

# Soil Series, Higher Taxa, and Their Morphology

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In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each soil series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (USDA, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (USDA, 1999) and in "Keys to Soil Taxonomy" (USDA, 1998). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units".

## ***Abbottstown Series***

*Depth class:* Deep, moderately deep to fragipan

*Drainage class:* Somewhat poorly drained

*Permeability:* Moderate above the fragipan, slow in the fragipan, and slow to moderately slow below the fragipan

*Landform:* Uplands in valleys in the piedmont

Position on the landform: Foot slopes and toe slopes

*Parent material:* Residuum from acid red shale, siltstone and sandstone

*Slope range:* 0 to 15 percent

*Associated soils:* Readington, Croton, Reaville, Lansdale, Amwell, Buckingham, Culleoka, Nockamixon, Steinsburg

**Taxonomic class:** Fine-loamy, mixed, mesic Aeric Fragiaqualfs.

### **Typical Pedon**

Abbottstown silt loam, 3 to 8 percent slopes in Montgomery County, Skippack Township, 1/4 mile south of the intersection of Mt. Airy Road and Heckler Road, 144 feet northwest of Mt. Airy road in a field; USGS Collegeville topographic quadrangle; Lat. 40 degrees 12 minutes 36 seconds N. and Long. 75 degrees 25 minutes 23 seconds W.

Ap=0 to 10 inches; dark reddish gray (5YR 4/2) silt loam; weak fine granular structure; friable, slightly sticky and slightly plastic; 5 percent angular channers of shale channers; moderately acid; abrupt smooth lower boundary.

Bt=10 to 13 inches; reddish brown (5YR 4/3) silt loam; common fine faint yellowish red (5YR 5/6) iron accumulations and reddish gray (5YR 5/2) iron depletions; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; 5 percent angular channers of shale; common distinct clay films on ped faces; strongly acid; clear wavy lower boundary.

Btg=13 to 20 inches; reddish gray (5YR 5/2) silt loam with many medium distinct red (2.5YR 5/6) iron accumulations and gray (5YR 6/1) iron depletions; moderate very coarse prismatic structure parting to moderate medium blocky structure; firm, slightly sticky and slightly plastic; 10 percent angular channers of shale; common distinct clay films on blocky ped faces; very strongly acid; abrupt wavy lower boundary.

Bxg=20 to 39 inches; weak red (2.5YR 4/2) channery loam; many distinct reddish brown (5YR 5/4), yellowish red (5YR 5/6) iron accumulations and pinkish gray (7.5YR 6/2) iron depletions; moderate very coarse prismatic structure parting to moderate medium platy; very firm and brittle, slightly sticky and slightly plastic; 15 percent angular channers of shale; common distinct clay films on ped faces and lining pores; common black coatings; moderately acid; clear wavy lower boundary.

BCg=39 to 48 inches; weak red (2.5YR 4/2) channery silt loam; many medium gray (5YR 5/1) and weak red (2.5YR 6/2) iron depletions; reddish brown (5YR 5/4) iron accumulations; weak medium platy structure; firm, slightly sticky and slightly plastic; 20 percent angular channers of shale; few distinct clay films; few black coatings; moderately acid; clear wavy lower boundary.

R=48 to 49 inches; dusky red (2.5YR 3/2) partly weathered shale.

### Range in Characteristics

*Solum thickness:* 30 to 60 inches

*Depth to Bedrock:* 40 to 60 inches

*Depth to Fragipan:* 15 to 30 inches

*Content of clay in the control section:* 18 to 34 percent

*Content of rock fragments in the control section:* 0 to 15 percent

*Kind of rock fragments:* Angular and subangular channers of shale, sandstone and siltstone

*Reaction:* Where unlimed, reaction ranges from extremely acid to strongly acid in the upper part of the solum and from strongly acid to slightly acid in the lower part of the solum and the C horizon.

*Ap horizon:*

Hue=2.5YR to 10YR

Value=3 or 4

Chroma=2 to 4

Texture of the fine earth fraction=silt loam

Content of rock fragments= 0 to 10 percent

*Bt horizon:*

Hue=10R to 5YR

Value=4

Chroma=3

Texture of the fine earth fraction=silt loam, silty clay loam, or loam

Content of rock fragments= 0 to 15 percent

*Btg horizon:*

Hue=10R to 5YR

Value=4 to 6

Chroma=1 or 2

Texture of the fine earth fraction=silt loam or silty clay loam

Content of rock fragments= 0 to 15 percent

*Bx horizon:*

Hue=10R to 5YR

Value=4 or 5

Chroma=1 to 4

Texture of the fine earth fraction=silt loam or silty clay loam

Content of rock fragments= 10 to 30 percent

*BC horizon:*

Hue=10R to 5YR

Value=4 to 6

Chroma=1 to 4

Texture of the fine earth fraction=silt loam or loam

Content of rock fragments= 10 to 65 percent.

### Alton Series

Depth class: Very Deep, moderately deep to sandy skeletal plain material

Drainage class: Well to somewhat excessively drained

Permeability: Rapid above 40 inches and ranges from rapid to slow in the substratum

Landform: Alluvial fans and terraces in the Northern coastal plain

Position on the landform: Interfluves and shoulders of side and nose slopes

Parent material: Alluvium and glacial outwash from dominantly hard acid rock

Slope range: 0 to 8 percent

Associated soils: Delaware, Hatboro, Matapeake, Mattapex, Hatboro, Udorthents, gravelly, Udorthents, sandy, Fluvaquents

**Taxonomic class:** Loamy-skeletal, mixed, mesic Dystric Eutrochrepts

### Typical Pedon

Alton gravelly loam, 0 to 3 percent slopes, Bucks County, PA, Falls Township, South of Penn Warner Industrial Park, 500 feet W of Newbold Rd. underpass at Tyburn Rd., 75 feet South of Tyburn Rd., between Tyburn Rd. and Old Tyburn Rd., in a mowed area; USGS Trenton West quadrangle; Lat. 40 degrees 10 minutes 51 seconds N. and Long. 74 degrees 47 minutes 28 seconds W.

Ap=0 to 7 inches; dark grayish brown (10YR 4/2) gravelly loam; moderate medium granular structure; friable, non-sticky and non-plastic; common fine and medium roots throughout; common fine and very fine discontinuous tubular pores; 20 percent well rounded mixed igneous, sedimentary, and metamorphic gravels; strongly acid; abrupt smooth lower boundary.

Bw1=7 to 22 inches; light yellowish brown (10YR 6/4) gravelly loam; moderate fine subangular blocky structure; very friable, non-sticky and non-plastic; common fine and very fine roots throughout; common fine and medium discontinuous pores; 30 percent well rounded mixed igneous, metamorphic and sedimentary gravels; strongly acid; clear smooth lower boundary.

Bw2=22 to 41 inches; yellowish brown (10YR 5/4) very gravelly coarse sandy loam; weak fine subangular blocky structure; friable, non-sticky

and non-plastic; common medium void between rock fragment pores; 45 percent well rounded mixed igneous, metamorphic and sedimentary gravels; strongly acid; clear smooth lower boundary.

2C=41 to 62 inches; dark yellowish brown (10YR 4/4) extremely gravelly coarse sand; single grain; loose; non-sticky and non-plastic; common fine to coarse voids between rock fragment pores; 70 percent well rounded mixed igneous, metamorphic and sedimentary gravels and 10 percent well rounded mixed igneous, metamorphic and sedimentary cobbles.

### **Range in Characteristics**

*Solum thickness:* 30 to 45 inches

*Depth to Bedrock:* Greater than 80 inches

*Content of clay in the control section:* 1 to 20 percent

*Content of rock fragments in the control section:* 35 to 60 percent

*Kind of rock fragments:* Well rounded through subrounded gravels and cobbles of mixed igneous, sedimentary and metamorphic rocks

*Reaction:* Where unlimed, reaction ranges from strongly acid to neutral.

*Ap horizon:*

Hue=10YR through 7.5YR

Value=2 through 4

Chroma=2 through 4

Texture of the fine earth fraction=loamy sand, sandy loam, or loam

Content of rock fragments=20 to 40 percent

*Bw horizon:*

Hue=10YR through 5YR

Value=3 through 6

Chroma=3 through 5

Texture of the fine earth fraction=loam, sandy loam, or loamy sand

Content of rock fragments=30 to 60 percent, but averages greater than 35 percent throughout

*2C horizon:*

Hue=10YR or 7.5YR

Value=4 or 5

Chroma=2 through 4

Texture of the fine earth fraction=stratified gravel and sand, loamy sand, or sandy loam

Content of rock fragments=40 to 80 percent

## ***Amwell Series***

*Depth class:* Very deep

*Drainage class:* Somewhat poorly drained

*Permeability:* Moderate above the fragipan and slow to moderate in the fragipan

*Landform:* Dissected hillslopes with broad long slopes of low relief

*Parent material:* Colluvium derived from gray metamorphic shale and siltstone, basic igneous rocks, or shales

*Slope range:* 0 to 15 percent

*Associated soils:* Readington, Croton, Abbottstown, Doylestown

**Taxonomic class:** Fine-loamy, mixed, mesic Aquic Fragiudalfs

### **Typical Pedon**

Amwell silt loam, 3 to 8 percent slopes, in West Rockhill Township, Bucks County, 3/4 mile West of Sellersville, 1000 feet North of the intersection of Pennsylvania Route 309 and 563, 250 feet West of Pennsylvania Route 309; USGS Telford topographic quadrangle; Lat. 40 degrees 22 minutes 22 seconds N. and Long. 75 degrees 19 minutes 47 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 10 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure parting to strong fine and medium platy; very friable, non-sticky, non-plastic; common fine and medium roots throughout; neutral; 2 percent angular and subangular mixed metamorphic and sedimentary channers; clear smooth lower boundary.

BE=10 to 14 inches; pale brown (10YR 6/3) and light yellowish brown (10YR 6/4) silt loam, common dark brown (7.5YR 3/4) masses of iron accumulation in ped interiors; weak medium subangular blocky structure parting to weak fine and medium subangular blocky; friable non-sticky, non-plastic; few fine roots between peds; 2 percent angular and subangular mixed metamorphic and sedimentary channers; clear wavy lower boundary.

Bt=14 to 21 inches; brownish yellow (10YR 6/6) silty clay loam, many medium distinct light brownish gray (10YR 6/2) iron depletions along ped faces and common yellowish brown (10YR 5/8) masses of iron accumulation in ped interiors; moderate medium subangular blocky structure; firm; slightly sticky, moderately plastic, few fine roots between peds; few faint brownish yellow (10YR 6/6) discontinuous clay films on faces of peds and in pores; neutral, 5 percent angular and

subangular mixed metamorphic and sedimentary channers; gradual wavy lower boundary.

Btx1=21 to 42 inches; yellowish brown (10Y 5/6) and olive brown (2.5YR 4/3) silt loam; common medium and coarse prominent light brownish gray (10YR 6/2) iron depletions along ped faces, and common distinct yellowish brown (10YR 5/8) masses of iron accumulation in ped interiors; strongly medium and coarse prismatic structure parting to moderate medium subangular blocky; very firm and slightly brittle, slightly sticky, moderately plastic, few distinct yellowish brown (10YR 5/4) discontinuous clay films on faces of peds and in pores; few fine and medium irregular soft dark masses; neutral; 10 percent angular and subangular mixed metamorphic and sedimentary channers; gradual irregular lower boundary.

Btx2=42 to 57 inches; dark grayish brown (2.5Y 4/2) and yellowish brown (10YR 5/4) channery silty clay loam; common medium and coarse prominent light brownish gray (10YR 6/2) iron depletions along ped faces, and medium distinct yellowish brown (10YR 5/4) masses of iron accumulation in ped interiors; very strong medium and coarse prismatic structure parting to strong medium and coarse subangular blocky; very firm and slightly brittle, slightly sticky, slightly plastic, few distinct yellowish brown (10YR 5/4) discontinuous clay films on faces of peds and in pores; common medium and coarse irregular soft dark masses; neutral; 20 percent angular and subangular mixed metamorphic and sedimentary channers; gradual irregular lower boundary.

BC=57 to 65 inches; yellowish brown (10YR 5/4) and brown (7.5 YR 5/4) very channery loam; common medium prominent light gray (10YR 7/2) iron depletion among ped faces, fine and medium distinct brownish yellow (10YR 6/6) masses of iron accumulation in ped interiors; weak coarse subangular blocky structure; friable; slightly sticky; slightly plastic; few fine and medium irregular soft dark masses; mildly alkaline; 40 percent angular and subangular mixed metamorphic and sedimentary channers; gradual irregular lower boundary.

C=65 to 75 inches; 50 percent grayish brown (2.5Y 5/2) and 50 percent grayish brown (10YR 5/2) very channery clay loam; common fine and medium distinct light gray (2.5Y 7/2) iron depletion along ped faces, and fine brownish yellow (10YR 6/6) masses of iron accumulation in ped interiors; weak coarse subangular blocky structure; friable; slightly sticky; slightly plastic;

few fine and medium irregular soft dark masses; mildly alkaline; 40 percent angular and subangular mixed metamorphic and sedimentary channers.

### **Range in Characteristics**

*Solum thickness:* 30 to 60 inches

*Depth to Bedrock:* Greater than 60 inches

*Depth to fragipan:* 15 to 35 inches

*Depth to redox features:* 14 to 21 inches

*Content of clay in the control section:* 18 to 26 percent; depth of redox depletion within the upper 10 inches of the argillic horizon

*Content of rock fragments in the control section:* Less than 25 percent

*Kind of rock fragments:* Angular and subangular gravels through channers of mixed metamorphic and sedimentary rocks

*Reaction:* Where unlimed, reaction is strongly to moderately acid in the surface and strongly to slightly acid below.

*A horizon:*

Hue=7.5YR or 10YR

Value=3 or 4

Chroma=2 or 4

Texture of the fine earth fraction=silt loam

Content of rock fragments=1 to 20 percent

*BE horizon:*

Hue=7.5YR or 10YR

Value=4 to 6

Chroma=3 to 6

Texture of the fine earth fraction=silt loam

Content of rock fragments=1 to 20 percent

*Bt horizon:*

Hue=7.5YR or 10YR

Value=3 to 6

Chroma=3 to 6

Texture of the fine earth fraction=silt loam

Content of rock fragments=10 to 35 percent

*C horizon:*

Hue=7.5YR or 10YR

Value=3 or 4

Chroma=2 to 6

Texture of the fine earth fraction=silt loam, loam

Content of rock fragments=20 to 60 percent

### ***Arendtsville Series***

*Depth class:* Very deep  
*Drainage class:* Well drained  
*Permeability:* Moderately slow to moderate  
*Landform:* Hillsides and ridges in piedmont  
*Position on the landform:* Shoulders  
*Parent material:* Residuum from red gravelly and cobbly conglomerate  
*Slope range:* 0 to 25 percent  
*Associated soils:* Penn, Readington, Abbottstown, and Croton  
**Taxonomic class:** Fine, mixed, mesic Ultic Hapludalts

### Typical Pedon

Arendtsville gravelly silt loam, 3 to 8 percent slopes in a cultivated field in Lehigh County, Lower Milford Township, 3 1/2 miles southwest of the junction of LR39004 and the Bucks County Line, about 1 mile northeast of the Pennsylvania Turnpike; USGS Milford square topographic quadrangle: Lat. 40 degrees 28 minutes 15 seconds N. and Long. 75 degrees 25 minutes 55 seconds W.

Ap=0 to 10 inches; reddish brown (5YR 4/3) gravelly silt loam; weak fine granular structure; friable, non-sticky and non-plastic; 15 percent gravels of sandstone and quartzite; neutral; abrupt smooth lower boundary.

Bt1=10 to 19 inches; yellowish red (5YR 4/6) gravelly silty clay loam; moderate medium subangular blocky structure; friable, sticky and plastic; common distinct clay films; 25 percent gravels of sandstone and quartzite; neutral; gradual wavy lower boundary.

Bt2=19 to 27 inches; reddish brown (5YR 4/4) gravelly silty clay loam; moderate medium subangular blocky structure; friable, sticky and plastic; common distinct clay films; 20 percent gravels of sandstone and quartzite; slightly acid; clear wavy lower boundary.

Bt3=27 to 37 inches; reddish brown (5YR 4/4) gravelly silty clay loam with reddish brown (5YR 5/4) faces; weak very coarse prismatic structure parting to moderate medium subangular blocky structure; firm, sticky and plastic; common distinct clay films; 15 percent gravels of sandstone and quartzite; Moderately acid; clear wavy lower boundary.

Bt4=37 to 52 inches; dark reddish brown (5YR 3/4) gravelly clay loam; moderate medium and coarse subangular blocky structure; firm, sticky and plastic; common distinct clay films; 20 percent

gravels of sandstone and quartzite; strongly acid; clear wavy lower boundary.

C1=52 to 69 inches; dark reddish brown (5YR 3/4) very gravelly loam; massive; friable, non-sticky and non-plastic; 50 percent rock fragments of sandstone and quartzite gravel; strongly acid; clear wavy lower boundary.

C2=69 to 81 inches; dark red (2.5YR 3/6) very gravelly loam; massive; friable, non-sticky and non-plastic; 50 percent gravels of sandstone and quartzite gravel; strongly acid.

### Range in Characteristics

*Solum thickness:* 40 to 60 inches

*Depth to Bedrock:* Greater than 72 inches

*Content of clay in the control section:* 35 to 50 percent

*Content of rock fragments in the control section:* 5 to 30 percent

*Reaction:* Where unlimed, reaction is strongly acid to moderately acid.

*Ap horizon:*

Hue=5YR

Value=3 or 4

Chroma=3 or 4

Texture of the fine earth fraction=silt loam

Content of rock fragments=5 to 30 percent

*Bt horizon:*

Hue=5YR or 2.5YR

Value=3 or 4

Chroma=3 to 6

Texture of the fine earth fraction=clay loam or silty clay loam

Content of rock fragments=5 to 30 percent

*C horizon:*

Hue=5YR to 10R

Value=3 or 4

Chroma=2 to 4

Texture of the fine earth fraction=loam, clay loam, or silty clay loam

Content of rock fragments=15 to 50 percent

### Bedington Series

*Depth class:* Very Deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Landform:* Uplands in shale hills

*Position on the landform:* Summits, side slopes and shoulders of hills

*Parent material:* Residuum from shale, siltstone, some sandstone

*Slope range:* 0 to 25 percent

*Associated soils:* Berks, Weikert, Comly, Fountainville, Brownsburg, Culleoka

**Taxonomic class:** Fine-loamy, mixed, mesic Typic Hapludults

### Typical Pedon

Bedington channery silt loam, in Bedington-Berks complex, 3 to 8 percent slopes in Berks County, Greenwich Township, 1.75 miles south-southeast of Klinesville, 2.5 miles southwest of Krumsville, 50 feet east of t770, 190 feet south of the intersection of t770 and t810; USGS Kutztown topographic quadrangle; Lat. 40 degrees 33 minutes 17 seconds N. and Long. 75 degrees 50 minutes 06 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 10 inches; brown (10YR 4/3) channery silt loam; weak fine granular structure; friable, non-sticky and non-plastic; 15 percent angular shale channers; neutral; abrupt smooth lower boundary.

Bt1=10 to 17 inches; strong brown (7.5YR 5/6) channery silt loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; 15 percent angular shale channers; common distinct clay films; neutral; clear wavy lower boundary.

Bt2=17 to 35 inches; yellowish red (5YR 5\6) channery silt loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; 20 percent angular shale channers; common distinct clay films; slightly acid; clear wavy lower boundary.

Bt3=35 to 43 inches; yellowish red (5YR 5/6) very channery silt loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; 50 percent angular shale channers; common distinct clay films; slightly acid; clear wavy lower boundary.

C=43 to 63 inches; yellowish red (5YR 5/6) extremely channery silt loam; massive; friable, non-sticky and non-plastic; 80 percent angular shale channers; slightly acid; clear wavy lower boundary.

R=63 to 64 inches; light olive brown (2.5Y 5/4) fractured shale bedrock.

*Depth to Bedrock:* More than 60 inches.

*Content of clay in the control section:* 18 to 34 percent

*Content of rock fragments in the control section:* 20 to 35 percent

*Kind of rock fragments:* Angular and subangular channers and flagstones of siltstone, shale and sandstone

*Reaction:* Where unlimed, reaction ranges from strongly acid through slightly in the upper part of the solum and very strongly acid and strongly acid in the lower part of the solum and in the C horizon.

*Ap horizon:*

Hue=10YR

Value=3 or 4

Chroma=2 to 4

Texture of the fine earth fraction=silt loam

Content of rock fragments=5 to 40 percent

*Bt horizon:*

Hue=10YR to 5YR

Value=4 to 6

Chroma=4 to 8

Texture of the fine earth fraction=loam, silt loam, silty clay loam and clay loam

Content of rock fragments=5 to 80 percent

*C horizon:*

Hue=2.5YR to 10YR

Value=4 or 5

Chroma=4 to 8

Texture of the fine earth fraction= silt loam or loam

Content of rock fragments=60 to 90 percent

### Range in Characteristics

*Solum thickness:* 40 to 70 inches

## ***Berks Series***

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Permeability:* Moderate or moderately rapid

*Landform:* Broad hilltops and hillsides in uplands

*Position on the landform:* Summits, shoulders and back slopes

*Parent material:* Residuum, mostly from shale, and siltstone with some sandstone

*Slope range:* 0 to 60 percent

*Associated soils:* Bedington, Weikert, Culleoka, Klinesville, Ryder

**Taxonomic class:** Loamy-skeletal, mixed, mesic Typic Dystrochrepts

### **Typical Pedon**

Berks channery loam, in an area of Bedington-Berks complex, 3 to 8 percent slopes in Lehigh County, Weisenberg Township, 1 mile south and east on T624 from New Smithville and 200 feet north of road; USGS Topton topographic quadrangle; Lat. 40 degrees 34 minutes 06 seconds N and Long. 75 degrees 42 minutes 57 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 10 inches; dark brown (10YR 4/3) channery loam; weak fine granular structure; friable, non-sticky and non-plastic; 30 percent angular channers of shale; neutral; abrupt smooth lower boundary.

Bw1=10 to 17 inches; yellowish brown (10YR 5/6) channery loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; 35 percent angular channers of shale; slightly acid; gradual wavy lower boundary.

Bw2=17 to 21 inches; yellowish brown (10YR 5/6) very channery silt loam; weak fine subangular blocky structure modified by rock fragments; friable, slightly sticky and non-plastic; very few faint clay films on rock fragments; 50 percent angular shale channers; slightly acid; abrupt wavy lower boundary.

CB=21 to 26 inches; strong brown (7.5YR 5/6) very channery silt loam; structure obscured by rock fragments; friable, non-sticky and non-plastic; 60 percent angular channers of shale; slightly acid; clear irregular lower boundary.

C=26 to 33 inches; Yellowish brown (10YR 5/6) extremely channery loam in pockets between and as coatings on rock fragments; structureless;

friable, non-sticky and non-plastic; 75 percent angular channers of shale; moderately acid; clear wavy lower boundary.

R=33 to 34 inches; very dark grayish brown (10YR 3/2) and light olive brown (2.5Y 5/6) fractured shale bedrock; very few thin clay films on upper surfaces of rock fragments.

### **Range in Characteristics**

*Solum thickness:* 12 to 40 inches

*Depth to Bedrock:* 20 to 40 inches

*Content of clay in the control section:* 34 percent or less

*Content of rock fragments in the control section:* 35 to 60 percent

*Kind of rock fragments:* Angular and subangular channers and flagstones of shale, siltstone and sandstone

*Reaction:* Where unlimed, reaction ranges from extremely acid to slightly acid.

*Ap horizon:*

Hue=10YR

Value=3 to 5

Chroma=2 to 4

Texture of the fine earth fraction=loam or silt loam

Content of rock fragments=15 to 50 percent

*B horizon:*

Hue=7.5YR to 2.5Y in the upper part and 5YR to 2.5Y in the lower part

Value=4 to 6

Chroma=3 to 8

Texture of the fine earth fraction=loam or silt loam

Content of rock fragments=15 to 75 percent

*CB horizon:*

Hue=5YR to 2.5Y

Value=4 to 6

Chroma=3 to 8

Texture of the fine earth fraction=loam or silt loam

Content of rock fragments=15 to 75 percent

*C horizon:*

Hue=5YR to 2.5Y

Value=4 to 6

Chroma=2 to 8

Texture of the fine earth fraction=loam or silt loam

Content of rock fragments=35 to 90 percent

*R horizon:*

Hue=5YR to 2.5Y

Value=3 to 6  
Chroma=1 to 6  
Rock=mostly shale with some sandstone and siltstone

### ***Bowmansville Series***

*Depth class:* Very deep  
*Drainage class:* Somewhat poorly drained  
*Permeability:* Moderate in the surface, moderately slow to moderate, in the subsoil and moderately rapid in the substratum  
*Landform:* Floodplains  
*Position on the landform:* Along perennial streams  
*Parent material:* Alluvium of mixed origin of reddish basic rocks  
*Slope range:* 0 to 3 percent  
*Associated soils:* Knauers, Rowland, Croton, Doylestown  
**Taxonomic class:** Fine-loamy, mixed, nonacid, mesic Aeric Fluvaquents

#### **Typical Pedon**

Bowmansville silt loam in Berks Co.,PA Union Township, 1.2 miles north-northwest of Geigertown, 67 feet south of LR244, 1.5 miles northeast of the junction of LR244 and Pa. route 82, on the floodplain of Hay Creek; USGS Elverson topographic quadrangle; Lat. 40 degrees 13 minutes 02 seconds N. and Long. 75 degrees 50 minutes 41 seconds W. Colors are for moist soil unless specified otherwise.

Ap=0 to 7 inches; brown (7.5YR 4/2) silt loam; weak fine granular structure; friable, non-sticky and non-plastic; slightly acid; abrupt smooth lower boundary.

Bw=7 to 10 inches; reddish brown (5YR 5/3) silt loam with yellowish brown (10YR 5/4) iron accumulations; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; strongly acid; clear wavy lower boundary.

Bwg=10 to 26 inches; reddish gray (5YR 5/2) silty clay loam with common medium distinct brown (7.5YR 5/4) weak iron accumulations; blocky structure; friable, slightly sticky and slightly plastic; strongly acid; clear wavy lower boundary.

Cg1=26 to 43 inches; gray (5YR 5/1) fine sandy loam; massive; friable, non-sticky and non-plastic; slightly acid; abrupt wavy lower boundary.

2Cg2=43 to 65 inches; gray (10YR 6/1) gravelly sandy loam; massive; friable, non-sticky and non-plastic; 30 percent rounded cobbles of shale and sandstone; neutral.

#### **Range in Characteristics**

*Solum thickness:* 24 to 40 inches  
*Depth to Bedrock:* Greater than 72 inches  
*Content of clay in the control section:* 18 to 34 percent  
*Content of rock fragments in the control section:* 0 to 15 percent  
*Kind of rock fragments:* Well rounded through subrounded gravel, cobble, and stone sized sandstone, siltstone, and shale  
*Reaction:* Where unlimed, reaction ranges from strongly acid through slightly acid in the solum and strongly acid through neutral in the C horizon.

