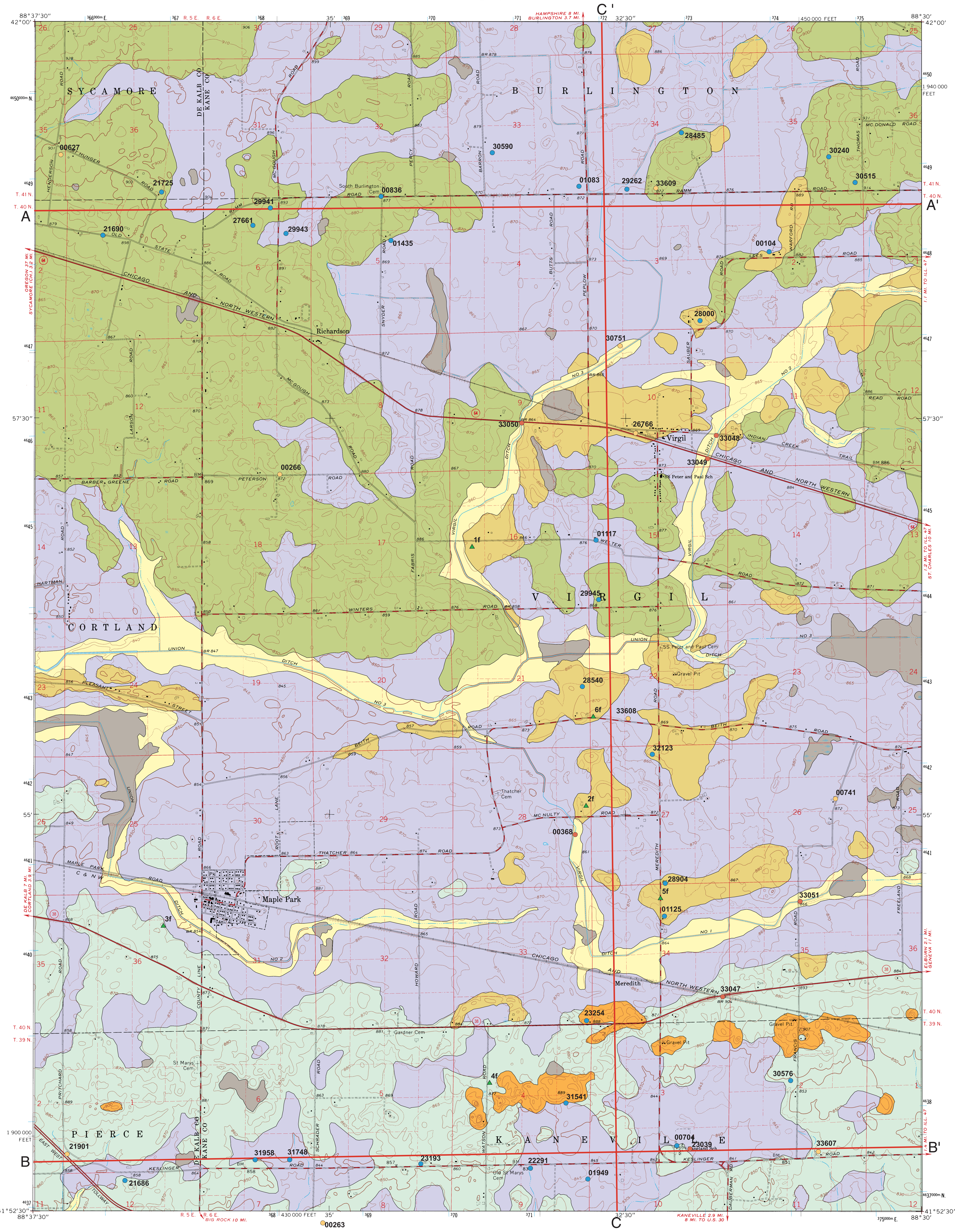
Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
William W. Shilts, Chief

