October conservatively brackets all known seasonal observations of Indiana bats in southern Lower Michigan and would ensure that these animals are protected during the reproductive season. Rangewide, the population of Indiana bats has decreased by 57% since 1960 (Clawson 2002), and only through continued research and enlightened management will we reverse this trend.

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[FIGURE 2 OMITTED]

TABLE 1

Roost trees used by adult females and/or young Indiana bats in southern Lower Michigan.

Species	Number of trees	Number of living vs dead trees	Number of roosts under bark vs. in crevices
Green ash (Fraxinus pennsylvanica)	27	1/26	26/1
Silver maple (Acer saccharinum)	11	0/11	11/0
Unidentified maple (Acer sp.)	9	0/9	9/0
American elm (Ulmus americana)	7	0/7	7/0
Blak ash (Fraxinus nigra)	4	0/4	4/0
Red maple (Acer rubrum)	3	0/3	1/2
Shagbark hickory (Carya ovata)	3	3/0	3/0
Cottonwood (Populus deltoides)	1	0/1	0/1
Slippery elm (Ulmus rubra)	1	0/1	0/1
Unidentified	1	0/1	1/0
Total	69	4/65	64/5

Species	Diameter (cm) (1) at breast height
Green ash (Fraxinus pennsylvanica)	39 [+ or -] 1 (27)
Silver maple (Acer saccharinum)	47 [+ or -] 11 (11)
Unidentified maple (Acer sp.)	48 [+ or -] 4 (8)
American elm (Ulmus americana)	36 [+ or -] 4 (7)
Blak ash (Fraxinus nigra)	25 [+ or -] 3 (4)
Red maple (Acer rubrum)	41 [+ or -] 3 (3)
Shagbark hickory (Carya ovata)	51 [+ or -] 6 (3)
Cottonwood (Populus deltoides)	36
Slippery elm (Ulmus rubra)	34
Unidentified	42
Total	41 [+ or -] 2 (68)

Species	Height of tree (m) (1)

Green ash (Fraxinus pennsylvanica)	24 [+ or -] 2 (27)
Silver maple (Acer saccharinum)	18 [+ or -] 2 (11)
Unidentified maple (Acer sp.)	23 [+ or -] 2 (9)
American elm (Ulmus americana)	16 [+ or -] 2 (5)
Blak ash (Fraxinus nigra)	14 [+ or -] 1 (4)
Red maple (Acer rubrum)	23 [+ or -] 2 (3)
Shagbark hickory (Carya ovata)	31 (1)
Cottonwood (Populus deltoides)	9
Slippery elm (Ulmus rubra)	9
Unidentified	
Total	21 [+ or -] 1 (64)

Species	Height of of exit (m) (1)
Green ash (Fraxinus pennsylvanica)	10 [+ or -] 1 (25)
Silver maple (Acer saccharinum)	10 [+ or -] 1 (10)
Unidentified maple (Acer sp.)	12 [+ or -] 2 (9)
American elm (Ulmus americana)	6 [+ or -] 1 (6)
Blak ash (Fraxinus nigra)	6 [+ or -] 0.3 (4)
Red maple (Acer rubrum)	13 [+ or -] 1 (2)
Shagbark hickory (Carya ovata)	
Cottonwood (Populus deltoides)	8
Slippery elm (Ulmus rubra)	9
Unidentified	
Total	10 [+ or -] 1 (61)

Species	Number of trees with high, medium low, or zero peeling bark (2)	Number of trees with high, medium, or low solar exposure (3)
Green ash (Fraxinus pennsylvanica)	15, 8, 2, 0	25, 1, 1
Silver maple (Acer saccharinum)	4, 2, 5, 0	5, 2, 2
Unidentified maple (Acer sp.)	6, 2, 2, 0	7, 2, 0
American elm (Ulmus americana)	5, 0, 1, 0	2, 3, 0
Blak ash (Fraxinus nigra)	1, 2, 1, 0	0, 4, 0
Red maple (Acer rubrum)	0, 2, 0, 1	2, 1, 0
Shagbark hickory (Carya ovata)	3, 0, 0, 0	0, 1, 2
Cottonwood (Populus deltoides)	0, 1, 0, 0	1, 0, 0
Slippery elm (Ulmus rubra)	0, 0, 0, 1	0, 1, 0
Unidentified	0, 1, 0, 0	1, 0, 0
Total	34, 19, 11, 2	42, 15, 4

(1)Mean [+ or -] standard error n.

(2)Rating follows Gardner et al. (1991). High means that [greater than or equal to]25% of trunk covered by peeling bark; medium, [greater than or equal to]10 but <25% of trunk covered; low, < 10% covered.

(3)High means [greater than or equal to]10 h of exposure; medium

(greater than or equal to]10 h; low, <5 h.

TABLE 2

Roost trees used by adult male Indiana bats in southern Lower Michigan.

Species	Diameter at breast (cm)	Height of trees (m)
American elm	20	12
American elm	16	9
Black ash (3)	17	16
Black ash (3)	24	16
Black ash (3)	26	13
Green ash	22	20
Green ash (3)	52	47
Red Oak	52	31
Silver maple	95	31
Mean	36 [+ or -] 9 (9) (4)	21 [+ or -] 4 (9) (4)

Species	Height of exit (m)	Amount of peeling bark (1)	Amount of solar exposure (2)
American elm	4	High	
American elm	3	Medium	
Black ash (3)	5	Medium	Medium
Black ash (3)	5	Low	Medium
Black ash (3)	10	Medium	Medium
Green ash	15	Medium	High
Green ash (3)	12	High	High
Red Oak	13	Low	Low
Silver maple	13	High	
Mean	9 [+ or -] 2 (9) (4)		

(1)Rating follows Gardner et al. (1991). High means that [greater than or equal to]25% of trunk covered by peeling bark; medium, [greater than or equal to]10 but <25% of trunk covered; low, <10% covered.

(2)High means [greater than or equal to]10 h of exposure; medium, [greater than or equal to]5 but <10 h; low, <5 h.

(3)Trees initially located by radiotracking adult females.

(4)Mean [+ or -] standard error (n).

FIELD SURVEY FOR INDIANA BAT (*MYOTIS SODALIS*) HIBERNACULA FOR PROPOSED SECTION 202 FLOOD DAMAGE REDUCTION ACTIVITIES PIKE COUNTY, KENTUCKY

PREPARED FOR:
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FIELD SURVEY FOR INDIANA BAT (*MYOTIS SODALIS*) HIBERNACULA FOR PROPOSED SECTION 202 FLOOD REDUCTION ACTIVITIES PIKE COUNTY, KENTUCKY

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I. INTRODUCTION

Eco-Tech, Incorporated, was contracted to conduct a search for hibernacula for the federally endangered Indiana bat (*Myotis sodalis*) at two areas (North Pikeville and Coal Run Village) in Pike County, Kentucky, where floodwalls and levees are proposed for flood damage reduction (see attached project location maps). Potential hibernacula for Indiana bats may include caves or mine portals.

II. SPECIES STATUS, DISTRIBUTION, AND NATURAL HISTORY

A. Species Status

The Indiana bat was listed as an endangered species on March 11, 1967 by the United States Fish and Wildlife Service (USFWS). As with all federally endangered species, it is protected by the Endangered Species Act (ESA) of 1973 (Public Law 93-205) (United States Congress 1973), as amended. Several years following its listing, an Indiana bat recovery plan was developed by biologists (i.e., the recovery team) and reviewed by the USFWS. Since that time the recovery plan has been revised to reflect recent studies and surveys. The Indiana Bat Recovery Plan outlines criteria for protecting and recovering the species (Brady *et al.* 1983, USFWS 1999).

