

OWNER: City of Norfolk, USGS Test Well #1
DRILLER: Layne-Atlantic Company
COUNTY: Norfolk (Moores Bridge)

VDMR: 2154
WWCR: 166
TOTAL DEPTH: 2587 1/2'

GEOLOGIC LOG

Depth in
feet

0-100	No samples
YORKTOWN FORMATION ¹ (100-292')	
100-130	Sand — greenish- and brownish-gray, moderately clayey, 5% shell fragments (pelecypods, gastropods, worm tubes), a few small pebbles up to 20 mm (quartz, quartzite, chert, calcitic sandstone); fine to coarse, moderately sorted (skewed fine); very slightly glauconitic and micaceous; echinoid spines and foraminifers common
111-113 C ²	Sand — greenish-gray, slightly clayey, trace of shell; fine to medium, well-sorted; 90% clear and greenish angular quartz, 5% glauconite, 5% sand-size shell fragments, echinoid spines, foraminifers, and ostracods; traces of muscovite and hornblende
130-140	No sample
140-150	Sand — greenish-gray, slightly clayey, 5% shell fragments, including <u>Turritella</u> ; fine to coarse, rather poorly sorted; 80% angular to subrounded quartz, 20% dark-green glauconite; a few foraminifers and echinoid spines
150-160	" 90% quartz, 10% glauconite; locally, a dolomitic sandstone
157-160 T	Clay — gray, compact, very slightly silty and sandy; non-clay fraction consists of 50% quartz (coarse silt and very fine sand) and 50% fine to medium, dark-green glauconite; concretionary pyrite common; trace of muscovite
157-160 B	" trace of silt and sand; concretionary pyrite abundant

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- 160-170 Sand — gray, moderately clayey (clay is locally white, calcareous), 5% shell fragments, 5% fragments of tan, dolomitic sandstone; very fine to coarse, moderately sorted (skewed fine); sand is 90% quartz, 10% glauconite; traces of muscovite and bone and shell phosphorite
- 170-180 " very clayey
- 180-190 Sand — gray, clayey trace of shell fragments; fine to medium, well-sorted; 90% angular quartz, 10% glauconite; foraminifers common, ostracods and echinoid spines present
- 190-203 Sand and shell — greenish-gray, clayey; 30% pelecypod and gastropod shells and shell fragments, and a few bone fragments; 70% fine, well-sorted sand; sand is 90% quartz, 10% glauconite; a few foraminifers and echinoid spines
- 203-215 Sand — gray, very slightly clayey; fine to medium, fairly well-sorted; 90% quartz, 10% glauconite; a few shell fragments and echinoid spines; foraminifers rare
- 203-206 T Sand — greenish-gray, slightly clayey; fine, well-sorted; 90% quartz, 10% glauconite; trace of muscovite
- 215-226 Sand — greenish-gray, clayey, trace of shell; fine, well-sorted; 90% quartz, 10% glauconite; traces of muscovite and pyrite; a very few foraminifers
- 220-227 Clay — greenish-gray, silty, slightly to moderately sandy, numerous pelecypod and gastropod shells and shell fragments, and fragments of dense, dark greenish-gray, slightly sandy limestone; a few fragments of dolomitic sandstone; concretionary pyrite common; sand fraction is generally fine, moderately sorted, slightly micaceous and glauconitic; foraminifers common
- 225-235 Clay — greenish-gray, moderately sandy, trace of shell; sand is fine to coarse, moderately sorted (skewed fine); angular; 95% quartz, 5% glauconite; minor amounts of muscovite and pyrite; foraminifers common; a very few bone fragments

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- 235-249 Clay — greenish-gray, moderately sandy, 15% shell fragments; sand is fine to coarse, moderately sorted (skewed fine), angular; clay is 95% quartz, 5% glauconite; minor amounts of muscovite and pyrite; foraminifers common; a very few bone fragments
- 249-252 T Sand — dark brownish-gray, slightly clayey; fine to medium, fairly well-sorted; 95% angular quartz, 5% glauconite; a few echinoid spines and small shell fragments; foraminifers rare
- 250-260 Sand — greenish-gray, very slightly clayey, a very few shell fragments; fine to coarse, moderately sorted; 5% glauconite; a few Textularia
- 260-272 " slightly to moderately clayey; fine to coarse, poorly sorted
- 272-282 Clay — light-gray, moderately sandy, 5-10% shell fragments, 5% fragments of dark greenish-gray, slightly sandy limestone, and a few fragments of tan, dolomitic sandstone; sand is fine, fairly well-sorted, 85% quartz, 15% glauconite; foraminifers common
- 282-292 " sand fraction is 95% quartz, 5% glauconite
- 292-294 No sample
- ST. MARYS FORMATION (294-410')
- 294-297 T Clay — greenish-gray, silty and slightly sandy, large pelecypods and small gastropods common; non-clay fraction consists of well-sorted coarse silt to fine sand; muscovite and gypsum relatively abundant; foraminifers (mostly Nonion, with a few Textularia and miliolids) moderately abundant
- 294-297 B " abundant acicular aragonite (in pockets in clay)
- 295-300 Clay — gray, slightly sandy, 5% pelecypod shell fragments and a few gastropods; sand is fine, well-sorted, and angular, with 2% each of glauconite and muscovite; foraminifers common

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- 300-310 Sand — gray, clayey, 10% pelecypod and gastropod shells and shell fragments; fine, well-sorted, angular; 5% glauconite; a few aragonite needles, mica flakes, and pyrite concretions; a few foraminifers
- 310-320 " very clayey; with 25% fragments of dark greenish-gray slightly sandy limestone, and numerous pyrite nodules and fragments of tan, dolomitic sandstone
- 310-312 T Clay — gray, fairly compact, abundant silt and fine sand; slightly glauconitic; muscovite and gypsum, relatively abundant; Nonion common
- 310-312 B " with abundant white, compact, calcareous clay
- 320-329 No sample
- 329-340 Clay — greenish-gray, silty, a few shell fragments, and numerous fragments of dark greenish-gray slightly sandy limestone; concretionary pyrite common; a few foraminifers
- 340-350 Clay — gray, uniformly silty to fine sandy, trace of shell fragments; trace of glauconite; abundant muscovite; abundant foraminifers (mostly Nonion); ostracods common
- 350-357 Clay — greenish-gray, uniformly silty to fine sandy, trace of shell fragments; abundant muscovite, traces of glauconite and gypsum; Nonion abundant, Textularia and Robulus common, a few globigerinids, Bulimina gracilis, and ostracods; echinoid spines and fine bone fragments common
- 350-353 T Clay — greenish-gray, uniformly silty to very fine sandy, trace of shell; moderately micaceous; traces of gypsum and glauconite; echinoid spines, Nonion, and Textularia common; Robulus and Bulimina gracilis present; ostracods and diatoms present
- 350-353 B " micaceous

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- 357-370 Clay — greenish-gray, uniformly silty to very fine sandy, trace of shell; micaceous; traces of gypsum and glauconite; echinoid spines common; abundant foraminifers — Nonion, Textularia, Globigerina, Lagena, Robulus, and Bulimina gracilis; ostracods and diatoms present
- 370-380 Clay — greenish-gray, uniformly silty to very fine sandy, trace of shell; moderately micaceous; traces of gypsum and glauconite; echinoid spines, Nonion, and Textularia common; Robulus and Bulimina gracilis moderately abundant; ostracods and diatoms present
- 380-389 " foraminifers common, but not abundant
- 380-383 T Clay — greenish-gray, uniformly silty, trace of very fine to fine sand; micaceous; gypsum and anhydrite after gypsum are common; foraminifers common; echinoid spines, ostracods, diatoms, and small bone fragments present
- 380-383 B "
- 389-400 Clay — greenish-gray, uniformly silty, trace of generally fine sand, with a few coarse grains of quartz and glauconite; micaceous; a few shell fragments and plant fragments; abundant concretionary pyrite; echinoid spines and foraminifers (including Nonion, Robulus, Globigerina, Bulimina) common
- 400-403 T Clay — brownish-gray, slightly silty, slightly micaceous; diatoms present; foraminifers rare
- 400-403 B " slightly carbonaceous and pyritic
- 400-410 Clay — greenish-gray, uniformly silty, trace of generally fine sand, with a few coarse grains of quartz and glauconite; micaceous; a few shell fragments and plant fragments; abundant concretionary pyrite; echinoid spines and foraminifers (including Nonion, Robulus, Globigerina, Bulimina) common