SURFICIAL GEOLOGY OF MAPLE PARK QUADRANGLE
KANE AND DE KALB COUNTIES, ILLINOIS

Illinois Preliminary Geologic Map
IPGM Maple Park-SG

David A. Grimley
2004



QUATERNARY DEPOSITS

HUDSON EPISODE (~12,000 years before present (B.P.) to today)

gp — Grayslake Peat

Fibrous peat, muck, organic silt and clay; interbedded with sand, silt, and clay in some places; up to 20 feet thick; intertongues with Equality Formation and Cahokia Formation; may overlie Cahokia, Equality or Henry Formations.

c — Cahokia Formation

Stratified to massive sand, silt, and clay; generally less than 10 feet thick; dominantly silty redeposited loess and lacustrine sediment; occurs in floodplains and channels of modern streams and streams converted to drainage ditches. Alluvium.

WISCONSIN EPISODE (~55,000 - 12,000 years B.P.)
MASON GROUP (sorted sediments)

e — Equality Formation

Laminated to massive clay and silt, containing some fine to medium sand beds; 5 to 25 feet thick; intertongues with other units in Mason and Wedron Groups; occurs in proglacial, supraglacial, slackwater, and some modern lake basins; commonly underlain by Tiskilwa Formation, Batestown Member, Lemont Formation, or Henry Formation. Lacustrine sediment.

h — Henry Formation (except Wasco facies)

Stratified to massive sand and gravel containing beds of silt, clay, and diamicton; generally well-sorted; cross-bedded to plane-bedded; up to 60 feet thick; intertongues with Equality Formation and Wedron Group units; intertongues or occurs under Batestown Member, Lemont Formation; occurs extensively under the Tiskilwa Formation; deposited in glacial meltwater channels, outwash plains, deltas, bars. Outwash.

h(w) — Wasco facies, Henry Formation

Irregularly bedded and moderately sorted sand and gravel, containing lenses of silt, clay, and diamicton; 5 to 30 feet thick; associated with Batestown Member of Wedron Group; may contain a covering of 2 to10 feet of loose loamy ablation till; occurs in kames in the Arlington Moraine in the southern third of the map. Ice-contact and ice-marginal sediment.

WISCONSIN EPISODE (~55,000 - 12,000 years B.P.)
WEDRON GROUP (diamicton units)

l-b — Batestown Member, Lemont Formation

Silt loam to loam diamicton, gray to gray-brown, oxidizing to yellow-brown; as much as 35 feet thick; upper portion may be mixed with stratified and interbedded silt and sand; lower portion is more likely to be massive subglacial till. Till and ice-marginal sediment.

t — Tiskilwa Formation

Loam to clay loam diamicton; pink to reddish-brown to gray; locally contains thick beds of sand and gravel; sometimes stratified in upper portions; occurs at the surface in the northwest and northeast portions of the quadrangle, where it is up to 150 feet thick. Till and ice-marginal sediment.

ILLINOIS EPISODE (~200,000 - 130,000 years B.P.)

g — Glasford Formation (in cross sections only)

Loam to clay loam diamicton, pinkish-brown to brown to gray; up to 110 feet thick; contains some beds of sorted sediment, within and especially at the base of the unit. Till and ice-marginal sediment and channel deposits.

Base map compiled by Illinois State Geological Survey from data provided by the the United States Geological Survey. Topography compiled from imagery dated 1965. Field checked 1968.

North American Datum of 1983 (NAD 83)
Projection: Transverse Mercator
10,000-foot ticks: Illinois State Plane Coordinate System, east zone (Transverse Mercator)
1,000-meter grid: Universal Transverse Mercator grid, zone 16

Recommended citation:

Grimley, D.A., 2004, Surficial Geology of Maple Park Quadrangle, DeKalb and Kane Counties, Illinois: Illinois State Geological Survey, Illinois Preliminary Geologic Map, IPGM Maple Park-SG, 1:24,000.

