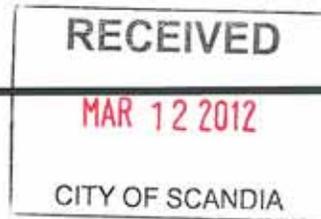


**Appendix A:
Public Comments Received on the Proposed Zavoral Mine and Reclamation Plan
Draft Environmental Impact Statement (EIS)**

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Anne Hurlburt

From: Alexandria Bowen [andybowen@me.com]
Sent: Sunday, March 11, 2012 1:10 PM
To: council@ci.scandia.mn.us
Subject: EIS evaluation of Zavoral mine

Scandia City Council. I am writing to oppose the Zavoral mine. My family have been summer residents and taxpayers in Washington County for many years, residing in Scandia. We strongly oppose the Zavoral mine. Some of our reasons for this opposition are as follows: 1) NOISE POLLUTION from operation of on-site mining equipment and from hundreds of daily trucks traveling both directions on Highway 97; 2) AIR POLLUTION from exhaust of said trucks; 3) DANGER of moving COMROMISE OF FEDERALLY DESIGNATED SCENI C RIVER AND HIGHWAY; 7) the location of the proposed mine is PART OF A PRISTINE AREA dedicated to the preservation of the natural habitats of flora and fauna; 8) the proposed mine is a BENEFIT TO ONLY ONE FAMILY, the Zavorals, and should not adversely affect the quality of life of the many other residents in the area. Sincerely yours, Alexandria Russell Bowen, life-time Scandia summer resident.

To: City of Scandia, City Council Members
From: Don Mitchell, resident at 20233 Quinnell Avenue North
Re: Gravel Mining Proposal

You have before you a serious and difficult issue in the gravel mining proposal, and I do not envy you the choice you will have to make. Strong arguments will be made on both sides. This is a classic case where the rights of an individual family collide head-on with the rights and interests of the larger community. The Zavorals have always been good neighbors, and I bear them no ill will.

We have learned from an early age to respect the rights of an owner to determine the activities that will occur on land that is privately held. It is easy (and often correct) to say “It’s none of anyone else’s business.” On the other hand, every property owner faces limitations on the ways in which land can be used, with the understanding that some individual rights and activities must yield to collective societal priorities. In the case of the gravel mine, if the activity and its consequences had no effect on surrounding properties, on the City of Scandia as a whole, and specifically on the St. Croix River, then the proposed activity would indeed be “nobody’s business” but the Zavorals’. However, the nature and scale of the proposed activity makes it immediately clear that yes, neighboring properties will be affected, and yes, the City of Scandia will be affected, and yes, the river will be affected, too. This means the discussion cannot be limited to the rights of the property owner to do as he likes with his land.

Surely it matters to the Council that noise and dust will envelop not just the mine, but also the surrounding neighborhood, for a period of years while the operation goes forward. Surely it matters that the volume of truck traffic through Scandia will probably increase even beyond the current high levels. (Even the most careful and cautious truck drivers, when appearing on the highway through Scandia in these numbers, represent a hazard to all residents, but especially to the children near the school.) Surely it matters that the aftermath of this project will be a vast hole in the ground, “reclaimed” only in the limited sense that vegetation may be planted around the edges of the void.

All of this, while valid in the discussion, is of local importance and local significance. The mining proposal meets its most serious and fatal objection in the obvious threat to the St. Croix River—a supposedly protected natural resource of national stature. The threat is runoff, whether drastic as occurred in a single incident in the late 1970s, or gradual as will occur through interference with the water table through “internal drainage.”

The Draft Environmental Impact Statement severely understates the first form of this threat when it says:

There is some evidence that a major transportation of soil occurred in the past, primarily based on discussions with area residents and the existence of a delta deposit near the mouth of Zavoral Creek that appears to be the result of a significant erosion event. The cause of this delta deposit is not known. It could be the result of a natural erosion event (major rain event) or the result of human activities.

Excuse me, but the cause is well known and the incident is well documented—a rainstorm in a wet year overwhelmed inadequate protections at the mine site, and a catastrophic flood of sand, gravel, and debris

scoured the creek bed and dumped its unwelcome load directly into the river. The steepness of the terrain gave force and violence to the flood (as it will in any recurrence) and created the delta that is still so painfully obvious to this day. Beyond the sand and gravel, most of which was deposited at the delta, there was a torrent of silt, carrying the influence of the washout far downstream and damaging sensitive organisms well removed from the mining site.

The mining company will insist it can prevent a similar washout by what the DEIS calls a “best management practice.” The same assurance was no doubt offered in the 1970s. This time the risks will be greater, because the basin will be much deeper, the water pressure greater, and the effects of the washout correspondingly more severe. As we have seen, there is no way to mitigate the damage of such a washout after it occurs.

The second form of runoff threat appears in the DEIS’s inadequate discussion of what it calls “internal drainage” at the mine site. Since the plan is to excavate within a few feet of the water table, it seems reasonable to ask what internal drainage actually means. It apparently means that runoff from a substantial area will collect in the immense basin created by the mining activity, and from there it will either pool as a stagnant pond, or enter directly into the ground water system. To call this internal drainage begs the question: Where does the water go after that? The answer is that it goes to the countless springs and seeps that cover the hillsides between the mine site and the river. From there, as anyone might imagine, the runoff will go directly into the river. Runoff that had previously been filtered through thick, packed layers of sand and gravel will now arrive, laden with silt and perhaps other contaminants, immediately at the level of the water table, and will go directly to the river in the outflow from the springs. It is therefore a serious misunderstanding that “internal drainage” will take care of water quality issues, and that no off-site properties or interests will be compromised.

I believe Council members are aware of their stewardship role with respect to the St. Croix River. Each local government on both sides of the riverway has a clear duty toward all other municipalities, toward the federal government, and to all the citizens of Minnesota and Wisconsin, to protect the river through appropriate land use policies. It would be totally contrary to that stewardship to let the proposed mining activity go forward. I trust that the leaders of Scandia will not forget their solemn responsibility.

Sincerely,

Don Mitchell

March 25, 2012

City Council
City of Scandia
14727 209th St. N.
Scandia, MN 55073

Subject: Zavoral Mine and Reclamation Project
Ref: Draft Environmental Impact Statement (2/14/2012)

Dear City Council Members:

I respectfully submit the following comments regarding the Zavoral mining proposal, and specifically the DEIS dated February 14, 2012.

In general, I was expecting the subject document to present an independent, unbiased analysis of the proposed operation and its potential environmental, social, and economic impacts. Indeed the scope of the study and the DEIS summary is impressive, but I was disappointed to find that it reads as if the consultants were paid to prove that the project presents no real problems or issues.

The environmental effects of the operation on the surrounding areas (not only the site itself) are of high interest to my family, and frankly I cannot believe we are even considering allowing a mine to open in that location. But I am also not qualified to comment on such environmental issues. It is my hope that local experts will continue to make the issues known. As a resident of the Lofton Ave./Scandia Trail intersection, however, I do consider myself an expert on the subject of Tiller Corporation mining traffic noise. I challenge the notion that the alternatives proposed would all result in similar material transport volume. It seems that the transportation costs of the material must be a significant component in the economics of manufacturing the final product. The current locations for material are 2.5 times further than the proposed location. It seems logical that this would allow the company to produce cheaper product, sell more product, and thus need more material transported.

4.15.4.2.2 Traffic Noise

As a licensed professional engineer, I can appreciate the scientific approach taken in studying the potential noise effects. However, traffic generates a very complex spectrum of frequencies and I suspect the perceived noise is a bit more complicated and subjective than comparing average dBA measurements- especially when dealing with the dynamic sounds generated by heavy load trucks. Since many Scandia residents already endure periodic hauling blitzes by Tiller Corp, perhaps a survey of the affected residents during high traffic periods might have been more telling.

Our residence and work place is on the SE corner of Scandia Trail and Lofton Avenue. As such, we have first-hand knowledge of the typical mining traffic volume and the problems it presents. Our personal observation is that the mining trucks approaching and turning in this intersection stand out among all other traffic, generating sounds and sound levels that are unreasonable. There is no hiding from the permeating screech of truck brakes under heavy load. The practice of jake-braking vibrates the ground so violently that the walls and windows of our house shake. Our efforts over the years to curb engine braking at the intersection include numerous calls to the County Sheriff, calls (and a letter) to the Scandia Town Board, and personal conversations with County police in the area- all of which have been in vain. We were told by one deputy that the practices of engine braking, lifting axles illegally, and speeding are very difficult to police because the mining truckers, unlike typical vehicular traffic, communicate via radio- alerting one another if there is a squad car in the area.

At times, Tiller more or less monopolizes the roadway, sending a continuous stream of trucks through the intersection and generating an ungodly amount of noise. So if the consultants want to know if the sound is "perceivable" to Scandia's residents, feel free to give them our phone number. My wife, two kids, or I would be happy to relay our perceptions.

4.3.5 Nearby Property Values

The DEIS makes the following statement: *"Based upon this study, it was concluded that a negative impact would most likely occur to property values within, but not beyond, 1/4 mile of the Zavoral Site."*

In our opinion, this is absolutely ludicrous. Any rational person could predict that increased mining traffic, especially to the levels discussed in the subject document, could negatively affect the values of homes all along the hauling routes and well beyond. Our neighbors, located half a mile from the roadway and separated by mature forest, have complained that the mining truck noise is unreasonable.

Our home was recently appraised for a loan refinancing. As luck would have it, Tiller was in the midst of a hauling blitz on the day of the appraisal activity. We watched in horror as the appraiser observed the chaos and repetitively commented on the traffic noise. Of course there are many reasons why home values have dropped in recent years, but we have no doubt that the day's mining activity negatively impacted our home valuation.

4.13.1.6.1 Safety Evaluation

In general we feel that the safety study is inadequate in that the conclusions seem to be based on past and current traffic levels, rather than the potential traffic volume increases presented by the proposal. It also seems to offer the conclusion that, because vehicle collisions in the area have not involved mining trucks, the trucks do not present safety risks.

Scandia Trail and Lofton

The DEIS states *“No significant crash problems were identified in the study area during the 3-year period (2008–2010).”*

It goes on to say *“The TH 97 and CR 1 (Lofton Avenue) intersection had the highest number of crashes during the 3-year period (12 crashes), including five right angle crashes... The crashes were likely caused by drivers erroneously turning in front of vehicles on TH 97. Concerns about speeding on TH 97 are an enforcement issue that requires the attention of the State Patrol.”*

The assertion that 12 crashes in a 3-year period (in a rural intersection) are insignificant seems quite nonsensical.

This particular intersection suffers from a number of potential safety issues:

1. Our driveway is located just 200 ft. downstream of the intersection on the major thoroughfare (Hwy 97). MN/DOT's Access Management Manual, Section 3.4.4 (“Access within the Functional Area of an Intersection”) recommends a minimum downstream corner clearance of 650 feet.
2. The east-bound bypass lane merges with the primary lane 30 feet downstream of the outlet of our driveway. Drivers often turn out in front of us from Lofton, thinking we are signaling to turn on to Lofton, when in fact we are signaling to turn into our driveway. Likewise, vehicles moving at high speeds behind us are forced to merge quickly to the primary lane, missing us by a narrow margin as we turn into the drive.
3. A deep “valley” exists just east of the intersection, making it very difficult to see high-speed traffic approaching from the east.
4. Tiller Corp creates chaos during its major hauling campaigns by sending hundreds of trucks per day turning through the intersection.

The DEIS States *“The data captures actual crashes and does not record near-miss or other close call data.”* This is an important observation. Living at this intersection, we can attest that there are “close calls” on a routine basis. We know first-hand that the level of truck volume induced by the mining operation increases the safety risk. Allowing more mining traffic and/or evening traffic would greatly amplify the situation.

4.13.1.6.2 Scandia Elementary School

The DEIS states *“the traffic operation, capacity, and safety were evaluated for the school driveways (at TH 97 and Oakhill Road). No problems were found with capacity or safety based on traffic volumes and turning movements out of the driveway.”*

We would be interested to know more about this part of the study. What year were these driveways built? Discussions with long-time Scandia residents indicate that they have been in place for a very long time, and were built when there were extremely low traffic volumes on Scandia Trail.

Who was interviewed to draw the conclusion that *“the school does not cite any major concerns with traffic and safety on TH 97?”* Were the school bus drivers surveyed to determine what effect the mining blitzes have on the efficiency and safety of transporting our children? It might be eye opening to observe the situation when Bus 100 tries to turn from Lofton onto Scandia Trail, stopping 200 ft. from the intersection at our driveway, as numerous mining trucks attempt to keep the pace turning through the intersection.

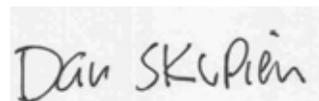
Conclusion

Mining is an industrial operation, best suited for industrial corridors. The people of Scandia have made it clear that our desire is to remain a bedroom community with rural character. Allowing mining to develop amidst our unique natural resources and our pleasant residential areas goes against the grain of our vision. Mining and the related traffic has negative impacts on the environment, public safety, and the general quality of life in Scandia.

At this point in our history, Scandia has the opportunity to model its future through the decisions it makes. Of course we cannot stop commerce on a state highway, but do we really want to implement policy that promotes the use of our roads as a thoroughfare for industrial traffic? The only tangible benefit to the people of Scandia is a completely trivial increase in tax revenue, while the detriments are numerous.

I implore the City Council of Scandia to deny permission to operate mining activities at the Zavoral site, and we welcome any questions or comments regarding this letter.

Best regards,

A handwritten signature in black ink that reads "Dan Skupien". The signature is written in a cursive, slightly slanted style.

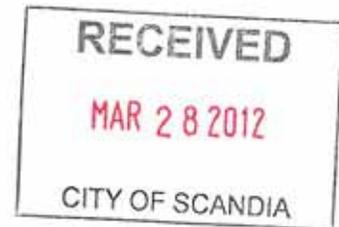
Dan Skupien
11939 Scandia Tr. N
Scandia, MN 55073

4



STATE HISTORIC PRESERVATION OFFICE

March 27, 2012



Ms. Anne Hurlburt, Administrator
City of Scandia
14727 209th Street N
Scandia, MN 55073

RE: Zavoral Mine and Reclamation Project – operate a gravel mine on the site of a dormant mine located along St. Croix Trail North (TH 95) near its intersection with TH 97
T32 R19 S18-19
Scandia, Washington County
SHPO Number: 2012-1373

Dear Ms. Hurlburt:

Thank you for the opportunity to review and comment on the above project. It has been reviewed pursuant to the responsibilities given the Minnesota Historical Society by the Minnesota Historic Sites Act and the Minnesota Field Archaeology Act.

Based on our review of the project information, we conclude that there are no properties listed on the National or State Registers of Historic Places, and no known or suspected archaeological properties in the area that will be affected by this project.

Please note that this comment letter does not address the requirements of Section 106 of the National Historic Preservation Act of 1966 and 36CFR800, Procedures of the Advisory Council on Historic Preservation for the protection of historic properties. If this project is considered for federal assistance, or requires a federal permit or license, it should be submitted to our office with reference to the assisting federal agency.

Please contact our Compliance Section at (651) 259-3455 if you have any questions regarding our review of this project.

Sincerely,

A handwritten signature in black ink, appearing to read 'Mary Ann Heidemann'.

Mary Ann Heidemann
Manager, Government Programs and Compliance

4/2/2012

Scandia City Council
Ann Hurlburt, City Administrator



Once more I'm hoping this mining project will not go forward. All these points have been brought forward time and again.

For those of us who live along 97, the outlandish amount of truck hauling traffic:

- will pollute the air and land
- will be harmful to our health with particulate tainting the atmosphere
- will be extremely noisy
- will be hazardous driving for us who use 97 to get to our homes, the local businesses, the elementary school
- And highway 97 will rapidly deteriorate.

Traffic along 95 Scenic Drive will be at risk as well. The St. Croix River, the beauty of this area will be well on the way to turning into an industrial wasteland.

Does the current council want to leave a legacy of providing for the destruction of a beautiful area? We are stewards of this great land of ours, not owners.

Save or destroy – that is your choice. Choose wisely.

Please VOTE NO to the Zavoral mining project.

Karen Sogge
35 year resident



Ms Karen Sogge
21350 Pomroy Ave. N
Scandia, MN 55073

March 30, 2012

21881 Pomroy Avenue North
Scandia, MN 55073

Anne Hurlburt, City Administrator
City of Scandia
14727 209th Street North
Scandia, MN 55073

Dear Ms. Hurlburt:

Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for the Zavoral Mining Project. The comments are primarily concerns or issues I have with the DEIS and the claims made.

1. Section ES2.10, “Silica Analysis”, page ES-31:

• **Paragraph 1**

The author starts off the discussion by referencing two occupational exposure limits for crystalline silica. The first reference appears to be the OSHA exposure limit, which actually is called a Permissible Exposure Limit (PEL), not MEL. The PEL of $300 \mu\text{g}/\text{m}^3$ (actually $370 \mu\text{g}/\text{m}^3$) is a calculated value that is dependant on the per cent of silica in the dust, which is claimed to be 25%. The second reference is the ACGIH TLV for crystalline silica that is stated to be “...between $50 \mu\text{g}/\text{m}^3$ and $100 \mu\text{g}/\text{m}^3$...”. These values are incorrect; the ACGIH TLV for respirable silica is $25 \mu\text{g}/\text{m}^3$. In my opinion, these errors reduce my confidence in the qualifications of the author to speak on this matter, and possibly other matters.

I also object to the author applying occupational exposure limits to a residential setting. Occupational exposure limits are based on 8-hour/day, 40-hour/week exposures. In addition, employees in occupational settings are provided training, protective gear where needed, access to medical consultation, etc. This is not the case in a residential setting where the potential exposures are longer term and susceptible individuals are likely nearby.

• **Paragraph 4**

The author makes an assumption that dust from mining will be well controlled. In my experience with aggregate mining, dust control takes a back seat to production and is not applied over every square foot of area. In addition, warm and windy days tend to be dusty despite attempts of dribbling water out the back of a tanker truck.

In my opinion, dust will be a problem for homes near mining operations. Think about how much dust is produced when a farmer prepares a field for planting or during harvest. In this case, there will be several hundred trucks entering and leaving the property plus other dust-producing operations.

2. Noise

The noise level referred to in the DEIS does not appear to consider impact or impulse noise from back-up alarms and dumping gravel into steel truck beds. The impact noise will likely be more disturbing than the type of noise elaborated on in the DEIS.

3. Diesel Exhaust

The DEIS does not appear to consider the impact of diesel engine emissions on air quality in the area. Two of the important diesel exhaust contaminants are diesel exhaust particulate and nitrogen oxides. With several hundred trucks entering and leaving the mining area plus other equipment, local air contamination is an important factor.

The Minnesota Department of Health (MDH) has issued Health Risk Values (HRV) designed to protect sensitive individuals. For diesel particulates and nitrogen dioxide, the HRVs are $5 \mu\text{g}/\text{m}^3$ and $470 \mu\text{g}/\text{m}^3$ respectively. Under certain weather conditions, these HRVs could be exceeded, thereby increasing the risk for respiratory problems for nearby susceptible individuals.

4. Diesel Fuel

The DEIS suggests that bulk fuel will be stored on-site. Since this fuel will be stored near a waterway, a Spill Prevention Plan (SPP) may be necessary. The DEIS does not appear to address the need for a SPP.

In conclusion, the DEIS does not appear to be complete, and in my opinion, not totally objective in its findings and conclusions.

Thanks again for providing the opportunity to comment.

Sincerely,

Tom Kapfer

Comment #7, Page 1 of 2

My permanent residence is at 12230 205th st North ,Marine on St Croix Mn 55047,it is located right off Lofton .We do hear the trucks hauling gravel from Osceola and Franconia all season long,even though we are located close to Big Marine lake.We are also part time summer residents at 20201 Quinnell Ave north ,Scandia Mn 55047.I grew up spending my summers on the St Croix river I do remember when Barton operated the gravel pit and the big blow out that occurred and altered the St Croix river.

I am very surprised that the city of Scandia would even consider granting Tiller a permit to resume mining that area .It is an environmental hazard and will cause nothing but more harm .Even though it is barely outside the limits of the Scenic Easement it will ultimately affect the habitat surrounding and obviously inevitably cause more damage to the river. And the fact they are going to mine land that was previously unmined,that is old- growth forest and woodlands is atrocious. I would think we should all want to conserve any land we have that has old forest growth and woodlands.And then to excavate up to 70 ft deep is going to cause further damage .So it will affect the aquifer,erosion will be a major factor.The peace and quiet of Scandia and all along 95 and 97 will be disrupted even more.It will discourage further tourism for who wants to drive behind one of those trucks or have to be in traffic with those trucks .They are loud and very polluting .It will be horrible for all people who live close by,including all residents of Scandia .I certainly hope the Scandia town board reconsiders granting Tiller a permit.For I think it is a grave mistake and can cause nothing but environmental disaster.We have already thought about different ways to travel if this does happen.As it is we cannot stand the noise of hearing the gravel trucks that travel along 97 on their way to the mine site on Lofton .They are very,very loud.And there will be fall out from dust particulates .So it is health hazard.So I am totally opposed to Tiller mining the Zavoral site.I do hope they are not granted a permit that will cause further damage to the environment . I think the town of Scandia should deny issuing them a permit, Tourism will be affected,the town of Scandia will be affected and all residents living within at least a six mile radius will be affected.

Sincerely

Jennifer Gross-permanent residence
12230 205th St North
Marine on St Croix Mn 55047

Comment #7, Page 2 of 2

summer resident at 20201 Quinell ave No.
Scandia Mn 55073

Anne Hurlburt

From: Chris Johnson [christineljohnson@gmail.com]
Sent: Saturday, April 07, 2012 4:23 PM
To: a.hurlburt@ci.scandia.mn.us
Subject: Zavoral Mining and Reclamation Project

To Scandia City Council,

I am a relatively new resident of Scandia, my husband and I have been here just 2 years.

We were surprised to hear about the Zavoral proposal when we first moved in and I have been following the information posted on the city website.

I cannot find one positive argument for this proposal and many negative ones. We moved here from a first ring suburb of St. Paul to get away from the noise and the traffic and pollution. Allowing this proposal to go through would increase truck traffic on Hwy 97 which is already quite heavy and noisy, plus why anyone would want to allow this type of operation so close to a treasure like the St.Croix River is beyond me.

Surely, some type of environmentally responsible and community friendly use can be found for this land.

I am against this proposal and will consider very carefully my choices in the next election of any council member who is in favor of it.

Please do not sell out the residents of Scandia by allowing this project to move forward.

Christine Johnson
21889 Oldfield Ave North
Scandia

--
Chris Johnson

christineljohnson@gmail.com

Anne Hurlburt, City Administration; City of Scandia
14747 209th St. N.
Scandia, MN. 55073

4/6/12



Re: Zavoral/Tiller Mine Operation

Ms Hurlburt,
We are Larry and Mary Whitaker. We reside at 625 Pine Cone Trail,
Marine on St. Croix.

Common Sense and Credibility:

The current Scandia Comprehensive Development Plan does not allow mining on that site. Why is this mining operation even being considered? There are many other site options available.

Tiller has taken years to collect data and analysis for this EIS. They have missed deadline after deadline. Their original permit application should be canceled due to failure to meet requirements. Tiller never did complete the required reclamation for their 1980's mining operation. Their lack of commitment to meet their obligations should not be rewarded.

We have listed here the top 3 of our concerns about the inadequacies of the DEIS concerning the scope document for the Zavoral / Tiller mining effort. Traffic Safety; The integrity of the St. Croix River; Valley Environment.

Safety

Our family members and we frequently travel Highways 97 and 95. We think that this DEIS has not adequately studied the traffic patterns and traffic safety issues.

With 300 to 700 truck trips crossing highway 95 each day, there are numerous traffic safety issues that have not been addressed. This point was noted with the 6-point vs 2-point accident scenario as stated at the 4/3/12 meeting with traffic crossing vs right turning.

Why would Scandia allow these potential safety issues in our community? If you approve this project we urge Scandia City Council to include in the permit the requirement to have a 3 way stop or a traffic circle at the intersection of Hwy 97 & 95, and to also add an acceleration lane onto west bound highway 97 and north bound Hwy95.

Given the slow acceleration of loaded gravel trucks and the number of trucks crossing highway 95 during a "haul event", how many minutes each day will highway 95 be blocked due to truck crossings? This will be a very dangerous situation for hwy 95 traffic, without adequate traffic control.

Integrity of the St. Croix River

This mine site is located in a very unique location that is adjacent to a National Treasure, namely the St. Croix River. Therefore special precautions must be taken to prevent any damage to this unique natural resource.

In case of a "flash flood" event, will Dr. Zavoral, Tiller Corp. and the City of Scandia be required to rectify any resultant damage to private and public lands and property, as well as the St. Croix River?

The existing reclamation plan is way too vague. There should be specific details identified and illustrated. Consider the following:

Water run off and ponding issues. How will contaminated water be controlled and kept out of the St. Croix River?

Tiller must provide Vertical cliff wall terracing and/or retaining walls to prevent side wall cave-ins and erosion. They should also be held liable for the long term maintenance of these items.

How many trees, and of what species will be replanted? Where will they be placed?

How many species of native grasses will be replanted, over how large of an area?

Have the WCD, or DNR Land Management Specialist approve the reclamation plan.

Valley Environment

How will air, noise and water pollution monitoring be conducted at the mining site and along the haul routs, during the mining activity? Who will be conducting the testing and who will be doing the evaluations? (AECOM has not been as thorough as we feel is required.) Who will do the enforcement? Will the enforcer have the authority to stop the operations when limits are exceeded? Will Tiller be required to immediately stop operations when any limit is exceeded?

What plan has been made to mitigate the back up alarm noise on equipment so it is not heard by people canoeing or kayaking on the river?

Business

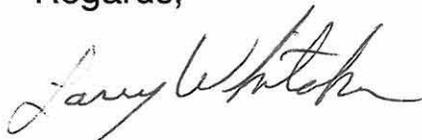
Has there been a study of how local area businesses will be affected by this mining operation, given the large number of trucks traveling highways 97 and 95? Have these businesses been consulted?

Most of the merchants in Marine rely on the traffic volume passing on Hwy 95 to be profitable. How many loaded, and empty trucks will be passing through Marine on St. Croix each day on their way to and from the work site? At what time of day will they be passing through? Have the Marine City Council and local business owners been informed of this increased traffic volume?

In closing:

There are many unanswered questions yet to be answered. How can a valid cost / benefit analysis be completed without all the detail identified. Will the additional tax income offset the actual costs to the community? Is this worth it?

Regards,



Larry Whitaker



Mary Whitaker

Cc: TA-COS



Minnesota Department of Transportation

Metropolitan District
Waters Edge Building
1500 County Road B2 West
Roseville, MN 55113

April 11, 2012

Anne Hurlburt
City Administrator
City of Scandia
14727 209th St North
Scandia, MN 55073

SUBJECT: Zavoral Mining, MnDOT Review # EIS12-001
East of TH 95 at TH 97 Intersection
Scandia, Washington County
Control Section: 8210

Dear Ms. Hurlburt:

Thank you for the opportunity to review the Zavoral Mining Draft Environmental Impact Statement. Please note that MnDOT's review of this Draft Environmental Impact Statement does not constitute approval of a regional traffic analysis and is not a specific approval for access or new roadway improvements. MnDOT's staff has reviewed the document and has the following comments:

Traffic:

The prior comments made by MnDOT concerning the right turn lane and the trail located on the east side of TH95 identified in 2009 and 2011 are still valid.

Regarding the stub trail in question, the presence of a "long-term" trail on the north side of TH97 in Scandia planning documents does not change the MnDOT recommendation to remove and sod over the stub trail on the southeast quad of 95/97. Unless the City of Scandia is willing to take ownership and maintenance, MnDOT requires removal of the stub trail. The right of way will still be there if in the future the stub trail is rebuilt via a Limited Use Permit, with City ownership and maintenance. For questions regarding these comments, contact Marc Briese, Area Engineer, at 651-234-7715.

Design:

To ensure the safety of a newly configured intersection, a Level 2 Layout will need to be submitted for review. For further information concerning the criteria for the layout please go to the following website: <http://dotapp7.dot.state.mn.us/edms/download?docId=636152> Refer to the discussion about Level 2 layouts. Information regarding the alignments, profiles, typicals, soil borings and cross sections are essential in planning for the proposed roadway change. For questions regarding these comments, contact Nancy Jacobson, MnDOT Metro Design, at 651-234-7647.

Permits:

Any work that impacts MnDOT right of way requires a permit. Permit forms are available from MnDOT's utility website at <http://www.dot.state.mn.us/utility/>. Include one 11 x 17 plan set and one full size plan set with each permit application. Direct any questions regarding permit requirements to Buck Craig, MnDOT's Metro Permits Section, at 651-234-7911.

Review Submittal Options:

MnDOT's goal is to complete the review of plans within 30 days. Submittals sent in electronically can usually be turned around faster. There are four submittal options:

1. One (1) electronic pdf version of the plans. MnDOT can accept the plans via e-mail at metrodevreviews.dot@state.mn.us provided that each separate e-mail is less than 20 megabytes.
2. Three (3) sets of full size plans. Submitting seven sets of full size plans will expedite the review process. Plans can be sent to:

MnDOT – Metro District Planning Section
Development Reviews Coordinator
1500 West County Road B-2
Roseville, MN 55113

3. One (1) compact disk.
4. Plans to MnDOT's external FTP Site. Send pdf files to: <ftp://ftp2.dot.state.mn.us/pub/incoming/MetroWatersEdge/Planning>. Internet Explorer does not work using ftp so use an FTP Client or your Windows Explorer (My Computer). Also, send a note to metrodevreviews.dot@state.mn.us indicating that the plans have been submitted on the FTP site.

If you have any additional questions regarding this follow up letter, please call me at (651) 234-7789.

Sincerely,



Molly McCartney
Sr. Transportation Planner

Encl:

1. Zavoral Mining EAW09-001.pdf
2. Zavoral Mining EAW09-001A.pdf
3. Trail Located on the East Side of TH 95, Extending South of TH 97.pdf

CC:

Steve Channer, Right-of-Way

Bryce Fossand, Water Resources

Buck Craig, Permits

Chad Erickson, Traffic

Marc Briese, Area Engineer

Nancy Jacobson, Design

Peter Wasko, Noise Abatement/Air Quality

Gina Mitteco, Planning

Tod Sherman, Planning

Ann Braden, Metropolitan Council



Minnesota Department of Transportation

Metropolitan District
Waters Edge
1500 West County Road B-2
Roseville, MN 55113-3174

October 13, 2011

Anne Hurlburt
City Administrator
City of Scandia
14727 209th St North
Scandia, MN 55073

SUBJECT: Trail Located on the East Side of TH 95, Extending South of TH 97--
Scandia, Washington County
Control Section: 8210

Dear Ms. Hurlburt:

Mn/DOT's letter to the City of Scandia dated June 29th, 2011, concerning the Zavoral Mining development states that when the site is developed, a right turn lane will be required into the site and that the subject trail would need to be either relocated or vacated. It is our understanding that Scandia would like Zavoral Mining to relocate the portion of the trail impacted by the right-turn lane and bring the trail up to ADA standards. Additionally, we understand the city would like Mn/DOT to maintain and operate the trail.

After considerable discussion, we do not feel that the expense of upgrading, maintaining, and operating the trail is a good use of state resources for the following reasons:

- This stub trail is 0.38 miles long and does not connect with any other trails.
- The DNR confirmed that the subject trail would not be used as an extension of the Gateway Trail.
- The overgrown condition of the trail in conjunction with no observed use by MnDOT maintenance staff provides clear indication that the trail is used only minimally. Additionally MnDOT has received no complaints about the trail's condition
- Generally, trails on Mn/DOT right-of-way, particularly those with only a local benefit, are maintained by the local government through a Limited Use Permit from Mn/DOT.

