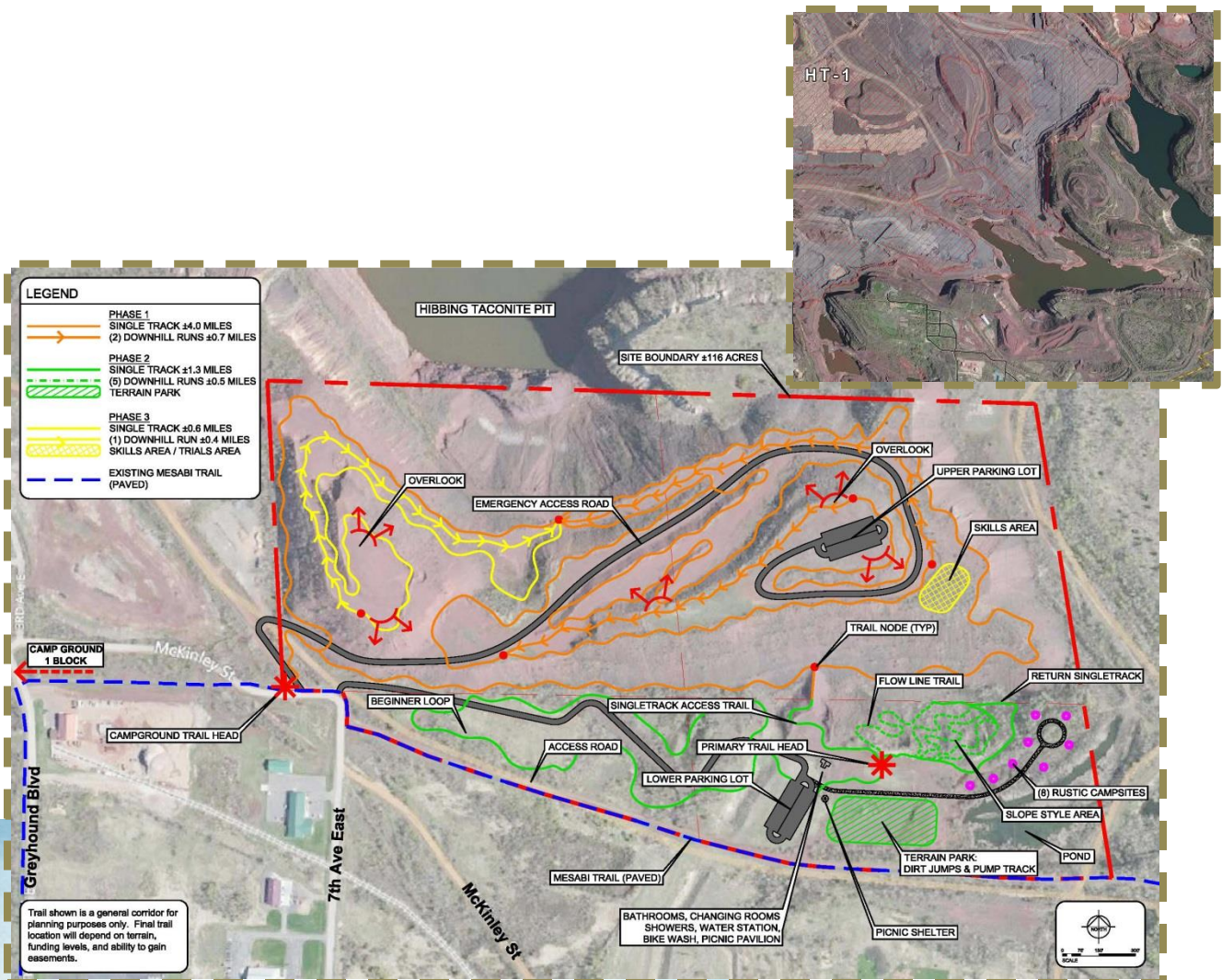


The Future Today: Redeveloping Mine Stockpiles & Creating In-pit Pit Lake Shoreland Zones



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**Prepared for Iron Range Resources & Rehabilitation Board
by Project Team of:
Architectural Resources, Inc. ▪ Applied Insights^{north} ▪ Community GIS, Inc.**

1.0 Project Overview

1.1 Background and Objectives

A 2010 Innovation Grant was used to take advantage of an in-pit disposal project at Hibbing Taconite to recreate, within limits, the historical terrain and vegetation common to the Laurentian Divide.¹ That successful project fueled two conclusions. First, additional similar innovative in-pit disposal designs should be sought. Second, the creation of shoreland for pit lakes that may not exist until 75-100 years in the future is worthwhile but redeveloping mine lands for near-term economic activity will have more immediate impact for Iron Range communities.

Thus, the Iron Range Resources and Rehabilitation Board issued a follow up Laurentian Vision Partnership Innovation Grant to:

- Identify a series of sites, most likely mine stockpiles, that communities feel have potential for short- and long-term redevelopment that would benefit the communities and the Iron Range.
- Identify additional locations for innovative in-pit disposal to create future lake shore land.

In effect, the set of redevelopment sites will be a preliminarily assessed list of high value locations for potential community and regional investment.

The list of in-pit sites can be used by the operating mines and Minnesota Department of Natural Resources Lands and Minerals Division, the mine land reclamation regulatory agency, to guide ongoing disposal actions to locations with greater options for innovative site design.

1.2 Planning for the Uncertain Future

The Iron Range is a landscape dominated by mining and the uncertainties of mining. A recent article in the Harvard Business Review provided advice for corporations concerning creating strategies for the future that equally applies to communities:²

- Strategy is not about turning uncertainty into certainty.
- No choice made today can make future uncertainty go away.
- Strategy means making the best possible choices you can make today and then being responsive when the bets do or do not come in as hoped.

Although the future uncertainty remains, creating a strategy identifies the things to pay attention to and adapt as they evolve over time. That outlook is critical in a region where the future is

¹ *Pit Lake Shoreland Zone and Upland Development Project: Hull Rust Mahoning Pit (HibTac) In-Pit Shoreland Development Innovation Project*, prepared by Architectural Resources, Inc, Applied Insights^{north}, Braun Intertec, Inc., August 2011.

² Martin, Roger, *Placing Strategic Bets in the Face of Uncertainty*, Harvard Business Review, www.hbr.org/magazine, accessed 9:00 am January 22, 2013.

dependent upon natural resources. Mining is currently the major economic provider and its future is certain –mining will continue and expand, but for which the *timing* of that activity in any given location is uncertain.

A presentation before the Laurentian Vision Partnership (LVP) highlighted an approach to dealing with the uncertainty of mining, an approach that is relevant to both the redevelopment of mine stockpiles and the creation of future pit lake shore lands.³ The approach begins with an understanding of the Certainties, Anticipated Changes, and Uncertainties:

↳ **Certainties**

- Where the resource was mined yesterday.
- Where it is being mined today.
- Where the unmined resource is.

↳ **Anticipated changes**

- Expansion of mining as we know it.
- Advances in mining extraction and resource utilization.
- Mining is more than taconite.
- Increasing realization of the value of minerals as a public resource.

↳ **Uncertainties**

- **Will** the resource ever be mined?
- **When** might it be mined?
- **How** will it be mined—above ground, underground, new technologies?

At some point communities need to assess the “uncertainties” in terms of degrees of probability. That is, what is the probability that a given section of ferrous resource will be mined; what is the probability it will be mined sooner rather than later; and what is the probability it will be mined through above ground or underground approaches?

Shortly after this project’s outset two of the above items were emphatically underscored and greatly altered the project’s timing and outcome.

