

# Mineral Potential Evaluation Section (MPES) Report 380: Aggregate Resource Potential in Parts of Northern St. Louis and Lake Counties, MN

## - Sand and Gravel Potential - report380\_sgp

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### Metadata Summary

<b>Originator</b>	Minnesota Department of Natural Resources, Division of Lands and Minerals, Mineral Potential Evaluation Section
<b>Abstract</b>	This dataset consists of information about the geology, geological characteristics, and sand and gravel potential of 267 map units. Five fields relate to the surficial geology of the map unit, including a unique map unit id, sediment, landform, surficial geology description, and dominant lithology. Five fields relate to sand and gravel characteristics, including probability, quality, texture, overburden thickness, deposit size, and sand and gravel thickness. These characteristics were used to calculate the aggregate potential of the map unit for sand and gravel. Two additional map units found in this dataset did not evaluate the aggregate potential in the land types; ferrous mining lands and water features. Ferrous mining lands are the locations of current or inactive ferrous mining, mining stockpiles, mining roads, tailing basins, etc. Water features were taken from MN DNR 1:24,000 hydrography lakes and rivers spatial dataset.
<b>Browse Graphic</b>	none available
<b>Time Period of Content Date</b>	2010
<b>Currentness Reference</b>	Data were gathered in the fall of 2009 and the spring of 2010. Data were compiled and interpreted in the spring and summer of 2010.
<b>Access Constraints</b>	Acknowledgement of the Minnesota Department of Natural Resources is appreciated for products derived from these data.
<b>Use Constraints</b>	Acknowledgement of the MN DNR is appreciated in products derived from these data.
<b>Distributor Organization</b>	Minnesota Department of Natural Resources, Division of Lands and Minerals
<b>Ordering Instructions</b>	<p>The MPES Report 380's spatial datasets (shapefiles &amp; file geodatabase) are included in the file report380data.zip, accessible from the MN DNR Aggregate Mapping web page: <a href="http://www.dnr.state.mn.us/lands_minerals/aggregate_maps/completed/index.html">http://www.dnr.state.mn.us/lands_minerals/aggregate_maps/completed/index.html</a></p> <p>The spatial datasets include: sand and gravel resource potential, clay and silt resource potential, field observations, aggregate pits, Minnesota Geological Survey (MGS) County Well Index (CWI) data points, MGS CWI stratigraphy table, sieve analysis database, Mn/DOT Aggregate Source Information System (ASIS) points, and Mn/DOT ASIS pit quality table.</p>
<b>Online Linkage</b>	<a href="#">Click here</a> to download data. (See Ordering Instructions above for details.) By clicking here, you agree to the notice in "Distribution Liability" in Section 6 of this metadata.

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### Full Metadata

# Mineral Potential Evaluation Section (MPES) Report 380: Aggregate Resource Potential in Parts of Northern St. Louis and Lake Counties, MN