Therefore, Mn/DOT does not plan to require the developer to rebuild the trail.

In our discussions with the County and the DNR, neither are willing to take over ownership and maintenance responsibilities this trail. If the City of Scandia is willing to own and maintain the trail we will reconsider our position about removal of the trail. If the city is willing to take over the trail, the city will need to obtain a Limited Use permit from the Mn/DOT Right-of-Way office. For information concerning Limited Use Permits, please contact Steve Channer, 651-234-7558 with Mn/DOT Metro's Right-of-Way Section.

If you have any additional questions regarding this follow up letter, please call me at (651) 234-7794.

Sincerely,

A handwritten signature in black ink, appearing to read 'Tod Sherman', written over a horizontal line.

Tod Sherman,
Planning Supervisor

Copy sent via E-Mail:

Marc Briese, Area Engineer
Tim Mitchell, Bicycle/Pedestrian
Kristie Billiar, ADA
Paul, St. John, Right-of-Way
Steve Channer, Right-of-Way
Chad Erickson, Traffic
Adam Josephson, Area Manager
James, Michael, Maintenance
David Hagle, Maintenance
Brian Heimerl, Maintenance
William Goff, Planning
Ann Braden / Metropolitan Council



Minnesota Department of Transportation

Metropolitan District

Waters Edge
1500 West County Road B-2
Roseville, MN 55113-3174

January 22, 2009

Anne Hurlburt
City Administrator
City of Scandia
14727 209th St North
Scandia, MN 55073

SUBJECT: Zavoral Mining, Mn/DOT Review #EAW09-001
East of TH 95 at TH 97 Intersection
Scandia, Washington County
Control Section: 8210

Dear Ms Hurlburt:

Thank you for the opportunity to review the Zavoral Mining EAW. Please note that Mn/DOT's review of this EAW does not constitute approval of a regional traffic analysis and is not a specific approval for access or new roadway improvements. As plans are refined, we would like the opportunity to meet with our partners and to review the updated information. Mn/DOT's staff has reviewed the document and has the following comments:

A north bound full right turn lane will need to be constructed (300' RTL 180' taper) as part of the proposed use. The entrance into the site needs to be 32 feet wide. Additionally, as indicated in the EAW, the site access will need to be reconfigured to line up with TH 97 on the west side of TH 95. For questions concerning these comments, please contact Wayne Lemaniak, Mn/DOT Traffic Section, at (651) 234-7830.

To ensure the safety of the intersection, a Mn/DOT Level 3 Geometric Layout will need to be prepared before a permit can be issued for construction of the access and right turn lane. For further information concerning the criteria for a Level 3 layout, please go to the following website: <http://www.dot.state.mn.us/tecsup/xyz/plu/hpdp/book2sg/geo/geoapp2.html> Refer to the discussion about Level 3 layout and Table 1 at the bottom of the page for the information concerning this layout. Information regarding the alignments, profiles, typicals, soil boring and cross sections are essential in planning for the proposed roadway change. For questions regarding design, please contact Ed Boytim, at (651) 234-7646.

The City/Developer may choose to pay Mn/DOT for the required improvements so that they can be coordinated and included with the Mn/DOT projects in the area. Mn/DOT will require payment for the work to be conducted by the City/Developer prior to any work by Mn/DOT. For questions concerning agreements please contact Jan Ekern, Partnership Coordinator, Mn/DOT Maintenance Office at (651) 366-3548

Any use of or work within or affecting Mn/DOT right of way requires a permit. Permit forms are available from MnDOT's utility website at www.dot.state.mn.us/tecsup/utility . Please include one 11 x 17 plan set and one full size plan set with each permit application. Please direct any

questions regarding permit requirements to Buck Craig (651-234-7911) of MnDOT's Metro Permits Section.

As a reminder, please address all initial future correspondence for development activity such as plats and site plans to:

Development Review Coordinator
Mn/DOT - Metro Division
Waters Edge
1500 West County Road B-2
Roseville, Minnesota 55113

Mn/DOT document submittal guidelines require either:

1. One (1) electronic pdf. version of the plans (the electronic version of the plan needs to be developed for 11" x 17" printable format with sufficient detail so that all features are legible);
2. Seven (7) sets of full size plans.

If submitting the plans electronically, please use the pdf. format. Mn/DOT can accept the plans via e-mail at metrodevreviews@dot.state.mn.us provided that each separate e-mail is less than 20 megabytes. Otherwise, the plans can be submitted on a compact disk.

If you have any additional questions regarding this review please call me at (651) 234-7792.

Sincerely,

Jon P. Solberg
Senior Planner



Copy send via Groupwise:

Tod Sherman
Wayne Lemaniak
Jan Ekern
Todd Clarkowski
Buck Craig
Nancy Jacobson
Sulmaan Kahn
Ann Braden / Metropolitan Council

File Copy:

Mn/DOT Division File CS 8210
Mn/DOT LGL File Scandia



Minnesota Department of Transportation

Metropolitan District

Waters Edge
1500 West County Road B-2
Roseville, MN 55113-3174

June 29, 2011

Anne Hurlburt
City Administrator
City of Scandia
14727 209th St North
Scandia, MN 55073

SUBJECT: Zavoral Mining, Mn/DOT Review #EAW09-001A – **Follow Up Letter**
East of TH 95 at TH 97 Intersection
Scandia, Washington County
Control Section: 8210

Dear Ms Hurlburt:

Thank you for meeting with Mn/DOT on Tuesday, June 7th concerning the Zavoral Mining plans. This letter is intended to respond to the questions brought up at this meeting. The questions and answers are as follows:

Mn/DOT though is currently reviewing options concerning the need for the trail as well as the proper ownership of the trail.

1. *Since truck traffic will be traveling between the Zavoral site to the site off of Lofton, trucks are not expected to turn right into the site. Is a right turn lane (Per Mn/DOT's letter dated January 22, 2009) still needed? Would a truck acceleration lane on TH 97 be more useful?*

Based on the trips generated by the proposed mining operation, a right turn lane is warranted. To allow for current and future turning movements into the site, the right turn lane is still required. Since it would not be feasible to construct an acceleration lane long enough for trucks to reach highway speed, an acceleration lane is not needed. For questions concerning these comments, please contact Chad Erickson, Mn/DOT Metro Traffic Section, at 651-234-7806.

2. *Since sight distance is better to the north, than the south, will Mn/DOT still require the Zavoral driveway on TH 95 to be moved further south to line up with TH 97?*

Yes, the change in sight distance would be minimal. The driveway must be aligned with TH 97 to improve the operation of traffic at the TH 97/TH 95/Zavoral Mining intersection.

3. *Who owns and maintains the stub trail located along the east side of TH 95, south of TH 97? Will the trail need to be rebuilt?*

Mn/DOT currently owns this trail. In order to accommodate the right turn lane, the trail will need to be relocated. However, Mn/DOT is currently reviewing options concerning the need for the trail as well as the proper ownership of the trail.

If you have any additional questions regarding this follow up letter, please call me at (651) 234-7794.

Sincerely,



Tod Sherman,
Planning Supervisor

Copy send via Groupwise:

Marc Briese, Area Engineer

Chad Erickson, Traffic

Adam Josephson, Area Manager

Michael Caron, Tiller Corporation (Mikec@tillercorp.com)

Christina Morrison, Tiller Corporation (Christinam@tillercorp.com)

Kirsten Pauly, Sunde Engineering (kapuly@sundecivil.com)

Mark Rothfork, AECOM (mark.rothfork@aecom.com)

Angie Christo, AECOM (angela.christo@aecom.com)

Ann Braden / Metropolitan Council

Name: Kenneth Sogge
Address: Pomroy Avenue, Scandia
Phone: (651) 433 – 3989
Email: ksogge@frontiernet.net



Comments:

I would like to raise two considerations for the Scandia City Council.

ONE: There are a LOT of Scandia residents who DO NOT want a gravel pit at the Zavoral site.

If the City Council decides to proceed with allowing the pit to open, be assured that there will be many residents who will take it as a personal responsibility to assure that you will not be re-elected or elected to a local political responsibility in our community. You will have gained large numbers of local citizens who will take this as a personal affront to their enjoyment of living in this community and as an abdication of your elected responsibility to listen to their concerns and act in their behalf.

If the City Council decides to NOT allow this pit to open, there will be a small number of local residents who will wonder why you made such a decision. Many local citizens will congratulate you on your wisdom and courage and your standing in the community will increase greatly.

TWO: The courts will rule that a gravel pit is justified at the Zavoral site.

I have heard an opinion expressed that, IF the City Council proceeds to NOT allow this pit to open, Tiller corporation will ask the courts to overrule the council decision. This could happen. As our community leaders, you will have gone on record that the community does NOT want a gravel pit at the Zavoral site, as indicated strongly in the now effective Comprehensive Plan. There is no reason why this path is not the prudent way to handle this matter.

It will be a lot easier to justify a decision made by listening to your constituents, than to explain why you did not listen.

Ken Sogge
Resident of Scandia for 35+ years



Zavoral Mine Draft EIS Coverage

Thanks to the Messenger for providing coverage of the proposal to reactivate the Zavoral Mine in Scandia. This is a very important issue for the future of Scandia, adjacent communities, and the St. Croix National Scenic Riverway, a national park unit. Unfortunately the April 11 article had some misquotes that require clarification. I provided a statement at the public hearing before the Scandia Planning Commission on April 3. I stated that I concurred with the findings of the specialists representing Take Action-Conserve Our Scandia (TA-COS). They pointed out a number of inadequacies in the Draft Environmental Impact Statement (DEIS) including the off-site ecological impacts of the mine, lack of detail in the reclamation plan, effects on groundwater, inadequate analysis of traffic impacts especially at the corner of 95 and 97, and an inadequate and flawed property value analysis. While the DEIS has inadequacies that must be addressed, I did not state the DEIS is "severely flawed and needs to be redone." I did say that the DEIS property value analysis "is severely flawed and needs to be redone". Scandia's residents deserve a better and more thorough approach to evaluating the potential loss of property value that will occur if this project goes forward. The city has done a terrific job providing information on this project through their website. I urge readers to visit the website and learn more about this project and its potential impacts. The attorney for Tiller Corporation stated this is "probably the most well studied gravel pit in Minnesota." It should be, it sits next to a National Park, in an important ecological corridor, next to a State Scenic Byway, and in the rural Scandia that we all cherish.

Randy Ferrin, Scandia

Published in the Country Messenger April 18, 2012 Volume 28, Number 51.

*Randy Ferrin
rsferrin@frontiernet.net*

Anne Hurlburt

From: Lyle Helke [lylea@frontiernet.net]
Sent: Tuesday, April 24, 2012 7:31 AM
To: a.hurlburt@ci.scandia.mn.us
Subject: Zavoral

I live in Marine so am uncertain that my thoughts count, but I wanted to weigh in on the Zavoral Mine. After following the discussion in the Messenger and talking to people who have attended the meetings I would like to submit that I think the Mine would be a detriment to the valley. The ground water concern is very important and the traffic concern is also. It does not seem like the money that Scandia will recoup for this will be worth the adverse effects. Thank you so much for reading my concern. Connie Helke, 400 Nason Hill Rd., Marine, Mn. =

Anne Hurlburt

From: elimsw@frontiernet.net
Sent: Friday, April 27, 2012 7:39 AM
To: Anne Hurlburt
Subject: Re: gravel trucks

I just noticed a mis-spelling. I intended to indicate the trucks travel south on 95 and turn right onto **97**. I don't know know if you have the ability to edit a letter submitted but if you can you have my request and permission to do so. But, I know the council knows what I was intending anyways.

Thanks,

STW

Scott T. Westphal, Pastor
Elim Lutheran Church
Scandia, MN
651-433-2723

From: [Anne Hurlburt](#)
Sent: Thursday, April 26, 2012 12:15 PM
To: elimsw@frontiernet.net
Subject: RE: gravel trucks

Scott, do you intend that this be entered into the official record of comments about the Zavoral Mining and Reclamation project? If so, please confirm. Thanks,

Anne

From: elimsw@frontiernet.net [<mailto:elimsw@frontiernet.net>]
Sent: Thursday, April 26, 2012 11:15 AM
To: a.hurlburt@ci.scandia.mn.us
Subject: gravel trucks

Ann,

Please forward to the council this piece of info which they may find relevant to the mining pit issue.

Tuesday evening, April 24th, about 8:30PM, one of the myriad gravel trucks tipped over at the intersection of 95 and 97. The tip over spilled the entire load of gravel and much fuel.

I am no accident reconstruction expert but common sense would tell us that this tip over occurred for the very same reason that there are weekly gravel spills at this same intersection. The trucks come south on 95, take a 90 degree right turn on to 95 and they take it way too fast. I have seen significant gravel spills almost every week at that intersection including just the Monday before the tip over. I have stopped reporting these spills because they happen so often. The gravel company does not clean this up. We just wait for the traffic to push it aside over the course of the week and then we start anew with another spill just when the path is getting cleared.

It is not a stretch to infer from this unsafe driving practice that the gravel mining operation is not a good neighbor and is careless about traffic safety. I have reported this to the highway patrol and they tell me they talk to the companies who promise to do better but they seem to be reaping the same results. If the mining operation is as repeatedly careless about this very public display of spillage one can rightfully assume they are going to be careless about plenty of other matters with regard to water, dust, and noise contamination should they activate the Zavoral pit.

I am eager to field any question you may have about this email.

Thank you,
Scott T. Westphal
433-2722

Anne Hurlburt

From: Moncur, Corinne [Corinne.Moncur@ecolab.com]
Sent: Friday, May 04, 2012 3:21 PM
To: a.hurlburt@ci.scandia.mn.us
Cc: moncur1@frontier.com
Subject: Zavoral Mining and Reclamation Project - public review and comment

Anne Hurlburt City Administrator and Scandia City Council,

My husband and I have lived in the area of this peaceful old mine for 18 years and love the river valley. When we bought our property we were assured there wasn't much chance of that old mine ever opening again. Scandia has grown in the years since with houses and homes springing up but for the most part, Scandia has maintained its rural character. Allowing this mining operation to take hold, even for a short period, will destroy the beauty and serenity of the river valley her in Scandia.

Scott and I are unequivocally against the Zavoral Mine reclamation project in our neighborhood. We are against this mining operation for so many reasons, all of which have been voiced by many of our neighbors and citizens of Scandia.

Dirt, dust, constant noise during operating hours, additional truck noise, increased dangerous heavy vehicle operation on the intersection of Hwy. 95 and Hwy. 97, congestion and danger to all of our children, family and pets. I'll take a moment and point to the recent accident on this very corner related to the semi-truck rollover April 24th, 2012 due to a load shifting.

The river valley is a wonderful place to hike, run, ride bikes and to recreate. With an operating mine? Not so much!

We, like everyone else in the country, have watched our property values plunge during the economic downfall. Opening this mine would surely force our property values to drop significantly further and potentially make them *unmarketable* without deeper discounts.

The last point I want to make is that we believe real damage could be done to the aquifers in the area and adversely effecting our wells. Mining operations take large if not huge amounts of water in their processes. I'd like to refer you to the Thursday March 29th, 2012 Forest Lake Times article on page 6, written by Angie Hong, "The towns the sucked a whole like dry" about White Bear Lake and the effects of huge water usage. Maybe in 5 years The Country Messenger could report "The mine that sucked the rural wells dry" about eastern Scandia.

Please stop this destruction in its tracks. No mine.

Corinne and Scott Moncur

20970 Quardrant Ave. North Scandia, MN 55073

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received

5-9-2012

4-50-12

To the Scandia City Council,
 I am writing, on behalf
 of my husband and myself,
 to encourage you to vote
 to deny reopening of the
 Zavoral Mine! My husband
 and I have lived in the
 St. Croix River Valley almost
 our entire lives. We treasure
 this natural gem and strongly
 believe that any mining
 activity within the St. Croix
 River Watershed would have a
 negative impact on the natural,
 scenic, and peaceful beauty of the
 river and the river valley. We look
 forward to the day when such
 natural areas and the many
 precious plants and animals that
 rely on them come before

monetary concerns. We under-
 stand that an EIS was done
 but we are unconvinced that
 the mining project would not
 negatively impact the river valley
 in some way. The St. Croix Wild
 and Scenic Waterway brings in
 a significant amount of revenue
 into the valley precisely because
 of its wild and scenic beauty.

Please help us keep it that
 way by voting to deny the
 reopening of the Zavoral Mine!
 Thank you for genuinely taking
 into consideration our opinion,
 our concerns!

Sincerely,
 Mary Juster and
 Jeff Peterson

PO Box 177
 Marine on St. Croix MN
 55047

17

Anne Hurlburt,
City Administrator
City of Scandia
14727 209th Street North
Scandia, MN 55073



May 5, 2012

Dear Ms. Hurlburt,

I wish to add my thoughts about the DEIS statement to those you are receiving from other community members.

My chief concern is that the impact of the projected additional truck traffic to and from the Zavoral site, and consequent safety concerns, have not been fully and satisfactorily addressed. 560 to 696 trucks crossing highway 95 each day during haul events sounds like a lot of potential for accidents. (Also, I live on Pomroy, 1/3 miles north of 97, and seeing oncoming traffic from the east at the top of the hill at our intersection is already "tense" enough!)

In addition, I think that the proposed gravel site along a National Scenic Highway and within site of a Wild and Scenic Riverway cannot help but have deleterious effects on the environments that we want to protect – and that tourists want to enjoy.

Thank you for your consideration of these concerns. I have appreciated the openness of Planning Commission members ~~committee~~ and Scandia officials to us citizens at community meetings I have attended.

Sincerely,

A handwritten signature in black ink that reads "Rita J. Erickson".

Rita J. Erickson, PhD
21590 Pomroy Avenue North
Scandia, MN 55073

P.S. (And thank you for your service to our community!)

RECEIVED

MAY 10 2012

CITY OF SCANDIA



We want to hear from you!

Please feel free to share any comments or concerns you have related to the Zavoral Mining and Reclamation Project EIS.

For more information about the Zavoral Mining and Reclamation Project EIS:

Contact: Anne Hurlburt, (651) 433-2274
Email: a.hurlburt@ci.scandia.mn.us
Fax: (651) 433-5112
Website: www.ci.scandia.mn.us

May 10, 2012

Name: John + Kathy Carlisle
Address: 19880 Quinell Ave N.
Scandia, MN 55073
Phone: 651-433-2059
Email: _____

Comments:

*As residents of Scandia and living on Quinell Ave, for thirty seven years we are very concerned about the Zavoral Mine project. The increase in truck traffic will be very dangerous for all who live here or just travel through. The St Croix River, streams and well water likely will be impacted in a negative way. There will be hard to monitor and problems ^{may} arise in later years when mining has ended. Air pollution, noise, cutting of trees and loss of wildlife are also of great concern. We feel the Zavoral Mine Project will impact the river valley in so many negative ways with no benefit for Scandia residents.
Thank You. Sincerely John Carlisle
Kathy Carlisle*

Thank you for your time and interest.

Please return comments to: Anne Hurlburt, City Administrator, City of Scandia, 14727 209th Street N., Scandia, MN 55073



Board of Commissioners

- Dennis C. Hegberg, Chair, District 1
- Bill Pulkrabek, District 2
- Gary Kriesel, District 3
- Autumn Lehrke, District 4
- Lisa Weik, District 5

May 8, 2012

Ms. Anne Hurlburt, Administrator
 City of Scandia
 14727 209th Street North
 Scandia, MN 55073

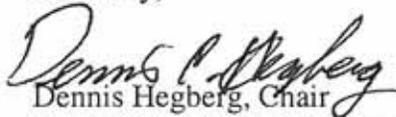
RE: Draft Environmental Impact Statement for the Zavoral Mine and Reclamation Plan

Dear Ms. Hurlburt:

Washington County is submitting comments in response to the Draft Environmental Impact Statement for the Zavoral Mine and Reclamation Plan. Washington County finds the Plan generally consistent with the 2003-2013 Groundwater Plan and Washington County Comprehensive Plan.

Attached are comments from the county in response to the Plan. Washington County would like to thank you for the opportunity to review the Draft Environmental Impact Statement for the Zavoral Mine and Reclamation Plan. Please contact Stephen Wensman at 651-430-6701 or via email at Stephen.Wensman@co.washington.mn.us if you have questions regarding the comments.

Sincerely,



Dennis Hegberg, Chair
 Washington County Board of Commissioners

- c. Washington County Board of Commissioners
- Molly O'Rourke, County Administrator
- Lowell Johnson, Department of Public Health & Environment
- Amanda Strommer, Department of Public Health & Environment
- Jessica Collin-Pilarski, Department of Public Health & Environment
- Stephen Wensman, Department of Public Health & Environment
- Jim Shaver, Carnelian Marine St. Croix Watershed District
- Judy Sventek, Metropolitan Council

Enclosure: comments

Draft Environmental Impact Statement for the Zavoral Mine and Reclamation Plan

April 2012

Washington County has reviewed the Draft Environmental Impact Statement for the Zavoral Mine and Reclamation Plan (EIS). The county has prepared the following comments to ensure the health, safety and welfare of county residents, ensure environmental compliance, and minimize environmental impact.

I. Aquifer Sensitivity

Given that the mining is proposed to be conducted about 25-50 feet above the water table, there should be no impact to the groundwater quality directly from the mining operations. However, care should be taken to ensure that any hazardous materials on site are properly handled and do not reach the water table.

The groundwater resources identified in the Zavoral Mine site are the Glacial, Prairie Du Chien-Jordan, Franconia-Ironton-Galesville, and Mt. Simon Aquifers. The upper geologic profile, the Glacial Aquifer, is shallow and consists of unconsolidated granular materials with a lack of low permeable soils above them considered to have “high” sensitivity to pollution. Because of the high soil sensitivity, contaminants introduced on the site will most likely reach the groundwater system in several weeks to years.

The existing well, unique number 210498, is a multi-aquifer well and is open across the Franconia, Ironton-Galesville, Eau Claire (confining layer), and into the Mount Simon. This type of well construction is not allowed in MN for new wells; however, because it was constructed in 1969, it is grandfathered. The Minnesota Department of Health recommends reconstructing this well so that it obtains water from only one aquifer.

Department of Public Health and Environment comments:

- Section 2.8, Solid Waste, Hazardous Waste, and Storage Tanks, indicates the possibility of an above ground storage tank (AST), or refueling from a bulk delivery truck. Solid and Hazardous Waste located in the project area shall be disposed of in accordance with Minnesota Rules 7035 and 7045 and Washington County Ordinances #114 and #119. A spill recovery kit must be present during fueling activities used to run equipment at the mine. Containment must be implemented for fuel tank storage.

- Section 5.3, Other Mitigation, recommends that Tiller keep records of when the Zavoral Site Well is pumped, and provide these to the city for groundwater monitoring activities. This data along with all groundwater monitoring data should also be provided to Stephen Wensman, Associate Planner, Washington County Department of Public Health and Environment, 14949 62nd St. N., P.O. Box 6. Stillwater, MN 55082.
- The Minnesota Department of Health recommends reconstructing the well so that it obtains water from only one aquifer. Washington County supports this recommendation. For well reconstruction information and procedures, contact: Patrick T. Sarafolean, Hydrologist, Well Management Section, Minnesota Department of Health at (651) 201-3962.
- The EIS, Sections 4.7.1.5.1, 4.7.1.5.3, and 4.7.1.5.4, denote that there is no significant cumulative effect of well pumping; however the tests were conducted with a prohibition of pumping by Abrahamson Nursery. The cumulative effect of the use of the Zavoral well and Abrahamson's well simultaneously has not been adequately tested. The cumulative effect of both wells running simultaneously should be studied.
- Section 4.7.2, Potential Mitigation Measures, states that mitigation measures are not proposed because significant impacts are not expected as a result of pumping. A mitigation plan should be required in the event significant impacts occur.

II. Transportation Safety

The Zavoral Mine is located at the intersection of State Trunk Highways 95 and 97. With the "build alternatives", the proposed haul route for the mine operations would be on State Highway 97. The primary difference between the alternatives is the duration of the hauling of material (total number of years and number of weeks).

Although these are state highways, the county has safety concerns which are addressed below.

Department of Public Works comments:

- Public Works will support any of the transportation alternatives; however they prefer alternatives 1 and 3.
- Public Works has safety concerns with the dual bi-pass lanes at the intersection of State Trunk Highways 95 and 97 and the mine access driveway.
- Public Works will be rehabilitating County Road 91 in the next few years and will work with residents and businesses regarding traffic operations during the mine operations.



May 14, 2012

Anne Hurlburt, Administrator
City of Scandia
14727- 209th St N
Scandia, MN 55073



RE: Zavoral Mining and Reclamation Project EIS

Dear Ms. Hurlburt:

For the duration of the Zavoral Mining and Reclamation Project Environmental Impact Statement (EIS) process, the Washington Conservation District (WCD) has been part of the advisory committee. For most of this time, I have served as the WCD's representative, although other staff members have been consulted based on the issues brought before the committee. For the most part, our review and comments have related to the natural resources that fall under our mission – the conservation and protection of soil and water resources. For an EIS project, these concerns fall into the following sections: wetlands, surface water resources, soils, and natural plant communities. Other issues, such as noise, traffic, air quality, and real estate values, will not be commented on by this agency.

The following comments will reiterate some of the points that were raised during the advisory committee meetings, but also provide comment on recent documents.

Wetlands. The WCD assists the City of Scandia with processing wetland impact applications, including the review of wetland delineations and replacement plans. During the EIS process, the site was reviewed for the presence of wetlands by both the EIS preparation team and a private firm hired by the applicant.

A few isolated areas with hydrophytic vegetation were identified within the previously mined portion of the site. Based on observations of conditions and the application of accepted wetland delineation and evaluation protocols, the wetland experts involved concurred that these isolated basins fail to meet the criteria of wetlands regulated by current state or federal rules. Our determination did not include a formal approval to fill these areas; such an approval may be granted by the City as a condition of the larger project approval. The reclamation plan for the project includes the construction of additional isolated depressions, similar to those that currently exist. These basins retard the flow off-site of the surface water, and allow it to infiltrate into the sub-surface groundwater levels, feeding the seeps and lower groundwater pools.

A second set of wetlands lie along the bottom of the ravines, outside of the proposed mining limits. These wetlands are naturally occurring wetlands, fed by a combination of groundwater and cliff-face seeps and surface runoff. These wetlands are recognized as having special hydrology, with a set of plant species that correlate with that hydrology. The groundwater well pumping tests did not indicate that the seeps or groundwater flow would be interrupted by the pumping activities proposed, to the extent of depriving the hydrology that maintains these wetland conditions. The wetland delineation of this set of wetlands marked the location of current seeps, establishing a base-line figure that can be consulted in the future to

determine significant changes. **If the project is approved, we recommend that conditions be attached which require frequent monitoring of the seeps and base flow, with immediate action required if the mining activities cause a reduced flow.** Seasonal variations are expected, as are longer term climatic changes. Presumably, if pumping diverts the seeps' water supply, cessation of pumping will see the seeps start again. The monitoring reports should be submitted to the full Technical Evaluation Panel, for review and consensus by all the overseeing wetland regulators. To best accommodate this monitoring, we suggest that the time period of the mining operation be extended rather than compressed or accelerated. Long term reduction in the volume or rate of seepage may result in loss of wetland area and quality. That loss would be contrary to the Minnesota Wetland Conservation Act and other wetland regulations. Rather than allowing replacement for such wetland impacts, I would recommend restoration, meaning the removal or cessation of the action which caused the loss of wetland.

Water Resources: The reclamation plan appears to contour the site in such a way that surface runoff and associated sediment will not flow overland to the creeks. The reclamation plan also indicates a staging of the mining activities, interspersed with the reclamation activities. Again, a compressed time frame may be contrary to the expectations of site stabilization. More comments will be given in the natural resources section, below.

The WCD, in partnership with the Carnelian-Marine on St. Croix Watershed District and cooperation with the landowner and City, has established a stream monitoring site downstream of the proposed site. We have been collecting baseline stream flow and water quality data since 2010, and are open to continuing or expanding that monitoring in the future.

Soils: Erosion control and prevention of off-site sedimentation is important, and the proposal appears to address this. For projects such as this, a Storm Water Pollution Prevention Plan and NPDES permit will be needed, in addition to the local permits from Carnelian Marine on St. Croix Watershed District. The WCD can assist the City in both review of those documents, and on-going site monitoring for compliance. The proposal appears to direct all cut surfaces to face the interior of the project site, minimizing impacts off site, but dust control and prevention of tracking onto public roads is needed.

Natural Plant Communities and Reclamation Plan: The reclamation plan offers to install prairie plant communities on most of the disturbed areas. Prairies were present historically, in the form of scattered openings in this part of the county. The prairie plant community is also well suited to the conditions that are expected to exist after the mining is finished. The roots will anchor the soil, and both expedite the infiltration needed to supply the seeps but also increase transpiration.

The reclamation plan (Appendix A.2) provides two alternatives for soil amendments for the post-mining reclamation. Of the two, we would recommend the use of an engineered soil, as is proposed as "Topsoil Requirements for Approach 1." This approach has been used successfully in many areas, and has been found to decrease the weed dominance on large sites. We understand this approach is not yet adopted under the current City ordinances. The WCD can work with the City on considering this alternative approach for this, and other, projects.

The Forest Management Plan (Appendix A.3) adequately describes the plant communities seen on our visits to the site. The native forest communities are ranked as good to moderate quality, with the deficiencies being related to the presence of invasive species, such as buckthorn and earthworms. Several of the tree species are vulnerable to their specific threats, such as oak wilt, emerald ash borer, and the butternut canker. These threats are valid throughout the county, not limited to this site. Approval conditions can be placed on the project to minimize the spread of these threats, such as seasonal timing of

May 14, 2012

Re: Zavoral Mining and Reclamation Project EIS

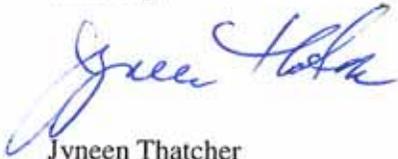
impacts to oaks. Close attention must be given to control invasions of noxious weeds, which may easily be imported from other gravel pits via the trucks.

The Reclamation Plan and Forest Management Plan address the general issues on the property. If the proposal is approved, the city may request additional details as a condition of such approval. In particular, the Plan could address how pioneer woody species should be managed in the reclamation pine forest, such as aspen, green ash or oaks. The Plan could also describe how buckthorn or reed canarygrass (or other invasive species) will be managed in the native forest areas.

Overall, we believe that the EIS has identified and addressed the potential impacts to the wetlands, surface water resources, and natural plant communities to enable the City's decision on these areas. Throughout this process, the applicant has responded by modifying the proposal to lessen potential impacts in these areas. We continue to encourage the protection and preservation of intact natural forest communities, such as the several acres of natural woodland being proposed for mining on this site, but acknowledge that in the absence of any Rules or applicable ordinances that apply to their removal, preservation is voluntary.

Please feel free to contact us if you would like clarification on any of these comments, or to involve us if the project progresses.

Sincerely,



Jyneen Thatcher
Natural Resource Specialist

Anne Hurlburt

From: Robyn D. [robdoc@robdoc.com]
Sent: Monday, May 14, 2012 5:23 PM
To: a.hurlburt@ci.scandia.mn.us
Subject: A Scandia citizen against the mine

As a Scandia citizen who lives on Quality Trail, just up the hill from the proposed mine site, I would like to have my comments added to the official record: I am 100% against opening and operating this mine.

My opinion is the result of reading the EIS, and hearing what others have to say on the issue, combined with my own values as a homeowner, outdoor enthusiast and taxpayer.

Primarily, my concern is one of safety. I cannot find a way to believe that dozens or hundreds of gravel-hauling trucks at the intersection of 97 and 95 can be safe. As a recreation and scenic corridor, there is a great deal of traffic on 95. While I'm sure most are safe drivers, some are busy admiring the views, reading signs or maps, or are otherwise distracted. While it's not Tiller's responsibility to account for these motorists, I do believe that it would be irresponsible for the city of Scandia to approve of hauling at this site, and essentially put lives on the line. Not only would it be tragic if even one death occurred (and one family shattered), but I have concerns that the city might have some risk of liability should such an accident occur.

