New York State Museum
Mark Schaming, Director

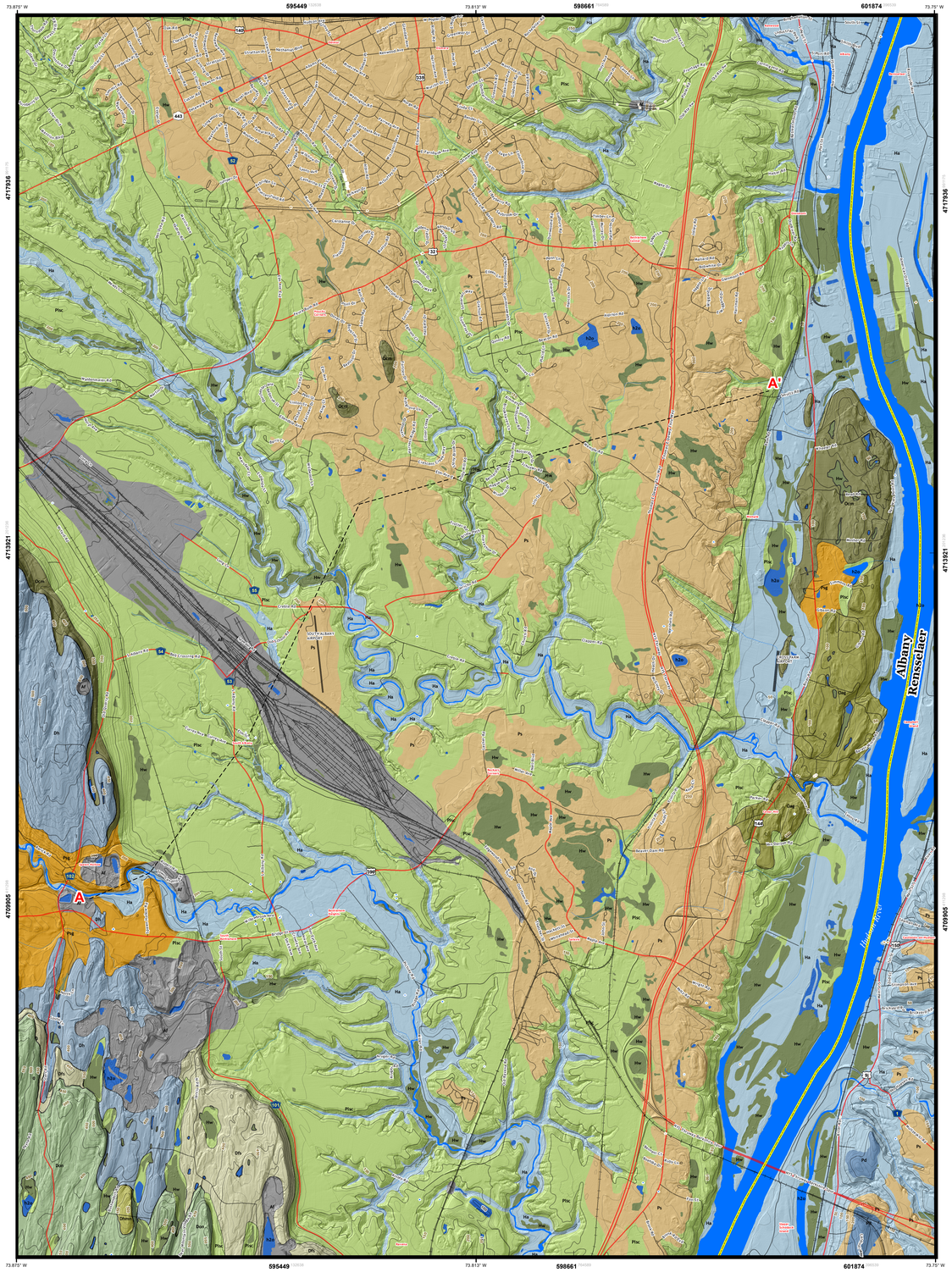
New York State Geological Survey

GEOLOGY OF THE DELMAR 7.5-MINUTE QUADRANGLE, ALBANY AND RENSSELAER COUNTIES, NEW YORK

prepared by

James R. Leone and Andrew L. Kozlowski

Supported in part by the U.S Geological Survey Cooperative Agreement Number G15AC00340
National Cooperative Geologic Mapping Program (STATEMAP)