Although most of the hibernacula have been protected, the Indiana bat still appears to continue a 5% decline in range-wide population every two years. Currently, researchers are focusing studies on summer habitat, heavy metals, the influence of pesticides, and genetic variability within the species in attempts to find causes for the continuous declines in populations.

B. Distribution

The range of the Indiana bat includes most of the eastern United States. It occurs from Oklahoma, Iowa, and Wisconsin east to Vermont, and south to northwestern Florida (Barbour and Davis 1969). The majority (85%) of the range-wide population hibernates in nine Priority 1 hibernacula (sites that currently and/or historically contained more than 30,000 individuals), which are located in Indiana (three sites), Kentucky (three sites), and Missouri (three sites) (USFWS 1999).

Some Indiana bats migrate long distances from their hibernacula to find suitable summer habitat to raise offspring. Until recently it was thought that the entire species, with the exception of some males, migrated north and west from their hibernacula to forested areas in Missouri, Indiana, Kentucky, Iowa, Ohio, and Michigan during the summer (Barbour and Davis 1969). Currently, reproductive Indiana bats have been documented from the following states Illinois, Indiana, Iowa, Kentucky, Michigan, Missouri, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia.

C. Natural History

Winter Habitat

During the short days of autumn (late August through early October), Indiana bats roost under sloughing bark and in cracks of dead, partially dead, and live trees (Humphrey *et al.* 1977, Gardner *et al.* 1991, J. MacGregor *et al.* 1999). Roost trees used by Indiana bats during the autumn range

from 4.7 to 26.4 inches in dbh (diameter at breast height) and occur in forested, semi-forested and open habitats within 1.4 miles of the hibernacula (Kiser and Elliott 1996). Depending on local weather conditions, Indiana bats normally enter the hibernaculum in October and remain there through April (Hall 1962, LaVal and LaVal 1980). An abandoned iron mine in Missouri historically contained 139,000 Indiana bats. Most of the hibernacula with large colonies are located in Arkansas, Illinois, Indiana, Kentucky, Missouri, New York and Tennessee (USFWS 1999). Smaller hibernacula are located in Alabama, Connecticut, Florida, Georgia, Iowa, Maryland, Massachusetts, Michigan, Mississippi, New Jersey, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Vermont, Virginia, and West Virginia (ibid., Bryan *et al.* 1994).

According to Barbour and Davis (1969), temperature and relative humidity are important factors in the selection of hibernation sites. During the early fall Indiana bats roost in warm sections of caves and move down a temperature gradient as temperatures decrease. In midwinter Indiana bats tend to roost in portions of the cave where temperatures are cool (37° to 43° F). Relative humidity in Indiana bat hibernacula tends to be high, ranging from 66% to 95% (Barbour and Davis 1969). Prior to entering the hibernacula swarming occurs at the entrances (Cope and Humphrey 1977), or sometimes at other caves located near the hibernacula (LaVal *et al.* 1977, J. MacGregor *et al.* 1999). Swarming usually lasts for several weeks (August - September) and mating occurs toward the end of this period. After mating, females usually enter directly into hibernation, whereas males may remain active through the end of November. Adult females store sperm through the winter thus delaying fertilization until early May. During April and May the majority of the Indiana bat population will leave the cave areas and find suitable summer habitat. Females usually start grouping into larger maternity colonies by mid-May and give birth to a single young between late June and early July (Easterla and Watkins 1969, Humphrey *et al.* 1977).

Summer Habitat

Maternity colonies have been found under sloughing bark of dead and partially dead trees in upland and lowland forest (Cope *et al.* 1974, Humphrey *et al.* 1977, Gardner *et al.* 1991). These colonies are usually located in large-diameter, standing dead trees with direct exposure to sunlight (Callahan *et al.* 1997). A maternity roost may contain more than 100 adult females. During Callahan *et al.*'s (1997) study, he arranged roost trees into two groups depending on the intensity of use and size of the colony that used each tree. Callahan (1993) classified any tree that was used more than once by greater than 30 bats each time as a primary roost tree, and any tree with less than 30 bats or used only once as an alternate roost tree. The primary roost trees had an average diameter at breast height (dbh) of 22.4 inches, while alternate roost trees had an average dbh of 20.9 inches (Callahan *et al.* 1997). For unknown reasons, Indiana bats require many roost trees to fulfill their needs during the summer (Callahan *et al.* 1997). In Michigan, Kurta and Williams (1992) found that Indiana bats used two to four different roost trees during the course of one season. Although Indiana bats have been found roosting in several different species of trees, it appears that Indiana bats choose roost trees based on their structural composition. Therefore, it is difficult to determine if one particular species of tree is more important than others. However, twelve tree species have been listed in the Habitat Suitability Index Model (Romme *et al.* 1995) as primary species (class I trees). The trees listed by Romme *et al.* (1995) include silver maple (*Acer saccharinum*), shagbark hickory (*Carya ovata*), shellbark hickory (*C. laciniosa*), bitternut hickory (*C. cordiformis*), green ash (*Fraxinus pennsylvanica*), white ash (*F. americana*), eastern cottonwood (*Populus deltoides*), red oak (*Quercus rubra*), post oak (*Q. stellata*), white oak (*Q. alba*) slippery elm (*Ulmus rubra*), and

American elm (*Ulmus americana*). In addition to these species Romme *et al.* (1995) listed sugar maple (*A. saccharum*), shingle oak (*Q. imbricaria*), and sassafras (*Sassafras albidum*) as class 2 trees. The class 2 trees are those species believed to be less important, but still have the necessary characteristics to be used as roosts. Trees normally used as primary roosts are typically dead and have a dbh greater than 12 inches (Romme *et al.* 1995). However, in some rare cases primary roosts have been found in large hollow live trees. Kurta *et al.* (1993) found a primary roost in a 22 inch dbh hollow sycamore (*Platanus occidentalis*) in Michigan. Roost trees often provide suitable habitat as maternity roost for only a short period of time. However, bats will use them in consecutive years, if they remain standing and have sloughing bark (Gardner *et al.* 1991, Callahan *et al.* 1997).

Food Habits

Historically, the Indiana bat was thought to prey primarily on moths (Lepidoptera), beetles (Coleoptera), true flies (Diptera), and caddisflies (Trichoptera) (Belwood 1979, Brack 1983, Brack and LaVal 1985). During a study by Belwood (1979), the primary insects consumed by females and juveniles in southern Indiana were Lepidoptera (57%), Diptera (18%), and Coleoptera (9%). Belwood's information was very similar to a three year study conducted by Brack (1983) throughout Indiana. Brack (1983) found that Indiana bats also consumed Lepidoptera (48%), Coleoptera (24%), and Diptera (8.5%). However, he also found Trichoptera (9.8%) to be an important food source. Recent studies by Lee (1993) and Kurta and Whitaker (1998) found the same four insect orders were consumed by Indiana bats in central/northern Indiana and in Michigan. However, these studies showed that Indiana bats preyed much more on caddisflies in central/northern Indiana and in Michigan. The female Indiana bats in central and northern Indiana consumed 40% Lepidoptera, 29% Trichoptera, 13% Coleoptera, and 9% Diptera (Lee 1993). The most recent Indiana bat food habits study was conducted in Michigan at the northern limits of the species range. These bats consumed primarily Trichoptera (55.1%) and Diptera (25.5%) which have aquatic larva (Kurta and Whitaker 1998). These authors hypothesized that Indiana bats in northern portions of their range feed more on aquatic insects than southern populations because they foraged primarily over streams and wetlands.