Recently, a gravel truck overturned at that intersection. I drove through the intersection in the dark, and to be honest, I was amazed that the accident didn't spawn fender-benders or jeopardize our excellent emergency responders. I'd hate to see our firefighters, for whom I have utmost respect, called out away from their families to respond to accidents at this site, that need not have happened.

Also, as I mentioned, I live very close to this site. When we moved to Scandia eight years ago from Minneapolis, it was the quiet, green, natural beauty that attracted us. Everything about this mine suggests that quality of life will be compromised. I have spent thousands of dollars remodeling our home (local contractor, I might add) and will be enormously disappointed and frustrated if this mine is approved and we have to deal with dust, noise and traffic. This is exactly what I wanted to escape!

Further, if traffic at that intersection worsens (which it certainly will if the mine is approved), I certainly will be choosing to head away from the ruckus, toward Marine instead of head into Scandia for my gallon of milk, six-pack of beer, tank of gas or hot pizza. I hope that the council thoroughly thinks through the impact the mine will have on the merchants of Scandia. I don't want to not support these merchants. I like that they are here and I go out of my way to support them now. I would truly hate to see any of them have to close, but I don't want to have to brave more traffic, dust, noise to get to them. Marine is an easy option without noise, dust and danger.

I know many others have addressed the natural resources that will be lost if this area is mined. I agree with them, but I will not focus on that here. But please know, please understand, that wildlife and natural areas are very, very important to quality of life in Scandia. Please don't sell us down the river!

Thank you.

Robyn Dochterman
16277 Quality Trail N
Scandia MN 55073

Anne Hurlburt

From: Renee [arkey1@frontiernet.net]
Sent: Monday, May 14, 2012 4:32 PM
To: a.hurlburt@ci.scandia.mn.us
Subject: gravel mine on st croix river

Follow Up Flag: Follow up
Flag Status: Flagged

I am very opposed to having this mine here. It endangers the river and its habitat. Thank you Renee Arcand
15677 May Avenue
Marine on St Croix MN 55047

Anne Hurlburt

From: Richard Leider [richardleider@mac.com]
Sent: Tuesday, May 15, 2012 10:51 AM
To: a.hurlburt@ci.scandia.mn.us
Subject: ZAVORAL MINING PROJECT

TO THE SCANDIA CITY COUNCIL:

This letter is intended to voice strong opposition to the Zavoral Project.

This project has the potential for significant destructive human & environmental effects on Scandia and its environment. This is an inescapable conclusion. One would be hard pressed to select a worse site to put a gravel operation.

If you, our Council, are true to our city tagline--"Dedicated to Rural Community Values"--then, voting to proceed with this project would assuredly fly in the face of those values. These values are embedded in our Scandia Comprehensive Plan. To do an end run around this Met Council approved plan (based on a filing/timing technicality) would be a serious breach of ethics.

There are numerous oppositional issues that have been brought to you by standing-room-only groups of citizens attending your meetings, the National Park Service, the St. Croix River Association, The St. Croix Scenic Coalition, and others. So, I will not review those concerns here.

So, let me conclude with this deeply held viewpoint, shared by many: I will be shocked and dismayed if you do not abide by the spirit and guidelines of our Comprehensive Plan. We will be seen as the dinosaurs of the region and the state, a community stepping back in time. Every Scandia citizen or visitor passing by the Highway 95/97 intersection will be reminded by either your wise foresight or your lack of vision and courage to do the right thing for the community.

Please oppose this project!

Thank you for your consideration.

Sincerely,

Richard Leider
23229 St. Croix Trail North
Scandia, Mn 55073

Richard Leider
Founder & Chairman
INVENTURE-The Purpose Company
3601 West 76th Street
Suite 25
Edina, MN 55435
952-249-5222

* * www.inventuregroup.com

Anne Hurlburt

From: James Wm Johnson [jas.wm.johnson@gmail.com]
Sent: Tuesday, May 15, 2012 11:15 AM
To: a.hurlburt@ci.scandia.mn.us
Subject: Tiller/Zavoral gravel mine and acoustics and faulty BRKW assessment

Dear City of Scandia

As a one-time resident of Marine on St. Croix for over forty years (and its former mayor) and, as a former Minnesota-Wisconsin Boundary Commissioner and, the former owner Of AMADOR Corporation which tests (now as TUV Product Service) and certifies wave propagation, I feel I can speak with some authority on the EIS.

A most flagrant (in its ineptitude) aspect of this EIS would be the Bettendorf letter and BRKW File #6631 regarding property values. **In that assessment, the impact of acoustic noise is virtually ignored vis-a-vis adjoining property values.**

1. My late wife, whose family bought land in 1910 essentially joining the Tiller/Zavoral gravel mine property, used to recall to me that when she worked in the mid-1950's at Camp Courage (Camp Kiwanis) immediately south of Marine that after work, she and the other counselors would go up and lie down and stretch out on the hot pavement of Highway 95. There were ZERO cars and trucks traveling to disturb this peaceful scene.
2. We moved to Marine in 1969 when Highway 95 was still a country road and quiet. That has changed. It is not so peaceful. Here's why. Simple acoustic facts!
3. The St. Croix River itself acts as an acoustic reflector and bounces or reflects the noise from the highway (and from any commercial operation such as the proposed mine, chain saw noise, etc.). [From the website <http://www.acousticreflections.com/> "Flat Surfaces: A flat surface is effective in distributing sound. If the surface is large enough and positioned correctly, a flat surface can project sound."]
4. The flat surface of the river reflects the sound (of the mine, of the trucks) over to the Wisconsin shore ... whereupon the relatively flat surface of the bluffs reflects the sound BACK to the Minnesota side! The Minnesota bluff reflects the sound back to the St. Croix, to the Wisconsin side, etc. In other words the sound from the pit, from the trucks is greatly magnified. Anyone who now lives on the St. Croix in this region can tell you about the noise coming from a simple 10 hp outboard motor. Acoustic reflection!
5. Think about the increased truck sound; think about the increased heavy equipment sound from this proposed operation.
6. Persons will buy and have bought this land in this area for the tranquility of the scene. Reflected noise off the St. Croix, off its bluffs, from a gravel pit and the adjoining truck traffic is not tranquil. Believe me, property values will plunge, not to mention the tranquility of the valley.

The BRKW File #6631 claiming the **impact of the proposed commercial operation is 1/4 mile is absurd** and should be re-done taking into consideration the acoustical impact of the Zavoral operation.

The impact of this pit to property owners and users of the National Scenic Riverway is inestimable. One man's retirement project (viz., James Herman Zavoral, MD) should not so impact others who now enjoy a relatively noise-free peaceful home and the use of the St. Croix.

I was there when the late Mr. Plowman, whose home adjoined the mining property, single-handily stopped the last St. Croix-polluting mining operation here. Out of respect for his memory, and respect for the National Scenic Riverway, this land should retain its "highest and best use" and that is NOT a mine!

Respectively submitted,

James Wm Johnson

Anne Hurlburt

From: Deidre [deidre@frontiernet.net]
Sent: Tuesday, May 15, 2012 6:50 PM
To: a.hurlburt@ci.scandia.mn.us
Subject: opinion regarding the mine project in Scandia

May 15, 2012

TO: The City of Scandia
FROM: Deidre Pope, Resident (16277 Quality Tr. N)

I am writing to express my 0% support for allowing the Zavoral Mine project to proceed. I have listened to people speak at meetings, have read information as it has been made available online, and continue to have exactly the same concerns I had when I first wrote a letter expressing those in February 2009.

Those issues include air quality, noise pollution, danger to drivers (especially at the intersection of 95 and 97), congestion, negative impact on Scandia businesses, impact on wildlife and water, and quality of life for Scandia residents.

While I believe that private citizens should be able to do what they like with their land, it has become even more clear that the result of the mining activities do not *stay* on that land. If it were possible to contain the impacts of mining to the land-owner's property, then there would be no reason for any of us to object. However, all of the above mentioned impacts affect the community at large in negative ways. There is no way to keep the air, noise, trucks, etc. within the borders of that one property. Honoring "land-owner rights" for one person at the expense of the rest of the land-owners in the community is unacceptable.

I moved to Scandia eight years ago in order to be part of a small community, to enjoy clean air and water, to grow more of my own food, and to enjoy the peace and beauty of this place. Allowing the mining plans to proceed jeopardizes all of the reasons I love living in Scandia and, in my opinion, jeopardizes Scandia itself.

Thank you for recording my opinion as part of the record of public comment.

COMMENTS BY THE ST. CROIX RIVER ASSOCIATION ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED ZAVORAL GRAVEL MINE

These comments on the draft EIS augment those delivered orally by the St. Croix River Association at the Scandia public meeting on April 3, 2012.

As we stated at the public meeting, the draft EIS fails to reflect the condition of the pit that would be left after the proposed mining would be completed. Paragraph 1.1.1 asserts the average depth of mining will be fifteen feet, ranging from 10 feet to 70 feet. But figure 10 flatly contradicts that assertion. It shows excavation to a base pit floor elevation of 840 feet. It does not show a similar figure for the pit as it is now, but it shows excavation depths which are typically way more than fifteen feet. At the northwest corner of the pit, it shows 50 feet of excavation, and the same in the west central part of the pit. In the now-wooded area, it shows excavation to below 40 feet. The depth of the pit that Tiller wants to create, must be made evident in the final EIS. It will be a major hole. As it is, figure 10 shows that the bottom of 840 feet is 60 to 80 feet below the west edge, and 35 feet below the southwest edge.

The Scandia city council will be using the final EIS as a critical information source when it considers the conditional use permit application. We want it to understand that the proposed end product will be distinctly worse than what is there now. The bottom will be so far down that five story houses would not extend beyond its top, and trees planted would not reach the top for decades.

Regarding tree planting, figure 23 shows the now-wooded area will, post-restoration, be dry prairie and mesic prairie. It will not be reforested. In neither figure 23, nor anywhere in the EIS, is the extent of proposed tree planting revealed.

Regarding erosion control, it must be pointed out that at Tiller Corporation's sand mine near Grantsburg, an erosion control berm failed recently and sediment-laden water entered a wetland then a small stream and eventually flowed into the St. Croix River. If Tiller cannot properly control erosion on the relatively flat landscape near Grantsburg, how can it be expected to properly control erosion on the steep slopes adjacent to the Zavoral site?

The draft EIS lacks analysis of the usefulness of the pit for residential development, by comparing its present attractiveness for residential development, against the likelihood of people wanting to live in the bottom of the crater-like setting that the proposed mining would create.

Otherwise, the St. Croix River Association stands by what it said at the public meeting. where we urged particular attention be paid to the comments of specialists representing TA-COS and the National Park Service. Allowing a gravel operation right up against this National Park would be most unfortunate, a serious mistake. Many millions of public dollars have been spent on this park for land and scenic easements; this is not a project warranting devaluing that investment.

There was talk at the public meeting that the Final EIS might include the city's preferred alternative. It should not. The EIS is an information document, not a decision

document. The decision should be reserved for argument at the conditional use permit hearing.

Bill Clapp and Randy Ferrin
Board members, for the St. Croix River Association

May 16, 2012

Anne Hurlburt, City Administrator
City of Scandia
14747 209th St. N.
Scandia, MN. 55073



Dear; Mayor Simonson,
Council person Sally Swanson
Council person Chris Ness
Councilperson Connie Amos
Council person Jim Snyder

The mission of Take Action- Conserve Our Scandia is: To promote sustainable development in Scandia while endorsing conservation of its waters, wildlife, natural and historic resources and beauty, while referring to the Scandia Comprehensive Plan as our visionary guide.

I fully support the letter and all of the comments made on behalf of Take Action- Conserve Our Scandia submitted by Kieran Dwyer of Dorsey Whitney. In addition I am making the following g comments:

Additional Comments to City on the DEIS for the Tiller Mining and Reclamation Proposal

Incomplete contents of the DEIS

Since the EIS is intended to analyze “potential for significant environmental impacts”, there needs to be an analysis of chemical use on groundwater, seeps and streams.

Tiller intends to use calcium chloride within the mine area for dust abatement. According to a report on the Health of Streams in the metropolitan area by the Metropolitan Council in 2010, the amount of chloride in streams going into the St. Croix River had increased from 2000 to 2010. For both the Minnesota and St. Croix streams, the chronic chloride standard was exceeded 10 times during 2010. The chloride used in the mine will quickly infiltrate the soil and end up in streams and contaminate shallow groundwater. We know that chloride is toxic to trout (documented in Zavoral Creek) and hazardous to growth including pine trees and poplars. See Potential Impacts of Dust Suppressants: Avoiding Another Times Beach EPA Expert Panel Summary, May 30-31 2002 Section 3 and 3.1.1, 3.1.2&3.2.2

Also, in the EPA document noted above, Section 3.2.4 “dust suppressants have little efficacy at suppressing small respirable dust (particulate) have the potential to be inhaled directly into the lung and cause lung disease.” To say it will not meet the standard for causing cancer is quite dismissive of people’s health concerns. Of the fine small particulate, 25% is silica.

The EPA information above needs to be included to fully analyze the potential negative environmental impact of the mine.

Tiller plans to use herbicides during the reclamation and re-establishment of groundcover. Since Tiller will be mining down to 3 feet above the water table, herbicides will quickly infiltrate the groundwater and potential health problems may result. Why is this impact not included?

As one of two reasons to mine this area, Tiller has claimed that the site will be “more stable and less subject to soil erosion” after the site has been reclaimed. Where is the documentation that the site is unstable and subject to soil erosion now? Which area? During and after the mining process the site will be more unstable and subject to erosion, certainly while clearing, grubbing and removing overburden and while establishing new plants communities. If there are drought periods, it may be difficult or impossible to establish new growth. We also know from meteorologists that our storms are becoming more intense, localized and less predictable. Furthermore, the area will be more susceptible to erosion after losing an additional 23 plus acres of well-established trees.

Where is the analysis of the negative impacts of noise and dust as a result of removing over 23 acres of established trees mostly 30 to 80 years old? Noise will not be blocked and dust will not be trapped.

The EIS should include one alternative under the Alternative Designs or Layouts item. Given that the community has expressed ongoing issues with mining an additional 8 or 9 acres in the previously un-mined area next to the site, there needs to be an inclusion of a design that does not include mining the additional 8 or 9 acres. The Comprehensive Plan approved in March of 2009 and the Development Code approved thereafter, specifically intended that no new areas be opened to mining. Loss of the 5.4 acres of mature trees will increase noise, decrease habitat suitability for red-shouldered hawks. (Red shouldered hawks need large stands of mature old trees for breeding.) Medium quality is average quality and is a value to this area. Even though they were not found during the surveys they have been frequently observed in the closely surrounding area. The additional 9 acres is the most susceptible to erosion under any conditions. The DEIS stated that it will be more stable after reclamation which will be a considerable amount time from the commencement of the project. Since this area has not been mined before and has a steep gradient flowing down to South Creek the likelihood of an accident or extreme weather event resulting in serious erosion is great and irreversible. *(Despite Tiller's well-intended plans and implementation of the Grantsburg frac sand mine near highway 70, at the end of April, 2012 one of their berms failed. This resulted in sediment spilling into the wetland below and the St. Croix River.*

I do not think that the information in the DEIS adequately addresses the potential negative environmental impacts to this area and the surrounding area. Every area lost, impacts the whole ecology of the area.

The Scoping Document states that the economic impact, including impacts to the economy and tourism must be quantified. What is the data and analysis used to quantify these issues and conclude that there will be little impact? Also the aggregate tax owed to the County and Scandia needs to be clarified in the Economic section of the DEIS.

According to Item # 9- Land Use- the DEIS must address each of the alternatives on the current and future land use that will be impacted by the project.

Where is the data and analysis to support that the reclaimed area will be more suitable for residential development, agricultural use or conservancy? The outcome of the mine will be: a deeper and bigger hole (as close as 3 feet above the water table), the need to build special sewer and septic systems for any future development and few or no trees in most of the area compared to the 23 acres of existing established trees. The outcome of mining will not be more suitable for development, agriculture or conservancy. What will this “gateway to Scandia” be suitable for???

How did we get from “mining an additional 15 feet” “ including approximately 8 acres of un-mined area(Scoping Document)” to mining up to 70 feet and an additional 9 un-mined acres that contain 50% of the aggregate extracted from the area (DEIS)? Even at the third PAC meeting, Leslie Knapp affirmed that Tiller would be digging a hole 15 feet deep on 63 acres. (See meeting notes) I think this is one of the issues that has been misleading to the public. The aggregate in the additional 9 acres may be desirable to Tiller but there is no documentation that the need for this aggregate is essential within the Scoping Document or the DEIS.

Despite some additional information in the DEIS, the No Build Alternative sections do not adequately identify all the benefits of the No Build Alternative including:

- *Not removing over 23 acres of established trees (over 35% of the existing site).
- *Not easily viewing a noticeable gravel mining operation and a very contrived set of land forms when driving toward the site from highway 97 or passing by on Scenic Byway 95.
- *Not negatively impacting the trout in Zavoral Creek with calcium chloride.
- *Not potentially contaminating the groundwater with herbicides.
- *Not adversely impacting the health of the people in the surrounding community and riverway due to small particulate such as silica. According to the DEIS, 25 percent of the aggregate extracted will be silica. There is significant documentation that there is no effective suppressant for silica dust and that it does cause lung disease.
- *Not increasing the difficulty of developing the area for homes with few trees and expensive sewer and septic systems.
- *Not greatly increasing the likelihood of traffic accidents by increasing the number of conflicts from 2 conflicts to 6 conflicts)
- *Not risking unanticipated environmental consequences that can be very costly to undo or the negative impact to environmentally sensitive areas that can be impossible to restore. (This includes the land surrounding the Zavoral mine and the St. Croix Riverway.)
- *Not negatively impacting the reasons people from all over the country value and enjoy the experience of the St. Croix Riverway.
- *Not hindering or complicating future land use options.
- *Not risking the safety of people driving through the 95/97 intersection with gravel trucks crossing the road every 4 to 8 minutes.
- *Not risking loss of business for Scandia or Marine as a result of numerous gravel trucks driving up 95 through Marine to the mine and west on 97 through Scandia.
- *Not continuing the mining of frac sand (50 feet below the surface) along the St. Croix River.

The Cumulative Impact is incomplete

This section must include reports by Dr. Scott Alexander, Applied Ecological Services Inc. and Vern Schwing of RLK and Associates, Lisa Philippi's market analysis of property value reduction, my additional information and all additional data and analysis given to the city.

The DEIS discussion does not include indirect impacts. If the city reviews this information, it will be clear that the cumulative impact is collectively significant and has the potential for significant environmental impact.

The only reasonable alternative for the City and the 99.9+ % of the citizens is clearly the NO Build Alternative!

If another alternative is chosen by the City Council, the mitigations must include:

Not mining the 9 additional acres to avoid the loss of over 5 acres of old mature trees and habitat and risking erosion and damage to the south creek area.

No use of calcium chloride or any hazardous chemicals for dust abatement to avoid toxins to trout, trees and other growth and groundwater contamination.

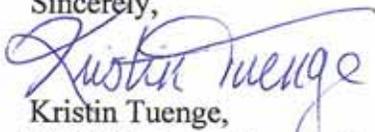
No use herbicides that may be toxic to humans and animals.

There must be ongoing monitoring of Zavoral Creek and South Creek seeps for water level, temperature, chlorine and sediment due to reports by Scott Alexander, AES and EPA Chlorine information. This expense must be paid by Tiller.

Adding an acceleration lane on 97 if the mining is approved for more than 150 days to make this area safer and more usable for other motorists. There was ample evidence in April of 2012 that gravel trucks were involved in accidents, safety violations and safety threats to citizens.

I appreciate the opportunity to give input into this critically significant issue and hope my comments and those of Take Action- Conserve Our Scandia are taken seriously.

Sincerely,



Kristin Tuenge,
20595 Quinnell Avenue N,
Scandia, MN. 55073

“We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.”

Aldo Leopold



To the City of Scandia

My husband, Rudy, and I live at 21715 Quarry Ave N. Our property lies less than 1/2 mile north of the proposed mining operation. Rudy has been under the care of Dr. Marshall Hertz, The Medical Director of the Lung Transplant Program at the University of Minnesota. According to one of his medical reports, interlobular thickening is seen with early interstitial fibrosis. We are extremely anxious that a mining operation which releases any type of particulate matter including silica, even at relatively low concentrations, could have devastating effects on his health.

We are not at all convinced that the DEIS sufficiently addresses these issues. There are two pages with mention of water and I believe, calcium chloride, for dust reduction, but nothing specific. Watering as needed? Who makes that decision? And who decides that there is sufficient rainfall in a 24 hour period to dampen the dust?

The issues concerning water, traffic, noise, loss of wildlife are similarly lacking in specifics.

Although this report was purportedly done by professionals it is sloppily written. Names are misspelled. There is a comment that since the land was once mined it should be mined again. How does this fit into a present day evaluation? Zavoral/Tiller slipped its application in under the wire. This mining operation would be outlawed under present standards. In the section on wells, ours is not depicted, nor are several of our neighbors' wells. Were they deliberately omitted or is it simply bad research?

We live between 1/4 and 1/2 mile north of the proposed mine. Yet our property was excluded from the chart showing property value reductions. The chart extends south as far as the Clapp property -- a much greater distance from Zavoral/Tiller than ours. Again, is this a deliberate omission? There is little question that a 2% property loss is patently laughable.

As an aside, our family has owned property on the river since 1950. We purchased 580 feet of river front property in McLeod's Slough from Rudy's parents in 1976. When we sold our home in St. Paul in 1996, we bought property at 21715 Quarry Avenue on the bluff above our river property. We have lived in our house there since 2000. It is our retirement home in Minnesota.

The Council might consider how a well planned housing development on the bluff of the Zavoral property would benefit the city. Jobs would be created for local engineers, carpenters, plumbers, painters, electricians, etc. There would be a permanent increased tax base with new home owners. Why the rush to mine this property when there are no upsides -- NONE -- for the city of Scandia?

Carol Sundberg

Anne Hurlburt

From: Dorothy Deetz [dorothydeetz@frontiernet.net]
Sent: Thursday, May 17, 2012 7:23 AM
To: Anne Hurlburt
Subject: Tiller Mining Concerns

May 17, 2012

To: The City of Scandia, MN
C.O. Anne Hurlburt <a.hurlburt@ci.scandia.mn.us>

I urge the City of Scandia to request that Tiller Mining Corporation revise their proposal to mine on the St Croix River in Scandia.

The revised proposal should include 100 foot set backs from the fragile boundary to our National Park, the St Croix River.

I think the City of Scandia needs to question if the EIS adequately presents the facts concerning impacts to this fragile river valley.

We need to know how truck traffic, noise and dust levels, and impacts to property values and classifications will change the way we live in Scandia, and Marine.

Recent gravel truck accidents at 95/97 intersection and the Grantsburg blow out should be a red flag to all who are responsible for making critical decisions on behalf of our community's future.

The comments from Tiller after the Grantsburg failure should never be allowed to be uttered again near our precious river valley.

“We’re moving forward with a more vigorous monitoring schedule that includes more frequent visual inspections and water quality monitoring,” Caron said. “When we’re mining a natural resource in close proximity to another important natural resource (St. Croix River), we have duties and responsibilities to protect it, and it’s our intention to do that.”

It is the responsibility and duty of the City of Scandia to prevent this from happening here.

Sincerely,
Dorothy Deetz
261 3rd Street, PO Box 272
Marine on St. Croix, MN 55047

May 16, 2012

Ms. Anne Hurlburt
City Administrator
City of Scandia
14727 209th St. N.
Scandia, MN 55073

Subject: Zavoral Mining and Reclamation Project Draft Environmental Impact Statement (EIS)

Dear Ms. Hurlburt,

I appreciate the opportunity to comment on the Draft EIS. My family currently owns property near the mining site at 20851 Quint Avenue North. We are very concerned about potential impacts to our property caused by the mining of the Zavoral property. My comments on the EIS are provided below.

- The description of Alternative 3A needs to define the months they will be working. Do they really need to work 12-hour days? If they worked 10-hour days it would appear that they could do the work over 180 days. Please clarify.
- Alternative 3A reduces biological, erosion/sedimentation, economic (impacts to land values) and water resources. Other impacts occur over a shorter-period of time such as visual, water use, noise and air quality, which reduces the impacts associated with the mining operation. We find this alternative to be superior to any of those studied and the EIS should identify this Alternative as the Environmentally Superior Alternative.
- The final EIS should complete a thorough analysis of the air quality impacts associated with Alternative 3A. The analysis currently indicates that the mitigation measure should address any increase in dust/emissions or decreased ambient air quality, but it uses language such as “not likely” rather than making a definitive statement about potential impacts. The EIS should clarify if this Alternative actually reduces these impacts.
- While the EIS indicates that noise levels along the St. Croix River do not exceed standards, there will be an increase in ambient noise. The river is a Wild and Scenic River and should receive greater protection than required by the general “outdoor living” noise standards. The increase in noise will change one’s experience on the river. Therefore, we suggest that the EIS include a recommended mitigation measure to provide berming along the Highway to further reduce the noise from truck traffic.
- We request that an additional Alternative be included in the EIS that would allow the mining to occur over two years and between October and June. This would minimize the impacts of the mining operation to the residents and visitors enjoying the St. Croix River during the highest period of use, summer.

Overall, we believe that if the site is to be mined that it should be done over a 1 or 2 year period to minimize the impacts to the community and those recreating on the St. Croix River. We understand that Tiller believes that their objectives can be met in a shorter timeframe. Please ensure that all of the required analysis of these two alternatives is completed in the EIS in order to allow decision-makers to approve either one of them.

If you have any questions regarding these comments please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink that reads "Lisa Plowman". The signature is written in a cursive style with a long horizontal line extending to the right.

Lisa Plowman
1314 Robbins Street
Santa Barbara, CA 93101
805-729-5956

Kathy Trombly-Ferrin
23290 Quentin Ave N
Scandia, MN 55073

May 16, 2012

Dear Honorable Mayor and Scandia City Council Members:

I am writing this letter to implore you to recall why you are in your respective positions for the city of Scandia. We the people, the residents of this fair city, have elected you based on your credentials and our belief that you hold the ability to make unbiased decisions on behalf of this city. Our expectation is that you will maintain fairness and uphold the best interests of this city and its residents, while listening to what we care about. After all, isn't this why we voted for you? Over the past 3 years, you have heard from many of your constituents with regard to their opinion of the proposed gravel mine at the intersection of MN State highways 95 and 97. Opposition to this site as a gravel mine has been repeated over and over, notwithstanding any considerations for the technical standards and requirements needed to meet the Draft Environmental Impact Statement (DEIS). The overwhelming majority of people who have commented so far have stated by one reason or another that they do not want another gravel pit in Scandia, especially in such a sensitive area within a National Scenic Riverway and State Scenic Byway.

Several years ago, my husband and I settled in Scandia, mainly because we were attracted to its rural character and country-like setting. We both enjoy paddling the St. Croix River, hiking, biking and skiing along the local paths, parks and lakes. We expect Scandia to retain these rural qualities and provide a safe and peaceful environment for many years to come. We have found that our neighbors and fellow residents value these same attributes, and they share our belief that we should be able to raise our families in an area without excessive noise, pollution or traffic safety issues, as is present in larger urban areas. I believe that you will find (and have already heard) that the majority of our residents put a significant value on the quality of life in the St. Croix valley.

During the April 3, 2012 PAC meeting, the attorney representing the Tiller Corporation stated that this is the most studied mine project in this state. Imagine that! Is it any wonder, based on all of the questions and concerns from our residents, that we want what is best for our families and our beautiful city?

In summary, I ask that you remember that it is the votes of the citizens of this fair city that put you into office, and it is our voices that you should be hearing and acting upon. We have opposed this hazardous gravel mine from day one, numerous times. I'm curious, have any of you asked Dr. Zavoral if he truly intends for this particular piece of property to become a horrific gouge in Scandia's landscape, or would he consider the opportunity to turn this scenic section into a park-like setting for many generations to enjoy? Just imagine!

Which outcome would you be proud to represent?

Sincerely,

Kathy Trombly-Ferrin

Cc: Anne Hurlbert, City Administrator

APPENDIX A

**Zavoral Mine
Ecological Review of
Draft Environmental Impact Statement (DEIS)
SCANDIA, MINNESOTA**



Submitted to:
Take Action – Conserve Our Scandia
Scandia, Minnesota

Prepared by:
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Prior Lake, MN 55372
Phone: (952) 447-1919
Email: info.mn@appliedeco.com

APRIL 13, 2012



TABLE OF CONTENTS

| | |
|--|-----------|
| Introduction | 1 |
| Project Alternatives | 1 |
| Alternative 1 – Preferred Alternative | 1 |
| Alternative 2 – No-Build Alternative | 1 |
| Alternative 3 – Reduced Timeframe | 1 |
| Subalternative 3A – Reduced Timeframe (150-Working Day Operation)..... | 1 |
| Sufficiency of DEIS | 2 |
| Alternatives Analysis..... | 2 |
| Reclamation Plan..... | 4 |
| Other Issues Addressed by the DEIS..... | 7 |
| Potential Mitigation Measures in the DEIS | 10 |
| Issues not Addressed by RSDD and DEIS | 14 |
| Regional Ecological Context | 14 |
| Historical Data Review | 14 |
| Habitat Fragmentation..... | 16 |
| Edge Effects..... | 17 |
| Conclusions | 18 |
| Recommendations | 19 |
| References | 20 |

FIGURES

| | |
|---|---|
| Figure 1. Gravel resources of the Twin Cities region in 1997..... | 3 |
| Figure 2. Excerpt from USGS Topographic Map – Scandia, MN (1974)..... | 5 |

MAP EXHIBITS

- Map Exhibit 1. Regional Ecological Context – Habitats
- Map Exhibit 2. Regional Ecological Context – Conservation Lands
- Map Exhibit 3. Forest Effects
- Map Exhibit 4. Edge Effects

APPENDICES

- Appendix A. Endangered, Threatened, Special Concern, SGCN, and Declining Bird Species in the Region around the Zavoral Mine
- Appendix B. Historical Aerial Photographs
- Appendix C. Historical Topographic Maps

INTRODUCTION

In December 2011, Applied Ecological Services, Inc. (AES) was retained by “Take Action – Conserve Our Scandia” to conduct a technical review of environmental review documents associated with the proposed Zavoral Mine, located near the St. Croix River in Scandia, Minnesota. The entire Zavoral Mine parcel (herein referred to as the “site”) is 114 acres, with 64 acres proposed for mining. 55 acres of this was previously mined and 9 acres has never been mined or cultivated). AES’s review focused on potential impacts to biological and other ecological resources at the site. AES did not review non- biological issues such as economics and traffic.

This report represents the products of AES’s scope of work:

1. Summarize the project alternatives in the Draft Environmental Impact State (DEIS);
2. Assess the DEIS’ adequacy in addressing issues identified in the Revised Scoping Decision Document (RSDD);
3. Identify ecological issues not addressed or inadequately addressed in the DEIS;
4. Assess the reclamation plan; and
5. Draw conclusions and key recommendations regarding the proposed mine.

PROJECT ALTERNATIVES

Alternative 1 – Preferred Alternative

In the applicant’s preferred alternative, Alternative 1, Tiller Corporation proposes to mine and restore 64 acres of land, 56 acres of which was previously mined from the 1960s to the 1980s. The mine will remove sand and gravel to “an average depth of 15 feet, ranging from approximately 10 to 70 feet deep,” followed by reclamation of the site. Approximately 4 acres of previously mined land in the St. Croix River District Zone and National Park Service scenic easement will not be mined but rather restored during the first five years of mining operations. Mining typically will occur from April through mid-November and will last up to 10 years. Reclamation of the site will be phased during each mining phase. Reclamation is proposed to consist of re-grading perimeter slopes, topsoil re-spread, vegetation establishment, monitoring and management.

