

**SURFICIAL GEOLOGIC MAP  
OF THE DES MOINES LOBE OF IOWA  
Phase 4: Humboldt County**

Iowa Geological Survey  
Open File Map 2002-3  
September 2002

Prepared by  
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Environmental Services Division  
Geological Survey and Land Quality Bureau

Supported by the U.S. Geological Survey  
Cooperative Agreement Number 010-HQAG-0091  
National Cooperative Geologic Mapping Program (STATEMAP)

Iowa Department of Natural Resources  
Jeffrey R. Vonk, Director

**ACKNOWLEDGEMENTS**

Recognized for direct contributions to map's production: Andrew B. Asell, Mary Pat Heitman, Lois Bair, Mary Skopec, B. J. Witzke, B. J. Bunker, and J. Gilmore. Drilling was provided under contract by Aquadrill of Iowa City; a special thanks to Diane Joslyn, Jay Joslyn and drilling crew members who worked at times in challenging drilling conditions. Also, thanks to Bob Rowden for operating the Giddings soil probe to obtain shallow drill cores. Assistance in describing solium cores was provided by the Natural Resources Conservation Service, Storm Lake Office personnel, Robin Wisner. A special thanks to the following individuals who graciously allowed access to their land for drilling, Alvin Berte, Brad Foth, John and Lawrence Fuhrman, Bruce Hefty, Ken Helmich, Gary Kraft, Daryl Kuehnast, Bob and Leonard Lanus, Russ Naeve, Thad and Richard Naeve, Gary Nelson, Todd Nygaard, Gerald Rasmussen, Stanley Sandvig, and the staff of the Humboldt County Conservation Board.

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# Surficial Geologic Materials of Humboldt County, Iowa

**LEGEND**

Description of Map Units

**Hudson Episode**

- Qo - Depressions (DeForest Formation-Woden Mbr.)** Generally 2.5 to 6 meters 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, massive, dense loam diamicton (Dows Fm.-Alden Mbr.) or Noah Creek Fm. sand and gravel. Associated with low relief features that occupy depressions and low sags on the landscape. Supports wetland vegetation and can be permanently covered by water. High water table.
- Qal - Alluvium (DeForest Formation-Undifferentiated)** Variable thickness (less than 1 to 5 meters) 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 Dows Formation (Morgan or Alden Mbrs.) or Noah Creek Formation. Associated with low-relief modern floodplain, closed depressions, modern drainageways or toeslope positions on the landscape. Seasonal high water table and potential for frequent flooding.
- Qalb - Alluvium shallow to bedrock (DeForest Formation-Undifferentiated)** Variable thickness (less than 1 to 5 meters) 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 Dows Formation (Morgan or Alden Mbrs.), Noah Creek Formation, or Mississippian carbonate bedrock surface is within 5 meters of land surface. Associated with low-relief modern floodplain, closed depressions, modern drainageways or toeslope positions on the landscape. Overlies Mississippian carbonate bedrock. Seasonal high water table and potential for frequent flooding.