Indiana bats forage primarily in upland, bottomland, and riparian forests (Cope *et al.* 1974, Humphrey *et al.* 1977, LaVal *et al.* 1977, Belwood 1979), but they will also use forest and cropland edges, fallow fields, and areas of impounded water (Gardner *et al.* 1991). It has been documented that Indiana bats may travel up to three miles from their summer roosts to summer foraging areas and will visit these same areas each night. A pregnant female captured near Morehead, Kentucky maintained a very systematic travel pattern to reach an upland wildlife pond and woods that had been shelterwood cut (J. MacGregor, unpublished data). This bat arrived at the pond and adjacent woods within a couple of minutes each night that it was tracked. Reproductively active females traveled a maximum mean distance of 1.5 miles from their roost trees to foraging areas in Illinois (Gardner *et al.* 1991). During a recent study by Pruitt *et al.* (1995) at the Jefferson Proving Ground (JPG), Jefferson County, Indiana, reproductive female bats were found to travel a mean distance of 1.7 miles from their original capture sites to their roost trees. Also, at JPG, a male traveled 0.4 miles from the capture site to its roost; this distance is less, but similar to the distance of 0.7 miles found by Gardner *et al.* (1991) for males in Illinois.

III. METHODS

Prior to the field survey, a thorough search of existing cave and mine portal information for the project area and adjacent area was conducted. The field survey for hibernacula was done on December 2, 2003. The study area was walked to locate potential hibernacula for the Indiana bat. This included searching for caves and mine portals. If these were present, further evaluation would be provided. Cave-like dwellings (culverts, cisterns, storm sewers) were also searched for within the project area. These features were evaluated for bat use.

Other Indiana bat habitat characteristics that were rated include summer roosting habitat, food and water availability and quality, and interspersion of habitat components. A bat habitat assessment form was completed during the field survey. Although this form is for all bat species, it was filled out with emphasis on the habitat requirements of the Indiana bat. Notes and photographs of existing land cover were taken. As required by the Endangered Species Act, the best scientific methods were used to evaluate habitat for the species.

IV. RESULTS AND DISCUSSION

The study area is mostly riparian forest and fields in a floodplain terrace of Levisa Fork (see attached photographs). No caves or mine portals were found in the study area. However, a few concrete culverts and drain pipes were inspected for bat use. No evidence of use was found in any of these structures. No hibernacula or winter habitat are present within the study area. According to geology maps of the area (Alvord 1965, Alvord and Holbrook 1965), the study areas are underlain entirely by alluvium (Quaternary). The Breathitt Formation (lower and middle Pennsylvanian) is situated at slightly higher elevations outside the study areas and has numerous coal zones, some of which contain mine portals. Numerous mine portals and a few caves are known within a five-mile radius; however, the Indiana bat has not been documented from this area of Pike County. Records are from a cave in Letcher County.

The study area provides medium quality potential summer roosting and foraging habitat for the Indiana bat. It was estimated from transect counts that approximately 10 trees per acre have structural attributes similar to known summer roost trees. These include sycamore, silver maple, box elder, river birch, and red elm snags and cavity trees, as well as live trees of the same species.

If proposed project is constructed during the winter (November 15 through March 31), this project is not likely to affect the Indiana bat. However, if tree removal is proposed outside of this time frame then additional surveys (mist netting and echolocation detection recording and analysis) should be conducted in the study area according to USFWS guidelines (USFWS 1999) to determine whether or not Indiana bats are present.

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Bat Habitat Requirements Summary Table.

North Pikeville Floodwall / Levee
Pike County KY 12-2-03

Habitat Component	Habitat Requirements
Food - Young	• Milk from mother (insects) usually within two weeks of birth.
Food - Adult	• (Night-flying insects) such as moths, beetles, fruit flies, mosquitoes, mayflies, caddis flies, midges, grasshoppers, cicadas, and many others. Insect types may vary by bat species. • Fish, frogs, lizards, small rodents, birds, other bats. United States and Canadian bats are primarily insectivorous, but tropical bats have adapted to many other food sources. • Fruit, pollen, and nectar from plants and flowers such as banana, mango, date, fig, peach, cashew, guava, avocado, agave, giant saguaro and organ pipe cacti, and many others. Only a few southwestern species feed on nectar and pollen from cacti and agaves.
Roosts - Hibernacula	• Caves and mines, occasionally buildings. Many species migrate, and a few overwinter in the open, such as in trees
-Maternity roosts	• (Loose tree bark) leaves, (tree cavities) caves, mines, bridges, and buildings.
-Bachelor roosts	• (Loose tree bark) leaves, (tree cavities) caves, mines, bridges, and buildings.
-Night roosts	• Bridges, (porches) barns, (other buildings) (trees) caves, mines, bat houses, and other structures
-Transient roosts	• May include all of those listed above ✓
Winter habitat	• Caves, mines, tree branches, cavities and bark; cliff and rock crevices; tangled hedgerow thickets; attics and roofs of barns and other structures that provide an overhang in close proximity to open water; mowed fields; desert landscapes; agricultural crop fields and residential areas lit with street and yard lights. Varies by species. Many bats migrate from their summer range
Water	• (Open bodies of fresh water large enough to enable drinking) on the wing without disturbance from cattails, bank side trees, or other vegetation.
Interspersion	• Prefer a (complex of open water, mowed fields, woodlots, streams) desert landscapes, agricultural crop fields, (residential areas) (trees) cliff and rock crevices, tangled hedgerow thickets, caves mines, attics and roofs of barns and other structures that provide an overhang. Interspersion of habitat components varies tremendously by bat species.
Minimum habitat size	• No reasonable estimate of minimum habitat size exists for bats, but probably varies by species

Limiting Factors

For planning purposes, use the table below to inventory the site to determine the availability of each of the basic habitat components, based on the above narrative habitat requirement descriptions. Habitat components that are absent or rated low are limiting habitat quality for bats.

Habitat Component	Availability/Quality			
	High	Medium	Low	Absent
Food		✓		
Roosts - hibernacula				✓
- maternity roosts		✓		
- bachelor roosts		✓		
- night roosts			✓	
- transient roosts			✓	
Winter habitat				✓
Water		✓		
Interspersion of habitat components		✓		

* See attached photographs.

Bat Habitat Requirements Summary Table.

Pike County, Kentucky. 12-2-03

Habitat Component	Habitat Requirements
Food - Young	• Milk from mother, insects, usually within two weeks of birth.
Food - Adult	• Night-flying insects such as moths, beetles, fruit flies, mosquitoes, mayflies, caddis flies, midges, grasshoppers, cicadas, and many others. Insect types may vary by bat species. • Fish, frogs, lizards, small rodents, birds, other bats. United States and Canadian bats are primarily insectivorous, but tropical bats have adapted to many other food sources • Fruit, pollen, and nectar from plants and flowers such as banana, mango, date, fig, peach, cashew, guava, avocado, agave, giant saguaro and organ pipe cacti, and many others. Only a few southwestern species feed on nectar and pollen from cacti and agaves.
Roosts - Hibernacula	• Caves and mines, occasionally buildings. Many species migrate, and a few overwinter in the open, such as in trees.
-Maternity roosts	• Loose tree bark, leaves, tree cavities, caves, mines, bridges, and buildings.
-Bachelor roosts	• Loose tree bark, leaves, tree cavities, caves, mines, bridges, and buildings.
-Night roosts	• Bridges, porches, barns, other buildings, trees, caves, mines, bat houses, and other structures.
-Transient roosts	• May include all of those listed above. ✓
Winter habitat	• Caves, mines, tree branches, cavities and bark; cliff and rock crevices; tangled hedgerow thickets, attics and roofs of barns and other structures that provide an overhang in close proximity to open water; mowed fields; desert landscapes; agricultural crop fields and residential areas lit with street and yard lights. Varies by species. Many bats migrate from their summer range.
Water	• Open bodies of fresh water large enough to enable drinking on the wing without disturbance from cattails, bank side trees, or other vegetation.
Interspersion	• Prefer a complex of open water, mowed fields, woodlots, streams, desert landscapes, agricultural crop fields, residential areas, trees, cliff and rock crevices, tangled hedgerow thickets, caves, mines, attics and roofs of barns and other structures that provide an overhang. Interspersion of habitat components varies tremendously by bat species.
Minimum habitat size	• No reasonable estimate of minimum habitat size exists for bats, but probably varies by species