- ➡ **Value of resource to public:** A presentation to the LVP by Pete Clevestine of the DNR highlighted a new reality of mining’s value to the public. Up until now, with the exception of some state lands that provided mining royalties, the public sector’s benefit from mining was indirect. However, anticipated expansion of mines will occur in many situations on tax forfeited lands where mineral royalties will be paid to the state, local governments and school districts. According to DNR illustrative examples a 40-acre parcel, depending upon thickness of the iron resource, could generate royalties in the range of \$29-83 million over a 30-year period. This insight has changed the region’s perspective of the value of mining to the public and even encouraged the St. Louis County Land Department to change its name to Lands and Minerals.⁴

³ “Planning in a New Age of Certainty - Case Studies that Demonstrate how Community Planning and Growth Management can Positively Influence Mining on the Iron Range”, John Powers, Applied Insights^{north}, January 17, 2013.

⁴ “US Steel Expansion Areas & Public Lands Opportunities”, Peter Clevestine, Manager of Engineering MDNR, Division of Lands & Minerals, May 9, 2012.

- **Magnetation, Inc.:** The impact of this new, regionally-based innovative business on the perception of what is “the resource” cannot be overstated. It’s newly developed technology allows it to reprocess iron ore residues into concentrate for steel making. Magnetation began production with one plant in 2011 at 198,000 wet metric tonnes and is projected to grow to five plants producing 4,750,000 tonnes by 2015.⁵

The change in perception involves the “resource” being exploited by the company. Currently the company is processing tailings basins of long shuttered mines (current basins are for mines that closed between 1976 and 1986). Once basins have been reprocessed the company (and, no doubt, similar other firms) will look to former natural ore mines and lean-ore stockpiles, all of which have sufficient material for decades of activity. In short, multiple generations of Iron Rangers have perceived these mines, many that have become large lakes and abandoned stockpiles as something to eventually “do something” with. They now must view them as the future resource for a vibrant and valuable economic activity.⁶

The impact on this project is obvious since the main component focused on redeveloping mine stockpiles. However, from the beginning this project understood the nature of development’s relationship to the iron ore outcrop and resource and to “abandoned” stockpiles. That is, it was mindful of the former and understood that few stockpiles were abandoned. Nonetheless, the surge of the new realization across the Range became a critical aspect of the project.

All of the above helped shape the six key attributes of the “planning with probabilities” approach for the Iron Range. They are:

- 1) Anticipate and embrace ambitious new mining.
- 2) Incorporate an expanded understanding of mining’s public benefit.
- 3) Evaluate the community’s position given likely future mining.
- 4) Future mining is one driver of land use. Create respectful boundaries for land uses, especially existing ones, on or near the resource.
- 5) Implement near-term actions that are available today and respect boundaries of the resource.
- 6) Have strategies in hand that respond to probable future mining.

1.3 Relationship to CIRI Brownfield Assessment Project

Parallel to this project is one headed by the Iron Range Brownfield Assessment Area Coalition organized by the Central Iron Range Initiative (CIRI). This endeavor utilizes a US Environmental Protection Agency brownfield assessment grant of \$726,500 to conduct Phase 1 and Phase II environmental site assessments on sites located within the Iron Range Coalition project area. The

⁵ "Magnetation: Western Mesabi's Next Big Miner", Matt Lehtinen, President Magnetation, May 9, 2012.

⁶ This discussion of Magnetation should not detract from other major investments by such firms as Essar, Mesabi Nugget and USS/KeeTac. The intent here is to emphasize how Magnetation caused most people outside of the mining industry to re-envision what had been considered exhausted or waste areas as valuable resources.

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Coalition may expand its objectives at a later date to include cleanup of sites assessed under the current grants. This is a three year program that began in September 2011.

The project's initial action is to identify and inventory potential brownfields within the Coalition project area. This work is being done in coordination with the GIS services of St. Louis and Itasca Counties.

Once the inventory has been assembled the Coalition will work with community stakeholders to select priority sites with the highest potential for reuse or development. Ultimately, the project is to "enhance economic development, improve the environment and keep our citizens healthy."⁷

The objectives of this brownfields project clearly complement those of the stockpile redevelopment effort without overlapping or duplicating. A review of the brownfield sites listed in Appendix A indicates the nature of these sites as being distinctly different in scale and nature than those being considered in the stockpile project. The brownfield sites tend to be much smaller, by definition are known to be contaminated, and often, but not always, are located within developed portions of communities.

⁷ Central Iron Range Initiative (CIRI) RFP/RFQ , For The Iron Range Brownfield Assessment Area Coalition for Environmental Consulting and Project Management for US EPA Hazardous Substances Grant, March 2, 2012.

2.0 Stockpile Redevelopment Projects

2.1 Purpose

The purpose of this project is to address the needs of Iron Range communities to reclaim mine lands, most often overburden (but also waste rock) stockpiles, by identifying potential projects that enhance the property tax base in the near-term (within 5-15 years).⁸

The set of project sites identified by this effort should be viewed as a preliminarily assessed list of high value locations for potential community and regional investment.

2.2 Project Selection Criteria

Projects were identified as being either short-term or long-term in prospective development.

Short-term Use

1. Location needs a minimum 10-20 year window for use before any likely mining activity on or impacting the site.
2. Types of uses will have low degree of investment and infrastructure that can be amortized during the period of use. Uses will likely be recreational in nature.
3. Public ownership of stockpile and surface is preferred but not essential.
4. Site use needs clearance from DNR Minerals and the affected mine operator.

Long-term Use

1. Preferred location is north of the Biwabik Iron Formation northern out-crop.
2. Locations on the outcrop or immediately south of it need to be carefully evaluated to ensure they are out of the path of likely future mining activity (which includes actual mines plus basins, disposal areas, buffer zones and the like).
3. Types of uses may involve higher levels of investment and infrastructure; uses can include residential, commercial and industrial as well as recreational.
4. Public ownership of stockpile, surface and minerals is preferred but not essential.
5. Site use needs clearance from DNR Land and Minerals if public ownership is involved

⁸ This effort is intended to complement ongoing LVP investments into making certain stockpiles into more attractive, more appropriately shaped and vegetated features on the landscape. It was not the objective of this effort to identify future sites for landscape improvement although several such sites emerged at one mine and are included in this report.

The Biwabik Iron Formation

The iron ore bearing Biwabik Iron Formation outcrop is exposed to the surface in a wide, variable width swath across the Mesabi Iron Range. Much of the historic and current mining occurs on the outcrop. The ore bearing iron formation, however, dips to the south as shown in the illustration. Thus, while the outcrop is an easily identified and referenced geographic feature and indicates areas where accessing the ore is easiest, it does not delineate the limits of potential future mining. That follows the downward slant of the formation.

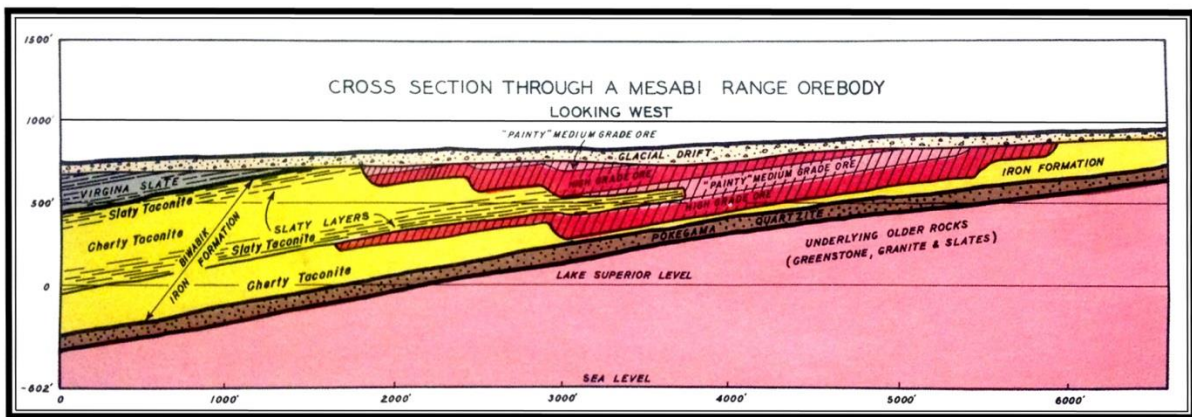


Image of 1950's era Oliver Mining Company poster provided by Tim Pastika, MDNR Division of Minerals.