SCALE 1:24 000
1 — 1/2 — 0 — 1 MILE
1000 — 0 — 1000 — 2000 — 3000 — 4000 — 5000 — 6000 — 7000 FEET
1 — .5 — 0 — 1 KILOMETER

BASE MAP CONTOUR INTERVAL 10 FEET
SUPPLEMENTARY CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Released by the authority of the State of Illinois: 2004

Geology based on fieldwork by D. Grimley, 1999.

Digital cartography by D. Grimley, Illinois State Geological Survey.

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This Illinois Preliminary Geologic Map (IPGM) is a lightly edited product, subject to less scientific and cartographic review than our Illinois Geological Quadrangle (IGQ) series. It will not necessarily correspond to the format of IGQ series maps, or to those of other IPGM series maps. Whether or when this map will be upgraded depends on the resources and priorities of the ISGS.

Data Type

- Outcrops, exposures or hand augers
- Stratigraphic boring (ISGS)
- Engineering boring
- Water well
- A—A' Line of cross section

Note: Data symbol labels indicate the county number, a portion of the 12-digit API number, on file at the Geologic Records Unit (outcrop and hand auger labels indicate field number.)

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ADJOINING QUADRANGLES

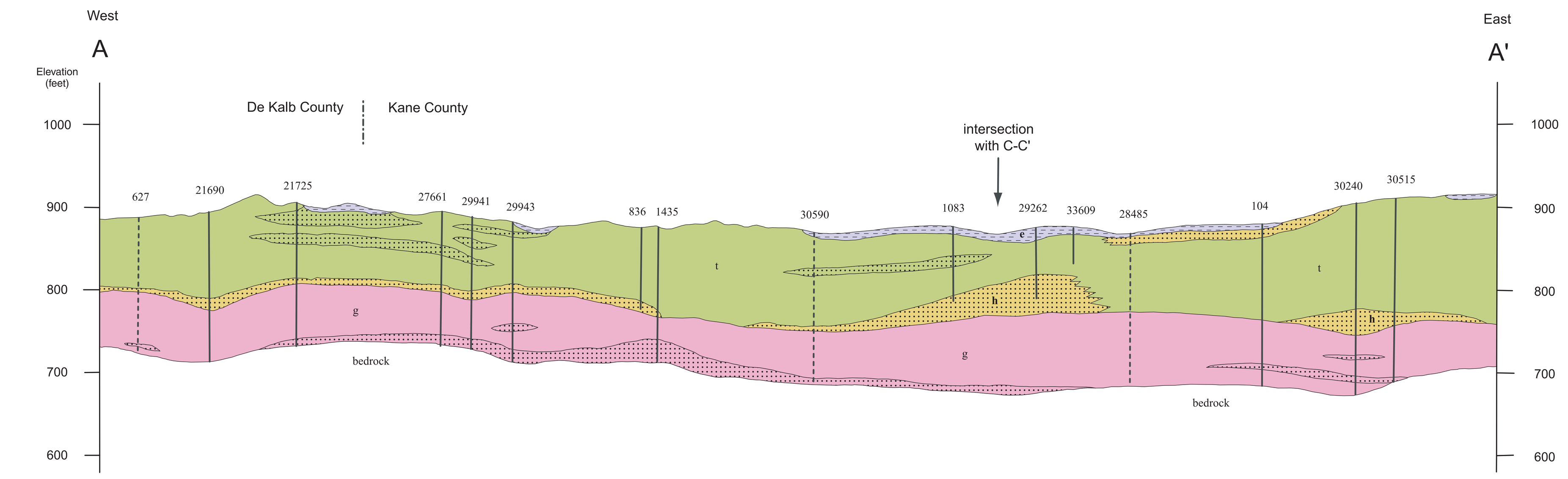
1	2	3
4		5
6	7	8

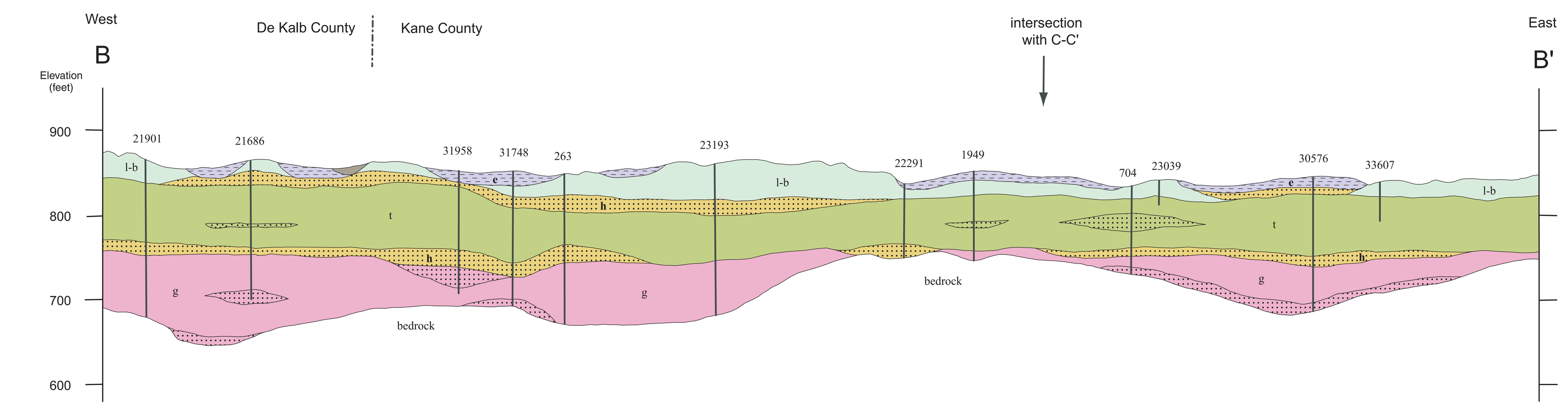
1 Genoa
2 Hampshire
3 Pingree Grove
4 Sycamore
5 Elburn
6 Hinckley
7 Big Rock
8 Sugar Grove

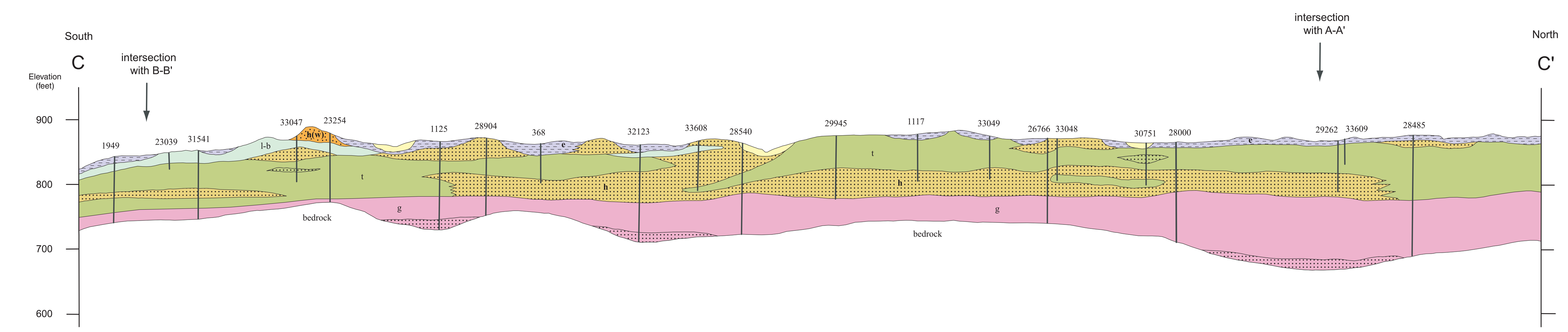
2½° — TRUE NORTH — MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 2004

ROAD CLASSIFICATION

- Primary highway, hard surface
- Secondary highway, hard surface
- Light duty road, hard or improved surface
- Unimproved road
- 64 Interstate Route
- 50 U.S. Route
- 158 State Route







