

DIGITAL MAPPING TECHNIQUES 2022

The following was presented at DMT'22
May 22 - 25, 2022

The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2022)

<http://ngmdb.usgs.gov/info/dmt/>

From Logging Borehole Cuttings to GeMS-based Database Storage

South Carolina Department of
Natural Resources Geological Survey

Megan James
Robby Morrow



Subsurface Data

Collection

Survey 123



2D Display

ArcGIS Dashboard
and Golden
Software's Strater



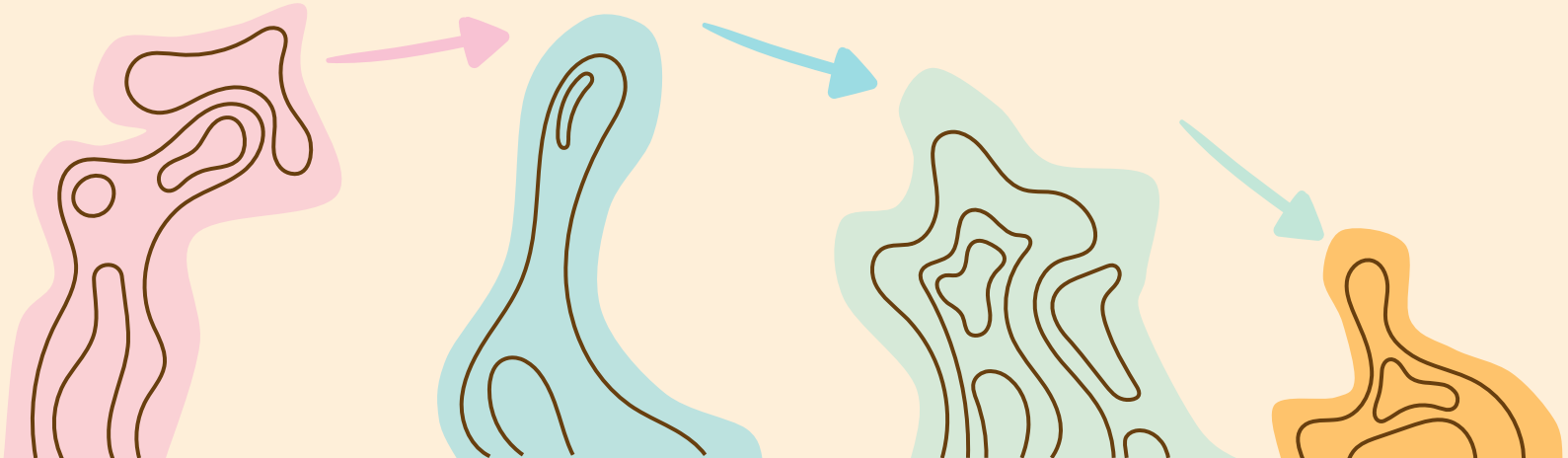
GeMS

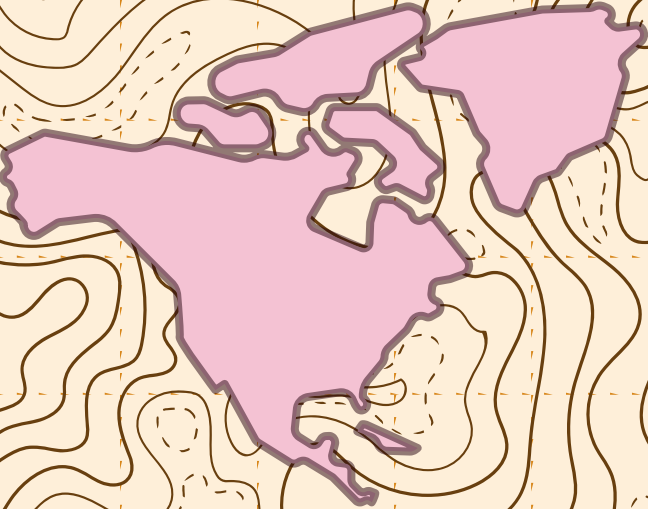
GeMS Feature
Class and Table



3D Display

Aquaveo's
Archydro





Borehole Logging

Using Survey 123



Purpose

- Paper → Digital Logs
- Standardized Data Collection
- Survey 123 → tailored to fit needs, exportable, GeMS compliant

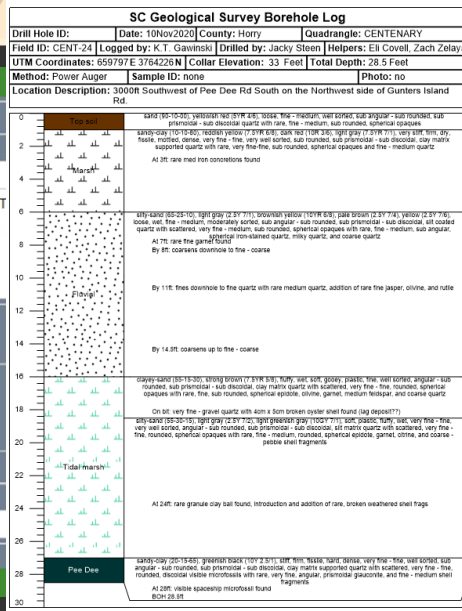
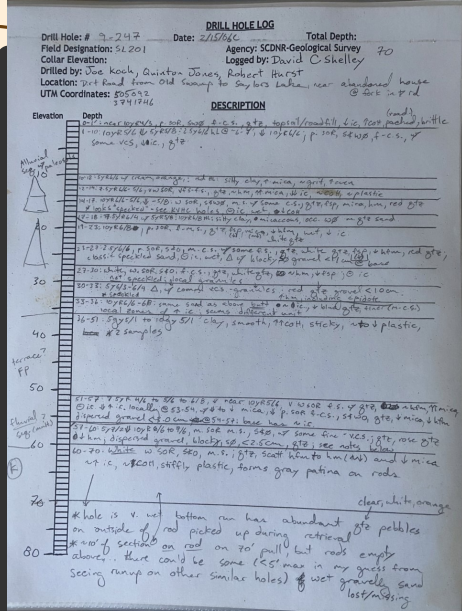
Tradition Description

orange, silt matrix supported, well sorted, subangular to subrounded, very fine and.



Survey 123 Generated Description

5-15-30, very dark gray (10YR 3/1), light brownish gray (10YR 6/2), yellowish 5/8), light bluish gray (10B 8/1), stiff, dense, medium - coarse, moderately sorted, sub rounded, sub prismatic - sub discoidal, clay matrix quartz with scattered, very rounded, spherical opaques with rare, medium-coarse, sub angular, smoky and very coarse - granule iron-stained quartz and quartz



Picture References

My Survey

very silt, silty

Sand Size:

Sand Size 1:

- very fine (1/16-1/8mm)
- fine (1/8-1/4mm)
- medium (1/4-1/2mm)
- coarse (1/2-1.0mm)
- very coarse (1.0-2.0mm)

Sand Size 2:

- medium (1/4-1/2mm)
- coarse (1/2-1.0mm)
- very coarse (1.0-2.0mm)
- granule (2.0-4.0mm)
- pebble (4.0-64.0mm)

Roundness:

Roundness 1:

- very angular
- angular
- sub-angular

Roundness 2:

- sub-rounded
- rounded
- well-rounded

Sorting:

Minerals and Matrix:

Major Mineral (>25%):

- quartz
- phosphate
- calcic sand

Secondary Mineral (10-25%):

- carbonate
- shell hash
- gravel

Matrix:

- silt matrix
- silt matrix supported
- silt coated
- clay matrix
- clay matrix supported

Sed Texture

My Survey

Roundness 1: sub-angular

Roundness 2: sub-rounded

Sorting:

Sorting 1:

- very poorly sorted
- poorly sorted
- moderately sorted

Sorting 2:

- moderately sorted
- well sorted
- very well sorted

Minerals and Matrix:

Major Mineral (>25%):

- quartz
- phosphate
- calcic sand

Secondary Mineral (10-25%):

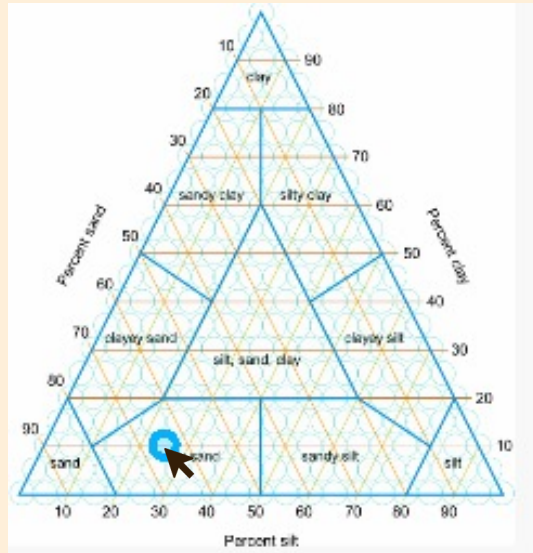
- calcic
- shell hash
- glauconitic
- gravelly
- fossiliferous
- phosphatic
- quartzose
- micaceous

Matrix:

- silt matrix
- silt matrix supported
- silt coated
- clay matrix
- clay matrix supported

Sed Texture

Interactive Images



Interactive Ternary Diagram

Sand - Silt - Clay %
65-25-10

Sed Composition
silty-sand

Automatic Descriptions

Notes

Field Unit/Confidence

Sample/Photo Data

Description
sandy-clay (35-10-55), brownish yellow (10YR 6/8), pale brown (2.5Y 7/3), stiff, fissile, fine - medium, well sorted, sub angular - sub rounded, sub prismatic - sub discoidal, clay matrix supported quartz with scattered, fine, rounded, spherical opaques with rare, fine-medium, sub rounded, sub prismatic garnet, citrine, rutile

Notes:
Any additional notes about the logged section, that is not incorporated into the generic description, can be added here.

Field Unit and Confidence:
Field Unit Assignment: marsh Confidence: 2

Bottom Depth: *

Sample 1:
Sample taken? Yes No Sample Depth: 5 Sample ID: DUF-1-5

Sample 2:
Sample taken? Yes No
Photo:



Borehole Logs

Using ArcGIS Dashboard
& Strater

Dashboard

SCGS Drill Hole Viewer

Quad
- ALL -

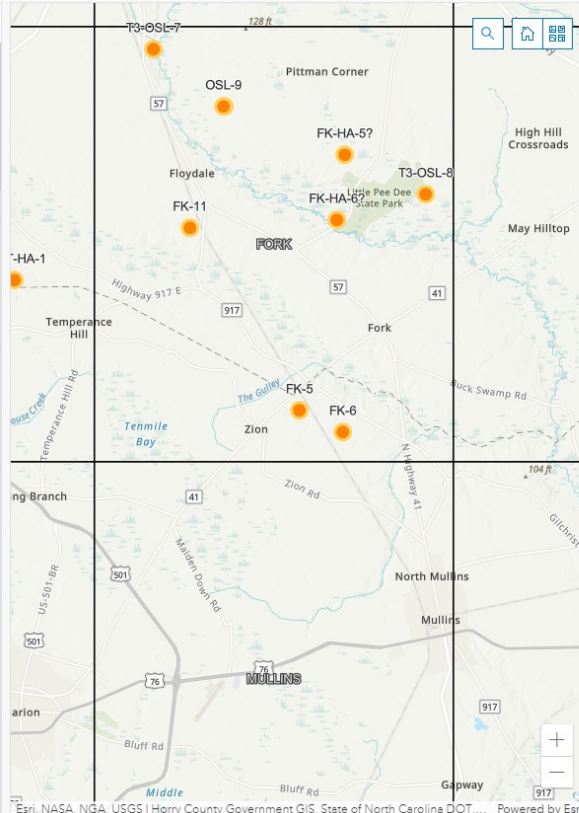
County
- ALL -

Method
- ALL -

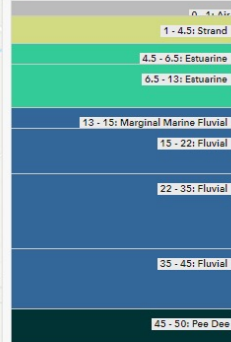


Drill Holes

Lad-3 - ADRIAN Depth: 24 Hand Auger (measurements in inches)
CENT-HA-1 - CENTENARY Depth: 150 Hand Auger (measurements in inches)
CENT-HA-3 - CENTENARY Depth: 59 Hand Auger (measurements in inches)
OSL-1 - CENTENARY Depth: 47.125 Hand Auger (measurements in inches)
T3-OSL-3 - DUFORD Depth: 78 Hand Auger (measurements in inches)
T3-OSL-6 - DUFORD Depth: 68 Hand Auger (measurements in inches)
T3-OSL-7 - DUFORD Depth: 78 Hand Auger (measurements in inches)
OSL-11 - DUFORD Depth: 65.5 Hand Auger (measurements in inches)
OSL-12 - DUFORD Depth: 69.75 Hand Auger (measurements in inches)
OSL-8 - DUFORD Depth: 67.625 Hand Auger (measurements in inches)
FK-5 - FORK Depth: 50 Power Auger (measurements in feet)
FK-6 - FORK Depth: 47 Power Auger (measurements in feet)
FK-11 - FORK Depth: 30



Log View



Log Description

FK-5: 0.00 - 1.00 Air Notes:
FK-5: 1.00 - 4.50 Strand , Light Yellowish Brown (2.5Y 6/4) fine, well sorted, sub angular - sub rounded, silt matrix quartz with rare, Vf opaques, med iron stained quartz Notes:
FK-5: 4.50 - 6.50 Estuarine , Light olive Brown (2.5Y 6/4), Yellowish brown (10YR 5/6), White (2.5Y 8/1), stiff fine - medium, poorly sorted, angular - sub angular, clay matrix supported quartz with rare, Coarse quartz, vf to fine opaques Notes:
FK-5: 6.50 - 13.00 Estuarine , Yellowish Brown (10YR 5/8), White (2.5Y 8/1), Red (2.5YR 4/8) clay with very fine - fine, moderately sorted, sub angular quartz with scattered, Med quartz and vf opaques Notes: By 8 ft, the sand fraction fines to fine to med
FK-5: 13.00 - 15.00 Marginal Marine Fluvial sand (80-00-20), Brownish yellow (10YR 6/8), White (2.5Y 8/1) fine - medium, moderately sorted, sub angular - sub rounded, clay matrix quartz with scattered, Vf opaques, with rare, Coarse quartz Notes: Thin streaks of a gray color
FK-5: 15.00 - 22.00 Fluvial silty-sand (7.5-25-00), Yellowish Brown (7.5YR 5/8), crumbly fine - fine_ pebble, very poorly sorted, angular - sub rounded, silt matrix supported quartz with rare, Milky quartz, vf to fine opaques, garnet Notes:
FK-5: 22.00 - 35.00 Fluvial , Pale Brown (2.5Y 8/4) fine - very coarse, poorly sorted, angular - sub rounded quartz with scattered, Granul sized quartz, with rare, Rose, smoky, milky, and polycrystalline quartz, vf to med opaques, fine garnet Notes: By 25.5 ft, sand fraction slightly fines to fine to coarse with rare vc quartz At 30 ft, sand fraction coarsens to a fine to vc quartz

Dashboard cont.