Universal Transverse Mercator, Zone 18 N
North American Datum of 1983

Elevation contours, hygrology, and planimetry layers from the New York State DOT Raster Quadrangle separates for Delmar 7½ minute quad. DOT edition date 1993, USGS contour dates 1963.
Topographic map symbols can be found at http://pubs.usgs.gov/gip/TopographicMapSymbols/topomapsymbols.pdf

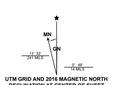
Magnetic declination from the NOAA online Declination Calculator: http://www.ngdc.noaa.gov/geomag-web/#declination

SCALE 1:24,000

1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 1
MILES
1000 500 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL: 10 FEET

Geologic mapping by J. Leone and A. Kozlowski 2016, R. Dineen 1982
Digital data and cartography, B. Bird and K. Backhaus, 2016 & 2019.



Introduction

The surficial geology of the Delmar 7.5-Minute Quadrangle was mapped in 2015-16 as part of a National Cooperative Geologic Mapping Program funded StateMap project (award G15AC00340). This map is part of a new composite mapping project of the New York Museum/New York State Geologic Survey to map all of Albany County, New York. The purpose of this map was to identify and delineate various surficial materials in the Delmar quadrangle with the intent that this information can guide municipalities in land use, environmental, and natural resource decisions.

The Delmar quadrangle is located in eastern New York, South of the junction of Interstate's 90 and 87. Included within the quadrangle mostly the town of Bethlehem, where most of the population is centered. Other municipalities in Albany County include the very southern industrial end of the City of Albany and south of Bethlehem are a portion of the Town of Coeymans. Across the Hudson River are portions of the City of Rensselaer, East Greenbush, Schodack and the village of Castleton. Outside the suburban hamlets of Delmar/Elsmere, and Glenmont are mostly large tracts of rural farm land, industry, mining, forests and wetlands.

Situated mainly in the Hudson River Lowlands and a small section of the Helderberg Plateau physiographic provinces the landscape is generally subdue, rolling topography with the greatest elevation atop the dissected portions of bedrock hills in the southwest portion of the quadrangle at 585-590 feet and the lowest elevation is at or within a few feet above sea level along the Hudson River. Much of the quadrangle lies in former lake bed of glacial Lake Albany. Sediments include clay, silt, sand, and gravel from glacial meltwater and lakes and post-glacial alluvium and wetland deposits. While diamicton (till) has been mentioned in literature about the quadrangle, there was none observed at the surface in this study. Most of the observed sediments comprised of well sorted materials. The lithologic units that comprise the quadrangle are highly variable in thickness and character although generally are expressed geomorphological as similar features.

Bedrock is exposed in areas in the southwestern edge and northeast portion of the quadrangle along the west side of the river. According to various drilling logs and NYSGS boring record BH1601, the depth to bedrock ranges from 6 to 375 feet across the quadrangle. An average depth to bedrock for the quadrangle is about 190 feet. The bedrock beneath glacial lake sediments in the quadrangle is mapped as Ordovician and Devonian in much of the exposures along the outcrops in the west. These range from the Ordovician Taconic Mélange along the Hudson River through the Devonian Marcellus in the very extreme southwest along the highest exposures. What is of note in this area is that the Rondout detachment is exposed along Old Quarry Road in Feura Bush. The unconformity represents the absence of the Silurian through the eastern portion of New York State. Drillers' logs indicate the bedrock is of fractured shale mainly black-grey in color.

Surficial Map Units

The Delmar 7.5-minute quadrangle is covered by a variety of sediment types deposited either directly by the glacier, meltwater emanating from the glacier, or by post-glacial streams and lakes. These sediments can be grouped into five major categories including diamicton, sand and gravel, fine sand, silt and clay, or recent organic deposits and sand and gravel deposits. Pleistocene glaciolacustrine sediment covers the largest percentage of the quadrangle with fine grained sand, silt and clay, while sand and gravel comprising the bulk of the rest.

Pleistocene Glaciolacustrine Silt and Clay (Plsc)

This unit comprised of bedded fine sand, silt, and clay covers about 33 percent of the quadrangle. The thickness of this unit is highly variable where drill logs indicate that this unit exceeds 360 feet in thickness (Dineen and Hanson, 1983). These materials were deposited in glacial Lake Albany which would have flooded the entire landscape approximately 14,000-16,000 years before present as the glacier retreated northward (LaFleur, 1965). Fine sediment suspended in the lake would have settled across the area with thickest accumulations in the low areas believed to be buried ancestral valleys (Dineen and Rogers, 1979).