**Wisconsin Episode**

- Qe - Sand Dunes and Sand Sheets (Pocahontas Formation-sand facies)** Generally less than 3 meters of yellowish brown, massive, calcareous loamy sand to fine sand. It may overlie yellowish-brown coarse-grained sand and gravel (Noah Creek Fm.), or it may overlie yellowish to grayish brown, usually calcareous, stratified loam to silt loam to sandy loam diamicton (Dows Fm.-Morgan Mbr.). Usually restricted to a narrow belt along major river valley bottoms or adjacent uplands on the Des Moines Lobe.
- Qoch - Valley train outwash (Noah Creek Formation)** Generally less than 8 meters of dark gray, dark grayish brown, dark brown to dark yellowish brown medium to coarse sand, gravelly sand to pebbly gravel. Overlies gray, calcareous, massive, dense loam diamicton (Dows Fm.-Alden Mbr.). In valley positions, it is at the land surface of older terraces. On the modern floodplain it is buried by DeForest Fm. alluvium. Low-relief landforms expressed as broad terraces; long, narrow longitudinal terraces or cusate-shaped point terraces. Terraces associated with the major valleys are benched on a gray, calcareous, massive, dense loam diamicton (Dows Fm.-Alden Mbr.). No flooding potential.
- Qochb - Valley train outwash shallow to bedrock (Noah Creek Formation)** Generally 1 to 5 meters of dark gray, dark grayish brown, dark brown to dark yellowish brown medium to coarse sand, gravelly sand to pebbly gravel. Overlies gray, calcareous, massive, dense loam diamicton (Dows Fm.-Alden Mbr.). It is at the land surface of older terraces. On the modern floodplain it is buried by DeForest Fm. alluvium. Low-relief landforms expressed as broad terraces; long, narrow longitudinal terraces or cusate-shaped point terraces. Unit is benched on a gray, calcareous, massive, dense loam diamicton (Dows Fm.-Alden Mbr.) or Mississippian carbonate bedrock within 5 meters of the land surface. No flooding potential.
- Qochs - Slackwater deposits overlying valley train outwash (Noah Creek Formation-silt facies)** Generally less than 3 meters of dark grayish brown to yellowish brown, massive to laminated, calcareous silt loam. Unit overlies less than 5 meters of dark gray, dark grayish brown, dark brown to dark yellowish brown medium to coarse sand, gravelly sand to pebbly gravel. Low-relief landforms expressed as broad terraces; long, narrow longitudinal terraces or cusate-shaped point terraces. Unit is benched on a gray, calcareous, massive, dense loam diamicton (Dows Fm.-Alden Mbr.) or Mississippian carbonate bedrock within 5 meters of the land surface. No flooding potential.
- Qtpl - Till Plain with discontinuous elongated hummocky ridge forms (Dows Formation-Morgan Mbr.)** Less than 4 meters of yellowish to grayish brown, calcareous, fractured, stratified loam to silt loam to sandy loam diamicton; textures can be quite variable. Overlies gray, calcareous, massive, dense loam diamicton (Dows Fm.-Alden Mbr.). The Alden Mbr. in this mapping unit can extend to depths in excess of 15 to 20 meters and may overlie Sheldon Creek Formation or Pre-Illinoian diamicton. Indistinct low relief, (less than 3 meters of local relief), ridges on slightly undulating plains with irregular surface patterns. **Discontinuous elongated ridge forms** within the unit are undulating by less than 8 meters of yellowish brown, often calcareous, stratified loam to silt loam to sandy loam diamicton (textures can be quite variable) that overlies gray, calcareous, massive, dense loam diamicton (Dows Fm.-Alden Mbr.). Indistinct elongated hummocks are oriented transverse to glacier flow on the till plain with irregular shaped surface patterns. Ridge forms are predominately low relief (less than 3 meters) features. Overall landform exhibits swell and swale topography. Seasonal high water table.
- Qtpl1 - Aligned ridge to discontinuous elongated hummocky ridge forms (Dows Formation-Morgan Mbr./ Pilot Knob Mbr.)** Less than 8 meters of yellowish brown, calcareous, fractured, stratified sand and gravel with interbedded stratified loam diamicton or yellowish to grayish brown, calcareous, fractured, stratified loam to silt loam to sandy loam diamicton; textures can be quite variable. Overlies gray, calcareous, massive, dense loam diamicton (Dows Fm.-Alden Mbr.). The Alden Mbr. in this mapping unit can extend to depths in excess of 15 to 20 meters and may overlie Sheldon Creek Formation or Pre-Illinoian diamicton. Low to moderate relief, (less than 8 m of local relief), slightly undulating plains with irregular surface patterns. **Aligned ridges to discontinuous elongated ridge forms** within the unit are undulating by less than 8 meters of yellowish brown, often calcareous, stratified loam to silt loam to sandy loam diamicton; textures can be quite variable. Evidence of shearing is sometimes present. Overlies gray, calcareous, massive, dense loam diamicton (Dows Fm.-Alden Mbr.). Tracts of faint to distinct aligned ridges to elongated hummocks oriented transverse to glacier flow on the till plain with irregular shaped surface patterns. Ridges or aligned hummocks are low to moderate relief features (3 to 8+ meters) Overall landform exhibits swell and swale topography. Seasonal high water table.