## - Sand and Gravel Potential - report380\_sgp

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Section 1	Identification Information	<a href="#">Top of page</a>
<b>Originator</b>	Minnesota Department of Natural Resources, Division of Lands and Minerals, Mineral Potential Evaluation Section	
<b>Title</b>	Mineral Potential Evaluation Section (MPES) Report 380: Aggregate Resource Potential in Parts of Northern St. Louis and Lake Counties, MN - Sand and Gravel Potential - report380_sgp	
<b>Abstract</b>	<p>This dataset consists of information about the geology, geological characteristics, and sand and gravel potential of 267 map units. Five fields relate to the surficial geology of the map unit, including a unique map unit id, sediment, landform, surficial geology description, and dominant lithology. Five fields relate to sand and gravel characteristics, including probability, quality, texture, overburden thickness, deposit size, and sand and gravel thickness. These characteristics were used to calculate the aggregate potential of the map unit for sand and gravel. Two additional map units found in this dataset did not evaluate the aggregate potential in the land types; ferrous mining lands and water features. Ferrous mining lands are the locations of current or inactive ferrous mining, mining stockpiles, mining roads, tailing basins, etc. Water features were taken from MN DNR 1:24,000 hydrography lakes and rivers spatial dataset.</p>	
<b>Purpose</b>	To summarize the geological characteristics, surficial geology, and aggregate potential (sand, gravel) of the different units. To help categorize the geological characteristics and incorporate them into a model to help determine the aggregate potential of the deposit.	
<b>Time Period of Content Date</b>	2010	
<b>Currentness Reference</b>	Data were gathered in the fall of 2009 and the spring of 2010. Data were compiled and interpreted in the spring and summer of 2010.	
<b>Progress</b>	Complete	
<b>Maintenance and Update Frequency</b>	None planned	
<b>Spatial Extent of Data</b>	Northern St. Louis County and Lake County, Minnesota	
<b>Bounding Coordinates</b>	-92.30 -91.65 47.92 47.45	
<b>Place Keywords</b>	St. Louis County, Lake County, Minnesota	
<b>Theme Keywords</b>	aggregate potential, sand and gravel, surficial geology, geological characteristics, probability, quality	

**Theme Keyword  
Thesaurus**

**Access Constraints** Acknowledgement of the Minnesota Department of Natural Resources is appreciated for products derived from these data.

**Use Constraints** Acknowledgement of the MN DNR is appreciated in products derived from these data.

**Contact Person Information** Aggregate Resource Mapping Program, Industrial Minerals Geologist or GIS Specialist  
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500 Lafayette Road  
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E-mail: [aggregatemap@state.mn.us](mailto:aggregatemap@state.mn.us)

**Browse Graphic** none available

**Browse Graphic File  
Description**

**Associated Data Sets** The MPES Report 380's spatial datasets (shapefiles & file geodatabase) are included in the file report380data.zip, accessible from the MN DNR Aggregate Mapping web page:  
[http://www.dnr.state.mn.us/lands\\_minerals/aggregate\\_maps/completed/index.html](http://www.dnr.state.mn.us/lands_minerals/aggregate_maps/completed/index.html)  
The spatial datasets include: sand and gravel resource potential, clay and silt resource potential, field observations, aggregate pits, Minnesota Geological Survey (MGS) County Well Index (CWI) data points, MGS CWI stratigraphy table, sieve analysis database, Mn/DOT Aggregate Source Information System (ASIS) points, and Mn/DOT ASIS pit quality table.

**Section 2**

**Data Quality Information**

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**Attribute Accuracy**

**Logical Consistency** Overshoots and undershoots were fixed using topology in ArcGIS 9.3, thus the lines have been checked and completed.

**Completeness** The sand and gravel potential map units were delineated by the interpretation of aerial photographs at a 1:40000 scale. These interpretations were plotted on 1:24000 USGS topographic maps. These delineations and unit descriptions were field checked and revised. The final coverage was digitized onscreen using ArcGIS 9.3.1 with USGS DOQs (at a scale of 1:12000) and USGS DRGs (at a scale of 1:24000) as the spatially registered backdrops. This was a reconnaissance-scale survey and was mapped at 1:50000.

**Horizontal Positional Accuracy** 1:50000

**Vertical Positional Accuracy** Not applicable.

**Lineage** Color, color-infrared (CIR), and black-and-white aerial photographs were used to delineate geological landforms and aggregate resources. Sources include; Stereoscopic pairs of color infrared aerial photographs (NAPP, 9in x 9in at 1:40000 scale, April 1991 and April 1992); On-screen landform analysis was used with FSA (Farm Services Administration) Color Aerial Photography collected from the following years, with their associated pixel resolution in parenthesis; 2003-04 (1 meter), 2005 (10 meter), 2006 (10 meter), 2008 (1 meter), 2009 (1 meter); and FSA CIR (Color Infrared) Imagery collected in 2008 (1 meter). Aerial photographic interpretation was completed with a glacial mapping technique known as the landsystems approach. This technique relies on the principle that depositional glacial landforms are composed of a predictable range of sediments, some consisting of sorted sand and gravel and others consisting of silts, clays, or unsorted materials. In addition to the landsystems approach, several other general characteristics helped determine the nature of the material, such as tonal contrasts, texture, context, shape, size, trend, association, and patterns. These characteristics can help determine the properties of the

surface material (e.g., certain vegetation grows on well drained soils such as sand and gravel, which on an aerial photograph has a distinctive texture, tone, pattern, etc.).