*Ap horizon:*  
Hue=7.5YR to 5YR  
Value=4  
Chroma=2 to 4  
Texture of the fine earth fraction=silt loam  
Content of rock fragments= 0 to 15 percent

*B horizon:*  
Hue=5YR to 7.5YR  
Value=3 to 6  
Chroma=2 or less, but includes a subhorizon with chroma higher than 2  
Texture of the fine earth fraction=silt loam or silty clay loam to sandy clay loam  
Content of rock fragments= 0 to 15 percent

*C horizon:*  
Hue=5YR to 7.5YR  
Value=4 to 6  
Chroma=2 or less  
Texture of the fine earth fraction=silty clay loam to sandy loam  
Content of rock fragments=0 to 15 percent above 40 inches and 10 to 45 percent below 40 inches

### ***Brecknock Series***

*Depth class:* Deep  
*Drainage class:* Well drained  
*Permeability:* Moderate  
*Landform:* Uplands  
*Position on the landform:* Tops and sides of broad hills  
*Parent material:* Residuum from dark gray metamorphic shale and sandstone  
*Slope range:* 0 to 60 percent

*Associated soils:* Neshaminy, Penn, Lansdale, Lehigh, Nockamixon  
**Taxonomic class:** Fine-loamy, mixed, mesic Ultic Hapludalfs

### Typical Pedon

Brecknock channery silt loam, 3 to 8 percent slopes in Berks County, Caernavon Township, 1.8 miles northwest of Morgantown, 150 feet east of the overpass of 06089 over interstate 176; USGS Morgantown topographic quadrangle; Lat. 40 degrees 10 minutes 31 seconds N. and Long. 75 degrees 54 minutes 43 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 10 inches; dark grayish brown (10YR 4/2) channery silt loam; weak fine granular structure; friable, non-sticky and non-plastic; 30 percent subangular channers of sandstone; neutral; abrupt smooth lower boundary.

Bt1=10 to 15 inches; very dark grayish brown (10YR 3/2) channery silt loam; weak medium subangular blocky structure; friable, sticky and plastic; 25 percent subangular channers of sandstone; common distinct clay films; neutral; clear wavy lower boundary.

Bt2=15 to 24 inches; brown (10YR 5/3) channery silt loam; moderate medium subangular blocky structure; friable, sticky and plastic; 30 percent subangular channers of sandstone; common distinct clay films; neutral; gradual wavy lower boundary.

Bt3=24 to 32 inches; brown (10YR 5/3) channery silt loam; moderate medium subangular blocky structure; friable, sticky and plastic; 35 percent subangular sandstone channers; common distinct clay films; neutral; clear wavy lower boundary.

C=32 to 41 inches; dark gray (10YR 4/1) extremely channery silt loam; massive structure; friable, non-sticky and non-plastic; 70 percent subangular channers of sandstone; neutral; abrupt wavy lower boundary.

R=41 to 42 inches; dark gray (10YR 4/1) hornfels.

### Range in Characteristics

*Solum thickness:* 24 to 40 inches

*Depth to Bedrock:* 40 to 60 inches

*Content of clay in the control section:* 18 to 34 percent

*Content of rock fragments in the control section:* 5 to 35 percent

*Kind of rock fragments:* Angular and subangular gravel, channer, and flagstone hornfels, sandstones, siltstones and shales

*Reaction:* Where unlimed, reaction ranges from very strongly acid through neutral throughout the soil.

*Ap horizon:*

Hue=10YR to 2.5Y

Value=3 or 4

Chroma=2 or 3

Texture of the fine earth fraction=silt loam

Content of rock fragments= 5 to 35 percent

*B horizon:*

Hue=10YR to 5Y

Value=3 to 5

Chroma=2 or 4

Texture of the fine earth fraction=silt loam, loam or clay loam

Content of rock fragments= 5 to 35 percent

*C horizon:*

Hue=10YR to 5Y

Value=3 to 5

Chroma=1 to 3

Texture of the fine earth fraction=silt loam, loam or clay loam

Content of rock fragments=15 to 70 percent

Brecknock soils in agricultural uses in Bucks County have slightly higher reactions due to continual liming and fertilizer practices than Brecknock soils of other land uses.

## **Brownsburg Series**

*Depth class:* Deep

*Drainage class:* Well

*Permeability:* Moderate

*Landform:* Hills

*Position on the Landform:* Summits and back slopes

*Parent material:* Loess deposits over red shale and siltstone residuum

*Slope range:* 0 to 15 percent

*Associated soils:* Duncannon, Steinsburg, Lansdale, Lawrenceville, Penn, Bedington, Chalfont,

Doylestown, Reaville, Fountainville, Klimesville

**Taxonomic class:** Coarse-loamy, mixed, mesic Typic Hapludalfs

### **Typical Pedon**

Brownsburg silt loam, 3 to 8 percent slopes in Makefield Township, Bucks County, .6 mile South Southwest of Brownsburg, 3300 feet Southwest of Brownsburg Road from the intersection of Brownsburg Road and Pennsylvania route 32, 100 feet South; USGS Lambertville topographic quadrangle; Lat. 40 degrees 18 minutes 37 seconds N. and Long. 74 degrees 55 minutes 29 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 10 inches; brown to dark brown (10YR 4/3) silt loam; weak fine and medium subangular blocky structure parting to weak medium granular; friable, non-sticky and non-plastic; common fine roots throughout; common fine and medium discontinuous tubular pores; 2 percent subangular channers of sandstone; neutral; abrupt smooth lower boundary.

Bt1=10 to 18 inches; brown to dark brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable, throughout; common very fine and fine discontinuous tubular pores; very few faint brown and dark brown (7.5YR 4/4) discontinuous clay films on faces of peds and in pores; fine cylindrical worm casts; 2 percent subangular channers of sandstone; strongly acid; gradual wavy lower boundary.

Bt2=18 to 30 inches; brown (7.5YR 4/4) to dark brown (7.5YR 3/4) silt loam; moderate fine and medium subangular blocky structure; firm, slightly sticky and slightly plastic; few fine roots throughout; common fine discontinuous tubular pores; very few faint brown (7.5YR 4/4) and dark brown (7.5YR 3/4) discontinuous clay films on faces of peds and in pores; 2 percent subangular

channers of sandstone; moderately acid; abrupt wavy lower boundary.

2Btb=30 to 44 inches; dark reddish brown (2.5YR 3/4) very channery loam; moderate medium subangular blocky structure; firm, non-sticky and non-plastic; few fine discontinuous tubular pores; few fine faint brown (7.5YR 4/4) and dark brown (7.5YR 3/4) discontinuous clay films on faces of peds and in pores; 45 percent angular and subangular channers of shale; moderately acid; clear wavy lower boundary.

2Cr=44 to 56 inches; dark reddish brown (2.5YR 3/4) extremely channery silt loam; massive; very firm, non-sticky and non-plastic; many very fine and fine discontinuous tubular pores; very few faint dark reddish brown (2.5YR 3/4) patchy clay films on rock fragments; 80 percent channers and 10 percent pebbles of shale; slightly acid; clear smooth lower boundary.

R=56 to 57 inches; extremely hard, weak red (10R 4/4) moderately weathered fractured shale bedrock

### **Range in Characteristics**

*Solum thickness:* 30 to 60 inches

*Depth to Bedrock:* 40 to 60 inches

*Content of clay in the control section:* 10 to 17 percent

*Content of rock fragments in the control section:* 5 to 15 percent

*Kind of rock fragments:* Angular and subangular channers of metamorphic shale, siltstone and sandstone

*Reaction:* Where unlimed, reaction is moderately to strongly acid in the solum and moderately to slightly acid in the substratum.

*Ap horizon:*

Hue=5YR or 10YR

Value=3 or 4

Chroma=3 or 4

Texture of the fine earth fraction=very fine sandy loam, loam, silt loam

Content of rock fragments=0 to 2 percent

*BE horizon:*

Hue=5YR of 7.5YR

Value=5

Chroma=4 to 6

Texture of the fine earth fraction=very fine sandy loam, loam, silt loam

Content of rock fragments=0 to 2 percent

*Bt horizon:*

Hue=5YR or 7.5 YR

Value=4 or 5

Chroma=2 to 6

Texture of the fine earth fraction=loam, silt loam

Content of rock fragments=0 to 5 percent

*2Bt horizon:*

Hue=2.5YR to 7.5YR

Value=4 or 5

Chroma=2 to 6

Texture of the fine earth fraction=silt loam, silty clay loam

Content of rock fragments=15 to 50 percent

*2C horizon:*

Hue=2.5YR or 5YR

Value=3 or 4

Chroma=3 or 4

Texture of the fine earth fraction=loam, silt loam

Content of rock fragments=30 to 80 percent

*2Cr horizon:*

Hue=2.5YR or 5YR

Value=3 or 4

Chroma=3 or 4

Texture of the fine earth fraction=loam, silt loam

Content of rock fragments=90 to 98 percent

## ***Buckingham Series***

*Depth class:* Very Deep, moderately deep to fragipan

*Drainage class:* Somewhat poorly drained

*Permeability:* Moderate above the fragipan and slow to moderately slow in the fragipan

*Landform:* Hills

Position on the landform: Head slopes, in drainageways, and in U-shaped valleys

*Parent material:* Colluvium and alluvium derived from gray and red shale, siltstone, and sandstone material eroded from adjacent uplands

*Slope range:* 0 to 8 percent

*Associated soils:* Lawrenceville, Reaville, Rowland, Readington, Croton, Abbottstown

**Taxonomic class:** Fine-loamy, mixed, mesic Aeric Fragiaqualfs

### **Typical Pedon**

Buckingham silt loam, 0 to 8 percent slopes, in Warwick Township, Bucks County, 1.2 miles West of Jamison, Warwick Road, 350 feet Northwest of Guinea Lane; USGS Buckingham quadrangle; Lat.

40 degrees 15 minutes 31 seconds N. and Long. 75 degrees 06 minutes 35 seconds W. Colors are for moist soils unless specified otherwise.

A1=0 to 2 inches; dark brown (7.5YR 3/2) silt loam; weak fine subangular structure; friable, non-sticky and non-plastic; many fine to very coarse roots throughout; 1 percent rounded gravels of shale and siltstone; strongly acid; clear wavy lower boundary.

A2=2 to 7 inches; brown (7.5YR 4/4) silt loam; moderate fine granular structure; friable, non-sticky and non-plastic; many fine to very coarse roots throughout; many medium interstitial and tubular pores; 2 percent rounded gravels of shale and siltstone; strongly acid; clear wavy lower boundary.

Bt1=7 to 14 inches; brown(7.5YR 5/3) silt loam; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; common coarse tubular pores; few distinct patchy brown (7.5YR 5/4) clay films on faces of peds and in pores; common fine and medium distinct pinkish gray (7.5YR 6/2) iron depletions on surfaces of peds, and strong brown (7.5YR 5/6) masses of iron accumulation in ped interiors; 2 percent rounded gravels of shale and siltstone; moderately acid; gradual wavy lower boundary.

Bt2=14 to 21 inches; brown(7.5YR 5/4) silt loam; moderate fine and medium subangular blocky structure; friable, slightly sticky and non-plastic; common medium roots throughout; common medium interstitial and tubular pores; many distinct brown continuous (7.5YR 5/2) clay films on faces of peds and in pores; common depletions on surface peds, and strong brown (7.5YR 5/6) masses of iron accumulation in ped interiors; 5 percent rounded gravels and cobbles of shale and siltstone; moderately acid; clear wavy lower boundary.

Bt3=21 to 30 inches; reddish brown (5YR 5/4) silt loam; moderate coarse subangular blocky structure parting to weak fine and medium platy; friable, slightly sticky and non-plastic; few medium roots throughout; few medium interstitial and tubular pores; many prominent continuous pinkish gray (7.5YR 7/2) clay films on faces of peds and in pores; common medium prominent pinkish gray (10YR 6/2) iron depletions on surfaces of peds, and strong brown (7.5YR 5/6) masses of iron accumulation in ped interiors; 5 percent gravel and cobbles of mixed metamorphic

and sedimentary rock; moderately acid; clear wavy lower boundary.

Btxb1=30 to 44 inches; strong brown (7.5YR 5/6) silty clay loam; strong very coarse prismatic structure parting to moderate medium platy; firm and brittle non-sticky and non-plastic; few very fine roots between peds; few distinct continuous light gray (N 7/0) clay films on faces of peds, and gray (N 6/0) clay films on vertical faces of peds, and common medium prominent pinkish gray (7.5YR 6/2) iron depletions on faces of peds, and reddish brown (5YR 5/4) masses of iron accumulation in ped interiors; 10 percent rounded gravels and cobbles of metamorphic and sedimentary rocks; moderately acid; diffuse wavy lower boundary.

Btxb2=44 to 70 inches; strong brown (7.5YR 5/6), and pinkish gray (7.5YR 6/2) gravelly silt loam; strong very coarse prismatic structure parting to moderate medium and coarse platy; firm and brittle, non-sticky and non-plastic; few very fine and fine roots between peds; few distinct continuous gray (N 7/0) clay films on vertical faces of peds, and light gray (N 6/0) clay films on faces of prisms; common medium prominent pinkish gray (7.5YR 6/2) iron depletions on faces of peds, and reddish brown (5YR 5/4) masses of iron accumulation in ped interiors; 15 percent rounded gravels and cobbles of mixed metamorphic and sedimentary rocks; moderately acid.

### **Range in Characteristics**

*Solum thickness:* 60 to 84 inches

*Depth to Bedrock:* Greater than 80 inches

*Depth to fragipan:* 20 to 40 inches

*Content of clay in the control section:* 14 to 34 percent

*Content of rock fragments in the control section:* Less than 35 percent

*Kind of rock fragments:* Well rounded through subangular gravels, cobbles and channers of metamorphic and sedimentary shale, siltstone and sandstone

*Reaction:* Where unlimed, reaction ranges from strongly to slightly acid in the upper solum and moderately acid to neutral in the lower solum.

*A horizon:*

Hue=5YR to 10YR

Value=3 to 5

Chroma=2 to 4

Texture of the fine earth fraction=silt loam to loam

Content of rock fragments=0 to 10 percent

*BA horizon:*

Hue=5YR to 10YR

Value=4 to 6

Chroma=2 to 4

Texture of the fine earth fraction=silt loam

Content of rock fragments=0 to 10 percent

*Bt horizon:*

Hue=5YR to 7.5YR

Value=5 to 7

Chroma=2 to 6

Texture of the fine earth fraction=silt loam, loam, or silty clay loam

Content of rock fragments=2 to 15 percent

*Btxb horizon:*

Hue=5YR to 10YR

Value=4 to 6

Chroma=2 to 6

Texture of the fine earth fraction=silt loam, silty clay loam, loam

Content of rock fragments=5 to 25 percent

*Redox features in the Btxb horizons:*

Hue=5YR to neutral

Value=4 to 7

Chroma=0 to 6

*C horizon:*

Hue=5YR to 10YR

Value=3 to 6

Chroma=1 to 6

Texture of the fine earth fraction=silt loam, loam

Content of rock fragments=20 to 80 percent

## **Chalfont**

*Depth class:* Very deep, moderately deep to the fragipan

*Drainage class:* Somewhat poorly drained soils

*Permeability:* Moderate above the fragipan, slow in the fragipan and slow to moderately slow in the substratum

*Landform:* Loess hills

*Position on the Landform:* Concave footslopes

*Parent material:* Loess mantle overlying weathered residuum of red shale and sandstone

*Associated soils:* Duncannon, Lawrenceville, Doylestown, Fountainville, Readington, Brownsburg

**Taxonomic class:** Fine-silty, mixed, mesic Aquic Fragiudalfs

### Typical Pedon

Chalfont silt loam, 0 to 3 percent slopes, in Bucks county, Doylestown Township, 1584 feet south-southeast on Wilkshire Road from Edison-Furlong Road, 693 feet northeast of PECO pole #5480 in a cultivated field. USGS Buckingham quadrangle, Lat. 40 degrees, 16 minutes, 44 seconds N, Long. 75 degrees, 6 minutes, 53 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 12 inches; brown (10YR 4/3), interior, silt loam; weak medium granular structure; friable, non-sticky and slightly plastic; common fine roots throughout; moderately acid; abrupt smooth lower boundary.

Bt1=12 to 16 inches; brown (7.5YR 5/4), interior, silt loam; common fine distinct strong brown (7.5YR 5/6) accumulations and common fine prominent pale brown (10YR 6/3) depletions; weak fine platy structure parting to weak medium subangular blocky; friable, slightly sticky and slightly plastic; common fine roots throughout; very few distinct discontinuous brown (7.5YR 5/4), moist, clay films on faces of peds; slightly acid; clear smooth lower boundary.

Bt2=16 to 25 inches; reddish brown (7.5YR 5/4), interior, silt loam; common fine prominent light gray (10YR 7/1) depletions, common fine prominent light brownish gray (10YR 6/2) depletions and common fine distinct strong brown (7.5YR 5/6) accumulations; weak medium subangular blocky structure; friable, sticky and plastic, common fine roots throughout; very few prominent discontinuous reddish brown (5YR 5/4), moist clay films on ped faces and very few black discontinuous black (N 2/0, manganese or iron manganese stains throughout; slightly acid; clear wavy lower boundary.

Bx=25 to 30 inches; dark yellowish brown (10YR 4/4), interior, silt loam; common fine distinct brown (7.5YR 5/4) accumulations and common fine prominent light brownish gray (10YR 6/2) depletions; weak very coarse prismatic structure parting to weak medium platy; firm, brittle, slightly sticky and slightly plastic; very few prominent discontinuous reddish brown (5YR 5/4), moist, clay films on faces of peds and very few prominent discontinuous black (N 2/0), moist, manganese or iron-manganese stains throughout; neutral; clear wavy lower boundary.

Bxg=30 to 48 inches; grayish brown (10YR 5/2), interior, silt loam; common fine distinct brown

(7.5YR 5/4) accumulations and many fine prominent light brownish gray (10YR 6/2) depletions; weak very coarse prismatic structure parting to weak thick platy; firm, brittle, slightly sticky and slightly plastic; very few distinct discontinuous reddish brown (5YR 5/4), moist, clay films on faces of peds; 3 percent subangular gravels of shale-noncalcareous; neutral; clear wavy lower boundary.

BC=48 to 55 inches; brown (7.5YR 4/4), interior, channery silt loam; common medium distinct grayish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm, non-sticky and non-plastic; 15 percent subangular gravels of shale-noncalcareous; neutral; clear wavy lower boundary.

2C=55 to 56 inches; brown (7.5YR 4/4), interior, very channery silt loam; massive; firm, non-sticky and non-plastic; 40 percent subangular gravels of shale-noncalcareous; neutral.

### Range in Characteristics

*Solum thickness:* 40 to 60 inches

*Depth to bedrock:* 42 to 96 inches

*Depth to fragipan:* 15 to 30 inches

*Depth to redox features:* 15 to 30 inches

*Content of clay in the control section:* 20 to 32 percent

*Content of rock fragments in the control section:* 0 to 10 percent

*Kind of rock fragments:* Angular and subangular gravels and channers of shale, siltstone and sandstone

*Reaction:* Where unlimed, reaction ranges from strongly acid through neutral.

*Ap horizon:*

*Hue=10YR*

*Value=3 through 5*

*Chroma=2 or 3*

*Texture of the fine earth fraction=silt loam*

*Content of rock fragments=0 to 5 percent*

*Bt horizon:*

*Hue=7.5YR or 10YR*

*Value=4 or 5*

*Chroma=4 through 8*

*Texture of the fine earth fraction=silt loam*

*Content of rock fragments=0 to 10 percent*

*Bx horizon:*

*Hue=7.5YR to 2.5Y*

*Value=4 or 5*

*Chroma=2 through 6*

Faces of prisms are neutral or have a hue of 10YR to 2.5Y, value of 4 through 7, and chroma of 0 or 2  
Texture of the fine earth fraction=silt loam or loam  
Content of rock fragments=0 to 10 percent

*2Bx horizon:*

Hue=2.5YR through 2.5Y  
Value=3 through 5  
Chroma=2 through 4  
Faces of prisms are neutral or have a hue of 10YR to 2.5Y, value of 4 through 7, and chroma of 0 or 2  
Texture of the fine earth fraction=silt loam or loam  
Content of rock fragments=15 to 60 percent

*2C horizon:*

Hue=2.5YR  
Value=3 through 5  
Chroma=2 through 4  
Faces of prisms are neutral or have a hue of 10YR to 2.5Y, value of 4 through 7, and chroma of 0 or 2  
Texture of the fine earth fraction=Silt loam or loam  
Content of rock fragments=15 to 60 percent

***Chester Series:***

Depth class: Very Deep  
*Drainage class:* Well Drained  
*Permeability:* Moderate  
*Landform:* Uplands  
*Position on the landform:* Sides and tops of ridges  
*Parent material:* Materials weathered from micaceous schist  
*Slope range:* 0 to 25 percent  
*Associated soils:* Manor, Glenelg, Glenville, Edgemont  
**Taxonomic class:** Fine-loamy,mixed,mesic Typic Hapludults

**Typical Pedon**

Chester silt loam, 3 to 8 percent slopes, 2,000 feet north of Painter's Cross Road, in Delaware County, Pennsylvania, east of Route US322 on golf course 100 feet east of windbreak of pine tree on east side of highway, 75 feet north of driveway, West Chester USGS Topographic quadrangle Lat. 39 degrees 53 minutes 08 seconds N.and Long. 75 degrees 33 minutes 00 seconds W. Colors are for moist soil unless specified otherwise.

Ap=0 to 8 inches; brown (10YR 4/3) silt loam; weak, fine, subangular blocky structure; friable; slightly

sticky and slightly plastic; strongly acid; clear wavy lower boundary.

BA=8 to 12 inches; strong brown (7.5YR 5/6) silty clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; common fine faint patchy strong brown (10YR 5/6) silt coats on ped faces and in pores; strongly acid; clear wavy lower boundary.

Bt1=12 to 21 inches; strong brown (7.5YR 5/6) silty clay loam; weak fine and medium subangular and angular blocky structure; friable; slightly sticky and plastic; common thick distinct strong brown (10YR 5/6) clay films on ped faces and in pores; 10 percent subangular channers of schist; strongly acid; clear wavy lower boundary.

Bt2=21 to 26 inches; yellowish red (5YR 4/6) silty clay loam; weak very thin, platy or subangular blocky structure; friable; slightly sticky and plastic; common thick distinct strong brown (10YR 5/6) clay films on ped faces and in pores; 15 percent subangular channers of schist; strongly acid; clear wavy lower boundary.

BC=26 to 33 inches; yellowish red (5YR 4/6) silt loam; weak very thin platy or medium subangular blocky structure; friable; non-sticky and slightly plastic; few thin faint discontinuous yellowish red (5YR 4/6) clay films throughout; many mica flakes throughout; strongly acid; abrupt wavy lower boundary.

C1=33 to 37 inches; reddish brown (5YR 4/4) micaceous silt loam; weak thin platy or weak medium subangular blocky structure; friable; non-sticky and non-plastic; many medium prominent black manganese coatings throughout; strongly acid; abrupt wavy lower boundary.

C2=37 to 64 inches; reddish brown (5YR 4/4) micaceous loam; massive; friable; non-sticky and non-plastic; strongly acid.

**Range in Characteristics**

*Solum thickness:* 0 to 50 inches

*Depth to Bedrock:* Greater than 72 inches

*Content of clay in the control section:* 10 to 35 percent

*Content of rock fragments in the control section:* 0 to 15 percent

*Kind of rock fragments:* Angular and subangular channers and gravels of quartzite or schist

*Reaction:* Where unlimed, reaction ranges from strongly acid to very strongly acid.

*Ap horizon:*

Hue=10YR or 7.5YR

Value=3 or 4  
Chroma=2 or 4  
Texture of the fine earth fraction=silt loam  
Content of rock fragments=0 to 15 percent

*B horizon:*

Hue=10YR to 5YR  
Value=4 or 5  
Chroma=4 through 8  
Texture of the fine earth fraction=loam to silty clay loam  
Content of rock fragments=0 to 15 percent

*C horizon:*

Hue=10YR to 5YR  
Value=4 to 6  
Chroma=4 through 8  
Texture of the fine earth fraction=loam to silty clay loam  
Content of rock fragments=0 to 15 percent

## **Clarksburg Series**

*Depth class:* Very deep, moderately deep to the fragipan

*Drainage class:* Moderately well drained

*Permeability:* Moderate above the Bx horizon, slow to moderately slow in the Bx and C horizon

*Landscape:* Uplands

*Position on the landform:* Foot slopes

*Parent material:* Colluvium from limestone, calcareous shale and sandstone

*Slope range:* 0 to 8 percent

*Associated soils:* Duffield, Washington, Ryder

**Taxonomic class:** Fine-loamy, mixed, mesic Oxyaquic Fragiudalfs

### **Typical Pedon**

Clarksburg silt loam, 0 to 3 percent slopes, in a cultivated field, in Berks County, Maxatawney Township, 0.8 miles northwest of the center of Kutztown, 80 feet southwest of t829; USGS Kutztown topographic quadrangle; Lat. 40 degrees, 31 minutes, 18 seconds N. and Long. 75 degrees, 47 minutes, 28 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 8 inches; brown (10YR 4/3) to dark brown (10YR 3/3) silt loam; weak fine granular structure; friable, non sticky, slightly plastic; strongly acid; 5 percent channers weathered limestone-shale; abrupt smooth lower boundary.

Bt1=8 to 22 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common distinct clay films (cutans); 4 percent subangular channers of weathered limestone-shale; 1 percent subangular sandstone channers; neutral; clear wavy lower boundary.

Bt2=22 to 27 inches; yellowish brown (10YR 5/6) silty clay loam; common distinct light brownish gray (10YR 6/2) iron depletions; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm, moderately sticky, moderately plastic; common distinct clay films (cutans); 9 percent subangular channers of limestone-shale; 1 percent subangular channers of sandstone; slightly acid; clear wavy lower boundary.

Btx=27 to 51 inches; strong brown (7.5YR 5/6) and light brownish gray (10YR 6/2) exterior silt loam; common distinct light brownish gray (10YR 6/2) iron depletions; moderate coarse prismatic structure parting to moderate very coarse platy; very firm, slightly sticky, slightly plastic, brittle; common distinct clay films (cutans); 9 percent subangular channers limestone- shale; 1 percent subangular channers of sandstone; slightly acid; clear wavy lower boundary.

C=51 to 84 inches; yellowish brown (10YR 5/6) silt loam; common distinct light brownish gray (10YR 6/2) iron depletions and strong brown (7.5YR 5/8) iron accumulations; massive; friable, non-sticky, non-plastic; 9 percent subangular channers of limestone-shale; 1 percent subangular channers of sandstone; slightly acid.

### **Range in Characteristics**

*Solum thickness:* 40 to 70 inches

*Depth to Bedrock:* More than 60 inches

*Depth to fragipan:* 20 to 36 inches

*Content of clay in the control section:* 18 to 34 percent

*Content of rock fragments in the control section:* 0 to 20 percent

*Kind of rock fragments:* Angular and subangular channers of limestone, shale, siltstone, and sandstone

*Reaction:* Where unlimed, reaction ranges from strongly acid to slightly acid.

*Ap horizon:*

Hue=7.5YR or 10YR

Value=3 through 5

Chroma=2 or 3

Texture of the fine earth fraction=Silt loam  
Content of rock fragments= 0 to 15 percent

*Bt horizon:*

Hue=7.5 YR or 10YR  
Value=4 through 6  
Chroma=4 through 8  
Texture of the fine earth fraction=silty clay loam, silt loam, loam or clay loam  
Content of rock fragments= 0 to 20 percent

*Bx horizon:*

Hue=5YR through 10YR  
Value=4 to 6  
Chroma=3 through 6  
Texture of the fine earth fraction=silt loam or silty clay loam  
Content of rock fragments= 5 to 30 percent

*C horizon:*

Hue=7.5YR or 10YR  
Value=5  
Chroma=4 through 8  
Texture of the fine earth fraction=silt loam to clay  
Content of rock fragments= 5 to 80 percent

## ***Croton Series***

*Depth class:* Very deep

*Drainage class:* Poorly drained

*Permeability:* Slow

*Landform:* Uplands

*Position on the landform:* Drainageways and concave basins

*Parent material:* Colluvium weathered from triassic red sandstone, shale and siltstone residuum

*Slope range:* 0 to 8 percent

*Associated soils:* Readington, Abbottstown, Bowmansville, Lansdale, Amwell, Culleoka, Lehigh, Nockamixon, Penn, Reaville, Steinsburg, Buckingham

**Taxonomic class:** Fine-silty, mixed, mesic Typic Fragiaqualfs

### **Typical Pedon**

Croton silt loam, 0 to 3 percent slopes, in Berks County, Union Township, French Creek state park, 150 feet southeast of t417, 180 feet southwest of the junction of t417 and the road to Hopewell, 1.4 miles southwest of Hopewell:USGS Elverson topographic quadrangle; Lat. 40 degrees 11 minutes 48 seconds

N. and Long. 75 degrees 47 minutes 31 seconds W.  
Colors are for moist soil unless specified otherwise.

Ap=0 to 6 inches, dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable, non-sticky and non-plastic; 5 percent angular and subangular gravels of sedimentary rocks; moderately acid; abrupt smooth lower boundary.