Limiting Factors

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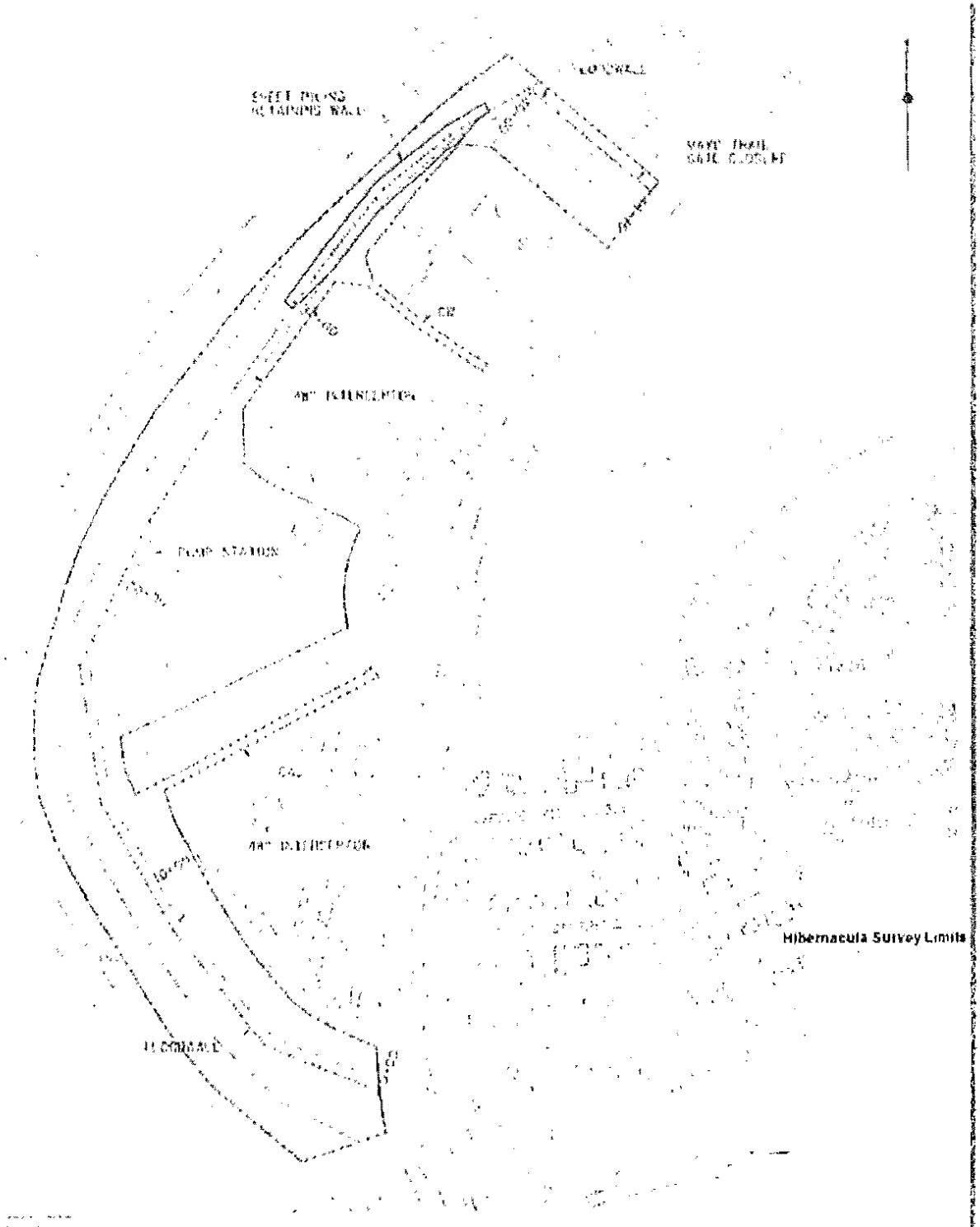
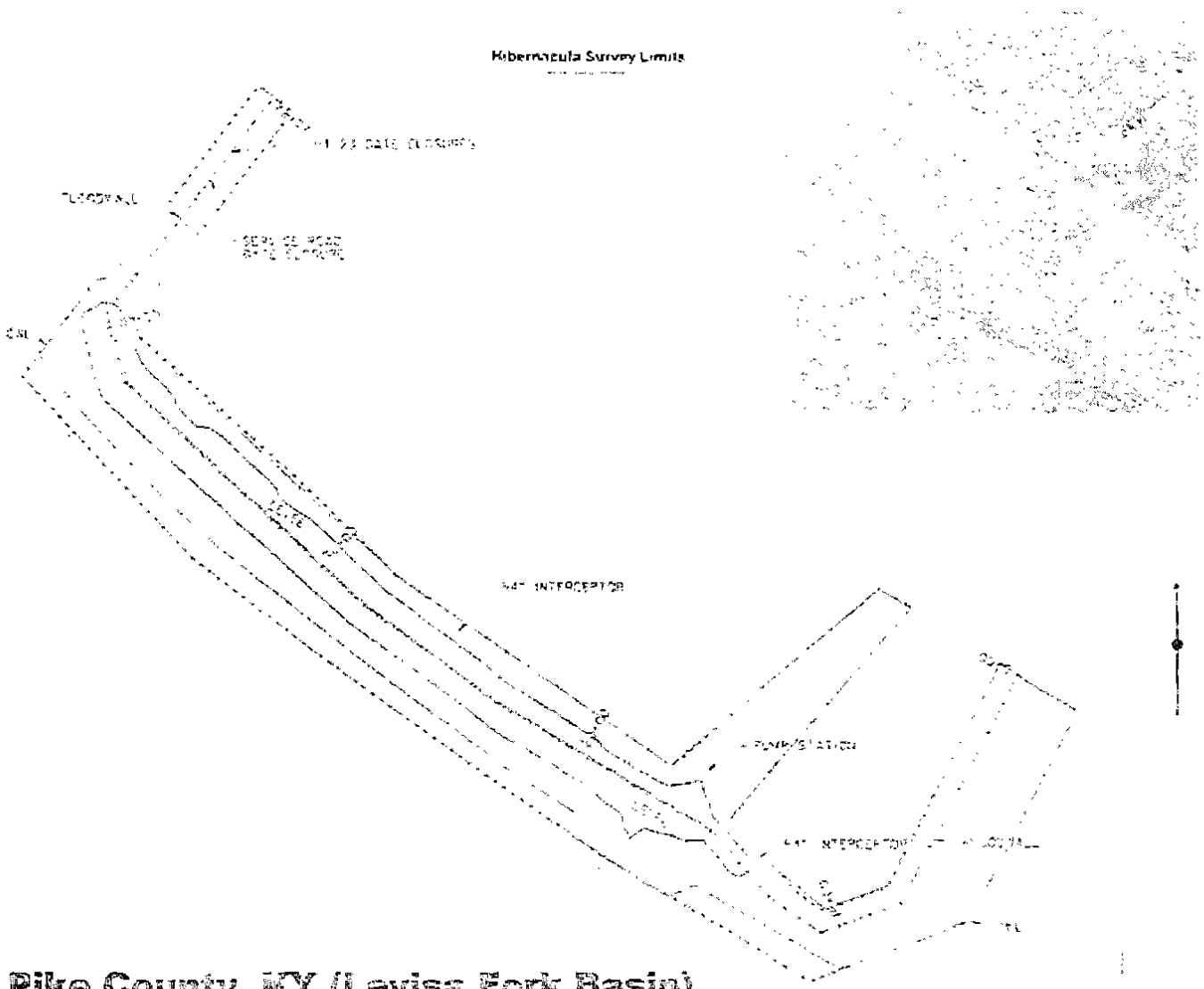
Habitat Component	Availability/Quality			
	High	Medium	Low	Absent
Food		✓		
Roosts - hibernacula				✓
- maternity roosts		✓		
- bachelor roosts		✓		
- night roosts			✓	
- transient roosts			✓	
Winter habitat				✓
Water		✓		
Interspersion of habitat components		✓		

* see attached photographs.