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CALVERT FORMATION (410-620')

- 410-420 Clay — pale brownish-gray, moderately silty and fine sandy; slightly micaceous, trace of glauconite; foraminifers common, but not abundant; diatoms present
- 412-415 T Clay — pale brownish-gray, compact; a few flakes of muscovite; a few foraminifers
- 412-415 B "
- 420-430 Clay — gray, slightly sandy, a few pelecypod and gastropod shell fragments; sand is generally fine, but contains enough medium and coarse grains to be considered rather poorly sorted; slightly glauconitic; minor amounts of muscovite, lignite, and plant remains; foraminifers common (Robulus dominant); trace of diatoms
- 430-440 "
- 440-450 "
- 450-453 T Clay — gray, compact; a few muscovite flakes and foraminifers
- 450-453 B "
- 453-460 No sample
- 460-470 Clay — gray, trace of fine sand; a few plant and bone fragments; traces of muscovite and glauconite; a few echinoid spines and foraminifers
- 470-480 "
- 480-490 " brownish-gray; plant fragments common
- 490-500 Clay — brownish-gray, small amount of fine, moderately glauconitic, micaceous sand, abundant plant fragments and a few shell fragments; foraminifers common; a few diatoms

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- 500-510 Clay — brownish-gray, small amount of fine, moderately glauconitic, micaceous sand, a few plant and shell fragments; foraminifers common; a few diatoms
- 510-520 Clay — brownish-gray, traces of sand, muscovite, glauconite, shell fragments, plant fragments, and pyrite; foraminifers common; a few diatoms
- 520-530 "
- 520-523 T Clay — gray, compact, trace of carbonaceous material; a very few foraminifers
- 520-523 B Clay — gray, compact, slightly carbonaceous, trace of gypsum
- 530-542 Clay — brownish-gray, slightly sandy, a very few shell and plant fragments; sand is 80% fine, well-sorted, slightly micaceous and glauconitic; 20% coarse, poorly sorted; pyrite common; foraminifers (Robulus) rare
- 542-550 "
- 542-545 C Clay — grayish-brown, compact; small, yellowish-brown bone fragments common
- 543-546 T " trace of anhydrite after gypsum
- 543-546 B " trace of fine, quartz-glauconite-phosphorite sand
- 550-560 Clay — gray, fairly compact, slightly sandy, trace of shell and plant fragments; 80% clear and greenish quartz, 15% brown and black fragmental phosphorite, and small amounts of muscovite and glauconite; a few foraminifers and echinoid spines
- 560-572 Clay — light-brown, very slightly sandy; sand is fine to very fine, well-sorted; clear and greenish quartz with 15% fragmental phosphorite and traces of muscovite and glauconite; foraminifers very abundant — Siphogenerina, spinus and S. lamellata (dominant), Nonion, Uvigerina, Robulus

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- 560-563 T Clay — dark-brown, uniformly silty to very fine sandy; sand fraction consists of 60% brownish quartz, 40% fine to very fine fragmental phosphorite; minor amount of anhydrite after gypsum
- 560-563 B Clay — dark-brown, trace of fine quartzo-phosphoritic sand; minor anhydrite after gypsum; foraminifers abundant (Siphogenerina dominant)
- 572-580 Clay — light-gray, pulverulent, diatomaceous, trace of fine sand; flood of foraminifers — Bolivina-Bulimina-Uvigerina-Globigerina assemblage with lesser numbers of Siphogenerina, Nonion, Cibicides and others
- 580-583 C Clay — greenish-gray, fairly compact, trace of fine sand; flood of foraminifers — Globigerina, Cibicides, Uvigerina, Bulimina, Bolivina, Discorbis, Robulus, Siphogenerina spinosus, S. lamellata, and others; diatoms present
- 580-590 "
- 590-603 Clay — tan, pulverulent, diatomaceous; flood of foraminifers — Uvigerina, Bolivina, Lagena, Cibicides, Siphogenerina, Robulus, Globigerina, Textularia, and others
- 603-606 C " abundant non-clay fraction is 75% foraminifers, 25% fine, fragmental phosphorite
- 603-610 " "
- 610-616 Clay, foraminifers, and phosphorite — greenish-brown; 35% clay; 30% fine to very coarse, light- to dark-brown fragmental phosphorite; 5% clear subrounded quartz (concentrated in coarser grades); 30% foraminifers, including several species of Robulus, Siphogenerina lamellata, S. spinosus, a variety of globigerinids, Uvigerina, Bolivina, Lagena, Nonion, and Marginulina; ostracods and echinoid spines common
- 616-621 Sand — abundant matrix of greenish-brown clay; fine to coarse, poorly sorted; 35% clear quartz, 45% brown and black fragmental phosphorite, 20% foraminifers, including Bolivina, Uvigerina, Siphogenerina lamellata, S. spinosus, Marginulina, Dentalina, Robulus, and globigerinids

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616-619 B Sand — abundant matrix of greenish-brown clay; fine to coarse, poorly sorted; 35% clear quartz, 55% brown and black fragmental phosphorite, 10% foraminifers, including Bolivina, Uvigerina, Siphogenerina lamellata, S. spinosus, Marginulina, Dentalina, Robulus, and globigerinids

MATTAPONI FORMATION (620-692')

620-633 Clay — greenish-brown, moderately sandy; non-clay fraction is fine, fairly well-sorted, and consists of 25% quartz, 10% foraminifers, 20-30% phosphorite, and 35-45% dark-green to black glauconite

621-624 T Clay — greenish-brown, compact, silty, trace of sand-size material consisting of quartz, glauconite, and fragmental phosphorite; a very few small foraminifers

621-624 B " muscovite common

633-640 Sand — dark-brown, clayey; fine to medium, well-sorted; 75% sooty, dark-green glauconite, 15% phosphorite, 10% angular quartz; foraminifers common

633-636 C Sand — dark-brown, moderately clayey; fine to medium, well-sorted; 80% sooty, green glauconite, 10% coarse, clear quartz, 5% anhydrite after gypsum, 5% phosphorite

640-648 Sand — brown, slightly clayey; fine to medium, well-sorted; 65% sooty, green glauconite, 30% quartz, 5% phosphorite; foraminifers moderately abundant; minor amounts of gypsum and muscovite

648-660 Sand — light-green and light-brown, very clayey; fine to medium, well-sorted; 90% sooty, green glauconite, 10% quartz; minor amount of phosphorite, trace of muscovite; a few poorly preserved foraminifers

648-651 C Sand — greenish-brown, moderately clayey; fine to medium, well-sorted; 65% glauconite, 30% quartz, 5% anhydrite after gypsum; a few poorly preserved foraminifers; small amount of phosphorite

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- 660-670 Clay — grayish-brown, moderately sandy; sand is fine to medium, well-sorted, and consists of 50% quartz, 45% glauconite, 5% foraminifers; minor amount of phosphorite, trace of muscovite
- 660-663 C Sand — green, slightly clayey; fine to medium, well-sorted; sooty green glauconite, with 5% each of quartz and anhydrite after gypsum; a few poorly preserved foraminifers
- 670-680 Clay — light grayish-brown, moderately sandy; sand is fine, well-sorted, and consists of 40% glauconite, 50% clear and greenish quartz, 10% foraminifers; minor amount of phosphorite, trace of muscovite
- 670-673 T Clay — light-grayish-brown, slightly to moderately sandy; sand is fine, well-sorted, and consists of 70% greenish quartz, 25% glauconite, 5% muscovite; foraminifers moderately abundant
- 673-674 C " very slightly micaceous; foraminifers common, but not abundant
- 674-677 C " very slightly micaceous; foraminifers moderately abundant
- 680-692 Clay — light brownish-gray, slightly sandy, trace of quartzo-feldspathic granule gravel, and a few shell fragments; 50% of non-clay fraction consists of fine, well-sorted, moderately foraminiferal quartz-glauconite sand; 50% consists of coarse to very coarse, slightly feldspathic quartz-glauconite sand