2.3 Selection Process

The site selection process involved three basic steps:

1. Consultant Team prepared maps of sub-regions of the Iron Range. The maps highlighted mine stockpiles and, where known, which stockpiles were publicly owned.
2. Consultant Team met with representatives of the four Laurentian Vision Partnership regions to learn from them of potential project sites. In the case of the Quad Cities area this meant meeting directly with the two cities in which developable stockpiles existed. Meetings were held with:
 - a. East Range Joint Powers Board (Aurora, Hoyt Lakes, Town of White)
 - b. Biwabik
 - c. Mountain Iron
 - d. Virginia
 - e. Central Iron Range Initiative (Chisholm, Hibbing, Buhl, Balkan Township)
 - f. Western Mesabi Mine Planning Board (Itasca County).

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3. Draft document was distributed to sub-regions for review and comment. Document was altered according to comments received.

In addition to the above steps, the Consultant Team used its meetings with area mines to explore site options. One result, for example, was the realization that there were no viable sites involving the United Taconite operation in Eveleth due to needs of mining operations.

Consultant Team determined from its review of background data and maps that Gilbert is utilizing its candidate sites with the existing and expansion of the Off Highway Vehicle park.

2.4 Potential Redevelopment Projects

This section presents basic information on the potential project sites identified through this process.

No.	East Range Project Sites	City	Possible Use	Near-term Feasibility*
ER-1	Laskin Energy Park Development Expansion	Hoyt Lakes	Industrial	Fair
ER-2	Red Top	Aurora	Recreation	Good
ER-3	St. James Lake Pit Campground	Aurora	Recreation	Good
ER-4	Pineville	Biwabik	Residential	Low
ER-5	Scenic Acres East	White Twp	Residential	Low
ER-6	Canton Lake	Biwabik	Residential/Recreation	Fair
ER-7	Canton Lake North	Biwabik	Residential/Recreation	Low

*Good = project could be launched immediately; Fair = project will take time and other developments to occur before it could be considered for undertaking; Low = project is highly conjectural but worth keeping in mind.

No.	Quad City Project Sites	City	Possible Use	Near-term Feasibility*
QC-1	Honda Hills	Virginia	Mixed	Good
QC-2	Fairview	Virginia	Residential	Good
QC-3	Rockridge	Mt. Iron	Commercial	Good
QC-4	Iroquois Pit Overlook	Mt. Iron	Recreation	Fair

*Good = project could be launched immediately; Fair = project will take time and other developments to occur before it could be considered for undertaking; Low = project is highly conjectural but worth keeping in mind.

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No.	Central Iron Range Project Sites	City	Possible Use	Near-term Feasibility*
CIR-1	Twin City Mine Pit	Chisholm	Recreation	Fair
CIR-2	Chisholm Industrial Park West	Balkan Twp	Industrial	Fair
CIR-3	CIRSSD Treatment Plant Area	Balkan Twp	Industrial	Fair
CIR-4	Boy Scout Hill	Hibbing	Residential	Good
CIR-5	Highland Park	Hibbing	Residential	Good
CIR-6	Ansley Hills	Hibbing	Residential	Fair
CIR-7	County Landfill Area	Hibbing	Recreation	Low

*Good = project could be launched immediately; Fair = project will take time and other developments to occur before it could be considered for undertaking; Low = project is highly conjectural but worth keeping in mind.

No.	Western Mesabi Range	City	Possible Use	Near-term Feasibility*
It-1	Tioga Mine	Cohasset	Recreation	Good

*Good = project could be launched immediately; Fair = project will take time and other developments to occur before it could be considered for undertaking; Low = project is highly conjectural but worth keeping in mind.

The one site within Itasca County was identified through work on another project by the consultant team; none were offered by the Western Mesabi Mine Planning Board (WMMPB). However, the WMMPB indicated an interest in identifying possible sites in the future. The recently updated *Itasca County Comprehensive Land Use Plan* (June 1, 2013) contains a specific objective directly related to the topic. The objective reads:

“Mine area reclamation – Facilitate reclamation and stabilization of older mine areas for potential future use in cooperation with Iron Range Resources and Rehabilitation, Minnesota Natural Resources Land and Minerals Division and Western Mesabi Mine Planning Board.”

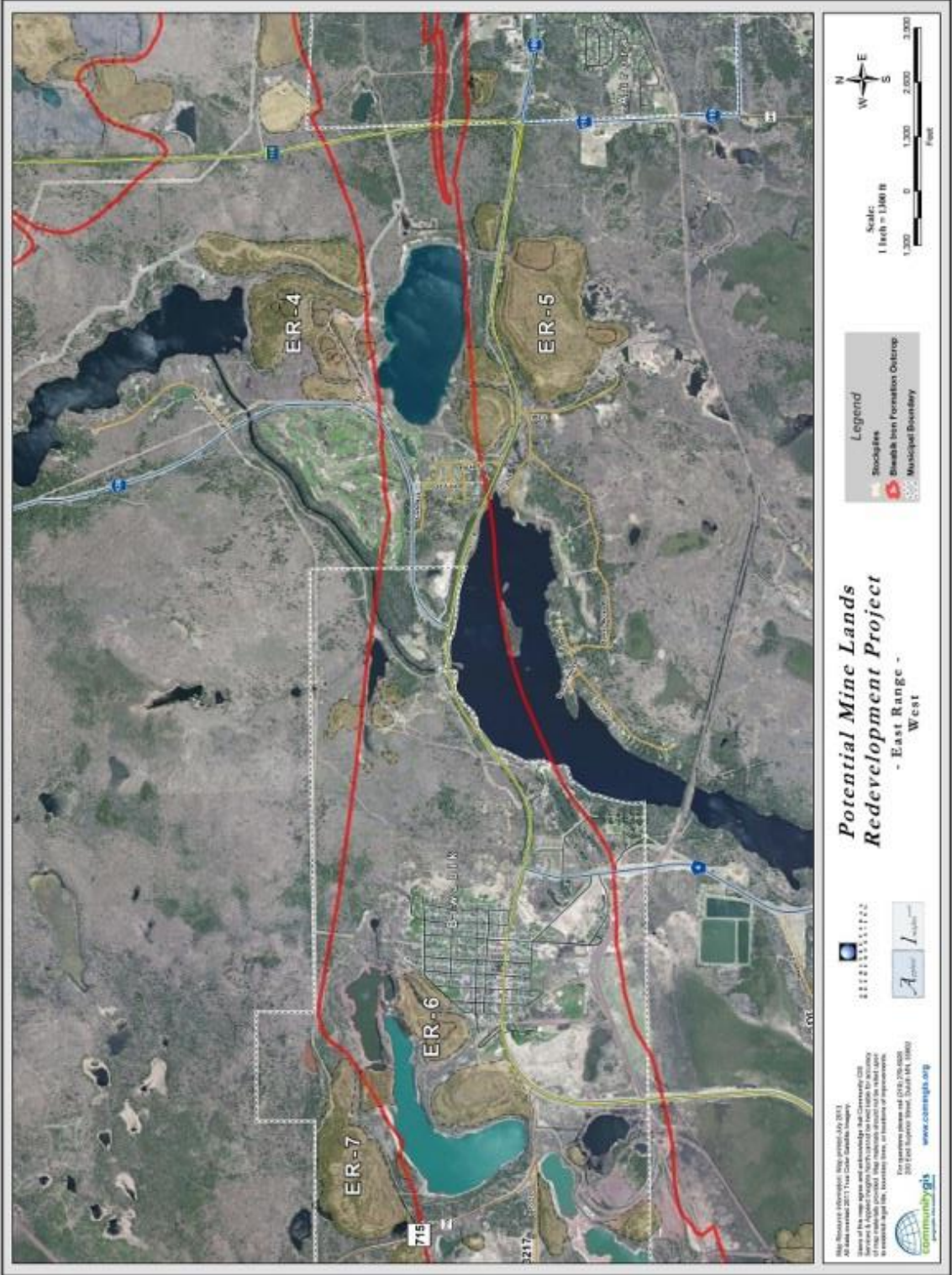
Appendix C contains language from the Itasca County comprehensive plan regarding the county’s objectives for mining.