The landform recognition approach (part of the landsystems approach) was also used when interpreting the topography within the MPES Report 380 project boundary. Glacial landforms have distinct and unique shapes and patterns that can be observed in their topographic expression. Topographic maps (USGS 1:24000), digital elevation models, and shaded relief maps were all used to help delineate these sand and gravel bearing features. The topographic expression of a feature can also be observed by looking at the distribution of lakes and wetlands. For example, a string of lakes and/or wetlands may be the signature of a glacial outwash channel or collapsed channel, which may host sand or gravel deposits. Several aggregate bearing features were located using this technique (outwash channels, collapsed channels, glaciofluvial fans, eskers, and terraces).

Other mapping sources include the Soil Survey Geographic Database for St. Louis County, Minnesota, published September 3rd, 2009, from the USDA-NRCS (United States Department of Agriculture - Natural Resource Conservation Service); a combination of 30-meter and 10-meter DEMs (Digital Elevation Models) from the USGS National Elevation Dataset and a 5-meter DEM covering the Mesabi Iron Range from the MN DNR; and CWI (County Well Index) database of located and unlocated wells from the Minnesota Department of Health and MGS (Minnesota Geological Survey), downloaded in June 2009.

Related geological maps were referenced including: Pleistocene Geology of the Embarrass Area, St. Louis County, MN by J. Lehr, 1991; USGS Bulletin 1331-C: Surficial Geology, Mesabi Vermilion Iron Range, Northeastern Minnesota, by T. Winter, R. Cotter, and H. Young, 1973; Glacial Geomorphology for the Laurentian Divide area, St. Louis and Lake Counties, Minnesota by J. Lehr and H. Hobbs, 1992 in MGS Guidebook 18; Distribution of Surficial Materials in the Copper-Nickel Region, Northeastern Minnesota by P. Olcott, 1976, modified from Prettyman, Eng, Winter and others 1973; DNR Report 262, Plate 3 Glacial Geology Map: Glacial Drift Geochemistry for Strategic Minerals, Duluth Complex, Lake County, Minnesota, 1989; MGS Miscellaneous Map M-164, Mesabi Iron Range Surficial Geology, by C. Jennings and W. Reynolds, 2005; MGS Miscellaneous Map M-163, Bedrock Geology of the Mesabi Iron Range, by M. Jirsa, V. Chandler, and R. Lively, 2005 and MGS State Map Series S21: Preliminary Bedrock Outcrop Map, 2010. Gravel pits and quarries were extracted from the several sources and reviewed in the field or on air photos.

Source Scale

Denominator

50000

Section 3	Spatial Data Organization Information	<a href="#">Top of full metadata</a>	<a href="#">Top of page</a>
Native Data Set Environment	ArcGIS 9.3.1 from ESRI		
Geographic Reference for Tabular Data			
Spatial Object Type	Vector		
Vendor Specific Object Types	Polygon		
Tiling Scheme	MPES Report 380 Project Boundary		

Section 4	Spatial Reference Information	<a href="#">Top of full metadata</a>	<a href="#">Top of page</a>
Horizontal Coordinate Scheme	UTM		
Ellipsoid	GRS80		
Horizontal Datum	NAD83		

<b><i>Horizontal Units</i></b>	Meters
<b><i>Distance Resolution</i></b>	
<b><i>Altitude Datum</i></b>	Not applicable
<b><i>Depth Datum</i></b>	Not applicable
<b><i>UTM Zone Number</i></b>	15E

