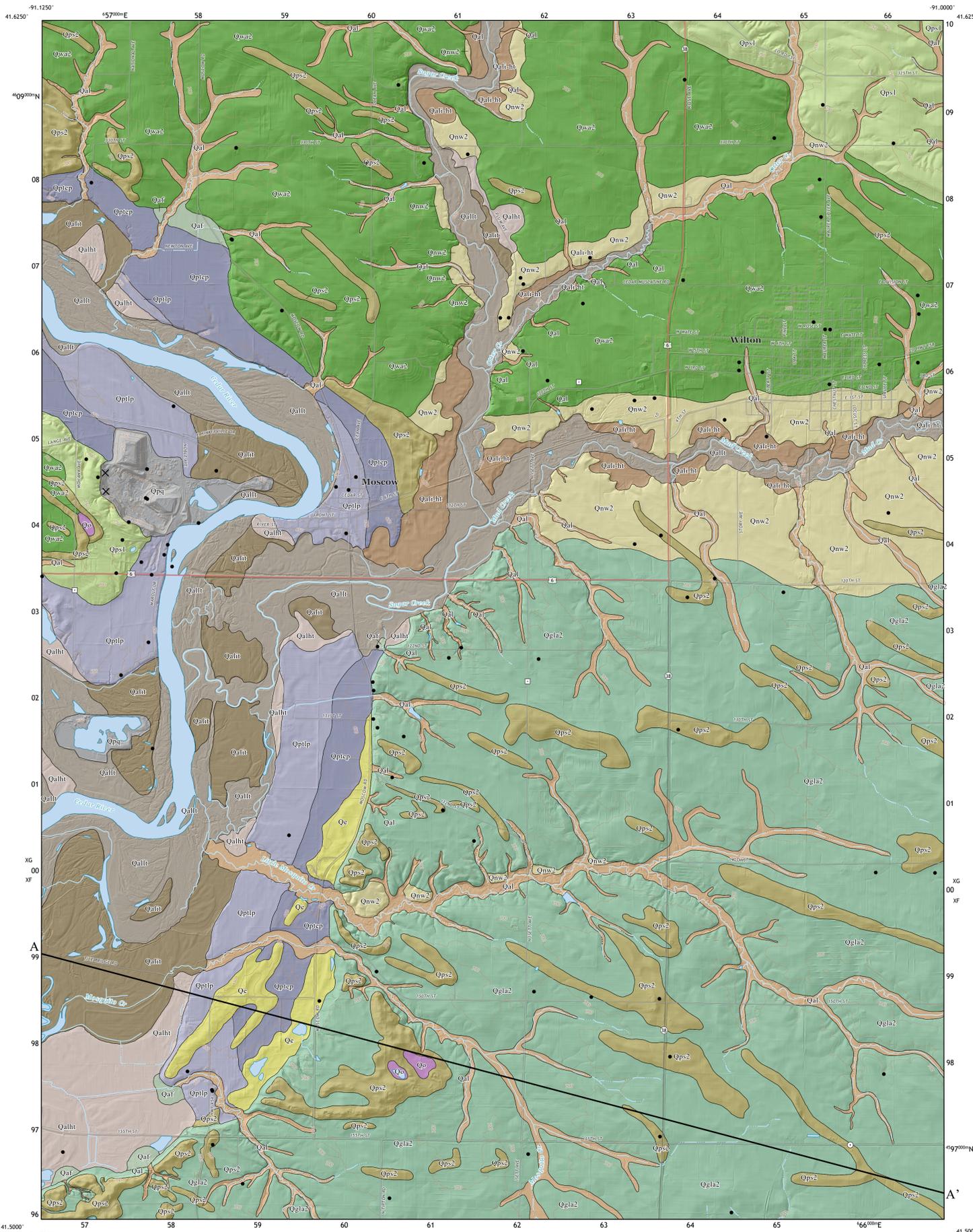


SURFICIAL GEOLOGIC MAP OF THE WILTON 7.5' QUADRANGLE, MUSCATINE AND CEDAR COUNTIES, IOWA

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INTRODUCTION

The Wilton 7.5' Quadrangle is located in Muscatine and Cedar counties, Iowa. Unlike other areas in eastern Iowa, the mapping area does not have bedrock outcrops due to the presence of the Cleona Bedrock Channel and thick, 10 to 60 m (30 – 200 ft), glacial deposits from multiple Quaternary ice advances. Yet the topography still preserves evidence of the influence of Paleozoic bedrock. The landscape of the mapping area is divided between the Cedar River Valley, the Illinoian till plain, and an older Pre-Illinoian till plain. The interplay between these three surfaces and the bedrock channel have been a source of interest and scientific debate since the 19th century.

