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**OSWEGO WETLAND MITIGATION SITE:
FINAL HYDROGEOLOGIC CHARACTERIZATION REPORT**
(U.S. Route 34 at Waubensee Creek
Oswego, Kendall County, Illinois)

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Lakes, Streams, and Wetlands Unit
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Submitted under Contract No. AE89005 to
Illinois Department of Transportation
Bureau of Design and Environment, Wetlands Unit
2300 South Dirksen Parkway
Springfield, Illinois 62764

October 21, 1994
Illinois State Geological Survey
Open File Series 1994-7

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INTRODUCTION

This report was prepared by the Illinois State Geological Survey (ISGS) to provide the Illinois Department of Transportation (IDOT) with information regarding the hydrogeologic characterization and conditions during short-term monitoring in the potential wetland mitigation site described below. This report provides geologic and hydrologic data for the study area and describes planned long-term monitoring by ISGS.

The Oswego site is located north of U.S. Route 34 at the easternmost bridge crossing Waubansee Creek on the east side of Oswego in Kendall County (T37N, R8E, Sec. 9, SE 1/4). The study area is outlined in figure 1. The study area includes an existing wetland and the potential wetland mitigation site (fig. 2).

IDOT requested that (1) the ISGS determine the suitability of the potential site for wetland mitigation; and (2) the existing wetland south of the mitigation site be included in this study in order that the hydrogeologic parameters of that wetland be determined and considered in designing the mitigation site. No geochemical characterization or monitoring was requested.

Figure 1 Study area (outlined) and vicinity, as shown on the Aurora South 7.5-minute topographic map (USGS 1954). Contour interval is 10 ft (3 m).

Figure 2 Site map showing boring/well and stage gauge locations, cross sections, proposed mitigation site, and existing wetland area. Topographic contours are in meters referenced to National Geodetic Vertical Datum of 1929 (NGVD, 1929); contour interval is 3 m (10 ft).

In the summer of 1993, two excavations were made in the mitigation site adjacent to Waubensee Creek. Surface- and ground-water levels in the study area will be monitored through September 1998 or until monitoring is no longer required by IDOT. A final monitoring report will be prepared by ISGS at that time.

METHODS

A series of seven borings was made to determine the geology of the study area (fig. 2). Borings 1 and 2 were made by driving an aluminum pipe 76 mm (3 in.) in diameter into the ground to depth, then extracting it to obtain a relatively undisturbed sample. Borings 3, 4, and 7 were made using a Mobile B-30S drilling rig with an 82 mm (3.25 in.) inner diameter hollow-stem auger. Continuous sampling was performed while drilling these borings. Borings 5 and 6 were made using a 76-mm (3-in.) diameter hand auger.

Monitoring wells were installed in each geologic boring to determine the hydrology of the study area. Stage gauges were installed in Waubensee Creek at points A and B (fig. 2) to monitor creek levels. Monitoring wells were constructed of 2.54-cm (1-in.) diameter Schedule 40 PVC pipe with 0.76-m (2.5-ft) slotted well screens; slot size was 0.25 mm (0.01 in.).

Wells installed in borings made with the Mobile drilling rig were constructed with a filter pack of 0.25–0.5 mm (0.010–0.020 in.) diameter quartz sand placed in the annulus from the base of the well screen to approximately 0.3 m (1 ft) above the top of the well screen. A seal of bentonite was placed above the filter pack. The borings were backfilled with differing amounts of bentonite and cuttings. Appendix C reports all well construction measurements.

Well screens installed in hand-augered borings were partially or fully driven to depth into undisturbed materials below the base of the boring. Any well screen not fully driven below the base of the boring was packed with sand, as described above. Wells were sealed with bentonite to the land surface. Protective covers were placed over each well. Covers for borings made with the Mobile drilling rig were set in approximately 0.3 m (1 ft) of concrete.

Elevations of wells and stage-measuring points were determined by leveling to third-order accuracy from benchmarks provided by IDOT. A Sokkia B-1 automatic level and fiberglass extending rods were used.

GEOLOGY

Regional Setting

Bedrock

The uppermost bedrock unit at the Oswego site consists of shaly and cherty dolomites of the Alexandrian Series of the Silurian System (fig. 3) overlying shales and limestones of the Ordovician System (Willman 1971). The bedrock surface in this area is generally horizontal with bedrock units dipping approximately 2° to the east-northeast (Willman 1971).

Quaternary Sediments

Quaternary sediments increase in thickness from west to east across the study area (Piskin and Bergstrom 1975, and ISGS well records on file). Bedrock crops out adjacent to the Fox River approximately 1.5 km (1 mi) to the west of the site. Sediment thickness increases to approximately 15 m (50 ft) below the site. Within the Minooka Moraine (fig. 3), 3 km (2 mi) east of the study area, sediments increase to greater than 30 m (100 ft) in thickness.

Well logs from the region (ISGS records on file) indicate that sediments consist of approximately 1.5–3 m (5–10 ft) of silty clay overlying 6–9 m (20–30 ft) of sand and gravel. Other minor sedimentary units are occasionally present below these beds.

The silty clay deposited at the surface is classified as Cahokia Alluvium adjacent to Waubensee Creek (Berg and Kempton 1988) but may include Richland Loess away from Waubensee Creek (Curry et al. 1988). The underlying sand and gravel is classified as part of the Batavia Member of the Henry Formation (fig. 4), which was deposited in glacial outwash plains adjacent to moraines (Willman 1971). Glacial till of the Wedron Formation is present at the surface approximately 3 km (2 mi) eastward in the Minooka Moraine (Berg and Kempton 1988).

Soils

Figure 5 shows the soils located in the study area (U.S. Department of Agriculture 1978). A body of Sawmill silty clay loam soil, which is listed as hydric by the Soil Conservation Service (USDA 1991, rev. January 31, 1992), exists along the banks of the creek and within the present wetland south of the mitigation site. Soils in the mitigation area and in the remainder of the study area are not listed as hydric.

Figure 3 Geologic map of the bedrock surface showing bedrock units in northeastern Illinois (from Willman 1971). Star indicates location of the study area.

Figure 4 Portion of the map of the surficial geology of the Chicago region showing the stratigraphic units below the study area (from Willman 1971). Map units: hb = Batavia Member, Henry Formation; hm = Mackinaw Member, Batavia Formation; mi = Minooka Moraine, Yorkville Till Member, Wedron Formation; ms = Marseilles Moraine, Yorkville Till Member; mhg = Marseilles-Huntley Ground Moraine, Yorkville Till Member; S = Silurian bedrock. Arrow indicates study area.