SCGS Drill Hole Viewer

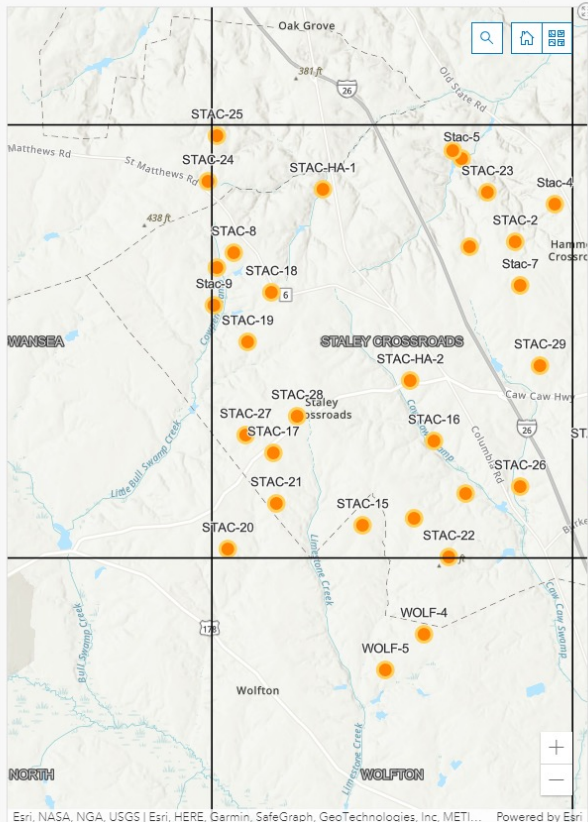
Quad
- ALL -

County
- ALL -

Method
- ALL -



Drill Holes
<p>Depth: 70 Power Auger (measurements in feet)</p>
<p>STAC-23 - STALEY CROSSROADS Depth: 90 Power Auger (measurements in feet)</p>
<p>STAC-24 - STALEY CROSSROADS Depth: 70 Power Auger (measurements in feet)</p>
<p>STAC-25 - STALEY CROSSROADS Depth: 68 Power Auger (measurements in feet)</p>
<p>STAC-14 - STALEY CROSSROADS Depth: 70 Power Auger (measurements in feet)</p>
<p>STAC-26 - STALEY CROSSROADS Depth: 65 Power Auger (measurements in feet)</p>
<p>STAC-27 - STALEY CROSSROADS Depth: 75 Power Auger (measurements in feet)</p>
<p>STAC-28 - STALEY CROSSROADS Depth: 75 Power Auger (measurements in feet)</p>
<p>STAC-29 - STALEY CROSSROADS Depth: 60 Power Auger (measurements in feet)</p>
<p>STAC-HA-1 - STALEY CROSSROADS Depth: 72 Hand Auger (measurements in inches)</p>
<p>STAC-HA-2 - STALEY CROSSROADS Depth: 136 Hand Auger (measurements in inches)</p>
<p>WOLF-4 - WOLFTON Depth: 75 Power Auger (measurements in feet)</p>
<p>WOLF-5 - WOLFTON Depth: 15 Power Auger (measurements in feet)</p>



Log View
0 - 1.5: Air
1.5 - 3: Poor Recovery
3 - 13.5: Dry branch?
13.5 - 29: ODB
29 - 72: ODB?
72 - 75: Congaree??

Log Description
<p>STAC-28: 0.00 - 1.50 Air , air Notes:</p>
<p>STAC-28: 1.50 - 3.00 Poor Recovery Notes:</p>
<p>STAC-28: 3.00 - 13.50 Dry branch? clayey-sand (60-10-30), Reddish yellow (7.5YR 6/8), slightly_stiff crumbly fine - medium, well sorted, sub angular - sub rounded, sub prismatic - spherical, clay matrix quartz with scattered, Coarse-vc quartz Notes: By 5ft: color changes to red (2.5YR 5/8), coarsens downhole to med-vc quartz with rare granules By 7ft: color changes to reddish yellow (5YR 6/8) At 8.5ft: color changes to red (10R 5/6) and white (7.5YR 8/2), gains mottling and slightly fissile texture, fines downhole to med-coarse, addition of rare fine opaques By 10.5ft: color changes to yellowish red (5YR 5/8) and pale yellow (5Y 7/4), gains fissile texture, fines downhole to vf-f quartz with rare coarse quartz and coarse mica, becomes a sandy clay (40-10-50) At 13ft: addition of rare sub round-well round med-vc pebble (lag deposit, contact?)</p>
<p>STAC-28: 13.50 - 29.00 ODB clayey-sand (70-10-20), Red (2.5YR 5/8), crumbly, slightly_stiff medium - very coarse, moderately sorted, angular - sub angular, sub prismatic - spherical, clay matrix quartz with rare, Vf-fine opaques Notes: By 16ft: addition of rare well rounded granule quartz From 18.5-20ft: addition of lenses of vf-f quartz within mottled clay, color of clay in lenses changes to light red (2.5YR 6/6) and pale brown (2.5Y 7/4), addition of rare fine-med mica within the lenses At 20.5ft: lenses of vf-f clay disappear At 22ft: color changes to reddish yellow (7.5YR 6/8), loses clay matrix, maintains clay coating, coarsens downhole to c-vc quartz, At 25ft: addition of rare rounded-well rounded, spherical-sub discoidal, fine-med pebble quartz By 28ft: fines downhole to med-vc quartz</p>
<p>STAC-28: 29.00 - 72.00 ODB? clayey-sand (65-10-25), Red (10R 4/6), Pale brown (5Y 7/4), wet, slightly_stiff, medium_plasticity, slightly_fissile, mottled very fine - fine, well sorted, angular - sub angular, sub prismatic - discoidal,</p>