Alternative 2 – No-Build Alternative

In Alternative 2 the property remains in its current condition with no mining or reclamation. The existing and allowed uses of the site include Agricultural and Rural Residential.

Alternative 3 – Reduced Timeframe

Alternative 3 is essentially the same as Alternative 1, except that the duration of mining would be up to 5 years.

Subalternative 3A – Reduced Timeframe (150-Working Day Operation)

Subalternative 3A is essentially the same as Alternative 1, except that the duration of mining would be approximately 1 year.

SUFFICIENCY OF DEIS

The Revised Scoping Decision Document (RSDD dated January 2010), identifies the alternatives and issues that are to be examined in depth in the EIS. It provides a tentative schedule of the environmental review process and discusses permit needs for the project. AES presents its review in the order of the RSDD format. AES includes other issues not addressed in the RSDD.

Alternatives Analysis

DEIS Review. Each of the RSDD-required Alternatives was addressed. Of these, Subalternative 3A is the most advantageous to natural resources.

The DEIS discusses the more intensive disturbance of Subalternative 3A:

- “Mining-related activity would be required more frequently or for longer durations, or a combination of both (pages ES-11, 4-7)”;
- “...increasing the potential sources of erosion during operation (page ES-20)”;
- “Noise levels are expected to be somewhat higher than Alternatives 1 & 3 due to the additional trucks on-site necessary to achieve the higher mining rate. Noise would occur for a longer period over the days worked at the Site and could be higher due to the higher tonnage required to be mined over the 150 working days. During hauling periods, noise levels along the haul route would be higher than for Alternatives 1 and 3; levels would be expected to be higher than those experienced during peak hauling in the past, but would occur over an estimated 1-year period (pages ES-33 and 4-99)”;
- “As a result of the reduced timeframe, the daily traffic volumes and the hours of operation would increase in order to mine and transport the material from the Site (page 3-14)”.

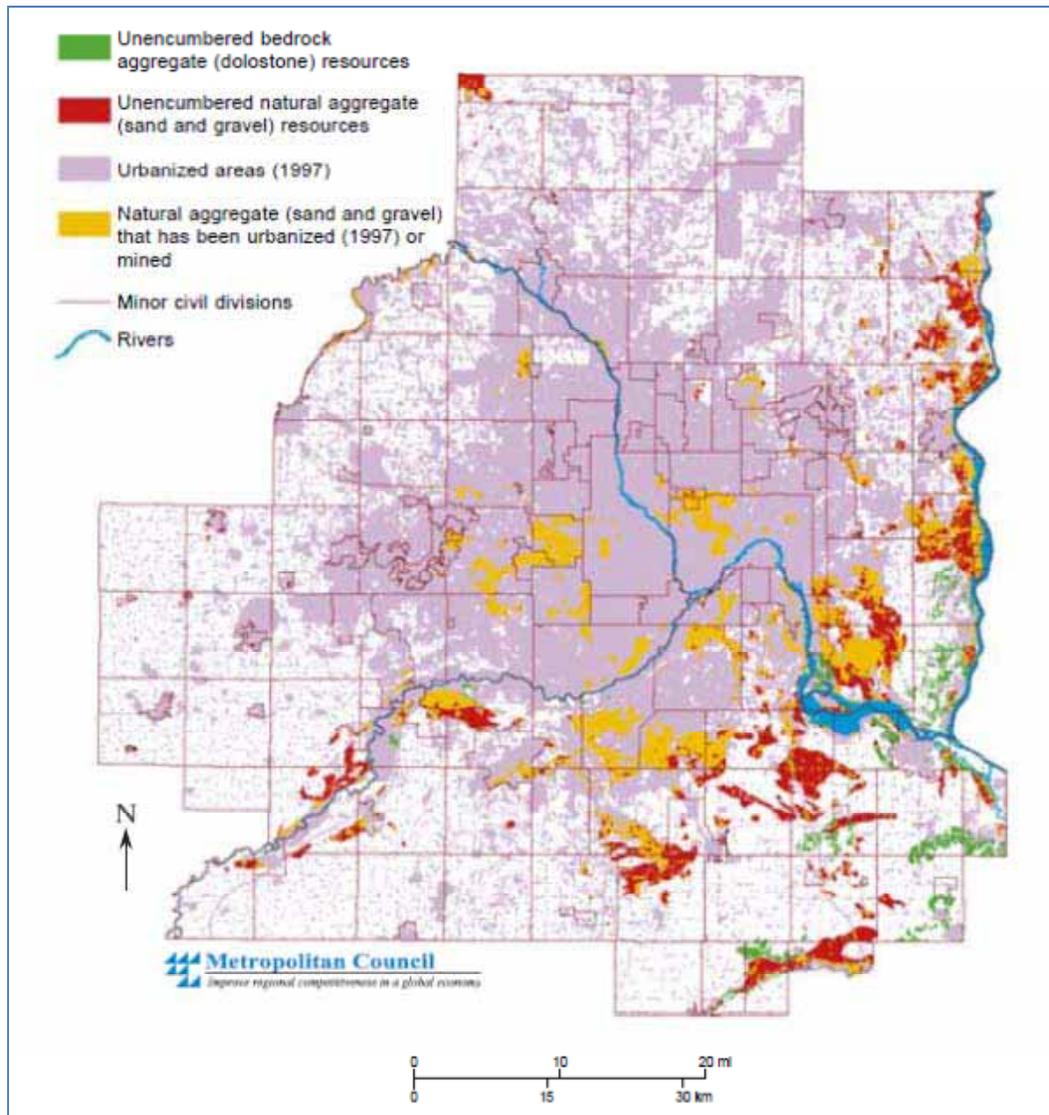
In contrast, the DEIS states that Subalternative 3A presents the lower probability of a major storm event during operation because of the reduced timeframe, and increased internal drainage and infiltration that would be established earlier than other alternatives.

AES views the addition of Subalternative 3A as welcome because any reduction in the duration of site disturbance and associated expediency in reclamation is generally advantageous from an ecological perspective. While disturbance may be more intensive during this compressed timeframe, the DEIS states that reclamation will be completed earlier and there will be a reduced period of wildlife displacement, which AES agrees with. However, the increased mining intensity and larger area of disturbed soil in a brief period during mining warrants increased site monitoring and inspections to ensure compliance and to safeguard against erosion and threshold exceedances, such as noise.

The DEIS also states that under Subalternative 3A the area would become available for post-mining use earlier. Given that the site’s post-mining use is not known, it is not clear if this would have ecological advantages or disadvantages.

The Scoping Document did not require the assessment of alternative mining sites, but AES feels that alternative sites should be addressed given the ecological significance and sensitive of the site, discussed below. Alternative site consideration and analysis is a standard requirement in the Minnesota Environmental Quality Board’s environmental review process, and the justification for not assessing alternative sites (RSDD, pg 8, “Alternative Sites”) is inadequate.

Figure 1. Gravel resources of the Twin Cities region in 1997¹



Numerous unencumbered deposits of sand and gravel are available to serve the metropolitan area (Figure 1). The Zavoral site is located within and adjacent to the St. Croix National Scenic Riverway, a unit of the National Park System, and within a MNDNR-identified Regionally Significant Ecological Area (RSEA). The public investment and highly valued natural resources here make this a significant environmental site. Other unencumbered sand and gravel resources exist nearby and do not impinge on significant natural resources or lands in which the public has made an investment. For this reason, these other gravel resources warrant consideration as alternatives to the Zavoral site.

¹ Southwick et al. 2000. Aggregate Resources of the Seven County Metropolitan Area, Minnesota. Minnesota Geological Survey Information Circular 46. Published in cooperation with the Metropolitan Council and University of Minnesota, St. Paul MN.

Reclamation Plan

The Reclamation Plan (DEIS Appendix A.2) provides a moderately detailed description of existing vegetation and soils, reclamation phasing, screening, and specific reclamation activities. These activities include site preparation, topsoil options, seeding, planting, erosion control, management, monitoring of performance standards, and potential mitigation measures. The reclamation plan calls for:

- Final slopes to be 4:1 (horizontal:vertical) or flatter;
- Mine floor will be graded to have 6 subtle depressions;
- Topsoil respread (DEIS proposes a minimum of 4 inches);
- Native seeding (dry and mesic prairie)
- Tree planting (transplanting white pine from the site);
- Maintenance (mowing, herbiciding, and prescribed burning); and
- Monitoring of performance standards.

AES supports most aspects of the reclamation design and agrees with these important elements. However, a few inadequacies were identified:

Mine Floor. The Reclamation Plan states, “There will be six (6) created depressions located throughout the proposed reclamation areas. These created depressions have a depth from 0.5 feet to 1.5 feet and range in size from approximately 20,000 sq.ft. to 75,000 sq.ft. These created depressions are not designed to allow stormwater to collect and stagnate or to convert to a wetland type environment...”

AES’s review of historical topographic maps and aerial photographs indicate that past mining at the site resulted in open water ponds in excavated depressions (Figure 2). Past historical conditions suggest the possibility of similar conditions existing in the future. The DEIS should address the effect of ponded water on Crystal Spring, Zavoral Creek and spring-fed wetlands, such as the Black Ash Seepage Swamp, given the shorter subterranean flow path that will exist after mining than presently between the mine floor and these spring-associated resources.

Figure 2. Excerpt from USGS Topographic Map – Scandia, MN (1974)



Topsoil. AES agrees that engineered/manufactured topsoil, consisting of sandy materials on site, amended with weed-free organic material, is an acceptable method to provide the topsoil needed for reclamation. However, the Reclamation Plan states that “Topsoil to be placed within each reclamation area will be graded to a minimum of four inches in depth (page 13).” AES agrees with the City of Scandia in their recommendation that a minimum of 6 inches of topsoil be spread in all reclamation areas prior to native seeding.

Tree Planting. Tree planting is discussed but not clearly explained in the Reclamation Plan. Tree planting is apparently limited to transplanting white pines from on-site areas to existing forest edge areas and berms. The Reclamation Plan (page 26) states, “For reclamation areas that border the forested bluffs native coniferous trees will be planted to create a natural transition between the existing forested landscape and the newly planted reclamation areas. This transition area will be created along the north and eastern side of Reclamation Phases 1, 3 and 4 with the intent of establishing similar tree species that are found within the adjacent forest systems. This transition zone will allow existing tree species found along the forested bluffs to seed into the reclamation areas and contribute to the overall species composition over time.” Figure 5 of the Reclamation Plan illustrates this intended “Coniferous Woodland” area.

AES agrees with using white pines as part of a forest edge restoration strategy. However, the single-species approach is not recommended and the extent of these plantings is insufficient to achieve the intended forest-to-prairie transition zone (see DEIS Appendix A.2, Figure 5). Transplanting only white pine will leave this Coniferous Woodland susceptible to disease due to the potential for white pine blister rust. Including other appropriate native trees (e.g., bur oak) and native shrubs would provide a more diverse, natural, and robust

edge to the forest. Coniferous Woodland should also be restored in a) Reclamation Phase 3 along the forested southern edge and along the forested portion of the western edge, and b) Reclamation Phase 2 along the forested portion of the northeastern edge.

The number of trees and their spacing are not specified. An adequate density of trees is necessary to providing meaningful benefits in the zone between remaining forest and the open areas of the mine. The City of Scandia should require that the mine reclamation plan specify a tree planting plan that restores Coniferous Woodland along all remaining forest edges at an adequate density to establish tree canopy closure within 5 years.

Maintenance. The Reclamation Plan's maintenance tasks and schedule are generally adequate with two exceptions. The Reclamation Plan calls for a 3-year maintenance period, which is inadequate for a restoration of this nature, especially due to dry and sandy soils. The significant ecological values of the location also require a longer period of monitoring. AES recommends a minimum of 5 years of maintenance and monitoring after mining is completed, as discussed below.

Year 3 maintenance recommends a prescribed burn. While AES agrees that prescribed burning is an appropriate maintenance technique for the prairie portions of the site, Year 3 may be premature for a burn due to low fuel accumulation due to the site's dry and sandy soils. The plan should provide flexibility to wait until Year 4 or 5 to burn, based on the site's response to restoration and maintenance activities.

Monitoring and Performance Standards. Performance standards were neither rigorous nor prescriptive, especially for Years 2 and 3. In particular, acceptable areal cover by seeded native species is not specified nor is the permissible areal cover of non-native and invasive plants.

For year 1 monitoring (page 22) the Reclamation Plan states that, "Seedlings of at least 3 native grasses and 3 native forbs should be widely dispersed through the seeded area." The term "widely dispersed" must be defined and agreed to by the City. There is also no mention of an acceptable area of bare ground during Year 1. The standard metric for assessing disturbed sites to ensure adequate soil stabilization is that no areas of bare soil larger than 3x3 feet shall exist within the restoration area.

For year 2 monitoring (page 23) the Reclamation Plan states, "Prairie sites will generally be dominated by cool season native grasses..." The term "dominated" needs to be defined and agreed to by the City. There is also no mention of an acceptable area of bare ground during Year 2.

Year 3 Monitoring (page 23) is unclear regarding the performance standards to be achieved. These require defining and approval by the City.

No monitoring is proposed beyond Year 3. Given the presence of invasive plants already on and adjacent to the site, it is likely that future invasions by non-native plants and noxious weeds will occur beyond Year 3. Likewise, erosion may occur on the site over time, requiring stabilization. Not addressing erosion could result in slope failure and degradation of downslope/downstream water quality and habitat.

More specific and rigorous performance standards are necessary to ensure the success of the reclamation, and consequences for not meeting performance standards should be specified (e.g., City should require remedial action followed by City review and approval prior to release of performance bond).

Other Issues Addressed by the DEIS

According to the RSDD, several items were screened and removed from further review. Most of the issues identified in the RSDD were addressed in the DEIS. However, several issues were not addressed, and many additional issues were not addressed adequately. RSDD-identified topics to be included in the EIS are listed below, followed by AES' sufficiency review of each topic. We did not address issues that are not explicitly listed below.

Item 9 – Land Use/Potential Environmental Hazards/Reclamation Plan. The RSDD states that the DEIS is to provide a detailed description of the reclamation plan for the site. The Reclamation Plan provided in the DEIS (Appendix A.2) addressed many issues regarding gravel mine reclamation; however, several issues were not addressed adequately. The Reclamation Plan was discussed above.

Item 10 – Cover Types. The site is located in a region containing many high-quality native plant communities. Significant land cover types in the proposed mining area consist of two plant communities:

- White Pine-Hardwood Forest, BC Rank (good quality)
- Maple-Basswood Forest, BC Rank (good quality)

Adjacent to proposed mining area are additional native plant communities, including:

- White Pine-Hardwood Forest, BC Rank (good quality)
- Maple-Basswood Forest, BC Rank (good quality)
- Black Ash swamp Seepage Subtype, No Rank
- Mesic Southern Cliff (Maderite Cliff), No Rank

It is unclear in the DEIS whether construction of the proposed earthen berms on the west and south edges of the mine would extend beyond the proposed mining and reclamation boundary, and in particular, it is unclear if construction, maintenance, and/or removal of the berms will impact any previously unmined forest areas. If berm activities will impact previously unmined forest, this would represent additional loss of native White pine-hardwood forest and Maple-basswood forest. Also, if the berms are to be removed post-mining, this will again disturb and open up the adjacent forest to edge effects.

Item 11—including 11a—Fish, Wildlife, and Ecologically-Sensitive Resources, and Item 11b—Threatened and Endangered Species. The MNDNR Natural Heritage Information System (NHIS) identified 70 records of rare plants, animals, fishes, reptiles, mussels, and native plant community occurrences within a 1-mile radius of the Site. This high density of rare natural features underscores the ecological significance of the site and its vicinity. Of the 70 records, the MNDNR Natural Heritage Program staff determined that the following state-listed species would have the potential to occur on the Site and, if present, would have the potential to be affected by project activities:

- Kitten-tails (*Besseyia bullii*; Minnesota Threatened)
- Bog blue grass (*Poa paludigena*; Minnesota Threatened)
- American ginseng (*Panax quinquefolius*; Minnesota Special Concern)
- Red-shouldered hawk (*Buteo lineatus*; Minnesota Special Concern)
- Blanding's turtle (*Emydoidea blandingii*; Minnesota Threatened)
- Several threatened and endangered species of mussels occurring within the St. Croix River

Surveys conducted for Blanding's Turtle, Red-shouldered Hawk, and rare plants did not identify these species on the Zavoral site. However, three raptors were observed and recorded during the call-response surveys for Red-shouldered hawks within the Site during the May 2010 surveys, including two Red-tailed hawks (*Buteo jamaicensis*) and one Bald eagle (*Haliaeetus leucocephalus*, Minnesota Special Concern).

A population of 33 Butternut (*Juglans cinerea*) trees, a Minnesota Special Concern tree species, was identified on the property. Of these 33 trees, only one healthy specimen found on the site; the rest of the Butternut trees showed signs of infection by Butternut Canker (*Sirococcus clavigignenti-juglandacearum*). Based on DEIS Figure 24, approximately 13 of these Special Concern trees (all located in the southern portion of the proposed mining area) will be destroyed during mining activities. According to the MNDNR, "A species is considered a species of special concern if, although the species is not endangered or threatened, it is extremely uncommon in Minnesota, or has unique or highly specific habitat requirements and deserves careful monitoring of its status (MNDNR, 2007)."

The DEIS addresses several issues regarding fauna, flora, and their associated habitats; however, mining immediately adjacent to a National Park easement (providing no buffer) and the removal of part of a Minnesota Department of Natural Resources (MNDNR)-identified Regionally Significant Ecological Area (RSEA) are not addressed.

The St. Croix National Scenic Riverway and associated National Park and easements will be adversely affected by the proposed mine because no buffer is provided between the active mine and the edge of the easement, which is part of a MNDNR-defined Regionally Significant Ecological Area and part of a larger block of habitat that contains many wildlife species, including rare plants and animals (see Appendix A).

The DEIS focuses only on the site and direct impacts from changes in land cover and habitat conversion. Discussion is lacking regarding the site's larger ecological context, rare species located near and adjacent to the site, and impacts likely to result from habitat fragmentation and edge effects, including noise impacts to wildlife (see Item 24 below).

Despite the regional significance of the location, coordination between the client and the NPS, MNDNR, and USFWS was not apparent beyond the 2008 and the 2011 Natural Heritage Database request letters to the MNDNR. AECOM has not yet received a response from their 2011 request letter; therefore, current MNDNR rare natural feature records associated with the site have not been considered in the DEIS.

The MNDNR has requested that Blanding's Turtle mitigation measures be applied to the project. However, it is unclear whether Tiller plans to implement any of these measures or if they will be required by the City to comply with this MNDNR request.

Item 12 – Physical Impacts on Water Resources. The DEIS does not address the RSDD-specified issue of the reversibility of potential impacts. If impacts to surface waters occur, repair and restoration techniques should be specified as well as the anticipated degree and timeframe for ecosystem recovery.

Item 13 – Water Use. AES did not assess this issue, but note that on page ES-6 there is an omission under Subalternative 3A where no gpd is listed in the last line.

Item 16 – Erosion and Sedimentation. The DEIS does not address the RSDD-specified issue of specific measures (e.g., BMPs) that will be implemented to avoid, minimize or mitigate identified impacts. Many techniques commonly referred to as BMPs have limited value in controlling erosion and sedimentation; therefore, the specific measures proposed should be listed and described, as required by the RSDD.

Zavoral Creek is a significant resource, supporting 400+ Brook Trout per mile of stream, based on MNDNR survey data. Water quality is excellent and water temperatures are fairly stable at around 10.5 C on average. The stream, however, is relatively small, with average flows of 3-4 cfs and a mean depth of 1-2 inches. Given its small water volume, the stream has little capacity to absorb pollution, and the Brook Trout are highly sensitive to pollution, such as sediment. Sediment pollution to Zavoral Creek is a possibility given that a portion of the proposed mined area will drain directly to the creek. There is one mention in the DEIS that two silt fences will be erected, possibly with vegetation filter strip, but without a specific location. Elsewhere the DEIS states that a single silt fence will be erected. Given the highly sensitive nature of Zavoral Creek, the City should require that erosion control include a detailed plan to construct and monitor erosion control BMPs in order to prevent discharge of pollution to Zavoral Creek during active mining.

Item 17—Surface Water Quality and Quantity. The DEIS does not address the RSDD-specified issues of:

- a) identifying and mapping the location of springs in the project area and areas of potential impact;
- b) providing water quality data for Middle Creek and South Creek; and
- c) quantifying impacts of specific pollutants (e.g., phosphorus, TSS, heavy metals, PAHs, VOCs, temperature) on receiving waters.

The DEIS should describe how sediment and other pollution from inadequately management mine runoff may affect Brook Trout and aquatic macroinvertebrates in Zavoral Creek. It should also discuss how the vegetation at spring discharge points, such as the Black Ash Seepage Swamp, could be affected by changed in groundwater discharge.

Page ES-18 of the DEIS states, “The reduction of surface water flow and increase in infiltration would benefit cold water species in Zavoral Creek, such as trout,” and page ES-19 states, “The Project would improve infiltration, resulting in slightly improved base flow conditions for the seeps, springs, and creeks, enhancing the ability of area creeks to support aquatic life, including cold water species such as trout.” These environmental changes are not clearly beneficial to the springs and trout. The site currently experiences little surface runoff, and increased internal drainage within the mine pit may lead to ponding and subsequent warming of spring recharge waters (based on historical mine conditions illustrated in Figure 2). This could raise the temperature of nearby springs and creeks (including Zavoral Creek), adversely affecting trout and other cold-water species. The DEIS should estimate the potential for warm ponded water in the mine to warm the streams and springs that receive groundwater discharge from the mine site.

Item 24 – Odors, Noise and Dust. The DEIS does not address in detail the RSDD-specified issue of describing noise sensitive areas and habitats. Addressing noise sensitive areas and habitats requires the identification and discussion of sensitive wildlife species in the area, which are not limited to the DEIS-discussed state-listed species would have the potential to occur on the Site and, if present, would have the potential to be affected by Project activities. For example, many territorial species of songbirds have been shown to be very sensitive to even low levels of noise and several are documented to nest on the nearby Falls Creek Scientific and Natural Area and should be expected in the National Park Service easement adjacent to the mine site². Neither this issue nor the effect on these species is addressed in the DEIS. Noise, which is a type of edge effect (see below) can result in extensive indirect impacts to certain species.

² Forman, R.T.T. et al. 2003. Road ecology: Science and solutions. Island Press, Washington D.C.

Item 26 – Visual Impacts. Visual impacts should address not only human receptors, but also sensitive wildlife species. Visual impacts of clearing vegetation and active mining should be discussed and assessed in relation to wildlife impacts.

Potential Mitigation Measures in the DEIS

The DEIS presents numerous “potential” mitigation measures, summarized on page ES-35 and 5-1. AES believes that many if not all should be required by the City of Scandia prior to approving mining at the site. The DEIS also contains many recommendations that it states “should” be implemented or are “recommended.” This provides little clarity and no assurance that these mitigation measures will indeed be implemented and enforced. A list of mitigation measures agreed to by the mine operator and City should be provided with the Final DEIS.

Below are the DEIS’s potential mitigation measures related to AES’s ecological review. For each one, AES provides comments.

1. Require Tiller to provide a funding mechanism to conduct any and all required monitoring at the Site.
 - AES agrees that secure funding is necessary to ensure the approved monitoring is conducted. This should be in the form of a performance bond or similar mechanism. This monitoring should be conducted by a qualified restoration ecologist operating independently of Tiller in order to ensure objectivity.
2. Require a vegetation establishment and monitoring period of at least 5 years after completion of the Project.
 - The Reclamation Plan calls for a 3-year monitoring period, which is inadequate for a restoration of this nature, especially due to dry and sandy soils. AES agrees a minimum of 5 years of monitoring and maintenance, as discussed above) should be required in all reclamation areas.
3. Develop an adaptive management plan to address long-term management issues.
 - AES agrees a site-specific adaptive management plan is important to the long-term success of the reclamation.
4. Identify the responsible party and funding source for active long-term stewardship of the Site.
 - AES agrees this long-term stewardship funding is critical to the long-term success of the reclamation.
5. Monitor the proposed transplanting of native White pine trees to verify maintenance and watering and to assess survival rates. If survival rates do not fall within a predetermined range established by the City, replacement trees should be provided by Tiller.
 - AES agrees monitoring, survivorship requirements, and replacement requirements are important. However, tree planting zones and densities need to be defined and established in the field in order to determine an appropriate survivorship rate.
6. Establish specific criteria for measuring and defining reclamation success that are acceptable to the City (i.e., percent cover requirements for seeded native species; limits on aggressive native species, invasive and exotic species, and so on). The diversity of the proposed reclamation must be met in order for the cover type and wildlife habitat evaluations in this EIS to be acceptable.
 - As discussed above, AES agrees that performance standards require greater rigor and clarity to result in successful reclamation.

7. Specify actions that would be taken by Tiller if reclamation were determined not to be successful and conditions under which reseeding, overseeding, and/or spot seeding or other management methods would be required.
 - As discussed above, AES agrees that performance standards require greater rigor and clarity to result in successful reclamation.
8. Construct the berm on the south end of the Site as close to the mining and reclamation limits as possible. This would result in lower off-site peak flow rates and increased on-site infiltration.
 - As discussed above, it is unclear whether additional forest impacts will result due to the construction, planting, and potential removal of screening berms.
9. Require that the WCD monitoring point installed for the pump test and collection of baseline data in Zavoral Creek be monitored during the lifetime of the Project. This monitoring should be funded by Tiller.
 - AES agrees that this monitoring should be conducted, as should monitoring of Middle and South Creeks.
10. Monitor the Black ash swamp seepage subtype wetland boundary mapped by CCES (CCES January 2010) that established the baseline boundary of the seep along Zavoral ravine. This monitoring should be funded by Tiller.
 - AES agrees the wetland boundary should be monitored; however, quantitative vegetation data should also be collected from this sensitive native plant community since changes in water temperature and quality, if they occur, would affect the vegetation composition of the wetland more than the wetland's boundary.
11. Monitor the mitigation methods used at the Site to reduce emissions of fugitive dust for the life of the Project. Records of the sweeping and water application would be maintained to document the fugitive dust control measures. The City should require Tiller to provide a funding mechanism to conduct any and all City-required monitoring at the Site to confirm that sufficient dust control measures are being implemented.
 - AES agrees that such monitoring is warranted, especially with the proximity of sensitive rare wildlife species such as trout and mussels.
12. Require noise mitigation techniques, such as developing berms and screens for the Zavoral Site, are implemented. Tiller should provide a funding mechanism for monitoring.
 - AES agrees noise monitoring is important, as adverse effects on native songbirds and potentially other species are expected during the operation of the mine.
13. Monitor to ensure that the proposed screening and reclamation strategies are successfully implemented.
 - AES agrees monitoring is important to control visual impacts (to wildlife as well as humans), and monitoring to ensure proper implementation of the Reclamation Plan and maintenance regime is critical to the project's success and compliance with the DEIS.
14. Establish Minimum Topsoil/Manufactured Topsoil Thickness: Proposed topsoil thickness must be reviewed and approved by the City. Tiller proposes 4 inches, which is the minimum allowed by the City ordinance; a common industry standard is 6 inches. Six inches of topsoil/manufactured topsoil is preferred and it should not be tilled, to reduce the potential for compaction.
 - AES agrees 6 inches of topsoil is more appropriate for the site.
15. Test Site Soils: Once soils are tested, recommendations can then be made as to whether on-site soils could be modified to provide an acceptable topsoil. A qualified agronomist should evaluate

sand/silt/clay structure, fertility, and pH of on-site soils and make recommendations regarding its use as topsoil.

- AES agrees such testing is prudent, especially given the dry and sandy soils that will remain post-mining and the paucity of on-site topsoil.
16. There is limited topsoil available on the Zavoral Site due to past mining activities. As a result, the material at the Site would need to be modified to produce an engineered or manufactured topsoil as described in Tillers reclamation plan, or topsoil would need to be brought to the Site from other locations.
 - AES agrees that engineered topsoil is acceptable if it meets the specifications, and off-site topsoil would require assurances that it contains no weed seed.
 17. To provide a suitable planting medium for the establishment of vegetation at the Site, the City would need to develop a topsoil and/or manufactured topsoil specification that meets the needs for this and other mining proposals. Criteria need to be established for what materials are suitable and the City needs to have approval authority. A single source supplier of organic material (e.g., municipal leaf compost, yard waste recycling company) should be used to maintain consistency of imported material and to ensure uniformity in resulting manufactured soil. Standards also need to be established for the use of on-site or other topsoil to avoid the use of topsoil containing invasive or weed species.
 - AES agrees the topsoil specification is important to reclamation success, and assurances regarding absence of invasive weed seed should be required by the City.
 18. Describe Subgrade Preparation: The subgrade should be disked and amended with compost or other amendments as necessary. Placed topsoil/manufactured topsoil should not be disked. It would be preferable to disk the subgrade soils to eliminate a barrier/impedance between soil layers/horizons (i.e., create positive drainage and ensure groundwater recharge).
 - AES does not understand the rationale behind prohibiting topsoil disking. However, the approach recommended above is acceptable.
 19. Modify Seed Mix and Methods: The proposed seed mixes should require 100+ seeds per square foot of permanent native seed for successful establishment of natural areas. An inoculant should be used during seeding to improve growth. Native seed mixes should be installed using broadcast sowing on the soil surface given loamy-sandy soil types, followed by the installation of straw erosion control blanket (straw blanket North American Green [NAG S-75 type) rather than straw crimping.
 - AES agrees that the above requirements will contribute to successful native seeding.
 20. Modify Cover Crop Specification: The temporary cover crop and how the Site would be prepared for permanent seeding after the cover crop is established should be clearly specified. The steps that would be taken for the temporary to permanent seeding process if optimal timing is not achieved should be described. A higher frequency of mowing and herbicide treatment during the establishment period should be considered, three times during the growing season is recommended. Tiller's reclamation plan should include a list of acceptable herbicides. An adaptive management plan should be developed.
 - AES agrees that greater detail should be provided in the Reclamation Plan, as well as development of an adaptive management plan.
 21. Describe Tree Transplanting: Describe how many trees, their size, transplanting method, and the location, and arrangement of plantings. Consider savannah habitat as transition from native grassland to forest.

- As discussed previously in this report, tree planting details are lacking in the Reclamation Plan. In addition, a larger area of plantings is required due to the adjacent high-quality native forests located on the National Park Service easement and other locations at the proposed mine site.
22. Refine Invasive and Aggressive Native Species Control: Weedy species should be better defined (a list of such species has since been provided by the WCD through the PAC. In addition:
- a. Add spotted knapweed (extremely invasive) control.
 - b. Add management methods for common buckthorn control, which is one of the most critical tasks in forest management.
 - c. Add reed canary-grass control methods.
 - d. Identify methods to keep boxelder, quaking aspen, and eastern red cedar that are prone to being weedy in check.
 - e. Remove non-native honeysuckle species from the Site.
 - f. Add to overall forest management including the use of a rotational burn, with follow-up reed canary-grass management, to suppress the growth of nonnative woody species and encourage species diversity.
 - g. AES agrees that target invasive and non-native plants should be specified. Rotational burning can be an effective management tool when used properly, and is appropriate in portions of the site.
23. Establish Funding Mechanism: Tiller should provide a funding mechanism for the City to conduct any and all required monitoring at the Site to assess the success of proposed reclamation.
- AES agrees that Tiller-funded monitoring conducted by the City or another independent entity is prudent to ensure objective monitoring and reporting.
24. Specific criteria for measuring and defining success acceptable to the City need to be established (percent cover requirements for seeded native species, limits on aggressive native species, invasive and exotic species, and so on). Actions that would be taken by Tiller if reclamation were determined not to be successful need to be specified. Conditions under which reseeding, overseeding, and/or spot seeding are required should be identified.
- AES agrees that greater specificity regarding performance standards is required, as well as a discussion of remedial actions that will be taken if performance standards are not met.
25. Extend Monitoring Period: The City should consider extending the establishment and monitoring period to 5 years from 3 years as proposed by Tiller. An adaptive management plan should be developed.
- AES agrees that maintenance and monitoring should be conducted for at least 5 years due to the sites dry and sandy soils and the sensitivity of adjacent high-quality native habitats.
26. Address Long-Term Management: The City should address long-term management and identify related responsible party and funding source for active long-term stewardship of the Site.
- AES agrees that the site's adjacency to high-quality native habitats and a National Park Service easement warrants careful consideration regarding long-term stewardship. An appropriate, site-specific, long-term stewardship plan should be developed and funding secured to ensure its continuation.