Topography

The regional slope over the study area is westward approximately 3–4 m/km (16–21 ft/mi) (fig. 1). Regional drainage is westward toward the Fox River. Site drainage is west and north toward Waubensee Creek, which in turn flows west-southwest toward the Fox River. Total relief in the study area is approximately 5 m (16 ft). Waubensee Creek is incised between 1.5–3 m (5–10 ft) below the adjacent land surface. Creek banks are steep and actively eroding in places.

Site Characterization

Data from the geologic borings were used to prepare two cross sections of the geology of the study area (Appendix A). Locations of the cross sections are shown in figure 2. Logs of geologic borings indicate that the uppermost unit of sediments across most of the study area

Figure 5 Portion of a map from *Soil Survey of Kendall County, Illinois*, showing soils in the study area (from USDA 1978). Soil types: 107 = Sawmill silty clay loam; 149 = Brenton silt loam; 325A/B = Dresden silt loam; 327C2 = Fox silt loam; 369A = Waupecan silt loam. Study area is stippled.

is a body of sandy and clayey silt (labeled silt unit A), which probably contains both Richland Loess and Cahokia Alluvium (Berg and Kempton 1988, Curry et al. 1988). As shown in cross section A–A' (Appendix A), these sediments have been eroded in the floodplain of Waubensee Creek. This unit is approximately 2.6 m (8.5 ft) thick near the east bank of the creek and thins to approximately 1.5 m (5 ft) thick toward the eastern edge of the study area. This unit and underlying beds dip toward the northwest at approximately 1.2–3.0 m/km (6–16 ft/mi).

A layer of peat (labeled peat unit B) occurs at the surface within the present wetland area in the floodplain of Waubensee Creek (fig. 2). The peat is classified as part of the Grayslake Peat (Willman 1971). This unit is approximately 0.76 m (2.5 ft) thick, including an underlying 0.46 m (1.5 ft) thick layer of interbedded sand and peat. This unit occurs throughout the wetland area and truncates laterally against the creek to the west and the edge of the floodplain to the east, as shown in cross section A–A'.

Below silt unit A and peat unit B lies an interval of bedded sand and gravel (labeled sand unit C) correlated with the Batavia Member of the Henry Formation (Berg and Kempton 1988). This unit is approximately 7.0 m (23 ft) thick on the east side of the study area and thins to approximately 3.7 m (12 ft) thick near Waubensee Creek. Individual beds of sand and sandy gravel are up to approximately 1 m thick. Some silt and silty sand beds are present. Sands are medium to coarse and yellow to red. Gravel up to 50 mm (2 in.) in diameter is present.

Below sand unit C lies a unit composed of silt loam and sandy loam diamicton interbedded with sand and gravel (labeled diamicton unit D). Diamicton is a term used to describe all very poorly sorted sediment, such as glacial tills and mud flows, without implying an origin of the sediment (Eyles 1983, p. 13). The thickness of each bed ranges from 0.1–0.5 m (0.3–1.6 ft). The base of this unit was not reached in borings made for this study; however, in a boring adjacent to the west side of the study area across Waubensee Creek (Curry et al. 1988), this unit was approximately 4.0 m (13 ft) thick. As much as 2.0 m (6.5 ft) of this unit was penetrated in borings made for this study. This unit is classified as Malden Till Member of the Wedron Formation (Curry et al. 1988).

Conclusions

During the late Wisconsinan Stage, diamicton unit D (Malden Till Member of the Wedron Formation) was deposited across the study area. The origin of this unit is unknown, but it may have been deposited as a glacial till. Another possibility is that the diamicton may have been formed by debris flows and other mass movements from the Minooka Moraine during deposition at the front of the glacier. Afterward, sand unit C (Batavia Member of the Henry Formation) was deposited above the diamicton as part of a sheet of outwash issuing from the Wisconsin glacier at the Minooka Moraine. The next unit to be deposited was silt unit A, which contains loess deposited across the site and alluvium deposited within and adjacent to Waubensee Creek. During this event, sand unit C was thinned by Waubensee Creek. Later, erosion exposed sand unit C in the floodplain of Waubensee Creek, providing a substrate for the deposition of peat unit B (Grayslake Peat) in the area of the present wetland.

HYDROLOGY

Regional Setting

Water well records in the ISGS files indicate that water in private wells in the vicinity is obtained from various bedrock aquifers. No records are on file for wells obtaining water from Quaternary sediments.

Waubensee Creek drains southwestward toward the Fox River, which is approximately 12 m (40 ft) lower in elevation. Because the Fox River has eroded to bedrock, it is probable that regional ground-water flow in Quaternary sediments of the study area is toward the river.

Site Characterization

Ground Water

Monitoring wells were installed in all geologic borings to identify the local ground-water flow system and measure the levels of any sources of ground water that sustain the present wetland and those that have the potential to sustain wetlands in the mitigation area. Monitoring wells and stage elevations were measured monthly during the study period. Because sand unit C is a shallow aquifer that underlies the entire study area, monitoring wells were installed at various depths and locations within sand unit C with the exception of boring 3.

Figure 6 is a hydrograph showing ground-water measurements in each well and stage of Waubensee Creek from the time of installation to March 18, 1994. Figure 7 shows the depth to ground-water levels below land surface at each well. All well and stage readings are summarized in Appendix B.

Figure 6 Hydrograph showing water-level elevations in wells and stage gauges in the study area during monitoring between January 1993 and March 1994.

Figure 7 Chart showing depth to ground water, referenced to land surface, at each well site in the study area during monitoring between January 1993 and March 1994. Plus sign indicates water above land surface.

These hydrographs can be used to infer general trends regarding the hydrology of the site. However, monthly readings do not record transient events and may attenuate the actual variations in levels. Water levels in the study area during the monitoring period were highest in the spring when precipitation is generally high and evapotranspiration generally low (Hensel 1992). Water levels decreased during the summer when evapotranspiration generally increases and precipitation decreases.

Changes in water levels also vary between wells. Irregular and rapid changes in level occur in relatively shallow wells (e.g. wells 1 and 2), as compared with deeper wells (e.g. well 3). During November 1993, wells 1, 2, 4, and 5 had sharp rises in water levels to the extent that ground-water flow reversed toward well 3. During this time, well 3 showed only a gradual rise in water level, which lasted several months longer than the higher water levels in the other wells. This may indicate that precipitation and seasonal changes in evapotranspiration strongly affect shallow wells, whereas longer term or regional conditions are more likely to affect deeper wells.