TUSCALOOSA FORMATION (692-750')

- 692-700 Clay — gray to greenish-gray, very sandy, 5% granule gravel and a few shell fragments; sand is fine to very coarse, poorly sorted; glauconitic and feldspathic; abundant authigenic pyrite; accessory garnet
- 700-705 "
- 700-703 C Sand — light-brown, moderately clayey; fine to medium, well-sorted, subangular; 2-3% each of muscovite and authigenic pyrite; slightly to moderately feldspathic

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- 705-718 Clay — gray, sandy, 5% fine (2-8 mm) gravel; sand is fine to very coarse, fairly well-sorted (skewed fine); moderately glauconitic and feldspathic; pyrite common; minor amount of muscovite
- 708-711 C Sand — gray, moderately clayey; fine to coarse, moderately sorted, angular to subangular; slightly glauconitic, moderately feldspathic; pyrite common, minor amount of muscovite, trace of garnet
- 718-722 Clay — brownish-gray, locally sandy, 10% shell fragments, and a few fragments of calcitic, glauconite-bearing sandstone; sand fraction is fine to medium, fairly well-sorted, moderately glauconitic and feldspathic; pyrite and muscovite common
- 722-730 " non-clay fraction consists of 60% shell fragments, 40% poorly sorted sand
- 722-723 C Sand and shell — gray, clayey; 50% small, fairly well-sorted shell fragments, 50% fine to coarse, rather poorly sorted, angular, moderately micaceous quartz sand; a few foraminifers and ostracods
- 730-740 " 60% small shell fragments, 40% fine to coarse, slightly glauconitic quartz sand
- 740-750 Sand — dark-gray, moderately clayey, a few small shell fragments; fine to medium, well-sorted, angular; 5% glauconite; slightly micaceous, trace of gypsum; foraminifers rare

PATUXENT FORMATION (750-2587')

- 750-760 Sand — dark-gray slightly clayey; coarse to very coarse, fairly well-sorted, subangular to subrounded; feldspathic; minor amount of glauconite; traces of garnet and muscovite; a few fragments of shell and phosphorite
- 750-751 C Sand — gray, locally orange-brown, slightly clayey; fine, very well-sorted, very slightly glauconitic, moderately micaceous

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- 760-770 Sand and gravel — gray, slightly clayey; 30% granule gravel, 70% coarse to very coarse, fairly well-sorted sand; both fractions feldspathic; much of the quartz contains abundant opaque inclusions; minor amount of pyrite, trace of garnet
- 770-783 Sand — gray, slightly clayey, 5% fine (2-8 mm) gravel and a few shell fragments; fine to coarse, poorly sorted, angular to subangular; moderately feldspathic; very slightly glauconitic and lithic; traces of muscovite, garnet, and epidote
- 783-790 Sand — grayish-brown, moderately clayey; medium, fairly well-sorted, angular to subangular; moderately feldspathic, very slightly micaceous and glauconitic
- 786-787 C Sand — yellowish-brown, slightly clayey; fine to medium, well-sorted; moderately feldspathic; very micaceous
- 790-800 Sand — yellowish-brown, moderately clayey, with lenses of dark-gray, sand-free clay; fine to coarse, rather poorly sorted; moderately feldspathic; small amounts of glauconite and muscovite
- 800-814 Sand — dark-gray, slightly clayey, trace of granule gravel; coarse to very coarse, fairly well-sorted; feldspathic; much of the quartz contains opaque or biotite inclusions
- 814-820 " very coarse-grained sand (75%) and granule gravel (25%)
- 820-830 " "
- 820-821 C Sand — light-gray, very slightly clayey; fine to coarse, moderately sorted, moderately feldspathic; traces of muscovite, garnet and glauconite
- 830-846 Sand — dark-gray, trace of clay, 5% granule gravel; medium to very coarse, fairly well-sorted; slightly to moderately feldspathic; trace of muscovite

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- 830-831 C Sand — gray, slightly clayey, 10% granule gravel; fine to very coarse, poorly sorted, angular to rounded; feldspathic (slightly decomposed to fresh); traces of muscovite and very fine glauconite
- 846-860 Sand — dark-gray, trace of clay; medium to coarse, well-sorted; feldspathic
- 860-870 Sand — greenish-gray, clayey; fine to coarse, moderately sorted; feldspathic; micaceous and moderately glauconitic in fine grades
- 870-873 C Clay — greenish-gray, trace of fine sand, consisting mostly of mica
- 873-880 No sample
- 880-893 Clay — greenish-gray, sandy, a few shell fragments; sand is fine to coarse, rather poorly sorted; feldspathic; moderately glauconitic; a few foraminifers and bone fragments
- 893-903 "
- 903-913 No sample
- 913-924 Sand and clay — 30% variegated clay, dominantly grayish-green, 15% fine (2-10 mm) gravel; 55% fine to very coarse, poorly sorted sand; clastic fraction is feldspathic in coarser grades
- 924-935 "
- 935-945 " trace of gravel; sand is medium to coarse, fairly well-sorted
- 935-945 T Sand — gray, slightly clayey; fine to coarse, rather poorly sorted, angular to subangular; moderately feldspathic
- 935-945 B Sand — gray, slightly clayey, 5% fine (2-10 mm) gravel; fine to coarse, well-sorted (skewed fine); moderately feldspathic

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945-955	Sand — greenish-gray, trace of clay; medium to very coarse, fairly well-sorted (skewed fine); feldspathic
955-965	" coarse, well-sorted
965-975	" coarse to very coarse, well-sorted
965-985 C	" coarse to very coarse, fairly well-sorted
975-985	" medium to very coarse, fairly well-sorted
985-995	Sand and gravel — gray, slightly clayey; 15% granule gravel; 85% medium to very coarse, moderately sorted sand; both fractions are feldspathic
995-1008	No sample
1008-1018	Clay — variegated, dominantly grayish-green, very sandy; sand is fine to very coarse, fairly well-sorted (skewed fine); slightly glauconitic and micaceous in fine grades; feldspathic in coarse grades; garnet common
1018-1029	" with 5-10% feldspathic granule gravel
1029-1039	Sand — yellowish-gray, very slightly clayey; medium to very coarse, moderately sorted; moderately feldspathic; trace of garnet
1029-1039 B	"
1039-1050	Sand — gray, trace of clay; coarse to very coarse, fairly well-sorted; feldspathic; minor amount of garnet
1050-1060	Sand — gray, trace of clay; coarse to very coarse, fairly well-sorted; feldspathic; garnet and rock fragments common
1060-1071	"
1071-1081	" slightly clayey; 5% feldspathic granule gravel
1081-1092	Clay — variegated, with greenish-gray aspect, 25% fine (4-8 mm), well-sorted, feldspathic gravel; 10-15% poorly sorted, moderately feldspathic sand; minor amount of pyrite; trace of glauconite