ISSUES NOT ADDRESSED BY RSDD AND DEIS

Regional Ecological Context

The proposed mine is located adjacent to the St. Croix National Scenic Riverway and associated National Park easement (Map Exhibit 2). The nearby St. Croix River is classified as a National Wild and Scenic River. The proposed mining area extends to the St. Croix River District boundary, as well as to the edge of the St. Croix River bluff and three ravines leading down to the river. No buffer is proposed between the proposed mine and the easement.

The St. Croix River corridor is recognized as a major recreation area, as well as a regional flyway for migrating songbirds. The corridor provides habitat (including large, contiguous forest and other natural lands) that is important for interior forest birds, numerous raptor species, other area-sensitive wildlife, and many rare plants and animals.

A portion of the site is located within a high-quality Regionally Significant Ecological Area (RSEA) extending along the St. Croix National Scenic Riverway (Map Exhibit 1). RSEAs represent large natural and semi-natural habitats that have the potential to, and often do, provide critical habitat for many native species, including rare plants and animals. The RSEA also is in a Conservation Corridor defined by the MNDNR. The proposed mine would encroach upon this RSEA and the greater wildlife corridor extending up and down the St. Croix River Valley.

While some of these individual natural features and conservation lands are mentioned in the DEIS (page ES-15 and Figure 3), the regional ecological significance of the project area is not discussed. The site's regional ecological context includes high quality forests, the RSEAs, and the St. Croix River Valley's large habitat blocks and regionally-significant wildlife corridor (Map Exhibit 1).

Several significant public investments have been made for conservation in the vicinity of the proposed mine site (Map Exhibit 2). These public investments include William O'Brien State Park, Rutstrom State Wildlife Area, Falls Creek Scientific and Natural Area, Farmington Bottoms, and Wind in the Pines Park. The National Park Service easement that is adjacent to the mine also represents a public investment in conservation. The proposed project provides no buffer between the mine and the NPS easement associated with the adjacent National Park.

The site's location next to a National Park, within an RSEA and a DNR-defined conservation corridor, and among large and important public conservation areas underscores the environmental significance of the mine's location and vicinity and the sensitivity of the natural resources in the vicinity to adverse effects of development activities, including mining.

Historical Data Review

In order to better understand the site's ecological setting and historical context, AES reviewed historical vegetation maps, historical aerial photographs, and historical topographic maps.

Pre-European Vegetation Mapping. Prior to European settlement of the region (early-mid 1800s), the site was in a transition between aspen-oak land (on the very western edge of the site and extending to the west) and oak openings and barrens (the majority of the site and extending to the east) (Marschner, 1974). These plant communities contained vegetation associated with prairies and typically experienced regular fires (likely ignited by Native Americans). The canopy would not have been fully closed to acquire a description of

openings and barrens, which signifies canopy cover less than in a forest. Since European settlement, fire suppression has likely contributed to the more closed, mesic forest systems seen along the St. Croix River Valley today.

Historical Aerial Photos. Historical aerial photographs of the site were obtained from Historical Information Gatherers (HIG) in order to assess site conditions over time, particularly site conditions prior to past mining of the site. Photos were obtained from the following years: 1938, 1953, 1957, 1964, 1970, 1980, 1986, 1991, 1997, 2003, 2010 (Appendix B of this report). A discussion of each photo follows.

1938 – This photo indicates the majority of the proposed mining area had already been cleared for agricultural production as of the late 1930s. What the DEIS refers to as “Middle Creek” was more intact in 1938, with banks/slopes consisting of savanna and extending across the center of the proposed mining area to the east. The savanna area was likely grazed by livestock. What appeared to be a meandering ditch traversed the northwest portion of the proposed mining area, eventually discharging into Zavoral Creek. The ravines and bluffs located east of the proposed mining area appeared to consist of forest and moderately-dense savanna. What appears to be a small sand/gravel pit is evident in the southwest corner of the site (outside of the proposed mining area). Transportation infrastructure was already present around the site in 1938, including St. Croix Trail North (State Trunk Highway 95 [TH95]) and TH 97 to the west, Quinzel Avenue North to the south, and the Soo Line Railroad to the east.

1953 – This photo is similar to the 1938 photo with the notable exception that what appears to be a small sand/gravel pit is evident in the east-central portion of the proposed mining area. The previously evident sand/gravel pit in the southwest corner of the site appears to have been enlarged slightly since the 1938 photo.

1957 – This photo was similar to the 1953 photo with the notable exception that the sand/gravel pit in the east-central portion of the proposed mining area had been expanded to the north.

1964 - This photo was similar to the 1957 photo with no notable exceptions. The areas previously appearing as moderately-dense savanna (along Middle Creek and east of the proposed mining area) appear to have filled in, consisting of more closed canopy forest. This would have resulted if livestock grazing were stopped. It appears that some trees east of the southeast corner of the proposed mining area died or were removed since the 1957 photo.

1970 – Sand/gravel mining had expanded substantially since 1964, with the 1970 photo showing mining occupying the entire northeastern portion of the proposed mining. The ravine associated with Middle Creek had been encroached upon from mining expansion on the north, and what appeared to be a small test pit had been dug south of the Middle Creek ravine. The previously meandering ditch located in the northwest portion of the proposed mining area had been realigned as a straight ditch located along the northwest edge of the proposed mining area.

1980 - Sand/gravel mining had expanded further south and northwest since 1970. The upper reaches of Middle Creek had been cleared and traversed with unpaved roads. Trees and/or shrubs had grown up along the northwest ditch.

1986 – This color infrared aerial photo showed that mining had not expanded significantly since 1980. The main pit (in the northern portion of the proposed mining area) appeared deeper, but revegetation of some previously bare areas appeared to have occurred over the preceding six years.

1991 – Significant changes on the site were not conspicuous from the period 1986 to 1991.

1997 – Again, significant changes were not conspicuous since 1986. Several stockpiles located in the east-central portion of the proposed mining area appeared to have been partially excavated since 1991. Some of the mined areas appeared to be revegetating

2003 - Significant changes were not conspicuous since the 1997 photo. The mined areas continued to revegetate.

2010 – This last aerial photo in the sequence appeared very similar to the 2003 photo. Mined areas continued to revegetate. Figure 17 (Existing Land Cover Map) in the DEIS illustrates the extent of this revegetation

Historical Topographic Maps. Historical U.S. Geological Survey (USGS) topographic maps were reviewed, including the 1974 Scandia 7.5-minute map, the 1993 revised version of the same map, and the 2010 updated map (Appendix C of this report). The 1974 map illustrated the majority of the proposed mining area to consist of open (non-forested) land. “Gravel Pits” were identified in the northeast, east-central, and southeast portions of the proposed mining area, and unpaved roads were shown traversing the northeast and central portions of the proposed mining area connecting TH95 on the west to a small structure (likely a house) located on the bluffs east of the proposed mining area. A moderate-sized body of open water was shown near the center of the site, a smaller open water area was shown in the northeast portion of the proposed mining area, and a deep depression was shown just southwest of the larger open water area. Forest/woodland was shown east, north, and south of the proposed mining area, as well as in the formerly unmined area proposed to be mined by Zavoral.

The 1993 revised topographic map was very similar to the 1974 map in the site area, with two conspicuous exceptions. First, the larger body of open water in the proposed mining area was no longer shown. Second, the alignment of the site’s unpaved road had been changed through the proposed mining area; however, the road still connected TH95 to the small structure on the bluff.

The 2010 map (created using 2009 aerial photography, 2009 hydrography, and 2002 contour data) illustrated conditions similar to current site conditions; however, the road passing through the site ended in the southeast portion of the proposed mining area, near a small body of open water.

Summary of Historical Data Assessment. Based on our review of pre-European settlement vegetation (representative of the mid-1800s), historical aerial photos (1938-2010), and historical topographic maps (1974, 1993, and 2010), the site’s original vegetation was likely dominated by oak savanna. By 1938 and through 1964, the majority of the proposed mining area had already been converted to agricultural fields. Sand/gravel mining appears to have been at least intermittently active on the site by 1938 (when a small area in the southwest portion of the site appeared to have been mined). Mining was observed in the proposed mining area in the 1953 photo. Between 1964 and 1970 the sand and gravel operation expanded significantly. By 1980 there was an additional expansion of sand and gravel operations. From 1980-2010 little alteration of the site occurred, and natural revegetation progressed significantly on the mined areas.

Habitat Fragmentation

The Zavoral Mine site has naturally been recovering from previous mining activities for over 30 years. While the landscape of the mined portion of the site has obviously been altered, natural and semi-natural vegetation has colonized and developed, creating a diversity of habitats, including forests, woodlands, and grasslands with scattered trees. This process of revegetation has started to “fill in” the proposed mining area and

provide greater forest/woodland connectivity in the regional habitat corridor (Map Exhibit 1) and greater ecological buffering of adjacent high-quality native forest (Map Exhibit 3). The existing habitats within the proposed mining area, coupled with the adjacent, high quality native forests, currently provide nesting, foraging, and breeding habitat for native wildlife species, including small mammals, birds and insects. This process of passive revegetation has begun to mitigate some of the previous mine's direct impacts as well as its indirect impacts on the greater landscape. Left alone, these habitats would continue to evolve such that the entire proposed mining site would become a forest, expanding the contiguous forest habitat and widening the regional wildlife corridor.

The proposed mine would fragment local habitat as well as the regional wildlife corridor. Map Exhibit 3 illustrates the loss of forest and woodland that would result from the proposed mine, including 5.4 acres of native forest that was not cleared during previous mining activity, and 18.2 acres of woodland buffer that has passively revegetated on the site since mining ceased. Additionally 33.6 acres of other semi-natural habitat would be cleared and lost as a result of the mine. These habitat losses would reset the recovery of the site, which has been progressing for 30 years, and open up the adjacent high-quality native forests to indirect impacts, including a variety of edge effects, discussed below.

Edge Effects

While the DEIS addresses many direct ecological impacts that would be associated with the proposed mine, indirect impacts on ecological resources are not addressed adequately. Edge effects represent a suite of indirect impacts that occur adjacent to land use changes³. Edge effects that would be expected to occur as a result of the proposed mine include:

Noise Impacts. While described in the context of human receptors, the DEIS does not address noise impacts on wildlife. Research has shown that wildlife species such as some forest passerine birds (e.g., Wood Thrush, Ovenbird, Least Flycatcher, Yellow-throated Vireo, and Cerulean Warbler) are adversely affected by the increased noise levels that are predicted to occur as a result of the Zavoral Mine, as far as ¼- mile from the mine⁴. Forest breeding bird habitat of approximately 172 acres is expected to be affected by noise from the mine (Map Exhibit 4), based on noise modeling presented in the DEIS.

Visual Impacts. Mining equipment, hauling trucks, and decreased screening and buffering will disturb wildlife far beyond the edge of the mine pit.

Invasive Plant and Predator Impacts. Re-opening the forest edge to disturbance provides an opportunity to introduce many invasive plant species. Invasive plants are already abundant in several portions of the former mine site, leaving adjacent forests susceptible to their spread. Predators (e.g., raccoons, nest parasites) will also encroach further into the forest as the edges are cleared for mining. Edge effects vary significantly, depending on the site, adjacent topography and vegetation, and the species in question. The removal of 18.2 acres of woodland buffer opens the adjacent high quality forest to edge effects (Map Exhibit 4).

³ For example, see Hilty, J.A., W.Z. Lidicker, Jr. and A.M. Merenlender. 2006. Corridor ecology: the science and practice of linking landscapes for biodiversity conservation. Island Press, Washington DC; and Liu, J., V. Hull, A.T. Morzillo and J.A. Wiens. Sources, sinks and sustainability. Cambridge University Press, New York NY.

⁴ Forman, R.T.T. et al. 2003. Road ecology: science and solutions. Island Press, Washington DC.

Microclimate Impacts. Groundcover plant life changes are expected in adjacent forests due to warming and drying following the opening of the forest edge with clearing for the mine operation.

Surface Water Impacts. While precautions are addressed in the DEIS, the potential remains for site erosion and sedimentation to Zavoral Creek and the St. Croix River. In 1970 or 1971, a significant erosion event originating from the Zavoral Mine site deposited a substantial amount of sediment in Middle Creek and the St. Croix River. This is of significant concern due to the presence of federally-listed mussel species in the St. Croix River, just downstream of the Zavoral site. Sediment-laden or warm runoff flowing to Zavoral Creek has the potential to affect the Brook Trout population.

Impacts to Shallow Groundwater. The DEIS indicates that flows are likely to increase in adjacent springs and seeps due to the greater infiltration that is expected to occur after mining is completed. These springs and seeps support Southern mesic cliff communities, Black ash seepage swamps, and trout habitat in Zavoral Creek. However, changes in water temperature (e.g., warming due to increased infiltration rates) and water chemistry (e.g., due to chloride application for dust control) was not investigated yet could adversely affect these plant communities and thermally-sensitive fish.

CONCLUSIONS

AES's investigations identified significant findings related to the site's ecological context, sensitive natural resources, potential ecological impacts, and potential mitigation strategies:

1. The proposed mine is located immediately adjacent to the St. Croix National Scenic Riverway and associated National Park easement. No buffer is proposed between the proposed mine and the easement. A portion of the site is located within a high-quality Regionally Significant Ecological Area (RSEA) extending along the St. Croix National Scenic Riverway.
2. The RSEA also is in a Conservation Corridor defined by the MN DNR. This wildlife corridor contains numerous rare plant and animal species. The proposed mine would compromise the Conservation Corridor directly by clearing 5.4 acres of native forest, increasing habitat fragmentation, and removing tree and shrub vegetation that has developed for over 30 years since mining ceased.
3. The mine will indirectly affect the adjacent high quality forests and National Park easement. Indirect effects are due to:
 - a. Opening of the forest edge which allows movement into the forest by invasive shrub species (buckthorn, honeysuckle) and also mammal and birds that prey on the young and eggs of forest birds, reducing the productivity of these species;
 - b. Noise, which DEIS modeling has indicated will result in perceptible change in noise levels at over a quarter mile from the mine. The resulting noise level will be perceived by forest nesting songbirds and likely result in lower density of nests in the noise-affected area;
 - c. Dust and warmed air caused by the mine's microclimate, which changes the plant life of the forests adjacent to the mine at distances of up to 50m; and
 - d. Visual disturbance to adjacent wildlife from vehicles and people, reducing wildlife's use of adjacent areas at varying distances depending on species.
4. The RSDD did not require the assessment of alternative mining sites, but AES believes there is justification to address alternative sites.
 - a. Alternative site consideration and analysis is a standard requirement of the Minnesota Environmental Quality Board's environmental review process;

- b. The justification for not assessing alternative sites (RSDD, pg 8, “Alternative Sites”) is inadequate;
 - c. Numerous unencumbered deposits of sand and gravel are available to serve the metropolitan area outside the St. Croix National Scenic Riverway, associated bluffs, and MN DNR-identified RSEAs and Conservation Corridors.
5. While not pristine, the proposed mining area will eliminate 64 acres of semi-natural grasslands, woodlands and forests. Review of historical aerial photographs and topographic maps indicate that in 1938 approximately 80% of the proposed mine had been cleared for agriculture and was being cultivated. Much of this cleared area was then mined, which increased the disturbed area to approximately 90% of the proposed mine. However, the site has passively restored itself beginning over 30 years ago. This vegetation currently protects the RSEA by buffering it from traffic noise and movement, microclimate effects, and to some extent incursions by invasive plants or predators on forest-nesting birds.
6. The addition of Subalternative 3A in the most recent version of the DEIS is welcome. Shortening the active period of mining and accelerating reclamation will reduce the length of time that wildlife is displaced and edge effects are experienced by the Conservation Corridor and RSEA. However, we do not know the site’s post-mining use (e.g., residential development, additional mining), which could negatively affect the Conservation Corridor and RSEA by its own direct or indirect impacts.
7. The DEIS describes erosion and stormwater runoff management for Zavoral Creek, but the proposed BMPs are not adequate for the high quality of this stream and the potential risk posed by the proposed mine. Zavoral Creek is a small creek (1-2 inches deep); therefore, it cannot absorb much pollution. Brook trout (estimated at 400+ per stream mile) are highly sensitive species, especially with regard to temperature and sediment. The 1970-1971 mass erosion event at the site underscores the site’s susceptibility to erosion and the potential for significant sediment loadings to adjacent creeks and the St. Croix River.
8. The mine has the potential to permanently alter groundwater flow to high quality plant communities and the trout stream, Zavoral Creek. Mining will alter surface hydrology, infiltration rates and water chemistry. Subtle changes in water flows and chemistry can be detrimental to sensitive plant communities (e.g., Black Ash Seepage Swamps), trout and aquatic macroinvertebrates. Scott Alexander’s findings will inform potential impacts to these natural resources.

RECOMMENDATIONS

AES’s makes these recommendations based on its work:

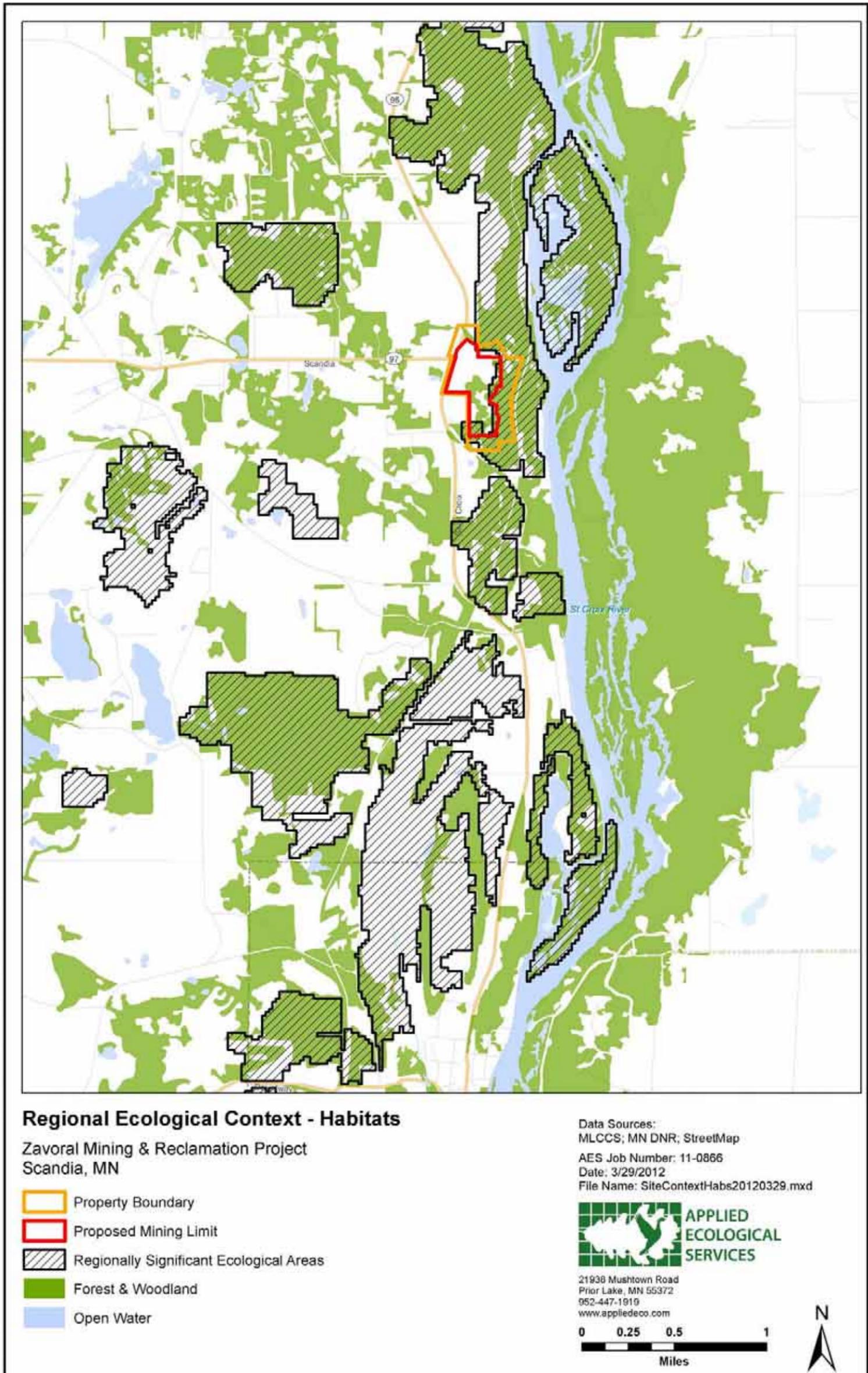
1. Request that alternative mining sites be considered, as mandated by the MN EQB.
2. Review whether the mine should proceed based on the consideration of more appropriate mining sites.
3. Review whether the mine should proceed in all areas of the proposed mine footprint based on considerations of the affect on groundwater flow to Zavoral Creek and spring-fed plant communities.
4. If the mine is approved, propose a reduced mine footprint that protects the forest edges of the proposed mining area. These are the most ecologically sensitive portions of the mine. Protecting these edges would significantly benefit the site and region.
5. Restore the forest edges of the mine with natural grades and intensive tree and shrub plantings to close the forest edge within 5 years.

6. Permanently protect the forest edge with a conservation easement held by a third party that is competent to ensure monitoring and protection in perpetuity.
7. Require that the applicant specify which Potential Mitigation Measures in the DEIS will be used and what actions will be taken if the measures are not implemented appropriately.
8. Request that the Reclamation Plan:
 - a. Contain greater specificity for tree and shrub plantings and performance standards;
 - b. Extend the monitoring and management period to at least 5 years;
 - c. Ensure funding to implement the plan and monitor the site; and
 - d. Include an adaptive management plan.

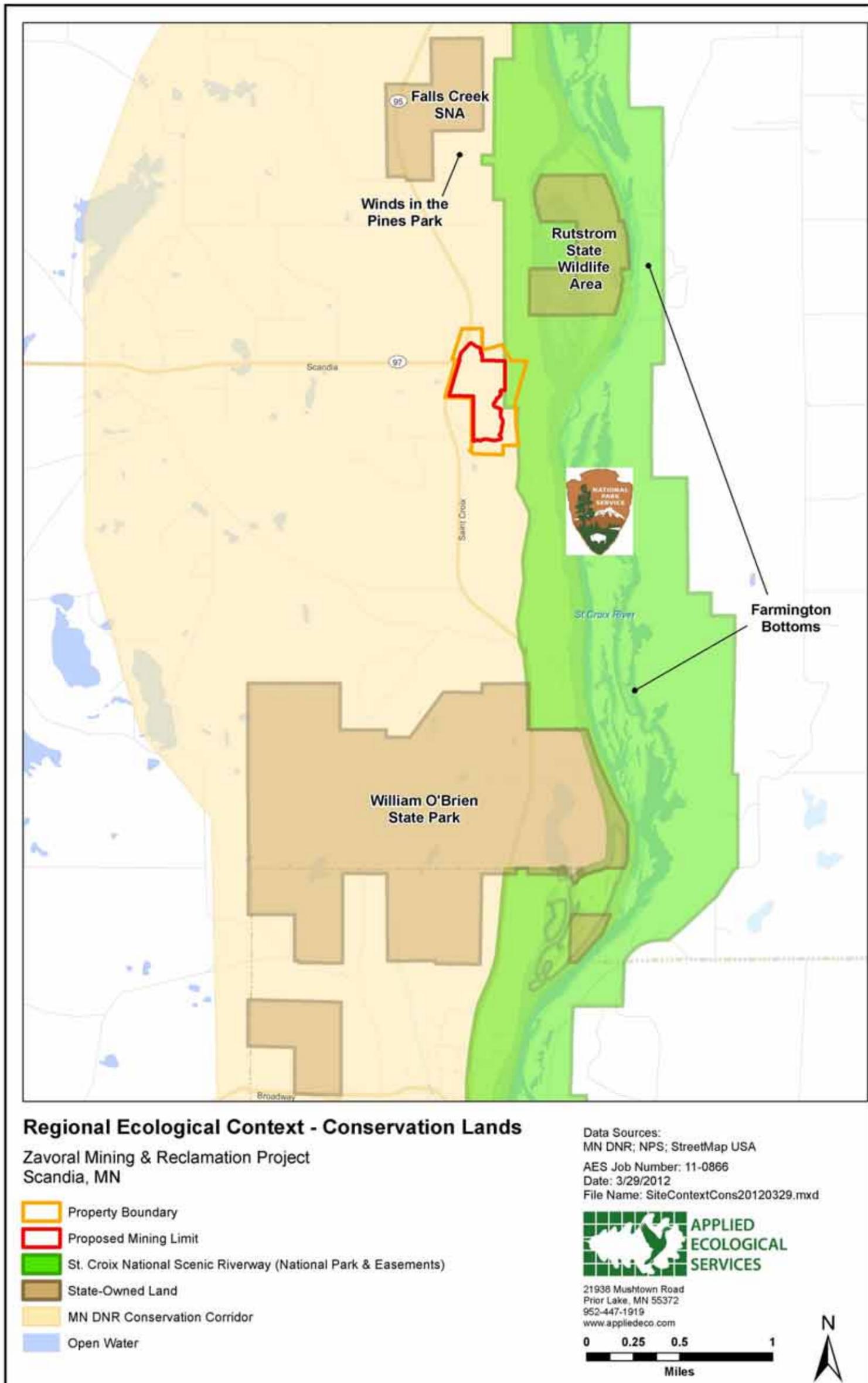
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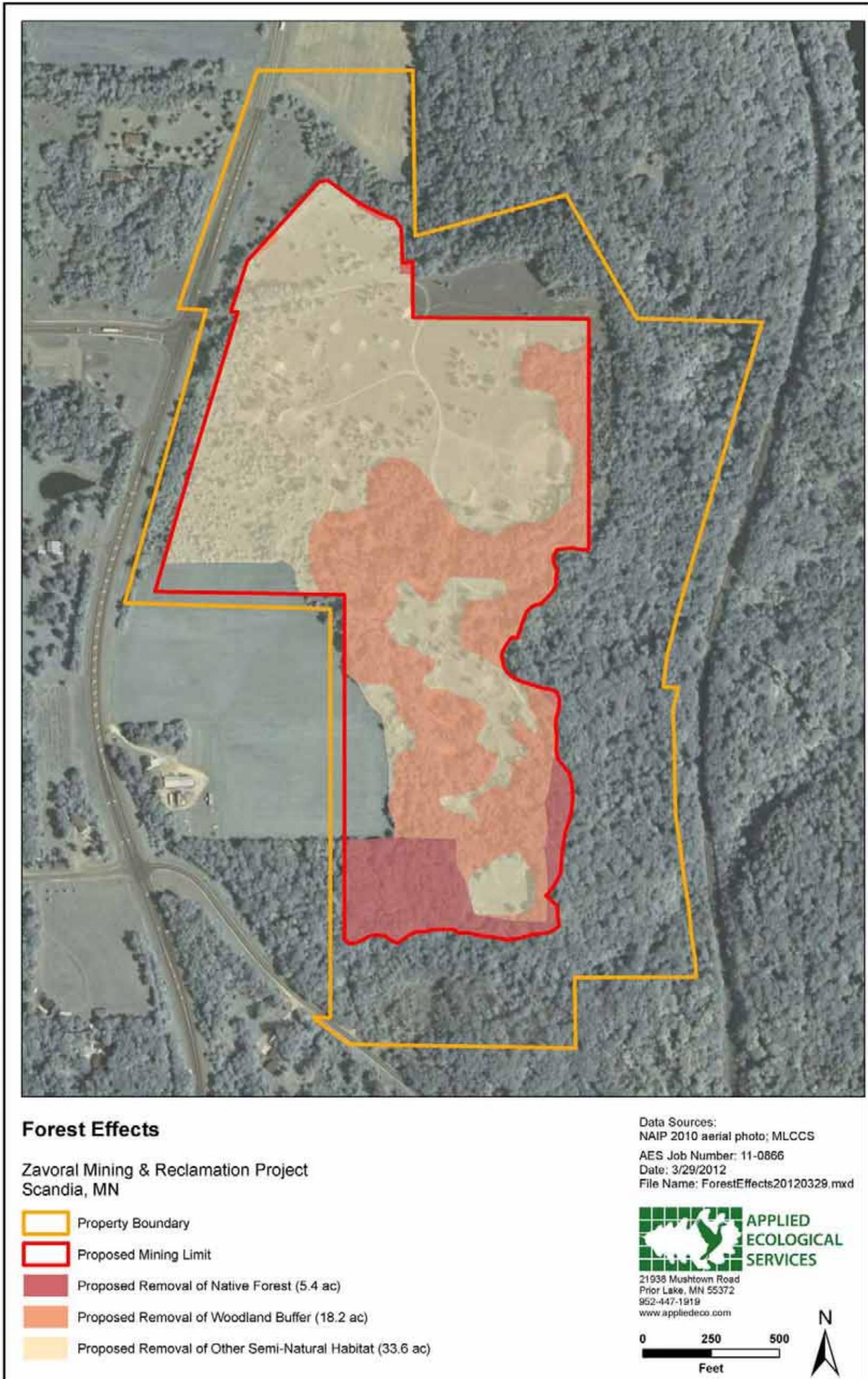
Map Exhibit 1. Regional Ecological Context – Habitats