Python Script

Quinn Nisbet & Tanner Arrington

Collars / Coordinates

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Hole ID	Easting	Northing	Starting D	Ending De	Location	Date	Logged by	County	Quadrang	Drilled by	Helpers	Sample ID	Photo	Drill Hole	Method	
2	MUL-6	660612	3780143	0	50	3000ft We	02March21	Kyle T. Ga	Marion	MULLINS	Jacky Stee	Eli_Covell	none	no		Power Auger (measur	
3	MUL-7	657796	3777440	0	50	4700ft Sou	02March21	Kyle T. Ga	Marion	MULLINS	Jacky Stee	Eli_Covell	MUL-7-47	no		Power Auger (measur	
4	MUL-8	660003	3783684	0	60	1000ft Noi	04March21	Kyle T. Ga	Marion	MULLINS	Jacky Stee	Eli_Covell	none	no		Power Auger	
5	MUL-9	656868	3779568	0	32	200ft East	04March21	Kyle T. Ga	Marion	MULLINS	Jacky Stee	Eli_Covell	none	no		Power Auger	
6	MUL-11	655037	3783050	0	7	200 feet si	05March21	C. Andrew	Marion	MULLINS	Jacky Stee	Eli_Covell	none	no		Power Auger	
7	MUL-12	653230	3779779	0	27	1700ft Sou	08March21	Kyle T. Ga	Marion	MULLINS	Jacky Stee	Eli_Covell	MUL-12-21	no		Power Auger	
8	MUL-13	654842	3778863	0	9	2000ft Eas	08March21	Kyle T. Ga	Marion	MULLINS	Jacky Stee	Eli_Covell	none	no		Power Auger	
9	MUL-14	650560	3779390	0	7.5	150ft Sou	08March21	Kyle T. Ga	Marion	MULLINS	Jacky Stee	Eli_Covell	none	no		Power Auger	
10	MUL-15	652148	3783030	0	30	1500ft Sou	10March21	Kyle T. Ga	Marion	MULLINS	Jacky Stee	Eli_Covell	none	no		Power Auger	
11	MUL-16	650528	3782699	0	5	100ft Nort	11March21	Kyle T. Ga	Marion	MULLINS	Jacky Stee	Eli_Covell	none	no		Power Auger	
12	MUL-17	653557	3785888	0	40	300ft Nort	11March21	Kyle T. Ga	Marion	MULLINS	Jacky Stee	Eli_Covell	MUL-17-11	no		Power Auger	
13	MUL-18	653056	3787042	0	9	350ft Wes	17March21	Kyle T. Ga	Marion	MULLINS	Jacky Stee	Eli_Covell	none	no		Power Auger	
14	MUL-19	652661	3788110	0	50	200ft Wes	17March21	Kyle T. Ga	Marion	MULLINS	Jacky Stee	Eli_Covell	none	no		Power Auger	
15	MUL-20	660208	3790944	0	40	2000ft Eas	19March21	Kyle T. Ga	Marion	MULLINS	Jacky Stee	Eli_Covell	none	no		Power Auger	

Lithology

	A	B	C	D	E	F	G	H	I	J	K
1	Hole ID	From	To	Lithology Keyword	Lithology Description	Notes 1	Notes 2	Notes 3	Notes 4	Notes 5	Note:
2	MUL-6	0	1	Road fill	Road fill						
3	MUL-6	1	24	Marsh	clayey-sand (50-15-35), strong brown (7.5YR 5/8), crumbly f	By 5.0ft: a	From 7.0-ft	At 8.5ft: c	At 10.0ft: i	By 13.0ft: By 16	
4	MUL-6	24	31	Fluvial	sand (85-15-00), brownish yellow (10YR 6/8), loose, wet medium -very coarse, moderately sorted, very angular -roun						
5	MUL-6	31	32	Weathering horizon	clayey-sand (50-15-35), strong brown (7.5YR 5/6), soft, sticky, goeey fine -medium, well sorted, angular -sub rounded						
6	MUL-6	32	44	Re-worked Pee Dee	clayey-sand (45-15-40), black (5Y 2.5/1), strong brown (7.5Y From 32.0-34.0ft: strong brown (6.5YR 4.0/6) color is mottl						
7	MUL-6	44	49	Pee Dee	sandy-clay (10-10-80), greenish black (10Y 2.5/1), light gray	By 47.0ft: i	By 48.0ft: addition of scattered very fine visible				
8	MUL-7	0	4	Floodplain deposit	clayey-sand (65-10-25), olive yellow (2.5Y 6/6), wet, playable, medium plasticity, soft fine -coarse, moderately sorted,						
9	MUL-7	4	30	Fluvial system	sandy-clay (25-10-65), white (5Y 8/1), dark red (2.5YR 3/6), r	By 7.5ft: a	By 11.0ft: By 15.0ft: By 22.0ft: i	At 27.0ft: i	At 28		
10	MUL-7	30	41	Marsh	sandy-clay (20-10-70), pale brown (10YR 6/3), sticky, slight	Rip up cla	At 36.0ft: color changes to light yellowish browi				
11	MUL-7	41	49	Pee Dee	sandy-clay (20-15-65), light gray (2.5Y 7/1), slightly stiff, mo	From 41.0	By 42.0ft: i	At 44.0ft: i	By 45.0ft: i	At 46.0ft: i	At 47
12	MUL-8	0	12	Marsh	clayey-sand (50-15-35), yellowish brown (10YR 5/8), soft, pl	By 3.0ft: c	By 5.0ft: l	By 7.0ft: o	By 10.0ft: i	At 12.0ft: color c	
13	MUL-8	12	20	Fluvial	silty-sand (65-35-00), pale brown (2.5Y 8/3), loose, wet fine	From 13.0	From 14.0	From 15.5-	From 16.5	At 17.0ft: i	By 19
14	MUL-8	20	26	Marsh	sandy-clay (30-10-60), reddish yellow (5YR 6/8), sticky, goo	From 24.0-26.0ft: addition of dark bluish gray color (8.0B 2					
15	MUL-8	26	33	Salt marsh	clayey-sand (40-20-40), dark bluish gray (10B 4/1), wet, soft	From 31.0-33.0ft: color changes to pinkish gray (5.5YR 4.0/					
16	MUL-8	33	34	Lag deposit	sand (85-15-00), pale brown (10YR 6/3), loose fine -medium pebble, very poorly sorted, angular -sub rounded, prisms						
17	MUL-8	34	36.5	Fluvial	sand (80-20-00), white (10YR 8/1), loose medium -coarse, w	From 36.0-36.5ft: color changes to light yellowish brown (
18	MUL-8	36.5	49	Oyster bed	clayey-sand (65-10-25), light bluish gray (10B 7/1), firm, der	Through	At 37.5ft: rare sub-rounded, sub-discoidal brown (