PDF versions of all maps in this report can be obtained through the IRRRB.

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ER-1 Laskin Energy Park Expansion

Location:	Hoyt Lakes
Project Description:	Industrial development park with an emphasis on vendors and industries that serve the mining industry, especially the ferrous and non-ferrous operations in the East Range
Stockpile Type:	Surface overburden / rock / slatey taconite mixed in
Ownership/Size:	Public and private [approx. 375 acres]
Assessment:	This is a long-range potential project. It requires the extension of CR 633 from the Laskin Energy Park across an arm of Colby Lake. The intent of the extension would be to provide a southern access to Mesabi Nugget and LTV operations. Site lies immediately south of the Biwabik outcrop and eventually could be mined. Any development would require discussions with landowners and mineral rights owners as well as the mines. Near-term feasibility: Fair

ER-2 Red Top

Location:	Aurora / Town of White
Project Description:	The project would enhance the East Range Sportsmen Club Shooting Range which has been on the stockpile for 4-5 years. Current level of development is rough and facility lacks basic infrastructure and amenities. A snowmobile trail loops through part of the site. Even in its rough condition the facility is hosting a major national archery event drawing 1,000 participants. The facility needs improvements (e.g., surfaced parking, lighting, bathrooms, event building space, etc.) to ensure its continued success.
Stockpile Type:	Surface overburden
Ownership / Size:	Town of White / [approx. 230 acres]
Assessment:	This project could be implemented immediately. First step would be preparation of detailed design. That would be followed by implementation and construction. The site lies south of the Biwabik outcrop; future mining potential is probably limited by proximity to developed areas of Aurora. In any event, this level of development would not be an impediment to future mining. Near-term feasibility: Good

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ER-3 St. James Pit Lake Campground

Location:	Aurora
Project Description:	This project would develop a campground on a site previously reclaimed as IRRRB mineland reclamation project. The facility would be an attraction in its own right, providing recreational access to a lovely pit lake. In addition, it could serve as a support facility for events held at the nearby Red Top shooting range.
Stockpile Type:	N.A.
Ownership / Size:	City of Aurora [approx. 25 acres]
Assessment:	This project could be implemented immediately. First step would be preparation of detailed design. That would be followed by implementation and construction. The site straddles the southern limit of the Biwabik outcrop. However, future mining potential is probably limited by proximity to developed areas of Aurora and the pit lake's use as the city's water supply. In any event, this level of development would not be impediment to future mining. Near-term feasibility: Good

ER-4 Pineville

Location:	Aurora / Town of White
Project Description:	This is a highly speculative prospective project. Site's location and presence of iron ore units in portions of the pile suggest a recreational project is most likely. Residential development is possible but might require purchase of rights to lean ore units in the stockpile.
Stockpile Type:	Overburden / taconite-lean ore
Ownership / Size:	Public and private [approx. 80 acres]
Assessment:	This is a longer-range project. ERJPB may be the entity to slowly pursue it, perhaps by working with existing residential developers in the Giants Ridge area. The site is north of the Biwabik outcrop, making future mining unlikely, however, the stockpile retains some iron units which might be extracted at a future date. Near-term feasibility: Low

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ER-5 Scenic Acres East

Location:	Town of White
Project Description:	This is a highly speculative prospective project. Site's location suggests that the development of residential sites (probably seasonal) could be a possibility.
Stockpile Type:	Surface overburden and rock
Ownership / Size:	Private [approx. 160 acres]
Assessment:	This is a longer-range project. Landowner's intentions for property are unknown. ERJPB may be the entity to slowly pursue it, perhaps by working with existing residential developers in the Giants Ridge area. The site is south of the Biwabik outcrop. Future mining potential or interest in this area is unknown. Near-term feasibility: Low

ER-6 Canton Lake

Location:	Biwabik
Project Description:	Stockpiles on the east and south sides of the lake have potential to become residential and/or recreational sites once the municipal water supply is shifted from Canton Lake to Lake Mine.
Stockpile Type:	Overburden with a small pocket of lean ore
Ownership / Size:	Public and private [approx. 30 acres]
Assessment:	This is a longer range project although an intermediate step could be to assess the property and define Biwabik's plans for it. The stockpiles are on the Biwabik outcrop but proximity to Biwabik probably precludes future mining activity. Pocket of lean ore might be extracted at a future date (or require purchase of rights). Near-term feasibility: Fair

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ER-7 Canton Lake North

Location:	Biwabik
Project Description:	This stockpile's location on the north side of Canton Lake makes it a bit more remote for immediate development although it could have potential for recreational uses and even residential sites, once access was defined.
Stockpile Type:	Surface overburden
Ownership / Size:	Private [approx. 120 acres]
Assessment:	This is a longer range project although an intermediate step could be to assess the property and define Biwabik's plans for it. The stockpiles are on the Biwabik outcrop but proximity to Biwabik probably precludes future mining activity. Near-term feasibility: Low

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QC-1 Honda Hills

Location:	Virginia
Project Description:	Mix of uses could be developed on this site. Fringes, where soil stability is best, could be used for industrial, residential, commercial, and recreational development. Upper portions, due to unstable soils contained within the core of the stockpile, are best suited for recreation.
Stockpile Type:	Overburden
Ownership / Size:	City of Virginia [approx. 45 acres]
Assessment:	This is a near-term project that could be initiated immediately. Design and engineering work is needed to pinpoint appropriate locations for development. Recreational uses could be identified, planned, and initiated in near-term. The site is on the Biwabik outcrop but its location within Virginia makes future mining unlikely. Near-term feasibility: Good

QC-2 Fairview

Location:	Virginia
Project Description:	Technically not a stockpile or mine disturbed site, this project location lies immediately adjacent to a former mine. It would be an extension of an earlier residential development to the southeast where the view over a former mine is the main attraction. This would be a residential development.
Stockpile Type:	N.A.
Ownership / Size:	City of Virginia [approx. 5 acres]
Assessment:	This is a near-term project that could be initiated immediately. Design and engineering work is needed to pinpoint appropriate locations for development. That would be followed by securing a developer. The site is on the Biwabik outcrop but its location within Virginia makes future mining unlikely. Near-term feasibility: Good