Btg1=6 to 12 inches, grayish brown (10YR 5/2) silty clay loam with few fine distinct yellowish brown (10YR 5/6) iron accumulations; moderate medium blocky structure; firm, sticky and plastic; 5 percent angular and subangular gravels of sedimentary rocks; common faint clay films; moderately acid; clear wavy lower boundary.

Btg2=12 to 19 inches, brown (7.5YR 5/2) silty clay loam with common medium distinct yellowish brown (10YR 6/6) iron accumulations; moderate medium blocky structure; firm, sticky and plastic; 5 percent angular and subangular gravels of sedimentary rocks; common faint clay films; moderately acid; clear wavy lower boundary.

Bx1=19 to 31 inches, reddish brown (2.5YR 4/4) silty clay loam with gray (10YR 6/1) ped faces and common medium distinct gray (10YR 6/1) iron depletions; moderate very coarse prismatic structure; firm and brittle, sticky and plastic; 5 percent subangular gravels of sedimentary rocks; common distinct clay films; moderately acid; gradual wavy lower boundary.

Bx2=31 to 49 inches, weak red (10R 4/3) silt loam with gray (10YR 6/1) ped faces; moderate very coarse prismatic structure; firm and brittle, sticky and plastic; 10 percent angular and subangular gravels and channers of sedimentary rocks; common distinct clay films; moderately acid; gradual wavy lower boundary.

Cx=49 to 78 inches, weak red (10R 4/3) silt loam; moderate very coarse prismatic structure; firm and brittle, non-sticky and non-plastic; 10 percent angular and subangular gravels and channers of sedimentary rocks; moderately acid; abrupt wavy lower boundary.

C=78 to 90 inches, weak red (10R 4/3) extremely channery loam; massive; friable, non-sticky and non-plastic; 75 percent angular and subangular gravels and channers of sedimentary rocks; moderately acid.

### **Range in Characteristics**

*Solum thickness:* 25 to 50 inches

*Depth to Bedrock:* 40 to 60 inches

*Depth to Fragipan:* 15 to 25 inches

*Depth to redox features:* In or directly below the surface layer  
*Content of clay in the control section:* 18 to 34 percent  
*Content of rock fragments in the control section:* 0 to 10 percent  
*Kind of rock fragments:* Angular and subangular gravels, channers and flagstones of sandstone, siltstone, and shale  
*Reaction:* Where unlimed, reaction ranges from very strongly acid and strongly acid in the upper part of the solum and ranges from strongly acid to neutral in the lower part of the solum.

*Ap horizon:*  
Hue=10YR to 5YR  
Value=4 or 5  
Chroma=2 or 3  
Texture of the fine earth fraction=silt loam  
Content of rock fragments= 0 to 10 percent

*Btg horizon:*  
Hue=10YR to 5YR  
Value=5 to 7  
Chroma=1 or 2  
Texture of the fine earth fraction=silt loam to silty clay loam  
Content of rock fragments= 0 to 10 percent

*Bxg horizon:*  
Hue=10YR to 5YR  
Value=5 or 6  
Chroma=1 to 6 and ped faces with 2 or less  
Texture of the fine earth fraction=silt loam to silty clay loam  
Content of rock fragments= 0 to 15 percent

*C horizon:*  
Hue=5YR to 10R  
Value=3 or 4  
Chroma=2 to 4  
Texture of the fine earth fraction=silt loam to silty clay loam  
Content of rock fragments=20 to 80 percent  
The Croton soils in this survey area are slightly outside the range of the series. They are thicker in the solum and are deeper to bedrock than is typical for the series.

## ***Culleoka Series***

*Depth class:* Moderately deep

*Drainage class:* Well drained  
*Permeability:* Moderate to moderately rapid in the A, moderate in the B and slow to very slow in the bedrock  
*Landform:* Hillsides and ridges in piedmont  
*Position on the landform:* Mid and upper sides of ridges  
*Parent material:* Residuum or colluvium from gray and black shale plus a fine grain sandstone or siltstone; generally formed on the Locketong Formation.  
*Slope range:* 3 to 15 percent  
*Associated soils:* Weikert, Bedington, Readington, Reaville, Abbottstown, Croton, Berks  
**Taxonomic class:** Fine-loamy, mixed, mesic Ultic Hapludalfs

### **Typical Pedon**

Culleoka channery silt loam, 8 to 15 percent slopes, is located in Bucks County, New Britain Township, 3000 feet southeast on Upper Church Road from Mace's Corner to King Road, 800 feet from intersection, and 225 feet northwest into field; USGS Doylestown topographic quadrangle Lat. 40 degrees, 19 minutes, 53 seconds N. and Long. 75 degrees, 11 minutes, 57 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 10 inches; dark brown (10YR 4/3) channery silt loam; moderate medium subangular blocky structure parting to fine medium granular structure; very friable; sticky and slightly plastic; 15 percent angular channers of shale and siltstone; slightly acid; abrupt smooth lower boundary.

Bt1=10 to 20 inches; yellowish brown (10YR 5/4) channery silt loam; weak coarse platy structure parting to moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; with many continuous distinct organic coats on vertical faces of peds; few discontinuous faint patchy clay films on faces of peds; and common continuous distinct skeletalans on faces of peds; 18 percent angular channers of shale and siltstone; moderately acid; clear smooth lower boundary.

Bt2=20 to 31 inches; dark yellowish brown (10YR 5/4) channery silt loam; medium coarse subangular blocky structure; friable, slightly sticky and slightly plastic; with few fine distinct strong brown (7.5YR 5/8) iron accumulations; with common discontinuous distinct patchy clay films on faces of peds; and few patchy distinct skeletalans

on faces of peds; 20 percent angular channers of shale and siltstone; moderately acid; clear smooth lower boundary.

BC1=31 to 36 inches; dark yellowish brown (10YR 4/4) channery silt loam; weak medium subangular blocky structure; friable, non-sticky and non-plastic; 15 percent angular channers of shale and siltstone and 7 percent angular flagstones of shale and sandstone; slightly acid; clear irregular lower boundary.

BC2=36 to 38 inches; dark yellowish brown (10YR 4/4) very channery silt loam; weak very fine subangular blocky structure; firm, non-sticky and non-plastic; with common medium distinct strong brown (7.5YR 5/8) iron accumulations; 20 percent angular channers of shale and siltstone and 20 percent angular flagstones of shale and sandstone; slightly acid; clear irregular lower boundary.

R=38 to 39 inches; very dark gray brown (10YR 3/2) shale bedrock

#### **Range in Characteristics**

*Solum thickness:* 20 to 40 inches

*Depth to Bedrock:* 20 to 40 inches

*Depth to redox features:* Greater than 40 inches

*Content of clay in the control section:* 15 to 30 percent

*Content of rock fragments in the control section:* 10 to 30 percent

*Kind of rock fragments:* Angular and subangular channers and flagstones of shale, siltstone and sandstone

*Reaction:* Where unlimed, reaction ranges from slightly acid to strongly acid.

*Ap horizon:*

Hue=10YR

Value=3 or 4

Chroma=2 through 4

Texture of the fine earth fraction=loam or silt loam

Content of rock fragments=5 to 25 percent

*Bt horizon:*

Hue=10YR

Value=4 or 5

Chroma=3 through 6

Texture of the fine earth fraction=silt loam, loam, or silty clay loam

Content of rock fragments=10 to 30 percent

*C horizon:*

Hue=10YR or 7.5YR

Value=3 through 5

Chroma=2 through 8

Texture of the fine earth fraction=loam, silt loam or silty clay loam

Content of rock fragments=25 to 65 percent

### ***Delaware Series***

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate to rapid

*Landform:* Terraces of the Delaware River valley

*Position on the landform:* Nearly level interfluves and backslopes of sideslopes

*Parent material:* Glacial outwash and alluvium

*Slope range:* 0 to 8 percent

*Associated soils:* Alton, Mattapex, Matapeake,

Fluvaquents, Nanticoke, Othello,

Udorthents, gravelly, Udorthents, sandy

**Taxonomic class:** Coarse-loamy, mixed mesic Typic Dystrochrepts

#### **Typical Pedon**

Delaware loam, 0 to 3 percent slopes, Bucks Co., PA., Falls Twp., Waterfront Township Park, in the far southwest corner of the park, 450 feet WSW of the end of the parking lot, 120 feet north of the Delaware River, Trenton West USGS Topographic quadrangle Lat. 40 degrees 7 minutes 48 seconds N., Long. 74 degrees 46 minutes 25 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 10 inches; brown (10YR 4/3) loam;

moderate medium granular structure; friable, non-sticky and non-plastic; few fine faint brown (10YR 4/3) silt coats on ped faces and in pores; 2 percent well rounded gravels of sandstone; strongly acid; abrupt smooth lower boundary.

Bw1=10 to 30 inches; brown (7.5YR 4/4) very fine sandy loam; moderate medium subangular blocky structure; friable, non-sticky and slightly plastic; 1 percent well rounded gravels of sandstone; strongly acid; gradual wavy lower boundary.

Bw2=30 to 40 inches; 60 percent dark yellowish brown (10YR 4/4) and 40 percent brown (7.5YR 4/4) very fine sandy loam; weak coarse subangular blocky parting to single grain structure; very friable, non-sticky and non-plastic; 1 percent well rounded gravels of sandstone; strongly acid; clear wavy lower boundary.

C1=40 to 65 inches; yellowish brown (10YR 5/4)

loamy fine sand; weak fine blocky parting to single grain structure; very friable, non-sticky and

non-plastic; 1 percent well rounded gravels of sandstone; strongly acid; gradual wavy lower boundary.

C2=65 to 72 inches; 40 percent brown (10YR 5/3) and 60 percent brown (7.5YR 4/2) very fine sand; single grain; loose, non-sticky and non-plastic; strongly acid; clear wavy lower boundary.

C3=72 to 87 inches; 80 percent brown (10YR 5/3) and 20 percent brown (7.5YR 4/2) loamy fine sand; single grain; loose, non-sticky and non-plastic; few medium prominent dark brown (10YR 3/3) manganese stains; strongly acid; abrupt wavy boundary.

2C=87 to 110 inches; brown (10YR 4/3) gravelly coarse sand; single grain; loose, non-sticky and non-plastic; 25 percent well rounded gravels of sandstone; strongly acid.

### **Range in Characteristics**

*Solum thickness:* 30 to 50 inches

*Depth to Bedrock:* Greater than 72 inches

*Content of clay in the control section:* Less than 18 percent but generally 8 to 12 percent

*Content of rock fragments in the control section:* 0 to 5 percent

*Kind of rock fragments:* Well rounded through subrounded gravels and cobbles of sandstone

*Depth to redox features:* Greater than 60 inches

*Reaction:* Where unlimed, reaction ranges from strongly acid to medium acid in the solum and strongly acid to mildly alkaline in the C horizon.

*Ap horizon:*

Hue=7.5YR or 10YR

Value=3 to 4

Chroma=2 to 4

Texture of the fine earth fraction=fine or very fine sandy loam, loam, silt loam, or sandy loam

Content of rock fragments=0 to 5 percent

*Bw horizon:*

Hue=5YR through 10YR

Value=3 through 5

Chroma=3 through 6

Texture of the fine earth fraction=loam, very fine sandy loam or sandy loam

Content of rock fragments=0 to 5 percent

*C horizons:*

Hue=5YR through 10YR

Value=4 through 6

Chroma=2 through 6

Texture of the fine earth fraction=loamy sand to fine sandy loam, there may be stratified water washed sands and gravels in very thin beds throughout  
Content of rock fragments=0 to 30 percent

## ***Doylestown Series***

*Depth class:* Deep

*Drainage class:* Poorly drained

*Permeability:* Moderate in the upper part of the solum and slow to moderately slow in the lower part

*Landform:* Nearly level to gently undulating drainageways and broad basins

*Position on the landform:* Footslopes and toeslopes

*Parent material:* Silty materials, presumably loess, over soil materials weathered from a variety of parent materials, but principally red shale

*Slope range:* 0 to 8 percent

*Associated soils:* Chalfont, Lawrenceville, Bowmansville, and Buckingham, Fountainville, Duncannon, Nockamixon, Amwell

**Taxonomic class:** Fine-silty, mixed, mesic Typic Fragiaqualfs

### **Typical Pedon**

Doylestown silt loam, 3 to 8 percent slopes, Montgomery County, PA, Lower Gwynedd township, 1000 feet southeast of US Rt. 202 on Summeytown Pike, 300 feet southwest of Summeytown Pike, USGS Topographic quadrangle: Lat. 40 degrees 11 minutes 57 seconds N, Long. 75 degrees 15 minutes 14 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; few medium distinct strong brown (7.5YR 5/6) iron accumulations; moderate, medium granular structure; friable, non-sticky and non-plastic; strongly acid; abrupt smooth lower boundary

BEg=8 to 14 inches; grayish brown (10YR 5/2) silt loam; many medium faint light gray (10YR 7/1) iron depletions, many medium distinct yellowish brown (10YR 5/8) iron accumulations; weak thick platy structure parting to weak fine blocky structure; friable, slightly sticky and non-plastic; very strongly acid; clear wavy lower boundary.

Btg=14 to 20 inches; gray (N 5/0) silt loam; many medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) iron accumulations; faint dark gray (10YR 4/1) iron depletions; weak

medium prismatic structure parting to weak medium blocky; firm, slightly sticky and non-plastic; 2 percent angular channers of shale; strongly acid; abrupt wavy lower boundary.

Btx1=20 to 38 inches; reddish brown (5YR 4/3) and strong brown (7.5YR 5/8)silt loam; gray (N 6/0) prism faces; weak very coarse prismatic structure parting to weak thick platy structure; very firm; brittle; sticky and slightly plastic; very few prominent clay films on faces of peds and in pores; few prominent black coatings; 3 percent angular channers of shale; strongly acid; clear wavy lower boundary.

Btx2=38 to 48 inches; reddish brown (5YR 4/3) silt loam ped interiors; grayish brown (10YR 5/2) and weak red (2.5YR 5/2) prism faces; weak very coarse prismatic structure; very firm; brittle; sticky and slightly plastic; few faint clay films on faces of peds and in pores; few prominent black coatings; 10 percent angular channers of shale; moderately acid; clear wavy lower boundary.

2R=48 to 49 inches; dusk red (2.5YR 3/2) shale

#### **Range in Characteristics**

*Solum thickness:* 40 to 60 inches

*Silty mantle thickness:* 40 to 60 inches

*Depth to Bedrock:* 42 to 72 inches

*Depth to fragipan:* 15 to 25 inches

*Depth to redox features:* 4 to 12 inches

*Content of clay in the control section:* 18 to 27 percent

*Content of rock fragments in the control section:* 5 to 20 percent

*Kind of rock fragments:* Angular and subangular gravels and channers of shale and siltstone

*Reaction:* Where unlimed, reaction ranges from very strong acid to strongly acid in the upper part of the solum and ranges from strongly acid to neutral in the lower part of the solum.

*Ap horizon:*

Hue=10YR

Value=4 or 5

Chroma=1 to 3

Texture of the fine earth fraction=silt loam

Content of rock fragments=0 to 5 percent

*Bt horizon:*

Hue=neutral or 10YR

Value=4 or 5

Chroma=0 through 2

Texture of the fine earth fraction=silt loam or silty clay loam

Content of rock fragments=5 to 20 percent

*Btx horizon:*

Hue=10YR through 5YR

Value=4 or 5

Chroma=3 through 8

Texture of the fine earth fraction=silt loam or silty clay loam

Content of rock fragments=5 to 20 percent

### ***Duffield series***

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Landform:* Uplands

*Position on the landform:* Tops and sideslopes of undulating low hills in undulating valleys

*Parent material:* Residuum from Limestone

*Slope range:* 0 to 25 percent

*Associated soils:* Murrill, Hagerstown, Ryder, Clarksburg, Penlaw, Ryder

**Taxonomic class:** Fine-loamy, mixed, mesic Ultic Hapludalfs

#### **Typical Pedon**

Duffield silt loam, 3 to 8 percent slopes in Lehigh County, Upper Macungie Township, 1 mile east of Newton, 500 feet southeast and 435 feet northeast of the intersection of Routes t458 and t456, 270 feet northeast of double bole hickory trees; USGS Topton topographic quadrangle; Lat. 40 degrees 32 minutes 59 seconds and Long. 75 degrees 38 minutes 41 seconds. Colors are for moist soils unless specified otherwise.

Ap=0 to 10 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable, non-sticky and non-plastic; slightly acid; abrupt smooth lower boundary.

Bt1=10 to 14 inches; yellowish brown (10YR 5/6) silty clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common faint clay films on faces of peds; slightly acid; gradual wavy boundary.

Bt2=14 to 28 inches; yellowish brown (10YR 5/8) silty clay loam; weak fine and medium prismatic structure parting to moderate medium subangular blocky; friable, slightly sticky and slightly plastic; many faint clay films on faces of peds; slightly acid; gradual wavy lower boundary.

Bt3=28 to 41 inches; yellowish brown (10YR 5/8) silty clay loam; few fine faint yellow (10YR 7/8) iron depletions; weak medium prismatic structure parting to weak medium blocky; friable, slightly sticky and slightly plastic; many distinct clay films and few iron and manganese coatings on faces of peds; strongly acid; gradual wavy lower boundary.

Bt4=41 to 53 inches; yellowish brown (10YR 5/8) silty clay loam; few streaks of very pale brown (10YR 8/4); weak medium prismatic structure parting to weak medium blocky; friable, slightly sticky and slightly plastic; many distinct clay films on faces of peds and few iron and manganese coatings; strongly acid; clear wavy lower boundary.

C=53 to 72 inches; yellowish brown (10YR 5/6) silt loam; streaks of strong brown (7.5YR 5/6) and very pale brown (10YR 8/4); weak medium and fine platy structure; friable, slightly sticky, slightly plastic; few faint clay films on faces of peds; 10 percent angular channers of shale; strongly acid.

#### Range in Characteristics

*Solum thickness:* 40 to 70 inches

*Depth to Bedrock:* 48 to 120 inches

*Content of clay in the control section:* 18 to 34 percent

*Content of rock fragments in the control section:* 0 to 20 percent

*Kind of rock fragments:* Angular and subangular channers of limestone, quartz and shale

*Reaction:* Where unlimed, reaction ranges from strongly acid to neutral to about the 50 inch depth and from strongly acid to slightly acid below 50 inches.

*Ap horizon:*

Hue=10YR or 7.5YR

Value=3 or 4

Chroma=2 to 4

Texture of the fine earth fraction=silt loam

Content of rock fragments= 0 to 15 percent

*B horizon:*

Hue=7.5YR or 10YR

Value=4 to 8

Chroma=4 to 8

Texture of loam to the fine earth fraction=silt loam to silty clay loam

Content of rock fragments= 0 to 20 percent in the upper part and 5 to 25 percent in the lower part

*C horizon:*

Hue=2.5YR to 5YR

Value=4 to 8

Chroma=4 to 8

Texture of the fine earth fraction=loam to clay

Content of rock fragments=5 to 40 percent

### ***Duncannon Series***

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Landform:* Uplands

*Position on the landform:* Interfluves

*Parent material:* Formed in silty to very fine sandy loam material, presumed to be loess, overlaying a variety of residuum materials, stream deposits

*Slope range:* 0 to 8 percent

*Associated soils:* Chalfont, Lawrenceville,

Doylestown, Brownsburg, Fountainville

**Taxonomic class:** Coarse-silty, mixed, mesic, Ultic Hapludalfs

#### **Typical Pedon**

Duncannon silt loam, 0 to 3 percent slopes in Bucks County, Upper Makefield Township 0.3 miles east of the intersection of Dolington Rd. along Mt. Eyre Rd., the 1584 ft. North from Mt. Rd. 280 ft. North from the NW corner of the stone garage; USGS Lambertville topographic quadrangle; Lat. 40 degrees, 16 minutes, 13 seconds N. and Long. 74 degrees, 52 minutes, 52 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 10 inches; brown (10YR 4/3) silt loam; weak, fine, granular; friable, slightly sticky and non-plastic; 1 percent subangular gravels of shale; strongly acid; abrupt wavy lower boundary.

BA=10 to 17 inches; yellowish brown (10YR 5/4) silt loam; weak, fine, subangular blocky; friable, slightly sticky and non-plastic; moderately acid; gradual wavy lower boundary.

Bt1=17 to 24 inches; brown (7.5YR 4/4) silt loam; weak, medium, subangular blocky; friable, slightly sticky and non-plastic; few distinct clay films; 1 percent subangular shale gravels; moderately acid; gradual wavy lower boundary.

Bt2=24 to 34 inches; brown (7.5YR 4/4) silt loam; weak, medium, subangular blocky; friable; slightly

sticky and non-plastic; few distinct clay films; 5 percent angular channers of shale; moderately acid; gradual wavy lower boundary.

BC=34 to 45 inches; brown (7.5YR 4/4) silt loam; weak, thick, platy; friable; slightly sticky and non-plastic; few distinct clay films; moderately acid; abrupt wavy lower boundary.

2C1=45 to 49 inches; dark brown (7.5YR 4/4) channery silt loam; common medium distinct accumulations of yellowish red (5YR 5/8) and depletions of brown (10YR 5/3); weak, medium, platy; friable; slightly sticky and non-plastic; few distinct clay films; 20 percent angular channers of shale; moderately acid; abrupt wavy lower boundary.

2C2=49 to 56 inches; dark brown (7.5YR 4/2) channery silt loam; weak thin platy structure; friable; slightly sticky and non-plastic; few faint clay films; 20 percent angular channers of shale; moderately acid; clear wavy lower boundary.

2C3=56 to 68 inches; dark reddish brown (5YR 3/3) channery silt loam; thin bands of yellowish brown (10YR 3/3); weak thin platy; friable; slightly sticky and non-plastic; 20 percent angular channers of shale; strongly acid.

#### **Range in Characteristics**

*Solum thickness:* 40 to 60 inches

*Depth to Bedrock:* Greater than 5 feet

*Content of clay in the control section:* 10 to 24 percent

*Content of rock fragments in the control section:* 15 to 50 percent

*Kind of rock fragments:* Angular and subangular gravels and channers of limestone, quartz, chert and shale

*Reaction:* Where unlimed, reaction ranges from very strongly to moderately acid.

*Ap horizon:*

Hue=10YR

Value=3 to 5

Chroma=2 to 4

Texture of the fine earth fraction=silt loam, loam, very fine sandy loam

Content of rock fragments=15 to 50 percent

*B horizon:*

Hue=7.5YR or 10YR

Value=4 to 5

Chroma=4 to 8

Texture of the fine earth fraction=very fine sandy loam, silt loam

Content of rock fragments=15 to 50 percent

*C horizon:*

Hue=10R to 10YR

Value=4 to 6

Chroma=4 to 8

Texture of the fine earth fraction=loam, silt loam, sandy loam

Content of rock fragments=15 to 50 percent

### **Edgemont Series**

*Depth class:* Deep and very deep

*Drainage class:* Well Drained

*Permeability:* Moderate to moderately rapid

*Landform:* Gently sloping to very steep uplands

*Position on the landform:* Tops and sides of hills

*Parent material:* Residuum, mostly from quartzite and sandstone

*Slope range:* 0 to 60 percent

*Associated soils:* Chester, Gladstone, Glenville, Glenelg, Lansdale, Steinsburg

**Taxonomic class:** Fine-loamy, mixed, mesic Typic Hapludults

#### **Typical Pedon**

Edgemont channery sandy loam, 8 to 25 percent slopes, extremely stony, in Berks County, Ruscombmanor Township, 1 1/4 miles southeast of Breezy Corner, 270 feet north of a quarry north side of route 569; USGS Fleetwood topographic quadrangle; Lat. 40 degrees 24 minutes 10 seconds N. and Long. 75 degrees 46 minutes 38 seconds W. Colors are for moist soils unless specified otherwise.

O<sub>i</sub>=0 to 1/2 inches; loose leaf litter that is mostly mixed oak leaves; abrupt smooth lower boundary.

O<sub>e</sub>=1/2 to 1 inches; very dark grayish brown (10YR 3/2) decomposed organic material; medium acid; abrupt smooth lower boundary.

A=0 to 2 inch; black (10YR 2/1) channery sandy loam; weak fine granular structure; very friable, non-sticky and non-plastic; 20 percent angular and subangular channers of quartzite; extremely acid; abrupt smooth lower boundary.

E=2 to 8 inches; yellowish brown (10YR 5/4) very channery sandy loam; weak fine subangular blocky structure; friable, non-sticky and non-plastic; 35 percent angular channers of quartzite; very strongly acid; clear wavy lower boundary.

BE=8 to 12 inches; light yellowish brown (10YR 6/4) channery sandy loam; weak medium subangular

blocky structure; friable, non-sticky and non-plastic; 20 percent angular channers of quartzite; very strongly acid; clear wavy lower boundary.  
Bt1=12 to 24 inches; light yellowish brown (10YR 6/4) channery sandy loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common distinct clay films; 20 percent angular channers of quartzite; very strongly acid; clear wavy lower boundary.  
Bt2=24 to 36 inches; light yellowish brown (10YR 6/4) channery loam; weak medium blocky structure; friable, slightly sticky and slightly plastic; common distinct clay films; 25 percent angular channers of quartzite; very strongly acid; gradual wavy lower boundary.  
C=36 to 60 inches; light yellowish brown (10YR 6/4) channery sandy loam; massive; very friable, non-sticky and non-plastic; 30 percent angular channers of quartzite; very strongly acid.

#### **Range in Characteristics**

*Solum thickness:* 20 to 40 inches  
*Depth to Bedrock:* 40 to 84 inches  
*Content of clay in the control section:* 18 to 34 percent  
*Content of rock fragments in the control section:* 5 to 35 percent  
*Kind of rock fragments:* Angular and subangular channers, stones and boulders of quartzite and sandstone  
*Reaction:* Where unlimed, reaction ranges from strongly acid to extremely acid.

*A horizon:*  
Hue=10YR  
Value=3 or 4  
Chroma=1 or 2  
Texture of the fine earth fraction=sandy loam or loam  
Content of rock fragments= 5 to 35 percent

*E horizon:*  
Hue=7.5YR to 2.5Y, or neutral  
Value=4 or 5  
Chroma=0 to 4  
Texture of the fine earth fraction=loam, sandy loam or silt loam  
Content of rock fragments= 5 to 40 percent

*Bt and BE horizons:*  
Hue=7.5YR or 10YR  
Value=5 or 6  
Chroma=4 to 8

Texture of the fine earth fraction=loam, sandy loam, fine sandy loam or clay loam  
Content of rock fragments= 5 to 40 percent

*C horizon:*  
Hue=7.5YR or 10YR  
Value=5 or 6  
Chroma=4 to 8  
Texture of the fine earth fraction=loamy sand to clay loam  
Content of rock fragments=10 to 90 percent

### ***Fluvaquents Series***

*Depth class:* Very deep, and moderately deep to impermeable layers.  
*Drainage class:* Somewhat poorly to very poorly drained  
*Permeability:* Moderately slow to moderate in the upper part of the soil and moderately slow to rapid in the upper part of the substratum and moderately slow to very slow in the lower part of the substratum, and moderately slow to moderately rapid in the buried layers if present.  
*Landform:* Floodplains  
*Position on the landform:* Nearly level toeslopes of headslopes  
*Distinctive landscape features:* Bar and channel features in dendritic patterns, hummocks from windthrows, closed depressions adjacent to natural levees. Oftentimes these soils occur on small islands within the Delaware and Schuylkill rivers.  
*Parent material:* Alluvium from mixed igneous, metamorphic, and sedimentary rocks  
*Slope range:* 0 to 2 percent  
*Associated soils:* Towhee, Hatboro, Mount Lucas, Neshaminy, Delaware, Alton, Othello, Nanticoke, Holly, Middlebury, Barbour, Lansdale  
**Taxonomic class:** Fluvaquents (classified only at the subgroup level due to high variability)

#### **General Pedon**

Fluvaquents, Bucks Co., PA, Haycock township, near Lake Towhee County Park, 2200 feet east of Applebachsville, 350 feet northwest of the northeastern-most stream inlet into Lake Towhee, in a wooded wetlands. Quakertown USGS Topographic quadrangle Lat.40 degrees 28 minutes 56.0 seconds N Long. 75 degrees 15 minutes 55.0 seconds W. Colors are for moist soil unless specified otherwise.