<b>Section 5</b>	<b>Entity and Attribute Information</b>	<a href="#">Top of full metadata</a>	<a href="#">Top of page</a>
<b><i>Entity and Attribute Overview</i></b>	The polygons were delineated to represent geological features, geological characteristics, and aggregate potential for sand and gravel.		
<b><i>Entity and Attribute Detailed Citation</i></b>	Attribute values can be found in a table at the bottom of this document (report380_sgp.pdf). If you are viewing this metadata in ArcCatalog, from the .xml file, the attribute table is not displayed. You will have to refer to the 'report380_sgp.pdf' document included in the project zip file report380data.zip, which can be found at the following folder directory: report380data\resource\shapefiles\mn_dnr\metadata		

<b>Section 6</b>	<b>Distribution Information</b>	<a href="#">Top of full metadata</a>	<a href="#">Top of page</a>
<b><i>Publisher</i></b>	Minnesota Department of Natural Resources, Division of Lands and Minerals, Mineral Potential Evaluation Section		
<b><i>Publication Date</i></b>	2011		
<b><i>Contact Person Information</i></b>	Aggregate Resource Mapping Program Industrial Minerals Geologist or GIS Specialist Minnesota Department of Natural Resources, Division of Lands and Minerals 500 Lafayette Road St. Paul, MN 55155-4045 Phone: 651-259-5959 FAX: 651-296-5939 E-mail: <a href="mailto:aggregatemap@state.mn.us">aggregatemap@state.mn.us</a>		
<b><i>Distributor's Data Set Identifier</i></b>	MPES Report 380: Aggregate Resource Potential in Parts of Northern St. Louis and Lake Counties, MN		
<b><i>Distribution Liability</i></b>	The Minnesota Department of Natural Resources makes no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Department of Natural Resources assumes no responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.		
<b><i>Transfer Format Name</i></b>			
<b><i>Transfer Format Version Number</i></b>			
<b><i>Transfer Size</i></b>	mb for data, mb for associated maps		
<b><i>Ordering Instructions</i></b>	The MPES Report 380's spatial datasets (shapefiles & file geodatabase) are included in the file report380data.zip, accessible from the MN DNR Aggregate Mapping web page: <a href="http://www.dnr.state.mn.us/lands_minerals/aggregate_maps/completed/index.html">http://www.dnr.state.mn.us/lands_minerals/aggregate_maps/completed/index.html</a>		

The spatial datasets include: sand and gravel resource potential, clay and silt resource potential, field observations, aggregate pits, Minnesota Geological Survey (MGS) County Well Index (CWI) data points, MGS CWI stratigraphy table, sieve analysis database, Mn/DOT Aggregate Source Information System (ASIS) points, and Mn/DOT ASIS pit quality table.

### Online Linkage

[Click here](#) to download data. (See Ordering Instructions above for details.) By clicking here, you agree to the notice in "Distribution Liability" above.

## Section 7

### Metadata Reference Information

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#### Metadata Date

2011

#### Contact Person Information

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#### Metadata Standard Name

Minnesota Geographic Metadata Guidelines

#### Metadata Standard Version

2.1

#### Metadata Standard Online Linkage

<http://www.lmic.state.mn.us/gc/stds/metadata.htm>

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Table Name	Field Name	Begin Column	Definition	Valid Values	Descriptions
report380_sgp.dbf	SGPOT_ID		Number, 4	e.g., 100-999	Unique identifier for the field-mapping units.
	SEDIMENT		Text, 50	e.g., Bedrock Outcrop; Silt, and Sand over Till; Organics over Sand and Gravel; Sand and Gravel over Bedrock; see below text values and their descriptions for subsequent information. Multiple values may be used in descriptions.	General description of the dominant sediment material for each mapping unit.
				Bedrock	Presence of bedrock in the form of an outcrop, boulder or