Upstream from the mapping area along the course of the Cedar River, there is a stretch of bedrock confinement where the valley width is less than 500 m (1600 ft). Downstream of Moscow, the river enters an area where bedrock is generally greater than 60 m (200 ft) deep. Here the river valley widened dramatically, and it becomes more than 11 km (7 miles) wide in the Atalissa Quadrangle to the west of Wilton. Sediments in the valley are largely comprised of coarse glaciofluvial deposits of the Noah Creek Formation that can be 15 to 25 m (50 – 80 ft) thick underlying 3 to 8 m (10 – 25 ft) of fine-grained Holocene alluvium or in place or reworked Peoria Formation silt.

The mapping area includes the presumed terminus of the Illinoian advance, but it lacks an associated moraine. Till of the Glasford Formation is preserved near the surface in the southeastern quarter of the mapping area, conversely the uppermost till in the northern third of the mapping area is the older till of the Wolf Creek/Alburnett formations. However, both till plains generally lack the Sangamon Geosol, which is indicative of a period of erosion during the Late Wisconsinan Episode. Notably the uplands also feature thick, 3 to 15 m (10 – 50 ft), sand dunes or sheets.

The thickness and distribution of the eolian sediments strongly suggest that a large portion of these deposits were sourced from outwash in the nearby Cedar River. Dune morphology also indicates that the effective wind direction was from the west-northwest when these features were formed, and zones of deflation further support this directional interpretation. The northeast corner of the mapping area is the only region within the quadrangle where a reliable loess package greater than 5 m (16 ft) is present. This loess-covered area has a clear, linear boundary that matches the limb angles of the parabolic dunes to the south. The likely cause for this geometry is that narrow valleys where bedrock is outcropping served to trap salting sand from the Cedar River. Ultimately, the mapping area is a complex, polygenetic landscape that has been developing through multiple glacial cycles. The relationships between these materials and geomorphologic processes will continue to be investigated in future mapping projects.

Data collected for this mapping project included 11 drill cores and 8 hand probe locations in and around the mapping area as well as investigation of the nearby Moscow Quarry.

DESCRIPTION OF MAP UNITS

QUATERNARY SYSTEM

HUDSON EPISODE

- Qal** - **Alluvium** (DeForest Formation-Undifferentiated) Variable thickness of less than 1 to 5 m (3-16 ft) of very dark gray to brown, noncalcareous to calcareous, stratified silty clay loam, clay loam, loam to sandy loam alluvium and colluvium in stream valleys, on hill slopes, and in closed depressions. May overlie Glasford Formation till on the Illinoian Till Plain or Wolf Creek/Alburnett formations or Noah Creek Formation sand and gravel on the Pre-Illinoian Till Plain. Associated with low-relief modern floodplain, closed depressions, modern drainages, or topose positions on the landscape. Unit also includes colluvial deposits derived from adjacent map units. Seasonal high water table and potential for frequent flooding.
- Qaf** - **Alluvial fan (Corrington Mbr)** Variable thickness of 2 to 5 m (7-16 ft) of dark brown to yellowish brown, noncalcareous, silt loam to loam with interbedded lenses of fine sand and silts. A pebble lag is commonly found at or near the fan surface. Overlies older silty clay to sandy loam alluvium of Holocene terraces or thick sand and gravel of the Noah Creek Formation within the Cedar River Valley.
- Qallt** - **River Channel Belt - Low Terrace** (DeForest Formation-Camp Creek and Roberts Creek members) Variable thickness of less than 1 to 5 m (3-16 ft) of very dark gray to brown, noncalcareous, stratified silty clay loam, loam, or clay loam, associated with the modern channel belt of the Cedar River, Sugar Creek, Mud Creek, and Otter Creek valleys. May overlie Wolf Creek/Alburnett formations or Noah Creek Formation sand and gravel. Occupies lowest position on the floodplain (i.e., modern and historic channel belts). Ox-bow lakes and meander scars are common features associated with this terrace level. Mapped primarily using aerial imagery and LiDAR. Seasonal high water table and frequent flooding potential.
- Qalit** - **Intermediate Terrace** (DeForest Formation-Camp Creek, Roberts Creek, and Gunder members) Variable thickness of less than 1 to 5 m (2-16 ft) of very dark gray to brown, noncalcareous, stratified silty clay loam to loam that overlies the Noah Creek Formation. Occupies low terrace position above the modern floodplain in the Cedar River and Sugar Creek valleys. Seasonal high water table and frequent flooding potential.
- Qali-ht** - **Intermediate-High Terrace** (DeForest Formation-Gunder Member) Variable thickness of less than 1 to 5 m (3-16 ft) of very dark gray to brown, noncalcareous, silty clay loam to loam alluvium or colluvium that overlies the Noah Creek Formation. Occupies terrace and valley margin positions 1 to 2 m (3-7 ft) above the modern floodplain on Mud and Otter Creeks. May be mantled with 2 to 3 m (7-10 ft) of well sorted medium to fine sand derived from wind reworking of the alluvium. Seasonal high water table and low to moderate flooding potential.
- Qalht** - **High Terrace** (DeForest Formation-Gunder and Corrington members) Variable thickness of less than 1 to 7 m (3-22.5 ft) of very dark gray to brown, noncalcareous, silty clay loam, loam alluvium or colluvium. Overlies Noah Creek Formation. Occupies terrace and valley margin position 2 to 3 m (7-10 ft) above the modern floodplain in the Cedar River, and Sugar and Otter Creeks. Seasonal high water table and rare flooding potential.
- Qo** - **Depressions** (DeForest Formation-Woden Member) Generally 2.5 to 6 m (8-20 ft) of black to very dark gray, calcareous, muck, peat and silty clay loam colluvium and organic sediments in drained and undrained, closed and semi-closed depressions. Overlies gray, calcareous, loam diamicton of the Glasford or Wolf Creek/Alburnett formations, or eolian sand of the Peoria Formation. Associated with parabolic dunes. Supports wetland vegetation and can be permanently covered by water. High water table.