Boring 7 contains wells screened in shallower and deeper portions of sand unit C. The bases of the well screens are at depths of 1.52 m (4.99 ft) and 6.22 m (24.41 ft). Readings of water levels in well 7 on March 18, 1994, show a moderate upward gradient, indicating that ground water may have been discharging in this area at that time.

Boring 3 contains well screens in sand unit C at a depth of 5.66 m (18.57 ft) and in sand beds within diamicton unit D at a depth of 8.71 m (28.58 ft). The difference in readings between these wells is negligible, indicating no significant vertical ground-water gradient between these two units at this location.

Ground-water levels measured on March 18, 1994, are shown on the cross sections in Appendix A, Part 2. These levels show that sand unit C is artesian at boring 4 adjacent to Waubensee Creek, but not fully saturated in the remainder of the study area. Water levels indicate that ground-water recharge occurs from the east. Ground-water discharge to the surface occurs only in those areas adjacent to Waubensee Creek where erosion has thinned or removed silt unit A. This discharge was observed on April 20, 1994, when ground-water seeps were noted along the eastern edge of the south portion of the newly excavated mitigation area. Additionally, ground-water discharge occurs in the present wetland area, as evidenced by often-observed seeps and standing water at the eastern edge of the floodplain, approximately 1–1.5 m (3.3–4.9 ft) above the water levels measured in the creek. Additional monitoring wells will be installed to better characterize potential ground-water discharge in the mitigation area.

Water levels in figure 8 show the potentiometric surface in sand unit C, as shown by readings collected on March 18, 1994. Contours of the potentiometric surface indicate that ground-water flow is in general toward Waubensee Creek. However, the reversal in flow shown by water levels recorded from November 1993 through February 1994 (fig. 7) indicates that the ground-water system in the study area may fluctuate, given appropriate conditions, and local ground-water recharge may occur adjacent to Waubensee Creek.

Surface water

Waubensee Creek was also examined for effects on the present wetland and as a potential source of water for the proposed mitigation area. Measurement of the water level in the creek began at stage gauge A on the U.S. Route 34 bridge in June 1993 (fig. 6). A second site, stage gauge B, was established in the spring of 1994. Observations regarding this source follow.

Figure 8 Site map showing well locations and contours of the potentiometric surface within sand unit C (Henry Formation). Water levels were measured on March 18, 1994. Contour interval is 0.5 m. Arrows show estimated ground-water flow directions.

Water levels in the creek have been relatively constant from July 1993 through March 1994, with the exception of June 1993, a period of heavy rainfall. Local residents stated that the creek has not flooded recently in an amount sufficient to overtop the banks. Additionally, ground-water levels in sand unit C flow toward and are above the level of Waubensee Creek. These data indicate that the creek is supplied by ground-water discharge from sand unit C.

Conclusions

Ground water recharges to sand unit C east of the study area and flows toward Waubensee Creek. Ground-water discharge occurs along and into Waubensee Creek where silt unit A has been eroded.

Water levels in Waubensee Creek have been high enough to saturate a portion of the present wetland only in June 1993, a period of very high precipitation. Since that time, water levels in the creek have been below the base of the peat (upper portion of peat unit B) despite the saturated conditions frequently observed within the wetland adjacent to the creek. Therefore, Waubensee Creek is not the primary source of water sustaining the present wetland area. The stable water levels in Waubensee Creek reflect a significant ground-water input that would provide a constant source for base flow. It should be expected that higher water levels in the creek will be transient, relating to increased precipitation.

The present wetland is primarily sustained by ground-water discharge from sand unit C. This discharge is occurring within the present wetland along Waubensee Creek and along the southeastern portion of the newly excavated mitigation area where erosion or removal of silt unit A has occurred.

Monitoring

The ISGS will monitor this site to determine the water-level conditions after construction and during establishment of a wetland. Surface- and ground-water levels are currently being monitored monthly. Additional monitoring wells will be installed to better characterize potential ground-water discharge in the mitigation area. Monitoring will continue through September 1998 or until no longer required by IDOT, after which a final monitoring report will be issued.

SUMMARY

Hydrogeologic characterization of the Oswego site has been completed and long-term monitoring is in progress. Results of this continuing monitoring will be submitted to IDOT as required, with conclusions drawn, if applicable. A final monitoring report, containing all monitoring results, will be issued by the ISGS after completion of scheduled monitoring in September 1998, or as required by IDOT. Ground-water discharge into the mitigation area will be characterized during long-term monitoring.

Bedrock in the study area is covered by approximately 15 m (50 ft) of sediments. These sediments were not fully penetrated in borings made for this study. Seven borings indicate that the sediments covering this site consist of diamicton bedded with sand and gravel of the Wedron Formation (diamicton unit D) covered by approximately 6 m (20 ft) of sand and gravel of the Henry Formation (sand unit C). These sediments are capped by 0.9–2.4 m (3–8 ft) of silt and clay of the Cahokia Alluvium and Richland Loess (silt unit A). Waubensee Creek has eroded into the Henry Formation deposits in its floodplain, where a thin layer of Grayslake Peat (peat unit B) is present within the existing wetland area.

Monitoring wells were installed in sand unit C and diamicton unit D to measure ground-water levels and to determine the direction of ground-water flow. Results indicate that sand unit C is not saturated in the eastern part of the study area, but is artesian in the western portion along Waubensee Creek. Water levels indicate that ground water flows from east of the study area toward Waubensee Creek. Ground-water discharge occurs along the banks of Waubensee Creek where erosion into sand unit C has occurred. The water level in Waubensee Creek is relatively constant, indicating a ground-water source. Local residents stated that Waubensee Creek does not overtop its banks during floods.

The existing wetland in the study area is primarily supported by the discharge of ground water along the east bank of Waubensee Creek. Water levels in the creek during the monitoring period have been insufficient to flood more than a minor portion of the wetland area and have generally remained below the base of the peat within the wetland.

ACKNOWLEDGMENTS

This study was supported by the Illinois Department of Transportation under contract number AE89005. Additional funding was provided by the Illinois State Geological Survey.