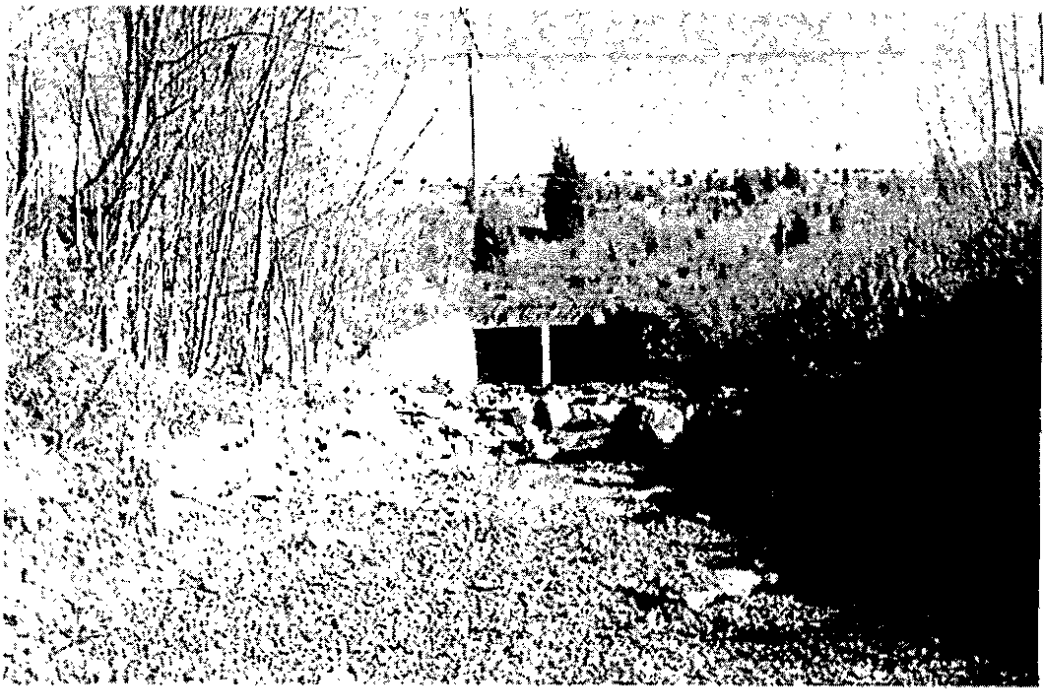
US Army Corps
of Engineers
Huntington District

Pike County, KY (Levisa Fork Basin)
Section 202 Project Floodwall/Levee
Alternative at North Pikeville

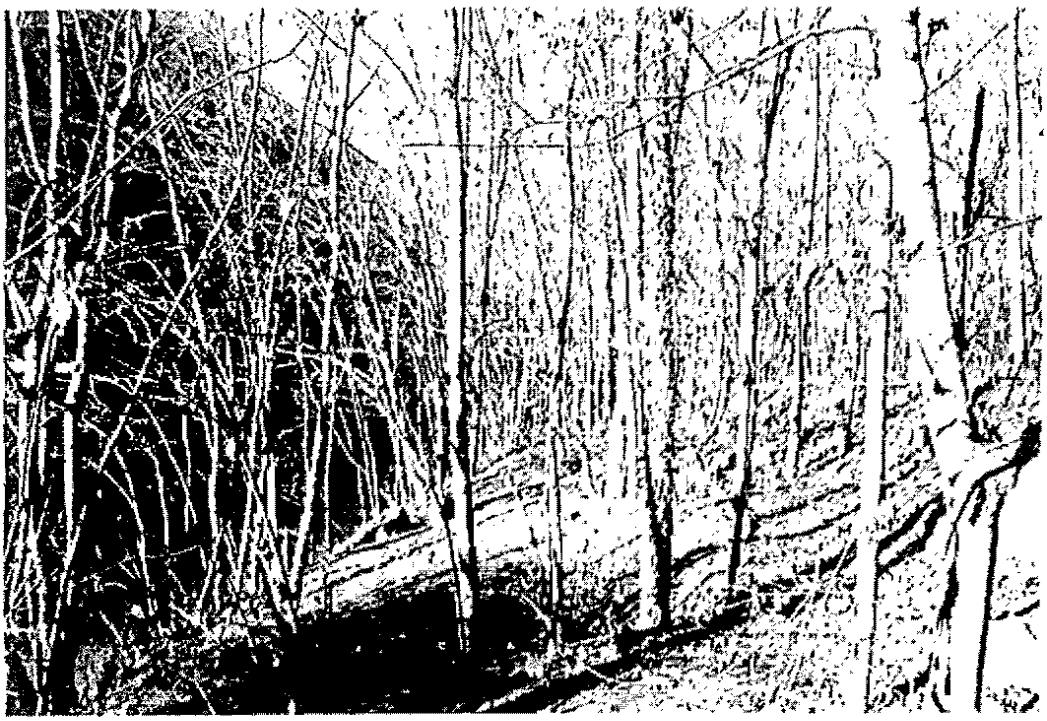


US Army Corps of Engineers
Huntington District

Pike County, KY (Levisa Fork Basin) Section 202 Project Floodwall/Levee Alternative at Coal Run Village



Proposed North Pikeville Floodwall Area – double box culvert at southern end



Proposed North Pikeville Floodwall Area – riparian forest on lower terrace

PHOTOGRAPHS

FIELD SURVEY FOR INDIANA BAT (*MYOTIS SODALIS*) HIBERNACULA FOR PROPOSED SECTION 202 FLOOD DAMAGE REDUCTION ACTIVITIES, PIKE COUNTY, KENTUCKY

2 DECEMBER 2003

ECO-TECH, INC.

1003 E. Main St.
Frankfort, KY 40601
Myotis2000@aol.com

Proposed North Pikeville Floodwall Area – lower terrace residential area

Proposed North Pikeville Floodwall Area – lower terrace behind high school

PHOTOGRAPHS

FIELD SURVEY FOR INDIANA BAT (*MYOTIS SODALIS*)
HIBERNACULA FOR PROPOSED SECTION 202 FLOOD
DAMAGE REDUCTION ACTIVITIES,
PIKE COUNTY, KENTUCKY

2 DECEMBER 2003

ECO-TECH, INC.

1003 E. Main St
Frankfort, KY 40601
Myotis2000@aol.com

Proposed Coal Run Village Floodwall Area – lower terrace fields and riparian forest

Proposed Coal Run Village Floodwall Area – lower terrace fields and riparian forest

PHOTOGRAPHS

FIELD SURVEY FOR INDIANA BAT (*MYOTIS SODALIS*)
HIBERNACULA FOR PROPOSED SECTION 202 FLOOD
DAMAGE REDUCTION ACTIVITIES,
PIKE COUNTY, KENTUCKY

2 DECEMBER 2003

ECO-TECH, INC.