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- 1092-1113 Sand — gray, trace of clay; medium to very coarse, moderately sorted; feldspathic
- 1092-1102 B Sand — light-gray, slightly clayey; medium, well-sorted; moderately feldspathic
- 1102-1112 C Sand — light-gray, slightly clayey, abundant lenses of lignite with some pyrite; fine to medium, well-sorted; micaceous; moderately feldspathic (much of the feldspar appears to be kaolinitized)
- 1113-1123 Gravel, sand, and clay — abundant (40%) matrix of variegated clay; 30% fine (2-6 mm), well-sorted, feldspathic gravel; 30% medium to very coarse, rather poorly sorted, moderately feldspathic sand; minor amount of garnet
- 1123-1134 " 30% clay, 50% gravel, 20% sand
- 1123-1134 C Clay — yellowish-brown, moderately sandy; sand is fine to very fine, well-sorted; micaceous (muscovite and biotite)
- 1134-1145 Sand — abundant matrix of gray, brown, and yellow clay, 5% fine (2-6 mm) gravel; fine to coarse, fairly well-sorted (skewed fine); moderately feldspathic; micas and lignite fragments common; trace of glauconite
- 1145-1155 "
- 1155-1165 Clay — variegated, with greenish-gray aspect, 15% fine (2-8 mm), feldspathic gravel, very sandy; sand is fine to coarse, moderately sorted (skewed fine); moderately feldspathic and lignitic; pyrite commonly associated with lignite; muscovite common
- 1165-1176 Sand and gravel — gray, slightly clayey; 30% granule gravel, 70% very coarse sand; both fractions sub-rounded to rounded and very feldspathic; garnet common
- 1166-1176 C Sand — light-gray, slightly clayey, a few lenses of lignite; fine to medium, fairly well-sorted; moderately micaceous, moderately feldspathic (much of the feldspar appears to be kaolinitized)

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- 1176-1186 Gravel and sand — gray, trace of clay; 80% granule gravel, 20% very coarse sand; very feldspathic
- 1186-1197 " with 10% fine (4-8 mm) gravel
- 1197-1207 Clay — variegated, with reddish-brown aspect, sandy; sand is fine, fairly well-sorted, angular, iron-stained; slightly micaceous; trace of glauconite
- 1207-1218 Clay — variegated, with light-gray aspect, sandy; sand is fine, fairly well-sorted, angular; slightly feldspathic; traces of muscovite and glauconite
- 1197-1218 C Clay — reddish-brown and grayish-green, slightly to moderately sandy; sand is fine to very fine, well-sorted; slightly feldspathic; very slightly micaceous
- 1218-1228 Sand — abundant matrix of variegated clay with reddish-brown aspect, 5% granule gravel; fine to coarse, poorly sorted; feldspathic; traces of muscovite, glauconite, and lignite
- 1228-1239 "
- 1239-1250 " moderately clayey, 10% fine (2-6 mm) gravel; moderately feldspathic
- 1250-1261 Sand — gray, slightly clayey, 10% fine (2-7 mm) gravel; coarse to very coarse, fairly well-sorted; slightly feldspathic
- 1239-1261 T Sand — tan, slightly clayey; fine to medium, well-sorted, angular; slightly to moderately feldspathic; moderately micaceous
- 1239-1261 M Sand — gray, slightly clayey, 5% fine (2-10 mm) gravel; medium to very coarse, moderately sorted; moderately feldspathic; minor amount of garnet
- 1239-1261 B Sand — white, slightly clayey; fine to coarse, fairly well-sorted, angular; slightly feldspathic; traces of muscovite and garnet

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- 1261-1271 Sand — gray, slightly clayey, 10% fine (2-7 mm) gravel; medium to very coarse, moderately sorted; feldspathic
- 1271-1282 " with 25% fine, feldspathic gravel
- 1282-1292 Gravel — gray, slightly clayey; fine (2-8 mm), well-sorted, subrounded; feldspathic
- 1292-1303 Clay — greenish-gray, slightly sandy, a few small pebbles; sand fraction is fine to coarse, rather poorly sorted; slightly feldspathic, micaceous, and lignitic
- 1292-1303 T Clay — tan, locally orange-brown, trace of fine to very fine, micaceous sand
- 1292-1303 M Clay — variegated, trace of very fine sand; traces of glauconite and muscovite
- 1292-1303 B "
- 1303-1313 Sand and gravel — abundant matrix of variegated clay; 15% fine (2-10 mm), feldspathic gravel; 85% fine to coarse, poorly sorted, slightly feldspathic sand; minor amount of muscovite; traces of glauconite and garnet
- 1313-1324 Clay — variegated, with greenish-gray aspect, moderately sandy, 5% granule gravel; sand is fine to coarse, moderately sorted, slightly to moderately feldspathic; slightly micaceous; a few plant fragments
- 1303-1324 Clay — variegated, with reddish-brown aspect, trace of rather poorly sorted, slightly feldspathic and micaceous sand
- 1324-1334 Clay — variegated, with gray aspect, moderately sandy; sand is very fine to very coarse, poorly sorted; somewhat feldspathic in coarse grades, slightly micaceous and a trace of glauconite in fine grades; lignite present
- 1334-1345 " sandy

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- 1324-1345 T Clay — pale-green and orange-brown, trace of fine to very fine sand
- 1324-1345 M Clay — dark-gray, locally brown, silty
- 1324-1345 B Clay — bluish-gray, abundant silt and very fine sand (clastic fraction is very well-sorted); very micaceous (muscovite and biotite)
- 1345-1355 Sand — gray, clayey, a few small pebbles and pelecypod shell fragments; medium to coarse, well-sorted, moderately feldspathic; minor amounts of glauconite, muscovite, and garnet
- 1355-1365 " medium to very coarse
- 1345-1366 C Clay — greenish-gray, very slightly sandy; sand is fine to very fine, well-sorted; traces of feldspar, muscovite and glauconite
- 1365-1376 Clay — variegated, with gray aspect, sandy; sand is fine to coarse, poorly sorted; slightly feldspathic, very slightly glauconitic; garnet common
- 1376-1387 Clay — grayish-green, very sandy; sand is fine to coarse, moderately sorted, angular; slightly feldspathic; very slightly micaceous and glauconitic
- 1366-1387 T Clay — pale yellowish-gray, sandy; sand is fine to very fine, very well-sorted; slightly micaceous
- 1366-1387 M "
- 1366-1387 B "
- 1387-1397 Sand — abundant matrix of variegated clay with gray aspect; fine to coarse, rather poorly sorted; slightly to moderately feldspathic; minor muscovite and glauconite; traces of biotite and garnet
- 1397-1408 " medium to coarse, fairly well-sorted
- 1408-1418 " fine to very coarse, poorly sorted

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- 1418-1429 Clay — variegated, with greenish-gray aspect, moderately sandy; sand is very fine to very coarse, poorly sorted; slightly to moderately feldspathic
- 1418-1429 T Clay — pale-green and reddish-brown
- 1418-1429 M " with trace of fine to medium, angular quartz sand; traces of glauconite and muscovite
- 1418-1429 B Sand — yellowish-gray, moderately clayey; fine to medium, well-sorted, angular; moderately feldspathic; slightly micaceous; very slightly glauconitic
- 1429-1439 Sand — greenish-gray, moderately clayey; fine to very coarse, moderately sorted (skewed coarse); feldspathic; traces of garnet and tourmaline
- 1439-1450 "
- 1429-1450 T Clay — pale greenish-gray and orange-brown, sandy; sand is very fine to coarse, poorly sorted; moderately feldspathic
- 1429-1450 M Sand — pale yellowish-gray, slightly clayey; medium to very coarse, fairly well-sorted (skewed fine); feldspathic; minor amount of garnet
- 1429-1450 B " medium to coarse, well-sorted
- 1450-1460 Sand — dark-gray, slightly clayey, 5-10% granule gravel; coarse to very coarse, moderately sorted; feldspathic; trace of garnet
- 1460-1470 Gravel and sand — gray, trace of clay; 50% granule gravel, 50% coarse to very coarse sand; feldspathic; garnet common
- 1450-1471 C Sand — gray, slightly clayey, 5% fine (2-10 mm), feldspathic gravel; medium to coarse, fairly well-sorted; moderately feldspathic