Pleistocene Sand (Ps)

This unit is comprised of well sorted and stratified sand, and gravel deposited by rivers, streams, and may also include cobbles. Inferred to be deposited as delta or fan deposits in glacial lakes and in some cases Aeolian sand (Dineen, 1975; Bradley et al., 2010). The distribution of Ps in the Delmar quadrangle is mainly in the north central half as well as sections along the uplands adjacent to the Hudson River. The transport of these sands are believed to have been from glacial meltwater and possible storm inputs along with large areas related to wind transport after the lake bottom was exposed after catastrophic drainage and related to the sand dunes in adjacent quadrangles.

Pleistocene Sand and Gravel (Psg)

Characterized by stratified sand and gravel with occasional cobbles this unit is interpreted to be deposited by glacial meltwater at or very near the glacier and can be upwards of 80 feet thick (Dineen and Hanson, 1983). Psg is distributed in the west central edge of the quadrangle. of stratified sand and gravel likely represent a similar environment without a well preserved fan complex. Barrow pits are common in this unit with very limited large scale gravel mining operating at the time of mapping.

Pleistocene Diamicton (Pd)

An admixture of unsorted sediment ranging from clay to boulders. Brownish-red in color the surficial diamicton is matrix supported and massive.

Holocene Alluvium (Ha) and Holocene Wetlands (Hw)

Post glacial sediments occupy the low areas and along the shoreline. The organic sediments (Hw) are coincident with wetlands across the area while the alluvium (Ha) is associated with fluvial processes along the Hudson River and its tributaries.

Artificial Fill (Af)
Surficial sediments composed of various materials and grain-sizes, anthropogenically transported and used for infrastructure.

Bedrock Map Units

The Delmar 7.5-Minute quadrangle has bedrock exposed mainly towards the southern end of the quadrangle with outcrops also found along the Hudson River and within the Normanskill Creek. Most of the bedrock within the quadrangle is overlain by Pleistocene and Holocene glacial sediment deposits. Each rock formation is described in the Description of Map Units Pre-Pleistocene section on this map.

Methods

For this map multiple methods were used to gather surface and subsurface data. For field mapping a 1.5 meter-long hand auger or samples were collected from excavated areas such as drainage ditches, road and stream cuts were used to collect samples at 24 locations. Each of these locations was recorded with a global positioning system (Garmin 72H in NAD 81 UTM 18N coordinates) and the sediment encountered was noted. A field map of this information was created and is included as part of NYSGS Open File number 1601-DMR.

Water wells (about 40 wells) from the Department of Environmental Conservation (NYSDEC), were also used to decipher the subsurface of the Delmar quadrangle. Working with the NYSDEC water well records, the sediment lithologies were simplified from drillers' descriptions to more concise, uniform descriptions. The thickness of each lithology and bedrock depth was recorded and the location plotted. The uppermost layer under the topsoil was used to delineate the surficial geology while the stratigraphy was used to create a geologic cross section which extends southwest to northeast nearly bisecting the quadrangle map from A to A'. The same process was followed for the NYSDOT and engineering borings.
Field data were digitized in ArcMap 10.2. Polygons were created based upon the lithology of the surface material and the sample and boring locations were plotted. The cross-section was created using Adobe Illustrator CS6 with a topographic profile from ArcMap and wells and boring.

Conclusions

The pattern and character of surficial sediments in the Delmar quadrangle are a result of a retreating glacier across the area. On the final retreat across the area copious amounts of meltwater flooded much of the present-day Hudson Valley creating meltwater channels and then glacial Lake Albany. Fine sand, silt and clay washed into the lake from glacial meltwater which then settled on the bottom of the lake. Stratified sand and deposits stretch across the north and eastern portion of the quadrangle. This tract was deposited as glacial meltwater exited from beneath the glacier and then reworked by aeolian transport in some locations. Currently no distinct ice margins in the Delmar quadrangle have been identified.