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APPENDIX A Geologic Cross Sections and Logs of Borings at Oswego Site

Part 1 Index of Geologic Symbols

Gravel
(includes boulders, cobbles,
pebbles, and granules)

Sandy gravel

Sand and gravel

Sand

Silty sand

Silty clay sand

Clayey sand

Sandy silt

Silt

Clayey silt

Silty clay

Clay

Diamicton

Peat

Black organic material

Depth of soil development

Roots

No recovery

APPENDIX A *continued*
Part 2 **Geologic Cross Sections**

CROSS SECTION A-A'

APPENDIX A continued
Part 2 Geologic Cross Sections

CROSS SECTION B-B'

APPENDIX A *continued*
Part 3 **Geologic Logs of Borings**

OSWEGO #1

Location SE SW SE, Sec. 9, T37N, R8E, Aurora South, Illinois
Date 01/28/93
Field Crew Christine Fucciolo, Jim Miner
Weather Conditions 0° F
Comments Core collected by hammering an aluminum pipe 76 mm (3 in.) in diameter to depth.
Well Information One well installed; construction information in Appendix C.

		Depth	Unit Descriptions
Meters Feet 0 0 1 1 5		0.00 - 0.35 m (0.00 - 1.15 ft)	Black organic material; (N 2.5/); noncalcareous; visible root material constitutes about 50%; silty texture with some fine sand; structureless; soft.
		0.35 - 0.67 m (1.15 - 2.20 ft)	Bedded sand and peat. Peat layers are 1–61 mm (0.04–2.40 in.) thick; no regularity in thickness; black (N 2.5/); spongy texture; noncalcareous; visible organic fragments comprise about 30%; moderately stiff. Sand layers vary in thickness from one layer of granules to 30 mm (1.18 in.); gray (10YR 6/1); poorly sorted with grains ranging in size from granules to fine sand; poorly rounded.
		0.67 - 0.81 m (2.20 - 2.65 ft)	Sand and gravel; gray (10YR 6/1); approximately 5% is silt; poorly sorted; about 50% is gravel; pebbles up to 10 mm (0.39 in.) in diameter are rounded and consist of shale, dolomite, chert and granitics; densely packed; little pore space between pebbles due to sand and silt.

APPENDIX A *continued*
Part 3 **Geologic Logs of Borings**

OSWEGO #2

Location NE SW SE, Sec. 9, T37N, R8E, Aurora South, IL
Date 01/29/93
Field Crew Christine Fucciolo, Jim Miner
Weather Conditions 0° F
Comments Core collected by hammering an aluminum pipe 76 mm (3 in.) in diameter to depth.
Well Information One well installed; construction information in Appendix C.

		Depth	Unit Descriptions
Meters Feet 0 0 1 1 5		0.00 - 0.18 m (0.00 - 0.60 ft)	Black organic material; (N 2.5/); noncalcareous; soft; silty; crumb structure; visible stems, roots, twigs and leaves constitute 50%. Gradual contact over 0.03 m (0.10 ft) to:
		0.18 - 0.47 m (0.60 - 1.55 ft)	Black peat; (N 2.5/); silty; noncalcareous; visible organic fragments comprise about 30%; moderately stiff, especially near base where it is also spongy. Sharp lower contact to:
		0.47 - 0.69 m (1.55 - 2.25 ft)	Bedded sand and peat. Peat layers spongy; dark gray (2.5Y 4/1); about 40% is visible fragments of stems and roots; noncalcareous; layers up to 15 mm (0.60 in.) thick; some layers are mixed with sand. Sand layers poorly sorted with grains ranging in size from granules to fine sand and in thickness from one granule to 8 mm (0.30 in.) thick; poorly rounded; grains consist of quartz, rock fragments and feldspars. Gradual contact over 25 mm (1 in.) to:
		0.69 - 0.88 m (2.25 - 2.90 ft)	Sand and gravel; light gray (5Y 7/1); approximately 50% is granules and gravel, about 50% is fine to coarse sand; poorly sorted; tightly packed; pebbles up to 10 mm (0.39 in.) in diameter are rounded and consist of shale, dolomite, chert and granitics; no obvious bedding or structure.

APPENDIX A *continued*
Part 3 **Geologic Logs of Borings**

OSWEGO #3

Location NE SE SE, Sec. 9, T37N, R8E, Aurora South, Illinois
Date 04/12/93 and 04/13/93
Field Crew Tim Young, Mark Hart, Jim Miner
Weather Conditions Sunny, windy, 45° F
Comments Mobile rig, hollow-stem auger, continuous 1.5-m (5-ft) sampler 11.3 m (37 ft) north of the centerline of US 34, 15 m (50 ft) west of the centerline of the gravel farm road, 305 m (1000 ft) east of Waubensee Creek.
Well Information Two wells installed; construction information in Appendix C.

		Depth	Unit Descriptions
Meters	Feet		
0	0	0.00 - 0.18 m (0.00 - 0.60 ft)	Silty sand ; very dark gray (N 3/) organic; noncalcareous; consists of fine sand, silt and some clay; rooty; coarse crumb to fine blocky structure; about 1% is pebbles of quartz and dolomite 10 mm (0.39 in.) in diameter. Sharp contact to:
1	5	0.18 - 0.24 m (0.60 - 0.80 ft)	Silt ; black (2.5Y 2.5/1); rooty; soil is structureless to very poorly developed blocky structure; laminated with streaks of yellowish brown (10YR 5/6) silty clay. Gradual laminated lower contact to:
2	10	0.24 - 0.30 m (0.80 - 1.00 ft)	Clayey sand ; yellowish brown (10YR 5/6); medium to coarse grains; subrounded; 50% is sand, 50% is silty clay. Very sharp lower contact to:
3	15	0.30 - 0.70 m (1.00 - 2.30 ft)	Clayey silt ; black (5Y 2.5/1); noncalcareous; about 10% is clay; blacker root zones present. Gradual lower contact over 0.09 m (0.30 ft) to:
4	20	0.70 - 1.46 m (2.30 - 4.80 ft)	Silty clay ; dark yellowish brown (10YR 4/4); structureless; noncalcareous; slightly moist; some fine sand below 1.10 m (3.60 ft); very sandy between 1.22 m and 1.46 m (4.00–4.80 ft); pebble 40 mm (1.57 in.) in diameter at base. Sharp lower contact to:
5	25	1.46 - 1.86 m (4.80 - 6.10 ft)	Silty coarse sand ; dark brown (7.5YR 3/3); subrounded; sorted; noncalcareous; at 1.80 m (5.90 ft), color changes gradually over 0.06 m (0.20 ft) to reddish yellow (7.5YR 6/6). Gradual lower contact over 0.03 m (0.10 ft) to:
6	30	1.86 - 2.23 m (6.10 - 7.30 ft)	Very coarse sand and gravel ; yellow (10YR 7/6); gravel is larger than 10 mm (0.39 in.) in diameter and consists of quartz, potassium feldspars, granitics and exotics; poorly sorted; subrounded; noncalcareous; slight bedding to massive structure.
7	35	2.23 - 2.47 m (7.30 - 8.10 ft)	Sandy gravel ; poorly sorted; about 50% is gravel 10–30 mm (0.39–1.18 in.) in diameter consisting of dolomite, quartz, jasper, shale and some exotics; structureless.
8			
9			
10			
11			