Geoprocessing

Pull Drill Logs from Survey123

Parameters Environments

AGOL Username
UsernameExample

AGOL PW
PasswordExample

Output Folder
test

Quad Prefix
MUL

Lower Drill Hole # 2

Upper Drill Hole # 22

Item ID
itemIDfromArcGISOnlineFeatureClassCreatedBySurvey123

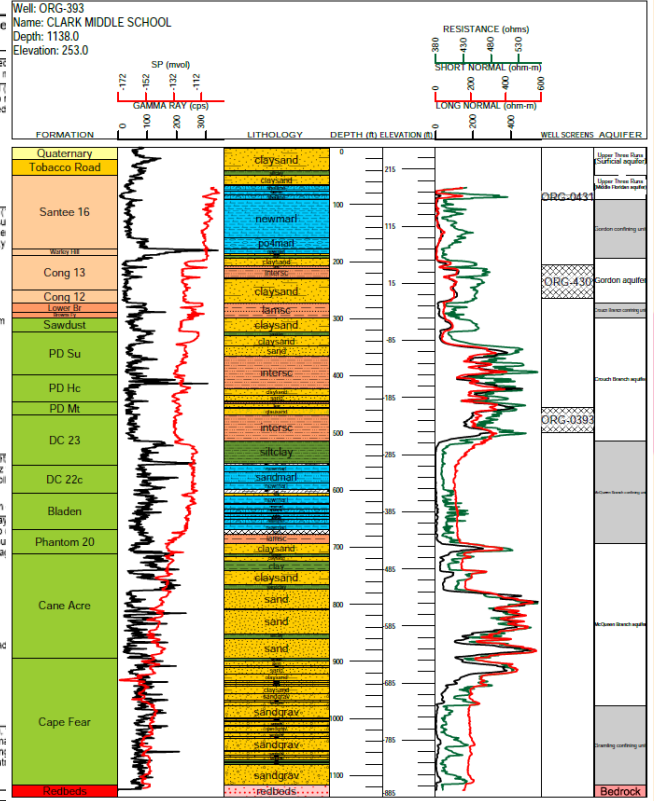
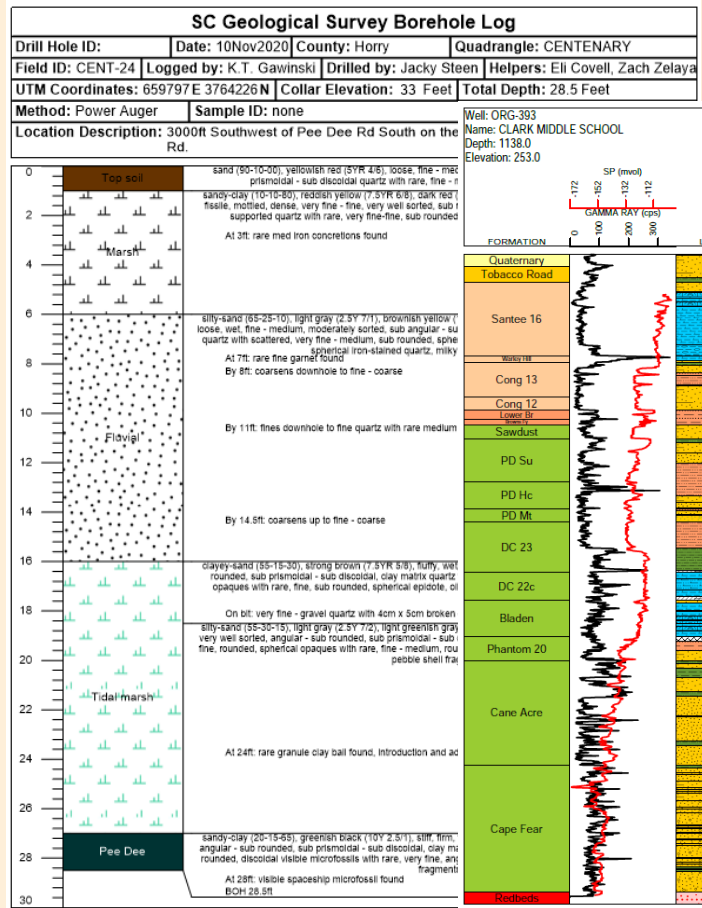
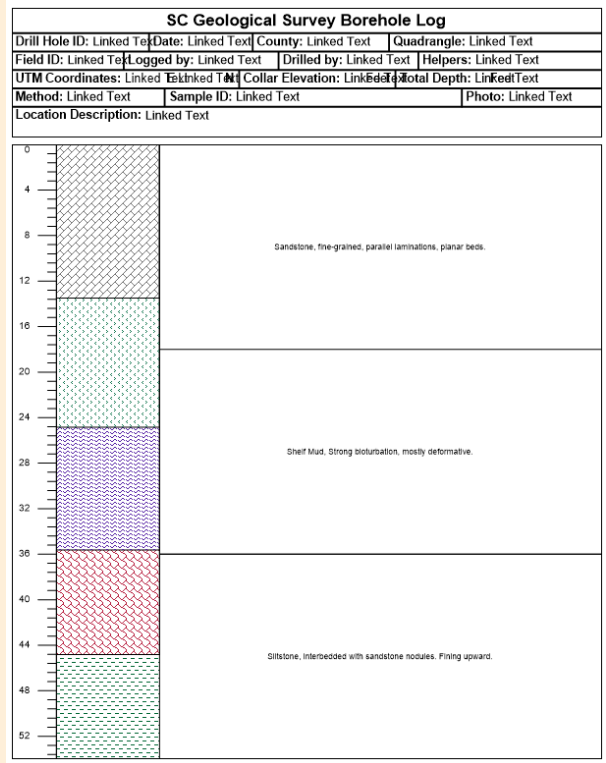
Run

Import Template Data: _GeologyBoreholeTemplate.tst ? X

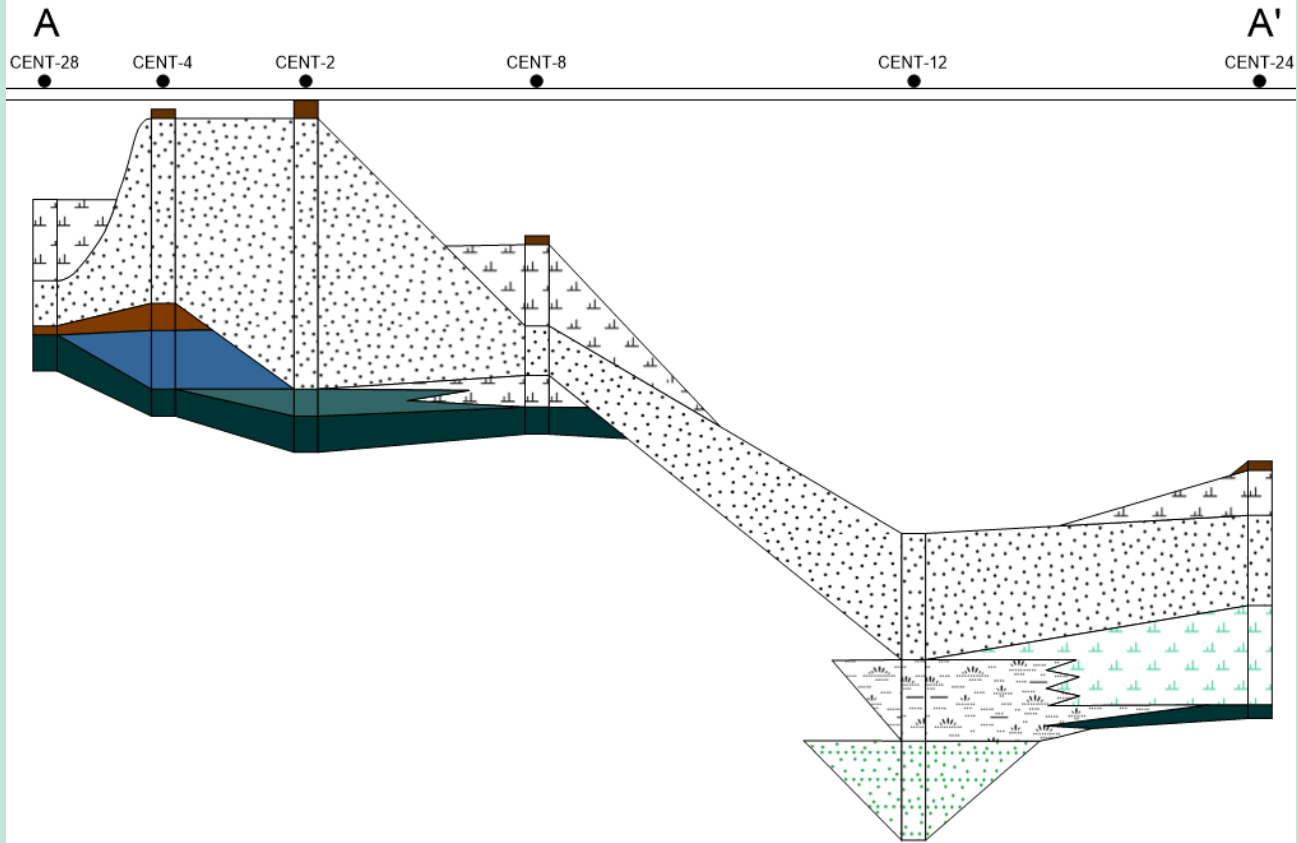
You may either import data into the tables referenced in the template file now, or do it on your own later.