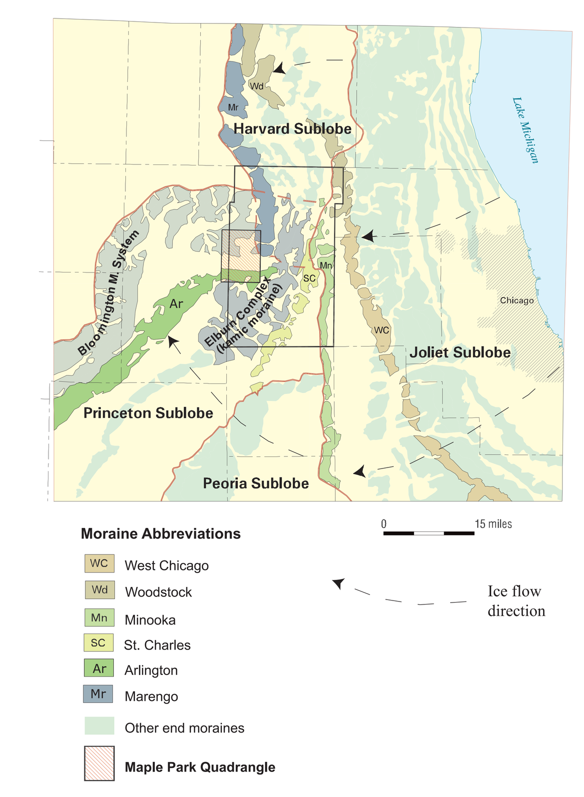
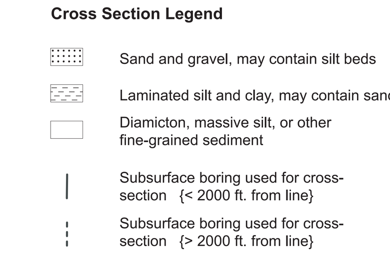


Figure 1 Wisconsin Episode moraines in the Lake Michigan Lobe of northeastern Illinois; modified from Willman and Frye (1970). Kane County is outlined in black.

Cross Section Legend



INTRODUCTION

This map of surficial (Quaternary) deposits for the Maple Park Quadrangle is located in northeastern Illinois about 50 miles west of Chicago. Studied deposits include unconsolidated sediments down to bedrock. The map is intended to provide an important framework for land and groundwater use, engineering assessment, economic development and geological studies in the area. This study is part of a broader geologic mapping program undertaken by the ISGS for 7.5-minute quadrangles in the Chicago Metro Region and was partially funded by a USGS-STATEMAP contract.

Glacial sediment, from 70 to 270 feet thick in this quadrangle, was deposited during successive advances of glaciers during both the Illinois and Wisconsin Episodes. At least one advance of Illinois Episode glaciers and two advances of Wisconsin Episode glaciers have deposited sediments in this part of western Kane and eastern De Kalb Counties (Curry et al., 1999; Grimley and Curry, 2001). This quadrangle is unusual for Illinois in that Lake Michigan Lobe ice advanced from a southeasterly direction into this area during the last glaciation (Fig. 1). The underlying bedrock, Paleozoic carbonates and shales, are not known to outcrop in the Maple Park 7.5' Quadrangle.

SURFICIAL DEPOSITS

Illinois Episode till and sand and gravel (both Glasford Formation in cross sections) are preserved primarily in bedrock lowlands or buried valleys and at elevations below about 750 to 800 feet. No outcrops of Illinois Episode deposits are known in the Maple Park quadrangle; however, they were encountered in several stratigraphic test borings and many water wells. The upper 5 to 10 feet of Glasford Formation deposits were intensely weathered during the Sangamon interglacial episode (from about 135,000 to 55,000 years before present). This physically and chemically weathered zone, known as the Sangamon Geosol, is often described as a "green clay" in water well drillers' logs. The Sangamon Geosol is an excellent marker bed for separation of Illinois Episode and Wisconsin Episode deposits (Curry, 1989).