1003 E. Main St.
Frankfort, KY 40601
Myotis2000@aol.com

MAPS

Location

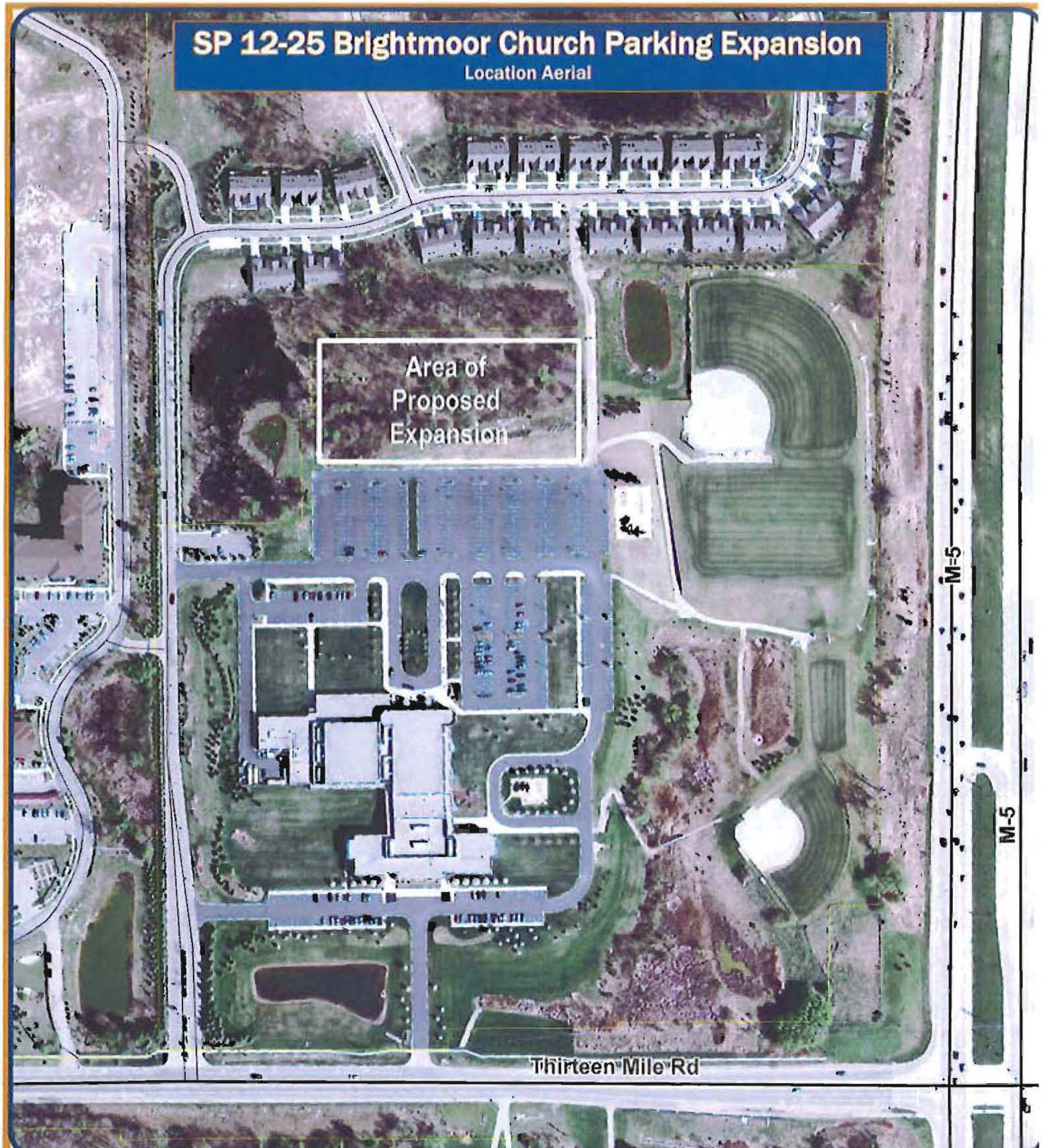
Zoning

Future Land Use

Natural Features

SP 12-25 Brightmoor Church Parking Expansion

Location Aerial



Map Author: David Campbell
Date: 6/20/2012
Project: SP12-25 Brightmoor Church
Version #: 1.0

Amended By:
Date:
Department:

MAP INTERPRETATION NOTICE

Map Legend

Tax Parcels

City of Novi

Dept. of Community Development
City Hall / Civic Center
45175 W Ten Mile Rd
Novi, MI 48375
cityofnovi.org

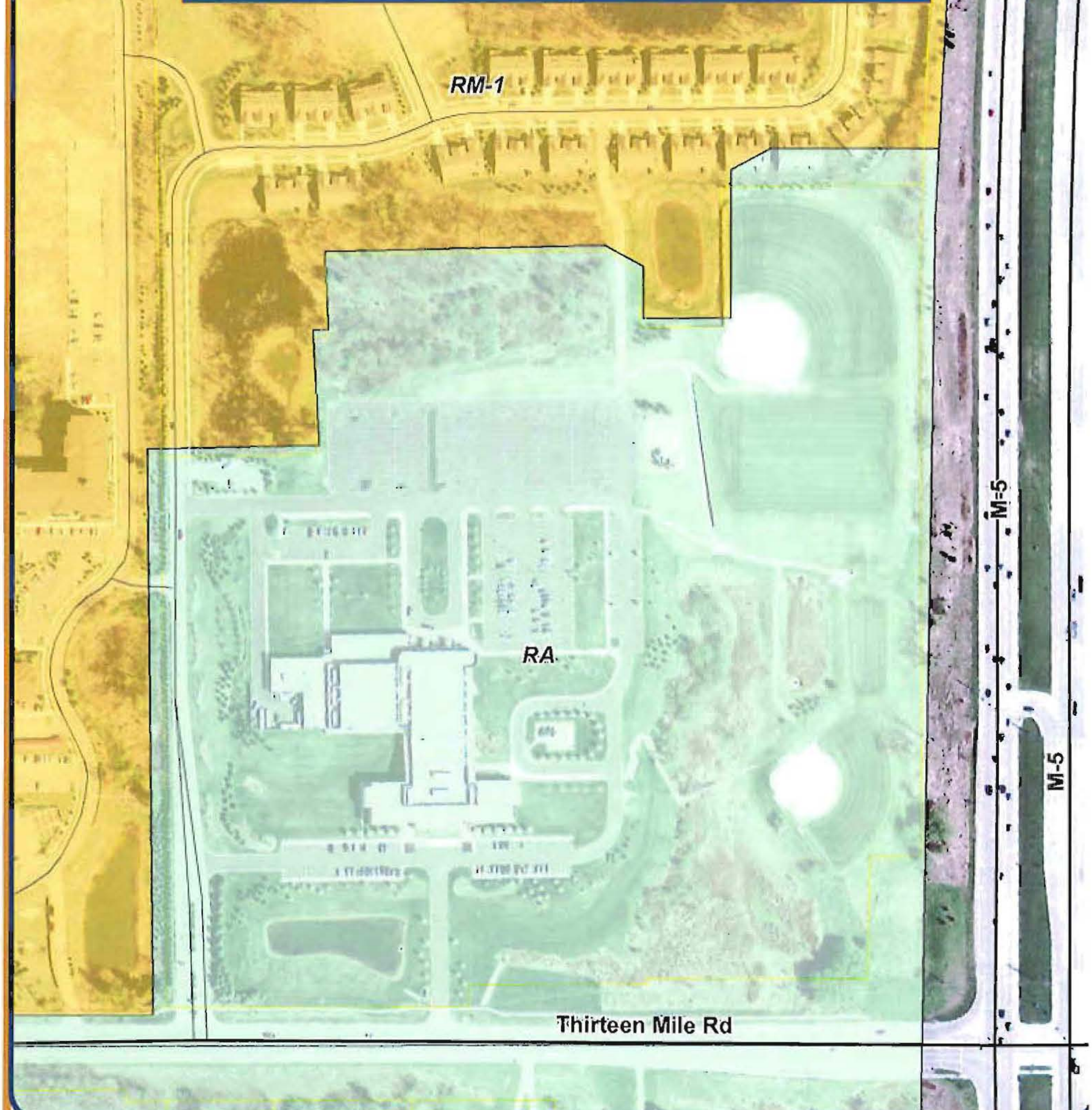
Feet

0 50 100 200 300 400

1 inch = 250 feet

SP 12-25 Brightmoor Church Parking Expansion

Zoning



Map Author: David Campbell
Date: 6/20/2012
Project: SP12-25 Brightmoor
Version #: 1.0