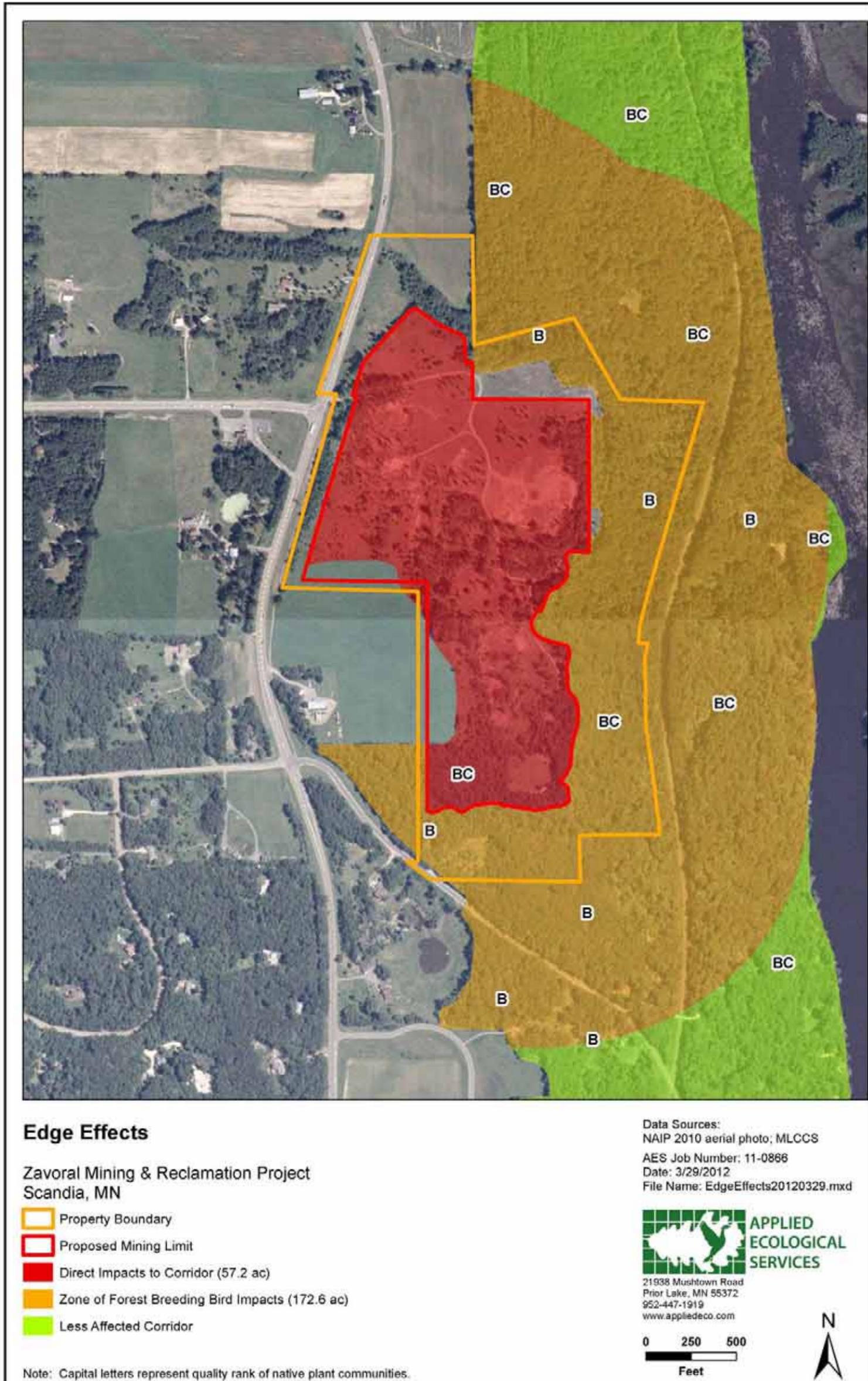
Map Exhibit 2. Regional Ecological Context – Conservation Lands



Map Exhibit 3. Forest Effects



Map Exhibit 4. Edge Effects



Appendix A. Endangered, Threatened, Special Concern, SGCN, and Declining Bird Species in the Region around the Zavoral Mine

| Scientific Name | Common Name | Name Type | Name Category | Subcategory | NHIS Database (within 5 mi. of Zavoral site) | SGCN | BBS Declining Bird Species | State Legal Status | Federal Legal Status |
|-----------------------------------|----------------------------|------------|-------------------|-------------|--|------|-------------------------------|--------------------------|----------------------------|
| <i>Microtus ochrogaster</i> | Prairie Vole | Zoological | Vertebrate Animal | MAMMAL | | X | | SPC | NL |
| <i>Mustela nivalis</i> | Least Weasel | Zoological | Vertebrate Animal | MAMMAL | | X | | SPC | NL |
| <i>Myotis septentrionalis</i> | Northern Myotis | Zoological | Vertebrate Animal | MAMMAL | X | X | | SPC | NL |
| <i>Pipistrellus subflavus</i> | Eastern Pipistrelle | Zoological | Vertebrate Animal | MAMMAL | X | X | | SPC | NL |
| <i>Reithrodontomys megalotis</i> | Western Harvest Mouse | Zoological | Vertebrate Animal | MAMMAL | | X | | NL | NL |
| <i>Spermophilus franklinii</i> | Franklin's Ground Squirrel | Zoological | Vertebrate Animal | MAMMAL | X | | | NL | NL |
| <i>Spilogale putorius</i> | Eastern Spotted Skunk | Zoological | Vertebrate Animal | MAMMAL | | X | | THR | NL |
| <i>Taxidea taxus</i> | American Bager | Zoological | Vertebrate Animal | MAMMAL | | X | | | |
| <i>Taxidea taxus</i> | American Badger | Zoological | Vertebrate Animal | MAMMAL | | X | | NL | NL |
| <i>Ammodramus henslowii</i> | Henslow's Sparrow | Zoological | Vertebrate Animal | BIRD | | X | | END | NL |
| <i>Ammodramus savannarum</i> | Grasshopper Sparrow | Zoological | Vertebrate Animal | BIRD | | X | X | NL | NL |
| <i>Anas acuta</i> | Northern Pintail | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Anas discors</i> | Blue-winged Teal | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Anas rubripes</i> | American Black Duck | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Ardea herodias</i> | Great Blue Heron | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Arenaria interpres</i> | Ruddy Turnstone | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Aythya affinis</i> | Lesser Scaup | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Bartramia longicauda</i> | Upland Sandpiper | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Botaurus lentiginosus</i> | American Bittern | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Buteo lineatus</i> | Red-shouldered Hawk | Zoological | Vertebrate Animal | BIRD | X | X | | SPC | NL |
| <i>Calidris alpina</i> | Dunlin | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Calidris fuscicollis</i> | White-rumped Sandpiper | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Calidris pusilla</i> | Semipalmated Sandpiper | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Caprimulgus vociferus</i> | Whip-poor-will | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Carduelis pinus</i> | Pine Siskin | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Carpodacus purpureus</i> | Purple Finch | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Catharus fuscescens</i> | Veery | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Catharus ustulatus</i> | Swainson's Thrush | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Chaetura pelagica</i> | Chimney Swift | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Chlidonias niger</i> | Black Tern | Zoological | Vertebrate Animal | BIRD | | X | X | NL | NL |
| <i>Chordeiles minor</i> | Common Nighthawk | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Circus cyaneus</i> | Northern Harrier | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Cistothorus palustris</i> | Marsh Wren | Zoological | Vertebrate Animal | BIRD | | X | X | NL | NL |
| <i>Cistothorus platensis</i> | Sedge Wren | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Coccothraustes vespertinus</i> | Evening Grosbeak | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Coccyzus erythrophthalmus</i> | Black-billed Cuckoo | Zoological | Vertebrate Animal | BIRD | | X | X | NL | NL |
| <i>Colaptes auratus</i> | Northern Flicker | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Contopus cooperi</i> | Olive-sided Flycatcher | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Contopus virens</i> | Eastern Wood-pewee | Zoological | Vertebrate Animal | BIRD | | X | X | NL | NL |
| <i>Cygnus buccinator</i> | Trumpeter Swan | Zoological | Vertebrate Animal | BIRD | | X | | THR | NL |
| <i>Dendroica cerulea</i> | Cerulean Warbler | Zoological | Vertebrate Animal | BIRD | X | X | | SPC | NL |

| Scientific Name | Common Name | Name Type | Name Category | Subcategory | NHIS Database (within 5 mi. of Zavoral site) | SGCN | BBS Declining Bird Species | State Legal Status | Federal Legal Status |
|-----------------------------------|-------------------------------|------------|-------------------|-------------|--|------|-------------------------------|--------------------------|----------------------------|
| <i>Dolichonyx oryzivorus</i> | Bobolink | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Empidonax minimus</i> | Least Flycatcher | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Empidonax traillii</i> | Willow Flycatcher | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Empidonax vireescens</i> | Acadian Flycatcher | Zoological | Vertebrate Animal | BIRD | | X | | SPC | NL |
| <i>Falco peregrinus</i> | Peregrine Falcon | Zoological | Vertebrate Animal | BIRD | | X | | THR | NL |
| <i>Falco sparverius</i> | American Kestrel | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Fulica americana</i> | American Coot | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Gallinago gallinago</i> | Common Snipe | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Gallinula chloropus</i> | Common Moorhen | Zoological | Vertebrate Animal | BIRD | | X | | SPC | NL |
| <i>Gavia immer</i> | Common Loon | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Haliaeetus leucocephalus</i> | Bald Eagle | Zoological | Vertebrate Animal | BIRD | X | X | | SPC | THR |
| <i>Hylocichla mustelina</i> | Wood Thrush | Zoological | Vertebrate Animal | BIRD | | X | X | NL | NL |
| <i>Icterus galbula</i> | Baltimore Oriole | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Ixobrychus exilis</i> | Least Bittern | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Lanius ludovicianus</i> | Loggerhead Shrike | Zoological | Vertebrate Animal | BIRD | | X | X | THR | NL |
| <i>Limnodromus griseus</i> | Short-billed Dowitcher | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Limosa haemastica</i> | Hudsonian Godwit | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Melanerpes erythrocephalus</i> | Red-headed Woodpecker | Zoological | Vertebrate Animal | BIRD | | X | X | NL | NL |
| <i>Melospiza georgiana</i> | Swamp Sparrow | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Mergus serrator</i> | Red-breasted Merganser | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Nycticorax nycticorax</i> | Black-crowned Night-heron | Zoological | Vertebrate Animal | BIRD | | X | X | NL | NL |
| <i>Parula americana</i> | Northern Parula | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Phalaropus tricolor</i> | Wilson's Phalarope | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Pheucticus ludovicianus</i> | Rose-breasted Grosbeak | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Pluvialis dominica</i> | American Golden-plover | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Podiceps grisegena</i> | Red-necked Grebe | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Progne subis</i> | Purple Martin | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Protonotaria citrea</i> | Prothonotary Warbler | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Rallus limicola</i> | Virginia Rail | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Recurvirostra americana</i> | American Avocet | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Sayornis phoebe</i> | Eastern Phoebe | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Scolopax minor</i> | American Woodcock | Zoological | Vertebrate Animal | BIRD | | X | X | NL | NL |
| <i>Seiurus aurocapillus</i> | Ovenbird | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Seiurus motacilla</i> | Louisiana Waterthrush | Zoological | Vertebrate Animal | BIRD | X | X | | SPC | NL |
| <i>Setophaga magnolia</i> | Magnolia Warbler | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Setophaga virens</i> | Black-th. Green Warbler | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Sphyrapicus varius</i> | Yellow-bellied Sapsucker | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Spiza americana</i> | Dickcissel | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Spiza americana</i> | Dickcissel | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Spizella pusilla</i> | Field Sparrow | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Stelgidopteryx serripennis</i> | Northern Rough-winged Swallow | Zoological | Vertebrate Animal | BIRD | | X | X | NL | NL |
| <i>Sterna forsteri</i> | Forster's Tern | Zoological | Vertebrate Animal | BIRD | | X | | SPC | NL |
| <i>Sturnella magna</i> | Eastern Meadowlark | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |

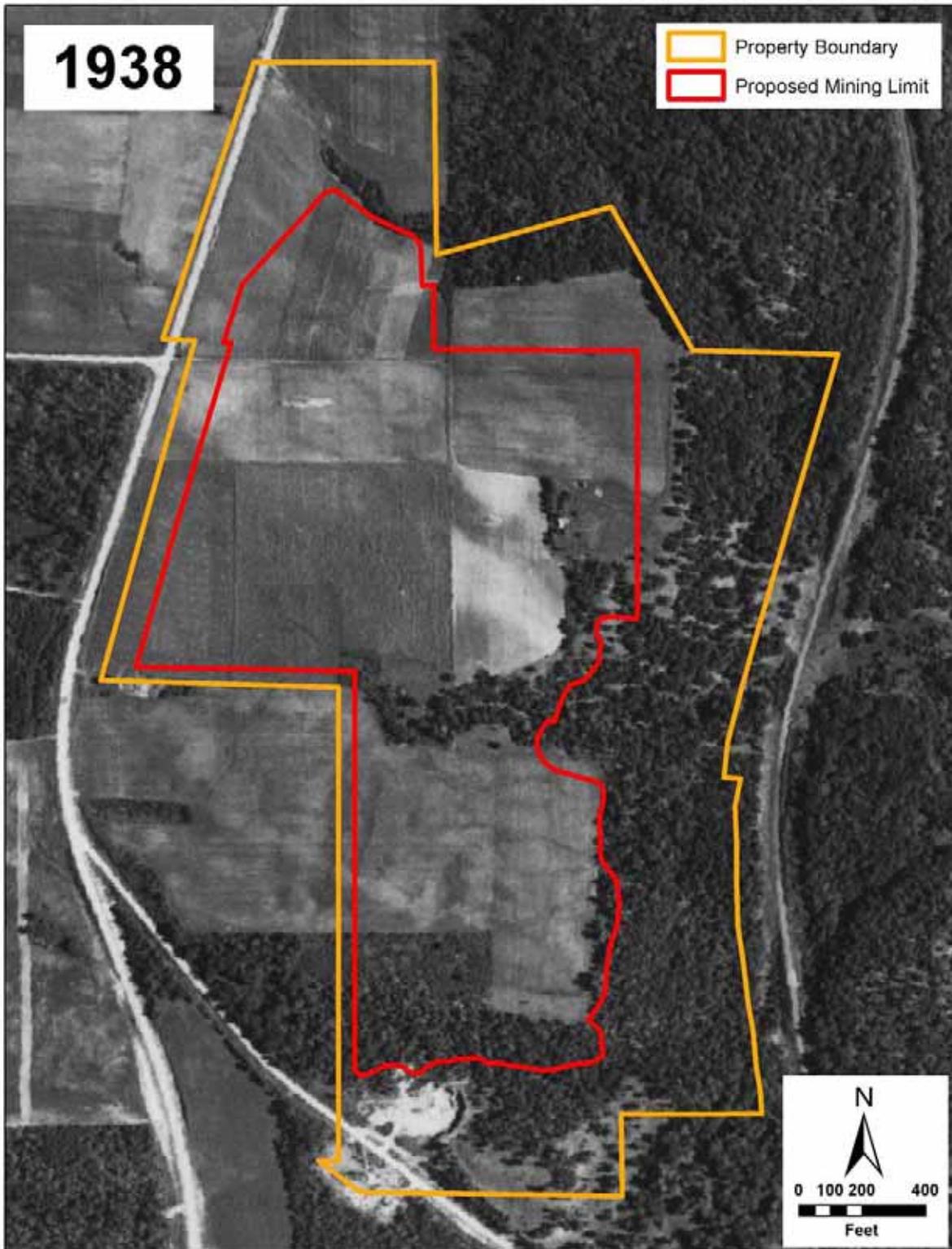
| Scientific Name | Common Name | Name Type | Name Category | Subcategory | NHIS Database (within 5 mi. of Zavoral site) | SGCN | BBS Declining Bird Species | State Legal Status | Federal Legal Status |
|-------------------------------------|----------------------------|------------|-------------------|-------------|--|------|-------------------------------|--------------------------|----------------------------|
| <i>Toxostoma rufum</i> | Brown Thrasher | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Tringa melanoleuca</i> | Greater Yellowlegs | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Tringa semipalmata</i> | Willet | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Troglodytes troglodytes</i> | Winter Wren | Zoological | Vertebrate Animal | BIRD | | X | X | NL | NL |
| <i>Tryngites subruficollis</i> | Buff-breasted Sandpiper | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Tyrannus tyrannus</i> | Eastern Kingbird | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Tyrannus verticalis</i> | Western Kingbird | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Vermivora pinus</i> | Blue-winged Warbler | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Vireo bellii</i> | Bell's Vireo | Zoological | Vertebrate Animal | BIRD | | X | | NL | NL |
| <i>Wilsonia canadensis</i> | Canada Warbler | Zoological | Vertebrate Animal | BIRD | | | X | | |
| <i>Wilsonia citrina</i> | Hooded Warbler | Zoological | Vertebrate Animal | BIRD | X | X | | SPC | NL |
| <i>Acipenser fulvescens</i> | Lake Sturgeon | Zoological | Vertebrate Animal | FISH | X | X | | SPC | NL |
| <i>Alosa chrysochloris</i> | Skipjack Herring | Zoological | Vertebrate Animal | FISH | | X | | SPC | NL |
| <i>Ammocrypta asprella</i> | Crystal Darter | Zoological | Vertebrate Animal | FISH | | X | | SPC | NL |
| <i>Ammocrypta clara</i> | Western Sand Darter | Zoological | Vertebrate Animal | FISH | | X | | NL | NL |
| <i>Anguilla rostrata</i> | American Eel | Zoological | Vertebrate Animal | FISH | | X | | NL | NL |
| <i>Aphredoderus sayanus</i> | Pirate Perch | Zoological | Vertebrate Animal | FISH | | X | | SPC | NL |
| <i>Campostoma oligolepis</i> | Largescale Stoneroller | Zoological | Vertebrate Animal | FISH | | X | | NL | NL |
| <i>Cycleptus elongatus</i> | Blue Sucker | Zoological | Vertebrate Animal | FISH | X | X | | SPC | NL |
| <i>Etheostoma asprigene</i> | Mud Darter | Zoological | Vertebrate Animal | FISH | | X | | NL | NL |
| <i>Etheostoma chlorosoma</i> | Bluntnose Darter | Zoological | Vertebrate Animal | FISH | | X | | NL | NL |
| <i>Hybognathus nuchalis</i> | Mississippi Silvery Minnow | Zoological | Vertebrate Animal | FISH | | X | | NL | NL |
| <i>Ichthyomyzon gagei</i> | Southern Brook Lamprey | Zoological | Vertebrate Animal | FISH | X | X | | SPC | NL |
| <i>Ictiobus niger</i> | Black Buffalo | Zoological | Vertebrate Animal | FISH | | X | | SPC | NL |
| <i>Lampetra appendix</i> | American Brook Lamprey | Zoological | Vertebrate Animal | FISH | | X | | NL | NL |
| <i>Lepomis gulosus</i> | Warmouth | Zoological | Vertebrate Animal | FISH | | X | | NL | NL |
| <i>Lepomis megalotis</i> | Longear Sunfish | Zoological | Vertebrate Animal | FISH | | X | | NL | NL |
| <i>Macrhybopsis aestivalis</i> | speckled chub | Zoological | Vertebrate Animal | FISH | | X | | NL | NL |
| <i>Moxostoma carinatum</i> | River Redhorse | Zoological | Vertebrate Animal | FISH | | X | | NL | NL |
| <i>Moxostoma valenciennesi</i> | Greater Redhorse | Zoological | Vertebrate Animal | FISH | | X | | NL | NL |
| <i>Notropis amnis</i> | Pallid Shiner | Zoological | Vertebrate Animal | FISH | | X | | SPC | NL |
| <i>Notropis anogenus</i> | Pugnose Shiner | Zoological | Vertebrate Animal | FISH | | X | | SPC | NL |
| <i>Opsopoeodus emiliae</i> | Pugnose Minnow | Zoological | Vertebrate Animal | FISH | X | X | | NL | NL |
| <i>Percina evides</i> | Gilt Darter | Zoological | Vertebrate Animal | FISH | X | X | | SPC | NL |
| <i>Polyodon spathula</i> | Paddlefish | Zoological | Vertebrate Animal | FISH | | X | | THR | NL |
| <i>Scaphirhynchus platyrhynchus</i> | Shovelnose Sturgeon | Zoological | Vertebrate Animal | FISH | | X | | NL | NL |
| <i>Apalone mutica</i> | Smooth Softshell | Zoological | Vertebrate Animal | REPTILE | X | X | | SPC | NL |
| <i>Chelydra serpentina</i> | Common Snapping Turtle | Zoological | Vertebrate Animal | REPTILE | | X | | SPC | NL |
| <i>Clemmys insculpta</i> | Wood Turtle | Zoological | Vertebrate Animal | REPTILE | X | X | | THR | NL |
| <i>Cnemidophorus sexlineatus</i> | Six-lined Racerunner | Zoological | Vertebrate Animal | REPTILE | | X | | NL | NL |
| <i>Coluber constrictor</i> | Eastern Racer | Zoological | Vertebrate Animal | REPTILE | | X | | SPC | NL |
| <i>Crotalus horridus</i> | Timber Rattlesnake | Zoological | Vertebrate Animal | REPTILE | | X | | THR | NL |
| <i>Elaphe vulpina</i> | Western Fox Snake | Zoological | Vertebrate Animal | REPTILE | X | | | NL | NL |

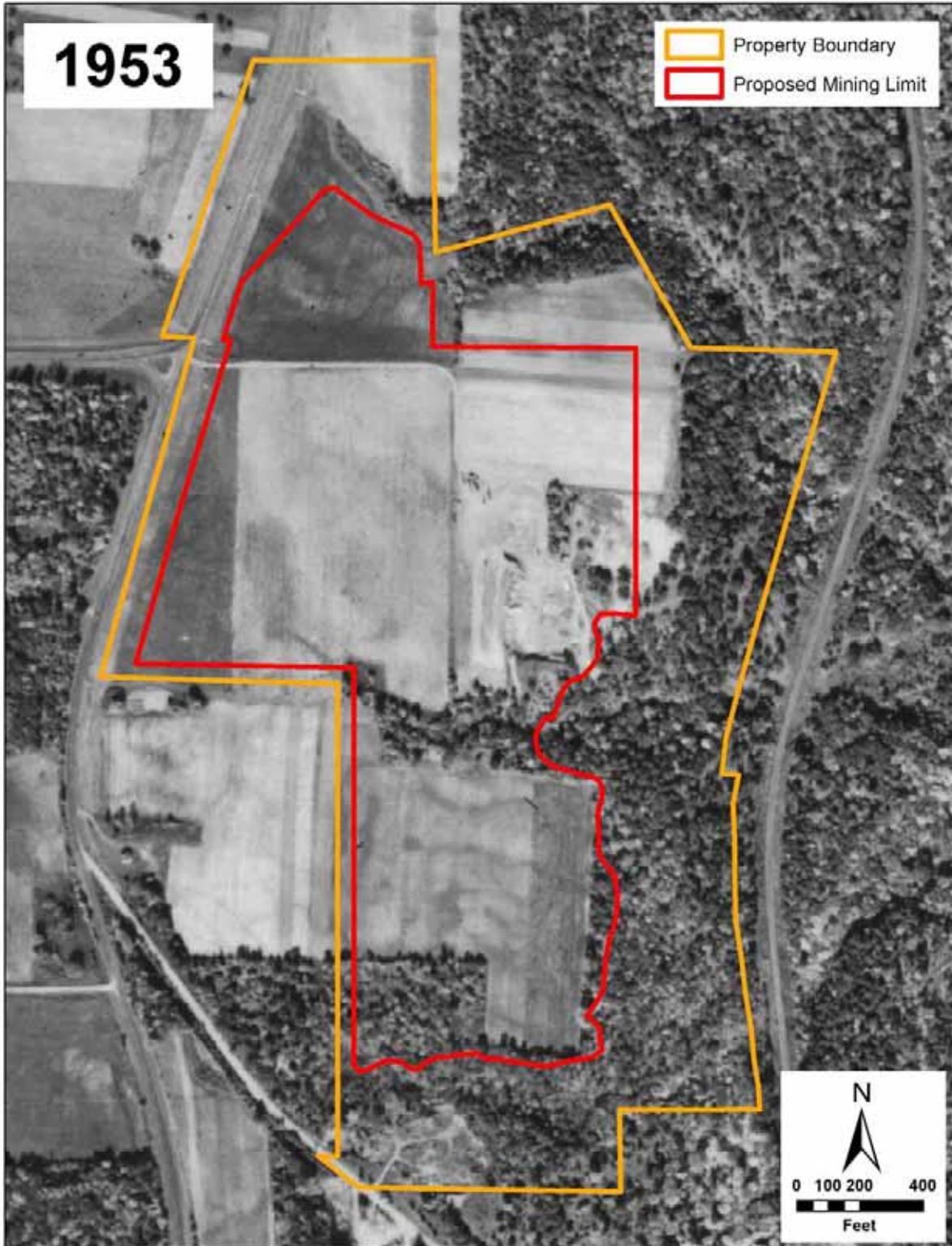
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|---|-------------------------------|------------|---------------------|--------------|--|------|-------------------------------|--------------------------|----------------------------|
| <i>Elaphe vulpina</i> | Eastern Fox Snake | Zoological | Vertebrate Animal | REPTILE | | X | | NL | NL |
| <i>Emydoidea blandingii</i> | Blanding's Turtle | Zoological | Vertebrate Animal | REPTILE | X | X | | THR | NL |
| <i>Eumeces fasciatus</i> | Five-lined Skink | Zoological | Vertebrate Animal | REPTILE | | X | | SPC | NL |
| <i>Heterodon nasicus</i> | Western Hognose Snake | Zoological | Vertebrate Animal | REPTILE | | X | | SPC | NL |
| <i>Heterodon platirhinus</i> | Eastern Hognose Snake | Zoological | Vertebrate Animal | REPTILE | | X | | NL | NL |
| <i>Lampropeltis triangulum</i> | Milk Snake | Zoological | Vertebrate Animal | REPTILE | | X | | NL | NL |
| <i>Liochlorophis vernalis</i> | Smooth Green Snake | Zoological | Vertebrate Animal | REPTILE | | X | | NL | NL |
| <i>Pituophis catenifer</i> | Gopher Snake | Zoological | Vertebrate Animal | REPTILE | | X | | SPC | NL |
| <i>Acris crepitans</i> | Northern Cricket Frog | Zoological | Vertebrate Animal | AMPHIBIAN | | X | | END | NL |
| <i>Hemidactylium scutatum</i> | Four-toed Salamander | Zoological | Vertebrate Animal | AMPHIBIAN | | X | | SPC | NL |
| <i>Necturus maculosus</i> | Common Mudpuppy | Zoological | Vertebrate Animal | AMPHIBIAN | | X | | NL | NL |
| <i>Marpissa grata</i> | A Jumping Spider | Zoological | Invertebrate Animal | SPIDER | | X | | SPC | NL |
| <i>Metaphidippus arizonensis</i> | A Jumping Spider | Zoological | Invertebrate Animal | SPIDER | | X | | SPC | NL |
| <i>Paradamoetas fontana</i> | A Jumping Spider | Zoological | Invertebrate Animal | SPIDER | | X | | SPC | NL |
| <i>Aflexia rubranura</i> | Red Tailed Prairie Leafhopper | Zoological | Invertebrate Animal | INVERTEBRATE | | X | | SPC | NL |
| <i>Asynarchus rossi</i> | A Caddisfly | Zoological | Invertebrate Animal | INVERTEBRATE | | X | | SPC | NL |
| <i>Atrytone arogos</i> | Arogos Skipper | Zoological | Invertebrate Animal | INVERTEBRATE | | X | | SPC | NL |
| <i>Cicindela patruela patruela</i> | A Tiger Beetle | Zoological | Invertebrate Animal | INVERTEBRATE | | X | | SPC | NL |
| <i>Epidemia epixanthe michiganensis</i> | Bog Copper | Zoological | Invertebrate Animal | INVERTEBRATE | | X | | NL | NL |
| <i>Erynnis persius</i> | Persius Duskywing | Zoological | Invertebrate Animal | INVERTEBRATE | | X | | END | NL |
| <i>Euphyes bimacula illinois</i> | Two-spotted Skipper | Zoological | Invertebrate Animal | INVERTEBRATE | | X | | NL | NL |
| <i>Gomphus viridifrons</i> | Green-faced Clubtail | Zoological | Invertebrate Animal | INVERTEBRATE | | X | | NL | NL |
| <i>Hesperia leonardus leonardus</i> | Leonard's Skipper | Zoological | Invertebrate Animal | INVERTEBRATE | | X | | SPC | NL |
| <i>Lycaena epixanthe michiganensis</i> | Bog Copper | Zoological | Invertebrate Animal | INVERTEBRATE | X | | | | |
| <i>Ophiogomphus susbehcha</i> | St. Croix Snaketail | Zoological | Invertebrate Animal | INVERTEBRATE | X | X | | SPC | NL |
| <i>Papaipema beeriana</i> | Blazing Star Stem Borer | Zoological | Invertebrate Animal | INVERTEBRATE | | X | | NL | NL |
| <i>Speyeria idalia</i> | Regal Fritillary | Zoological | Invertebrate Animal | INVERTEBRATE | | X | | SPC | NL |
| <i>Actinonaias ligamentina</i> | Mucket mussel | Zoological | Invertebrate Animal | MOLLUSC | X | X | | THR | NL |
| <i>Alasmidonta marginata</i> | Elktoe | Zoological | Invertebrate Animal | MOLLUSC | X | X | | THR | NL |
| <i>Arcidens confragosus</i> | Rock Pocketbook | Zoological | Invertebrate Animal | MOLLUSC | | X | | END | NL |
| <i>Cumberlandia monodonta</i> | Spectaclecase | Zoological | Invertebrate Animal | MOLLUSC | X | X | | THR | CAND |
| <i>Cyclonaias tuberculata</i> | Purple Wartyback | Zoological | Invertebrate Animal | MOLLUSC | X | X | | THR | NL |
| <i>Ellipsaria lineolata</i> | Butterfly | Zoological | Invertebrate Animal | MOLLUSC | X | X | | THR | NL |
| <i>Elliptio crassidens</i> | Elephant-ear | Zoological | Invertebrate Animal | MOLLUSC | X | X | | END | NL |
| <i>Elliptio dilatata</i> | Spike | Zoological | Invertebrate Animal | MOLLUSC | X | X | | SPC | NL |
| <i>Epioblasma triquetra</i> | Snuffbox | Zoological | Invertebrate Animal | MOLLUSC | X | X | | THR | NL |
| <i>Fusconaia ebena</i> | Ebonysnail | Zoological | Invertebrate Animal | MOLLUSC | X | X | | END | NL |
| <i>Lampsilis higginsii</i> | Higgins Eye | Zoological | Invertebrate Animal | MOLLUSC | X | X | | END | END |
| <i>Lampsilis teres</i> | Yellow Sandshell | Zoological | Invertebrate Animal | MOLLUSC | | X | | END | NL |
| <i>Lasmigona costata</i> | Fluted-shell | Zoological | Invertebrate Animal | MOLLUSC | X | X | | SPC | NL |
| <i>Ligumia recta</i> | Black Sandshell | Zoological | Invertebrate Animal | MOLLUSC | X | X | | SPC | NL |
| <i>Megaloniais nervosa</i> | Washboard | Zoological | Invertebrate Animal | MOLLUSC | | X | | THR | NL |
| <i>Obovaria olivaria</i> | Hickorynut | Zoological | Invertebrate Animal | MOLLUSC | X | X | | SPC | NL |