OSWEGO #3 *continued*

Depth	Unit Descriptions
2.47 - 3.05 m (8.10 -10.00 ft)	No recovery.
3.05 - 3.84 m (10.00 -12.60 ft)	Sand and gravel; imbricated and tightly packed; clean; 25% is gravel larger than 5 mm (0.20 in.) in diameter, 50% is sand to very coarse sand and 25% is granules and fine gravel less than 5 mm (0.20 in.) in diameter; rounded; poorly sorted; no bedding; gravel is mostly dolomite with some shale, granitics and chert; gradual matrix color change from yellow (10YR 7/6) to yellowish red (5YR 5/8) at 3.35–3.55 m (11.00–12.00 ft) to dark red (10R 3/6) at 3.66 m (12.00 ft).
3.84 - 4.30 m (12.60 -14.10 ft)	No recovery.
4.30 - 4.45 m (14.10 -14.60 ft)	Sand and gravel; same as 3.05–3.84 m (10.00–12.60 ft) with yellowish red (5YR 5/8) stain on gravel.
4.45 - 4.75 m (14.60 -15.60 ft)	Sand and gravel; similar in size to 3.05–3.84 m (10.00–12.60 ft); poorly sorted; subrounded; noncalcareous; grains consist of quartz, shale, granitics and basalt; top 0.06 m (0.20 ft) is yellowish red (5YR 5/8) with sharp color change to yellow (10YR 7/6) below.
4.75 - 5.88 m (15.60 -19.30 ft)	Sand; medium to coarse with 8–5% granules; yellow (10YR 7/6); sorted; subrounded; grains are mostly quartz with dolomite fragments and a few exotics; slight bedding by grain size.
5.88 - 6.58 m (19.30 -21.60 ft)	Sand; coarse; gray (2.5Y 6/1); sorted; subrounded; calcareous; bedded at 25–50 mm (1–2 in.) intervals by grain size; granule beds at 6.00–6.04 m (19.70–19.80 ft) and 6.16–6.19 m (20.20–20.30 ft); granules are subrounded and poorly sorted.
6.58 - 6.61 m (21.60 -21.70 ft)	Silt; grayish brown (2.5Y 5/2); laminated at 1 mm (0.04 in.) intervals; calcareous; platy fracture.
6.61 - 7.32 m (21.70 -24.00 ft)	No Recovery.
7.32 - 7.47 m (24.00 -24.50 ft)	Sand; medium; grayish brown (2.5Y 5/2); laminated in 5–10 mm (0.20–0.39 in.) intervals by grain size and exotic content; poorly rounded; sorted; calcareous. Very sharp contact to:
7.47 - 7.59 m (24.50 -24.90 ft)	Clayey silt; gray (2.5Y 5/1); soft; noncalcareous; slightly laminated texture, but no obvious color or grain-size changes. Sharp lower contact with a black shale piece at contact to:

OSWEGO #3 *continued*

Depth	Unit Descriptions
7.59 - 7.99 m (24.90 -26.20 ft)	Diamicton; silt loam diamicton; dark gray (2.5Y 4/1); calcareous; 5% consists of clasts between 2–5 mm (0.10–0.20 in.) in diameter; some clasts as large as 10 mm (0.39 in.); laminated by color; platy appearance; flow structures present around clasts in upper 0.03 m (0.10 ft); visible flow fabric. Gradual change to:
7.99 - 8.20 m (26.20 -26.90 ft)	Diamicton; sandy loam diamicton; dark gray (2.5Y 4/1); very wet; calcareous; 30% consists of clasts between 10–50 mm (0.39–1.97 in.) in diameter; clasts primarily dolomite. Sharp contact to:
8.20 - 8.50 m (26.90 -27.90 ft)	Gravel; poorly sorted; ranging in size from granules to pebbles up to 50 mm (1.97 in.) in diameter; clean; calcareous; clasts consist of dolomite, quartz, exotics and pyrite.
8.50 - 8.53 m (27.90 -28.00 ft)	Diamicton; silt loam diamicton similar to 7.59–7.99 m (24.90–26.20 ft).
8.53 - 8.66 m (28.00 -28.40 ft)	Gravel; same as 8.208–.50 m (26.90–27.90 ft). Sharp contact to:
8.66 - 8.84 m (28.40 -29.00 ft)	Diamicton; sandy loam diamicton; grayish brown (2.5Y 5/2); calcareous; 10% clast content; most clasts are 2–10 mm (0.10–0.39 in.) in diameter, but some are as large as 30 mm (1.18 in.).
8.84 - 9.02 m (29.00 -29.60 ft)	Sand and gravel; medium to very coarse sand and granules; poorly sorted; rounded; calcareous; bedded by grain size. Gradual lower contact to:
9.02 - 9.14 m (29.60 -30.00 ft)	Sand and gravel; consisting of sand, granules and pebbles up to 10 mm (0.39 in.) in diameter; poorly sorted; rounded; clean. Gradual contact to:
9.14 - 9.24 m (30.00 -30.30 ft)	Diamicton; sandy loam diamicton; gray (2.5Y 5/1); 5% consists of dolomitic clasts. Laminated lower contact to:
9.24 - 9.30 m (30.30 -30.50 ft)	Silty fine sand; gray (2.5Y 5/1); calcareous.

APPENDIX A *continued*
Part 3 **Geologic Logs of Borings**

OSWEGO #4

Location	NW SE SE, Sec. 9, T37N, R8E, Aurora South, Illinois
Date	04/14/93
Field Crew	Tim Young, Mark Hart, Jim Miner
Weather Conditions	Overcast, 40° F
Comments	Mobile rig, hollow-stem auger, continuous 1.5-m (5-ft) sampler 10.1 m (33 ft) north of the centerline of US 34, 91 m (300 ft) east of Waubensee Creek.
Well Information	One well installed; construction information in Appendix C.