A=0 to 2 inches; very dark grayish brown (10YR 3/2)(10YR 4/2 dry) silt loam; moderate fine granular structure; friable, non-sticky and slightly plastic; common fine to coarse roots throughout; 1 percent rounded gravels of mixed-igneous-metamorphic & sedimentary rocks; slightly acid; clear smooth lower boundary.

Ag=2 to 6 inches; dark grayish brown (10YR 4/2)(10YR 5/2 dry) silt loam; common fine faint grayish brown (10YR 5/2) iron depletions between peds and common fine and medium prominent yellowish red (5YR 5/6) iron accumulations throughout; weak medium subangular blocky structure parting to moderate fine granular; friable, non-sticky and slightly plastic; common fine to coarse roots throughout; 1 percent rounded gravels of mixed-igneous-metamorphic & sedimentary rocks; strongly acid; clear smooth lower boundary.

Cg1=6 to 10 inches; light brownish gray (10YR 6/2) silty clay loam; many medium and coarse prominent yellowish red (5YR 4/6) iron accumulations throughout; weak very fine subangular blocky and massive; friable, very sticky and slightly plastic; common fine to coarse roots throughout; very few distinct patchy brown (10YR 4/3) organic coats on faces of peds; 1 percent rounded gravels of mixed-igneous-metamorphic & sedimentary rocks; strongly acid; clear wavy lower boundary.

Cg2=10 to 20 inches; gray (7.5YR 6/1) silty clay loam; many coarse prominent strong brown (7.5YR 5/8) iron accumulations throughout; massive; firm, very sticky and plastic; common fine to coarse roots throughout; few distinct patchy brown (7.5YR 4/4) organic coats on faces of peds; 1 percent rounded gravels of mixed-igneous-metamorphic & sedimentary rocks; strongly acid; gradual wavy lower boundary.

Cg3=20 to 30 inches; gray (10YR 6/1) silty clay; common medium and coarse prominent yellowish brown (10YR 5/6) iron accumulations throughout; massive; firm, very sticky and plastic; common fine and medium roots throughout; very few prominent patchy very dark gray (N 3/0) manganese or iron-manganese stains throughout; 1 percent rounded gravels of mixed-igneous-metamorphic & sedimentary rocks; neutral; abrupt wavy lower boundary.

2Cg4=30 to 42 inches; dark gray (5Y 4/1)(5Y 5/1 dry) clay; common fine distinct brown (7.5YR 5/4) iron accumulations throughout; massive; very firm, very sticky and very plastic; common very

fine and fine roots throughout; 3 percent rounded gravels of mixed-igneous-metamorphic & sedimentary rocks; moderately alkaline; clear wavy lower boundary.

3Cg5=42 to 55 inches; very dark grayish brown (2.5Y 3/2)(2.5Y 4/2 dry) clay; common fine and medium distinct brown (7.5YR 5/4) iron accumulations throughout and common fine and medium prominent strong brown (7.5YR 5/8) iron accumulations throughout; massive; firm, very sticky and very plastic; few very fine and fine roots throughout; 1 percent well rounded gravels of mixed-igneous-metamorphic & sedimentary rocks; moderately alkaline; clear wavy lower boundary.

4Cg6=55 to 62 inches; very dark gray (N 3/0)(N 4/0 dry) clay; massive; very firm, very sticky and very plastic; 2 percent rounded gravels of mixed-igneous-metamorphic & sedimentary rocks; moderately alkaline.

#### **Range in Characteristics**

*Solum thickness:* 3 to 20 inches

*Depth to Bedrock:* Greater than 60 inches, and can be greater than 10 feet

*Depth to redox features:*

*Accumulations:* 0 to 20 inches

*Depletions:* 3 to 18 inches, typically within 5 inches

*Content of clay in the control section:* 20 to 85 percent

*Content of rock fragments in the control section:* 0 to 40 percent

*Kind of rock fragments:* Well rounded to subangular gravels, cobbles, boulders, and channers of diabase, shales, quartzites, and sandstones

*Reaction:* Where unlimed, reaction is extremely acid through neutral in the solum and very strongly acid through slightly alkaline in the substratum.

*A horizon:*

Hue=5YR, 7.5YR, 10YR, 2.5Y

Value= 2 through 4

Chroma= 0 through 3

Texture of the fine earth fraction= silt, silt loam, loam, clay loam, sandy loam, loamy sand, and sand

Content of rock fragments=0 to 25 percent

*Cg horizon:*

Hue= 2.5YR 5YR, 7.5YR, 10YR, 2.5Y, 5Y, or neutral

Value= 3 through 4, accumulations of iron have values of 4 through 6

Chroma= 0 through 3, accumulations of iron have chromas of 4 through 8  
Texture of the fine earth fraction= silt, silt loam, loam, silty clay loam, clay, clay loam, sandy loam, loamy sand, and sand  
Content of rock fragments=0 to 40 percent

*Substratum of contrasting material:*

Hue= 7.5YR, 10YR, 2.5Y, 5Y, or neutral  
Value= 3 through 4, accumulations of iron have values of 4 through 6  
Chroma= 0 through 4, accumulations of iron have chromas of 4 through 8  
Texture of the fine earth fraction= silt, silt loam, loam, silty clay loam, clay, clay loam, sandy loam, loamy sand, and sand  
Content of rock fragments=0 to 80 percent

*Some pedons have a buried A or Bt horizon from upland soils within 60 inches:*

Hue= 5YR, 7.5YR, or 10YR  
Value= 3 through 5  
Chroma= 1 through 3, accumulations of iron have chromas of 4 through 8  
Texture of the fine earth fraction= silt loam, loam, silty clay loam, or clay loam  
Content of rock fragments= 5 to 20 percent

## ***Fountainville Series***

*Depth class:* Deep, moderately deep to fragipan

*Drainage class:* Moderately well drained

*Permeability:* Moderate above the fragipan, and slow to moderately slow in the fragipan

*Landform:* Hills

*Position on the landform:* Interfluves and backslopes and footslopes of side and headslopes.

*Parent material:* Loess deposits over red or brown shale and siltstone residuum

*Slope range:* 0 to 15 percent

*Associated soils:* Duncannon, Steinsburg, Lansdale, Lawrenceville, Penn, Bedington, Chalfont, Doylestown, Reaville, Brownsburg, Klinsville

**Taxonomic class:** Fine-silty, mixed, mesic Oxyaquic Fragiudalfs

### **Typical Pedon**

Fountainville silt loam, 3 to 8 percent slopes, in Bucks County; 0.75 mile southwest of Fountainville; 2800 feet northwest from the intersection of Chapman Road and Ferry Road, 400 feet west of Chapman Road; USGS Doylestown topographic

quadrangle; Lat. 40 degrees 20 minutes 14 seconds N. and Long. 75 degrees 10 minutes 05 seconds W. Colors for moist soils unless specified otherwise.

Ap=0 to 8 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine and medium granular structure; friable, non-sticky and non-plastic; common very fine and fine roots throughout; common very fine and fine interstitial and tubular pores; 3 percent angular and subangular channers of mixed-metamorphic and sedimentary rock; mildly alkaline; abrupt smooth lower boundary.

Bt=8 to 22 inches; yellowish brown (10YR 5/6) silt loam; moderate fine and medium subangular blocky structure; friable, slightly sticky and non-plastic; few very fine and fine roots throughout; few very fine and fine interstitial and tubular pores; few distinct pale brown (10YR 6/3) continuous clay films on faces of peds and in pores; 3 percent angular and subangular channers of mixed-metamorphic and sedimentary rock; neutral; gradual wavy lower boundary.

2Btx1=22 to 30 inches; yellowish brown (10YR 5/4) silt loam; moderate very coarse prismatic structure; firm and brittle, slightly sticky and non-plastic; few very fine and fine roots between peds; few very fine and fine interstitial and tubular pores; few distinct light gray (10YR 7/1) continuous clay films on faces of peds; common medium prominent strong brown (7.5YR 5/6) masses of iron accumulation in ped interiors and pinkish gray (7.5YR 6/2) iron depletions along ped faces; very few black manganese or iron-manganese stains on rock fragment; 5 percent angular and subangular channers of mixed-metamorphic and sedimentary rock; slightly acid; diffuse wavy lower boundary.

2Btx2=30 to 42 inches; yellowish brown (10YR 5/8) silt loam; strong very coarse prismatic structure; very firm and brittle, non-sticky and non-plastic; few very fine and fine roots between peds; few very fine and fine interstitial and tubular pores; few distinct light gray (10YR 7/1) continuous clay films on faces of peds; common medium prominent pinkish gray (7.5YR 6/2) iron depletions along ped faces; 10 percent angular and subangular channers of mixed-metamorphic and sedimentary rock; moderately acid; diffuse wavy lower boundary.

2BCx=42 to 46 inches; dark yellowish brown (10YR 4/6) channery silt loam; moderate very coarse prismatic structure parting to weak medium and coarse platy; firm and brittle, non-sticky and non-

plastic; few distinct light gray (10YR 7/1) continuous clay films on faces of peds; common medium prominent strong brown (7.5YR 5/8) masses of iron accumulation in ped interiors and pinkish gray (7.5YR 6/2) iron depletions along ped faces; 30 percent angular and subangular channers of mixed-metamorphic and sedimentary rock; slightly acid; abrupt wavy lower boundary. 2R=46 to 47 inches; very hard, olive gray shale (5Y 4/2) and dark grayish brown (10YR 4/2) moderately weathered fractured shale bedrock; 4 to 12 inches between fractures; many distinct clay and silt bridging between rock fragments.

### Range in Characteristics

*Solum thickness:* 30 to 60 inches  
*Silt Mantle thickness:* 20 to 30 inches  
*Depth to Bedrock:* 40 to 60 inches  
*Depth to fragipan:* 20 to 40 inches  
*Depth to redox depletions:* Greater than 16 inches  
*Content of clay in the control section:* 18 to 30 percent  
*Content of rock fragments in the control section:* 1 to 10 percent  
*Kind of rock fragments:* Angular and subangular gravels and channers of sedimentary and metamorphic shale, siltstone and sandstone  
*Reaction:* Where unlimed, reaction ranges from moderately acid to slightly acid in the upper part of the solum, strongly acid to slightly acid in the lower part of the solum and moderately acid to neutral in the substratum.  
*A horizon:*  
Hue=7.5YR or 10YR  
Value=3 or 4  
Chroma=3 or 4  
Texture of the fine earth fraction=loam, silt loam  
Content of rock fragments = 0 to 3 percent  
*Bt horizon:*  
Hue=7.5YR to 2.5Y  
Value=4 or 5  
Chroma=5 or 6  
Texture of the fine earth fraction=silt loam, silty clay loam  
Content of rock fragments= 0 to 5 percent  
*2Btx horizon:*  
Hue=5YR to 10YR  
Value=4 or 5  
Chroma=4 to 6  
Texture of the fine earth fraction=silt loam, silty clay loam  
Content of rock fragments=5 to 20 percent  
*2BCx horizon:*

Hue=10R to 10YR  
Value=4 to 6  
Chroma=4 to 8  
Texture of the fine earth fraction=silt loam, silty clay loam  
Content of rock fragments=15 to 30 percent  
*2C horizon (if it occurs)*  
Hue=10R to 10YR  
Value=4 to 6  
Chroma=4 to 8  
Texture of the fine earth fraction=silt loam, loam  
Content of rock fragments=40 to 80 percent

### Gladstone Series

*Depth class:* Very deep  
*Drainage class:* Well drained  
*Permeability:* Moderate in the subsoil and moderately rapid in the substratum  
*Landform:* Nearly level to very steep uplands  
*Position on the landform:* Broad hilltops and hillsides  
*Parent material:* Residuum and colluvium from granitic gneiss  
*Slope range:* 0 to 55 percent  
*Associated soils:* Glenville, Glenelg, Edgemont, Towhee  
**Taxonomic class:** Fine-loamy, mixed, mesic Typic Hapludults

### Typical Pedon

Gladstone gravelly silt loam, 8 to 15 percent slopes, extremely bouldery, in Berks County, Hereford Township, 3600 feet east of Huffs Church, 2.6 miles northeast of Clayton, 1300 feet east of Greenhouse Lane, 2,250 feet north-northeast of the junction of Huffs Church Road and Greenhouse Lane. USGS East Greenville topographic quadrangle: Lat. 40 degrees 26 minutes 44 seconds N. and Long. 75 degrees 36 minutes 25 seconds W. Colors for moist soils unless specified otherwise.

A=0 to 2 inches; very dark grayish brown (10YR 4/2) gravelly silt loam; weak fine granular structure; friable, non-sticky, non-plastic; common very fine and medium roots throughout; many fine and medium discontinuous tubular pores; very strongly acid; 20 percent subangular gravels of gneiss; clear wavy lower boundary.  
E=2 to 6 inches; brown (10YR 5/4) gravelly silt loam; weak fine subangular blocky structure; very friable, non-sticky, non-plastic; many fine to coarse roots throughout; common fine and

medium discontinuous tubular pores; very strongly acid; PH 4.8; 15 percent subangular gravels of gneiss; clear wavy lower boundary.  
 BE=6 to 10 inches; strong brown (7.5YR 5/6) gravelly silt loam; weak medium subangular blocky structure; friable, non-sticky, non-plastic; many fine and medium roots throughout; many fine and medium discontinuous tubular pores; few faint brown (7.5YR 5/4) discontinuous films on faces of peds; strongly acid ; 15 percent subangular gravels and cobbles of gneiss; diffuse wavy lower boundary.

Bt1=10 to 29 inches; strong brown (7.5YR 5/6) gravelly clay loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine and medium roots throughout and few coarse roots throughout; common fine and medium discontinuous tubular pores; common faint brown (7.5YR 5/4) discontinuous clay films on faces of peds; strongly acid ; 15 percent gravels and cobbles of gneiss; diffuse wavy lower boundary.

Bt2=29 to 42 inches; strong brown (7.5YR 5/6) gravelly clay loam; strong medium subangular blocky structure; friable, slightly sticky, slightly plastic; many fine and medium roots throughout; many fine and medium discontinuous tubular pores; few fine mica flakes; common faint brown (7.5YR 5/4) discontinuous clay films on faces of peds; strongly acid ; 20 percent subangular gravels and cobbles of gneiss; diffuse wavy lower boundary.

C=42 to 68 inches; brown (7.5YR 5/4) gravelly loam; massive; firm, non-sticky, non-plastic; few fine and medium discontinuous tubular pores; few fine mica flakes; very strongly acid; 30 percent subangular gravels of gneiss.

#### **Range in Characteristics**

*Solum thickness:* 30 to 42 inches  
*Depth to Bedrock:* 42 to 120 inches  
*Content of clay in the control section:* 18 to 34 percent  
*Content of rock fragments in the control section:* 0 to 5 percent  
*Kind of rock fragments:* Angular and subangular gravels, cobbles and stones of granitic gneiss  
*Reaction:* Where unlimed, reaction ranges from strongly acid to very strongly acid throughout the profile.

*A horizon:*  
 Hue=10YR or 7.5YR

Value=2 or 5  
 Chroma=2 to 4  
 Texture of the fine earth fraction=silt loam  
 Content of rock fragments= 5 to 20 percent

*E horizon:*  
 Hue=10YR or 7.5YR  
 Value=4 or 5  
 Chroma=2 through 5  
 Texture of the fine earth fraction=silt loam or loam  
 Content of rock fragments= 10 to 20 percent

*B horizon:*  
 Hue=10YR or 7.5YR  
 Value=4 or 5  
 Chroma=4 through 6  
 Texture of the fine earth fraction=loam to silty clay loam  
 Content of rock fragments= 0 to 20 percent

*C horizon:*  
 Hue=10YR to 5YR  
 Value=4 through 6  
 Chroma=4 through 8  
 Texture of the fine earth fraction=loam, silty clay loam, loamy sand or sandy clay loam  
 Content of rock fragments=0 to 35 percent  
 These soils differ from the typical Gladstone soils in that silt loam textures dominate throughout the upper part of the solum.

### ***Glenelg Series***

*Depth class:* Very deep  
*Drainage class:* Well  
*Permeability:* Moderate  
*Position on the landform:* Broad hilltops and hillsides  
*Landform:* Sloping to moderately steep uplands  
*Parent material:* Residuum from micaceous schist and gneiss  
*Slope range:* 0 to 35 percent  
*Associated soils:* Gladstone, Chester, Manor, Glenville, Towhee and Edgemont  
**Taxonomic class:** Fine-loamy, mixed, mesic Typic Hapludults

#### **Typical Pedon**

Glenelg channery silt loam, 8 to 15 percent slope, located in Chester County, West Vincent Township, 1 3/10 miles west northwest of Birchrunville, 83 feet south of route T439, 2/10 mile northeast of the

junction of T439 and L.R. 15085. USGS Pottstown topographic quadrangle; Lat. 40 degrees, 8 minutes, 22 seconds N. and Long. 75 degrees, 39 minutes and 9 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 8 inches; brown (7.5YR 4/2) channery silt loam; weak fine granular structure; friable, non-sticky and non-plastic; 15 percent rock fragments; slightly acid; abrupt smooth lower boundary.

Bt1=8 to 16 inches; reddish brown (5YR 5/4) channery clay loam; moderate medium subangular blocky structure; friable, sticky and plastic; common distinct clay films; 15 percent subangular channers of schist; slightly acid; clear wavy lower boundary.

Bt2=16 to 28 inches; yellowish red (5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable, sticky and plastic; common distinct clay films; 10 percent subangular channers of schist; slightly acid; clear wavy lower boundary.

C=28 to 75 inches; strong brown (7.5YR 5/6) channery loam; massive; friable, non-sticky and non-plastic; 30 percent subangular schist channers; slightly acid.

#### **Range in Characteristics**

*Solum thickness:* 18 to 30 inches

*Depth to Bedrock:* 72 to 120 inches

*Content of clay in the control section:* 20 to 35 percent

*Content of rock fragments in the control section:* 3 to 35 percent

*Kind of rock fragments:* Angular and subangular gravels and channers of schist, gneiss and quartz

*Reaction:* Where unlimed, reaction ranges from very strongly acid to slightly acid.

*Ap horizon:*

Hue=7.5 YR or 10YR

Value=3 through 5

Chroma=1 through 4

Texture of the fine earth fraction=silt loam or loam

Content of rock fragments=3 to 15 percent

*Bt horizon:*

Hue=5YR through 10YR

Value=4 or 5

Chroma=4 through 8

Texture of the fine earth fraction=silty clay loam, clay loam, or loam

Content of rock fragments=3 to 25 percent

*C horizon:*

Hue=2.5YR through 10YR

Value=4 through 6

Chroma=2 through 8

Texture of the fine earth fraction=loam or sandy loam

Content of rock fragments=5 to 30 percent

### ***Glenville Series***

*Depth class:* Very deep, shallow to fragipan

*Drainage class:* Moderately well drained

*Permeability:* Moderate above the fragipan, slow to moderately slow in the fragipan and moderately slow in the substratum

*Landform:* Gneiss and schist hills

*Position on the Landform:* Foot slopes at the base of colluvial hills

*Parent material:* Colluvium weathered from gneiss and schist residuum

*Slope range:* 0 to 8 percent

*Associated soils:* Gladstone, Towhee, Neshaminy, Glenelg, Manor, Chester, Edgemont

**Taxonomic class:** Fine-loamy, mixed mesic Aquic Fragiudults

#### **Typical Pedon**

Glenville silt loam, 3 to 8 percent slopes, in a cultivated field, in Chester County, Franklin Township, 4000 feet southeast of Kemblesville, 1600 feet south of Pennsylvania 896, 128 feet east of farm lane; USGS Newark West quadrangle; Lat. 39 degrees 44 minutes 33 seconds N. and Long. 75 degrees 48 minutes 47 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 9 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; friable, non-sticky and non-plastic; slightly acid; abrupt smooth lower boundary.

Bt1=9 to 16 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common distinct clay films (cutans) on faces of peds and in pores; 5 percent subangular channers of quartzite; very strongly acid; clear wavy lower boundary.

Bt2=16 to 19 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common distinct clay films (cutans) on

faces of ped and in pores; common many distinct light brownish gray (10YR 6/2) iron depletions occur on prism faces and common many prominent strong brown (7.5YR 5/8) masses of iron accumulation occur in ped interiors; 5 percent subangular channers of quartzite; very strongly acid; clear wavy lower boundary.

Btx1=19 to 25 inches; brown (10YR 5/3) silt loam; weak coarse prismatic structure parting to moderate coarse platy; very firm and brittle, slightly sticky and slightly plastic; common distinct clay films (cutans) throughout; common many distinct light brownish gray (10YR 6/2) iron depletions occur on prism faces and common many prominent strong brown (7.5YR 5/8) masses of iron accumulation occur in ped interiors; 10 percent subangular channers of quartzite; moderately acid; gradual wavy lower boundary.

Btx2=25 to 33 inches; light brownish gray (10YR 6/2) exterior, and brown (10YR 5/3) silt loam; weak coarse prismatic structure parting to moderate very coarse platy; very firm and brittle, slightly sticky and slightly plastic; common fine mica flakes; common distinct clay films (cutans); common distinct light brownish gray (10YR 6/2) iron depletions occur on prism faces; 10 percent subangular channers of quartzite; moderately acid; gradual wavy lower boundary.

BC=33 to 39 inches; yellowish brown (10YR 5/4) silt loam; weak coarse subangular blocky structure parting to weak medium subangular blocky; firm, slightly sticky and slightly plastic; common fine mica flakes; many common faint pale brown (10YR 6/3) masses of iron accumulation occur in ped interiors; 10 percent subangular channers of quartzite; moderately acid; gradual wavy lower boundary.

C=39 to 82 inches; yellowish brown (10YR 5/4) channery loam; massive; friable, non-sticky and non-plastic; many fine mica flakes; many common prominent strong brown (7.5YR 5/8) masses of iron accumulation occurs in ped interiors and many common distinct grayish brown (10YR 5/2) iron depletions occurs on prism faces; 15 percent subangular channers of quartzite; moderately acid.

#### **Range in Characteristics**

*Solum thickness:* 30 to 45 inches

*Depth to Bedrock:* More than 5 feet

*Depth to fragipan:* 15 to 30 inches

*Depth to redox features:* 12 to 18 inches

*Content of clay in the control section:* 18 to 30 percent

*Content of rock fragments in the control section:* 0 to 30 percent

*Kind of rock fragments:* Angular and subangular gravels and channers of quartzite, schist and gneiss

*Reaction:* Where unlimed, reaction ranges from neutral to very strongly acid in the surface, moderately acid to very strongly acid in the subsoil and strongly acid or very strongly acid in the substratum.

#### *A horizon:*

Hue=10YR or 2.5Y

Value=3 to 4

Chroma=2 to 4

Texture of the fine earth fraction=silt loam and loam

Content of rock fragments=0 to 10 percent

#### *Bt horizon:*

Hue=7.5YR or 10YR

Value=4 to 6

Chroma=2 to 8

Texture of the fine earth fraction=loam, silt loam or silty clay loam

Content of rock fragments=0 to 30 percent

#### *Btx horizon:*

Hue=7.5YR or 10YR

Value=4 to 6

Chroma=2 to 6

Texture of the fine earth fraction=loam or silt loam

Content of rock fragments=0 to 30 percent

#### *BC horizon:*

Hue=7.5YR or 10YR

Value=4 to 6

Chroma=3 to 6

Texture of the fine earth fraction=silt loam

Content of rock fragments=0 to 30 percent

#### *C horizon:*

Hue=2.5YR to 10YR

Value=4 to 6

Chroma=1 to 8

Texture of the fine earth fraction=loam or sandy loam

Content of rock fragments=5 to 80 percent

### ***Hatboro Series***

*Depth class:* Very deep

*Drainage class:* Poorly drained

*Permeability:* Moderate in the Solum and moderately rapid in the substratum

*Landform:* Nearly level floodplains

*Position on the landform:* Toeslopes

*Distinctive landscape features:* Dissected with channel and bar features subject to common flooding.

Water stands on the surface for very brief periods during heavy rains and after spring thaw

*Parent material:* Alluvium washed from schist, gneiss, and quartzite parent materials

*Slope range:* 0 to 3 percent

*Associated soils:* Rowland, Alton, Fluvaquents, Nanticoke

**Taxonomic class:** Fine-loamy, mixed, nonacid, mesic Typic Fluvaquents

### Typical Pedon

Hatboro silt loam, 0 to 3 percent slopes, is located in Montgomery County, Upper Moreland township, 1 mile south of Hatboro along Pennypack Creek, 1600 feet north of junction of Pennypack road and Creek road; topographic quadrangle; Lat. 40 degrees 9 minutes 18 seconds N. and Long. 75 degrees 4 minutes 35 seconds W. Colors are for moist soil unless specified otherwise.

Ap=0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; weak, fine granular structure; friable, slightly sticky and slightly plastic; few, fine, faint yellowish brown (10YR 5/4) iron accumulations; strongly acid; abrupt smooth lower boundary.

Bg1=9 to 27 inches; gray (10YR 5/1) silt loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common medium distinct dark yellowish brown (10YR 4/4) iron accumulations and grayish brown (2.5Y 5/2) iron depletions; common mica flakes; strongly acid; clear smooth lower boundary.

Bg2=27 to 44 inches; grayish brown (2.5Y 5/2) silt loam; weak medium and fine subangular blocky structure; firm, slightly sticky and slightly plastic; common medium, distinct strong brown (7.5YR 5/6) and yellowish brown (10YR 5/4) iron accumulations; gray (N 6/0) ped coatings; moderately acid; clear smooth lower boundary.

Cg1=44 to 56 inches; light brownish gray (10YR 6/2) sandy clay loam; massive; friable, slightly sticky and slightly plastic; common medium distinct yellowish brown (10YR 5/8) iron accumulations and gray (10YR 5/1) iron depletions; moderately acid; clear smooth lower boundary.

C2=56 to 70; stratified sandy, clayey and gravelly sediments; massive; friable moderately acid.

### Range in Characteristics

*Solum thickness:* 40 to 60 inches

*Depth to Bedrock:* Greater than 72 inches

*Depth to redox features:* 0 to 10 inches

*Content of clay in the control section:* 15 to 35 percent

*Content of rock fragments:* 0 to 10 percent

*Kind of rock fragments:* Well rounded gravels and cobbles of gneiss or quartzite

*Reaction:* Where unlimed, reaction ranges from very strongly acid to neutral in the upper 30 inches and moderately acid through slightly acid below 30 inches.

*A horizon:*

Hue=10YR

Value=3 or 4

Chroma=2 or 3

Texture of the fine earth fraction=silt loam or loam

Content of rock fragments=0 to 10 percent

*Bg horizon:*

Hue=10YR or 5Y

Value=4 through 7

Chroma=0 through 2

Texture of the fine earth fraction=silt loam or silty clay loam, silt loam or sandy clay loam

Content of rock fragments=0 to 10 percent

*C horizon:*

Hue=10Yr or 5Y

Value=4 through 7

Chroma=0 through 2

Texture of the fine earth fraction=sandy clay loam or silt loam in the upper part and contains thin lenses of mica flakes. The lower part is stratified sand, silt, and clay sediments and gravel.