During the Wisconsin Episode, a pink loam to clay loam diamicton with some sand and gravel bodies, classified as Tiskilwa Formation, was deposited in all areas of the quadrangle. The Tiskilwa Formation is up to 150 feet thick and is generally a dense and uniform subglacial till. This unit is distinct from other Wedron Group units in its color, texture, clay mineralogy, and engineering properties (Wickham et al., 1988; Curry et al., 1999). The Tiskilwa Formation was first deposited in the Marengo Moraine, whose western flank is in the northeastern portion of the Maple Park Quadrangle (Fig. 1), between about 25,000 and 22,000 radiocarbon years ago (Hansel and Johnson, 1996; Curry et al., 1999). Following this, a second phase of Tiskilwa Formation deposition occurred over much of the quadrangle as a result of ice advances (from south to north; Fig. 1) which formed the Bloomington Morainic System between about 22,000 and 19,000 radiocarbon years ago (Hansel and Johnson, 1996; Curry et al., 1999). The Tiskilwa Formation is thickest in the northeastern portion of this quadrangle probably since both phases of deposition occurred here. In the north-central portion of this quadrangle, the Tiskilwa Formation is overlain by thin lacustrine deposits (Equality Formation) and, in places, underlain by thick sand and gravel outwash (Ashmore Tongue, Henry Formation) that may represent proglacial deposits at the Marengo Moraine ice front (A-A' and B-B' cross-sections).

In the southern one-third of the quadrangle, a grey to yellow-brown, silt loam to loam diamicton (Batestown Member, Lemont Formation) is found in the Arlington Moraine (Fig. 1) and overlying the Tiskilwa Formation. The Batestown diamicton is siltier, less pink, and contains slightly more illite than Tiskilwa diamicton. The Arlington Moraine marks a readvance position of the ice as it advanced from south to north during overall retreat of the Lake Michigan Lobe. Sand and gravel (Henry Formation) is sometimes found between the Batestown and Tiskilwa diamictons or in kamic hills (Wasco facies, Henry Formation) on the moraine (C-C' cross-section).

A large area of lacustrine sediment exists north of the Arlington Moraine as ice advancing from the south caused meltwater to pond between the glacier and the Bloomington Morainic System. Stratified fine sand, silt, and clay (Equality Formation) occurs as a veneer, up to 25 feet thick, in north-central portions of the lake (C-C' and B-B' cross-sections). Other areas of lake sediment occur on both the Arlington or Bloomington Moraines. Many coarser sand bars and deltas in the glacial lake, as well as outwash below lake sediment, are mapped as Henry Formation. Sand and gravel outwash up to 60 feet thick occurs in front of the Arlington Moraine. The upper portion of this sediment is likely proglacial to this moraine, but some may be related to older advances.

The Grayslake Peat, up to 20 feet thick, is common in depressions and low-lying areas, within and adjacent to lake and outwash plains in this landscape. During postglacial times, peat and organic silts were deposited in swampy depressions and preserved due to anoxic conditions. Modern (postglacial) stream sediment, primarily sand and silt deposits, is inset into older glacial deposits along the lowlands adjacent to Union and Virgil Ditches. Being far from the base level influence of major rivers and having had only about 18,000 years since glaciation for landscape development (a short time geologically speaking), these stream channels have not yet developed well defined valleys or caused significant dissection. Constructional landforms (moraines, kames, lake plains, kettle holes) dominate the landscape in this quadrangle.

CROSS SECTIONS

Sand and gravel bodies are stippled on cross sections only where data indicates their presence. Additional sand and gravel lenses undoubtedly occur within the Glasford, Tiskilwa, and Batestown tills. A two- to four-foot thick cover of loess at the ground surface is not shown in the cross sections, nor are most other geologic units that are less than 5 feet in maximum thickness. Water wells and test holes used for the three cross sections are mainly transposed from within 2000 feet of the cross section lines (see map). Those data points transposed from > 2000 feet are indicated as dashed vertical lines in cross sections (cross-section A-A' only). Data points were transposed to positions on the cross section with similar geomorphology and surface elevations. Many water wells extend deep into bedrock and so their full extent is not always shown.