APPENDIX A *continued*
Part 3 **Geologic Logs of Borings**

OSWEGO #5

Location SE NW SE, Sec. 9, T37N, R8E, Aurora South, Illinois
Date 05/11/93
Field Crew Mark Hart, Christine Fucciolo, Jim Miner
Weather Conditions Sunny, 80° F
Comments Drilled with bucket auger.
Well Information One well installed; construction information in Appendix C.

		Depth	Unit Descriptions
Meters 0 1 2 3 Feet 0 5 10		0.00 - 1.04 m (0.00 - 3.40 ft)	Silty clay; 0.00–0.30 m (0.00–1.00 ft) is light brown with brownish yellow silty inclusions; 0.30–0.61 m (1.00–2.00 ft) is grayish brown; 0.61–1.04 m (2.00–3.40 ft) is black.
		1.04 - 1.77 m (3.40 - 5.80 ft)	Silty clay mixed with sand and gravel; silty clay is gray; gravel is up to 10 mm (0.39 in.) in diameter.
		1.77 - 2.10 m (5.80 - 6.90 ft)	Medium sand and granules; poorly sorted; grains consist of quartz, chert, shale and exotics.

APPENDIX A *continued*
Part 3 **Geologic Logs of Borings**

OSWEGO #6

Location NW NW SE, Sec. 9, T37N, R8E, Aurora South, Illinois
Date 05/11/93
Field Crew Mark Hart, Christine Fucciolo, Jim Miner
Weather Conditions Sunny, 80° F
Comments Drilled with bucket auger.
Well Information One well installed; construction information in Appendix C.

		Depth	Unit Descriptions
Meters 0 1 2 3 Feet 0 5 10		0.00 - 0.91 m (0.00 - 3.00 ft)	Silty clay ; reddish brown to 0.76 m (2.50 ft); between 0.76 and 0.91 m (2.50–3.00 ft), color is gray with reddish root zones.
		0.91 - 1.22 m (3.00 - 4.00 ft)	Silty clay sand ; yellowish brown.
		1.22 - 1.83 m (4.00 - 6.00 ft)	Medium sand ; sorted; rounded; coarsens downward.
		1.83 - 2.44 m (6.00 - 8.00 ft)	Sand and gravel ; poorly sorted; gravel is up to 10 mm (0.39 in.) in diameter; yellowish brown; some silt.

APPENDIX A *continued*
Part 3 **Geologic Logs of Borings**

OSWEGO #7

Location SE, SW, NE, Sec. 9, T37N, R8E, Aurora South, Illinois
Date 01/24/94 and 01/25/94
Field Crew Christine Fucciolo and Jim Neal
Weather Conditions Cloudy, damp, 40° F
Comments Mobile rig, hollow-stem auger, continuous 1.5-m (5-ft) sampler. Approximately 37 m (120 ft) east of Waubensee Creek and approximately 30 m (100 ft) south of the tennis court fence.
Well Information Two wells installed; construction information in Appendix C.

		Depth	Unit Descriptions
Meters 0 1 2 3 4 5 6 7 8 9 30	Feet 0 5 10 15 20 25 30	0.00 - 0.61 m (0.00 - 2.00 ft)	No Recovery ; frozen ground; center-bit drilled to 0.61 m (2.00 ft).
		0.61 - 0.73 m (2.00 - 2.40 ft)	Clayey silt ; black (2.5Y 2.5/1); noncalcareous matrix; coarse to fine crumb structure; about 1% is granules and pebbles up to 10 mm (0.39 in.) in diameter; gravel is quartz and dolomite and is subangular to subrounded; about 10% is sand ranging in size from very coarse to very fine; about 1% of matrix has brownish yellow (10YR 6/6) silty inclusions; about 20% of matrix has dark red (2.5YR 3/6) root zones; one pebble 30 mm (1.18 in.) in diameter at base.
		0.73 - 1.13 m (2.40 - 3.70 ft)	Clayey silt ; black (2.5Y 2.5/1); noncalcareous; structureless; about 50% is granules and pebbles up to 40 mm (1.57 in.) in diameter; gravel consists of quartz, dolomite and exotics; gravel is subangular to subrounded; about 10% is sand ranging in size from very coarse to very fine; sand grains are subangular to subrounded; some yellowish brown siltstone pebbles appear to be weathering to silt; about 20% of matrix has dark red (2.5YR 3/6) root zones.
		1.13 - 1.22 m (3.70 - 4.00 ft)	Clayey silt and sand ; black (2.5Y 2.5/1); noncalcareous; about 50% is sand; sand grains range in size from medium to very fine and are subrounded to rounded; about 1% is granules and pebbles up to 10 mm (0.39 in.) in diameter; the rest is clayey silt; about 10% of matrix has dark red (2.5YR 3/6) root zones.
		1.22 - 1.25 m (4.00 - 4.10 ft)	Gravel ; relatively clean; subrounded; pebbles up to 30 mm (1.18 in.) in diameter consist of dolomite and quartz.
		1.25 - 1.34 m (4.10 - 4.40 ft)	Sandy gravel ; light yellowish brown (10YR 6/4); noncalcareous; about 50% is subangular to subrounded gravel up to 30 mm (1.18 in.) in diameter; about 40% is medium sand with subangular to subrounded grains; about 10% is granules, coarse sand, fine sand and silt.
		1.34 - 1.40 m (4.40 - 4.60 ft)	Sand and gravel ; grayish brown (2.5Y 5/2); noncalcareous; about 20% is pebbles up to 20 mm (0.79 in.) in diameter; about 20% is granules; about 60% is sand, the majority of which is coarse to medium; however, grains range from very coarse to very fine; all grains are subangular to subrounded.