Amended By:
Date:
Department:

MAP INTERPRETATION NOTICE

Map Legend

Tax Parcels

Zoning

Zoning Code

- R-A: Residential Acreage
- RM-1: Low-Density Multiple Family
- OST: Office Service Technology

City of Novi

Dept. of Community Development
City Hall / Civic Center
45175 W Ten Mile Rd
Novi, MI 48375
cityofnovi.org

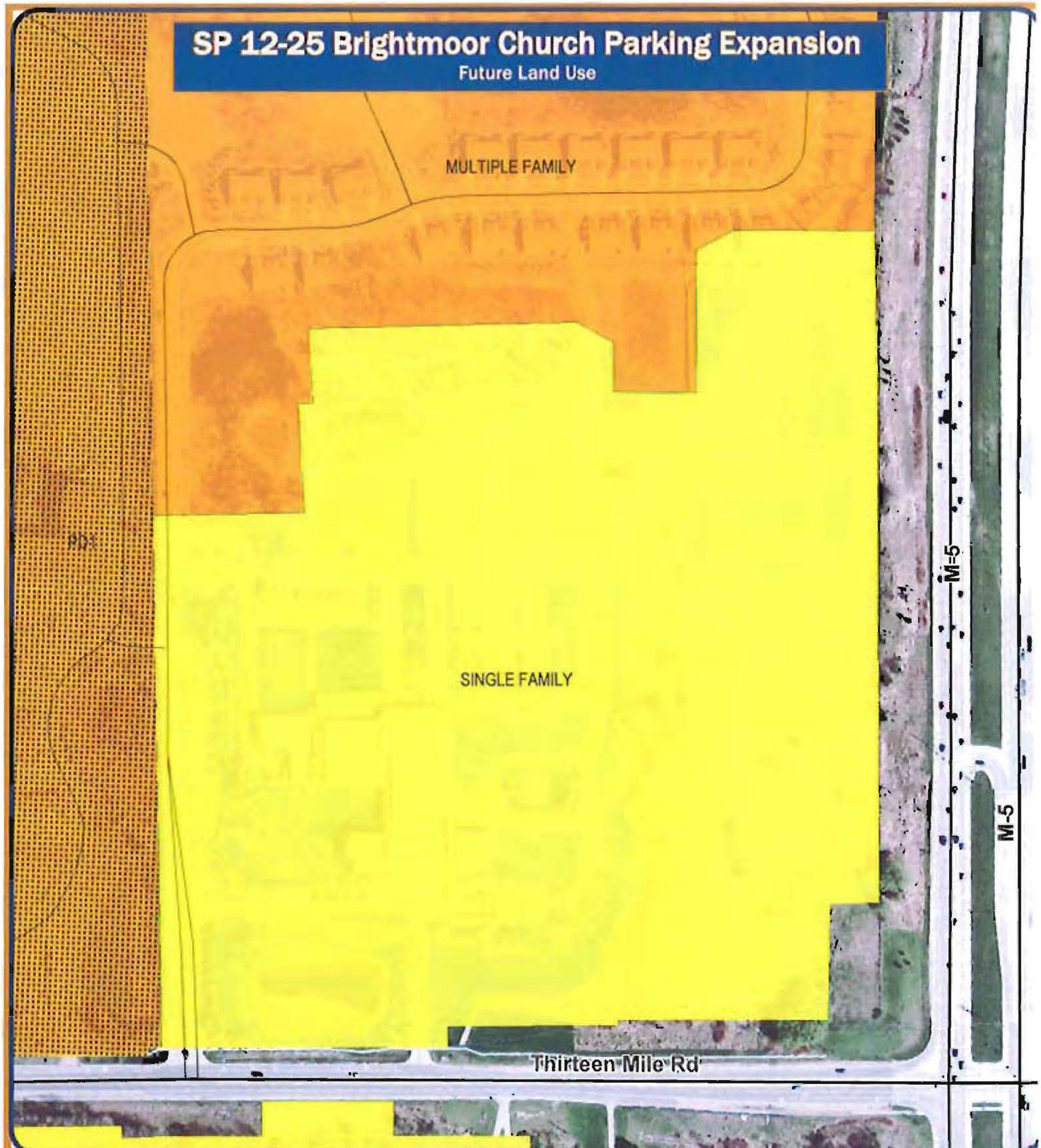
Feet

0 50 100 200 300 400

1 inch = 250 feet

SP 12-25 Brightmoor Church Parking Expansion

Future Land Use



Map Author: David Campbell
Date: 6/20/2012
Project: SP12-25 Brightmoor
Version #: 1.0

Amended By:
Date:
Department:

MAP INTERPRETATION NOTICE

Map Legend

Tax Parcels

Future Land Use (2010)

Proposed Land Use

- SINGLE FAMILY
- MULTIPLE FAMILY
- PD1

City of Novi

Dept. of Community Development
City Hall / Civic Center
45175 W Ten Mile Rd
Novi, MI 48375
cityofnovi.org