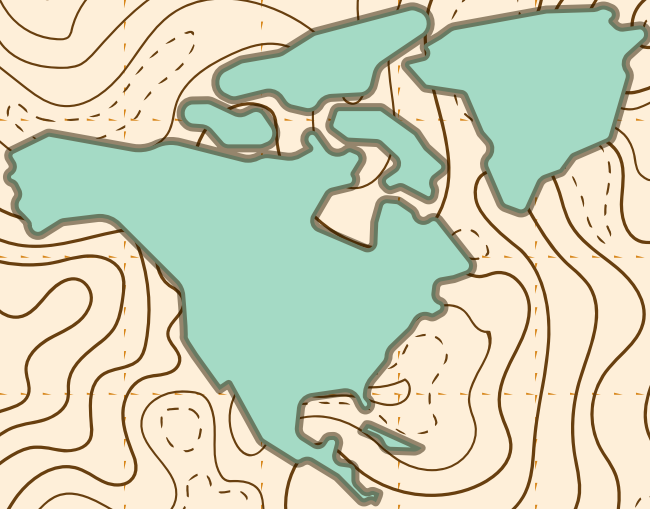
Import data into the tables referenced in the template file now:

Table Name	Table Type	Preview	Action
Coordinates	Collars Table	View Table	Import Data
Lithology	Lithology Table	View Table	Import Data



Cross Section





Boreholes in GeMS

Methods

- Export shapefile from Survey 123
- Script → fill in “Stations” feature class and “StationsBoreholeLogs” table

ArcGIS Survey123 My Surveys Help

SCGS Coastal Plain Borehole Log Overview

Report Export Open in Map Viewer Form view

Selected records only

CSV
Excel
KML
Shapefile
File Geodatabase

Data:		X			
STALEY CROSSROADS	STAC-12	283	57	508174.5	37226
STALEY CROSSROADS	STAC-11	333	75	506517.1	37218

GeMS Feature Classes and Tables

Stations (GeMS Feature Class)

FieldID
LocationConfidenceMeters
ObservedMapUnit
MapUnit
Symbol
Label
PlotAtScale
DataSourceID
Notes
Stations_ID
TimeDate
Observer
SignificantDimensionsMeters
LocationMethod
GPSX
GPSY
PDOP
MapX*
MapY*
ElevationMeters*
LocationDescription*
LoggedBy*
County*
Drilled By*
Helpers*
SampleID*
Photo*
Method*

StationsBoreholeLogs*

FieldID
TopContactDepth_ft
TopContactDepth_m
BottomContactDepth_ft
BottomContactDepth_m
TopContactElevation_ft
TopContactElevation_m
BottomContactElevation_ft
BottomContactElevation_m
BoreholeUnitThickness_ft
BoreholeUnitThickness_m
BoreholeUnit
Description
IdentityConfidence
DataSourceID
StationsBoreholeLogs_ID

*Added

GeMS_Definition.py

```
'Stations': [['FieldID', 'String', 'NoNulls', IDLength],
             ['LocationConfidenceMeters', 'Single', 'NoNulls'],
             ['ObservedMapUnit', 'String', 'NullsOK', mapUnitLength],
             ['MapUnit', 'String', 'NoNulls', mapUnitLength],
             ['Symbol', 'String', 'NullsOK', defaultLength],
             ['Label', 'String', 'NullsOK', IDLength],
             ['PlotAtScale', 'Single', 'NoNulls'],
             ['DataSourceID', 'String', 'NoNulls', IDLength],
             ['Notes', 'String', 'NullsOK', defaultLength],
             ['LocationMethod', 'String', 'NullsOK', defaultLength],
             ['TimeDate', 'Date', 'NullsOK'],
             ['Observer', 'String', 'NullsOK', defaultLength],
             ['SignificantDimensionMeters', 'Single', 'NullsOK'],
             ## 06/2021: New fields start here
             ['ElevationMeters', 'Single', 'NullsOK'],
             ['LocationDescription', 'String', 'NullsOK', 500],
             ['LoggedBy', 'String', 'NullsOK', 50],
             ['County', 'String', 'NullsOK', 50],
             ['DrilledBy', 'String', 'NullsOK', 50],
             ['Helpers', 'String', 'NullsOK', 50],
             ['SampleID', 'String', 'NullsOK', 50],
             ['Photo', 'String', 'NullsOK', 50],
             ['Method', 'String', 'NullsOK', 100],
             ## New fields end here
             ['GPSX', 'Double', 'NoNulls'],
             ['GPSY', 'Double', 'NoNulls'],
             ['PDOP', 'Single', 'NullsOK'],
             ['MapX', 'Double', 'NoNulls'],
             ['MapY', 'Double', 'NoNulls']],
```

GeMS_CreateDatabase.py

```
# create tables
# 6/8/2021 added 'StationsBoreholeLogs'
tables = ['DescriptionOfMapUnits', 'DataSources', 'Glossary']
for tb in ['RepurposedSymbols', 'StandardLithology', 'GeologicEvents', 'MiscellaneousMapInformation', 'StationsBoreholeLogs']:
    if tb in OptionalElements:
        tables.append(tb)
```

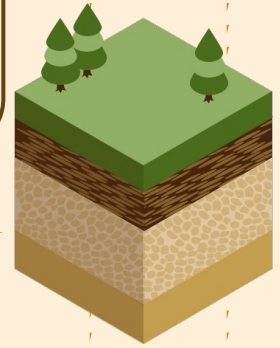
GeMS_Definition.py

```
## 06/2021: New table starts here ##
'StationsBoreholeLogs': [
    ['FieldID', 'String', 'NoNulls', 50],
    ['TopContactDepth_ft', 'Single', 'NoNulls', defaultLength],
    ['TopContactDepth_m', 'Single', 'NoNulls', defaultLength],
    ['BottomContactDepth_ft', 'Single', 'NoNulls', defaultLength],
    ['BottomContactDepth_m', 'Single', 'NoNulls', defaultLength],
    ['TopContactElevation_ft', 'Single', 'NoNulls', defaultLength],
    ['TopContactElevation_m', 'Single', 'NoNulls', defaultLength],
    ['BottomContactElevation_ft', 'Single', 'NoNulls', defaultLength],
    ['BottomContactElevation_m', 'Single', 'NoNulls', defaultLength],
    ['BoreholeUnitThickness_ft', 'Single', 'NoNulls', defaultLength],
    ['BoreholeUnitThickness_m', 'Single', 'NoNulls', defaultLength],
    ['BoreholeUnit', 'String', 'NoNulls', 100],
    ['Description', 'String', 'NoNulls', 2500],
    ['IdentityConfidence', 'String', 'NoNulls', 50],
    ['DataSourceID', 'String', 'NoNulls', 50],
    ['StationsBoreholeLogs_ID', 'String', 'NoNulls', 50]]
## New table ends here ##
```



3-D Geology

Using Archydro by Aquaveo





DISCLAIMER

“While it is important to recognize the importance of geologic features for groundwater analysis, we did not attempt to create a comprehensive geologic map database in the groundwater data model design” (Strassberg et al., 2011).