OSWEGO #7 *continued*

Depth	Unit Descriptions
1.40 - 1.49 m (4.60 - 4.90 ft)	Silty sand; brownish yellow (10YR 6/6); noncalcareous; sand is medium to very fine; about 5% is very coarse sand to pebbles up to 10 mm (0.39 in.) in diameter; one pebble 35 mm (1.38 in.) in diameter near center of unit.
1.49 - 1.55 m (4.90 - 5.10 ft)	Sandy silt; grayish brown (10YR 5/2); noncalcareous; sand is fine to very fine.
1.55 - 1.71 m (5.10 - 5.60 ft)	Sand; medium to coarse; pale brown (10YR 6/3); noncalcareous; grains range in size from very coarse to very fine and are subangular to subrounded; about 2% is granules and pebbles up to 20 mm (0.79 in.) in diameter.
1.71 - 2.80 m (5.60 - 9.20 ft)	No recovery.
2.80 - 2.99 m (9.20 - 9.80 ft)	Sand; medium to coarse; pale brown (10YR 6/3); noncalcareous; grains are subangular to subrounded and range in size from very coarse to very fine; about 1% is silt; two pebbles up to 30 mm (1.18 in.) in diameter at base.
2.99 - 3.05 m (9.80 -10.00 ft)	Silt; grayish brown (10YR 5/2); calcareous; about 30% is granules and pebbles up to 30 mm (1.18 in.) in diameter.
3.05 - 3.14 m (10.00 -10.30 ft)	Clayey silt; grayish brown (2.5Y 5/2); calcareous; about 30% is granules and pebbles up to 30 mm (1.18 in.) in diameter.
3.14 - 3.23 m (10.30 -10.60 ft)	Sandy silt and gravel; light yellowish brown (10YR 6/4); calcareous; sand is fine; about 20% is pebbles up to 25 mm (0.98 in.) in diameter; one dolomite pebble 60 mm (2.36 in.) in diameter in unit.
3.23 - 3.54 m (10.60 -11.60 ft)	Sand; medium; light yellowish brown (10YR 6/4); calcareous; grains range in size from very coarse to very fine and are subangular to subrounded; about 3% is granules and pebbles up to 20 mm (0.79 in.) in diameter.
3.54 - 3.96 m (11.60 -13.00 ft)	Sand; Fine to medium; light yellowish brown (10YR 6/4); calcareous; better sorted than above unit, but grains still range in size from very coarse to very fine; about 1% is silt; less than 1% is granules and pebbles up to 10 mm (0.39 in.) in diameter; grains are subrounded; between 3.84–3.90 m (12.60–12.80 ft), color is yellowish brown (10YR 5/6).
3.96 - 4.48 m (13.00 -14.70 ft)	No recovery.

OSWEGO #7 *continued*

Depth	Unit Descriptions
4.48 - 4.85 m (14.70 - 15.90 ft)	Sand ; medium to coarse; brownish yellow (10YR 6/6); calcareous; moderately sorted, but grains range in size from very coarse to very fine; grains are subangular to subrounded; about 5% is granules and pebbles up to 20 mm (0.79 in.) in diameter; one dolomite pebble 35 mm (1.38 in.) in diameter at base.
4.85 - 4.88 m (15.90 - 16.00 ft)	Sand ; medium; brownish yellow (10YR 6/6); calcareous; better sorted than above unit, but grains range in size from very coarse to very fine.
4.88 - 5.06 m (16.00 - 16.60 ft)	Sand ; coarse to medium; light yellowish brown (10YR 6/4); calcareous; poorly sorted; top 0.09 m (0.30 ft) has about 30% granules and pebbles up to 30 mm (1.18 in.) in diameter; lower 0.09 m (0.30 ft) is somewhat better sorted with granules and pebbles up to 10 mm (0.39 in.) in diameter comprising about 1%.
5.06 - 5.12 (16.60 - 16.80 ft)	Sandy silt and granules ; light yellowish brown (10YR 6/4); calcareous; about 50% is silt; about 10% is poorly sorted sand; about 40% is granules and pebbles up to 10 mm (0.39 in.) in diameter.
5.12 - 5.24 m (16.80 - 17.20 ft)	No recovery.
5.24 - 5.43 m (17.20 - 17.80 ft)	Sand ; coarse to medium; brownish yellow (10YR 6/6); calcareous; moderately sorted, but grains range in size from very coarse to very fine; grains are subangular to subrounded; about 1% is granules.
5.43 - 5.55 m (17.80 - 18.20 ft)	Sandy gravel ; about 50% is granules and pebbles up to 30 mm (1.18 in.) in diameter; about 50% is poorly sorted sand and silt; silt is yellowish red (5YR 5/6) giving the unit a stained appearance.
5.55 - 5.67 m (17.80 - 18.60 ft)	No recovery.
5.67 - 5.82 m (18.60 - 19.10 ft)	Sand ; medium; brownish yellow (10YR 6/6); calcareous; moderately sorted, but grains range in size from very coarse to very fine; grains are subangular to subrounded; less than 1% is granules; one pebble 20 mm (0.79 in.) in diameter is present.
5.82 - 5.94 m (19.10 - 19.50 ft)	Silty sand ; light yellowish brown (10YR 6/4); calcareous; sand is fine to very fine; well sorted; grains are subrounded.
5.94 - 6.07 m (19.50 - 19.90 ft)	Sand ; fine to medium; light brownish gray (10YR 6/2); calcareous; sorted.

OSWEGO #7 *continued*

Depth	Unit Descriptions
6.07 - 6.10 m (19.90 -20.00 ft)	Sandy silt with gravel; light brownish gray (10YR 6/2); calcareous; sand is fine to very fine; about 15% is granules and pebbles up to 25 mm (0.98 in.) in diameter.
6.10 - 6.13 m (20.00 -20.10 ft)	Silt; light brownish gray (10YR 6/2); calcareous.
6.13 - 6.83 m (20.10 -22.40 ft)	No recovery.
6.83 - 6.89 m (22.40 -22.60 ft)	Fine sandy silt; light yellowish brown (10YR 6/4); calcareous.
6.89 - 6.98 m (22.60 -22.90 ft)	Sand and gravel; light yellowish brown (10YR 6/4); calcareous; sand is medium to fine and sorted; about 30% is granules and pebbles up to 35 mm (1.38 in.) in diameter.
6.98 - 7.19 m (22.90 -23.60 ft)	Silt; light brownish gray (10YR 6/2); calcareous.
7.19 - 7.28 m (23.60 -23.90 ft)	Clayey silt; light brownish gray (2.5YR 6/2); calcareous.
7.28 - 7.32 m (23.90 -24.00 ft)	Sand; fine; light yellowish brown (10YR 6/4); calcareous; moderately well sorted.
7.32 - 7.59 m (24.00 -24.90 ft)	Fine sandy silt and gravel; light yellowish brown (10YR 6/4); calcareous; about 10% is granules and pebbles up to 20 mm (0.79 in.) in diameter.
7.59 - 7.74 m (24.90 -25.40 ft)	Fine sandy silt; light yellowish brown (10YR 6/4); calcareous.
7.74 - 7.86 m (25.40 -25.80 ft)	Silty fine sand; Light brownish gray (10YR 6/2); calcareous; pebbles up to 25 mm (0.98 in.) in diameter at base.
7.86 - 8.32 m (25.80 -27.30 ft)	Diamicton; silty clay loam diamicton; dark grayish brown (10YR 4/2); calcareous; about 1% is pebbles up to 20 mm (0.79 in.) in diameter.