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- 1471-1481 Sand — gray, moderately clayey, trace of granule gravel; fine to coarse, rather poorly sorted; slightly to moderately feldspathic; very slightly micaceous; trace of garnet
- 1481-1492 Sand — grayish-brown, moderately clayey; fine to very coarse, poorly sorted; moderately feldspathic
- 1471-1492 T Sand — light-gray, slightly clayey; fine to medium, well-sorted; moderately feldspathic; slightly micaceous; much of the feldspar appears to be kaolinitized
- 1471-1492 B " with lenses of fine gravel in a matrix of greenish clay
- 4192-1502 Sand — dark-gray, slightly clayey, 10% fine (2-10 mm) gravel; medium to very coarse, moderately sorted; feldspathic
- 1502-1513 "
- 1513-1523 " moderately clayey
- 1492-1514 C Sand — white, slightly clayey; fine to coarse, moderately sorted; clear quartz with small amount of kaolinitized feldspar; slightly micaceous; trace of garnet
- 1523-1534 Sand — abundant matrix of dark greenish-gray clay, 10% fine (2-10 mm) gravel; medium to very coarse, rather poorly sorted; feldspathic
- 1534-1544 " very clayey
- 1514-1535 C Sand — light brownish-gray, very slightly clayey; medium to coarse, fairly well-sorted; moderately feldspathic; garnet common
- 1544-1555 Clay — greenish-gray, sandy, trace of fine (2-10 mm) gravel; sand is fine to medium, fairly well-sorted; slightly to moderately feldspathic, slightly micaceous; trace of garnet

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- 1555-1565 Sand — moderately abundant matrix of variegated clay with reddish-brown aspect; fine to medium, well-sorted, angular; feldspathic; slightly micaceous; garnet, biotite, and tourmaline present
- 1535-1556 T Sand — light-gray, very slightly clayey; very fine to very coarse, poorly sorted; feldspathic; accessory muscovite, biotite, garnet, tourmaline, and graphite; quartz commonly contains abundant opaque inclusions, and much of the feldspar appears to be kaolinitized
- 1535-1556 M Sand — pale greenish-yellow, slightly clayey; fine, well-sorted; abundant decomposed feldspar; abundant biotite and muscovite
- 1535-1556 B " medium, fairly well-sorted; micas common, but not abundant
- 1565-1576 Sand — moderately abundant matrix of variegated clay with gray aspect, 5% fine, feldspathic gravel; fine to very coarse, poorly sorted; feldspathic
- 1556-1577 T Sand — yellowish-green, slightly clayey; fine to medium, fairly well-sorted; feldspathic; small amounts of muscovite and biotite
- 1556-1577 M "
- 1556-1577 B " medium to coarse, fairly well-sorted
- 1577-1587 Clay — variegated, with reddish-brown aspect, very sandy; fine to very coarse, poorly sorted; feldspathic; hematitic; minor amounts of muscovite and biotite
- 1587-1598 " fine to coarse, moderately sorted
- 1577-1598 T Clay — variegated; very hematitic, trace of fine sand
- 1577-1598 M Clay — white, with lenses of yellow and red; abundant silt and very fine sand (very well-sorted)
- 1577-1598 B Sand and clay — 80% white, slightly clayey sand, and 20% red and yellowish-green clays; sand is fine to medium, well-sorted, angular; moderately feldspathic (much of the feldspar appears to be kaolinitized); minor amounts of muscovite and biotite

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- 1598-1609 Sand — abundant matrix of variegated clay with greenish-gray aspect; fine to coarse, moderately sorted; moderately feldspathic; slightly micaceous
- 1609-1619 Sand — with abundant variegated clay, with gray aspect, 5% granule gravel; fine to very coarse, poorly sorted; feldspathic; traces of garnet and tourmaline
- 1598-1619 T Sand — pale greenish-yellow, slightly clayey; fine to coarse, moderately sorted; feldspathic (much of the feldspar appears to be kaolinitized); very slightly micaceous
- 1598-1619 M "
- 1598-1619 B Sand — yellowish-gray and slightly clayey, with a few lenses of greenish-gray clay and a few minute seams of lignite; sand is fine to coarse, rather poorly sorted; moderately feldspathic
- 1619-1629 Sand — moderately abundant matrix of variegated clay, 10% granule gravel; fine to very coarse, poorly sorted; feldspathic
- 1629-1640 Sand — reddish-brown, slightly clayey, 10% granule gravel; medium to very coarse, moderately sorted; feldspathic
- 1640-1650 Sand — reddish-brown, very clayey; fine to coarse, rather poorly sorted; moderately feldspathic; slightly micaceous; very slightly glauconitic; minor amount of garnet
- 1650-1661 Sand — reddish-brown, moderately clayey, trace of fine gravel; medium to very coarse, rather poorly sorted; feldspathic; minor amounts of muscovite, biotite, and glauconite; trace of garnet
- 1661-1671 " gray, clayey; fine to very coarse, poorly sorted
- 1671-1682 " gray, very clayey (40% clay), 5-10% fine (2-8 mm), feldspathic gravel
- 1682-1692 No sample

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- 1692-1703 Clay — variegated, with reddish-gray aspect, moderately sandy to sandy, 5% fine (2-6 mm) gravel; sand is fine to very coarse, fairly well-sorted (skewed fine); feldspathic; slightly micaceous (muscovite and biotite)
- 1703-1713 "
- 1713-1724 Clay — variegated, with brownish-red aspect, moderately sandy; sand is fine to coarse, moderately sorted (skewed fine); moderately feldspathic (much of the feldspar is extensively decomposed); small amounts of muscovite, biotite, and glauconite (concentrated in fine grade); hematite-goethite pigments and masses
- 1724-1734 " medium to very coarse, fairly well-sorted
- 1734-1745 " "
- 1734-1745 T Sand — pale greenish-yellow, slightly clayey; fine to coarse, fairly well-sorted; feldspathic (much of the feldspar appears to be kaolinitized); slightly micaceous (muscovite exceeds biotite)
- 1734-1745 M " medium, fairly well-sorted
- 1734-1745 B " fine to coarse, moderately sorted
- 1745-1755 Sand — brown, very slightly clayey, 20% granule gravel; coarse to very coarse, well-sorted; feldspathic
- 1755-1766 Sand — abundant matrix of variegated clay with reddish-brown clay, 20% granule gravel; medium to very coarse, moderately sorted; moderately feldspathic
- 1745-1766 T Sand — tan, slightly clayey; medium to coarse, fairly well-sorted; moderately feldspathic
- 1745-1766 B "
- 1766-1776 Clay — variegated, with brownish-red aspect, moderately sandy; sand is fine to very coarse, poorly sorted; moderately feldspathic; slightly micaceous and glauconitic in fine grades; trace of garnet

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- 1776-1788 Sand — abundant matrix of variegated clay with brownish-red aspect; medium to very coarse, fairly well-sorted; feldspathic; trace of micas
- 1766-1788 T Clay — brick-red, locally pale grayish-green, trace of fine to coarse sand; traces of feldspar and mica
- 1788-1798 Sand — reddish-brown, moderately clayey, 5-10% fine (2-8 mm) gravel; fine to very coarse, poorly sorted; feldspathic; garnet common, tourmaline rare
- 1798-1809 Sand — reddish-brown, slightly clayey, 10% granule gravel; medium to very coarse, moderately sorted; very feldspathic; garnet common; minor amounts of pyrite and carbonaceous material
- 1788-1809 T Sand — white, slightly clayey; fine to medium, well-sorted; feldspathic (white, decomposed feldspar); moderately micaceous (muscovite and biotite)
- 1788-1809 B " medium, well-sorted, subangular; very slightly micaceous
- 1809-1819 Sand — reddish-brown, moderately clayey, 10% fine (2-12 mm) gravel; fine to coarse, rather poorly sorted; feldspathic; traces of muscovite and garnet
- 1819-1830 " medium to very coarse, fairly well-sorted
- 1809-1830 T Sand — light-gray, slightly clayey; fine to coarse, moderately sorted; feldspathic (white, decomposed feldspar); very slightly micaceous
- 1809-1830 B Sand — white, moderately clayey (kaolinitic); 5% granule gravel and a few larger (15-25 mm) pebbles; fine to very coarse, poorly sorted, angular to subangular; very clear quartz, slightly feldspathic; traces of garnet and epidote (X-ray analysis - quartz, microcline, kaolinite and chlorite)
- 1830-1840 Sand and gravel — brown, slightly clayey; 35% fine (2-10 mm), feldspathic gravel; 65% medium to very coarse, moderately sorted, subrounded, moderately feldspathic sand; a few rock fragments