Borehole Viewer

Arc Hydro GW ▾ Subsurface ▾ ID [Icons] Fields

- Import GeoSection From XML
- Import GeoVolume From XML
- HGU Color Manager
- Borehole/Well Editor**
- Borehole/Well Editor
- Create Borehole/Well
- Show Borehole/Well

This command manages Boreholes and Wells as part of the Arc Hydro Groundwater Data Model

This command manages Boreholes and Wells

Borehole Editor

Boreholes

- 1 (HydroID: 1001)
- 2 (HydroID: 1002)
- 3 (HydroID: 1003)
- 4 (HydroID: 1004)
- 5 (HydroID: 1005)
- 6 (HydroID: 1006)
- 7 (HydroID: 1007)
- 8 (HydroID: 1008)

Wells (Point Features) Well: Well Key Field: HydroID

BoreholeLog (Table) BoreholeLog Log Key Field: WellID Optional Unit: <Not used>

Contacts X: 656186.000000001 Y: 3773465

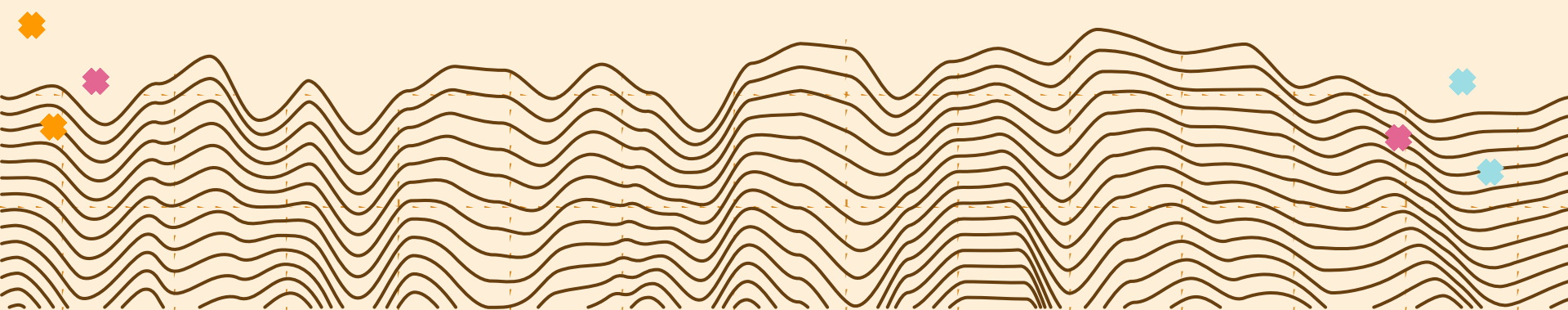
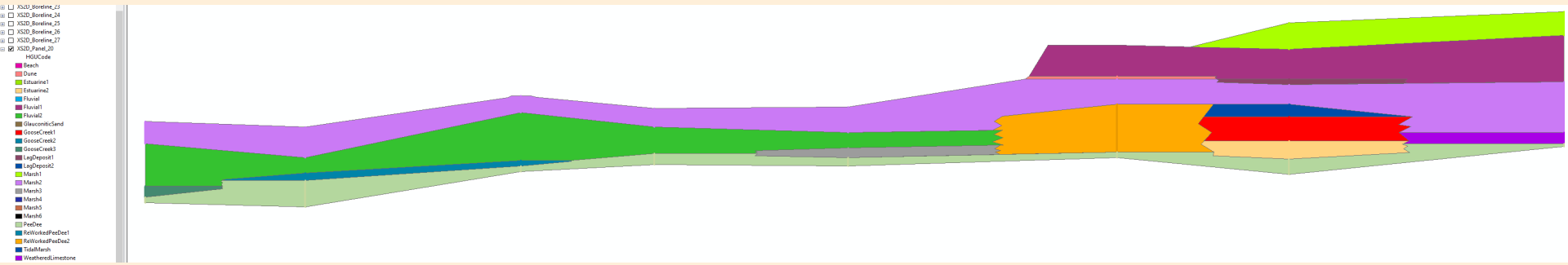
OID	TopElev	Bottom...	HGUID
291	87	77.5	11
292	77.5	76.5	5
293	76.5	67	5
294	67	65	9
295	65	58	11
296	58	54	9
297	54	53.5	9