					below sediment.
				Clay	Clay is very fine-grained sediment that is less than 0.004 mm in size.
				Gravel	Rock fragments of specific particle size that is larger than 2 mm and less than 63 mm.
				Organics	Soil that contains decaying organic matter.
				Mine Lands	Ferrous mining lands of current or inactive ferrous mining, stockpiles, tailing basins, mining roads, etc. These records were <b>not evaluated for their aggregate potential or sediment</b> . The records are sourced from the Mining Features shapefile as of December 2009. This individual shapefile is available from the MN DNR Division of Lands and Minerals.
				Not Available	Sediment was not evaluated in records containing water features.
				Sand	Rock fragments that range in diameter from 0.0625 to 2 mm.
				Sand with Gravel	Sediment that contains a mixture of rocks in varying sizes ranging from 0.0625 to 64 mm. This description is given to sediment that contains less than 15% by volume gravel.
				Sand and Gravel	Sediment that contains a mixture of rocks in varying sizes ranging from

					0.0625 to 64 mm. This description is given to sediment that contains greater than 15% by volume gravel.
				Silt	Rock fragments that have a diameter between 0.004 to 0.0625 mm.
				Till	A term used to describe the unsorted sediment deposited by glaciers- contains a mixture of clay, silt, sand, gravel, cobbles and boulders.
	SGPOT_DESC		Text, 125	e.g., Mostly till with isolated pockets of sand and gravel.	A summarized description of each mapping unit.
	LANDFORM		Text, 50	See Below	The geological landform associated with each mapping unit.
				Alluvial Valley	Valley carved by flowing water like a river, stream or creek valley.
				Beach	A feature that forms along a shoreline that usually consists of sorted silt, sands, gravels, and cobbles.
				Bedrock	Regions where bedrock topography control the landscape. Bedrock is at or near the surface thinly mantled with till or sorted sediment.
				Ferrous Mine Lands	Ferrous mining lands of current or inactive ferrous mining, stockpiles, tailing basins, mining roads, etc. These records were <b>not evaluated for their aggregate potential or sediment</b> . The records are sourced



					from the Mining Features shapefile as of December 2009. This individual shapefile is available from the MN DNR Division of Lands and Minerals.
				Glaciofluvial Feature	Landform created by the channelization of significant amounts of glacial meltwater. In this case, it is differentiated from outwash channel by its greater size and amount of deposited sediment.
				Ground Moraine	Till covered areas with irregular topography forming gently rolling hills or plains. It is accumulated under glacial ice as transports and deposits sediment.
				Ice Contact Feature	A landform consisting of sediments that was initially contained or bound by glacial ice. Steep slopes characterize these landforms where ice once existed. Common ice contact features in mpes380 include eskers, kames, and ice-walled lakes.
				Lake Plain	Characterized by a flat topography consisting of sands, silts, and clays formed by the impoundment of glacial meltwater forming a glacial lake.
				Linear Ridges	Linear features trending NNW-SSE within mpes 380 project boundaries (not perpendicular to glacial flow but in a contrary direction).

					Interpreted on some geologic maps as a rogen moraine.
				Outwash Channel	Stratified sediments, chiefly silt, sand, and gravel, removed or “washed out” from a glacier by meltwater streams and deposited in a channel or valley.
				Outwash Feature	A landform consisting of stratified sediments, chiefly sand and gravel, removed or “washed out” from a glacier by meltwater streams and deposited in front of or beyond the end moraine or the margin of an active glacier.
				Outwash Terrace	Terrace deposited by meltwater flowing through a glacial outwash channel. Generally sediments deposited in terraces are sorted sand and gravel, silt is possible and local till can be incorporated by erosional activity.
				Recessional Moraine	Consisting of mostly till as well as stratified sediments. A recessional moraine forms during standstills in a glaciers retreat. The resulting landform is an arcuate ridge-like accumulation of till that can range from a distinct ridge to a large-scaled hummocky landform. Besides till, they also bear sorted outwash deposits.
				Water Feature	Water features include lakes and rivers sourced from