Geologic Hazards

The extensive thickness of fine-grained silt and clay deposits in the capital district (Inclusive of the Delmar 7.5-Minute Quadrangle) has a long history as a geologic resource and as a geologic hazard. With the drainage of glacial Lake Albany the floor or bottom of the lake was exposed as the new land surface. It is this landscape that the capital and its suburban communities are now built upon. The development of the modern Hudson River Valley and its tributaries have incised through these silt and clay deposits and in the process created steep slopes. These slopes comprised of fine-grained sediments are inherently unstable and highly susceptible to episodic slope failures. These fine-grained sediments have not been evaluated for their susceptibility to fail due to a seismic event such as an earthquake. However, such a study is recommended given the nature of the materials. Development and construction activities along slopes in the Delmar quadrangle and adjacent areas should proceed with caution and the appropriate level of geotechnical investigations to determine the factor of safety and suitability for the desired land use.

Acknowledgements

The NYSM/NYSGS would like to thank Dennis Northrop for allowing a stratigraphic boring BH1601 to be drilled on his property. This mapping was funded by in part by the United States Geological Survey StateMap grant award number G15AC00340.

References

Bradley, J.A., Younge, M.H., Kozlowski, A.L., 2010. The Sundler Sites: Reconstructing the Late Pleistocene Landscape and its People in the Capital Region of New York, in: Drooker, P.B., Hart, J.P. (Eds.), Soldiers, Cities, And Landscapes: Papers In Honor Of Charles L. Fisher. The University of the State of New York, Albany, New York, p. 213-224.

Dineen, R.J. 1975. Geology and land use in the Pine Bush, Albany County, N.Y. New York State Museum Circular #47, p. 27

Dineen, R.J. and Rogers, W.B., 1979. Sedimentary environments in glacial Lake Albany in the Albany section of the Hudson-Champlain Lowlands. New York Geological Association Guidbook, Troy, p. 87-119

Dineen, R.J. and Hanson, E.L., 1983. Bedrock topography and glacial deposits of the Colonie Channel Between Saratoga Lake and Coeymans, New York. New York State Museum Map and Chart Series # 37

Fisher, D.W., Y.W. Isachsen, and L.V. Rickard. Geologic Map of New York State, 1970. 1:250,000. Consists of five sheets: Niagara, Finger Lakes, Hudson-Mohawk, Adirondack, and Lower Hudson. Map and Chart Series No. 15. 5 geologic bedrock maps: 1:250,000. 1970

W.S.F. Kidd, A. Plesch, and F.W. Vollmer, 1995. Lithofacies and Structure of the Taconic Flysch, Melange, and Allochthon, in the New York Capital District. pp. 57-80 in Garver, J.I. and Smith, J.A. (eds), Field Trip Guide for the 67th Annual Meeting of the New York State Geological Association, Union College, Schenectady, N.Y.

DESCRIPTION OF MAP UNITS

Holocene

Af — **Artifical Fill (Af)**
Surficial sediment composed of coarse/fine and or crushed rock anthropogenically transported and used for construction purposes.

Ha — **Stratified silt, sand and gravel (Ha)**
Sorted and stratified silt, sand, and gravel, deposited by rivers and streams. May include cobbles and boulders. Inferred as post-glaical alluvium and includes modern channel, over-bank and fan deposits

Hw — **Wetland Deposit (Hw)**
Peat, muck, marl, silt, clay or sand deposited in association with wetland environments. Various sediments can be present at transitional boundaries from one facies to another

Pleistocene

Ps — **Stratified Sand (Ps)**
Well sorted and stratified sand, deposited by fluvial, lacustrine or eolian processes. Inferred as deposits associated with distal glacial environments.

Plsc — **Silt and Clay (Psc)**
Stratified, fine-grained sediment consisting of fine sand, silt and clay size particles. Inferred to be deposited in mid shore to deepwater settings of glacial lakes. May include marl, rythmites, and varves.

Psg — **Stratified sand and gravel (Psg)**
Well-sorted and stratified sand and gravel. May include cobbles and boulders. Inferred to be delta, fan or lag deposits in glacial channels or near ice margins.

Pd — **Diamicton (Pd)**
An admixture of unsorted sediment ranging from clay to boulders. Generally matrix supported, massive and clast-rich.

Pre-Pleistocene

Hamilton Group

Dhmr — **Marcellus Sub-Group (Dhmr)**
Fissile black shale; overlain by fine grained sandstone beds, interbedded with black shales.