WISCONSIN EPISODE

- Qe** - **Sand Dunes and Sand Sheets** (Peoria Formation-sand facies) Generally less than 3 m (10 ft) of yellowish brown, massive, loamy sand to fine sand. It may overlie yellowish brown coarse-grained sand and gravel of the Noah Creek Formation or it may overlie yellowish to grayish brown, usually calcareous, stratified loam to silt loam to sandy loam diamicton of the Glasford or Wolf Creek/Alburnett formations. Usually restricted to narrow belts within the Cedar River Valley.
- Qps1** - **Loess and Intercalated Eolian Sand** (Peoria Formation-silt facies) Generally 2 to 5 m (7-16 ft) of yellowish brown to gray, massive, fractured, noncalcareous grading downward to calcareous, silt loam and intercalated fine to medium, well sorted, sand. Sand is most abundant in the lower part of the eolian package. Overlies massive, fractured, loamy glacial till of the Wolf Creek or Alburnett formations with or without intervening clayey Farmdale/Sangamon Geosol.
- Qptlp** - **Late Phase High Terrace (LPHT)** (Peoria Formation-silt and/or sand facies) Generally 2 to 8 m (7-26 ft) of yellowish brown to gray, massive, jointed, calcareous or noncalcareous, silt loam and intercalated fine to medium, well sorted, sand. Gradually interbedded by yellowish brown to gray, massive, moderately to well stratified, coarse to fine feldspathic quartz sand, loam, or silt loam alluvium of the Noah Creek Formation.
- Qptep** - **Early Phase High Terrace (EPHT)** (Peoria Formation-silt and/or sand facies) Generally 2 to 7 m (7-23 ft) of yellowish brown to gray, massive, jointed, calcareous or noncalcareous, silt loam and intercalated fine to medium, well sorted, sand. The Peoria deposits overlie a Farmdale Geosol developed in the Pisgah Formation which in turn overlies a well-exposed Sangamon Geosol developed in poorly to moderately well sorted, moderately to well stratified, coarse to fine sand, loam, or silt loam alluvium. The Pisgah Formation is in the same stratigraphic position as the Roxanna Silt mapped in Illinois.
- Qnw** - **Sand and Gravel** (Noah Creek Formation) Generally 3 m (10 ft) to more than 20 m (66 ft) of yellowish brown to gray, poorly to well-sorted, massive to well stratified, coarse to fine feldspathic quartz sand, pebbly sand and gravel. This unit is found in the Cedar River Valley and underlies Holocene alluvium and other terrace deposits. Shown only on the cross-section.
- Qps2** - **Eolian Sand and Intercalated Silt** (Peoria Formation-sand facies) Generally 5 to 15 m (16-49 ft) of yellowish brown to gray, moderately to well stratified, coarse to fine feldspathic quartz sand, pebbly sand and gravel with few intervening layers of silty clay. A thin mantle of loess, reworked loess or fine-grained alluvium may be present. This unit includes silty colluvial deposits derived from the adjacent map units. This unit encompasses deposits that accumulated in low-relief stream valleys during the Late Wisconsin. Seasonal high water table and some potential for flooding.
- Qnw2** - **Sand and Gravel** (Noah Creek Formation) Generally 2 to 8 m (7-26 ft) of yellowish brown to gray, poorly to well-sorted, massive to well stratified, coarse to fine feldspathic quartz sand, pebbly sand and gravel with few intervening layers of silty clay. A thin mantle of loess, reworked loess or fine-grained alluvium may be present. This unit includes silty colluvial deposits derived from the adjacent map units. This unit encompasses deposits that accumulated in low-relief stream valleys during the Late Wisconsin. Seasonal high water table and some potential for flooding.
- Qgla2** - **Periglacial and Eolian Sediments Shallow to Glacial Till** (unnamed erosion surface sediment) Generally 1 to 3 m (3-10 ft) of yellowish brown to gray, massive to weakly stratified, well to poorly sorted loamy, sandy and silty loam Erosion Surface sediment. Map unit includes some areas mantled with less than 2 m (7 ft) of Peoria silt or sand. Overlies massive, fractured, firm glacial till of the Illinoian Glasford Formation.
- Qwa2** - **Periglacial and Eolian Sediments Shallow to Glacial Till** (unnamed erosion surface sediment) Generally 2 to 8 m (6-26 ft) of yellowish brown to gray, massive to weakly stratified, well to poorly sorted loamy, sandy and silty loam Erosion Surface sediment. Map unit includes some areas mantled with less than 2 m (7 ft) of Peoria Formation materials (loess and eolian sand). Overlies massive, fractured, firm, glacial till of the Wolf Creek/Alburnett formations. Seasonally high water table may occur in this map unit.