Insert Delete

Use HGU Color Manager **HGU Color Manager** OK Cancel

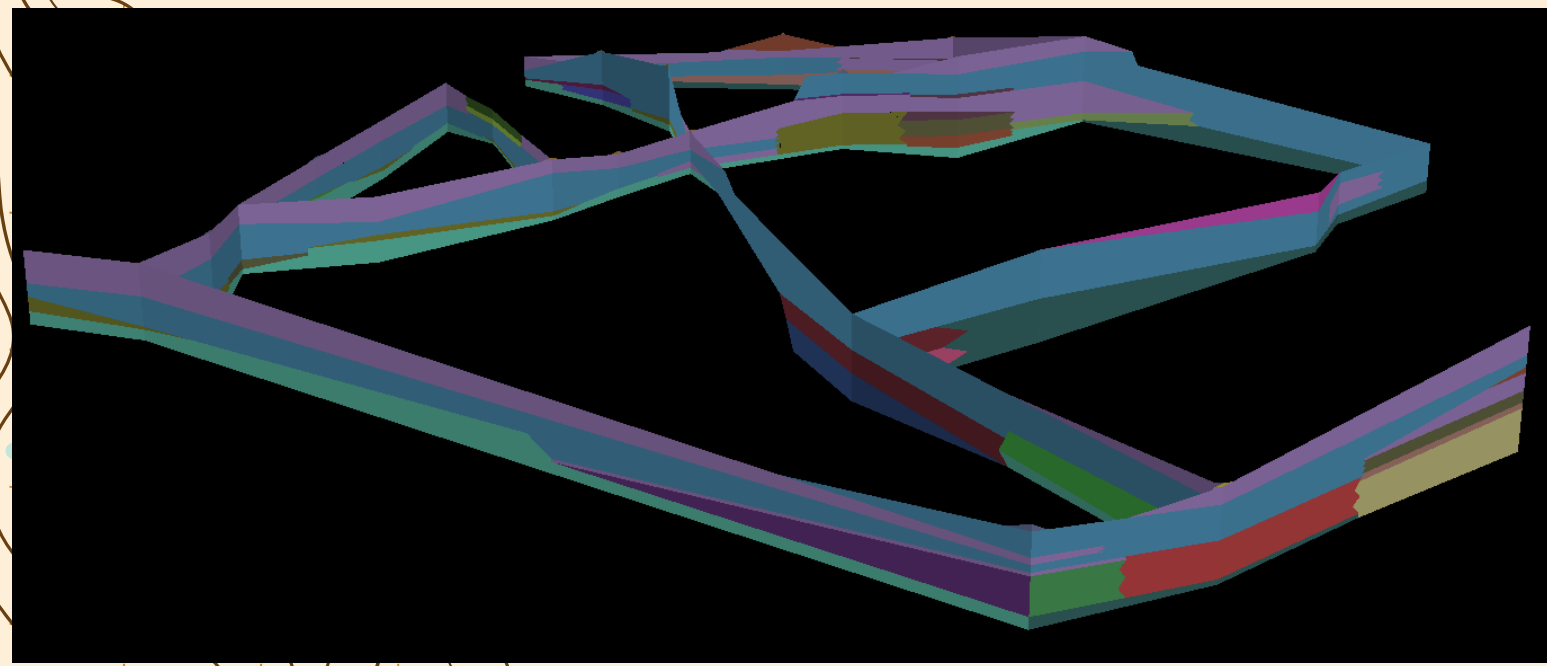
HGU

Cross Sections

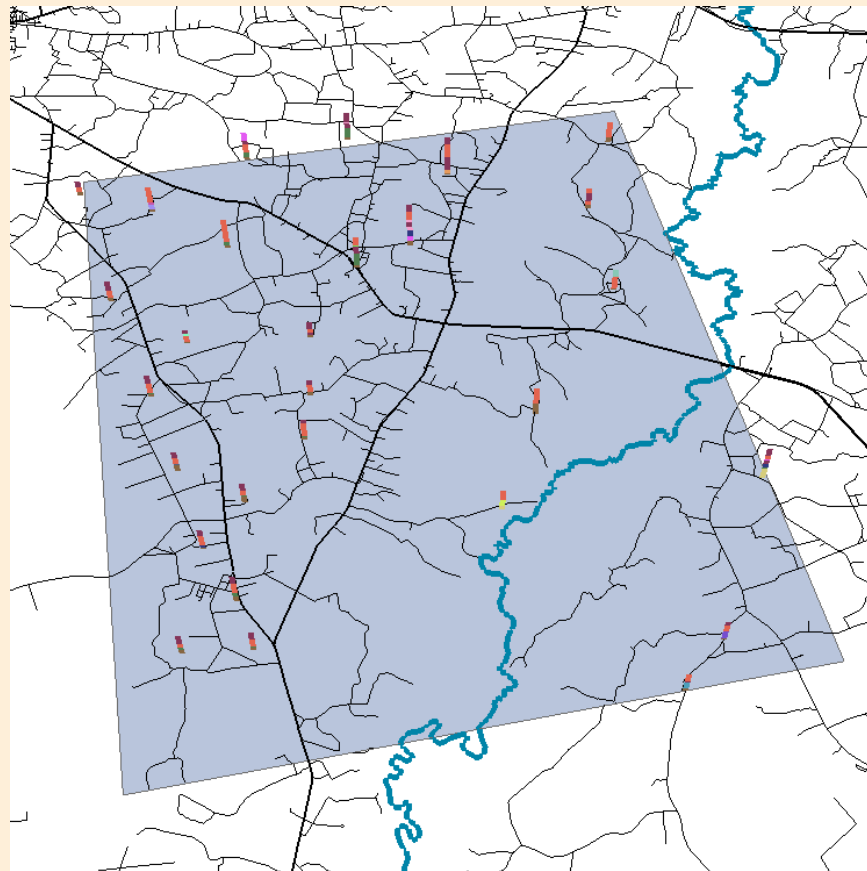


Fence Diagrams

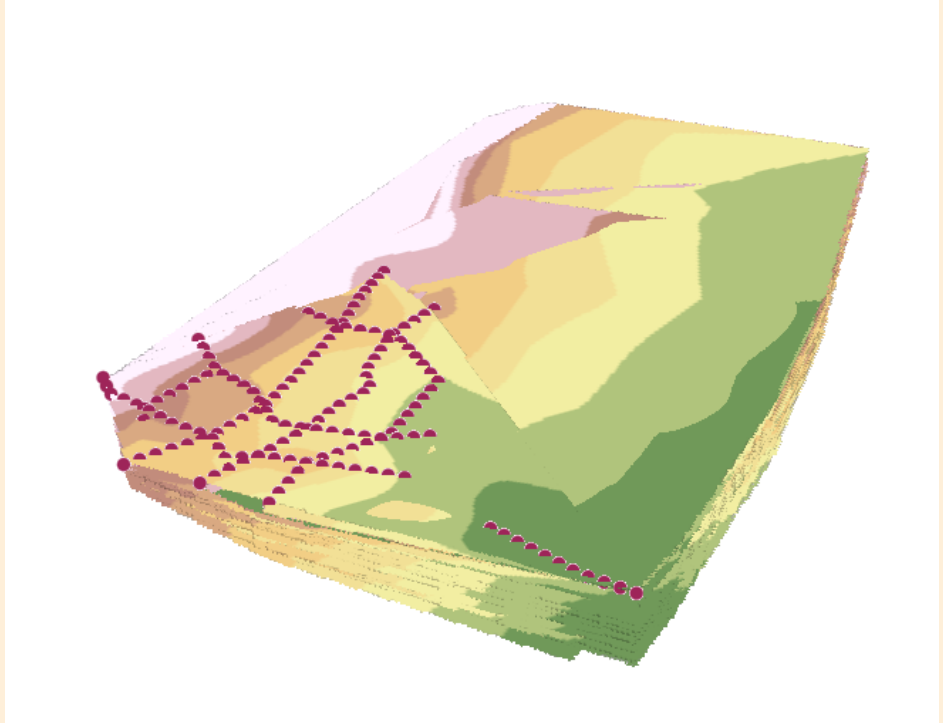
- Scene layers
- Well
 - BoreLine
 - GeoSection
- HGUCode
- Dune
 - Dune into Beach
 - Estuarine
 - Fluvial
 - Glaucconitic Sand
 - Glaucconitic Sand/Fluvial
 - Glaucconitic sand
 - Goose Creek
 - Lag deposit
 - Marginal estuarine
 - Marsh
 - Pee Dee
 - PeeDee
 - Pleistocene Floodplain
 - Re-worked Pee Dee
 - Reworked PeeDee
 - Road fill
 - Salt marsh
 - Swamp
 - Tidal Marsh
 - Tidal marsh
 - Top Soil
 - Top soil
 - Weathered Limestone
 - Weathered Pee Dee
 - Weathering horizon
 - Wicomico marsh
- BorePoint
- ◆



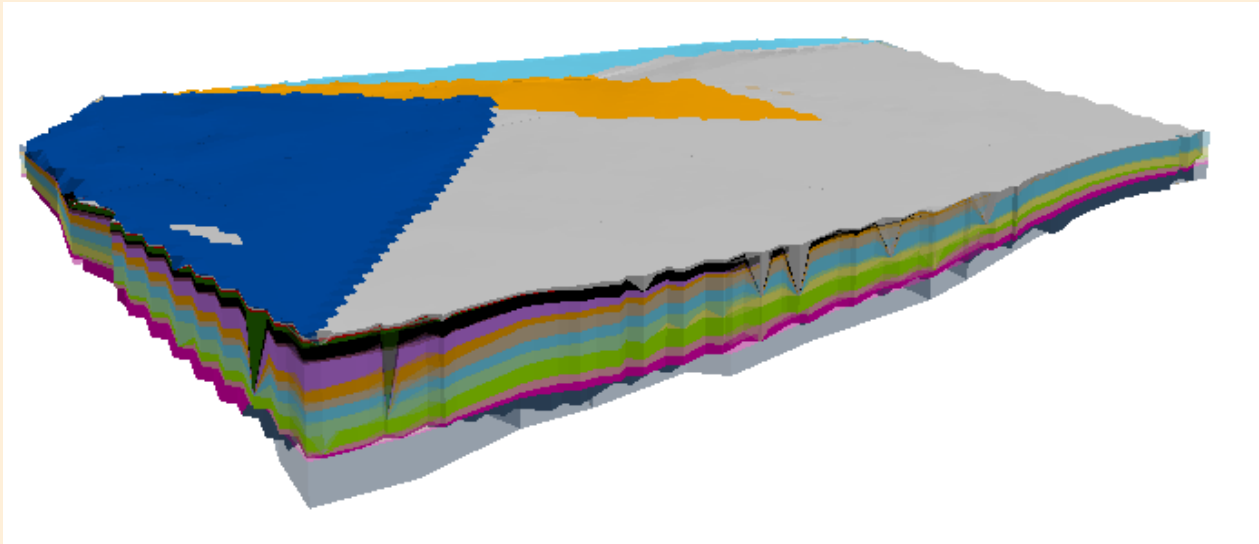
Borehole Visualization



Raster Creation



Solids Layers





Thanks!

MorrowR@dnr.sc.gov

JamesM@dnr.sc.gov

<https://www.dnr.sc.gov/geology/>

CREDITS: This presentation template was created by **Slidesgo**, including icons by **Flaticon**, and infographics & images by **Freepik**