Content of rock fragments=0 to 65 percent

### Holly Series

*Depth class:* Very Deep

*Drainage class:* Very poorly drained and poorly drained

*Permeability:* Moderate to moderately slow in the solum, and moderate to moderately rapid in the underlying material

*Landform:* Nearly level floodplains in mountains and piedmont river valleys.

*Position on the landform:* toeslopes along perennial and intermittent streams.

*Distinctive landscape features:* Subject to frequent flooding. Standing water on the surface for a long period of time during heavy rains and spring thaws. Dissected with channel and bow features.

*Parent material:* Loamy alluvium weathered from acid sandstone and shale residuum

*Slope range:* 0 to 3 percent

*Associated soils:* Middlebury, Linden, Fluvaquents

**Taxonomic class:** Fine-loamy, mixed, nonacid mesic Typic Fluvaquents

### Typical Pedon

Holly silt loam, on the floodplain of Irish creek, in Berks County, Centre Township, 10 feet south of the creek, 260 feet north of a point on L.R. 06019, 0.1 miles east of the junction of L.R.06019 and t714, 2 miles west-southwest of Centerport; Bernville USGS topographic quadrangle; Lat. 40 degrees 28 minutes 31 seconds N. and Long. 76 degrees 02 minutes 33 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable, non-sticky and non-plastic; neutral; abrupt smooth lower boundary.

Bg1=7 to 10 inches; dark gray (10YR 4/1) silty clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; slightly acid; clear wavy lower boundary.

Bg2=10 to 18 inches; gray (10YR 5/1) silty clay loam with common medium faint yellowish brown (10YR 5/4) iron accumulations; weak coarse subangular blocky structure; friable, slightly sticky and slightly plastic; slightly acid; clear wavy lower boundary.

Bg3=18 to 26 inches; gray (10YR 6/1) silty clay loam with many common distinct yellowish brown (10YR 5/6) iron accumulations; weak coarse subangular blocky structure; friable, slightly sticky and slightly plastic; slightly acid; clear wavy lower boundary.

Cg1=26 to 44 inches; gray (10YR 6/1) silty clay loam with common medium distinct yellowish brown (10YR 5/4) iron accumulations; massive; friable, slightly sticky and slightly plastic; slightly acid; clear wavy lower boundary;.

2Cg2=44 to 62 inches; light brownish gray (10YR 6/2) gravelly loam with common medium distinct yellowish brown (10YR 5/4) iron accumulations; massive; friable, slightly sticky and slightly

plastic; 25 percent rounded gravels and cobbles of sandstone; slightly acid.

### Range in Characteristics

*Solum thickness:* 24 to 44 inches

*Thickness of loamy deposits:* 40 to 60 inches

*Depth to Bedrock:* Greater than 60 inches

*Depth to redox features:* 0 to 10 inches

*Content of clay in the control section:* 18 to 30 percent

*Content of rock fragments:* 0 to 15 percent

*Kind of rock fragments:* Well rounded through angular gravels, cobbles, and channers of sandstone, siltstone, and shale

*Reaction:* Where unlimed, reaction ranges from neutral to medium acid surface, neutral to strongly acid in the upper part of the subsoil, neutral to medium acid in the lower part, and is medium acid to mildly alkaline in the substratum.

*Ap horizon:*

Hue=10YR

Value=4

Chroma=1 or 2

Texture of the fine earth fraction=silt loam, loam, or silty clay loam

Content of rock fragments=0 to 10 percent

*Bg horizon:*

Hue=10YR to 5Y or neutral

Value=4 through 6

Chroma=2 or less

Texture of the fine earth fraction=silty clay loam, silt loam, loam, or sandy loam

Content of rock fragments=0 to 15 percent

*Cg horizon:*

Hue=10YR to 5Y

Value=4 through 6

Chroma=2 or less

Texture of the fine earth fraction=commonly silt loam, loam, or sandy loam, and is less commonly silty clay loam. Below 40 inches the soil typically is stratified and includes textures of loamy sand, sand, or their gravelly analogues. Thin strata of clay loam are in some pedons

Content of rock fragments=0 to 15 percent

### Klinesville Series

*Depth class:* Shallow

*Drainage class:* Somewhat excessively drained

*Permeability:* Moderately rapid in the upper part and slow to moderate in the substratum  
*Landform:* Rolling hills, ridges and mountain valleys  
*Position on the landform:* Broad hilltops and hillsides  
*Parent material:* Red shale and siltstone residuum  
*Slope range:* 3 to 50 percent  
*Associated soils:* Weikert, Berks, Penn, Fountainville, Brownsburg  
**Taxonomic class:** Loamy-skeletal, mixed, mesic Lithic Dystrachrepts

### Typical Pedon

Klinesville channery silt loam in Calvin-Klinesville channery silt loams, 8 to 15 percent slopes in Berks County, Penn Township, 1.3 miles northwest of Mount Pleasant, 0.25 miles northeast of the intersection of t489 and PA. rt. 183, 125 feet northwest of t489; USGS Bernville topographic quadrangle; Lat. 40 degrees 25 minutes 00 seconds N. and Long. 76 degrees 05 minutes 12 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 8 inches; dusky red (2.5YR 3/2) channery silt loam; weak fine granular structure; friable, non-sticky and non-plastic; 40 percent angular and subangular channers of shale and siltstone; slightly acid; abrupt wavy lower boundary.  
Bw=8 to 14 inches; weak red (10R 4/3) very channery silt loam; weak medium subangular blocky structure; friable, non-sticky and non-plastic; 45 percent angular and subangular channers of shale and siltstone; moderately acid; clear wavy lower boundary.  
C=14 to 18 inches; weak red (10R 4/3) extremely channery silt loam; massive; 70 percent angular and subangular channers of shale and siltstone; moderately acid; abrupt wavy lower boundary.  
R=18 to 19 inches; dusky red (10R 3/4) fractured siltstone bedrock.

### Range in Characteristics

*Solum thickness:* 10 to 20 inches  
*Depth to Bedrock:* 10 to 20 inches  
*Content of rock fragments in the control section:* 35 to 75 percent  
*Kind of rock fragments:* Angular and subangular gravels and channers of shale, siltstone, and sandstone  
*Texture of the fine earth in the control section:* Silt loam or loam  
*Reaction:* Where unlimed, reaction ranges from very strongly acid to moderately acid throughout.

*Ap horizon:*  
Hue=5YR through 10R  
Value=2 through 4  
Chroma=2 through 4  
Texture of the fine earth fraction=silt loam  
Content of rock fragments=20 to 75 percent

*Bw horizon:*  
Hue=5YR through 10R  
Value=3 through 5  
Chroma=3 through 6  
Texture of the fine earth fraction=silt loam or loam  
Content of rock fragments=35 to 75 percent

*C horizon:*  
Hue=5YR to 10R  
Value=3 or 4  
Chroma=3 through 6  
Texture of the fine earth fraction=silt loam or loam  
Content of rock fragments=45 to 90 percent. The Klinesville soils in Bucks County differ from those mapped in Berks County in that they tend to have flag-sized rock fragments in the lower part of the solum.

### Knauers Series

*Depth class:* Very deep  
*Drainage class:* Poorly drained  
*Permeability:* Moderate in the surface, moderately slow to moderately rapid in the subsoil and moderately rapid in the substratum  
*Landform:* River valleys  
*Position on the landform:* Floodplains along perennial streams  
*Distinctive landscape features:* Dissected with channel and bow features  
*Parent material:* Alluvium, mostly from residuum from shale, sandstone and siltstone  
*Slope range:* 0 to 3 percent  
*Associated soils:* Bowmansville, Rowland, Barbour  
**Taxonomic class:** Fine-loamy over sandy-skeletal, mixed, nonacid, mesic Typic Fluvaquents

### Typical Pedon

Knauers silt loam in Robeson Township, 3.9 miles south of Mt. Penn, 6100 feet northeast of Green Hills Lake dam, 400 feet south of route 568, 140 feet south of Allegheny Creek, and 300 feet east of the driveway; USGS Reading topographic Quadrangle; Lat. 40 degrees 16 minutes 18 seconds N and Long.

75 degrees 53 minutes 17 seconds W. Colors are for moist soils unless specified otherwise.

A=0 to 8 inches; dark brown (7.5YR 3/2) silt loam; moderate fine to medium crumb structure; friable, non-sticky and non-plastic; strongly acid; clear wavy lower boundary.

Bg1=8 to 17 inches; gray (10YR 5/1) silt loam with many prominent medium to coarse reddish brown (5YR 5/4) and common fine distinct strong brown (7.5YR 5/8) iron accumulations; moderate medium subangular blocky structure; friable, non-sticky and non-plastic; strongly acid; abrupt wavy lower boundary.

Bg2=17 to 24 inches; gray (10YR 5/1) gravelly sandy loam with common prominent medium reddish brown (5YR 5/4) iron accumulations; weak medium subangular blocky structure; very friable, non-sticky and non-plastic; strongly acid; gradual wavy lower boundary; 20 percent well rounded and subrounded gravels of shale, sandstone and siltstone.

Cg=24 to 72 inches; gray (10YR 5/1) very gravelly and cobbly sand; massive; loose, non-sticky and non-plastic; strongly acid; 40 percent well rounded and subrounded shale, sandstone and siltstone.

#### Range in Characteristics

*Solum thickness:* 20 to 36 inches

*Depth to Bedrock:* Greater than 72 inches

*Content of rock fragments in the control section:* 0 to 35 percent in the upper part and 0 to 70 percent in the lower part

*Kind of rock fragments:* Well rounded through subrounded gravels and cobbles of shale, sandstone and siltstone

*Reaction:* Where unlimed, reaction ranges from strongly acid through slightly acid.

#### *Ap horizon:*

Hue=7.5YR to 5YR

Value=3 or 4

Chroma=2 to 4

Texture of the fine earth fraction=silt loam

Content of rock fragments= 0 to 15 percent

#### *B horizon:*

Hue=5YR to 10YR or N

Value=3 to 6

Chroma=2 or less

Texture of the fine earth fraction=silt loam or clay loam to sandy loam

Content of rock fragments= 0 to 35 percent

#### *C horizon:*

Hue=5YR to 10YR or N

Value=4 to 6

Chroma=2 or less

Texture of the fine earth fraction=sandy loam to sand  
Content of rock fragments=35 to 65 percent

## Lamington Series

*Depth class:* Very deep, moderately deep to fragipan

*Drainage class:* Poorly drained

*Permeability:* Moderate above the fragipan, slow in the fragipan and moderate to rapid below the fragipan

*Landform:* Gently sloping uplands in the piedmont and mountain valleys

*Position on the landform:* High stream terraces

*Parent material:* Old alluvium from red triassic shale and sandstone residuum

*Slope range:* 0 to 3 percent

*Associated soils:* Birdsboro, Raritan

**Taxonomic class:** Fine loamy, mixed, mesic Typic Fragiaquults.

#### Typical Pedon

Lamington silt loam, 0 to 3 percent slopes in Berks County, Union Township, 0.6 miles west of Unionville, 1170 feet south of Pa. 724, 400 feet east-southeast of a private road; USGS Pottstown topographic quadrangle; Lat. 40 degrees 14 minutes 43 seconds N. and Long. 75 degrees 43 minutes 30 seconds W. Colors are for moist soils unless specified otherwise.

Ap= 0 to 7 inches; dark reddish gray (5YR 4/2) silt loam; weak fine granular structure; friable, non-sticky and non-plastic; 10 percent well rounded gravels and cobbles of shale and sandstone; slightly acid; abrupt smooth lower boundary.

Btg= 7 to 21 inches; gray (5YR 5/1) silty clay loam; common medium distinct strong brown (7.5 YR 5/6) iron accumulations; moderate medium blocky structure; firm, sticky and plastic; common prominent clay films; 10 percent well rounded gravels and cobbles of shale sandstone; moderately acid; clear wavy lower boundary.

Btxg=21 to 41 inches; reddish gray (5YR 5/2) interiors with gray (5 YR 5/1) faces and common medium distinct strong brown (7.5 YR 5/6) iron accumulations; gravelly clay loam; moderate very

coarse prismatic structure; very firm and brittle; common prominent clay films; 20 percent well rounded gravels and cobbles of shale and sandstone; moderately acid; gradual irregular lower boundary.

2Cg=41 to 63 inches; gray (5YR 6/1) very gravelly sandy loam; massive; friable, non-sticky and non-plastic; 35 percent well rounded gravels and cobbles of shale and sandstone; moderately acid.

#### **Range in Characteristics**

*Solum thickness:* 40 to 60 inches

*Depth to Bedrock:* Greater than 60 inches *Depth to fragipan:* 15 to 30 inches

*Depth to redox features:* Directly below the surface

*Content of clay in the control section:* 18 to 34 percent

*Content of rock fragments in the control section:* 0 to 25 percent

*Kind of rock fragments:* Well rounded through subrounded gravels and cobbles of sandstone, siltstone, and shale

*Reaction:* Where unlimed, reaction ranges from strongly to very strongly acid.

*Ap horizon:*

Hue=5YR to 10YR

Value=6 to 4

Chroma=1 or 2

Texture of the fine earth fraction=Silt loam or loam

Content of rock fragments= 0 to 15 percent

*Btg horizon:*

Hue=5YR to 10YR

Value=4 to 7

Chroma=1 or 2

Texture of the fine earth fraction=Loam to silty clay loam

Content of rock fragments= 0 to 15 percent

*Bxg horizon:*

Hue=5YR to 2.5YR

Value=4 to 6

Chroma=1 or 2

Texture of the fine earth fraction=Clay loam, loam, silt loam, or silty clay loam

Content of rock fragments= 0 to 25 percent

*2C horizon:*

Hue=5YR to 2.5YR

Value=4 to 6

Chroma=1 to 3

Texture of the fine earth fraction=Silty clay loam to sand and gravel

Content of rock fragments=0 to 35 percent

### **Lansdale Series**

*Depth class:* Deep

*Drainage class:* Well drained

*Permeability:* Moderately slow to moderate in the A horizon, moderately slow to moderately rapid in the B horizon, moderately rapid in the substratum and moderately slow in the bedrock.

*Landform:* Nearly level to steep uplands in the piedmont

*Position on the Landform:* Sideslopes and ridges

*Parent material:* Residuum mostly from sandstone and conglomerate

*Slope range:* 0 to 50 percent

*Associated soils:* Edgemont, Steinsburg, Readington, Abbottstown, Croton, Fountainville, Brecknock, Brownsburg

**Taxonomic class:** Coarse-loamy, mixed, mesic Typic Hapludults

#### **Typical Pedon**

Lansdale loam, 3 to 8 percent slopes, Bucks County, PA., Solbury Twp. 3150 feet northwest of Aquetong Road from Rt. 262 then SW on Honey Hollow Rd. to abandoned farm (1900 feet down road). Follow farm lane through woods 1400 feet NW. of burned barn, 1500 feet NNW of horse barn.; USGS Buckingham topographic quadrangle; Lat. 40 degrees 22 minutes 2 seconds N. and Long. 75 degrees 2 minutes 28 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 10 inches; dark brown (10YR 4/3) loam; moderate fine granular structure; very friable, non-sticky and non-plastic; 5 percent subangular gravels of sandstone; slightly acid; abrupt smooth lower boundary.

BA=10 to 14 inches; yellowish brown (10YR 5/4) loam; moderate, medium subangular blocky structure parting to moderate fine granular structure; friable, non-sticky and non-plastic; 5 percent subangular gravels of sandstone; strongly acid; clear smooth lower boundary.

Bt1=14 to 20 inches; brown (7.5YR 5/4) loam; moderate, medium subangular blocky structure; friable, non-sticky and slightly plastic; 5 percent subangular gravels of sandstone; strongly acid; clear wavy lower boundary.

Bt2=20 to 30 inches; strong brown (7.5YR 5/6) loam; common fine distinct discontinuous strong brown (7.5YR 5/8) iron accumulations on ped faces and in pores; moderate coarse subangular blocky structure; non-sticky and slightly plastic; very few thin faint patchy strong brown (7.5YR 5/6) clay films on ped faces; 8 percent subangular gravels of sandstone; strongly acid; clear wavy boundary.

BC=30 to 40 inches; strong brown (7.5YR 5/6) fine sandy loam; weak very fine and fine blocky structure; non-sticky and non-plastic; 5 percent subangular gravels of sandstone; strongly acid; clear wavy boundary.

C=40 to 60 inches; yellowish brown (10YR 5/8) loamy sand; very few fine prominent patchy strong brown (7.5YR 5/8) iron accumulations throughout; single grain structure; firm, non-sticky and non-plastic; very few medium prominent patchy black (N 2/0) manganese stains throughout; 5 percent subangular gravels of sandstone; strongly acid.

R=60 to 61 inches; yellowish brown (10YR 5/8) unweathered sandstone bedrock.

#### Range in Characteristics

*Solum thickness:* 20 to 40 inches  
*Depth to Bedrock:* 40 to 60 inches  
*Depth to redox features:* None within 60 inches  
*Content of clay in the control section:* 10 to 25 percent  
*Content of rock fragments in the control section:* 5 to 25 percent  
*Kind of rock fragments:* Subangular gravels and cobbles of sandstone  
*Reaction:* Where unlimed, reaction ranges from very strongly acid to strongly acid.

#### *Ap horizon:*

Hue=7.5YR or 10YR  
 Value=4 or 5  
 Chroma=2 or 3  
 Texture of the fine earth fraction=loam or sandy loam  
 Content of rock fragments=5 to 25 percent

#### *Bt horizon:*

Hue=10YR or 7.5YR  
 Value=4 or 5  
 Chroma=4 through 6  
 Texture of the fine earth fraction=loam or sandy loam; some subhorizons may be sandy clay loam or heavy loam  
 Content of rock fragments=5 to 25 percent

#### *C horizon:*

Hue=10YR  
 Value=5  
 Chroma=6 or 8  
 Texture of the fine earth fraction=sandy loam or loamy sand  
 Content of rock fragments=5 to 45 percent  
 Due to continuous heavy liming in agricultural areas this soil varies slightly from the typical Lansdale soil in that reactions range from slightly acid through very strongly acid

### ***Lawrenceville Series***

*Depth class:* Very deep, moderately deep to fragipan

*Drainage class:* Moderately well drained

*Permeability:* Moderate

*Landform:* Uplands

*Position on the landform:* Side slopes

*Parent material:* Loess from shale-siltstone material over residuum from shale siltstone material

*Slope range:* 0 to 15 percent

*Associated soils:* Duncannon, Chalfont, Readington, Fountainville, Brownsburg, Buckingham, Doylestown

**Taxonomic class:** Fine silty, mixed, mesic typic fragiudalfs

#### Typical Pedon

Lawrenceville silt loam, 3 to 8 percent slopes in Montgomery County, Horsham Township, 1 3/4 miles west of Prospectville, first lane south off Horsham road, west of intersection with Babylon road, 300 ft. Northwest of third group of trees east of woodland on south boundary of farm in line with the second group of trees south of the creek; USGS Ambler topographic quadrangle; Lat. 40 degrees 11 minutes 48 seconds N. and Long. 75 degrees 10 minutes 12 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure, friable; 1 percent angular and subangular channers of shales and siltstone; slightly acid; clear smooth lower boundary.

BA=9 to 13 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; slightly sticky, slightly plastic; few faint clay films; 1 percent subangular channers of shales and siltstone; slightly acid, clear wavy lower boundary.

Bt1=13 to 19 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable, slightly sticky; slightly plastic; few faint clay films on ped faces; 5 percent subangular channers of shales and siltstone; slightly acid; gradual wavy lower boundary.

Bt2=19 to 25 inches; dark yellowish brown (10YR 4/4) silt loam; few fine faint brown(10YR 5/3) iron depletions; moderate, medium subangular blocky structure, friable, slightly sticky; slightly plastic; 1 percent subangular channers of shales and siltstone; slightly acid; gradual wavy lower boundary.

Bx1=25 to 32 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct light gray (10YR 7/2) iron depletions and strong brown (7.5YR 5/6) iron accumulations; moderate coarse prismatic structure parting to moderate medium subangular blocky, very firm and brittle; slightly sticky and slightly plastic; few faint clay films; few black coatings; 2 percent subangular channers of shales and siltstone; very strongly acid; clear wavy lower boundary.

Bx2=32 to 44 inches; brown (7.5YR 4/4) silt loam; many medium distinct reddish brown (5YR 5/4) iron acumulations and pinkish gray (7.5YR 7/2) iron depletions; moderate coarse prismatic structure parting to moderate medium platy; very firm and brittle; slightly sticky, slightly plastic; few black coatings, 2 percent subangular channers of shales and siltstone; very strongly acid; gradual wavy lower boundary.

C1=44 to 68 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct grayish brown (2.5Y 5/2) iron depletions and yellowish red (5YR 5/8) iron accumulations; moderate, very coarse, prismatic structure parting to moderate medium platy; firm; slightly sticky, slightly plastic; few black coatings in the subsurface; 1 percent subangular channers of shales and siltstone; very strongly acid; gradual wavy lower boundary.

C2=68 to 74 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct gray (10YR 6/1) iron depletions and strong brown (7.5YR 5/6) iron accumulations; moderate very coarse prismatic structure parting to moderate medium platy; firm; slightly sticky; slightly plastic; 5 percent subangular channers of shale and siltstone; strongly acid; abrupt wavy lower boundary.

2R=74 to 75 inches; dusky red (10Y 3/4); shale and siltstone.

### **Range in Characteristics**

*Solum thickness:* 40 to 80 inches

*Depth to Bedrock:* Greater than 48 inches

*Depth to fragipan:* 24 to 38 inches

*Content of clay in the control section:* 18 to 34 percent

*Content of rock fragments in the control section:* Less than 10 percent

*Kind of rock fragments:* Angular and subangular channers of shale, siltstone and sandstone

*Depth to redox features:* 20 to 30 inches

*Reaction:* Where unlimed, reaction ranges from very strongly acid to moderately acid.

*Ap horizon:*

Hue=10YR to 7.5YR

Value=3 or 4

Chroma=2 or 3

Texture of the fine earth fraction=silt loam or loam

*Bt horizon:*

Hue=10YR to 7.5 YR

Value=4 or 5

Chroma=4 to 6

Texture of the fine earth fraction=silt loam or silty clay loam

*Bx horizon:*

Hue=10YR to 7.5YR

Value=4 or 5

Chroma=4 to 6

Texture of the fine earth fraction=silt loam or loam

*C horizon:*

Hue=10 YR to 7.5 YR

Value=4 or 5

Chroma=4 to 6

Texture of the fine earth fraction=silt loam or loam

Content of rock fragments=10 to 85 percent

### **Lehigh Series**

*Depth class:* Deep

*Drainage class:* Moderately well

*Permeability:* Moderate in the surface and slow in the subsoil and substratum

*Landform:* Uplands

*Position on the Landform:* Lower slopes of hills

*Parent material:* Residuum or colluvium from metamorphosed shale and sandstone

*Slope range:* 0 to 25 percent

*Associated soils:* Brecknock, Readington, Croton

**Taxonomic class:** Fine-loamy, mixed, mesic Aquic Hapludalfs

### Typical Pedon

Lehigh silt loam, 3 to percent slopes in Berks County, Douglass Township, 1 and 1/2 miles NW of Pottstown, 1 mile NE of Douglassville, 1 mile NE of junction of Pa 662 and US 422W, 1 and 7/10 miles S of Pine Forge, 600 ft. E of Douglass Drive, 300 ft. S of paved driveway; USGS Boyertown topographic quadrangle; Lat.40 degrees 15 minutes 36 seconds N. and Long. 75 degrees 42 seconds 32 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; friable, non-sticky, non-plastic; many fine to coarse roots throughout; few medium continuous tubular pores; moderately acid; 10 percent subangular channers of porcelanite; abrupt wavy lower boundary.

Bt1=9 to 18 inches; dark grayish brown (10YR 4/2) channery silt loam; moderate medium subangular blocky structure; firm, non-sticky, slightly plastic; many fine to coarse roots throughout; few to common medium continuous tubular pores; common faint dark yellowish brown (10YR 4/4) continuous clay films on faces of peds; slightly acid; 20 percent subangular channers of porcelanite; clear wavy lower boundary.

Bt2=18 to 24 inches; dark grayish brown (10YR 4/2) channery silt loam with grayish brown (10YR 5/2) and brown (7.5YR 4/4) throughout; moderate medium subangular blocky structure; firm, non-sticky, slightly plastic; common fine to medium and few coarse roots throughout; few to common medium continuous tubular pores; common faint dark yellowish brown (10YR 4/4) continuous clay films on faces of peds; slightly acid; 30 percent subangular channers of porcelanite; gradual wavy lower boundary.

Bt3=24 to 34 inches; dark grayish brown (10YR 4/2) very channery silt loam with grayish brown (10YR 5/2) and brown (7.5YR 4/4) throughout; moderate medium subangular blocky structure; very firm, non-sticky, slightly plastic; few to common fine to medium roots throughout; few medium continuous tubular pores; common faint dark yellowish brown (10YR 4/4) continuous clay

films on faces of peds; slightly acid; 40 percent subangular channers and cobbles of porcelanite; clear wavy lower boundary.

C=34 to 53 inches, yellowish brown (10YR 5/4) very channery silt loam with common medium distinct gray (10YR 6/1); massive; firm, non-sticky and non-plastic; common faint clay films; 50 percent subrounded cobbles of diabase; neutral; abrupt wavy lower boundary.

R=53 to 55 inches, dark gray porcelanite bedrock.

### Range in Characteristics

*Solum thickness:* 20 to 40 inches

*Depth to Bedrock:* 40 to 60 inches

*Content of clay in the control section:* 18 to 34 percent

*Content of rock fragments in the control section:* 5 to 35 percent

*Kind of rock fragments:* Angular and subangular channers and cobbles of porcelanite, diabase, shale and siltstone

*Reaction:* Where unlimed, reaction ranges from strongly acid to neutral throughout.

*Ap horizon:*

Hue=10YR to 5Y

Value=3 to 5

Chroma=1 to 3

Texture of the fine earth fraction=silt loam

Content of rock fragments=0 to 25 percent

*Bt horizon:*

Hue=7.5YR to 5Y

Value=3 to 6

Chroma=0 to 4

Texture of the fine earth fraction=silt loam or silty clay loam

Content of rock fragments=5 to 35 percent

*C horizon:*

Hue=10YR to 5Y

Value=3 to 5

Chroma=0 to 3

Texture of the fine earth fraction=silt loam or silty clay loam

Content of rock fragments=25 to 80 percent

### Linden Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderately rapid above 42 inches and rapid below 42 inches.

*Landform:* Bottom lands

*Position on the Landform:* High floodplains

*Parent material:* Alluvium

*Slope range:* 0 to 3 percent

*Associated soils:* Middlebury, Holly, Rowland

**Taxonomic class:** Coarse-loamy, mixed, mesic Fluventic Dystrochrept

### Typical Pedon

Linden loam, in Berks County, Perry Township, along the Schuylkill River, 2 miles northwest of Shoemakersville, 2.4 miles South-southwest of Hamburg, 1,000 feet south of the junction of t952 and t954, 300 feet west of t952 and 200 feet east of the Schuylkill River; USGS Hamburg topographic quadrangle; Lat. 40 degrees 31 minutes 08 seconds N. and Long. 75 degrees 59 minutes 57 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 10 inches; dark reddish brown (10YR 3/3) loam; weak fine granular structure friable; non-sticky, non-plastic, slightly acid; abrupt smooth lower boundary.

Bw=10 to 31 inches; reddish brown (5YR 4/4) loam; weak fine subangular blocky structure; friable, non-sticky and non-plastic; moderately acid; gradual wavy lower boundary.

BC2=31 to 42 inches; reddish brown (5YR 4/4) loam; weak fine subangular blocky structure; friable, non sticky and non plastic; moderately acid; clear wavy lower boundary.

C=42 to 63 inches; reddish brown (5YR 4/4) gravelly loam; 15 percent rounded gravels of sandstone; moderately acid.