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- 1830-1840 B Sand — pale yellowish-gray, slightly clayey, trace of granule gravel and rare small (2-10 mm) pebbles; fine to coarse, moderately sorted, subangular; very clear quartz, slightly feldspathic
- 1840-1851 Clay — gray and brown, subordinately red, sandy, 5-10% feldspathic granule gravel, a few large shell fragments; sand is fine to very coarse, poorly sorted, feldspathic; trace of garnet
- 1840-1850 B Sand — white, slightly to moderately clayey, fine to coarse, fairly well-sorted (skewed coarse), subangular; very clear quartz, moderately feldspathic; trace of muscovite
- 1840-1851 T Sand — light-gray, slightly to moderately clayey, 15% very feldspathic granule gravel and a few small pebbles up to 10 mm; medium to very coarse, fairly well-sorted, subangular; feldspathic; garnet common
- 1840-1851 M " 5% feldspathic granule gravel; medium to coarse
- 1851-1861 Clay — gray to brown, sandy, 5% granule gravel, 10% large pelecypod shell fragments; sand is fine to very coarse, poorly sorted; traces of glauconite, carbonaceous material, and plant fragments
- 1851-1861 T Sand — light-gray, slightly clayey, 5% feldspathic granule gravel, and a very few rounded pebbles up to 10 mm; medium to coarse, fairly well-sorted, subangular; feldspathic; garnet common, trace of kyanite
- 1851-1861 M " fine to medium, well-sorted, feldspathic, moderately micaceous (muscovite and biotite)
- 1851-1861 B Sand — white, slightly to moderately clayey, a few lenses of carbonaceous material; medium, well-sorted, moderately feldspathic, slightly micaceous

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- 1861-1872 Clay — greenish-gray, moderately sandy, minor amount of fine, feldspathic gravel and a few shell fragments; sand is medium, moderately sorted; moderately feldspathic, slightly glauconitic; traces of muscovite and garnet
- 1872-1882 " sand is fine to very coarse, poorly sorted
- 1882-1893 " sand is medium to very coarse, rather poorly sorted; numerous pelecypod shells and shell fragments
- 1861-1893 T Sand — white, slightly clayey; medium, well-sorted; moderately feldspathic (dull-white, decomposed feldspar); muscovite and biotite common; minor amount of garnet
- 1861-1893 M "
- 1861-1893 B Sand — white to pale yellowish-gray, slightly to moderately clayey; medium to coarse, well-sorted, sub-angular to subrounded; feldspathic; minor amount of garnet
- 1893-1903 Clay — greenish-gray, sandy, 10% granule gravel, 5% shell fragments; sand is fine to very coarse, rather poorly sorted; feldspathic, very slightly glauconitic; traces of garnet, muscovite, and carbonaceous material
- 1903-1914 Sand — gray, moderately clayey, 5% fine (2-6 mm) gravel, and a few shell fragments; medium to very coarse, moderately sorted; feldspathic; minor amount of garnet
- 1893-1914 T Sand — light-gray, slightly to moderately clayey; medium to very coarse, moderately sorted, subangular to subrounded; feldspathic (dull-white, decomposed feldspar common); accessory garnet
- 1893-1914 B "
- 1914-1924 Clay — grayish-brown, very sandy, a few shell fragments; sand is fine to coarse, moderately sorted (skewed fine); feldspathic; very slightly micaceous and glauconitic; garnet common

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- 1924-1935 Sand — gray, slightly clayey, 5% feldspathic granule gravel, a few shell fragments; medium to very coarse, fairly well-sorted; feldspathic; garnet common
- 1935-1945 " with 20% feldspathic granule gravel
- 1945-1956 " with 40% feldspathic granule gravel
- 1914-1956 T Sand — light-gray, slightly clayey; medium, well-sorted; feldspathic (dull-white, decomposed feldspar is common); slightly micaceous (muscovite and chloritized biotite)
- 1914-1956 M "
- 1914-1956 B " fine to coarse, fairly well-sorted
- 1956-1966 Sand — brownish-gray, slightly to moderately clayey, 10% fine (2-7 mm) gravel, and a very few shell fragments; medium to very coarse grained, fairly well-sorted (skewed coarse); feldspathic; garnet common
- 1956-1966 T Sand — white, slightly clayey; coarse, fairly well-sorted, subangular to subrounded; feldspathic (dull-white, decomposed grains are common)
- 1956-1966 M Sand and clay — 80% light-gray, slightly to moderately clayey, medium to very coarse, moderately sorted, feldspathic sand; very slightly micaceous; garnet common; 20% light-green, sand-free, chlorite-bearing clay
- 1956-1966 B Sand — pale grayish-green, slightly clayey; medium to coarse, well-sorted, subangular to subrounded; yellowish, iron-oxide-stained quartz, moderately feldspathic; minor amount of garnet
- 1966-1977 Sand — matrix of subtly variegated clay with grayish-brown aspect, 10% fine (2-8 mm) gravel, trace of shell debris; medium to very coarse, rather poorly sorted; moderately feldspathic; traces of glauconite, muscovite, and garnet

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- 1977-1987 Sand — matrix of subtly variegated clay with grayish-brown aspect, 10% fine (2-8 mm) gravel, trace of shell debris; medium to very coarse, rather poorly sorted; moderately feldspathic; traces of glauconite, muscovite, and garnet
- 1987-1998 " fairly well-sorted (skewed coarse)
- 1998-2008 " "
- 2008-2019 " medium to very coarse, rather poorly sorted
- 1966-2019 T Sand — pale grayish-green, slightly clayey; 90% medium, well-sorted; 10% very coarse, well-sorted; yellowish, iron-oxide-stained quartz, moderately feldspathic; muscovite common, minor amount of biotite
- 1966-2019 M Sand — light-gray, slightly clayey; 80% fine to medium, well-sorted, 20% coarse to very coarse, well-sorted; feldspathic; muscovite common, biotite rare
- 1966-2019 B Sand — pale greenish-gray, slightly to moderately clayey; fine to coarse, fairly well-sorted, subangular; feldspathic; slightly micaceous
- 2019-2029 Sand — brownish-gray, slightly clayey, 5% granule gravel; fine to very coarse, poorly sorted; moderately feldspathic
- 2019-2029 T Sand — light-gray and slightly clayey, with lenses of grayish-green, chlorite-bearing sandy clay; medium to coarse, fairly well-sorted; moderately feldspathic; traces of garnet and muscovite
- 2019-2029 M " medium to coarse, moderately sorted; 20% lenses of compact, green, chlorite-bearing clay
- 2019-2029 B Clay — green, compact, chloritic, locally sandy; sand is fine to coarse, moderately sorted, slightly to moderately feldspathic; muscovite and biotite common

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- 2029-2040 Sand — brownish-gray, slightly clayey, 20% feldspathic granule gravel, a few shell fragments; medium to very coarse, moderately sorted; feldspathic; trace of garnet
- 2040-2050 " slightly to moderately clayey; fairly well-sorted (skewed fine)
- 2050-2060 " slightly clayey; moderately sorted
- 2060-2071 Sand — grayish-brown, slightly clayey, 25% feldspathic granule gravel; coarse to very coarse, well-sorted, subrounded; feldspathic; trace of garnet
- 2029-2070 B Sand — yellowish-white, slightly clayey; fine to coarse, moderately sorted, angular to subrounded; moderately feldspathic (including some dull-white, decomposed grains); garnet common
- 2071-2081 Sand, gravel, and clay — 30% essentially sand-free gray, green, red, and brown clays; 20% granule gravel, and a few small (4-8 mm), rounded pebbles; 50% coarse to very coarse, fairly well-sorted sand; sand and gravel are feldspathic; a few shell fragments
- 2070-2080 T Sand — white, slightly to moderately clayey, a few small (10-15 mm) quartz pebbles and kaolinite nodules; fine to very coarse, fairly well-sorted (skewed coarse); slightly feldspathic; garnet common
- 2070-2080 B Sand and gravel — white, slightly to moderately clayey (kaolinitic); 25% fine (2-8 mm), well-sorted gravel consisting of quartz and intensely decomposed feldspar, and a few larger kaolinite nodules and fragments of kaolinitic sandstone; sand (75%) is medium to very coarse, moderately sorted, slightly to moderately feldspathic; trace of garnet
- 2080-2090 Sand — brownish-gray, moderately clayey, 10% granule gravel; medium to very coarse, moderately sorted, subangular; moderately feldspathic; minor amounts of garnet and brown epidote
- 2090-2103 " coarse to very coarse, fairly well-sorted; feldspathic