DATA SOURCES

This surficial geologic map is based in part upon soil series parent materials compiled from the Soil Survey of Kane County (Goddard, 1979; scale 1:15,840) and De Kalb County (Hinkley, 1978; scale 1:15,840), but was considerably modified based upon field observations and new drill cores obtained as part of this STATEMAP project. Data from dissertation theses (Gross, 1969), from ISGS supervised geotechnical exploration in the county (Curry et al., 1988), and from unpublished data of other ISGS geologists was also utilized for maps and cross sections. Well log data, Illinois Department of Transportation records, and other engineering boring data, on file at the Illinois State Geological Survey, were used to further aid in mapping, and especially in drafting the three cross sections. Some data were obtained from the early studies of Leverett (1899). The most important data used for constructing this surficial geologic map are noted on the map and cross sections. The 5-digit numbers indicated on the map and cross sections are "county numbers", shortened versions of the 12-digit API number, unique to Kane and DeKalb Counties. Boring descriptions are available from the Geologic Records Unit of the Illinois State Geological Survey. New drill core and outcrop descriptions obtained specifically for this mapping project are in a manuscript of Key Data used for the Surficial Geologic Map of the Maple Park 7.5' Quadrangle (Grimley, 2004).

RESOURCES / ENVIRONMENTAL HAZARDS

Sand and gravel

Sand and gravel deposits in the Maple Park 7.5' quadrangle are in the Henry Formation and are present as lenses within till units. Sources of economically minable sand and gravel are mostly limited to the Henry Formation (including the Wasco facies) because sand and gravel bodies within till units are generally limited in thickness and unpredictable in their dimensions. Sand and gravel deposits in Kane County and De Kalb the past in kamic hills (Wasco facies, Henry Formation) and in glaciofluvial deposits in terraces and deltas (undifferentiated Henry Formation). As of 1998, few, if any, pits remain in the Maple Park 7.5' County have been a potential source for construction materials for many years (Block, 1960; Anderson 1964). Many small pits have operated inQuadrangle because of the trend towards fewer, but larger sand and gravel operations. Sand and gravel is commonly used by the construction industry for concrete, asphalt, fill, and roadbase (Goldman, 1994).

Groundwater and its potential contamination

Groundwater is extensively used as household, public, and industrial water supply in Kane and De Kalb Counties. In valleys and lowlands, bodies or tongues of Henry Formation sand and gravel compose the most significant Quaternary aquifer (see stippled areas of cross sections). Groundwater in sand bodies, buried by later glacier advances, provides some of the best water supply because it is protected from surface contamination by silty or clayey till deposits. In upland areas, the most common Quaternary groundwater aquifers are thick Henry Formation below the Tiskilwa Formation, sand and gravel bodies within till units, particularly within the base of the Glasford Formation (see stippled areas of cross sections). Several wells tapping into these sand aquifers can be seen on the cross sections. Leverett (1899) noted the presence of three artesian wells in Sec. 27, T41N, R6E at depths of 56 to 86 feet which are probably related to a thick tongue of Henry Formation underlying Tiskilwa diamicton here. Many deep wells also obtain water from fractured dolomite bedrock.

Surface contaminants provide a potential threat to groundwater supplies in near-surface aquifers that are not overlain by a confining (clayey, unfractured) aquitard, such as clayey till deposits or lake deposits (Berg, 1984). Shallow sand and gravel aquifers, such as Henry Formation exposed at the surface or buried by a thin loess cap (< 4 feet) are most vulnerable to agricultural or industrial contaminants. Tiskilwa diamicton (contains an average of 25-30 % clay) is an excellent aquitard when it is uniform and does not contain sand bodies within it. Batestown diamicton (typically 15-20 % clay) is a less reliable aquitard because this till is less clayey than Tiskilwa diamicton and it also is generally thinner and more heterogeneous, containing numerous sand bodies and lenses.

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