### Range in Characteristics

*Solum thickness:* 24 to 50 inches

*Depth to Bedrock:* Greater than 72 inches

*Content of clay in the control section:* Less than 18 percent

*Content of rock fragments in the control section:* 0 to 10 percent

*Kind of rock fragments:* Well rounded through subangular gravels cobbles and channers of sandstone, siltstone and shale

*Reaction:* Where unlimed, reaction ranges from extremely acid to moderately acid throughout.

*Ap horizon:*

Hue=5YR to 10YR

Value=3 or 4

Chroma=2 to 4

Texture of the fine earth fraction=silt loam, loam or sandy loam

Content of rock fragments=0 to 10 percent

*Bw horizon:*

Hue=2.5YR to 7.5YR

Value=3 to 5

Chroma=3 or 4

Texture of the fine earth fraction=silt loam, loam, or sandy loam

Content of rock fragments=0 to 10 percent

*C horizon:*

Hue=2.5YR to 10YR

Value=3 to 5

Chroma=3 or 4

Texture of the fine earth fraction=ranges from loam to sandy loam above 40 inches and from sandy loam to sand below 40 inches

Content of rock fragments=In BC and C horizons above 40 inches rock fragments range 0 to 25 percent, and C horizons below 40 inches ranges from 0 to 80 percent

### Manor Series

*Depth class:* Very deep

*Drainage class:* Well

*Permeability:* Moderate in the solum and moderate to moderately rapid in the C horizon

*Landform:* Strongly dissected uplands in the northern Piedmont plateau

*Position on the landform:* Gently sloping to very steep shoulder slopes and interfluves

*Parent material:* Materials weathered from micaceous schist

*Slope range:* 3 to 60 percent

*Associated soils:* Chester, Glenelg, Glenville

**Taxonomic class:** Coarse-loamy, micaceous, mesic Typic Dystrochrepts

### Typical Pedon

Manor loam, 8 to 15 percent slopes, Chester County, PA, West Marlborough Township, 1.5 miles west of Woodville, 0.1 miles east of junction T359 and PA841, 50 feet south of T359, in a wooded lot, West Grove USGS topographic quadrangle; Lat. 39 degrees, 52 minutes, 07 seconds N. and Long. 75 degrees, 49 minutes, 37 seconds W. Colors are for moist soil unless specified otherwise.

A=0 to 7 inches; brown (10YR 4/3) loam; weak fine granular structure; very friable, non-sticky and non-plastic; many fine to coarse roots; common fine mica flakes throughout; very strongly acid; 5 percent subangular channers of quartzite and schist; clear smooth lower boundary.

Bw1=7 to 13 inches; yellowish red (5YR 5/8) loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; many fine and medium roots; many fine mica flakes throughout; 10 percent subangular channers quartzite and schist; strongly acid; gradual wavy lower boundary.

Bw2=13 to 21 inches; yellowish brown (10YR 5/6) loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; many fine mica flakes throughout; common fine roots; 25 percent subangular channers of quartzite and schist; strongly acid; gradual wavy lower boundary.

C=21 to 70 inches; 60 percent dark yellowish brown (10YR 4/4) and 40 percent yellow (10YR 7/6) sandy loam; massive; friable, non-sticky and non-plastic; many fine mica flakes throughout; very few fine roots in the upper part; very strongly acid.

#### **Range in Characteristics**

*Solum thickness:* 15 to 35 inches

*Depth to Bedrock:* 72 to 120 inches

*Content of clay in the control section:* 8 to 18 percent

*Content of rock fragments in the control section:* 0 to 30 percent

*Kind of rock fragments:* Subangular gravels and channers of quartzite and schist

*Reaction:* Where unlimed, reaction ranges from moderately acid to extremely acid.

*A horizon:*

Hue=10YR to 5YR

Value=3 through 5

Chroma=2 through 4

Texture of the fine earth fraction=loam or silt loam

Content of rock fragments= 0 to 5 percent

*E horizon:* (when present)

Hue=10YR to 5YR

Value=4 through 6

Chroma=2 through 6

Texture of the fine earth fraction=loam or silt loam

Content of rock fragments=0 to 5 percent

*Bw horizon:*

Hue=2.5YR to 7.5YR

Value=4 through 5

Chroma=4 through 8

Texture of the fine earth fraction=silt loam or loam

Content of rock fragments= 0 to 30 percent

*C horizon:*

Hue=10R to 10YR

Value=4 through 8

Chroma=2 through 8

Texture of the fine earth fraction=loam or sandy loam

Content of rock fragments= 0 to 30 percent

#### ***Matapeake Series***

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate in the solum and rapid to very rapid in the substratum

*Landform:* Terraces

*Position on the landform:* Interfluves

*Parent material:* Silty mantle overlying sandy, unconsolidated fluvial coastal plain sediments

*Slope range:* 0 to 8 percent

*Associated soils:* Mattapex, Delaware, Othello, Alton

**Taxonomic class:** Fine-silty, mixed, mesic Typic Hapludults

#### **Typical Pedon**

Bucks Co., PA., Falls Twp., 1600 ft. SE of Fallsington, 2.45 miles SW of Morrisville, 1500 ft. NW on Tyburn Road from junction of U.S. Route 13, 75 ft. S. from Tyburn Road in a field of nursery stock, Trenton West USGS Topographic quadrangle Lat. 40 degrees 10 minutes 55 seconds N., Long. 74 degrees 8 minutes 46 seconds W. Colors are for moist soil unless specified otherwise.

Ap=0 to 10 inches; brown (10YR 4/3) silt loam; moderate medium granular structure; friable, slightly sticky and slightly plastic; 1 percent subangular gravels of sandstone; moderately acid; abrupt smooth lower boundary.

Bt1=10 to 16 inches; dark yellowish brown (10YR 4/4) silt loam; strong medium and coarse subangular blocky structure; firm, slightly sticky and slightly plastic; few fine prominent irregular brown (10YR 4/3) organic coats throughout; few fine faint irregular dark yellowish brown (10YR 4/4) clay films between pedis; 1 percent subangular gravels of sandstone; moderately acid; clear wavy lower boundary.

Bt2=16 to 24 inches; dark yellowish brown (10YR 4/6) silt loam; strong medium subangular blocky structure; friable, sticky and plastic; few fine faint irregular dark yellowish brown (10YR 4/6) clay films between ped; 5 percent subangular gravels of sandstone; moderately acid; abrupt irregular lower boundary.

2C1=24 to 45 inches; dark yellowish brown (10YR 4/4) gravelly sandy loam; moderate fine subangular blocky structure; very friable, non-sticky and non-plastic; 20 percent subangular sandstone; strongly acid; gradual wavy lower boundary.

2C2=45 to 70 inches; dark yellowish brown (10YR 4/4) gravelly loamy coarse sand; single grain; very friable, non-sticky and non-plastic; 30 percent subangular gravels of sandstone; very strongly acid.

#### **Range in Characteristics**

*Solum thickness:* 24 to 40 inches

*Thickness of silty mantle:* 22 to 40 inches

*Depth to Bedrock:* Greater than 80 inches

*Content of clay in the control section:* 20 to 30 percent

*Content of rock fragments in the control section:* 0 to 5 percent

*Kind of rock fragments:* Subangular gravels and channers of sandstone

*Reaction:* Where unlimed, reaction is very strongly acid to moderately acid.

*Ap horizon:*

Hue=10YR

Value=3 through 6

Chroma=1 through 6

Texture of the fine earth fraction=silt loam or silty clay loam

Content of rock fragments=0 to 6 percent

*Bt horizon:*

Hue=10YR or 7.5YR

Value=4 or 5

Chroma=4 through 8

Texture of the fine earth fraction=silt loam or silty clay loam

Content of rock fragments=0 to 6 percent

*2C horizon:*

Hue=5YR through 10YR

Value=4 through 7

Chroma=3 through 8

Texture of the fine earth fraction=sandy loam, loamy sand and gravelly loamy coarse sand

Content of rock fragments=0 to 20 percent

### ***Mattapex Series***

*Depth class:* Very Deep

*Drainage class:* Moderately well drained

*Permeability:* Moderately slow

*Landform:* Coastal Plain Terraces

*Position on the landform:* Toe slopes

*Parent material:* Silty sediments overlying coarser sediments of marine or alluvial origin

*Slope range:* 0 to 3 percent

*Associated soils:* Matapeake, Othello, Delaware, Alton

**Taxonomic class:** Fine silty, mixed, mesic Aquic Hapludults

#### **Typical Pedon**

Bucks Co., PA., Falls Twp., 1.7 miles SW of Morrisville, 0.8 miles NE of Fallsington, 1200 ft. W on Lower Morrisville Rd., from Rt. 13 overpass, 200 ft. S of Lower Morrisville Rd. in wooded area; Trenton West Topographic quadrangle Lat. 40 degrees, 11 minutes and 30 seconds N and Long. 74 degrees, 48 minutes and 19 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 9 inches; brown(10YR 4/3) silt loam; moderate medium granular structure, friable, slightly sticky and slightly plastic, many fine to coarse roots throughout; strongly acid; gradual smooth lower boundary.

Bt1=9 to 16 inches; yellowish brown (10YR 5/6) silt loam; moderate medium to coarse subangular blocky structure; friable, slightly sticky and slightly plastic; many fine to coarse roots throughout; strongly acid, gradual wavy lower boundary.

Bt2=16 to 32 inches; yellowish brown (10YR 5/6) silt loam; common fine and medium distinct very dark grayish brown (10YR 3/2) iron depletions; moderate medium to coarse subangular blocky structure; friable, slightly sticky and slightly plastic; strongly acid, gradual wavy lower boundary.

Bt3=32 to 42 inches; yellowish brown (10YR 5/6) silt loam; common fine and medium distinct light brownish gray (10YR 6/2) iron depletions and common fine and medium distinct yellowish brown (10YR 5/8) iron accumulations; moderate, medium subangular structure; friable, moderately

sticky and moderately plastic; very strongly acid; gradual wavy lower boundary.

C=42 to 45 inches; pale brown (10YR 6/3) silt loam; common medium distinct yellowish brown (10YR 5/8) iron accumulations; friable, slightly sticky and non-plastic; strongly acid; clear wavy lower boundary.

2C=45 to 70 inches; yellowish brown (10YR 5/4) sandy loam; many medium distinct yellowish brown (10YR 5/8) iron accumulations and common medium and coarse prominent light brownish gray (10YR 6/2) iron depletions; moderate and strong medium subangular blocky structure; 10 percent rounded gravels of sandstone.

### **Range in Characteristics**

*Solum thickness:* 27 to 45 inches

*Depth to redox features:* 23 to 36 inches

*Content of clay in the control section:* 18 to 30 percent

*Content of rock fragments in the control section:* 0 to 3 percent

*Kind of rock fragments:* Rounded through subangular gravels, cobbles and channers of sandstone

*Reaction:* Where unlimed, reaction ranges from slightly acid to moderately acid.

*Ap horizon:*

Hue=10YR

Value=3 through 5

Chroma=2 through 4

Texture of the fine earth fraction=silt loam

Content of rock fragments=0 to 2 percent

*Bt horizon:*

Hue=10YR or 7.5YR

Value=5 or 6

Chroma=6 through 8

Texture of the fine earth fraction=silt loam or silty clay loam

Content of rock fragments=0 to 2 percent

*C horizon:*

Hue=10YR

Value=5 or 6

Chroma=1 through 3

Texture of the fine earth fraction=silt loam or loam

Content of rock fragments=0 to 2 percent

*2C horizon:*

Hue=10YR or 2.5YR

Value=5 or 6

Chroma=4 through 6

Texture of the fine earth fraction=loam, sand, loamy sand and sandy loam

Content of rock fragments=0 to 20 percent

### **Mount Lucas Series**

*Depth class:* Very deep

*Drainage class:* Moderately well and somewhat poorly drained

*Permeability:* Moderate in the surface horizons, slow to moderately slow in the subsoil and slow to moderately rapid in the substratum.

*Landform:* Uplands

*Position on the landform:* Footslopes and drainageways in the uplands

*Parent material:* Residuum and colluvium from diabase

*Slope range:* 0 to 25 percent

*Associated soils:* Neshaminy, Nockamixon, Towhee, Fluvaquents

**Taxonomic class:** Fine-loamy, mixed mesic Aquic Hapludalfs

### **Typical Pedon**

Mount Lucas silt loam, 3 to 8 percent slopes in Montgomery County, New Hanover Township, 1/2 mile northeast of Anise, near Hildebrant Road, 800 feet north of the intersection of Finn Road; USGS Sassamansville topographic quadrangle; Lat. 40 degrees 20 minutes 00 seconds N. and Long. 75 degrees 31 minutes 38 seconds W. Colors are for moist soils unless specified otherwise.

Oi=0 to 3 inches; loose leaf litter.

A=3 to 5 inches; very dark brown (10YR 2/2) silt loam; moderate very fine granular structure; very friable, non-sticky and non-plastic; 5 percent subrounded gravels of diabase; moderately acid; abrupt wavy lower boundary.

E=5 to 9 inches; yellowish brown (10YR 5/4) silt loam; moderate fine granular structure; friable, slightly sticky and non-plastic; 10 percent subrounded gravels of diabase; moderately acid; clear wavy lower boundary.

BE=9 to 13 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; 10 percent subrounded gravels of diabase; moderately acid; clear wavy lower boundary.

Bt1=13 to 20 inches; strong brown (7.5YR 5/6) clay loam; moderate medium and fine subangular

blocky structure; friable, slightly sticky and slightly plastic; common faint clay films; 10 percent subrounded gravels of diabase; moderately acid; clear wavy lower boundary.

Bt<sub>2</sub>=20 to 34 inches; brown (7.5YR 4/4) clay loam; many medium and coarse prominent iron accumulations of yellowish red (5YR 5/8) and dark red (2.5YR 4/6); grayish brown (10YR 5/2) iron depletions; moderate medium subangular blocky structure; friable, sticky and plastic; common faint clay films; 10 percent subrounded gravels of diabase; moderately acid; abrupt wavy lower boundary.

BC=34 to 38 inches; dark brown (7.5YR 4/4) clay loam; common medium distinct iron depletions of gray (10YR 6/1) and yellowish red (5YR 5/6) iron accumulations; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films; 10 percent subrounded gravels of diabase; slightly acid; abrupt wavy lower boundary.

C1=38 to 54 inches; dark brown (7.5YR 4/4) gravelly clay loam and sandy loam; layers or streaks of reddish brown (5YR 4/4) and gray (10YR 5/1); weak coarse subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films; 30 percent subrounded gravels of diabase; slightly acid; abrupt wavy lower boundary.

C2=54 to 61 inches; dark yellowish brown (10YR 4/4) gravelly loamy sand; single grained; friable, non-sticky and non-plastic; 25 percent subrounded gravels of weathered diabase; slightly acid.

#### Range in Characteristics

*Solum thickness:* 25 to 50 inches  
*Depth to Bedrock:* Greater than 60 inches  
*Content of clay in the control section:* 18 to 34 percent  
*Content of rock fragments in the control section:* 0 to 30 percent  
*Kind of rock fragments:* Rounded and subrounded gravels and cobbles of diabase  
*Reaction:* Where unlimed, reaction ranges from strongly acid to slightly acid in the upper part of the solum and moderately acid to neutral in the lower part.

*A horizon:*  
 Hue=7.5YR or 10YR  
 Value=4 or 5  
 Chroma=2 to 4  
 Texture of the fine earth fraction=silt loam  
 Content of rock fragments= 0 to 15 percent

*Bt horizon:*  
 Hue=7.5YR to 10YR  
 Value=5 or 6  
 Chroma=3 to 6  
 Texture of the fine earth fraction=silt loam, silty clay loam, clay loam or sandy clay loam  
 Content of rock fragments= 0 to 30 percent

*C horizon:*  
 Hue=7.5YR to 10YR  
 Value=4 or 5  
 Chroma=3 to 6  
 Texture of the fine earth fraction=silt, clay, loamy coarse sand, or sandy loam. Depth to loamy coarse sand is greater than 40 inches.  
 Content of rock fragments=0 to 60 percent

### *Nanticoke Series*

*Depth class:* Very deep  
*Drainage class:* Very poorly drained  
*Permeability:* Moderately slow  
*Landform:* Floodplains of tidally influenced rivers and creeks in the mid-Atlantic coastal plain  
*Position on the landform:* Fresh water estuarine marshes and depressions  
*Parent material:* High n-value loamy (silty) estuarine deposits  
*Slope range:* 0 to 1 percent  
*Associated soils:* Hatboro, Othello, Delaware, Fluvaquents, Udorthents, gravelly, Udorthents, sandy  
**Taxonomic class:** fine-silty, mixed, nonacid, mesic Typic Hydraquents

#### Typical Pedon

Nanticoke-Hatboro silt loams complex, Bucks County, PA, Biles island in Falls township, 1 mile south of Morrisville, PA, 1750 feet northeast of the intersection of Tyburn Rd. and Pennsylvania Avenue South, 50 feet west of the Delaware river, USGS Topographic quadrangle Lat. 40 degrees 11 minutes 4 seconds N., Long. 74 degrees 45 minutes 20 seconds W. Colors are for moist soils unless specified otherwise.

A=0 to 9 inches; very dark gray (10YR 3/1) silt loam; massive; friable, slightly sticky and slightly plastic; common fine faint light gray (10YR 7/1) iron depletions; n value greater than 1; material flows easily through the fingers when squeezed; moderately acid; gradual smooth lower boundary.

Cg1=9 to 40 inches; dark greenish gray (5GY 4/1) silt loam; massive; friable, slightly sticky and slightly plastic; common fine faint light gray (2.5Y 7/2) iron depletions; n value greater than 1.0, material flows easily through the fingers when squeezed; moderately acid; gradual smooth lower boundary

Cg2=40 to 80 inches; dark greenish gray (5GY 4/1) silty clay loam; massive; soft, sticky and plastic; common fine faint light gray (2.5Y 7/2) iron depletions; n value greater than 1, material flows easily through the fingers when squeezed; moderately acid.

### Range in Characteristics

*Thickness of the A and Cg horizons:* Greater than 60 inches

*Depth to Bedrock:* Greater than 80 inches and generally is more than 20 feet

*Depth to redox features:* 6 to 10 inches

*Content of clay in the control section:* 18 to 34 percent

*Content of rock fragments in the control section:* 0 to 10 percent

Kind of rock fragments: Well rounded and rounded gravels of sandstones

*Reaction:* Where unlimed, reaction ranges from moderately acid through neutral.

#### *A horizon:*

Hue=10YR through 5GY

Value=2 or 3

Chroma=0 through 2

Texture of the fine earth fraction=silt loam or mucky silt loam

Organic matter content: 3 to 10 percent

Content of rock fragments=0 to 2 percent

#### *Cg horizon:*

Hue=2.5Y through 5GY

Value=3 or 4

Chroma=0 through 2

Texture of the fine earth fraction=typically silty clay loam but includes silt loam through fine sandy loam, some pedons have thin sandy mineral layers less than 1 inch thick stratified within the horizon.

Organic matter content: 0.5 to 5 percent

Content of rock fragments=0 to 10 percent, some pedons have thin organic layers stratified within the horizons

## ***Neshaminy Series***

*Depth class:* Deep

*Drainage class:* Well drained

*Permeability:* Moderate in the A and E horizons and moderately slow in the B and C horizons

*Landform:* Uplands

*Position on the landform:* Tops and sides of high hills

*Parent material:* Residuum from Diabase.

*Slope range:* 0 to 60 percent

*Associated soils:* Mount Lucas, Glenville, Towhee, Brecnock, Fluvaquents

**Taxonomic class:** Fine-loamy, mixed, mesic Ultic Hapludalfs

### Typical Pedon

Neshaminy gravelly silt loam, extremely bouldery, 8 to 25 percent slopes in Montgomery County, Marlborough Township, 1 1/2 miles north of Sumneytown, in the Delmont Boy Scout camp, the east side of Swamp Creek road, across from the middle of Delmont Lake, 140 feet east (up slope) of the extreme south end of the range embankment on the old rifle range; USGS Perkiomenville topographic quadrangle; Lat. 40 degrees 20 minutes 39 seconds N. and Long. 75 degrees 26 minutes 09 seconds W.

Oi=0 to 2 inches; litter of hardwood leaves.

Oa=2 to 3 inches; black, highly decomposed organic matter.

A=3 to 5 inches; brown (10YR 4/3) gravelly silt loam; weak fine granular structure; friable, slightly sticky and slightly plastic; 25 percent subrounded gravels of diabase; strongly acid; clear wavy lower boundary.

E=5 to 11 inches; yellowish brown (10YR 5/4) gravelly silt loam; weak fine granular structure; friable, slightly sticky and slightly plastic; 20 percent subrounded gravels of diabase; strongly acid; gradual wavy lower boundary.

BE=11 to 14 inches; brown (7.5YR 4/4) gravelly silt loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; 20 percent subrounded gravels of diabase; moderately acid; clear wavy lower boundary.

Bt1=14 to 21 inches; brown (7.5YR 5/4) gravelly clay loam; moderate medium subangular blocky structure; firm, slightly sticky and plastic; many prominent clay films; few black coatings; 25 percent subrounded gravels diabase; moderately acid; gradual wavy lower boundary.

Bt2=21 to 39 inches; yellowish red (5YR 5/6) gravelly clay loam; moderate medium blocky

structure; firm, sticky and plastic; many distinct clay films in upper part, common distinct in lower part; 25 percent subrounded gravels of diabase; moderately acid; abrupt irregular lower boundary.  
Bt3=39 to 52 inches; yellowish red (5YR 5/6) gravelly sandy clay loam; moderate medium blocky structure; friable, slightly sticky and slightly plastic; few faint clay films; 30 percent subrounded gravels of diabase; moderately acid; abrupt irregular lower boundary.  
C=52 to 54 inches; yellowish red (5YR 4/6) very gravelly sandy loam; massive; friable, non-sticky and non-plastic; 50 percent subrounded gravels of weathered diabase; moderately acid; abrupt irregular boundary.  
R=54 to 55 inches; hard, fine-grained diabase bedrock.

#### **Range in Characteristics**

*Solum thickness:* 40 to 60 inches  
*Content of clay in the control section:* 18 to 34 percent  
*Depth to Bedrock:* 48 to 60 inches  
*Content of rock fragments in the control section:* 0 to 35 percent  
*Kind of rock fragments:* Rounded and subrounded gravels, cobbles and stones of diabase  
*Reaction:* Where unlimed, reaction ranges from very strongly acid through moderately acid in the upper part of the solum and from strongly acid through slightly acid in the lower part of the solum and substratum.

*A horizon:*  
Hue=7.5YR or 10YR  
Value=2 to 4  
Chroma=2 to 3  
Texture of the fine earth fraction=silt loam  
Content of rock fragments= 0 to 15 percent

*E horizon:*  
Hue=7.5YR or 10YR  
Value=4 or 5  
Chroma=2 to 4  
Texture of the fine earth fraction=silt loam or loam  
Content of rock fragments= 0 to 40 percent

*B horizon:*  
Hue=2.5YR to 7.5YR  
Value=4 or 5  
Chroma=4 to 8  
Texture of the fine earth fraction=silt loam, loam, clay loam or sandy clay loam

Content of rock fragments= 0 to 40 percent

*C horizon:*  
Hue=2.5YR to 7.5YR  
Value=3 to 5  
Chroma=4 to 6  
Texture of the fine earth fraction=silt loam, loam, or sandy loam  
Content of rock fragments=0 to 60 percent

### ***Nockamixon Series***

*Depth class:* Very deep, moderately deep to fragipan  
*Drainage class:* Somewhat poorly drained  
*Permeability:* Moderate above the fragipan and slow to moderately slow in the fragipan  
*Landform:* Hills  
*Position on the landform:* Backslopes and footslopes  
*Parent material:* Colluvium derived from gray slightly metamorphosed shale and siltstone  
*Slope range:* 0 to 15 percent  
*Associated soils:* Brecknock, Mount Lucas, Readington, Croton, Abbottstown, Doylestown  
**Taxonomic class:** Fine-loamy, mixed, mesic Aquic Fragiudalfs

#### **Typical Pedon**

Nockamixon silt loam, 3 to 8 percent slopes, in Haycock Township, Bucks County, Nockamixon State Park, 1100 feet southeast of intersection of Pennsylvania Route 563 and Fishing Pier Road, 300 feet south of Fishing Pier Road; USGS Bedminster quadrangle; Lat. 40 degrees 27 minutes 31 seconds N. and Long. 75 degrees 14 minutes 30 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine and medium granular structure; friable, non-sticky and non-plastic; common very fine and fine roots throughout; 7 percent subangular channers of sandstone, and 3 percent subangular gravels of sandstone; moderately acid; abrupt smooth lower boundary.  
Bt1=8 to 14 inches; brown (10YR 5/3) silt loam; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium roots; few faint clay films on faces of peds and in pores; few fine prominent strong brown (7.5YR 5/6) masses of iron accumulations in ped interiors; 7 percent subangular channers of sandstone, and 3 percent

subangular gravels of sandstone; moderately acid; clear wavy lower boundary.

Bt2=14 to 24 inches; light yellowish brown (2.5Y 6/3), and yellowish brown (10YR 5/6) channery silt loam; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium roots; few faint clay films on faces of peds and in pores; few fine prominent light gray to gray (10YR 6/1) iron depletions on surfaces of peds and strong brown (7.5YR 5/6) masses of iron accumulation in ped interiors; 15 percent subangular channers of sandstone, and 3 percent subangular gravels of sandstone; moderately acid; clear wavy lower boundary.

Btx1=24 to 31 inches; light olive brown (2.5Y 5/3) channery silt loam; moderate coarse prismatic parting to strong coarse and very coarse platy parting to weak fine and medium subangular blocky structure; firm and brittle, non-sticky and non-plastic; few fine roots along faces of some peds; few distinct continuous clay films on faces of prisms and faint patchy clay films on faces of horizontal plates and peds; common medium prominent light gray to gray (10YR 6/1) iron depletions along ped faces and yellowish brown (10YR 5/6) masses of iron accumulation in ped interiors; 20 percent channers of sandstone, and 3 percent subangular gravels of sandstone; moderately acid; clear wavy lower boundary.

Btx2=31 to 43 inches; brown (10YR 5/3) channery silt loam; moderate coarse prismatic parting to strong coarse and very coarse platy parting to weak fine and medium subangular blocky structure; firm and brittle, non-sticky and non-plastic; few fine roots along faces of some peds; few distinct continuous clay films on faces of prisms and faint patchy clay films on faces of horizontal plates and peds; few fine distinct light gray to gray (10YR 6/1) iron depletions along ped faces and yellowish brown (10YR 5/6) masses of iron accumulation in ped interiors; 15 percent subangular channers of sandstone, and 10 percent subangular gravels of sandstone; moderately acid; gradual wavy lower boundary.

C=43 to 60 inches; light olive brown (2.5Y 5/3) very channery silt loam; massive; friable, non-sticky and non-plastic; few roots along faces of some peds; few fine prominent yellowish brown (10YR 5/6) masses of iron accumulations in ped interiors; few medium prominent iron stains on rock fragments; 35 percent subangular channers of

sandstone, and 15 percent subangular gravels of sandstone; moderately acid.

### **Range in Characteristics**

*Solum thickness:* 30 to 50 inches

*Depth to Bedrock:* Greater than 60 inches

*Depth to fragipan:* 20 to 36 inches

*Depth to redox depletions:* 8 to 14 inches

*Content of clay in the control section:* 18 to 30 percent

*Content of rock fragments in the control section:* Less than 35 percent

*Kind and size of rock fragments:* Subrounded and subangular gravels, channers and flagstones of shale siltstone and sandstone

*Reaction:* Where unlimed, reaction ranges from strongly to slightly acid in the solum and moderately acid to neutral in the substratum.