					the MN DNR 1:24,000 scale Hydrography Lakes and Rivers shapefile.
	Potential		Text, 75	See Below	
				Significant Potential for Sand and Gravel Resources	Geologic units that are inferred to contain sand and gravel. These units exhibit the geologic characteristics that typically produce sand and gravel deposits. Existing gravel pit and MN/DOT aggregate sources lying within these units are considered identified or known resources. These resources include the classes High and Moderate potential for sand and gravel deposits.
				Nonsignificant Potential for Sand and Gravel Resources	Units that generally have little or no potential for significant aggregate resources. These units exhibit geologic characteristics that are typically not consistent with significant aggregate deposits. These units typically contain clay, silt, fine sand, unsorted sediments (till), or very thin layers of sand and gravel. Nonsignificant potential regions also coincide where bedrock is at or near the surface. Or these units may include aggregate deposits that are too small to map.
	CLASS		Text, 75	See Below	
				High Potential for Sand and Gravel Resources	Outwash features and channels, ice contact features, and areas of coarse material in ground moraines. Deposits consist typically of sand and gravel. The probability <sup>2</sup>

					<p>that a potential sand and gravel deposit exists within any mapping unit is moderately high to very high. Thickness of the deposits ranges from 10 to 50+ feet with less than 5 feet of overburden. These deposits are moderately large to very large in areal extent<sup>3</sup> and the textural characteristics<sup>4</sup> are good to very good. The quality<sup>5</sup> is typically moderately high to very high relative to other deposits within mpes380.</p>
				<p>Moderate Potential for Sand and Gravel Resources</p>	<p>Outwash channel, terrace and features; ice contact features; ground moraine with a sandy matrix; sorted areas of recessional moraines; and gravel bearing zones of linear ridges. Deposits typically consist of till, sand and gravel. The probability that a potential sand and gravel deposit exists within this unit is moderate to moderately high. Deposit thickness ranges from 0 to 45+ feet with less than 15 feet of overburden. These deposits are moderately large to large in areal extent and the textural characteristics are moderate to good. The quality is typically moderate to high.</p>
				<p>Low Potential</p>	<p>Alluvial valley;</p>

				for Sand and Gravel Resources	<p>beach; fine textured ice contact features; outwash channels, features, and terraces; lake plains; ground and recessional moraines and linear ridges. Deposits consist of till and sand with gravel. The probability that a potential deposit exists within this unit is low to moderately low. Thickness of the deposits ranges from 0 to 40 feet with overburden thickness ranging from 0 to 45+ feet. These deposits are small to moderately small in areal extent and the textural characteristics are poor to moderately poor. The quality ranges from low to moderately low.</p>
				Limited Potential for Sand and Gravel Resources	<p>Scoured bedrock with little or no mantle of sediment; clayey ground moraine; low lying recessional moraine; lake plains; and small, low areas of outwash channels and features. The deposits of this unit contain all or one of the following: clay with boulders, silt, sand, and/or bedrock. The probability that a significant sand and gravel deposit exists within this unit is low to very low. The thickness of these deposits is typically less than 15 feet with overburden thickness ranging from 0 to 50+ feet. The sand and gravel</p>

					deposits occurring in this unit are very small to small in areal extent. The textural characteristics are very poor to poor with the quality ranging from very low to low. Thick sequences of sand and gravel lack in this category because bedrock is usually at or near surface.
	PROBABLTY		Text, 20	Very High, High, Moderately High, Moderate, Moderately Low, Low, Very Low	The relative degree of certainty that sand and gravel exists within a unit. Based on air photo interpretations, field observations, CWI, drilling, presence of gravel pits and quarries, etc. Each unit is relative to the other units and range from very high to very low.
	SIZE		Text, 20	Very large, Large, Moderately Large, Moderate, Moderately Small, Small, Very Small	The relative size of the sand and gravel deposit.
	ACREAGE		Text, 8	See Below	The size of the deposit in acres.
				30+	Very Large
				20-30	Large
				15-20	Moderately Large
				10-15	Moderate
				5-10	Moderately Small
				3-5	Small
				<3	Very Small
	TEXTURE		Text, 20	Very Good, Good, Moderately Good, Moderate, Moderately Poor, Poor, Very Poor.	A relative scale of the textural quality of the sand and gravel resource (sieve analysis). The coarser the material the higher the rating. Fine sand

