

AGGREGATE RESOURCES

BLUE EARTH COUNTY, MINNESOTA

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AGGREGATE POTENTIAL: For the purpose of this study, aggregate potential is defined as an assessment of the relative probability that an aggregate deposit exists within a given area, with almost all emphasis placed upon geologic evidence, parameters, and interpretation at the reconnaissance level, rather than upon economic feasibility evaluation or other parameters. This assessment does not imply that everywhere within a given map unit designated as "Potential Aggregate Resources" there exists economic aggregate deposits. Rather, that within such a map unit, geologic processes were active that could have created aggregate deposits at specific sites. Geologic measurements of aggregate deposits remain constant, but economic criteria and environmental permitting vary across time and place. Important site-specific factors such as ownership, zoning, protected waters and wetlands, environmental permitting and impacts, distance to markets, royalties, and individual site characteristics, such as access, all contribute to the final "potential" of a specific parcel, however, these factors were not included in this study.

POTENTIAL SAND AND GRAVEL RESOURCES: Those 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 indicate identified or known resources. The geologic units having potential for sand and gravel include terrace, alluvial, delta, beach, flood plain, outwash channel, and ice contact (esker and kame) features; these units typically contain sorted sand and gravel with little silt or clay.

HIGHLY DESIRABLE SAND AND GRAVEL DEPOSITS: Glaciofluvial features such as terraces, fans, deltas, and outwash channels that are moderately to very large in areal extent¹. These deposits consist of sand and gravel with thicknesses ranging from 10 to 50 feet with less than 15 feet of overburden. The probability that a potential sand and gravel deposit exists within this unit is high to very high. The textural characteristics² of these deposits range from moderately good to very good. The quality³ ranges from moderate to very good relative to all deposits within Blue Earth County, however many of these deposits contain samples that do not meet MN/DOT aggregate specifications for concrete and asphalt.

MODERATELY DESIRABLE SAND AND GRAVEL DEPOSITS: Glaciofluvial features such as outwash channels, terraces, eskers, kames, fans, and deltas as well as Holocene alluvial flood plains. These deposits are moderately to very large in areal extent with sand and gravel thicknesses ranging from 0 and 40 feet with less than 20 feet of overburden. The probability that a potential sand and gravel deposit exists within this unit is moderate to very high. The textural characteristics of these deposits are moderate to very good with the quality ranging from moderate to good.

LESS DESIRABLE SAND AND GRAVEL DEPOSITS: Glaciofluvial features such as fans, deltas, outwash channels, kames, and small terraces, as well as other features such as flood plains, streams (alluvium), and beaches. These deposits are small to large in areal extent and consist of sand and fine sand with thicknesses ranging from 0 and 20 feet with overburden thicknesses between 0 and 80 feet. The probability that a potential sand and gravel deposit exists within this unit is moderate to moderately high. The textural characteristics of these deposits are moderately poor to moderately good with the quality ranging from moderately poor to moderately good.

POTENTIAL CRUSHED STONE RESOURCES: Those bedrock formations that consist of limestone (dolomitic limestone) and sandstone (quartzose sandstone) that are suitable for crushing. These units are inferred to be relatively thick (>50 feet) with overburden thicknesses of less than 50 feet. Quarries located within these units indicate identified or known resources. These bedrock resources are typically exposed as large benches along the Minnesota River where alluvial processes have eroded away the overlying glacial material. Thin sand and gravel deposits are typically found overlying these units.

MODERATELY DESIRABLE CRUSHED STONE DEPOSITS: Those limestone bedrock units with a large to very large areal extent that contain materials suitable for crushing. These units have a thickness of greater than 50 feet with overburden thicknesses of less than 10 feet. These units have a very high probability of containing potential crushed stone deposits. The quality of these units is moderate to moderately good. Thin sand and gravel deposits are typically found overlying these units.