#### *A horizon:*

Hue = 7.5YR or 10YR

Value = 2 to 5

Chroma = 0 to 2

Texture of the fine earth fraction = silt loam or loam

Content of rock fragments = 1 to 20 percent

#### *Bt horizon:*

Hue = 2.5Y or 10YR

Value = 3 to 6

Chroma = 0 to 3

Texture of the fine earth fraction = silt loam, silty clay loam

Content of rock fragments = 5 to 25 percent

#### *Btx horizon:*

Hue = 2.5Y or 10YR

Value = 4 or 5

Chroma = 2 to 6

#### *Redox features of the Btx horizon:*

Hue = 2.5Y or 10YR

Value = 5 or 6

Chroma = 1 through 6

Texture of the fine earth fraction = silt loam, loam

Content of rock fragments = 10 to 35 percent

#### *C horizon:*

Hue = 2.5YR or 10YR

Value = 3 to 6

Chroma = 2 to 4

#### *Redox features of the Btx horizon:*

Hue = 2.5Y or 10YR

Value = 5 or 6

Chroma = 3 through 6

Texture of the fine earth fraction = silt loam, loam  
Content of rock fragments = 35 to 60 percent

### ***Othello Series***

*Depth class:* Very deep

*Drainage class:* Poorly drained

*Permeability:* Moderate in the A horizon, moderately slow in the B horizon, and moderately slow to moderately rapid in the C horizon

*Landform:* Depressions in the mid-Atlantic and Northern coastal plain

*Position on the landform:* Footslopes and toeslopes of broad terraces and depressions

*Parent material:* Silty sediments overlying coarser sediments of marine or alluvial origin

*Slope range:* 0 to 3 percent

*Associated soils:* Matapeake, Mattapex, Nanticoke Fluvaquents, Delaware, Udorthents, gravelly, Udorthents, sandy

**Taxonomic class:** Fine silty, mixed, mesic Typic Endoaquults

#### **Typical Pedon**

Othello silt loam, located in Bucks county, Pa, Falls township, 2.3 miles west of Morrisville, 2700 feet south of the intersection of Big Oak road and Knights Bridge Drive, 1100 feet south of the parking area at the end of Knights Bridge Drive, in a wooded area. Trenton West USGS Topographic quadrangle Lat. 40 degrees 11 minutes and 57 seconds N., Long. 74 degrees 50 minutes and 30 seconds W. Colors are for moist soils unless specified otherwise.

Oe=0 to 2 inches; very dark grayish brown (10YR 4/2) partially decomposed organic matter; moderate medium crumb structure, very friable; non-sticky and non-plastic; many medium roots throughout; strongly acid; abrupt smooth boundary.

A=2 to 5 inches; very dark gray (10YR 3/1) silt loam; moderate fine subangular blocky parting to moderate fine granular structure; very friable, non-sticky and non-plastic; many fine and medium roots; strongly acid; abrupt smooth boundary.

E=5 to 8 inches; gray (10YR 5/1) silt loam; moderate medium subangular blocky structure; friable, non-sticky and slightly plastic; common patchy faint very dark gray (10YR 3/1) organic coats on ped faces; common fine and medium roots; strongly acid; clear smooth boundary.

Btg1= 8 to 26 inches; gray (10YR 6/1) silt loam; moderate coarse platy parting to moderate fine subangular blocky structure; friable, non-sticky and slightly plastic; many medium prominent yellowish brown (10YR 5/8) iron accumulations throughout; common discontinuous dark gray (10YR 4/1) clay films on ped faces; common fine and medium roots; strongly acid; clear wavy boundary.

Btg2= 26 to 39 inches; light brownish gray (10YR 6/2) silt loam; strong coarse platy parting to strong fine angular blocky structure; friable, slightly sticky and slightly plastic; many medium prominent yellowish brown (10YR 5/8) iron accumulations throughout; common discontinuous faint dark grayish brown (10YR 4/2) clay films on ped faces and in pores; few fine and medium roots; strongly acid; clear wavy boundary.

2Cg= 39 to 62 inches; light gray (10YR 7/1) sandy loam; massive; common medium patchy yellowish brown (10YR 5/8) iron accumulations throughout and few medium discontinuous grayish brown (10YR 5/2) iron depletions throughout; 3 percent well rounded gravels of sandstone; strongly acid.

#### **Range in Characteristics**

*Solum thickness:* 24 to 40 inches

*Depth to coarse-textured sediments:* Less than 40 inches

*Depth to Bedrock:* Greater than 60 inches and can be greater than 10 feet

*Depth to redox features:* 6 to 10 inches

*Content of clay in the control section:* 18 to 34 percent

*Content of rock fragments in the control section:* 0 to 5 percent

*Kind of rock fragments:* Rounded and well rounded gravels and cobbles of sandstone

*Reaction:* Unlimed reaction is strongly acid to very strongly acid in the A horizon and extremely acid to strongly acid in the B and C horizons.

*A horizon:*

Hue=10YR through 5Y

Value=3 through 5

Chroma=0 through 2

Texture of the fine earth fraction=silt loam or fine sandy loam

Content of rock fragments=0 to 1 percent

*E horizon:*

Hue=10YR through 5Y

Value=5 through 7  
Chroma=0 through 2  
Texture of the fine earth fraction=silt loam or fine sandy loam  
Content of rock fragments=0 to 2 percent

*Btg horizon:*

Hue=10YR through 5Y  
Value=5 through 7  
Chroma=0 through 2  
Texture of the fine earth fraction=silt loam or silty clay loam  
Content of rock fragments=0 to 4 percent

*2Cg horizon:*

Hue=10YR through 5Y or neutral  
Value=5 through 7  
Chroma=0 through 2  
Texture of the fine earth fraction=loamy sand, sandy loam or sandy clay loam  
Content of rock fragments=0 to 10 percent

## ***Penn series***

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Permeability:* Moderate to moderately rapid

*Landform:* Uplands

*Position on the landform:* Broad hilltops and hillsides

*Parent material:* Residuum from red Triassic shale, siltstone and fine grained sandstone

*Slope range:* 0 to 35 percent

*Associated soils:* Klinesville, Readington, Reaville, Croton, Fountainville, Brecknock, Brownsburg

*Taxonomic class:* Fine-loamy, mixed, mesic Ultic Hapludalfs

### Typical Pedon

Penn silt loam, 3 to 8 percent slopes in Montgomery County, Perkiomen Township, 1 mile north of Trappe, 2 miles northwest of Collegeville, east of Church Road across from entrance to farm buildings in second strip north of the pasture fence, 300 feet east of light pole NO. 31, 330 feet east of pole no. 32, 48 feet from south of the top strip boundary, 72 feet north of the bottom of the strip boundary in 1961; USGS Collegeville topographic quadrangle; Lat. 40 degrees 12 minutes 33 seconds N. and Long. 75 degrees 29 minutes 03 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 8 inches; dark reddish brown (5YR 3/4) silt loam; weak fine and medium granular structure; friable, non-sticky and slightly plastic; 10 percent angular and subangular channers of shale and siltstone; slightly acid; clear wavy boundary.

Bt1=8 to 11 inches; reddish brown (5YR 4/4) channery silt loam; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; common faint clay films; 15 percent angular and subangular channers of shale and siltstone; moderately acid; clear wavy lower boundary.

Bt2=11 to 17 inches; reddish brown (5YR 4/4) channery silt loam; moderate fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; 25 percent angular and subangular channers of shale and siltstone; many faint clay films; moderately acid; clear wavy boundary.

Bt3=17 to 21 inches; weak red (10R 4/4) very channery silt loam; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; few faint clay films; common black coatings; 40 percent angular and subangular channers of shale and siltstone; moderately acid; clear wavy boundary.

C=21 to 34 inches; weak red (10R 4/4) very channery silt loam; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; few faint clay films; common black coatings; 40 percent angular and subangular channers of shale and siltstone; strongly acid; clear smooth boundary.

Cr=34 to 35 inches; dusky red (10R 3/3) soft, fractured shale and siltstone bedrock.

### Range in Characteristics

*Solum thickness:* 17 to 34 inches

*Depth to Bedrock:* 20 to 40 inches

*Content of clay in the control section:* 18 to 34 percent

*Content of rock fragments in the control section:* 10 to 35 percent

*Kind of rock fragments:* Angular and subangular channers of siltstone and shale

*Reaction:* Where unlimed, reaction ranges from extremely acid through strongly acid in the upper part of the solum, is strongly acid or moderately acid in the lower part of the solum, and ranges from strongly acid through slightly acid in the C horizon.

*Ap horizon:*

Hue=10R to 7.5YR

Value=3 or 4  
Chroma=2 to 4  
Texture of the fine earth fraction=silt loam  
Content of rock fragments= 2 to 15 percent

*B horizon:*

Hue=10R to 5YR  
Value=3 or 4  
Chroma=3 or 4  
Texture of the fine earth fraction=silt loam, loam, or silty clay loam  
Content of rock fragments= 10 to 15 percent

*C horizon:*

Hue=10R to 5YR  
Value=3 or 4  
Chroma=3 or 4  
Texture of the fine earth fraction=silt loam or loam  
Content of rock fragments=30 to 70 percent

## ***Psamments***

*Depth class:* very deep, and deep to very deep to contrasting material.

*Drainage class:* Moderately well to somewhat excessively drained

*Permeability:* Rapid to very rapid throughout.

*Landform:* Mid-Atlantic northern coastal plain

*Position on the landform:* Nearly level to strongly sloping broad and narrow flats and terraces

*Distinctive landscape features:* This soil consists of areas adjacent to the Delaware River that have had silty, sandy and gravelly dredgings deposited on the surface. Little has been done with them since, except some land leveling or mining of the sand and gravel for building purposes. Slopes are very complex and the landscape has an undulating or rolling topography.

*Parent material:* Sandy, gravelly, and some silty alluvium and glacial outwash sediments from mixed sedimentary, metamorphic, and igneous rocks that have been dredged from the Delaware River and deposited on the surface.

*Slope range:* 0 to 15 percent

*Associated soils:* Udorthents, gravelly, Udorthents, sandy, Alton, Delaware, Othello, Nanticoke, Pits and quarries, water, and Hatboro

*Taxonomic class:* Psamments

### General Pedon

Psamments, dredged river material Bucks Co., PA, Falls township, on Money Island, 2 miles S of

Tullytown, 1800 feet SW of the pavillion at Waterfront (Falls Township) Park, 700 feet S on the road that leads top Money Island from the park, 200 feet E of the road in a wooded area.; USGS Trenton West PA-NJ topographic quadrangle; Lat. 40 degrees 7 minutes 39 seconds N. and Long. 74 degrees 46 minutes 43 seconds W.

C=0 to 60 inches; light gray (10YR 7/2), interior, coarse sand; single grain; very friable, non-sticky and non-plastic; many medium continuous voids between rock fragments pores; 10 percent well rounded mixed-igneous-metamorphic & sedimentary gravel; strongly acid; abrupt smooth boundary.

2Ab=60 to 64 inches; brown (10YR 4/3), interior, sand; weak very fine granular structure; very friable, non-sticky and non-plastic; common fine and medium moderately continuous voids; 2 percent well rounded mixed-igneous-metamorphic & sedimentary gravel; moderately acid.

### Range in Characteristics

*Solum thickness:* 0 to 4 inches

*Depth to Bedrock:* 6 to 10 feet or more

*Depth to redox features:*

*Accummulations:* 35 to 80 inches

*Depletions:* 35 to 80 inches

*Content of clay in the control section:* 1 to 4 percent

*Content of rock fragments in the control section:* 5 to 35 percent

*Kind of rock fragments:* Well rounded gravels and cobbles of mixed sedimentary, metamorphic and igneous rocks

*Reaction:* where unlimed reaction ranges from very strongly acid through neutral.

C horizon:

Hue=neutral, 5GY, 5G, 2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, 5Y

Value=2 through 8

Chroma=1 through 8

Texture of the fine earth fraction=coarse sand, loamy sand

Content of rock fragments=5 to 250 percent

2Ab horizon:

Hue=7.5YR, 10YR, 2.5Y

Value=2 through 5

Chroma=1 through 4

Texture of the fine earth fraction=coarse sand, loamy sand

Content of rock fragments=5 to 60 percent

## **Raritan Series**

*Depth class:* Very deep, moderately deep to fragipan

*Drainage class:* Moderately well and somewhat poorly drained

*Permeability:* Moderate above the fragipan, moderately slow in the fragipan, and moderate to moderately rapid below the fragipan

*Landform:* Uplands

*Position on the landform:* Terraces near major streams

*Parent material:* Old alluvium from red shale and sandstone

*Slope range:* 0 to 8 percent

*Associated soils:* Birdsboro, Lamington

**Taxonomic class:** Fine-loamy, mixed, mesic Aquic Fragiudults

### **Typical Pedon**

Raritan silt loam, 0 to 3 percent slopes in Montgomery County, Douglass Township, 1 mile northeast of Boyertown, 0.3 miles southeast of the junction of Smith road and Congo Road, 20 feet north of Smith road; USGS Sassamansville topographic quadrangle; Lat. 40 degrees 20 minutes 37 seconds N. and Long. 75 degrees 35 minutes 52 seconds W.

Ap=0 to 9 inches, brown (7.5YR 4/2) silt loam; weak fine granular structure; friable, non-sticky and non-plastic; 2 percent water rounded gravels of quartz; strongly acid; clear wavy lower boundary.

BA=9 to 14 inches, strong brown (7.5YR 5/6) silt loam; moderate fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films on faces of peds; 5 percent water rounded gravels of quartz and sandstone; strongly acid; clear wavy lower boundary.

Bt1=14 to 20 inches, yellowish red (5YR 5/6) clay loam; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; slightly acid; common distinct clay films on faces of peds and in pores; few dark coatings; 5 percent water rounded gravels of quartz and sandstone; strongly acid; clear wavy lower boundary.

Bt2=20 to 27 inches, reddish brown (5YR 5/4) clay loam with common medium distinct strong brown (7.5YR 5/6) iron accumulations and reddish gray (5YR 5/2) iron depletions; moderate medium

blocky structure; firm, slightly sticky and slightly plastic; common distinct clay films on faces of peds and in pores; 5 percent water rounded gravels of quartz and sandstone; strongly acid; abrupt wavy lower boundary.

Btx=27 to 43 inches, reddish brown (5YR 4/3) clay loam with grayish brown (10YR 5/2) prism coatings and common medium distinct red (2.5YR 4/6) iron accumulations, reddish gray (5YR 5/2) and dark brown (7.5YR 4/4) iron depletions; weak very coarse prismatic structure separating to moderate medium blocky and weak thin platy; very firm and brittle, slightly sticky and slightly plastic; common distinct clay films on faces of peds and in pores; common dark coatings; 10 percent rounded gravels of quartz and sandstone; very strongly acid; clear wavy lower boundary.

2C=43 to 60 inches, reddish brown (5YR 4/3) and pinkish gray (5YR 6/2) stratified sand, silt and gravel; massive; very strongly acid.

### **Range in Characteristics**

*Solum thickness:* 42 to 56 inches

*Depth to Bedrock:* greater than 60 inches

*Depth to Fragipan:* from 20 to 30 inches

*Content of rock fragments in the control section:* 0 to 15 percent

*Content of clay in the control section:* 18 to 34 percent

*Kind of rock fragments:* Rounded through subangular gravels and channers of sandstone, siltstone, and shale

*Reaction:* Where unlimed, reaction ranges from very strongly acid to moderately acid throughout.

*Ap horizon:*

Hue=10YR to 5YR

Value=4

Chroma=2 to 4

Texture of the fine earth fraction=silt loam

Content of rock fragments= 0 to 10 percent

*Bt horizon:*

Hue=7.5YR to 2.5YR

Value=4 or 5

Chroma=4 to 6

Texture of the fine earth fraction=Silty clay loam, clay loam or loam

Content of rock fragments= 0 to 15 percent

*Btx horizon:*

Hue=10YR to 2.5YR

Value=4 or 5

Chroma=3 to 6  
Texture of the fine earth fraction= clay loam or loam  
Content of rock fragments= 0 to 15 percent

*C horizon:*

Hue=7.5YR to 2.5YR  
Value=4 or 5  
Chroma=3 or 4  
Texture of the fine earth fraction=silty clay loam to gravel  
Content of rock fragments=0 to 40 percent

### **Readington Series**

*Depth class:* Deep and very deep, moderately deep to the fragipan

*Drainage class:* Moderately well drained

*Permeability:* Moderate in the Ap, Ba and Bt horizons, and moderately slow in the Bx horizon

*Landform:* Uplands

*Position on the landform:* Depressions and broad drainageways

*Parent material:* Residuum and colluvium from red shale, siltstone and fine-grained sandstone

*Slope range:* 0 to 8 percent

*Associated soils:* Lansdale, Penn, Croton, Reaville, Steinsburg, Amwell, Buckingham, Nockamixon, Culleoka, Lehigh, Lawrenceville Abbottstown, Chalfont

**Taxonomic class:** Fine-loamy, mixed, mesic Oxyaquic Fragiudalfs

#### **Typical Pedon**

Readington silt loam, 3 to 8 percent slopes in Montgomery County, New Hanover Township, 1 1/2 miles south of New Hanover Square, in Girl Scout Camp Laughing Waters, near the swimming pool, 105 feet north of light pole 1840, 230 feet east of pole 1839 and 242 feet west of pole 1841 and 5 feet north of the tennis court; USGS Sassamansville topographic quadrangle; Lat. 40 degrees 17 minutes 35 seconds N. and Long. 75 degrees 33 minutes 05 seconds W. Colors are for moist soils unless specified otherwise.

Ap=0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable, slightly sticky and non-plastic; 5 percent angular and subangular channers of shale and sandstone; slightly acid; abrupt smooth lower boundary.

BA=8 to 11 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; 3

percent angular and subangular channers of shale and sandstone; moderately acid; clear wavy lower boundary.

Bt1=11 to 20 inches; reddish brown (5YR 4/3) silt loam; moderate medium blocky structure; firm, slightly sticky and slightly plastic; common faint clay films on the faces of peds and in pores; 10 percent angular and subangular channers of shale and siltstone; strongly acid; clear wavy lower boundary.

Bt2=20 to 29 inches; reddish brown (5YR 4/3) silty clay loam with common medium distinct strong brown (7.5YR 5/6) iron accumulation and reddish brown (5YR 5/3) iron depletion ; moderate medium coarse prismatic structure parting to moderate medium blocky; firm, sticky and plastic; many faint clay films on the faces of peds and in pores; common black coatings; 10 percent angular and subangular shale and siltstone; strongly acid; clear wavy lower boundary.

Btx1=29 to 40 inches; reddish brown (5YR 4/4) channery silt loam; common fine distinct pinkish gray (5YR 6/2)iron depletions, strong brown (7.5YR 5/6) and yellowish red (5YR 5/6) iron accumulations; moderate very coarse prismatic structure parting to weak thick platy and subangular blocky; very firm, brittle, sticky and slightly plastic; common faint clay films on the faces of peds and in pores; common dark coatings; 20 percent angular and subangular channers of shale and siltstone; moderately acid; gradual wavy lower boundary.

Btx2=40 to 58 inches; dusky red (2.5YR 4/2) channery silt loam; common medium distinct reddish brown (5YR 5/3) iron accumulations and pinkish gray (5YR 6/2) iron depletions; weak thick platy structure; firm and brittle, slightly sticky and slightly plastic; common faint clay films on the faces of peds and in pores; common dark coatings; few concretions; 30 percent angular and subangular channers of siltstone and shale; moderately acid; gradual wavy lower boundary.

R=58 to 59 inches; dusky red (10Y 3/3) partly weathered shale.

#### **Range in Characteristics**

*Solum thickness:* 35 to 60 inches

*Depth to Bedrock:* 40 to 70 inches

*Depth to Fragipan:* 20 to 36 inches

*Content of clay in the control section:* 18 to 34 percent

*Content of rock fragments in the control section:* 0 to 30 percent

*Kind of rock fragments:* Angular and subangular channers of siltstone, shale, and some quartz  
*Reaction:* Where unlimed, reaction ranges from extremely acid through slightly acid in the upper part of the solum and very strongly acid through slightly acid in the lower part.

*Ap horizon:*

Hue=2.5YR to 10YR

Value=3 or 4

Chroma=2 to 4

Texture of the fine earth fraction=silt loam

Content of rock fragments= 0 to 15 percent

*Bt horizons:*

Hue=2.5YR or 5YR

Value=3 to 5

Chroma=2 to 4

Texture of the fine earth fraction=loam to silty clay loam

Content of rock fragments= 0 to 20 percent

*Btx horizon:*

Hue=10R to 5YR

Value=3 or 4

Chroma=2 to 6

Texture of the fine earth fraction=loam to silty clay loam

Content of rock fragments=5 to 50 percent

## ***Reaville Series***

*Depth class:* Moderately deep

*Drainage class:* Moderately well and somewhat poorly drained

*Permeability:* Moderate in the Ap and slow in the B and C horizons

*Landform:* Uplands

*Position on the landform:* Depressions and broad drainageways

*Parent material:* Residuum from red shale, siltstone and fine-grained sandstone

*Slope range:* 0 to 15 percent

*Associated soils:* Penn, Readington, Croton, Abbottstown, Steinsburg, Brownsburg, Buckingham, Culleoka

**Taxonomic class:** *Fine-loamy, mixed, Aquic Hapludalfs*

### **Typical Pedon**

Reaville silt loam, 0 to 3 percent slopes in Montgomery County, Limerick Township, 2 miles

northwest of Trappe, 1 3/4 miles south of Schwenksville, 255 feet east of electric light pole #6 located on east side of school road, 126 feet south of electric light pole # 902 located on north side of farm lane and 120 feet west of apple trees west of the farm house; USGS Collegeville topographic quadrangle; Lat. 40 degrees 13 minutes 56 seconds N. and Long. 75 degrees 29 minutes 51 seconds W. Colors are for moist soil unless specified otherwise.

Ap=0 to 8 inches, reddish brown (2.5YR 4/4)

channery silt loam; weak fine granular structure; friable, non-sticky and non-plastic; 10 percent angular and subangular shale channers; slightly acid; abrupt smooth lower boundary.

Bt1=8 to 12 inches, red (2.5YR 4/6) channery silty clay loam with few fine faint reddish gray (10R 5/3) iron depletions; weak medium platy structure breaking to moderate fine blocky; friable, non-sticky and slightly plastic; few faint clay films; 15 percent angular and subangular shale channers; very slightly acid; clear wavy lower boundary.

Bt2=12 to 15 inches, weak red (10R 4/3) channery silty clay loam with few reddish gray (10R 5/1) coatings on ped surfaces; moderate fine subangular blocky structure; firm, slightly sticky and slightly plastic; few distinct clay films; 25 percent angular and subangular shale channers; very slightly acid; gradual wavy lower boundary.

Bt3=15 to 19 inches, weak red (10R 4/4) channery silty clay loam with common fine distinct red (2.5YR 5/6) iron accumulations and reddish gray (10R 5/1) iron depletions and weak red (10R 5/2) ped coatings; moderate medium blocky structure; firm, slightly sticky and slightly plastic; common distinct clay films; 15 percent angular and subangular shale channers; very slightly acid; clear wavy lower boundary.

C1=19 to 26 inches, weak red (10R 4/4) very channery silt loam with a few weak red (10R 5/4) coatings on ped faces; weak thick platy structure breaking to moderate fine blocky; firm, slightly sticky and non-plastic; few faint clay films; 50 percent angular and subangular shale channers; very slightly acid; clear wavy lower boundary.

C2=26 to 32 inches, dusky red (10R 3/4) extremely channery silt loam; weak thick platy structure; very firm, slightly sticky and non-plastic; few faint clay films; 85 percent angular and subangular shale channers; very strongly acid; gradual smooth lower boundary.

R=32 to 33 inches, partly weathered dusky red (10R 3/3) shale bedrock.

### Range in Characteristics

*Solum thickness:* 12 to 24 inches

*Depth to Bedrock:* 20 to 40 inches

*Content of clay in the control section:* 18 to 34 percent

*Content of rock fragments in the control section:* 15 to 35 percent

*Kind of rock fragments:* Angular and subangular channers of shale, siltstone and sandstone

*Reaction:* Where unlimed, reaction ranges from very strongly acid to slightly acid throughout.

*Ap horizon:*

Hue=2.5YR to 7.5YR

Value=3 or 4

Chroma=2 to 4

Texture of the fine earth fraction=silt loam

Content of rock fragments= 3 to 15 percent

*Bt horizons:*

Hue=10R to 5YR

Value=4 to 6

Chroma=3 or 4

Texture of the fine earth fraction=silt loam or silty clay loam

Content of rock fragments= 15 to 45 percent

*C horizon:*

Hue=10R through 5YR

Value=3 or 4

Chroma=2 to 4

Texture of the fine earth fraction=silt loam or loam

Content of rock fragments=30 to 70 percent

## Rowland Series

*Depth class:* Very deep

*Drainage class:* Moderately well and somewhat poorly drained

*Permeability:* Moderately slow to moderate in the surface, subsoil and upper substratum and moderately rapid in the lower substratum

*Landform:* Nearly level bottom lands in piedmont river valleys

*Position on the Landform:* Low floodplains

*Parent material:* Alluvium from red and brown shale, siltstone and sandstone and conglomerate.

*Slope range:* 0 to 3 percent

*Associated soils:* Linden, Bowmansville, Knauers, Hatboro, Barbour, Buckingham

**Taxonomic class:** Fine-loamy, mixed, mesic Fluvaquentic Dystrochrepts

### Typical Pedon

Rowland silt loam in Berks County, Amity Township, in an idle field, 105 feet east of the bridge abutment of t440 over Monocacy Creek, 55 feet southeast of t440, 0.65 miles southeast of Stonersville; USGS Birdsboro topographic quadrangle; Lat. 40 degrees 18 minutes 31 seconds N. and Long. 75 degrees 47 minutes 44 seconds W. Colors are for moist soil unless specified otherwise.

Ap=0 to 12 inches; reddish brown (5YR 4/4) silt loam; weak fine granular structure; friable, non-sticky and non-plastic; moderately acid; abrupt smooth lower boundary.

BA=12 to 17 inches; reddish brown (5YR 4/3) silt loam; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; slightly acid; clear wavy lower boundary.

Bw=17 to 34 inches; reddish brown (5YR 5/3) silty clay loam with common medium distinct pinkish gray (5YR 6/2) iron depletions and strong brown (7.5YR 5/6) iron accumulations; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; slightly acid; abrupt wavy lower boundary.

Cg1=34 to 46 inches; pinkish gray (5YR 6/2) silty clay loam common medium distinct strong brown (7.5YR 5/6) iron accumulation; massive; friable, sticky and plastic; slightly acid; abrupt wavy lower boundary.

2Cg2=46 to 61 inches; pinkish gray (7.5YR 6/2) gravelly sandy loam; massive; friable, non-sticky and non-plastic; 30 percent well rounded through subangular gravels of sandstone, siltstone and shale; slightly acid.

### Range in Characteristics

*Solum thickness:* 24 to 40 inches

*Depth to Bedrock:* Greater than 60 inches

*Content of clay in the control section:* 18 to 34 percent

*Content of rock fragments in the control section:* 0 to 20 percent

*Kind of rock fragments:* Well rounded through subangular gravels and channers of sandstone, siltstone, and shale.

*Reaction:* Where unlimed, reaction ranges from strongly acid to moderately acid throughout.

*Ap horizon:*

Hue=2.5YR to 7.5YR  
Value=3 or 4  
Chroma=3 to 6  
Texture of the fine earth fraction=silt loam  
Content of rock fragments= 0 to 10 percent

*B horizon:*

Hue=2.5YR to 7.5YR  
Value=3 to 6  
Chroma=3 to 8  
Texture of the fine earth fraction=loam to silty clay loam  
Content of rock fragments= 0 to 10 percent

*C horizon:*

Hue=2.5YR to 7.5YR  
Value=3 to 6  
Chroma=2 to 8  
Texture of the fine earth fraction=sandy loam to silty clay loam  
Content of rock fragments=0 to 25 percent in the C horizon and 30 to 90 percent in the 2C horizon.