- Qtpld4 - Till Plain with linked depression systems and discontinuous elongated hummocky ridge forms (Dows Formation-Morgan Mbr./Lake Mills Mbr.)** Less than 8 meters of yellowish brown, calcareous, fractured, stratified sand and gravel with interbedded stratified loam diamicton or yellowish to grayish brown, calcareous, fractured, stratified loam to silt loam to sandy loam diamicton; textures can be quite variable. Overlies gray, calcareous, massive, dense loam diamicton (Dows Fm.-Alden Mbr.). The Alden Mbr. in this mapping unit can extend to depths in excess of 15 to 20 meters and may overlie Sheldon Creek Formation or Pre-Illinoian diamicton. **Discontinuous elongated ridge forms** within the unit are undulating by less than 8 meters of yellowish brown, often calcareous, stratified loam to silt loam to sandy loam diamicton; textures can be quite variable. Overlies gray, calcareous, massive, dense loam diamicton (Dows Fm.-Alden Mbr.). Indistinct elongated hummocks are oriented transverse to glacier flow on a very low relief till plain with reticulate linked-depression systems. Ridge forms are predominately low relief (less than 3 meters) features. Low to moderate relief (3 to 8 meters) discontinuous isolated ridges that run oblique to glacier flow are common. Numerous medium to large depressions and small glacial and historic lake beds. Overall landform exhibits swell and swale topography. High water table.
- Qtpld4-3 - Till plain with linked depression systems and aligned ridge forms to discontinuous elongated hummocky ridge forms (Dows Formation-Morgan Mbr./Lake Mills Mbr.)** Less than 8 meters of yellowish brown, calcareous, fractured, stratified sand and gravel with interbedded stratified loam diamicton or yellowish to grayish brown, calcareous, fractured, stratified loam to silt loam to sandy loam diamicton; textures can be quite variable. Overlies gray, calcareous, massive, dense loam diamicton (Dows Fm.-Alden Mbr.). The Alden Mbr. in this mapping unit can extend to depths in excess of 15 to 20 meters and may overlie Sheldon Creek Formation or Pre-Illinoian diamicton. **Aligned ridges to discontinuous elongated ridge forms** within the unit are undulating by less than 8 meters of yellowish brown, often calcareous, stratified loam to silt loam to sandy loam diamicton; textures can be quite variable. Evidence of shearing is sometimes present. Overlies gray, calcareous, massive, dense loam diamicton (Dows Fm.-Alden Mbr.). Tracts of faint to distinct aligned ridges to elongated hummocks oriented transverse to glacier flow on a very low relief till plain with reticulate linked-depression systems. Ridges or aligned hummocks are low to moderate relief features (3 to 8+ meters). Low to moderate relief (3 to 8 meters) discontinuous isolated ridges that run oblique to glacier flow are not uncommon. Numerous medium to large depressions and small glacial and lake beds. Overall landform exhibits swell and swale topography. High water table.
- Qtr - Till ridge (Dows Formation-Morgan Mbr.)** Generally 3 to 5 meters of yellowish to grayish brown, usually calcareous and fractured, stratified loam to silt loam; stratified sands and gravels to sandy loam diamicton; textures can be quite variable. Overlies gray, calcareous, massive, dense loam diamicton (Dows Fm.-Alden Mbr.). The Alden Mbr. in this mapping unit can extend to depths in excess of 15 meters and may overlie Sheldon Creek Formation diamicton or Pre-Illinoian diamicton. Low to moderate relief hummocky landform features exceed 3 to 8 meters of local relief. This landform is associated with the West Bend, Renwick and Unique Moraines in Humboldt county. Seasonal high water table.
- Qqlp - Lake Sediment small-scale landform features (Dows Formation-Lake Mills Mbr./Woden Mbr.)** Generally less than 3 meters of dark grayish brown, massive, calcareous silty clay loam, silt loam overlying a thin (less than 1 meter) basal increment of sand and gravel. Unit overlies yellowish to grayish brown calcareous, stratified loam to silt loam to sandy loam diamicton; textures can be quite variable (Dows Fm.-Morgan Mbr.) or it may overlie a gray, calcareous, massive, dense loam diamicton (Dows Fm.-Alden Mbr.). Small glacial lake beds associated with very low relief till plain with reticulate linked-depression systems. High water table.