MINELAND REDEVELOPMENT PROJECT

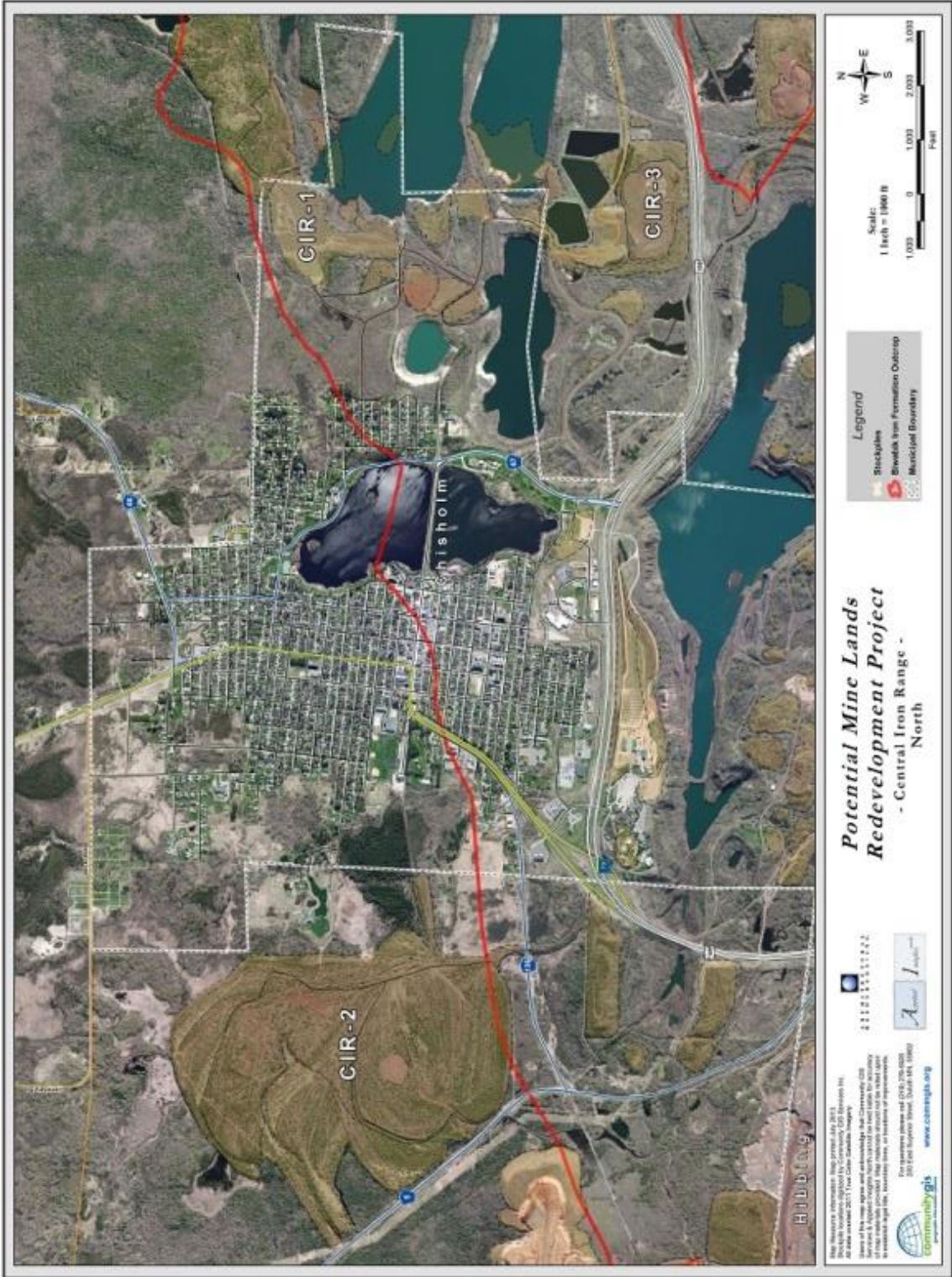
QC-3 Rockridge

Location:	Mt Iron
Project Description:	This project is now possible as a result of the relocation of CR 102 as part of expansion of the MinnTac east pit. The city has designated it for commercial development as a direct expansion of its successful site to the east. MinnTac is paying for the road construction and funds have been secured for basic utility installation. The project would involve design of a grading plan and platting of the proposed commercial area.
Stockpile Type:	Surface overburden
Ownership / Size:	Mt. Iron EDA [approx. 55 acres]
Assessment:	This is a near-term project that could be initiated in conjunction with construction of CR 102 in 2013/14. The site is immediately south of the southern boundary of the Biwabik outcrop and mining is unlikely. Near-term feasibility: Good

QC-4 Iroquois Pit Lake Overlook

Location:	Mt Iron
Project Description:	The Wacootah Mine Overlook will be eliminated as part of the expansion of MinnTac's east pit. The city would like to develop another such overlook and this site is probably the best opportunity. This would be a recreational development with minimal infrastructure. The first step is to assess the potential to locate and develop a suitable and attractive overlook at this point.
Stockpile Type:	Rock / surface overburden
Ownership / Size:	Private [approx. 20 acres]
Assessment:	This is a near-term project, relatively low-cost project that could be undertaken immediately. The initial assessment work could be done in conjunction with the Rockridge project. This site is on the Biwabik outcrop but future mining in this area is unlikely and definitely not within the next 20 years. Near-term feasibility: Fair

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CIR-1 Twin City Mine Pit

Location:	Chisholm
Project Description:	This area has long been promoted for residential and/or recreational development. It is suggested here that it be considered for recreational uses. This site could be tied to adjacent state and tax-forfeit lands to the north (Division Hill area) as the location for a mixed recreation and residential development.
Stockpile Type:	Overburden
Ownership / Size:	Private [approx. 60 acres]
Assessment:	This has to be considered a short-term site given its location on the northern edge of the Biwabik Iron Formation outcrop and its relative distance from the nearest development in Chisholm. A number of recreational uses could be contemplated for this area. Near-term feasibility: Fair

CIR-2 Chisholm Industrial Park West

Location:	Chisholm
Project Description:	Chisholm's recently adopted comprehensive plan identifies this area as a future industrial park.
Stockpile Type:	Overburden and rock / lean ore on eastern half
Ownership / Size:	Private [approx. 535 acres]
Assessment:	This is an ideal long-term development site located north of the Biwabik Iron Formation outcrop. The lean ore area on the east side could be avoided, have its rights acquired, or used for less intensive uses. Chisholm's comprehensive plan identified this site for future industrial development given its location north of the outcrop and along what could be the rerouted alignment of CR 5 (necessitated by anticipated mining through the current route). In all respects but one this site should be viewed as a "good" project but is downgraded to "fair" since the landowner has proven difficult to work with on development projects, including prior initiatives on this site. Near-term feasibility: Fair

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CIR-3 CIRSSD Treatment Plant Area

Location:	Balkan Township
Project Description:	Adjacent to Highway 169 and near the new CIRSSD wastewater treatment plant this area has long been considered for industrial and/or commercial development.
Stockpile Type:	Overburden / rock / some lean ore mixed in
Ownership / Size:	Private [approx. 80 acres]
Assessment:	This is a difficult site to assess. It lies on the Biwabik Iron Formation outcrop. However, it lies near the highway, a major new public facility, and may be on or near the divide between two drainage systems, which divide may have to be retained regardless of the ferrous resource. At any rate, it is unlikely that mining will occur here in the near-term. The presence of lean ore in the stockpile may mean future extraction or need to acquire rights to this material. Near-term feasibility: Fair

CIR-4 Boy Scout Hill

Location:	Hibbing
Project Description:	Located along Highway 169 as it heads toward Chisholm, this site already contains several apartment buildings. However, only part of the stockpile has been developed. The site's ideal location and the fact that it has development make it particularly attractive for future residential development. In addition, only a single road provides access to the existing housing; there is a need to provide a second route in the event of emergencies.
Stockpile Type:	Surface overburden / rock
Ownership / Size:	Private and public [approx. 70 acres]
Assessment:	This is a long-term project that could be undertaken as quickly as development resources could be assembled. Clearly, market conditions are critical but the site is prime for development. Near-term feasibility: Good

MINELAND REDEVELOPMENT PROJECT



MINELAND REDEVELOPMENT PROJECT

CIR-5 Highland Park

Location:	Hibbing
Project Description:	This site is located in east central Hibbing near the Fairview Hospital. It is partially developed. Its location and elevation makes it an exceptionally attractive residential development site.
Stockpile Type:	Surface overburden / rock
Ownership / Size:	Private [approx. 45 acres]
Assessment:	This is a long-term project that could be undertaken as quickly as development resources could be assembled. Clearly market conditions are critical but the site is prime for development. One reason for the area not being fully developed has centered on the lack of capacity of one owner to undertake a large-scale project. This is not, however, an insurmountable obstacle. Near-term feasibility: Good

CIR-6 Ansley Hills

Location:	Hibbing
Project Description:	Lying immediately adjacent to existing residential development this stockpile has potential for extending that neighborhood further east.
Stockpile Type:	Surface overburden
Ownership / Size:	Private [approx. 115 acres]
Assessment:	This is a long-term project even though it lies south of the Biwabik Iron Formation outcrop. It is adjacent to existing residential development which lessens the odds that this area would be mined in the future. Near-term feasibility: Fair