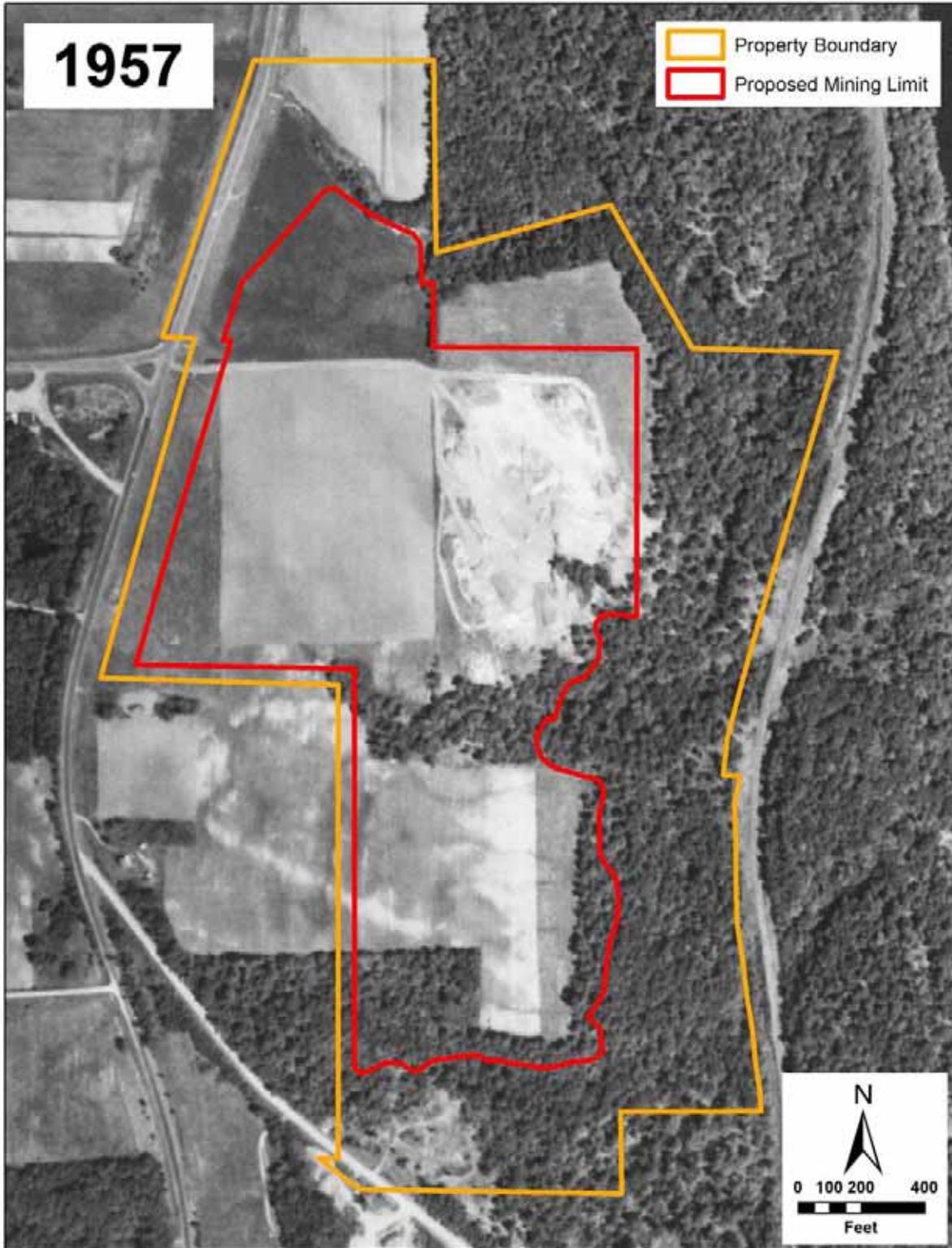
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|--|---|------------|-----------------------|-------------|--|------|-------------------------------|--------------------------|----------------------------|
| <i>Plethobasus cyphus</i> | Sheepnose | Zoological | Invertebrate Animal | MOLLUSC | | X | | END | CAND |
| <i>Pleurobema coccineum</i> | Round Pigtoe | Zoological | Invertebrate Animal | MOLLUSC | X | X | | THR | NL |
| <i>Quadrula fragosa</i> | Winged Mapleleaf | Zoological | Invertebrate Animal | MOLLUSC | X | X | | END | END |
| <i>Quadrula metanevra</i> | Monkeyface | Zoological | Invertebrate Animal | MOLLUSC | X | X | | THR | NL |
| <i>Quadrula nodulata</i> | Wartyback | Zoological | Invertebrate Animal | MOLLUSC | | X | | END | NL |
| <i>Simpsonaias ambigua</i> | Salamander Mussel | Zoological | Invertebrate Animal | MOLLUSC | X | X | | THR | NL |
| <i>Tritogonia verrucosa</i> | Pistolgrip | Zoological | Invertebrate Animal | MOLLUSC | X | X | | THR | NL |
| <i>Truncilla donaciformis</i> | Fawnsfoot | Zoological | Invertebrate Animal | MOLLUSC | X | X | | NL | NL |
| <i>Venustaconcha ellipsiformis</i> | Ellipse | Zoological | Invertebrate Animal | MOLLUSC | | X | | THR | NL |
| Bat Colony | Bat Concentration | Zoological | Animal Assemblage | NA | X | | | | |
| Colonial Waterbird Nesting Area | Colonial Waterbird Nesting Site | Zoological | Animal Assemblage | NA | X | | | | |
| Freshwater Mussel Concentration Area | Mussel Sampling Site | Zoological | Animal Assemblage | NA | X | | | | |
| <i>Besseyia bullii</i> | Kitten-tails | Botanical | Vascular Plant | NA | X | | | | |
| <i>Botrychium matricariifolium</i> | Matricary Grapefern | Botanical | Vascular Plant | NA | X | | | | |
| <i>Botrychium oneidense</i> | Blunt-lobed Grapefern | Botanical | Vascular Plant | NA | X | | | | |
| <i>Botrychium simplex</i> | Least Moonwort | Botanical | Vascular Plant | NA | X | | | | |
| <i>Carex typhina</i> | Cattail Sedge | Botanical | Vascular Plant | NA | X | | | | |
| <i>Cephalanthus occidentalis</i> | Buttonbush | Botanical | Vascular Plant | NA | X | | | | |
| <i>Desmodium nudiflorum</i> | Stemless Tick-trefoil | Botanical | Vascular Plant | NA | X | | | | |
| <i>Echinochloa walteri</i> | Walter's Barnyard Grass | Botanical | Vascular Plant | NA | X | | | | |
| <i>Fimbristylis autumnalis</i> | Autumn Fimbristylis | Botanical | Vascular Plant | NA | X | | | | |
| <i>Hieracium longipilum</i> | Long-bearded Hawkweed | Botanical | Vascular Plant | NA | X | | | | |
| <i>Hydrocotyle americana</i> | American Water-pennywort | Botanical | Vascular Plant | NA | X | | | | |
| <i>Lycopus virginicus</i> | Virginia Water Horehound | Botanical | Vascular Plant | NA | X | | | | |
| <i>Panax quinquefolius</i> | American Ginseng | Botanical | Vascular Plant | NA | X | | | | |
| <i>Platanthera flava</i> var. <i>herbiola</i> | Tuberclad Rein-orchid | Botanical | Vascular Plant | NA | X | | | | |
| <i>Poa paludigena</i> | Bog Bluegrass | Botanical | Vascular Plant | NA | X | | | | |
| <i>Scirpus georgianus</i> | Georgia Bulrush | Botanical | Vascular Plant | NA | X | | | | |
| Black Ash - (Red Maple) Seepage Swamp Type | Black Ash - (Red Maple) Seepage Swamp | Ecological | Terrestrial Community | NA | X | | | | |
| Dry Bedrock Bluff Prairie (Southern) Type | Dry Bedrock Bluff Prairie (Southern) | Ecological | Terrestrial Community | NA | X | | | | |
| Gravel/Cobble Beach (River) Type | Gravel/cobble Beach (River) | Ecological | Terrestrial Community | NA | X | | | | |
| Lake bed | Lake Bed | Ecological | Terrestrial Community | NA | X | | | | |
| Native Plant Community, Undetermined Class | Native Plant Community, Undetermined Class | Ecological | Terrestrial Community | NA | X | | | | |
| Red Oak - Sugar Maple - Basswood - (Bluebead Lily) Forest Type | Red Oak - Sugar Maple - Basswood - (Bluebead Lily) Forest | Ecological | Terrestrial Community | NA | X | | | | |
| Sand Beach (Inland Lake) Type | Sand Beach (Inland Lake) | Ecological | Terrestrial Community | NA | X | | | | |
| Seepage Meadow/Carr; Tussock Sedge Subtype | Seepage Meadow/Carr, Tussock Sedge Subtype | Ecological | Terrestrial Community | NA | X | | | | |
| Silver Maple - (Virginia Creeper) Floodplain Forest Type | Silver Maple - (Virginia Creeper) Floodplain Forest | Ecological | Terrestrial Community | NA | X | | | | |
| Southern Wet Ash Swamp Class | Southern Wet Ash Swamp | Ecological | Terrestrial Community | NA | X | | | | |
| Spikerush - Bur Reed Marsh (Northern) Type | Spikerush - Bur Reed Marsh (Northern) | Ecological | Terrestrial Community | NA | X | | | | |

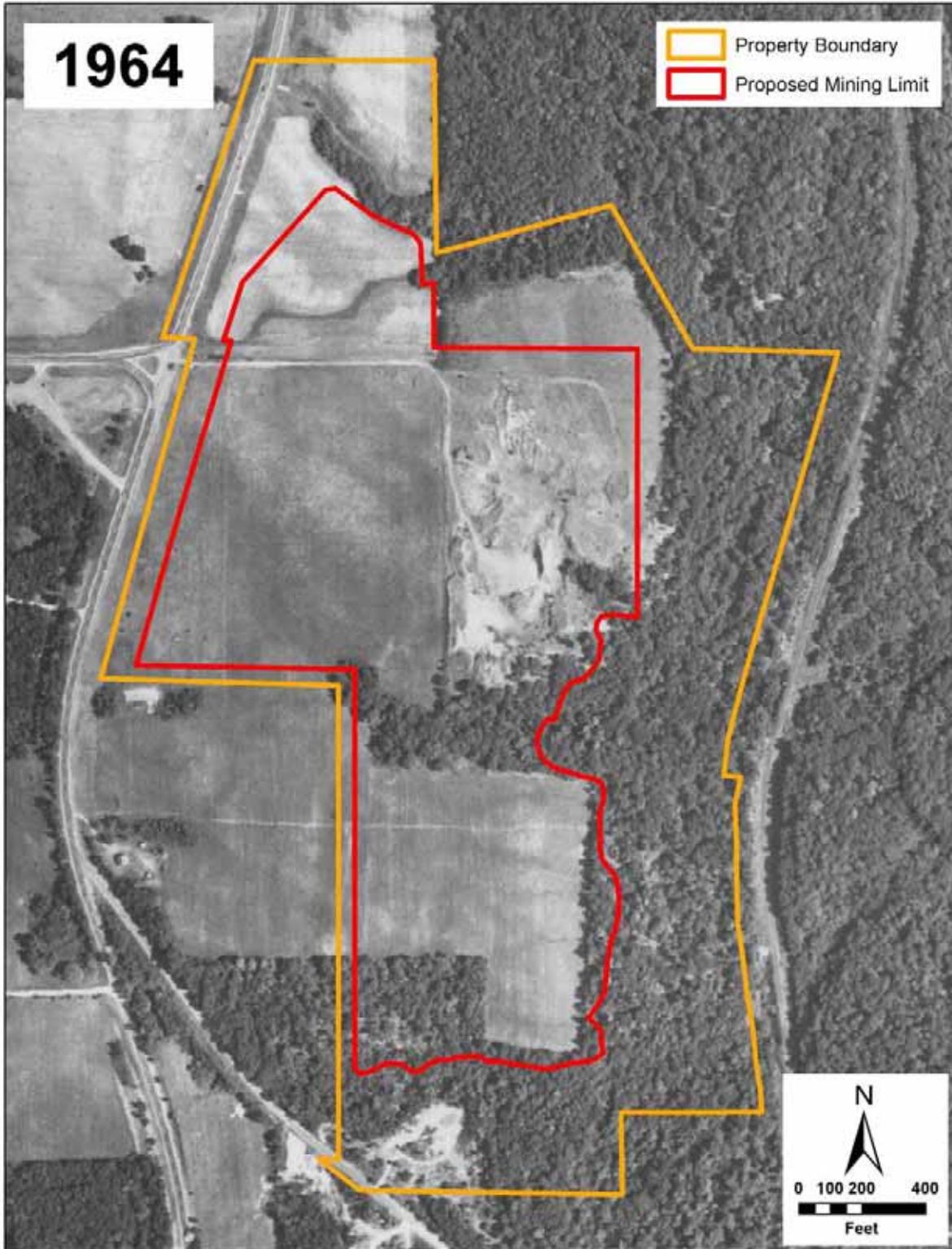
| Scientific Name | Common Name | Name Type | Name Category | Subcategory | NHIS Database (within 5 mi. of Zavoral site) | SGCN | BBS Declining Bird Species | State Legal Status | Federal Legal Status |
|--|---------------------------|------------|-----------------------|-------------|--|------|-------------------------------|--------------------------|----------------------------|
| Tamarack Swamp (Southern) Type | Tamarack Swamp (Southern) | Ecological | Terrestrial Community | NA | X | | | | |
| <p>Notes: NHIS = Natural Heritage Information System (MNDNR) SGCN = Species of Greatest Conservation Need BBS = Breeding Bird Survey END = Endangered THR = Threatened SPC = Special Concern CAND = candidate species (under consideration) NL = not listed</p> | | | | | | | | | |

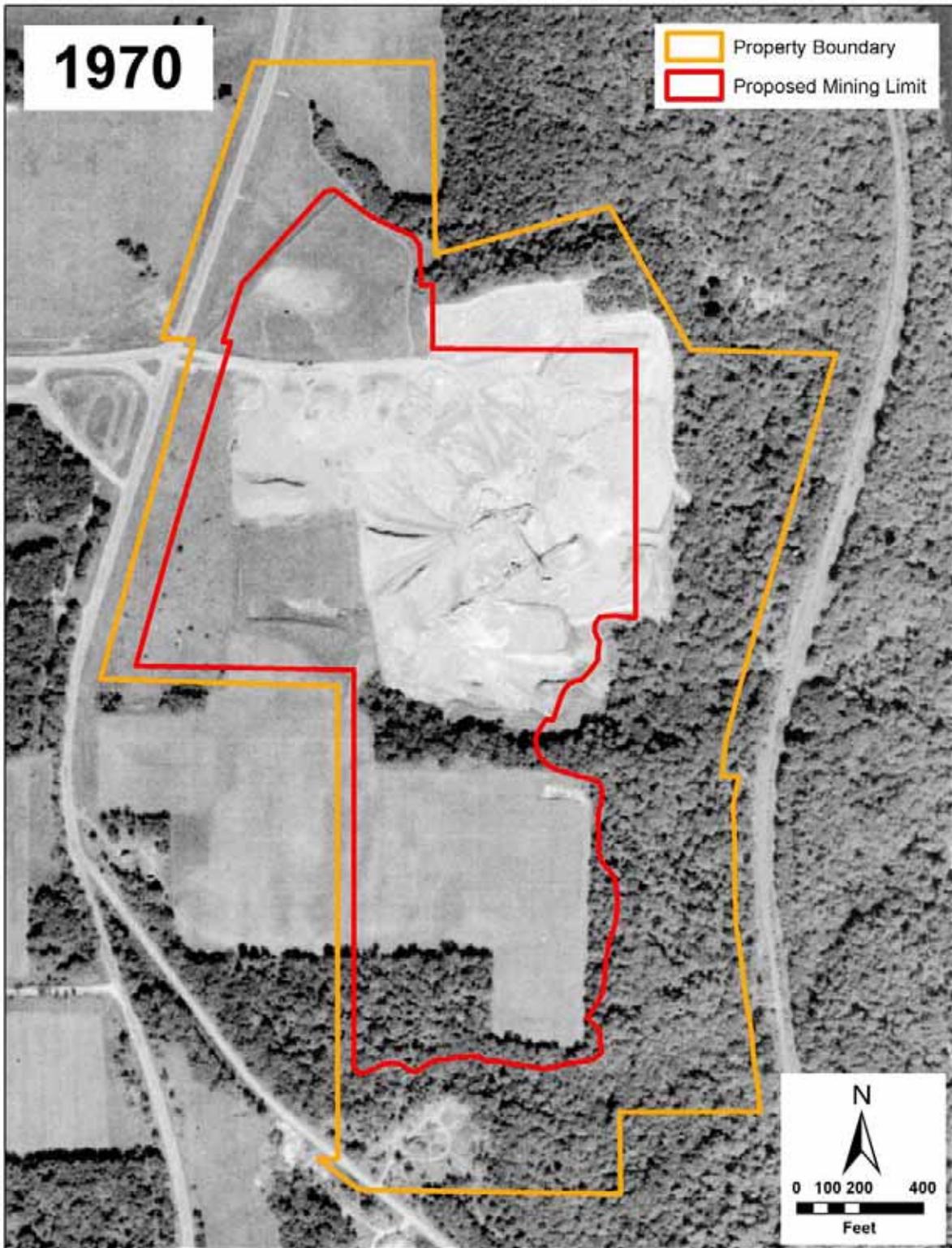
Appendix B. Historical Aerial Photographs