					material would have a poorer rating. See MN/DOT Pit sheets for more detail.
	QUALITY		Text, 20	Very High, High, Moderately High, Moderate, Moderately Low, Low, Very Low	A relative scale of the quality of the sand and gravel (soundness, durability, and mineral makeup). Determined from MN/DOT pit sheets.
	DOM_LITHO		Text, 30	See Below	Glacial Lobe Source
				Not Available	Records in Ferrous Mining Lands or Water Features were not evaluated for dominant lithology,
				Rainy Lobe Sediments	The Rainy Lobe flowed from the northeast from a Labradoran provenance. The Rainy Lobe passed over the high ground between the Superior Basin and the Red River Valley-Winnipeg Lowland. The Rainy Lobe traversed mostly over igneous and metamorphic rocks. These were eroded down to relatively unweathered bedrock producing the characteristic sandy matrix of Rainy Lobe till. The dominant lithology of Rainy Lobe till is heavily influenced by the underlying bedrock in the immediate area. The Rainy Lobe advanced and retreated multiple times sometimes confluent with the Superior Lobe. The Rainy Lobe flowed over the entire mpes380 project area. Sediment from

					this lobe tends to produce aggregate with widely varying quality due to the change of dominant lithology.
				Superior Lobe Sediments	Superior Lobe is a northeastern sourced glacier flowing from the Lake Superior basin to the southwest. Superior Lobe sediments tend to contain rhyolites, basalts, and other Duluth Complex rock types. Aggregate with Superior Lobe rock lithologies generally are of high quality and durability. Within mpes380 project boundaries, Superior Lobe outwash draining from the east to the west has been identified. Presence of Superior Lobe till is questionable.
				Undetermined	Dominant lithology was not determined.
	THICKNESS		Text, 15	5-15, 10-30, 20-100+	Gives range of minimum and maximum thickness for sand and gravel deposit.
	THICK_MOD		Text, 1	+	The thickness modifier indicates that the thickness of the unit exceeds the value listed in the Thick_max field.
	THICK_MIN		Number , 19, 5	0, 5, 10, 15, 20, 25, 30	Describes the minimum thickness of the sand and gravel unit.
	THICK_MAX		Number , 19, 5	5, 10, 15, 20, 25, 30, 40, 50, 75	Describes the maximum thickness of the sand and gravel unit.
	OVERBURDEN		Text, 15	0-100+, 0-5, 10-50	Gives range of minimum and maximum thickness for overburden.



	OB_MOD		Text, 1	+	The overburden modifier indicates that the thickness of the overburden exceeds the values listed in the Ob_max field.
	OB_MIN		Number , 19, 5	0, 3, 10, 20	Describes the minimum thickness of the overburden covering the sand and gravel.
	OB_MAX		Number , 19, 5	1, 3, 5, 10, 15, 20, 30, 40, 50	Describes the maximum thickness of the overburden covering the sand and gravel.
	BURIED_DEP		Text, 3	Yes or No	'Yes' indicates that the deposit/mapping unit is buried by significant overburden (10-45 ft).
	MNDOT_DATA		Text, 3	Yes or No	'Yes' indicates that the deposit/mapping unit has a MN DOT ASIS data sourced point (see carlpits.shp, field – SOURCE, value - 'ASIS').
	MAP_LABEL		Text, 2	See Below	A cartographic map label for the sand and gravel potential classifications.
				Hp	High Potential for Sand and Gravel Resources
				Mp	Moderate Potential for Sand and Gravel Resources
				Lp	Low Potential for Sand and Gravel Resources
				{Blank}	Limited Potential for Sand and Gravel Resources