MINELAND REDEVELOPMENT PROJECT

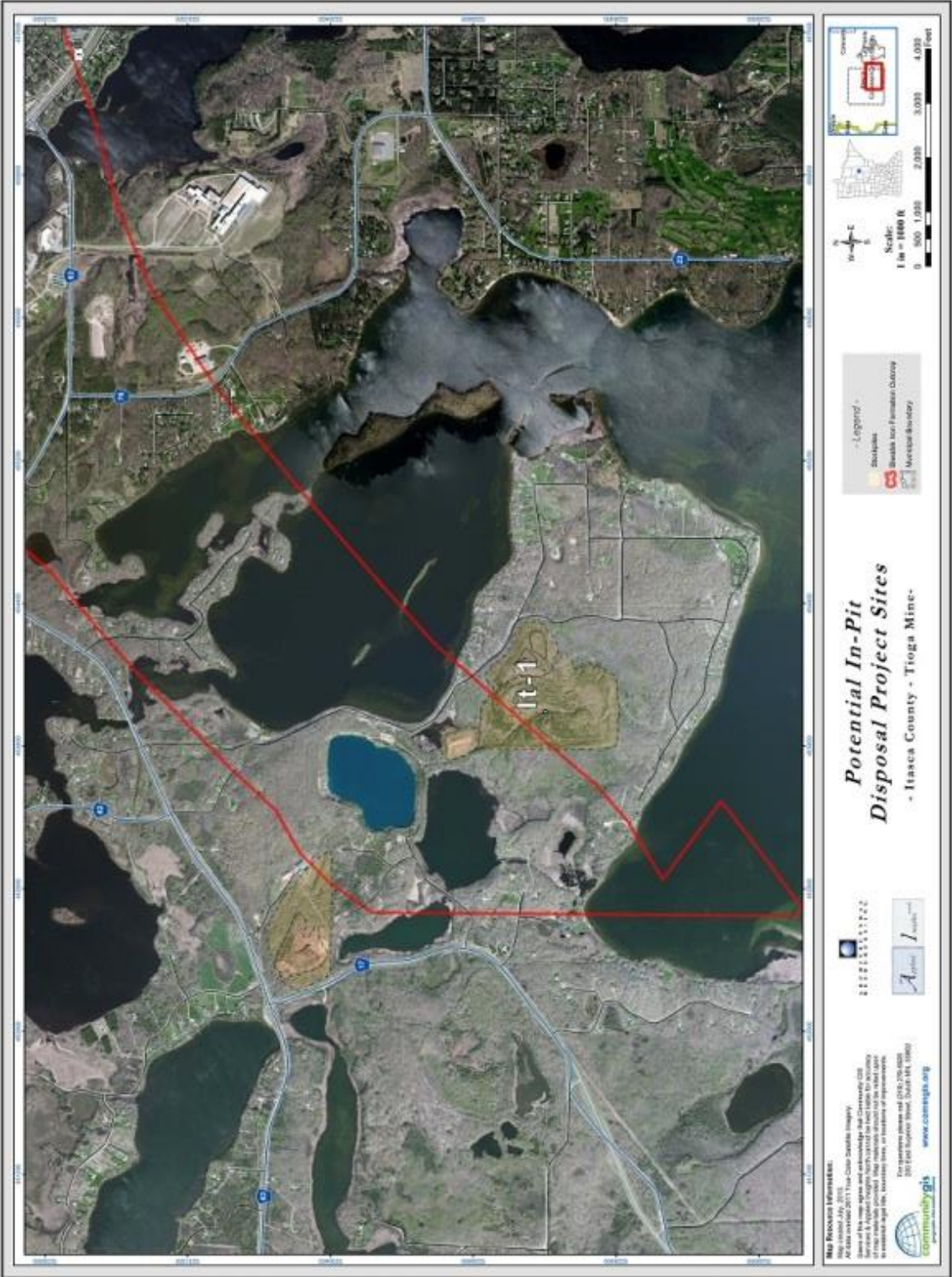
CIR-7 County Landfill Area

Location:	Hibbing
Project Description:	This series of stockpiles around the county transfer station / demolition landfill could be transformed into a recreational facility, perhaps for OHV use.
Stockpile Type:	Overburden / rock
Ownership / Size:	Private [approx. 350 acres]
Assessment:	City in conjunction with MPCA is devising a special zone for this area due to possible migration of methane from former landfill activities. This will limit use of land in this area. One possible use might be motorized recreation providing a facility similar to, but smaller in scale, to that which exists in Gilbert. Near-term feasibility: Low

It-1 Tioga Mine

Location:	Cohasset
Project Description:	This is a complete site composed of former natural ore mine pit lakes and adjacent stockpiles. There is already an access to the main pit lake. Site has been proposed by the city and DNR as a non-motorized trail oriented recreation area with primary use being mountain biking.
Stockpile Type:	Overburden / rock.
Ownership / Size:	State [approx. 530 acres]
Assessment:	DNR has given permission to city and private club to develop trails on the site. Near-term feasibility: Good

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Recommendation for Informational Signage

Many people and entities are concerned that developing stockpiles may undesirably encumber future ore resources. The oft-mentioned sentiment was that even for minimally developed sites it is “easier to give than to take away.” And since future mining might not occur for 20 or more years, people and communities could easily forget the original awareness of the probable temporary nature of the improvement. One solution could be to sign the properties to educate the public about the area and its mineral resource and forewarn them that the site might one day be mined.



3.0 In-pit Pit Lake Shoreland Development Sites

3.1 Purpose

The purpose of this project was to identify locations for implementing innovative approaches to in-pit disposal to create future lakeshore land.

The list of sites is intended to be used by the mines and Minnesota DNR Minerals Division to encourage broad application of innovative reclamation techniques. They could also be eligible for Innovation Grant support from the IRRRB.

3.2 Prior and Emerging Work

The IRRRB has used its Innovation Grant program to finance projects designed to reclaim stockpiles and conduct in-pit disposal in ways that help shape the landscape for the post-mining future. These projects include:⁹

- United Taconite Stockpile #1406
Innovatively shaped and vegetated a surface overburden stockpile adjacent to the heavily traveled Highway 53 corridor.
- KeeTac Stockpile #43
Shape and vegetate a rock stockpile. Such stockpiles tend to be more challenging to contour and vegetate than non-rock overburden stockpiles.
- Hibbing Taconite: In-Pit Shoreland Development Project
Project formed basis for this current effort. Design and build new mine pit lake shoreline, shallow pit lake areas suitable for aquatic life, fish spawning areas, and usable upland.
- Hibbing Taconite: Stockpiles 4090 and 5012
Build, shape and vegetate two stockpiles adjacent to Kleffman Road, a busy county road three miles east of Hibbing and one mile north of Kelly Lake. Phase II of this project includes developing land-shaping templates for use by mining engineers.
- Northshore Mining: Peter Mitchell Pit Master Landscape Concept Plan
Phase I provided a plan for future uses and multiple landscape opportunities for the mine once it is closed, including vegetation enhancement, littoral zones, islands, wetlands, and shoreland. Phase II will produce preferred working schematic plans for implementation.

3.3 Site Selection Criteria

Attributes of desirable potential project sites were generated by the prior report and through discussions with mine engineers. Site and project criteria are:

1. Location is within an active mine.
2. Surface and minerals are owned by public (State or tax-forfeit).

⁹ *Innovation Grant History FY 2006-2013*, IRRRB, April 2013.

3. Size has to be sufficient to make project worth undertaking.
4. Site has to be permanent (relative to future ferrous mining).
5. Project has to qualify for divergence from required DNR reclamation standards.
6. Project should save mining costs and at a minimum not increase costs.
7. Project should increase/maximize storage capacity.

During one of the mine meetings, an engineer humorously noted that there really isn't anything that is permanent in a mine. Nearly everything, he noted, is susceptible to being moved in the future, even if current operations do not foresee that event.