ILLINOIS EPISODE

- Qgla** - **Till** (Glasford Formation) Generally 3 to 10 m (10-33 ft) of very dense, massive, fractured, loamy glacial till of the Illinoian Glasford Formation with or without a thin loess mantle (Peoria Formation-less than 2 m) and intervening clayey Farmdale/Sangamon Geosol. This unit overlies Pre-Illinoian diamicton of the Wolf Creek/Alburnett formations and is only shown on the cross-section.

PRE-ILLINOIS EPISODE

- Qwa3** - **Till** (Wolf Creek or Alburnett formations) Generally 15 to 60 m (50-200 ft) of very dense, massive, fractured, loamy glacial till of the Wolf Creek or Alburnett formations. This unit overlies Paleozoic bedrock and is only shown on the cross-section.

OTHER MAPPING UNITS

- Qpq** - **Pits and Quarries** Sand and gravel pits and rock quarries. Extent mapped as shown on the county soil surveys and as identified on aerial imagery.

CORRELATION OF MAP UNITS

	Cedar River Valley	Pre-Illinoian Till Plain	Illinoian Till Plain	Episode	Series	Stage
Alluvium	Qaf	Qo	Qo	Hudson	Holocene	
	Qallt	Qallt				
	Qalit	Qalit	Qal			
Eolian	Qalht	Qali-ht	Qal	Wisconsin	Pleistocene	
	Qe	Qps1				
Outwash	Qptlp		Qps2	Wisconsin	Pleistocene	
	Qptep					
Colluvium	Qnw		Qnw2	Wisconsin	Pleistocene	
Glacial Till		Qwa2	Qgla2	Illinoian	Pre-Illinoian	
		Qwa3	Qgla			

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GEOLOGIC CROSS-SECTION A-A'

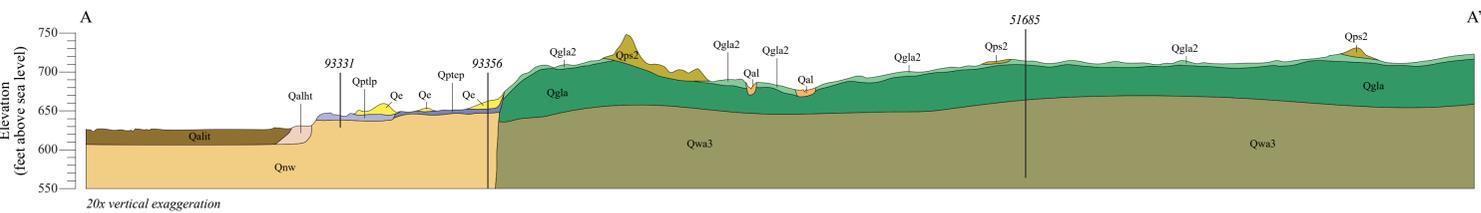


Figure 1. The location of the Wilton Quadrangle in Iowa.

Elevation (feet above sea level)

Elevation (feet above sea level)

20x vertical exaggeration