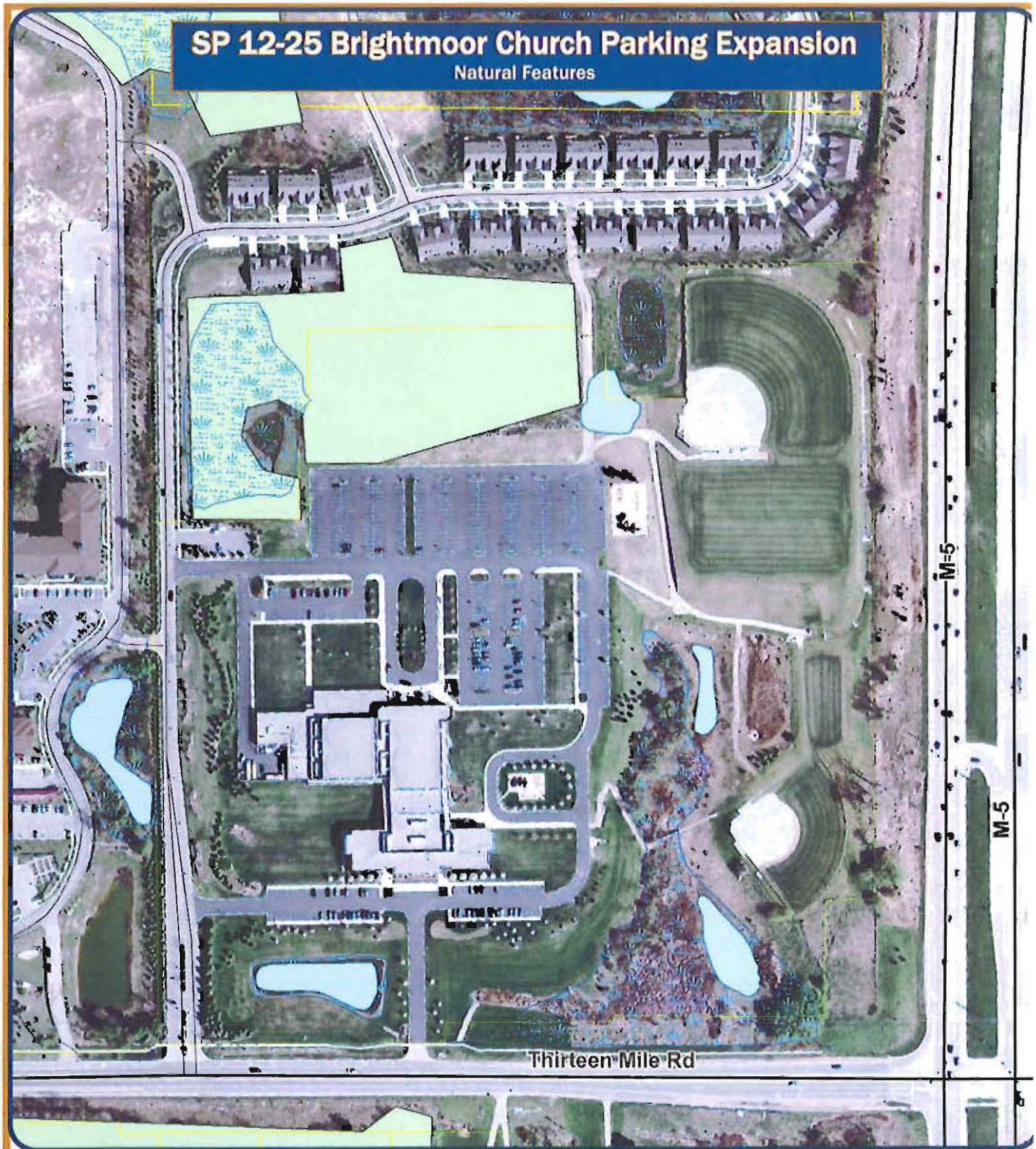
Feet

0 50 100 200 300 400

1 inch = 250 feet

SP 12-25 Brightmoor Church Parking Expansion

Natural Features



Map Author: David Campbell
Date: 6-20-2012
Project: SP12-25 Brightmoor Church
Version #: 1.0

Amended By:
Date:
Department:

MAP INTERPRETATION NOTICE

Map information depicted is not intended to replace or substitute for any official or primary source. This map was intended to meet National Map Accuracy Standards and use the most recent and accurate sources available to the people of the City of Novi. Boundaries are approximate and should not be construed as survey descriptions performed by a licensed Michigan Surveyor as defined in Michigan Public Act 132 of 1970 as amended. Please contact the City GIS Manager to confirm source and accuracy information related to this map.

Map Legend

- Tax Parcels
- Waterways
- Lake or Pond

FIRM Flood Hazard Areas

Flood Zones
- 0.2% Chance Flood Zone A
- 1.0% Chance Flood Zone AE
- Wetlands
- Woodlands

HabNat Priority Areas

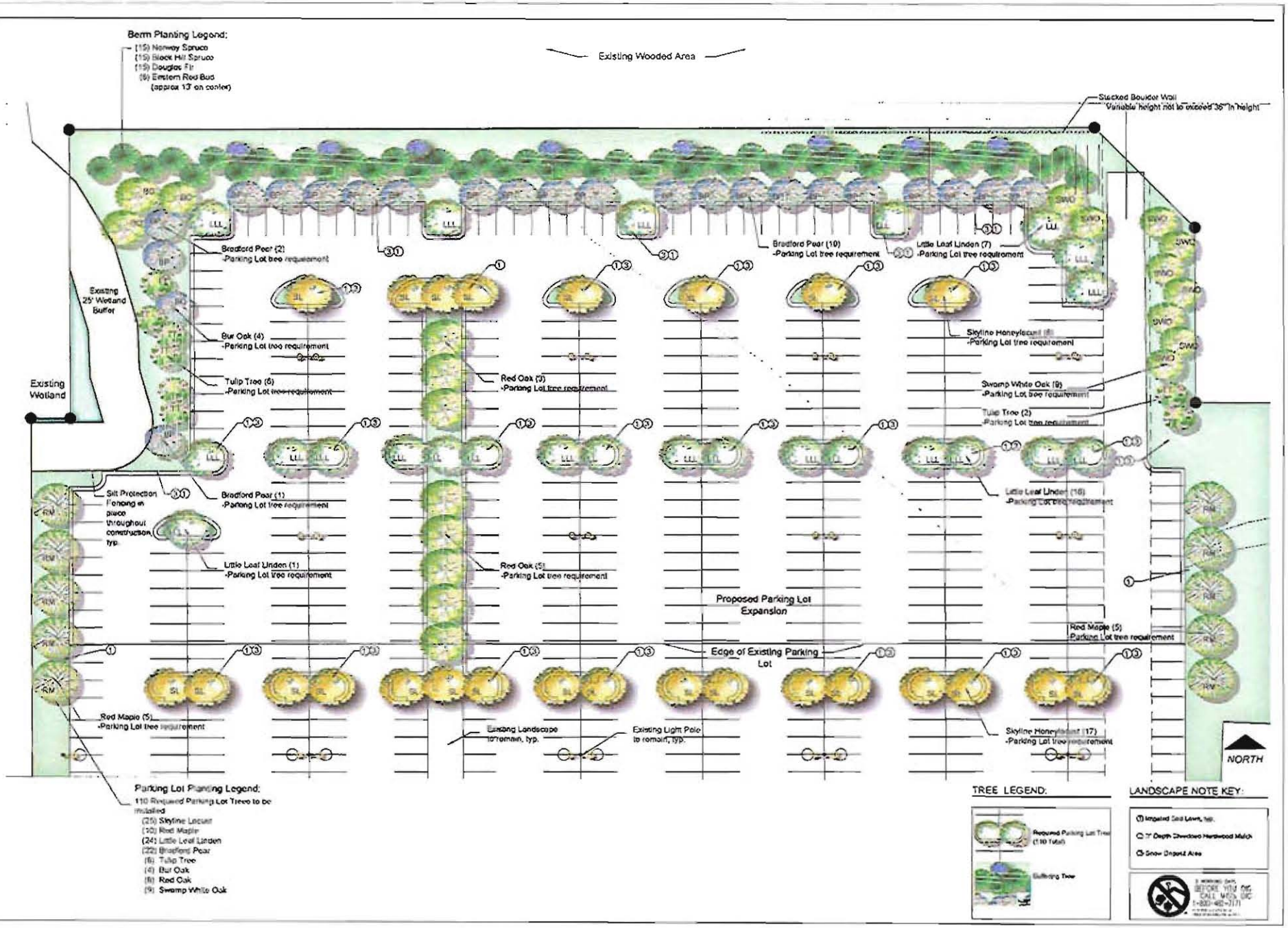
Rank
- High
- Medium
- Low

City of Novi
Dept. of Community Development
City Hall / Civic Center
45175 W Ten Mile Rd
Novi, MI 48375
cityofnovi.org

Feet
0 50 100 200 300 400

1 inch = 250 feet

SITE PLAN



J EPPINK PARTNERS INC

Brightmoor Christian Church

42600 West 10 Mile Road
Novi, Michigan 48377

WRG

LANDSCAPE PLANTING PLAN

Preliminary Site Plan Submission 05-01-12
Revised Pre Site Plan Submission 05-25-12

ADS
JTE
May 1, 2012
1" = 20'

L-1