**Paleozoic**

- Mu - Weathered Mississippian bedrock (Gilmore City Formation)** Kinderhookian-lower Osagean--Primarily limestone facies.
- Qpq - Pits and Quarries** Sand and gravel pits and rock quarries. Extent mapped as shown in county soil surveys.
- Qf - Fill** Areas of major land filling. Fill associated with railroad grades, highway grades and land leveling. Variable in texture ranging from loamy to sandy to concrete rubble. Extent mapped as shown in county soil surveys.

**Water Features**

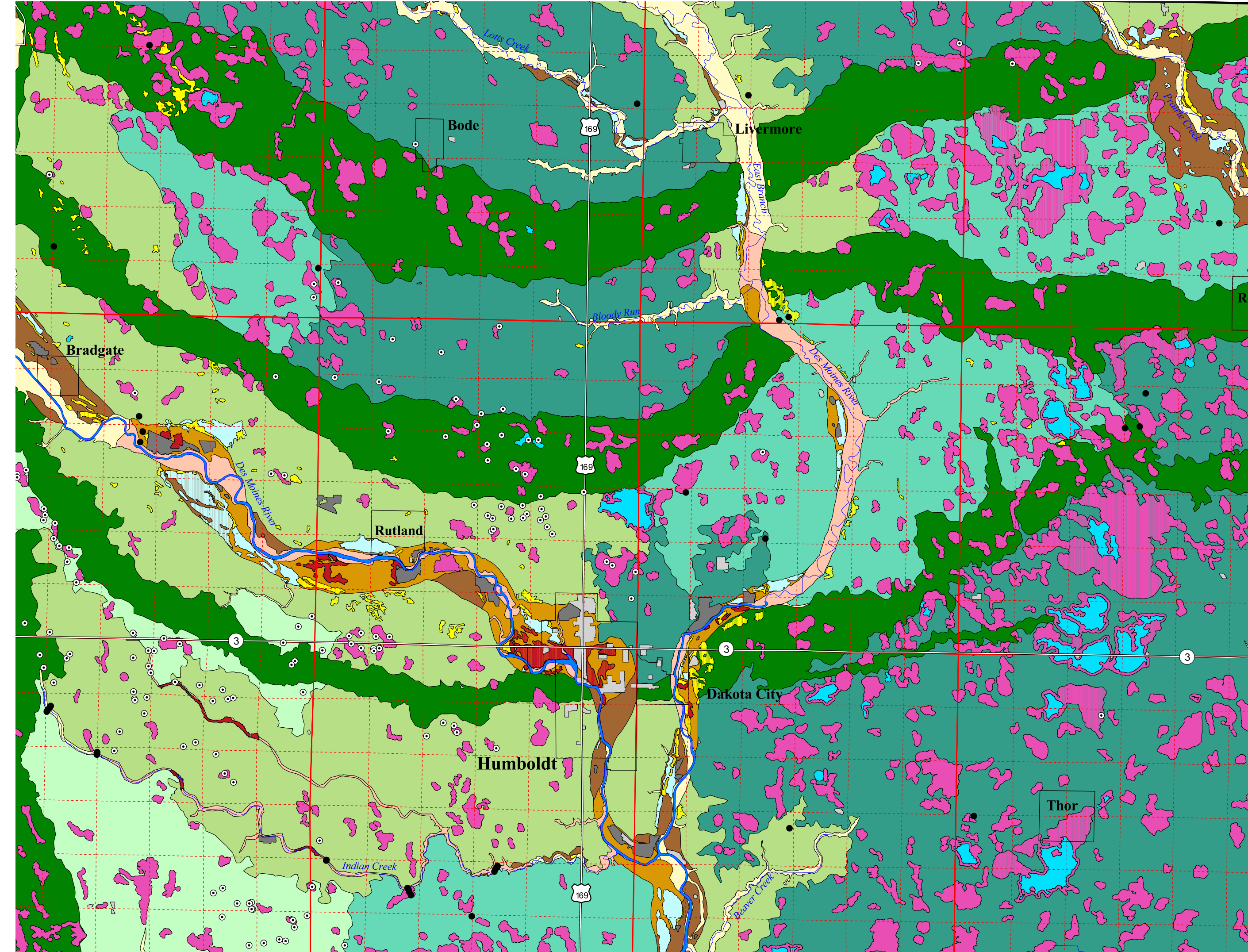
Blue line symbol

**Drill Hole Locations**

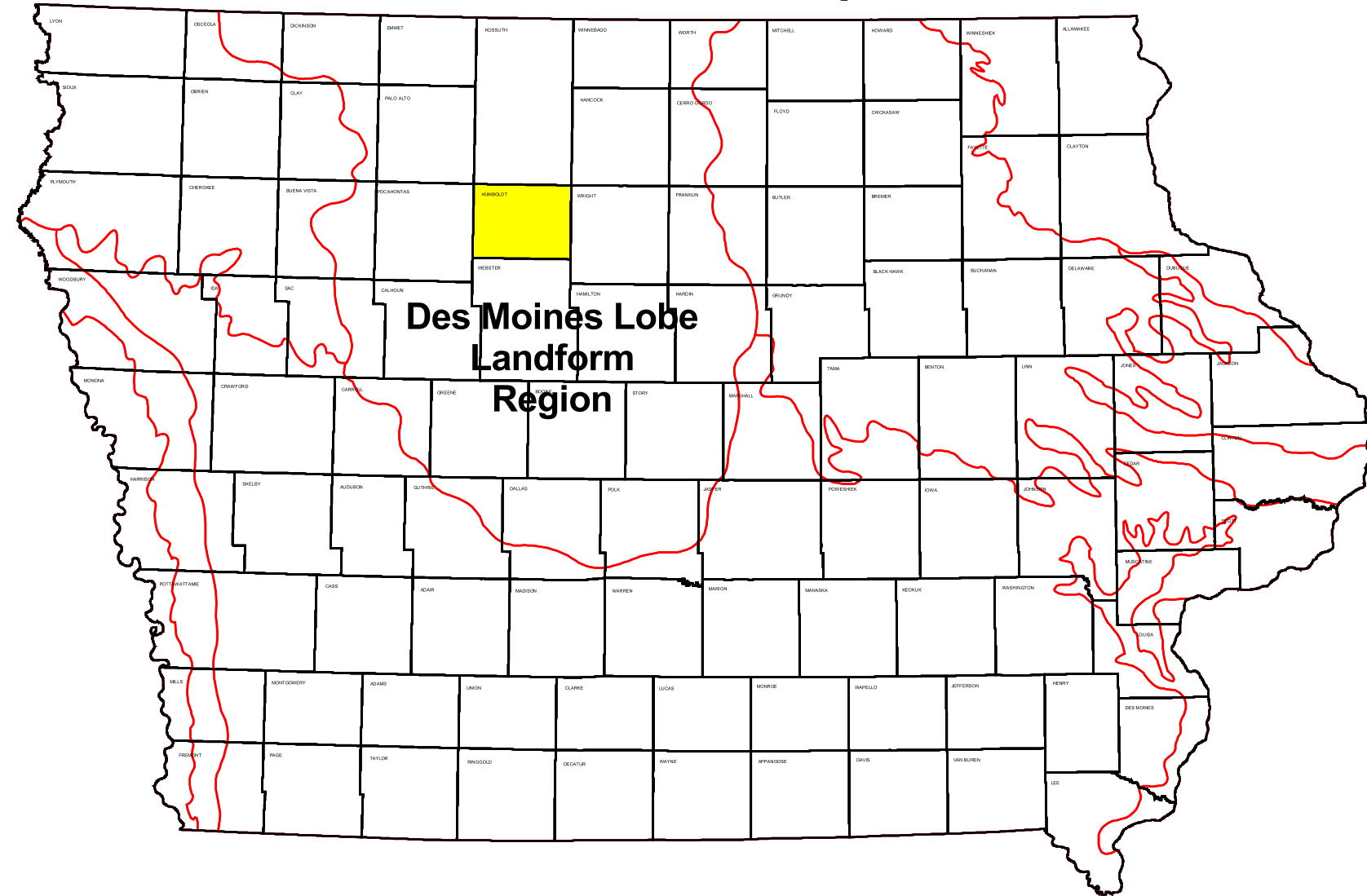
Black dot symbol

**Agricultural Drainage Wells**

Circle with dot symbol



**Location Map**



1:100,000

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