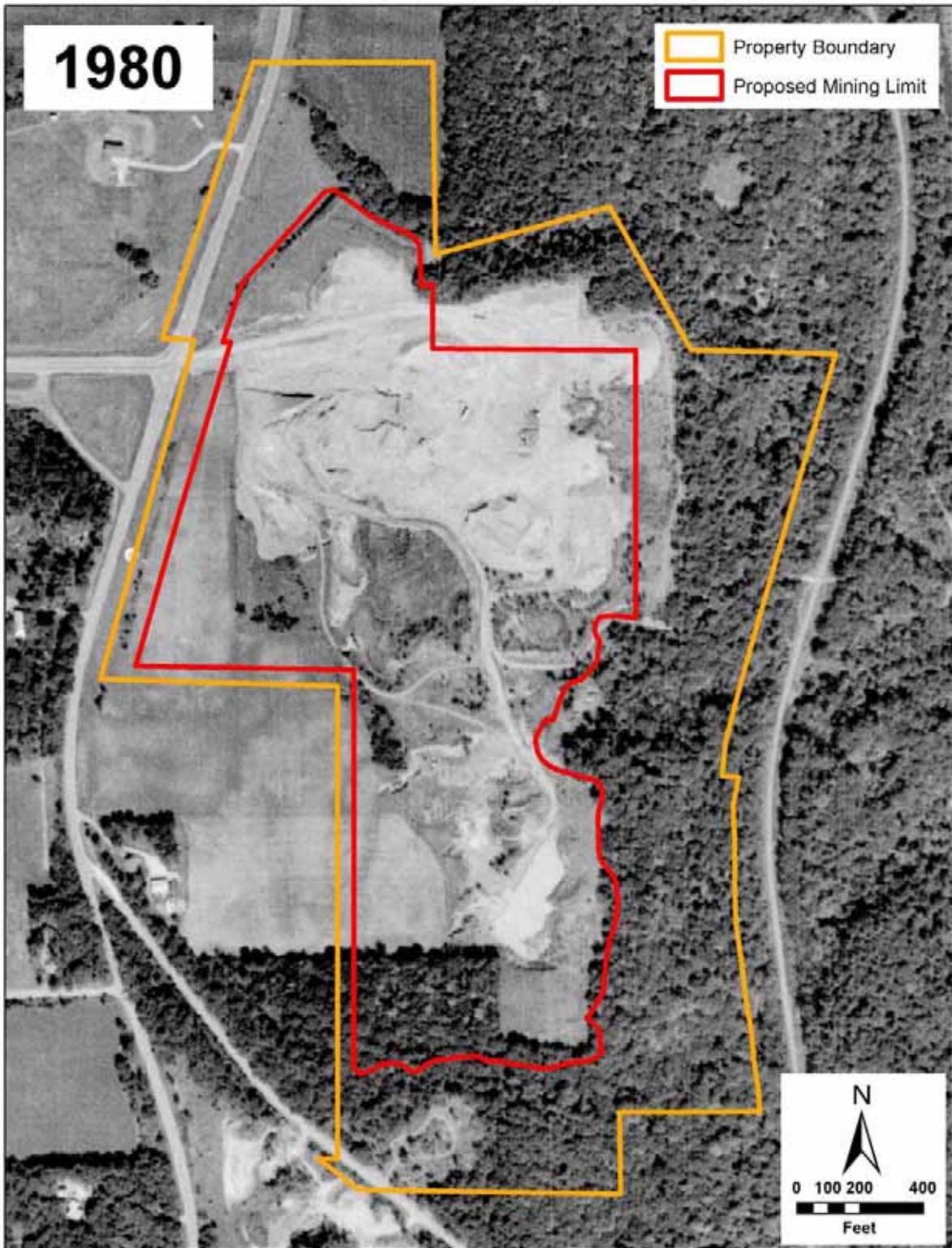


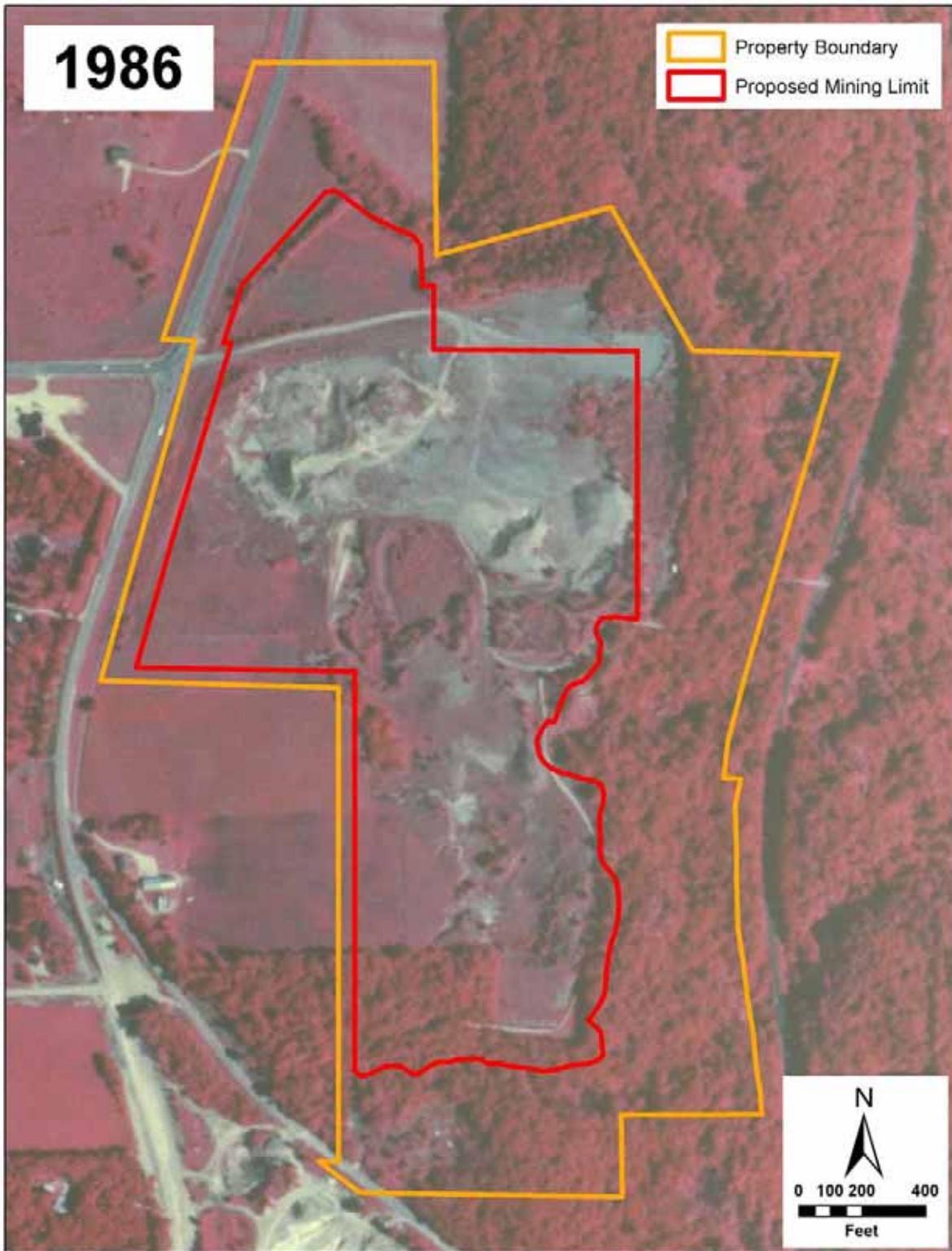


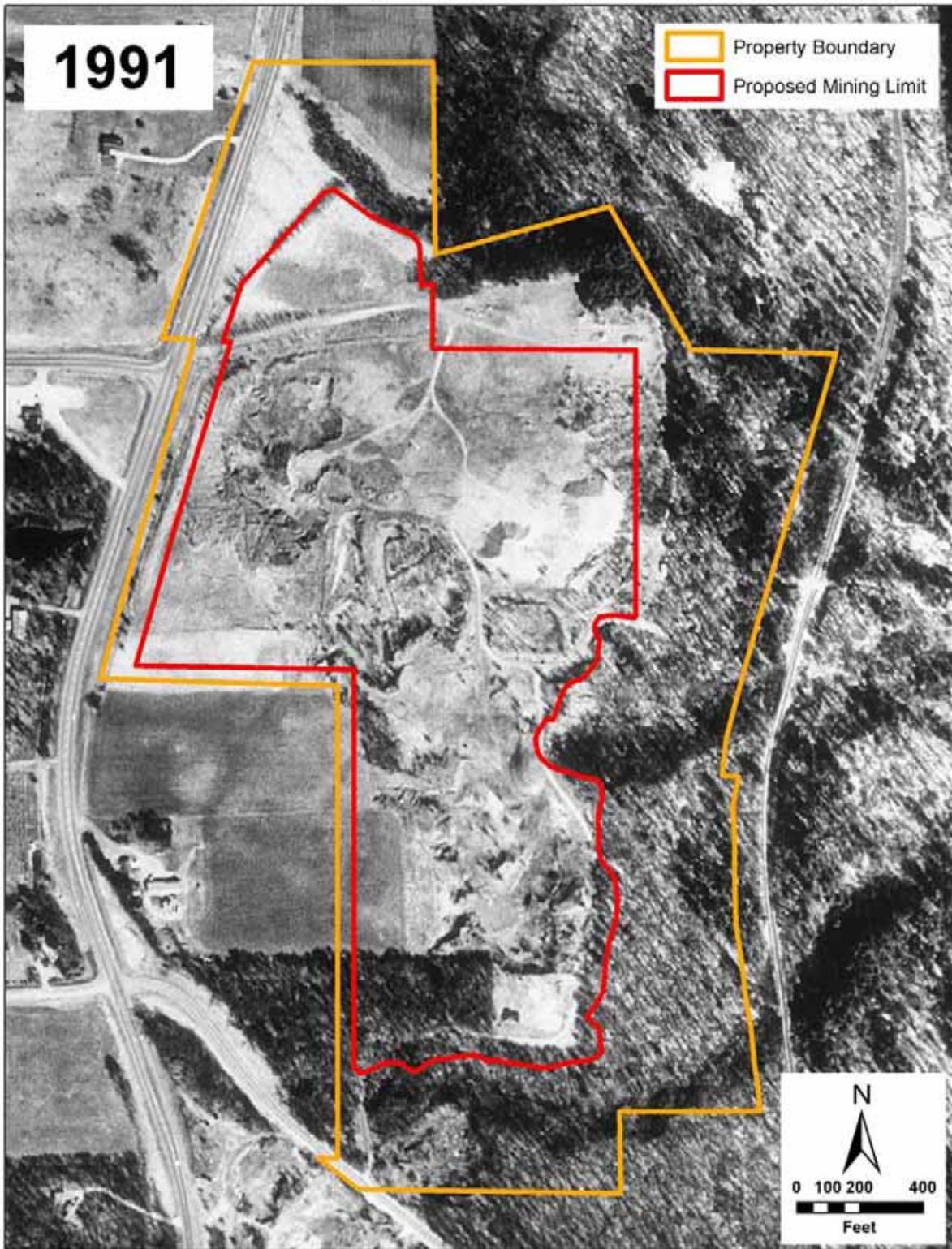


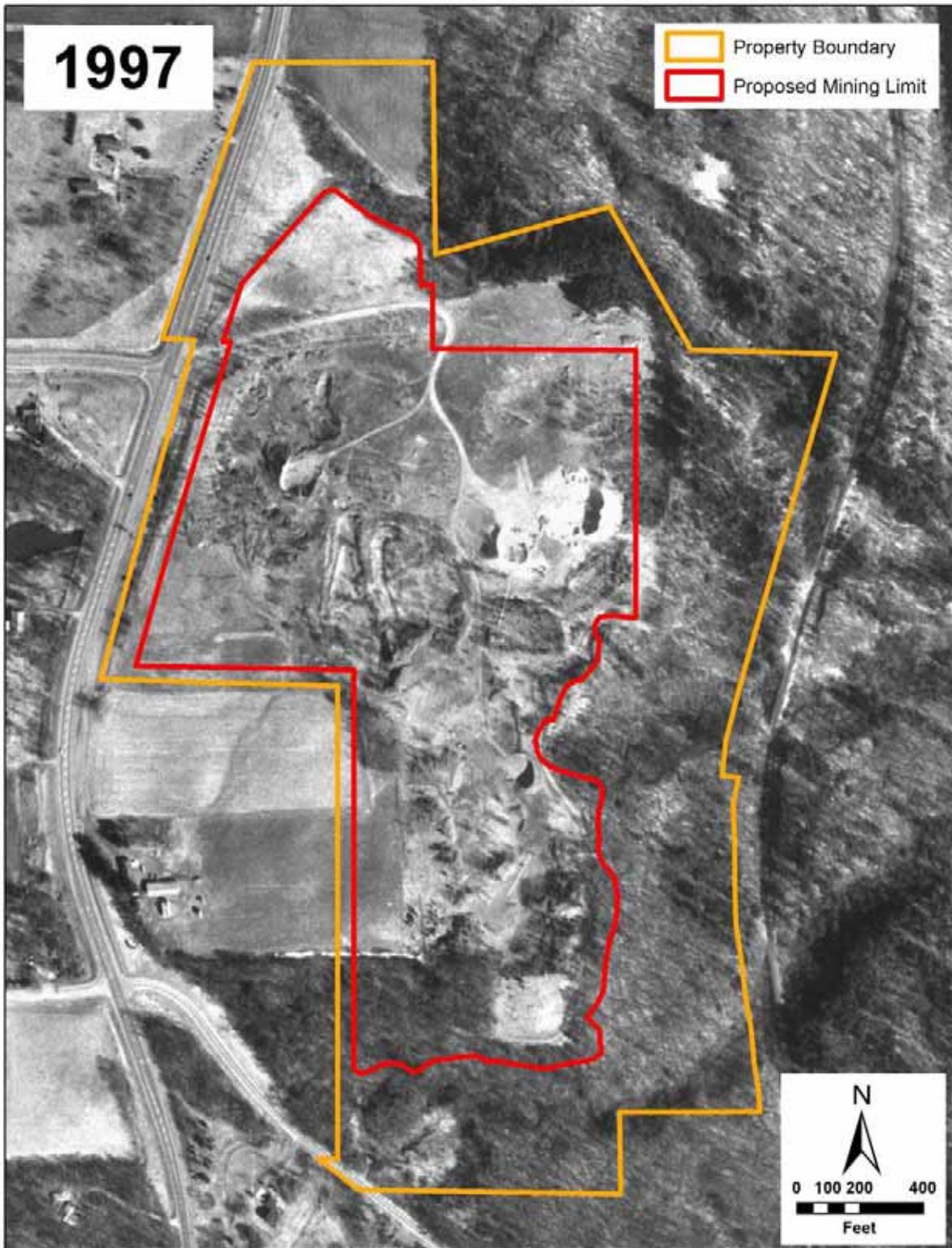




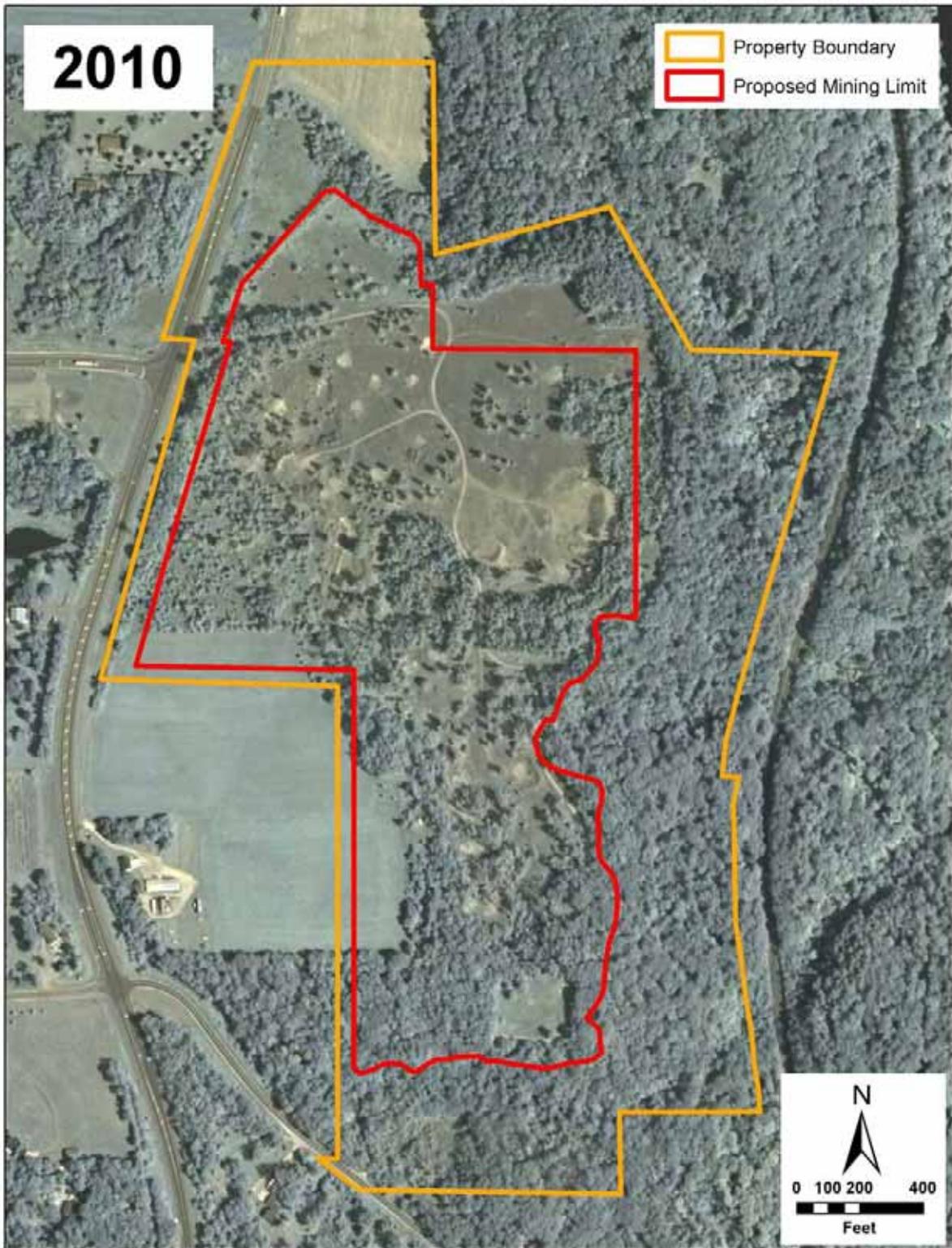






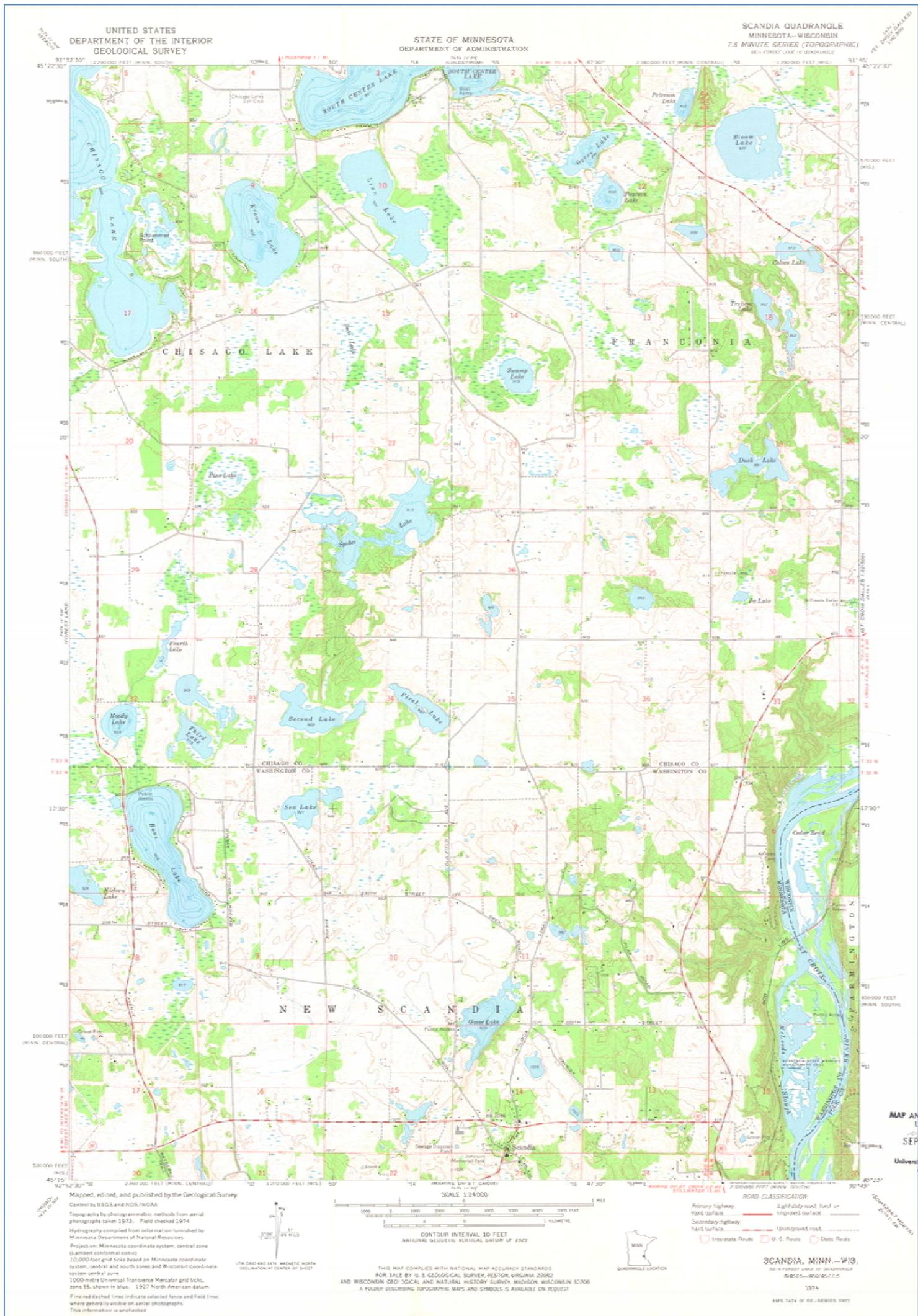




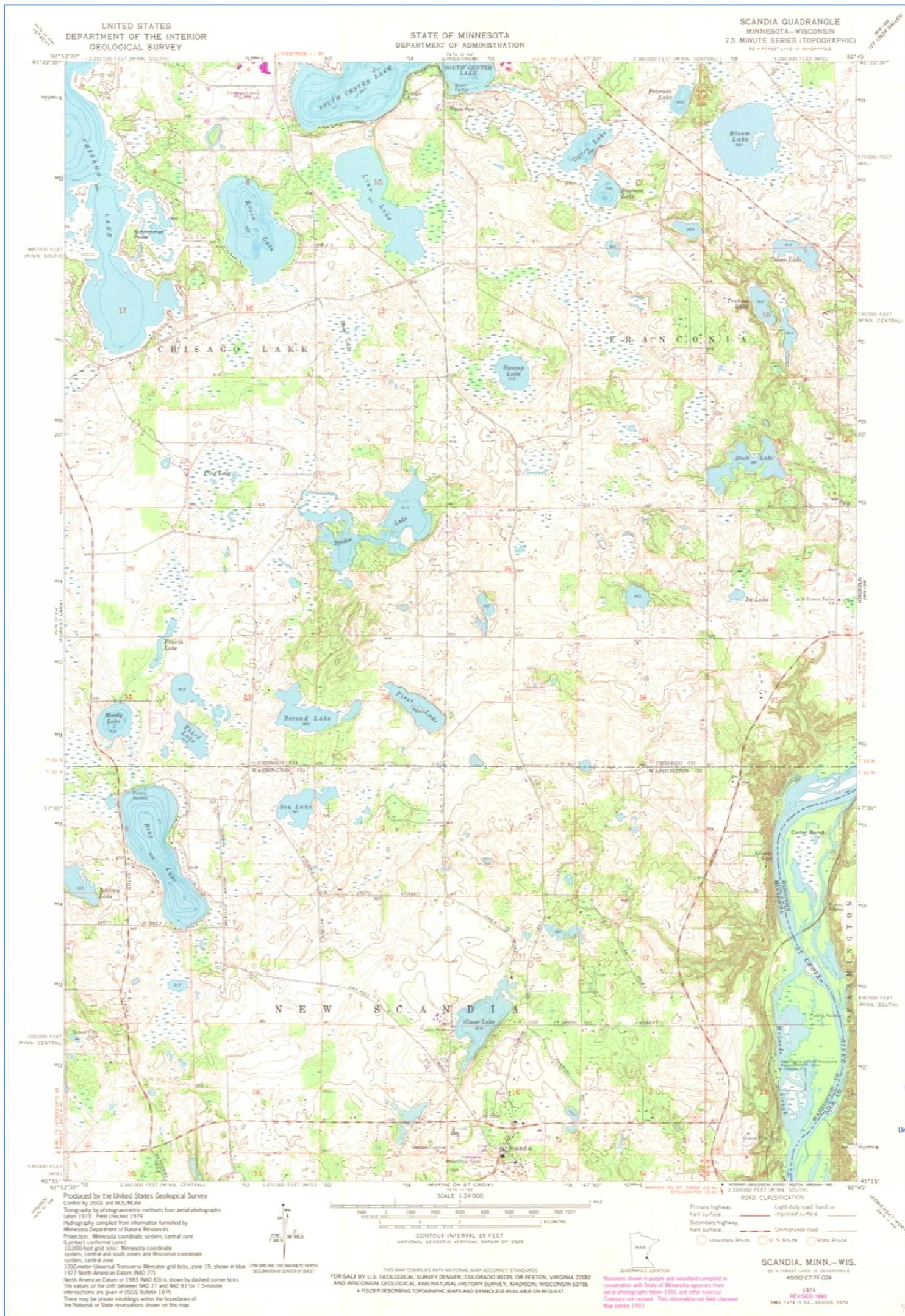


Appendix C. Historical Topographic Maps

1974 USGS Topographic Map



1993 USGS Topographic Map



2010 USGS Topographic Map



Kim Alan Chapman, Ph.D.

Principal Ecologist



EDUCATION

Ph.D. in Conservation Biology,
2001

University of Minnesota

M.A. in Biology (Ecology),
1984

Western Michigan University

B.A. in Biology, 1979

Kalamazoo College

AFFILIATIONS

Ecological Society of America

Natural Areas Association

American Society of Landscape
Architects

QUALIFICATIONS AND COMPANY ROLE

Before joining AES in 2003, Kim worked in the non-profit sector and taught at Macalester College, the University of St. Thomas, and University of Minnesota. With 25 years experience in applied ecology, he works with groups and organizations in finding ways to design, build, and live sustainably. Conservation design, ecosystem restoration, green planning, sustainability, and wildlife are his specialties. Kim's book on prairie, *Valley of Grass*, won a Minnesota Book Award. He directs the AES Minnesota consulting office, and lives in St. Paul with his wife and children.

SELECTED PROJECTS

- *Conservation Design Neighborhoods*. Design, permitting, and construction oversight for several developments in Minnesota, Colorado and Pennsylvania. These neighborhoods created wildlife habitat, restored ecosystems, regulated stormwater runoff ecologically, and provided for perpetual ecosystem management.
- *University Land Master Plan*. Part of a team creating a new sustainable community for a major university. The AES project focus is water use and re-use, stormwater, wildlife habitat design, and a research agenda for sustainability.
- *Avon Hills Initiative*. Partnering with St. John's University and The Nature Conservancy, this effort makes new development compatible with the preservation of natural resources and rural character on 90,000 acres in Stearns County, Minnesota.
- *Maplewood Greenway Plan*. Retrofitting an urban community with corridors and preserves to support disappearing wildlife.
- *Green Planning for Communities*. Several projects in the Twin Cities, Minnesota (with partner Dahlgren Shardlow Urban) to identify green infrastructure and bring ecosystem protection and restoration into development and recreation planning.
- *Vermillion River Temperature Trading Project*. Funded by the US EPA through the Vermillion River Watershed Joint Powers Organization, AES and its partners developed the scientific foundation for a market trading program in temperature to protect a major trout stream in the Twin Cities, Minnesota.
- *Forest Legacy Program*. With the Minnesota Forest Stewardship Committee, established the Forest Legacy Program which directed millions in federal and local dollars to protecting timber harvesting on thousands of acres of productive forest land in Minnesota.



Douglas M. Mensing, M.S.

Senior Ecologist



EDUCATION

M.S. in Conservation Biology,
1997

University of Minnesota

B.S. in Environmental Science,
1991

Valparaiso University

PROFESSIONAL INFORMATION

Minnesota Land Cover
Classification System
(MLCCS) Training

Protecting Water Resources
through Low Impact
Development (LID)
Workshop

Wetland Delineation Training
with an Emphasis on Soils
and Hydrology

AFFILIATIONS

Embrace Open Space/Regional
Greenways Collaborative
(former Steering Committee)

Growth Corridor Initiative
(Advisory Committee)

Minnesota Native Plant Society

QUALIFICATIONS AND COMPANY ROLE

Doug has over 15 years of professional and research experience in the ecological and environmental fields. He has applied expertise in: conservation planning, design, and development; low impact development (LID); multifunctional greenway corridor design; alternative/ecological stormwater management techniques; environmental review documents (e.g., AUAR, EAW); ecological inventory, assessment, restoration, monitoring, and management; natural resource damage assessments; wetland determinations, delineations, assessment, permitting and mitigation; wetland mitigation banking and monitoring; wetland vegetation and water chemistry monitoring; lakeshore and streambank restoration and bioengineering techniques; flora and fauna surveys; bioassessment techniques; and geographic information systems (GIS). As a consulting ecologist, Doug manages and provides technical support for a broad range of these types of ecological projects. Much of Doug's recent projects have focused on working with clients to design projects in a more ecologically sensitive fashion, conserving natural features and functions.

SELECTED PROJECTS

- *I-35E Corridor Alternative Urban Areawide Review (AUAR)*. Project manager, natural resource inventory (NRI), conservation design framework, and mitigation plan. Lino Lakes, Minnesota
- *Wild Meadows Conservation Development*. Project manager for ecological stormwater management monitoring. Medina, Minnesota
- *Dean Lakes Mixed Use Development*. Project manager, ecological restoration & management program, monitoring. Shakopee, Minnesota
- *Scott County MLCCS Update (184 sq mi)*. Project manager, lead ecologist, QA/QC. Scott County, Minnesota
- *Victoria Southwest Area AUAR*. Project manager, NRI, mitigation plan. Victoria, Minnesota
- *Twin Cities Army Ammunition Plant (TCAAP) Redevelopment Master Plan*. Project manager, NRI, conservation planning. Arden Hills, Minnesota
- *Lebanon Hills Regional Park Master Plan*. Project manager, NRI, master planning, native landscaping, and wetland issues. Eagan and Apple Valley, Minnesota
- *Assessing Wetland Quality with Ecological Indicators*. Minnesota



APPENDIX B

Review of BRKW's Market Analysis: The Impact on Property Values in Scandia Due to the Proposed Zavoral/Tiller Mining Operation

I am Lisa Philippi, a Scandia Resident and professional mortgage banker. I have reviewed the BRKW Market Analysis used in the Zavoral Mining and Reclamation Project Draft Environmental Impact Statement ("DEIS"). I have been employed in the mortgage industry for 32 years and have knowledge of appraisal practices and property value trends. I have also consulted with a commercial appraiser in the Twin Cities Metro area to determine what an adequate property value study looks like. In reviewing the BRKW analysis, I have found their study to be inaccurate and insufficient. The study ignores available data and information on the impact of a gravel mine in this market and grossly underestimates the home value reduction that will occur if the Zavoral/Tiller CUP is approved. Based on available market information and studies, a reduction of 25% in home value is likely. The ¼ mile radius and the impact on home values could extend up to three mile from the mine.

1. Time Frame of home sales Comparables

The housing market assumptions used by BRKW do not reflect the current market. Information on the current market indicates the Zavoral/Tiller Mine will have a larger impact on home values.

This is what BRKW says in their study regarding Time Frame of home sales Comparables:

In order to determine the impact, if any, from the introduction of a gravel mining operation into the area, a study was made of sales of single family residences within and without gravel mining and sites with perceived environmental hazard areas (i.e. demolition landfill and former superfund site). It is noted that home prices have been declining over recent years due to a variety of economic problems. In order to avoid the corruption of data from this down turn, single family home sale activity in the years 2006 and 2007 were selected. This timeframe is period of market stabilization and change from the rapid increase of property values in the first half of the decade and the sharp declines of the past few years. Based upon this study, it was concluded that a negative impact would most likely occur to property values within, but not beyond, 1/4 mile of the Zavoral Site.

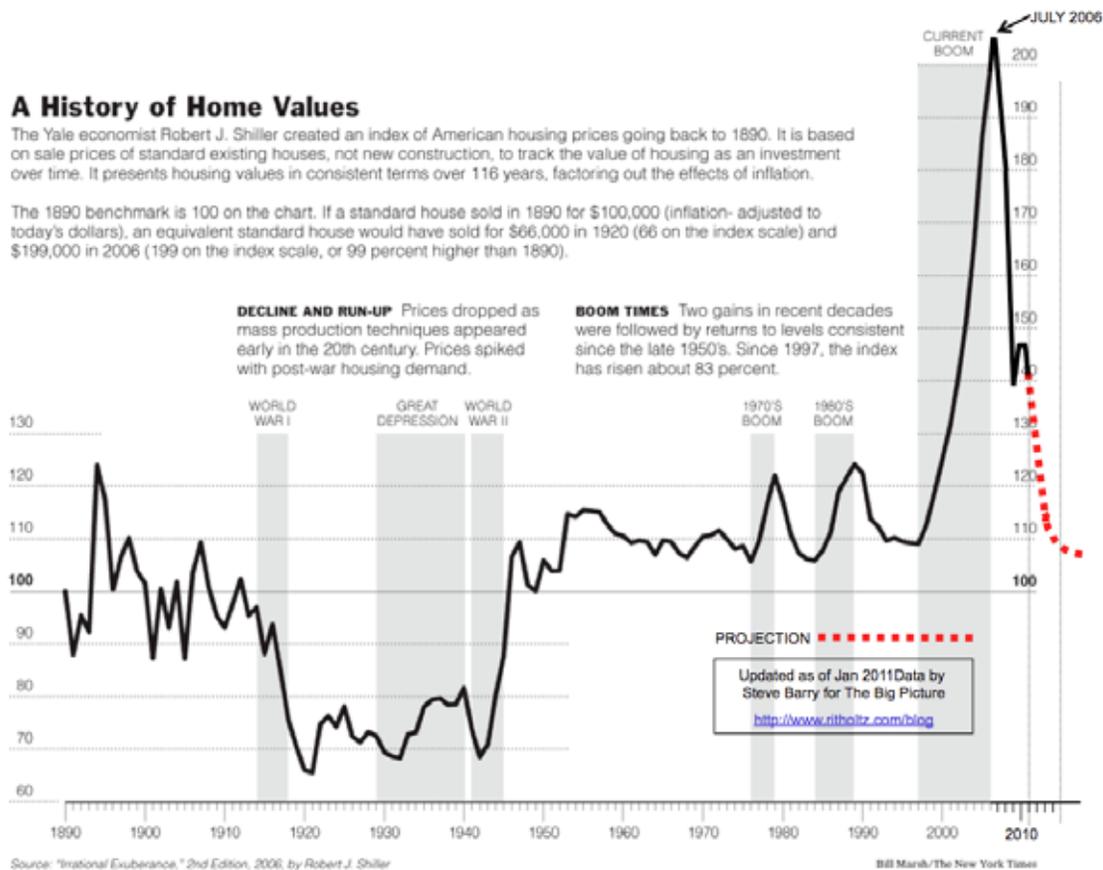
July of 2006 was the peak of the housing market. This was not a period of market stabilization. This was a period of peak demand, which would mean that homes would be purchased with less concern of location due to the numerous buyers and less homes for sale per buyer. This would result in not as much of a loss in property values due to adverse conditions such as a mine. So, then if the housing market were in decline, this would cause an increase in property value loss due to an adverse condition. BRKW admits this in their study conclusion. Here are their comments:

It is logical to assume that properties values abutting a new gravel mining operation could be adversely affected. This affect dissipates with distance from the mining operation. It is also noted that throughout the area, single family homes are in a declining market. The introduction of a perceived negative factor into this environment can have a stronger impact than if appearing in a

growth market where demand is more important. Taking all factors into consideration, it was concluded that properties located in a radius of 1 / 4 mile from the Site (Figure 14), have a potential for some loss.

So, why would BRKW use 2006 and 2007 home sales comparables, when using current data would be more representative of today's market? Since the housing market is currently in decline you would expect a greater loss in property values. This greater impact should be analyzed in the DEIS to properly assess the impacts of the proposed mine on the Scandia residents. It should also be noted that the housing value decline is not expected to increase dramatically any time soon. This is even more reason to assess property value losses due to this proposed mine that the Scandia residents will suffer. If BRKW had intended on showing home sales comparables during market stabilization then the years of 2000 – 2001 would have been more appropriate.

Here is a Case Shiller home value study to show this:



In the mortgage profession where I have 32 years of experience, lending requires appraisers to use home sales comparables that have sold within six months to a year

in order to be a valid appraisal. We would never allow the appraiser to go back to a peak market and give us a value from that period when the market is not like that today.

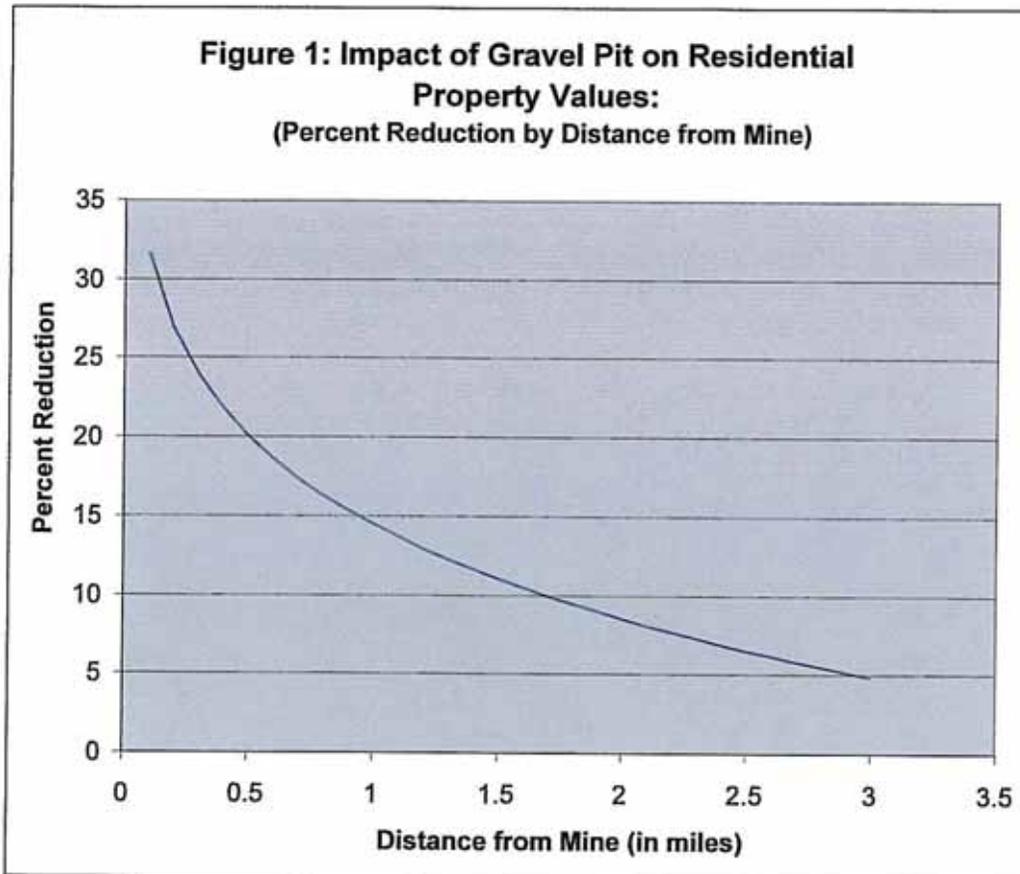
In reviewing BRKW's use of old sales comparison data, so I discovered BRKW Appraisals had previously performed a property value study for Excel Energy in 2007 for a Fly Ash Landfill site in West Lakeland, MN, located on a Tiller owned property. This study was completed in 2007. They utilized home sales comparables from 2006 and 2007, which at that time were current comparables and at the peak of the market. I also discovered in reviewing this Fly Ash study that BRKW also used three of the same Comparables at the Rosemount Gravel Mine and all six of the same Comparables at the Andover Site, as they used in the Zavoral/Tiller study. Based on this information, it appears the 2007 Comparables were used to short cut the work needed to prepare a study for the Zavoral/Tiller mine rather than finding new recent home sales comparables and completing an accurate study. BRKW's Xcel Fly Ash study is attached to this review as addendum 1.

2. Property value study approach

BRKW used a matched pair comparable approach. They used four gravel mines and took two to three pairs of property comparisons per mine. They compared a property close to the mine and then one further away. This is a very small number of comparables to base their value loss from and is inconsistent with industry standards.

I have reviewed several property loss studies and looked at their property loss approach. I reviewed the Economic Impact of the proposed Stoneco Gravel Mine Operation on Richland Township, Michigan. George Erickcek from W.E. Upjohn Institute for Employment Research prepared this study. W.E. Upjohn Institute is an internationally recognized economic research organization. In his study he utilized the Hedonic pricing models. Hedonic pricing models use a statistical regression technique that allows for estimating the impact of one factor while holding the other factors impacting house value constant. He cites a Professor Diane Hite, an agricultural economist who has published widely in the area of property value impact analysis and has applied the hedonic pricing methodology to study the effects of a gravel mine on nearby residential values. She examined the effects of distance from a 250-acre gravel mine, on the sale price of 2,552 residential properties from 1996 to 1998. This model controls a large set of other factors such as rooms, square footage, lot size, age of home etc. so that she can focus solely on the effect of proximity to the gravel mine on house values. Here is the property value loss expected on residential property values that are impacted by this Gravel Mine.

Figure 1 displays the estimated effects of distance from the gravel pit on house price. A residential property located a half mile from the gravel mine would experience an estimated 20 percent reduction in value; one mile from the mine, a 14.5 percent reduction; 2 miles from the mine, an 8.9 percent reduction; and 3 miles from the mine, a 4.9 percent reduction. These estimates are similar to estimates published in academic journals on the effects of landfills on nearby property values.



The loss in property value results from the negative consequences of the mining operation and reflects the deterioration in the area's quality of life due solely to the operation of the gravel mine. In other words, the loss in house value is a way to quantify in dollars the deterioration in quality of life, as capitalized in the price of the house. It captures the price reduction the homeowner would have to offer to induce a new buyer to purchase the property. Even if homeowners do not move as a result of the gravel mine, they will lose homeowner equity as the potential sale price of their house is less.⁶ Therefore, regardless of whether or not a person actually sells their property, it measures

⁶ Only those owning property at the time of the establishment of the gravel mine would experience a loss in equity. Those purchasing property near an established mine would not experience an equity loss because any negative effects from the mine's operation would have been incorporated into the purchase price. By implication, few property owners near long-established mines could claim loss of property value from the mine because few would have owned the properties at the time the mine went into operation.

This study shows that that a ¼ mile from the Mine will have a 25% reduction in property value and three miles from the mine will have 5% reduction in property value. This is much larger than the BRKW study, where ¼ mile has a 2-5% value reduction. The Hite study is a far better prediction of the impact on the mine since it used 2,552 properties, compared to the BRKW study that used 22 properties. See addendum 2 for a copy of the study.

I also reviewed the Potential financial impacts of the proposed Rockfort Quarry that was completed by the Centre for Spatial Economics. They also cited the Diane Hite Study. Diane Hite has a PH. D. in Agricultural Economics from Ohio State University and is well known for her use of the Hedonic value loss method. See addendum 3 for the study.

I also spoke with several Twin City appraisers who were familiar with Diane Hite's study and use of the Hedonic method. The Diane Hite study was very extensive and included numerous properties for data. There was a consensus that the BRKW study did not collect near enough data to determine what the value loss would be and not enough different methods used to determine value loss. BRKW only used one method, the matched pair analysis. For the Diane Hite Study see addendum 4, Diane Hite's Curriculum Vitae see addendum 5 and the definition of the Hedonic pricing method see addendum 6.

If Scandia had value losses similar to the Diane Hite study, then homes in a three-mile radius would have a 5% property value loss, and a two mile radius would have an 8% value loss, and one mile radius would have 14% value loss, and ½ mile a 20% value loss, and a ¼ mile a 25% loss. See addendum 7.

The BRKW report shows that \$12,886,000 is 2011's total market value for all of the properties ¼ mile from the mine. Only considering the area within a ¼ mile radius, the more accurate decrease in home value of 25% would cause a loss of \$3,221,500 to Scandia residents and potential annual real estate tax loss would be \$29,959. This loss is much greater when the larger radius of impact is considered.

3. BRKW's Market Analysis Inadequacies

When consulting with a local commercial appraiser, it was confirmed that in order to have an adequate Market analysis you must meet certain appraisal standards.

The USPAP (uniform standards professional appraisal practices) says that the scope of work must match the definition of the problem. Here is scope of work issues that should be addressed in an adequate appraisal:

- 1. Appropriate study should use small and large data methods or techniques.**
- 2. Appropriate study should utilize outside experts.**
- 3. The data should be verified.**
4. Appropriate study should use alternative sources of information.

5. Has the appraiser visited all comparables?

6. How will qualitative factors be addressed?

7. Is the appraiser experienced in this type of work?

8. Is the scope of work adequate to arrive at a value conclusion that is reliable?

BRKW's study does not sufficiently address these issues.

BRKW compared a very small sampling of 22 home sales comparables compared to Diane Hite's study using 2,552 homes. BRKW only used a small data set analysis, which was the matched pair approach. An adequate appraisal would also use a large data set analysis such as the Hedonic method.

BRKW did not explain why the scope of the study was only a one-mile radius of properties and then also did not explain why it ended up with only ¼ mile radius of affected properties.

BRKW did not use a cross section of property values, such as a high priced home, middle range home, low valued home, large acreage properties, especially with Scandia having varied property types and values. The home sale comparables were all in the \$200,000 - \$300,000 range.

BRKW did not utilize recent home sale comparables within the last couple of years. They utilized 2006 and 2007 comparables from the peak of the housing market boom, which would show a decreased effect on value loss.

BRKW did not utilize home sale comparables from either the Scandia Mine area, located off of Lofton or the Franconia Mine area. Even if there were limited comparables available, this information should have been evaluated.

BRKW's study did not compare value reduction with the different mining time lines. Such as the 10-year, five- year and one- year proposed plan. For example, the one-year plan having increased truck traffic over the other plans could affect property values more but for a shorter period of time.

BRKW utilized mines located in Maple Grove, Rosemount, and Andover, which are very high density housing areas in a suburban setting. This is not at all comparable to Scandia's rural nature and their unique river front properties.

Conclusion

In summary: In my professional opinion, BRKW's Market Analysis is not adequate to determine value losses in Scandia due to the proposed Zavoral/Tiller mine. Nor does this Market Analysis meet all appraisal standards. BRKW acknowledges these problems in their conclusion where they state: "**Basically the analysis is inconclusive**". Their estimated value reduction of 2%-5% in a ¼ mile radius from the mine is arbitrary and is grossly inconsistent with available market information and industry research. Current information indicates that as a result of the mine,

there will be a home value reduction of 25% within $\frac{1}{4}$ mile of the mine and a 5% reduction as far as three miles from the mine. This represents a loss of millions of dollars to the residents of Scandia and has the potential to impose significant economic hardship on individual residents. All residents of Scandia deserve to have the real impact on their homes, farms and property values from the Tiller/Zavoral Mine fully and accurately analyzed in the EIS

Lisa Philippi – Scandia Resident