APPENDIX B Water-Level Elevations and Depths to Water Below Land Surface

Table B1 Water level elevations referenced to NGVD, 1929 (in m).

	Well 1	Well 2	Well 3 upper	Well 3 lower	Well 4	Well 5	Well 6	Well 7 upper	Well 7 lower	Gauge A	Gauge B
01/29/93	197.12	*	*	*	*	*	*	*	*	*	*
03/12/93	197.11	197.30	*	*	*	*	*	*	*	*	*
05/10/93	196.93	197.26	198.38	198.42	196.81	*	*	*	*	*	*
06/09/93	197.27	197.92	198.38	198.40	197.72	197.85	197.93	*	*	197.03	*
06/25/93	197.18	197.30	198.31	198.26	197.43	197.42	197.48	*	*	196.35	*
07/22/93	196.71	197.27	197.77	197.71	197.17	197.33	197.35	*	*	196.16	*
08/27/93	196.62	196.89	197.35	197.31	196.89	197.10	197.25	*	*	196.16	*
09/22/93	196.70	196.89	197.25	197.19	196.95	197.04	removed	*	*	196.13	*
10/27/93	196.69	197.13	197.16	197.19	196.85	197.18	removed	*	*	196.09	*
11/15/93	196.99	197.26	197.18	197.15	196.95	197.29	removed	*	*	196.13	*
12/13/93	196.92	197.30	197.24	197.23	196.90	197.35	removed	*	*	196.09	*
01/13/94	196.86	197.26	197.29	197.28	196.88	197.35	removed	*	*	196.05	*
02/09/94	frozen	frozen	197.33	197.32	196.88	197.14	removed	197.38	197.55	frozen	*
03/14/94	197.08	197.03	197.70	197.67	197.12	frozen	removed	197.08	197.92	**	197.34
03/18/94	196.97	197.18	197.67	197.66	197.05	frozen	removed	197.41	197.93	196.10	197.32

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Not yet installed
No measurement

APPENDIX B Water-Level Elevations and Depths to Water Below Land Surface

Table B2 Depth to water in monitoring wells referenced to land surface (in m).

	Well 4	Well 2	Well 3 upper	Well 3 lower	Well 4	Well 5	Well 6	Well 7 upper	Well 7 lower
01/29/93	0.02	*	*	*	*	*	*	*	*
03/12/93	0.03	0.09	*	*	*	*	*	*	*
05/10/93	0.21	0.21	2.20	2.07	2.20	*	*	*	*
06/09/93	+0.12	+0.04	0.09	2.09	1.30	0.80	1.96	*	*
06/25/93	0.03	2.14	2.16	2.23	1.58	0.73	2.01	*	*
07/22/93	0.43	0.25	2.70	2.78	1.50	0.81	2.14	*	*
08/27/93	0.52	0.59	3.12	3.17	2.12	1.04	0.23	*	*
09/22/93	0.44	0.50	3.22	3.29	2.07	1.10	removed	*	*
10/27/93	0.16	0.35	3.31	3.35	2.14	0.60	removed	*	*
11/15/93	0.16	0.23	3.29	3.33	2.20	0.85	removed	*	*
12/13/93	0.02	0.19	3.23	3.29	2.11	0.80	removed	*	*
01/13/94	0.28	0.24	3.18	3.20	2.13	0.80	removed	*	*
02/09/94	frozen	frozen	3.14	3.17	2.13	0.00	removed	1.26	1.09
03/14/94	0.06	2.20	2.76	2.82	1.90	frozen	removed	1.16	0.73
03/18/94	0.17	0.31	2.80	2.83	1.96	frozen	removed	1.23	0.74

* Not yet installed
+ Above land surface elevation

APPENDIX C Well Construction Information

Table C1 Construction information for monitoring wells.

	Well 1	Well 2	Well 3 lower	Well 3 upper	Well 4	Well 6	Well 6	Well 7 lower	Well 7 upper
Elevation of Top of Well *	197.95	198.42	201.08	201.08	199.52	199.40	199.40	199.25	199.34
Land Surface Elevation *	197.14	197.49	200.49	200.47	199.01	198.14	198.14	198.64	198.64
Total Length of Well (m)	1.76	1.86	9.24	7.66	4.72	0.81	0.81	0.80	2.23
Stick Up (m)	0.81	0.93	0.53	0.61	0.51	1.86	1.86	0.81	0.46
Screen Length (m)	0.00	0.76	0.76	0.76	0.76	0.76	0.76	0.00	0.46
Sampled Length (m)	0.00	0.00	0.00	9.30	4.11	2.44	2.44	8.32	8.32
Depth of Well Point**	0.95	0.93	8.71	5.66	4.21	0.95	0.95	6.22	1.52
Bentonite Seal (Top)**	NA	NA	*	*	NA	NA	NA	0.00	0.00
Bentonite Seal (Bottom)**	NA	NA	*	*	NA	NA	NA	0.00	0.46
Sand Pack (Top)**	NA	NA	*	*	NA	NA	NA	0.00	0.46
Sand Pack (Bottom)**	NA	NA	*	*	NA	NA	NA	1.63	1.63
Bentonite Seal (Top)**	0.00	0.00	*	*	0.00	0.00	0.00	1.63	1.63
Bentonite Seal (Bottom)**	0.15	0.15	*	*	0.15	0.61	0.61	2.59	2.59
Sand Pack (Top)**	0.19	0.15	*	*	0.15	0.91	0.91	0.53	2.59
Sand Pack (Bottom)**	0.95	0.39	*	*	4.21	2.10	2.10	8.32	8.32
Screened Interval (Top)**	0.19	0.17	7.95	1.00	0.15	1.79	1.79	5.46	0.46
Screened Interval (Bottom)**	0.95	0.93	8.71	5.66	4.21	2.55	2.55	6.22	1.52
Screened Formation(s)	Henry & Grayslake	Henry & Grayslake	Wedron	Henry	Henry	Henry	Henry	Henry	Henry & Cahokia/ Richland

* In m, NGVD, 1929
 ** In m below land surface
 NA Not applicable
 * Data not available