Onondaga Limestone and Tri-States Group

Don — **Onondaga Limestone (Don)**
Moorehouse Limestone - thick bedded medium grey calcilutite and chert. Edgecliff Limestone - thick bedded light grey calcarenite, chert and coal biostrome with local bioherns, underline by the Schoharie Formation, Carlisle Center Shale and Esopus Shale of the Tri-states

Helderberg Group

Dhg — **Helderberg Group (Dhg)**
Grey or pink relatively pure thick bedded crinoidal calcisiltites and calcarenites; New Scotland Formation- gray argillaceous calcisiltites and calcareous shales; Kalkberg Limestone - dark gray cherty argillaceous calcisiltites, Coeymans Limestone - grey thin bedded calcisiltits and calcarentist crinoidal, local biohermes, Manlius Formation - thin bedded dark grey to black calcilutites and calcisiltites, local biostromes, Roundout Formation - light grey laminated dolostone, dolomitic shales and dolomitic limestones

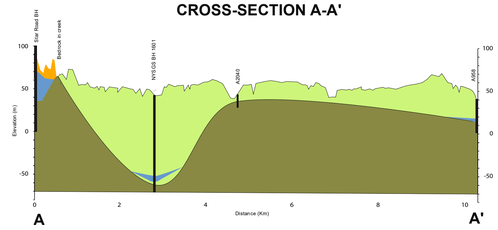
Lorraine, Trenton & Black River Groups; Taconic Overthurst (Allochthonous) Sequence

tOsc — **Schnectady Formation (tOsc)**
Bluish-grey greywacke, tan sandstones, siltstones and grey shales.

Oag — **Austin Glen Formation (Oag)**
Bluish-grey greywacke, grey shale; equates to the upper Martinsburg Penn Argyl and Rameysburn member and includes the Snall Hill of Offield (1967).

Ocm — **Cohoes Melange (Ocm)**
Proposed by Kidd. et. al., 1995.

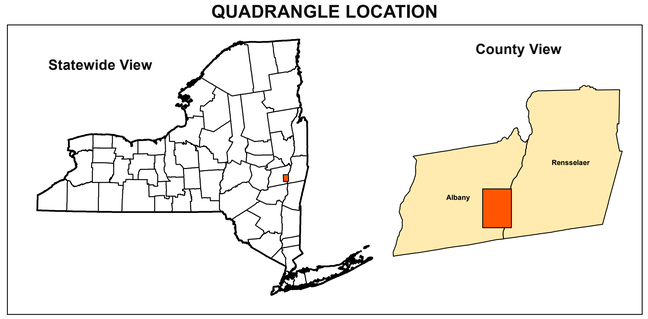
CROSS-SECTION A-A'



SYMBOLS

Streets
Highways
Railroads
Airport Runway
County Line
Water Bodies
Streams
Contours
Cross-Section Line
NYSGS Borehole Location
NYSDEC Waterwell Location
NYSDOT Boring Location

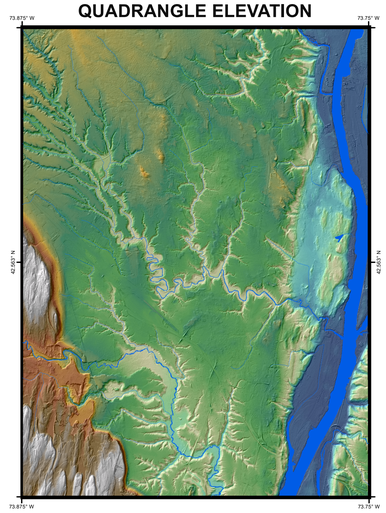
QUADRANGLE LOCATION



ADJOINING QUADRANGLES

Voorheesville	Albany	Troy South
Clarksville	Delmar	East Greenbush
Alcove	Ravena	Kinderhook

QUADRANGLE ELEVATION



Feet-amsl
0 620

1:75,000 scale; 2x vertical exaggeration

Shaded relief generated from the 2008 Capital District 2-meter and the 2015 Columbia-Rensselaer 1-meter lidar data sets by the New York State Group Purchasing Organization.

New York State Museum Map & Chart No. 91
ISSN:0097-3793 ; ISBN:978-1-55557-340-9

GEOLOGY OF THE DELMAR 7.5-MINUTE QUADRANGLE, ALBANY AND RENSSELAER COUNTIES, NEW YORK

James R. Leone, Andrew L. Kozlowski, and Robert J. Dineen

2016