3.4 Selection Process

Potential sites were identified through meetings of the Consultant Team with staff from each mine. Meetings were held with Hibbing Taconite (Cliffs Natural Resources), United Taconite (Cliffs Natural Resources), US Steel/MinnTac, and US Steel/Keewatin Taconite.

The draft version of this report was sent to the mines for their review and comment.

The Peter Mitchell mine operated by Cliffs Natural Resources was not included in this process since a whole-mine reclamation plan is being prepared for that facility by the University of Minnesota under another Innovation Grant.

Arcelor-Mittal's Minorca mine was also not included in this process since another recent Innovation Grant process used charettes to create reclamation concepts for the facility.

3.5 Potential Shoreland Sites

United Taconite

No project sites were identified at the United Taconite mine in Eveleth. The nature of the mining operation there precludes any assurances of "permanent" shoreline locations; at least as mine operations and configuration determine today.

Hibbing Taconite

HibTac is the location of previous Innovation Grant project, the so-called 5036 project site. Discussions with mine staff concluded there were few additional opportunities within the mine given these factors:

- In-pit disposal where the intent is to create permanent future shoreline only works with locations where the public owns both the mineral and surface rights.
- The only location within the mine that meets that ownership situation is the remainder of the 5036 section, which is State owned.
- The issue with other dumping areas is they are not necessarily permanent since there is a potential non-ferrous resource under many of them and/or future mine operations may require moving the stored material.

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HT-1 Remainder of Site 5036

Location:	HibTac Mine
Project Description:	Roughly a fifth of this section was shaped and vegetated under the prior Innovation Grant project. A small area in the southwest corner is yet to be mined; rest is mined out with a overburden rock pile that may move or be covered and a mine haul road that will remain active for duration of mine operations. Areas for potential future in-pit disposal and land shaping include the yet-to-be-mined area, the overburden stock pile, and the northeast quadrant.
Ownership:	State
Assessment:	This is an excellent location for a future in-pit project given the presence of the existing project, public ownership, and an existing stockpile that offers opportunity for additional disposal and shaping.

US Steel / MinnTac

Discussions with MinnTac mine engineers highlighted the fact that the term “permanent” is a moving target in a mine. In that same line of thinking, they do not want to create wetlands in places where they might have to be moved again in the future.

MinnTac’s opportunities are in two varieties. First, there are existing in-pit projects or stockpiles that may have potential for enhancement, which are the focus of this project. Second, there are several stockpiles outside of the current pits that could be reshaped and more appropriately vegetated under the LVP Innovation Grant program; these are outside the primary focus of this project but are included so as not to lose sight of the potential for their improvement.

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MT-1 Kinney Creek Project Expansion

Location:	US Steel / MinnTac Mine
Project Description:	As part of a prior mine expansion, MinnTac is required to replace the headwaters of Kinney Creek along the north rim at the west end of the West Pit immediately north of the town of Kinney. This is a 300-400 acre area within which the mine is creating a large open water feature, shallow water littoral area, wetlands and associated uplands. The mine is receptive to possible expansion of this project beyond the mandated area and features.
Ownership:	Private
Assessment:	This is an excellent project concept in that it provides for additional in-pit disposal in a manner that amplifies the value of another permanent ecological feature.

MT-2 Reshape East Pit Stockpiles

Location:	US Steel / MinnTac Mine
Project Description:	The mine has created a number of stockpiles over mined-out portions of the East Pit. Much of the volume of these stockpiles will lie below the ultimate pit lake water level. The stockpiles are in the conventional “wedding cake” tiered shape. The mine would like to explore the possibility of reshaping these stockpiles to gain storage capacity by creating more natural slopes for areas below the water level and shaping the littoral and upland areas into more varied and ecologically desired formations.
Ownership:	Private
Assessment:	This project could be a good marriage of mine objectives – more storage capacity – and DNR reclamation goals – more natural final contours supporting the ultimate landscape.

MinnTac engineers identified four existing overburden piles that could be prime candidates for shaping through additional deposition of material and vegetating in a more innovative manner. All four are on the Biwabik Iron Formation outcrop but are in places that MinnTac will not mine, generally due to very low grade ores for their type of processing. While none of these are in-pit disposal sites, they are good potential projects for innovative reclamation.

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MT-3 EE Overburden Stockpile

Location:	US Steel / MinnTac Mine
Project Description:	Located east of the East Pit adjacent to Highway 53, this stockpile is very visible. Additional material could be added to it to allow for desired contouring and as substrate for more natural vegetation.
Ownership:	Public with small area of private
Assessment:	This is an excellent project for additional innovative reclamation work and design. It is high degree of visibility means this effort would have positive impacts for the area.

MT-4 Costin Overburden Stockpile

Location:	US Steel / MinnTac Mine
Project Description:	This stockpile is situated immediately west of Old Downtown Mountain iron. It is highly visible from that portion of the community. Additional material could be added to it to allow for desired contouring and as substrate for more natural vegetation.
Ownership:	Private
Assessment:	This is also a good candidate for further innovative reclamation work. Although it is on the formation, there is a high probability it will not be mined for the foreseeable future.

MT-5 AA/BB Overburden Stockpiles

Location:	US Steel / MinnTac Mine
Project Description:	These twin stockpiles are west of Old Downtown Mountain Iron. Combined, they cover a large area and are visible from Highway 169. There is considerable opportunity to dispose more material as the basis for shaping into more attractive contours and to provide substrate for more natural vegetation.
Ownership:	Private
Assessment:	This is an excellent project for innovative reclamation work and design. It is highly visible, meaning the effort would have positive impacts for the area. Although they lie on the formation, there is a high probability it will not be mined for the foreseeable future.

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US Steel / KeeTac

In addition to the two projects described below, KeeTac currently is involved with an IRRRB Innovation Grant on the mine's Dump 43 in Section 22. The intent is to allow for a higher lift with a more natural slope. This is a rock stockpile, which makes it more challenging to contour and vegetate than non-rock overburden stockpiles.

KT-1 **Section 23**

Location:	US Steel / KeeTac Mine
Project Description:	This is a future stockpile site within the mine along its north rim.
Ownership:	State and private
Assessment:	This site provides an excellent opportunity to design an in-pit disposal area. The site is owned by the State and US Steel, which enhances its viability.

KT-2 **Section 18**

Location:	US Steel / KeeTac Mine
Project Description:	This is another long-range disposal area. It encompasses a large area, will take about 25 years to complete, and will extend above the projected ultimate pit lake water level.
Ownership:	Private
Assessment:	This site also provides an excellent opportunity to design an in-pit disposal area well in advance of its actual development.

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Appendix A: CIRI Brownfield Projects

The following are the brownfield project sites identified by the Iron Range Brownfield Assessment Area Coalition organized by the Central Iron Range Initiative (CIRI). For more detailed information on each site visit CIRI's website at www.ciri.org.

1. Corner of State and Culver: Buhl (0.81 acres)
2. Mesaba Home: Buhl (0.58 acres)
3. Gun Club Site: Bovey (16.17 acres)
4. Burn Jungle Site: Bovey (101.5 acres)
5. Former Rail Corridor: Bovey (73.5 acres)
6. Railroad Tie Site: Bovey (3.86 acres)
7. Chisholm Wastewater Treatment Plant: Chisholm (12.0 acres)
8. Tioga 40: Chisholm (16.31 acres)
9. McCahill Property: Chisholm (80.0 acres)
10. Alice Location: Eveleth (12.5 acres)
11. Eveleth Snow Dump: Eveleth (33.37 acres)
12. East Shore of Lake Ore-Be-Gone: Gilbert (N.A.)
13. Lind Mine: Grand Rapids (26.49 acres)
14. Former Hibbing GMP: Hibbing (20.0 acres)
15. Hibbing BMX Bike Park: Hibbing (3.89 acres)
16. Former Dupont Plant: Hibbing (N.A.)
17. West Pellet Avenue Industrial Park: Keewatin (8.31 acres)
18. Bozich Farm Site: Nashwauk (84.45 acres)
19. South Industrial Park Site: Nashwauk (112.0 acres)
20. West Midland Station: Nashwauk (0.80 acres)
21. North Overburden Site: Nashwauk (14.75 acres)
22. SMDC East Range Clinic: Virginia (4.25 acres)
23. Former County Garage: Virginia (0.6 acres)
24. Trap Shooting Range: Virginia (2.2 acres)
25. Former Stryder/Robinson Lot: Virginia (0.6 acres)
26. AEOA Building: Virginia (1.1 acres)
27. Former Greiner's Troy Building: Virginia (0.33 acres)
28. Former Railyard: Virginia (71.0 acres)
29. Staver Foundry: Virginia (2.71 acres)

Appendix B: 5036 Site Update

Winter 2012 and Spring 2013

The mine began efforts to strike off the initial dump piles but found the frozen ground exceptionally difficult to move.