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- 2103-2113 Sand — brownish-gray, moderately clayey, trace of granule gravel; medium to coarse, fairly well-sorted; subangular; feldspathic; minor amounts of garnet and brown epidote
- 2113-2123 Clay — variegated sandy clay with reddish-brown aspect, with laminae of bluish-gray, sand-free clay; sand is fine to very coarse, poorly sorted; moderately feldspathic; very slightly micaceous and glauconitic; traces of garnet and lignite
- 2123-2133 Clay — variegated, predominantly brick-red, sandy; sand is fine to very coarse, poorly sorted; moderately feldspathic; very slightly micaceous and glauconitic; traces of garnet and pyrite
- 2080-2133 T Sand — yellowish-white, moderately clayey; fine to coarse, moderately sorted, angular to subangular; slightly to moderately feldspathic; garnet common
- 2080-2133 M " moderately feldspathic
- 2080-2133 B " moderately feldspathic; with abundant laminae of dark greenish-brown, compact clay
- 2133-2143 Sand — matrix of variegated clay with reddish-gray aspect, 10% granule gravel; medium to very coarse, moderately sorted; feldspathic; minor amounts of pyrite and garnet; trace of brown epidote
- 2133-2143 T Clay — brick-red, locally greenish-gray, compact; small amount of silt and very fine sand; trace of mica
- 2143-2153 Clay — brick-red and pale-green, moderately sandy, small amount of granule gravel; sand is fine to coarse, rather poorly sorted; moderately feldspathic; traces of glauconite and muscovite
- 2153-2163 "
- 2143-2163 T Clay — brick-red, fairly compact, silty; trace of fine to medium sand
- 2143-2163 M " very silty; micaceous (muscovite and biotite)

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- 2143-2163 B Clay — brick-red, locally pale-green, compact; trace of fine to coarse, slightly feldspathic sand; moderately micaceous (muscovite and biotite)
- 2163-2173 Clay — variegated, with reddish aspect, moderately sandy, a few shell fragments, 5% fine (2-10 mm), feldspathic gravel; sand is fine to very coarse, poorly sorted; moderately feldspathic; minor amounts of muscovite, glauconite, garnet, and chloritized biotite
- 2173-2180 "
- 2163-2180 T Clay — brick-red, compact, silty; very micaceous (biotite and muscovite)
- 2163-2180 M Clay — brick-red, locally greenish-gray, compact; trace of fine to coarse, poorly sorted sand; muscovite, biotite, and feldspar present in small amounts
- 2163-2180 B " variegated, with brick-red color predominant; abundant pelletal hematite and goethite
- 2180-2190 Clay — variegated, with brownish-red aspect, very sandy, small amounts of fine gravel and shell fragments; sand is coarse to very coarse, fairly well-sorted; feldspathic; small amount of pyrite, trace of garnet
- 2180-2190 T Clay — brick-red, compact; trace of micaceous silt and fine to very fine sand; trace of glauconite
- 2190-2200 Clay — variegated, with brick-red aspect, sandy; sand is fine to coarse, poorly sorted, slightly to moderately feldspathic; minor amounts of glauconite and muscovite; accessory garnet
- 2200-2210 " very sandy
- 2210-2224 " "
- 2190-2224 T Clay — brownish-red, locally greenish-gray, compact; slightly silty, very slightly sandy
- 2190-2224 M Clay — light greenish-gray and pale-red, trace of sand
- 2190-2224 B Clay — light-gray to brownish-gray, locally pale-red; sandy; sand is fine, well-sorted

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- 2224-2234 Clay — brick-red, slightly to moderately sandy, trace of fine gravel; sand is fine to coarse, poorly sorted, angular to subangular; slightly feldspathic; minor amounts of muscovite, glauconite, and pyrite
- 2224-2234 T Clay — brick-red, locally green, compact, slightly sandy; sand is fine, well-sorted, angular
- 2224-2234 M " with very small amount of medium to coarse sand
- 2224-2234 B Clay — grayish-green, brown, and red, compact; slightly sandy; sand is fine, well-sorted
- 2234-2244 Clay — brownish-red, locally gray, green, yellow, or white, moderately sandy, traces of granule gravel and shell fragments; sand is fine to very coarse, fairly well-sorted (skewed fine); slightly feldspathic; very slightly glauconitic and micaceous
- 2244-2254 " sandy; sand is fine to coarse, fairly well-sorted, angular to subangular; moderately feldspathic; traces of glauconite and garnet
- 2234-2254 T Sand — medium-gray, clayey; fine to coarse, fairly well-sorted; moderately feldspathic (much of the feldspar is dull-white, decomposed); slightly micaceous (muscovite and biotite); trace of garnet
- 2234-2254 M Sand — white, slightly clayey; medium to coarse, well-sorted; feldspathic (including abundant dull-white, decomposed feldspar); traces of garnet, muscovite and biotite
- 2234-2254 B Sand — light-gray with greenish cast, slightly to moderately clayey; medium, well-sorted; moderately feldspathic; minor amounts of garnet, muscovite, and chloritized biotite
- 2254-2264 Sand — abundant matrix and lenses of brownish-red clay; fine to very coarse, poorly sorted; slightly to moderately feldspathic; trace of glauconite

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- 2264-2274 Sand -- matrix of reddish-brown clay, 10% feldspathic granule gravel; fine to very coarse, poorly sorted; slightly feldspathic; garnet common
- 2274-2285 "
- 2254-2285 T Sand -- pale-gray with greenish cast, slightly to moderately clayey; fine to coarse, rather poorly sorted; feldspathic; slightly micaceous (muscovite and biotite), garnet common
- 2254-2285 B Sand -- yellowish-white, slightly to moderately clayey, 5% granule gravel; coarse, well-sorted; slightly to moderately feldspathic; trace of garnet
- 2285-2295 Sand -- abundant matrix and lenses of reddish-brown clay, 10% granule gravel; fine to very coarse, moderately sorted (skewed coarse); moderately feldspathic; a few plant fragments
- 2295-2305 Sand and gravel -- matrix of brownish-red clay; 30% granule gravel; sand (70%) is medium to very coarse, fairly well-sorted; both fractions contain abundant decomposed feldspar
- 2285-2315 Sand and clay -- 80% white, locally green, slightly to moderately clayey sand; 20% lenses of green, chloritic, sand-free clay; sand is fine to coarse, moderately sorted (skewed fine), feldspathic; traces of garnet, muscovite, and biotite; a few kaolinite nodules
- 2315-2325 Sand -- abundant matrix and lenses of brownish-red and grayish-green clays, 5-10% fine (2-8 mm) gravel; fine to very coarse, moderately sorted (skewed coarse); moderately feldspathic (mostly decomposed feldspar)
- 2325-2335 "
- 2315-2335 T Sand -- yellowish-white, slightly clayey; fine to coarse, moderately sorted, angular to subangular; slightly to moderately feldspathic; accessory garnet
- 2315-2335 M Sand -- tan, moderately clayey; fine to very coarse, rather poorly sorted (skewed fine), angular to subangular; slightly to moderately feldspathic