LESS DESIRABLE CRUSHED STONE DEPOSITS: Those limestone and sandstone (quartzose sandstone) bedrock units that are very large in areal extent that contain materials suitable for crushing. These units have a thickness of greater than 50 feet with an overburden thickness ranging from 10 to 50 feet. These units have a very high probability of containing potential crushed stone deposits. The quality of the limestone units are moderate to moderately good. The sandstone units quality ranges from moderately poor to moderate, however these units are typically capped by limestone. Thin sand and gravel deposits are commonly found overlying these units.

LIMITED POTENTIAL FOR AGGREGATE RESOURCES: Those units that generally have little or no potential for aggregate resources. These units exhibit geologic characteristics that are typically not consistent with significant aggregate deposits. The geologic units having limited potential include lake plains, moraines, and small alluvial deposits; these units typically contain clay, silt, fine sand, unsorted sediments (till), or very thin layers of sand and gravel. These units may include aggregate deposits that are too small to map.

SLIGHTLY DESIRABLE AGGREGATE DEPOSITS: Glaciolacustrine features such as the glacial lake bed of Glacial Lake Minnesota; till plains, moraines, and crevasse fills; small alluvial features such as flood plains and streams and collapsed glaciofluvial channels. The probability that a potential aggregate deposit exists within this unit is very low to moderate. These deposits are moderate to very small in areal extent with sand (some gravel) thicknesses of less than 20 feet with up to 80 feet of overburden. The textural characteristics are very poor to moderate with the quality ranging from very poor to moderate. This unit also contains bedrock units with an overburden thickness of greater than 50 feet.

IDENTIFIED AGGREGATE RESOURCES: Those areas where aggregate resources (sand, gravel, and/or crushed stone) have been or are currently being mined. Pit and quarry locations have been gathered from several different sources, including topographic maps, aerial photographs, county records, county highway department maps, soil surveys, MN/DOT files, fieldwork, gravel operators, and other miscellaneous sources. The pits and quarries range in size from less than 1 acre to greater than 50 acres and may be active, inactive, depleted, or reclaimed. The aggregate quality of the pits varies.

✕ **Gravel Pits:** Locations were gathered from several sources. Any given pit may be active, inactive, depleted, or reclaimed.

⊗ **Gravel Pits - MN/DOT files:** Minnesota Department of Transportation's Aggregate Source Information System listing of aggregate sources. Test hole logs, sieve, and quality test data are available. Green symbols indicate test pits that meet MN/DOT aggregate specifications for deleterious materials for concrete and asphalt.

✱ **Quarries:** Limestone quarries from several sources. Any given unit may be active, inactive, depleted, or reclaimed.

WETLANDS: Wetland area.

WATER: Lakes or rivers.

Aggregate Resources:
Aerial photograph interpretation, field work, and delineation of mapping units by Jonathan B. Ellingson, 1998-1999. County Aggregate Mapping Program, Division of Minerals, Minnesota Department of Natural Resources. Source information included aerial photographs from NAPP (National Aerial Photography Program), 1991-1992, 9" x 9" color infrared photos at 1:40,000; DOGs (Digital Orthophoto Quadrangles) at 1:12,000 from USGS (United States Geological Survey); DRGs (Digital Raster Graphics) at 1:24,000 from USGS; 7.5-minute USGS topographic quadrangles at 1:24,000; and Soil Survey of Blue Earth County from USDA-SCS (United States Department of Agriculture - Soil Conservation Service), 1978.

Base map data sources:
Lakes, wetlands, and major rivers from National Wetland Inventory, U.S. Fish and Wildlife Service, compiled at 1:24,000 from aerial photography (1979-1988) and spot field checked. Minor rivers from State of Minnesota Basemap, 1996, Department of Transportation Surveying and Mapping BaseMap Development Group.
Public Land Survey - PLS Project, 1999, Minnesota Department of Natural Resources, Division of Minerals.
Roads from State of Minnesota Basemap, 1996, Department of Transportation Surveying and Mapping BaseMap Development Group.