A meeting in February with the Consultant Team and HibTac mine engineering, reclamation, and operations staff generated a “made on the fly” decision with dramatic repercussions for the project. Realizing that the composition and moisture level of the dumped material made striking off impossible in both frozen and thawed conditions, the decision was made to immediately redirect current operations to: prepare a dumping area, bring in additional material, and use it to shape the site as per the planned design (i.e., fill in the “divots” in the original hoosier dumping process and create the ridges).

The work above will be done in Zone A, the area above the 1450’ contour elevation and covering approximately 80 acres.

This is the area that will be seeded with the native innovative seed mixes.

Spring 2013

An additional 155,160 cubic yards of fill was deposited and the remaining hoosier dumps struck off. HibTac has begun with shaping the landscape to match the grading plan.

Summer 2013

Mine will continue shaping the landscape above the 1450’ contour.

Fall 2013

Mine will finish shaping the site and begin seeding per the planting plan.

Once the site is planted, a project close out report will be submitted to the IRRRB.

[Photographs courtesy of Hibbing Taconite]

Site prior to new round of disposal.



New round of disposal.



Site shaping in 2013.



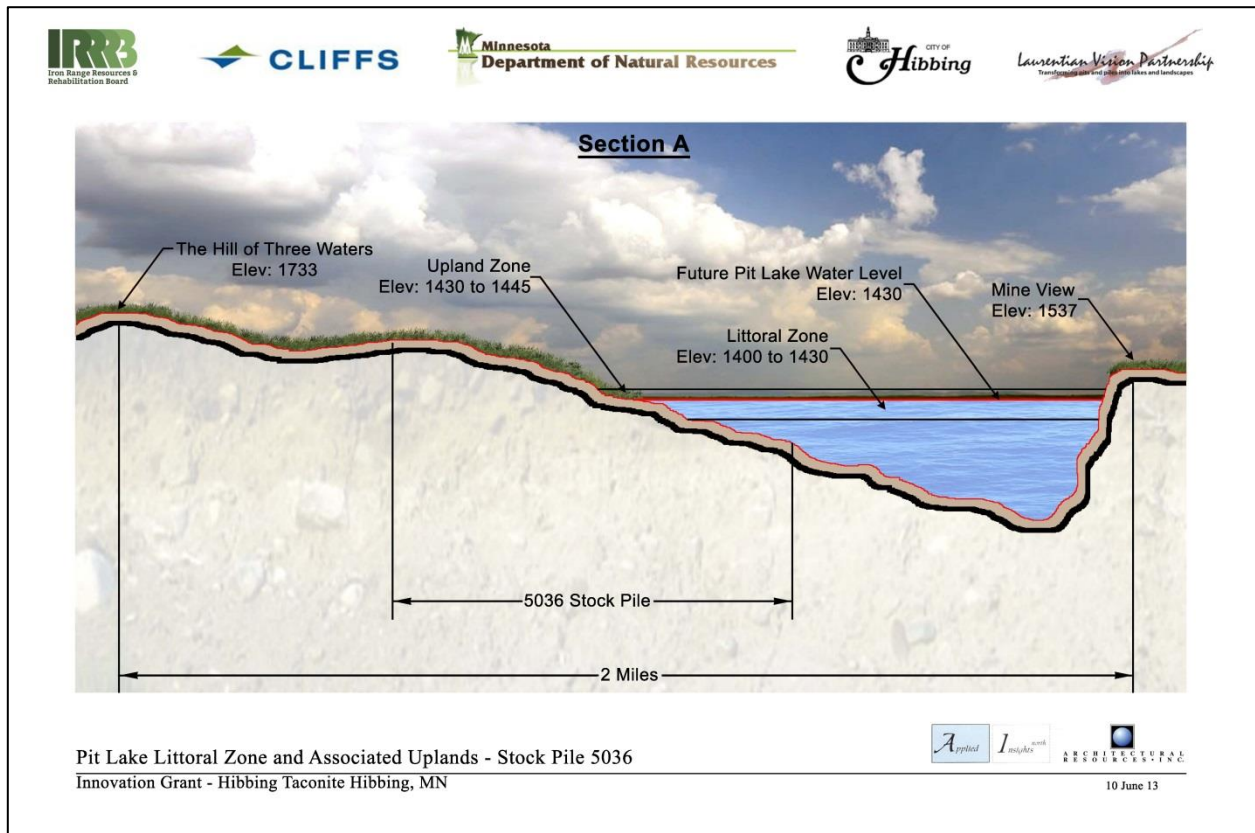
Site Response: Summer 2013

Even prior to implementation of the vegetation plan, the shaped site is responding to the design. The wetland is holding water and is naturally seeding from nearby sources; plants include ash, aspen, and fir as well as emergent aquatic species. The stream draining the wetland is conforming to the designed contours and has continually flowed since its inception.



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The image below shows a cross-sectional view (along red line in image to right) of the HibTac mine pit once the post-mining lake has formed. It indicates the location of the 5036 project site relative to the littoral zone, shore/upland zone, and the higher land area.



Appendix C: Itasca County Mining Objective

The Itasca County comprehensive plan and implementing zoning ordinance has a fairly rigorous approach to future mining activity. The following is the Mining Industry objective language from the just updated document.

Mining Industry Objective

Support the continuation and expansion of the mining industry. Encourage value-added processing and use of mining products in the county and ensure availability of mineral resources for mining while mitigating the impact on surrounding areas.

1. Mining industrial zone - Designate industrial zones using the Mining Overlay Districts, A, B and C with mining as the priority permitted use that includes identified and potential iron ore mining resources. In addition, designate adjacent lands necessary for processing minerals and storing overburden, lean ore, tailings and other mining activities in land packages large enough to allow such activities.
2. Cooperative planning - Encourage coordination and cooperation with the Western Mesabi Mine Planning Board, federal, state, county and local governmental units to ensure consistency across governmental boundaries of policies and ordinances, to prevent fragmentation of land into areas that are too small for mining development and conflicting policies and ordinances that lead to discouraging mining development.
 - a. Gravel, aggregate resources and mining - Maintain accessibility to these resources.
 - b. Designate - Locate and identify sand, gravel and aggregate resources.
 - c. Plan - Plan for long term extraction access to sand, gravel, and aggregate resources.
 - d. Development - Develop regulations to guide development.
 - e. Recycle – When reasonably practical, recycle bituminous, clean concrete, and aggregate material.
3. Mining/Aggregate operations - Maintain guidelines for visual screening and other methods to reduce the visual, dust, traffic and other impacts of mining operations on neighboring land uses. Other mineral resources - Encourage exploration for other mineral resources and plan for their development by formulating well-considered regulations and policies for which the county has jurisdiction.
4. Research and technology - Support research and encourage new technologies for development of the County's mineral resources and utilize local expertise for guidance and planning with regard to short term and long term plans, policy development and uses for the mineral resource.
5. Mine area reclamation - Facilitate reclamation and stabilization of older mine areas for potential future use in cooperation with Iron Range Resources and Rehabilitation, Minnesota Department of Natural Resources Land and Minerals Division and Western Mesabi Mine Planning Board.