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- 2315-2335 B Sand — white, moderately clayey; fine to very coarse, poorly sorted, angular to subangular; moderately feldspathic
- 2335-2346 Clay — reddish-brown and greenish-gray, moderately sandy, 5% granule gravel, trace of shell fragments; sand is medium to very coarse, fairly well-sorted; slightly feldspathic; traces of garnet and glauconite
- 2335-2346 T Sand — white, moderately clayey, 10% fine (2-6 mm) gravel; fine to very coarse, poorly sorted; slightly to moderately feldspathic; trace of blue quartz
- 2335-2346 M Sand — greenish-gray, moderately clayey; fine to medium, well-sorted; slightly feldspathic; very micaceous (chlorite-biotite and some muscovite)
- 2335-2346 B Sand — light-gray, moderately clayey; fine to coarse, moderately sorted, angular to subangular; slightly to moderately feldspathic; garnet common
- 2346-2356 Clay — variegated, predominantly red, moderately sandy, a few small pebbles; sand is fine to very coarse, poorly sorted, angular to subangular; slightly feldspathic; small amounts of pyrite, muscovite; traces of biotite, garnet
- 2346-2356 T Sand — white, moderately clayey; fine to coarse, moderately sorted, angular to subangular; moderately feldspathic; traces of garnet, muscovite and chlorite-biotite
- 2346-2356 B Sand — white, moderately clayey to clayey; fine to coarse, moderately sorted; moderately feldspathic; minor amounts of garnet, epidote, and tourmaline
- 2356-2366 Clay — variegated, with reddish-brown aspect, locally sandy, trace of fine gravel; sand is fine to very coarse, poorly sorted; slightly feldspathic; minor amounts of glauconite and mica in fine grades
- 2366-2376 " sand fraction grades into granule gravel; nodular pyrite common

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- 2356-2376 T Sand — white, locally light-green; clayey; fine to coarse, moderately sorted; slightly to moderately feldspathic; traces of muscovite and chlorite
- 2373-2383 Clay — variegated, with reddish-brown aspect, locally sandy, a few shell fragments, internal molds of gastropods, fragments of glauconitic limestone, pebbles of quartz and feldspar, pyrite nodules, and plant fragments; sand is fine to coarse, poorly sorted; moderately feldspathic in coarse grades, slightly glauconitic in fine grades
- 2383-2393 " very sandy; sand is moderately sorted (skewed coarse)
- 2373-2387 C Clay — white, locally brown, kaolinitic, sand-free to sandy; sand is very fine to coarse, moderately sorted (skewed fine); slightly feldspathic
- 2393-2404 Sand — matrix of variegated clay with reddish-brown aspect, 10% granule gravel; fine to very coarse, poorly sorted; slightly to moderately feldspathic; trace of glauconite
- 2393-2404 T Gravel, sand, and clay — 30% yellowish-brown, clayey sand, interlaminated with 20% brownish-red variably sandy clay; 50% pebbles (40-60 mm) of yellowish quartz and fine-grained, gray limestone; sand is generally fine, slightly feldspathic, very slightly glauconitic
- 2393-2404 B Sand — pinkish-gray, locally pale-yellow, very clayey, semi-consolidated; medium to very fine, well-sorted; slightly to moderately feldspathic
- 2404-2414 Sand — abundant matrix and lenses of variegated clay with reddish-brown aspect, medium to very coarse, moderately sorted; moderately feldspathic; traces of muscovite and glauconite
- 2414-2424 " fine to very coarse, poorly sorted
- 2424-2435 " "
- 2435-2445 " 15% fine (2-8 mm) gravel

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- 2445-2455 Sand — abundant matrix and lenses of variegated clay with reddish-brown aspect, medium to very coarse, moderately sorted; feldspathic; traces of muscovite and glauconite
- 2455-2465 " 15% fine (2-10 mm) gravel
- 2430-2465 C Clay — grayish-green, very sandy; sand is fine to very coarse, poorly sorted; slightly feldspathic; chlorite-biotite common; minor amounts of muscovite and garnet
- 2435-2465 B Sand — light-gray with greenish cast, moderately clayey; fine to medium, well-sorted; moderately feldspathic; micaceous (biotite-chlorite, and subordinate muscovite)
- 2465-2475 Sand — abundant matrix and lenses of variegated clay with reddish-brown aspect, traces of fine gravel and shell fragments; medium to very coarse, moderately sorted; moderately feldspathic; minor amounts of pyrite, glauconite, muscovite, garnet, and carbonaceous material
- 2475-2485 " with 10-15% granule gravel; coarse to very coarse, fairly well-sorted; feldspathic; nodular pyrite common
- 2485-2496 " with 20% granule gravel; coarse to very coarse, fairly well-sorted; feldspathic
- 2496-2506 " with 5% granule gravel; fine to very coarse, poorly sorted; moderately feldspathic; pyrite and glauconite common
- 2506-2516 " with 5-10% granule gravel; coarse to very coarse, fairly well-sorted; feldspathic
- 2516-2526 " with 20% granule gravel; medium to very coarse, moderately sorted; feldspathic
- 2526-2536 " with 10% granule gravel and a few pebbles up to 10 mm; fine to very coarse, rather poorly sorted; moderately feldspathic; a few plant and shell fragments

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- 2536-2546 Sand — abundant matrix and lenses of variegated clay with reddish-brown aspect, with 15-20% granule gravel and traces of shell fragments; medium to very coarse, moderately sorted; moderately feldspathic; minor amounts of pyrite, glauconite, muscovite, garnet, and carbonaceous material; a few plant fragments
- 2546-2556 " with 10% granule gravel; fine to very coarse, poorly sorted; moderately feldspathic; slightly glauconitic in fine grade; a few shell fragments
- 2556-2566 Clay — variegated, with reddish-brown aspect, 15% granule gravel and a few shell fragments, sandy; sand is very fine to very coarse, rather poorly sorted (skewed fine); feldspathic in coarse grades; nodular pyrite common
- 2556-2566 T Clay — variegated, red and grayish-green dominant, yellow common
- 2556-2566 M Clay — medium-gray, locally yellow-brown; compact, sectile; trace of fine sand
- 2556-2566 B "
- 2566-2576 Clay — variegated, with greenish-gray aspect, sandy, trace of fine gravel, a few shell fragments; fine to very coarse, poorly sorted; slightly feldspathic and glauconitic in coarse and fine grades respectively; slightly micaceous
- 2566-2576 T Clay — variegated, white, red, pink, gray, green, yellow-brown; compact; locally an indurated kaolinitic sandstone
- 2566-2576 M Clay — gray, mottled yellowish-brown; abundant pellets and nodules of hematite and goethite
- 2566-2576 B " sandy; sand is fine, well-sorted, feldspathic, micaceous (muscovite and biotite)
- 2576-2586 M Clay — light yellowish-gray, very sandy; sand is fine, well-sorted, feldspathic, slightly micaceous

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2576-2587 T Clay — brick-red and pale-green, moderately sandy;
sand is fine, well-sorted, feldspathic, slightly
micaceous

2576-2587 B " compact, slightly sandy

GEOLOGIC SUMMARY

	<u>Rock Unit</u>	<u>Age</u>
0-100'	No samples	—
100-292'	Yorktown Formation	Late Miocene
292-294'	No sample	—
294-410'	St. Mary's Formation	Late Miocene
410-620'	Calvert Formation	Middle Miocene
620-692'	Mattaponi Formation	Paleocene
692-750'	Tuscaloosa Formation	Late Cretaceous
750-2587'	Patuxent Formation	Early Cretaceous

- (1) Samples from intervals between 100 and 294 feet may be of post-Miocene age; they are not typical of samples from the Yorktown Formation
- (2) Core samples are designated by a "C" following interval figures in the depth column; if only a portion of the core was available for examination a "T" (top), "M" (middle) or "B" (bottom) indicates the position of the core in that interval

Virginia Division of Mineral Resources
Robert H. Teifke, Geologist
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