## **Ryder Series**

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Landform:* Hillside of mountain valleys

*Position on the landform:* Tops and sides of broad hills

*Distinctive landscape features:* Closed sinkholes and depressions in some areas, usually in broad swales between limestone ridges

*Special surface features:* 0 to 5 percent white quartzite and limestone shales

*Parent material:* Residuum from thin bedded shaly limestone

*Slope range:* 8 to 25 percent

*Associated soils:* Duffield, Comly, Washington, Clarksburg and Berks

**Taxonomic class:** Fine-loamy, mixed, mesic Ultic Hapludalfs

### **Typical Pedon**

Ryder silt loam, 3 to 8 percent slopes, Northampton Co., PA., Upper Nazareth Twp., 1.2 miles northwest of Nazareth, 2200 ft. east of intersection of Gracedale Ave. and Mauch Chunk St., 700 ft. north of Mauch Chunk St. in a cultivated field, Topographic quadrangle; Lat. 40 degrees 44 minutes 36 seconds

N., Long. 75 degrees 19 minutes 42 seconds W.  
Colors are for moist soil unless specified otherwise.

Ap=0 to 9 inches; dark grayish brown (10YR 4/2), silt loam; weak medium subangular blocky structure; friable, non-sticky and non-plastic; common fine roots throughout; neutral; 12 percent subangular channers of shale; abrupt smooth lower boundary.

Bt1=9 to 18 inches; yellowish brown (10YR 5/4), silt loam; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; common very fine and fine roots throughout; neutral; 7 percent subangular channers of shale; clear wavy lower boundary.

Bt2=18 to 24 inches; yellowish brown (10YR 5/6), silt loam; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium roots between peds; very few faint discontinuous clay films on faces of peds and in pores; neutral; 7 percent subangular channers of shale; clear wavy lower boundary.

C1=24 to 30 inches; yellowish brown (10YR 5/4), channery silt loam; few fine yellowish brown (10YR 5/8) accumulations; friable, non-sticky and non-plastic; very few distinct discontinuous manganese stains on faces of peds and in pores; neutral; 30 percent subangular channers of shale; gradual wavy lower boundary.

C2=30 to 34 inches; yellowish brown (10YR 5/4), very channery silt loam; very friable, non-sticky and non-plastic; neutral; 50 percent subangular channers of shale; clear wavy lower boundary.

R=34 to 35 inches; dark gray (2.5Y 4/1) shaly limestone bedrock of the Jacksonburg formation.

### **Range in Characteristics**

*Solum thickness:* 0 to 36 inches

*Depth to Bedrock:* 24 to 40 inches

*Depth to Accumulations:* 13 to 40 inches

*Depth to Depletions:* 9 to 40 inches

*Content of clay in the control section:* 18 to 30 percent

*Content of rock fragments in the control section:* 5 to 25 percent

*Kind of rock fragments:* Angular through subrounded channers and cobbles of limestone, quartzite and shale

*Reaction:* Where unlimed, reaction ranges from strongly acid through neutral in the solum and moderately acid through neutral in the C horizon.

Note: The pH reactions in this area may be slightly high due to heavy lime applications and the large number of concrete plants in the vicinity. Slightly alkaline pH readings do occur.

*Ap horizon:*

Hue=10YR  
Value=3 to 5  
Chroma=2 to 3  
Texture of the fine earth fraction=silt loam  
Content of rock fragments=5 to 15 percent

*B horizon:*

Hue=7.5YR to 2.5Y  
Value=5 or 6  
Chroma=4 to 6  
Texture of the fine earth fraction=silt loam or silty clay loam  
Content of rock fragments=5 to 25 percent

*C horizon:*

Hue=10YR or 2.5Y  
Value=4 or 5  
Chroma=3 to 6  
Texture of the fine earth fraction=loam or silt loam  
Content of rock fragments=25 to 75 percent  
Note: Variegated colors of the B and C horizons are inherited from the shaly limestone parent material

## ***Steinsburg Series***

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Landform:* Gently sloping to moderately steep uplands

*Position on the landform:* Tops and shoulders of hills

*Parent material:* Residuum mostly from sandstone and conglomerate

*Slope range:* 3 to 25 percent

*Associated soils:* Edgemont, Lansdale, Laidig, Readington, Reaville, Abbottstown, Croton, Fountainville, Brownsburg

**Taxonomic class:** Coarse-loamy, mixed, mesic Typic Dystrochrepts

### **Typical Pedon**

Steinsburg gravelly loam, 3 to 8 percent slopes, in Bucks County, Doylestown Township, 1/8 mile north of intersection of PA Route 263 and Edison Road at village of Furlong, 1/2 mile west of county road 350,

50 feet south of road; USGS Buckingham topographic quadrangle; Lat. 40 degrees 18 minutes 2 seconds N and Long. 75 degrees 5 minutes 26 seconds W. Colors are for moist soil unless specified otherwise.

Ap=0 to 8 inches; brown (7.5YR 4/2) gravelly loam; weak fine subangular blocky structure; friable, non-sticky and non-plastic; some clay bridging; 15 percent subangular channers and stones of sandstone; strongly acid; clear wavy lower boundary.

Bw=8 to 15 inches; brown (7.5 YR 4/4) sandy loam; weak fine subangular blocky structure; friable, non-sticky and non-plastic; some clay bridging; 10 percent subangular channers and stones of sandstone; strongly acid; clear wavy lower boundary.

C=15 to 30 inches; strong brown (7.5YR 5/6) very gravelly sandy loam; massive; friable; 40 percent subangular channers and stones of sandstone; strongly acid, gradual wavy lower boundary.

R=30 to 31 inches; brownish yellow (10YR 6/6) easily shattered sandstone conglomerate.

### **Range in Characteristics**

*Solum thickness:* 12 to 20 inches

*Depth to Bedrock:* 20 to 40 inches

*Depth to fragipan:* Not present

*Content of clay in the control section:* 5 to 17 percent  
*Content of rock fragments in the control section:* 5 to 34 percent

*Kind of rock fragments:* Subangular channers and stones of sandstone and conglomerate

*Reaction:* Where unlimed, reaction ranges from extremely acid to strongly acid.

*A horizon:*

Hue=7.5YR or 10YR

Value=4 or 5

Chroma=2 through 4

Texture of the fine earth fraction=loam or sandy loam

Content of rock fragments=0 to 20 percent

*Bw horizon:*

Hue=7.5YR or 10YR

Value=4 through 6

Chroma=2 through 4

Texture of the fine earth fraction=loam or sandy loam

Content of rock fragments=0 to 20 percent

*C horizon:*

Hue=7.5YR or 10YR

Value=4 through 6  
Chroma=3 through 6  
Texture of the fine earth fraction=loam, sandy loam,  
or loamy sand  
Content of rock fragments=0 to 40 percent

## ***Towhee Series***

*Depth class:* Very deep, moderately deep to fragipan

*Drainage class:* Poorly drained

*Permeability:* Moderate above the fragipan, slow in the fragipan and and slow to moderately slow below

*Landform:* Uplands

*Position on the landform:* Footslopes

*Parent material:* Colluvium or residuum from igneous rocks.

*Slope range:* 0 to 8 percent

*Associated soils:* Gladstone, Glenville, Glenelg, Neshaminy, Mount Lucas, Fluvaquents

**Taxonomic class:** Fine-loamy, mixed, mesic Typic Fragiqualfs

### **Typical Pedon**

Towhee silt loam; 0 to 3 percent slopes in Bucks County, Haycock Township, 1/2 miles south of Applebachville in the Lake Towhee Park area, 1.4 mile southeast of the intersection of Apple road and Bethlehem Road, about 2600 feet east of St. Pauls Church; USGS Quakertown topographic quadrangle; Lat. 40 degrees 28 minutes 38 seconds N., Long. 75 degrees 16 minutes 13 seconds W. Colors are for moist soil unless specified otherwise.

Ap=0 to 8 inches; brown (10YR 5/3) silt loam with a few stains of dark yellowish brown (10YR 3/4); weak fine granular structure; friable, non-sticky and non-plastic; 10 percent subrounded gravels of diabase; slightly acid; abrupt wavy lower boundary.

Btg1=8 to 11 inches; light brownish gray (2.5Y 6/2) silt loam with common fine distinct light gray (5Y 6/1) iron depletions and strong brown (7.5YR 5/8) iron depletions; weak fine blocky structure; friable, sticky and plastic; few faint clay films in pores; slightly acid; clear wavy lower boundary.

Btg2=11 to 21 inches; light brownish gray (2.5Y 6/2) gravelly silty clay loam with common fine distinct yellowish brown (10YR 5/8) and strong brown (7.5YR 5/8) iron accumulations; very coarse prismatic structure parting to weak fine blocky; friable, sticky and plastic; continuous faint clay films on faces of peds; 20 percent subangular

gravels of diabase; slightly acid; clear irregular lower boundary.

Btg3=21 to 28 inches; grayish brown (2.5Y 5/2) silty clay loam with common medium prominent yellowish red (5YR 5/8) iron accumulations and brown (7.5YR 4/2) iron depletions; very coarse prismatic structure parting to weak medium blocky; firm, sticky and plastic; continuous faint clay films; few black coatings; 10 percent subrounded gravels of diabase; neutral; clear wavy lower boundary.

Btx1=28 to 53 inches; yellowish red (5YR 4/6) silt loam with gray brown (10YR 5/1) ped faces and common coarse distinct dark gray (5YR 4/1) iron depletions and yellowish red (5YR 5/8) iron accumulations; weak coarse prismatic structure parting to weak coarse subangular blocky; firm and brittle, sticky and plastic; continuous faint clay films on faces of peds; 10 percent subangular gravels of diabase; neutral; clear wavy lower boundary.

Btx2=53 to 63 inches; strong brown (7.5YR 5/6) loam with grayish brown (2.5Y 5/2) faces and few coarse distinct dark gray (5YR 5/8) iron depletions and yellowish red (5YR 5/8) iron accumulations; weak coarse prismatic structure parting to weak coarse subangular blocky; very firm, sticky and slightly plastic; few faint clay films; 5 percent subangular gravels of diabase; neutral; abrupt wavy lower boundary.

C1=63 to 69 inches; reddish yellow (7.5YR 7/6) coarse sandy loam with clay pockets and many coarse distinct gray (N 6/0) iron depletions and reddish yellow (7.5YR 6/6) iron accumulations; massive; firm and sticky; few prominent clay films; 10 percent subrounded gravels of diabase; neutral; clear wavy lower boundary.

C2=69 to 76 inches, pale yellow (7.5YR 7/6) coarse sandy loam with many coarse prominent light gray (5Y 7/1) and yellowish red (5YR 5/8) iron accumulations; massive; firm, slightly sticky; some clay bridging between sand grains; 10 percent subrounded gravels of diabase; neutral.

### **Range in Characteristics**

*Solum thickness:* 40 to 70 inches

*Depth to Bedrock:* more than 6 feet

*Depth to Fragipan:* 20 to 30 inches

*Depth to redox features:* Directly below the surface

*Content of clay in the control section:* 18 to 34 percent

*Content of rock fragments in the control section:* 5 to 30 percent.

*Kind of rock fragments:* Rounded through subangular gravels, cobbles and channers of diabase and gneiss.  
*Reaction:* Where unlimed, reaction ranges from slightly acid to neutral throughout.

*Ap horizon:*

Hue=10YR to 2.5Y  
Value=3 or 6  
Chroma=1 to 6  
Texture of the fine earth fraction=Silt loam  
Content of rock fragments= 5 to 10 percent

*E horizon if present:*

Hue=10YR to 2.5Y  
Value=5 or 6  
Chroma=0 to 2  
Texture of the fine earth fraction=Silt loam  
Content of rock fragments= 5 to 10 percent

*Btg horizon:*

Hue=10YR to 2.5Y  
Value=4 to 6  
Chroma=1 or 2  
Texture of the fine earth fraction=Silt loam to silty clay loam  
Content of rock fragments=5 to 30 percent

*Bx horizon:*

Hue=10YR to 5YR  
Value=4 or 5  
Chroma=3 to 8  
Texture of the fine earth fraction=loam to silt loam  
Content of rock fragments=5 to 30 percent

*C horizon:*

Hue=5YR to 2.5Y  
Value=3 to 7  
Chroma=1 to 6  
Texture of the fine earth fraction=Sandy loam to clay loam  
Content of rock fragments=5 to 30 percent

## **Udorthents, Gravelly**

*Depth class:* Deep and very deep, and moderately deep to very deep to gravels.

*Drainage class:* Moderately well to somewhat excessively

*Permeability:* Rapid to very rapid throughout.

*Landform:* Mid-Atlantic northern coastal plain

*Position on the landform:* Nearly level to gently sloping broad flats and terraces

*Distinctive landscape features:* This soil consists of areas that have been cut and filled during grading for roads, railroads, building site developments, recreation areas, and other similar uses and now have been converted to lawns, playgrounds, or sedimentation basins for aesthetic, recreational or stormwater control uses in close proximity to large urban areas. Slopes are very complex.

*Special surface features:* Cuts and fill areas are so intermingled that it is impractical to separate them in mapping at this scale

*Parent material:* Sandy and gravelly alluvium and glacial outwash sediments from mixed sedimentary, metamorphic, and igneous rocks

*Slope range:* 0 to 15 percent

*Associated soils:* Udorthents, sandy, Alton, Delaware, Othello, Nanticoke, Pits and quarries, Urban land, water, and Hatboro

**Taxonomic class:** Udorthents

### **General Pedon**

Udorthents, gravelly, Bucks Co., PA, Falls township, in the Penn-Warner Sportsmen's Club, 3900 feet WSW from the Wheelabrator plant, 2100 feet NNW of Waste Management headquarters, 1500 feet SW from the SW corner of the Turkey Hill quarry.; USGS Trenton West topographic quadrangle; Lat. 40 degrees 9 minutes 17 seconds N. and Long. 74 degrees 46 minutes 56 seconds W.

A=0 to 3 inches; brown (10YR 4/3), gravelly coarse sand; weak very fine and fine granular structure; very friable, non-sticky and non-plastic; common very fine roots throughout; 25 percent well rounded gravels of mixed igneous, sedimentary and metamorphic rocks; strongly acid; clear smooth lower boundary.

C1=3 to 21 inches; brown (10YR 5/3), very gravelly loamy coarse sand; weak very fine and fine subangular blocky structure; very friable, non-sticky and non-plastic; 40 percent well rounded gravels of mixed igneous, sedimentary and metamorphic rocks; strongly acid; gradual wavy lower boundary.

C2=21 to 50 inches; 70 percent brown (10YR 4/3), and 30 percent strong brown (7.5YR 4/6), very gravelly coarse sand; single grain; non-sticky and non-plastic; common very fine to medium moderate continuity void between rock fragments pores; 40 percent well rounded gravels and 20 percent well rounded cobbles of mixed igneous, sedimentary and metamorphic rocks; strongly acid; gradual wavy lower boundary.

2C=50 to 62 inches; 50 percent brown (7.5YR 4/3), and 50 percent yellowish red (5YR 4/6), extremely cobbly coarse sand; single grain; non-sticky and non-plastic; many very fine to coarse high continuity void between rock fragments pores; 20 percent well rounded gravel and 60 percent well rounded cobbles of mixed igneous, sedimentary and metamorphic rocks; strongly acid.

#### **Range in Characteristics**

*Solum thickness:* 0 to 10 inches

*Depth to Bedrock:* 6 to 10 feet or more

*Depth to redox features:*

*Accumulations:* 20 to 60 inches

*Depletions:* 20 to 60 inches

*Content of clay in the control section:* 1 to 6 percent

*Content of rock fragments in the control section:* 35 to 60 percent

*Kind of rock fragments:* Well rounded gravels and cobbles of mixed igneous, metamorphic and sedimentary rocks

*Reaction:* Where unlimed, reaction ranges from very strongly acid to slightly acid.

*A horizon:*

Hue=2.5Y, 10YR, 7.5YR, 5YR, 2.5YR

Value=2 through 4

Chroma=2 through 4

Texture of the fine earth fraction=coarse sand, loamy sand

Content of rock fragments=5 to 35 percent

*C horizon:*

Hue=neutral, 5GY, 5G, 2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, 5Y

Value=2 through 8

Chroma=1 through 8

Texture of the fine earth fraction=coarse sand, loamy sand

Content of rock fragments=25 to 60 percent

*2C horizon:*

Hue=neutral, 5GY, 5G, 2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, 5Y

Value=2 through 8

Chroma=1 through 8

Texture of the fine earth fraction=coarse sand, loamy sand

Content of rock fragments=50 to 95 percent

#### ***Udorthents, loamy***

*Depth class:* moderately deep to deep to compacted subsoil, and very deep to bedrock.

*Drainage class:* Somewhat excessively to moderately well drained

*Permeability:* slow to very rapid in the solum, and slow to rapid in the substratum.

*Landform:* Nearly level to sloping summits and sideslopes in the Piedmont

*Position on the landform:* Interfluves, shoulders, and backslopes

*Distinctive landscape features:* This soil consist of areas that have been cut and filled during grading for roads, railroads, building site developments, recreation areas, and other similar uses and have now been converted to lawns, playgrounds, or stormwater control structures for aesthetic or recreational uses in close proximity to large urban areas.

*Special surface features:* Cut and fill areas are so intermingled that it is impractical to separate them in mapping at this scale.

*Parent material:*Residual, loessal and colluvial material from mixed sedimentary and metamorphic rocks

*Slope range:* 0 to 15 percent

*Associated soils:* Washington, Clarksburg, Duffield, Ryder, Readington, Reaville, Penn, Bedington, Culleoka, Weikert, Steinsburg, Lansdale.

*Taxonomic class:* Udorthents

#### **General Pedon**

Udorthents, loamy, Northampton Co., PA, Hanover township, in the Lehigh Valley Industrial Complex ; lat. 40 degrees 40 minutes 29 seconds N. and long. 75 degrees 23 minutes 05 seconds W.

A/B=0 to 5 inches; 20 percent strong brown (7.5YR 5/6) and 80 percent dark yellowish brown (10YR 4/4), loam; weak fine subangular blocky and weak fine granular structure; firm, slightly sticky and slightly plastic; common very fine and fine roots throughout; common very fine and fine moderate discontinuous tubular pores; neutral; 10 percent subrounded shale channers; abrupt smooth boundary. 10% fragments of argillic B horizon. Horizon is compacted.

C/B=5 to 28 inches; 20 percent strong brown (7.5YR 5/6) and 80 percent dark yellowish brown (10YR 4/4) loam; very firm, slightly sticky and nonplastic; common fine roots throughout; common very fine and fine moderate discontinuous tubular pores; neutral; 12 percent subrounded shale channers; clear wavy boundary. 10% fragments of argillic B horizon. Highly compacted.

C=28 to 40 inches; dark yellowish brown (10YR 4/4), very gravelly loam; massive; very firm, nonsticky and nonplastic; common fine low discontinuous tubular pores; neutral; 40 percent subrounded dolomite gravel; clear wavy boundary. Highly compacted.

2C=40 to 60 inches; strong brown (7.5YR 5/6), loam; massive; friable, slightly sticky and slightly plastic; common fine low discontinuous tubular pores; neutral; 10 percent subrounded limestone gravel. Underlying material from original soil.

#### **Range in Characteristics**

*Solum thickness:* 0 to 18 inches

*Depth to Bedrock:* 60 to 72 inches or more

*Depth to redox features: Accumulations:* 20 to 30 inches *Depletions:* 30 to 72 inches *Content of clay in the control section:* 10 to 27 percent

*Content of rock fragments in the control section:* 5 to 50 percent

*Kind of rock fragments:* Angular and subangular gravels and channers of shale siltstone, sandstone, quartzite, gneiss, and schist

*Reaction:* Where unlimed, reaction ranges from very strongly acid to neutral

*Ap horizon:*

Hue=10YR and 7.5YR

Value=3 or 4

Chroma=3 or 4

Texture of the fine earth fraction=loam

Content of rock fragments=0 to 35 percent

*C horizon:*

Hue=10YR, 5YR, and 2.5YR

Value=3 through 5

Chroma=4 through 6

Texture of the fine earth fraction=loam, sandy loam

Content of rock fragments=5 to 65 percent

*2C horizon:*

Hue=5YR through 2.5Y

Value=4 through 6

Chroma=3 through 5

Texture of the fine earth fraction=loam, silt loam

Content of rock fragments=5 to 25 percent

### ***Udorthents, Shale and Sandstone***

*Depth class:* Shallow to very deep

*Drainage class:* Moderately well drained through well drained

*Permeability:* Moderate in the solum and moderately slow to slow in the substratum

*Landform:* Nearly level to strongly sloping summits and ridges in the piedmont

*Position on the landform:* Summits, shoulders, and backslopes

*Distinctive landscape features:* This soil consist of areas that have been cut and filled during grading for roads, railroads, building site developments, recreation areas, and other similar uses and have now been converted to lawns, playgrounds, or stormwater control structures for aesthetic or recreational uses in close proximity to large urban areas. Slopes are very complex.

*Special surface features:* Cuts and fill areas are so intermingled that it is impractical to separate them in mapping at this scale

*Parent material:* colluvial, loessal, or residual material from reddish brown and grayish purple sandstone, mudstone, and shale.

*Slope range:* 0 to 15 percent

*Associated soils:* Reaville, Readington, Bedington, Bowmansville, Doylestown, Penn, Urban land, and water

**Taxonomic class:** Udorthents

#### **General Pedon**

Udorthents, shale and sandstone Bucks Co., PA, Warminster Township, 2.8 miles SE of Ivyland, 1500 feet SW of the intersection of Hatboro Road and Bristol Road, 1500 feet S on Orion Road, 30 feet NW in a grassed area near the playground; USGS Hatboro topographic quadrang; Lat. 40 degrees 11 minutes and 52 seconds N. and Long. 75 degrees 3 minutes and 7 seconds W. Colors are for moist soil unless specified otherwise.

Ap=0 to 11 inches; brown (10YR 4/3) silt loam; weak fine medium granular structure; very friable, slightly sticky and slightly plastic; common very fine and fine roots throughout; 5 percent subangular channers of shale; slightly alkaline; clear wavy lower boundary.

C1=11 to 14 inches; brown (7.5YR 4/3) silt loam; weak fine medium subangular blocky structure; very friable, non-sticky and non-plastic; few very fine roots between peds; 3 percent subangular channers of shale; neutral; clear wavy lower boundary.

C2=14 to 17 inches; yellowish brown (10YR 5/6) silt loam; strong medium coarse subangular blocky structure; firm, non-sticky and non-plastic; 4

percent subangular channers of shale; neutral; gradual wavy lower boundary.

C3=17 to 26 inches; dark yellowish brown (10YR 4/6) silt loam; strong medium coarse subangular blocky structure; firm, non-sticky and non-plastic; very few fine rounded black (10YR 2/1) manganese stains on ped faces; 4 percent subangular channers of shale; neutral; clear wavy lower boundary.

2C=26 to 34 inches; reddish brown (5YR 4/4) loam, weak fine medium subangular blocky structure; very friable, non-sticky and non-plastic; 3 percent subangular channers of shale; moderately acid.

=34 to 36 inches; fractured interbedded shale and siltstone bedrock.

### Range in Characteristics

*Solum thickness:* 6 to 26 inches

*Depth to Bedrock:* 12 to 60 inches or more

*Depth to redox features:*

*Accumulations:* 7 to 60 inches

*Depletions:* 8 to 26 inches

*Content of clay in the control section:* 8 to 28 percent

*Content of rock fragments in the control section:* 0 to 25 percent

*Kind of rock fragments:* Angular and subangular subangular channers of shale and sandstone

*Reaction:* Where unlimed, reaction ranges from mildly alkaline to strongly acid.

*A horizon:*

Hue=10YR, 7.5YR, 5YR, 2.5YR, 10R

Value=3 or 4

Chroma=2 through 4

Texture of the fine earth fraction=loam or silt loam

Content of rock fragments=0 to 10 percent

*B horizon:*(where present)

Hue=10YR, 7.5YR, 5YR, 10R, 2.5YR

Value=4 or 5

Chroma=4 through 8

Texture of the fine earth fraction=loam, silt loam

Content of rock fragments=0 to 35 percent

*C horizon:*

Hue=10YR, 7.5YR, 5YR, 2.5YR, 10R

Value=2 through 8

Chroma=2 through 6

Texture of the fine earth fraction=loam, silt loam, sandy loam

Content of rock fragments=0 to 35 percent

*2C horizon:*(where present)

Hue=7.5YR, 5YR, 10R, 2.5YR

Value=4

Chroma=2 through 4

Texture of the fine earth fraction=loam and silt loam

Content of rock fragments=1 to 10 percent

## Udorthents, Schist and Gneiss

*Depth class:* Shallow through very deep

*Drainage class:* Moderately well drained or well drained

*Permeability:* Moderate throughout

*Landform:* Nearly level to strongly sloping summits and ridges in the piedmont

*Position on the landform:* Summits, shoulders, and backslopes

*Distinctive landscape features:* This soil consist of areas that have been cut and filled during grading for roads, railroads, building site developments, recreation areas, and other similar uses and have now been converted to lawns, playgrounds, or stormwater control structures for aesthetic or recreational uses in close proximity to large urban areas.

*Special surface features:* Cut and fill areas are so intermingled that it is impractical to separate them in mapping at this scale.

*Parent material:*Residual and colluvial material from mixed sedimentary and metamorphic rocks

*Slope range:* 0 to 15 percent

*Associated soils:* Chester, Hatboro, Urbana, Urban land and water

**Taxonomic class:** Udorthents

### General Pedon

Udorthents, schist and gneiss Bucks Co., PA, Bristol Township, 0.7 mile N of Oxford Valley, 1.8 miles SW of Roelofs, 400 feet W of Oxford Valley Road overpass, 30 feet S of Route 1 in a built up area; USGS Trenton West topographic quadrangle; Lat. 40 degrees 11 minutes 37 seconds N and Long. 74 degrees 51 minutes and 57 seconds W. Colors are for moist soil unless specified otherwise.

A=0 to 7 inches; dark yellowish brown (10YR 4/4) silt loam; few fine distinct strong brown (7.5YR 5/8) mottles of weathered gneiss throughout; weak very fine and fine granular structure; friable, slightly sticky and non-plastic; many very fine and fine roots throughout; 5 percent well rounded gravels of siltstone; neutral; clear wavy lower boundary.

C1= 7 to 14 inches; dark yellowish brown (7.5YR 5/8) gravelly silt loam; few fine distinct strong brown (7.5YR 5/8) and gray (10YR 5/1) mottles of weathered gneiss throughout; weak medium subangular blocky structure; friable, slightly sticky and non-plastic; common very fine and fine roots throughout; 20 percent subangular and well rounded gravels and cobbles of mixed metamorphic and sedimentary rocks; neutral; clear wavy lower boundary.

C2=14 to 34 inches; dark yellowish brown (10YR 4/6) gravelly silt loam; few fine to medium distinct strong brown (7.5YR 5/8) and gray (10YR 6/2) mottles of weathered gneiss and schist throughout; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few very fine roots in cracks; 30 percent subangular and well rounded gravels and cobbles of mixed metamorphic and sedimentary rocks; neutral; clear wavy lower boundary.

2C=34 to 44 inches; yellowish red (5YR 5/6) and yellowish brown (10YR 5/6) gravelly silt loam; few fine to medium distinct gray (10YR 6/2) and red (2.5YR 5/6) mottles of weathered schist and gneiss throughout; moderate medium angular blocky structure; firm, slightly sticky and slightly plastic; 20 percent subangular and well rounded gravels and cobbles of mixed metamorphic and sedimentary rocks; slightly acid; clear wavy lower boundary.

2C2=44 to 60 inches; yellowish brown (10YR 5/4) gravelly silt loam; common fine and medium distinct gray (10YR 7/2) and red (2.5YR 4/8) mottles from weathered schist and gneiss throughout; moderate medium subangular blocky structure; firm; slightly sticky and slightly plastic; 25 percent subangular and well rounded gravels and channers of mixed metamorphic and sedimentary rocks; slightly acid.

### **Range in Characteristics**

*Solum thickness:* 5 to 15 inches

*Depth to Bedrock:* 15 to 60 inches or more

*Depth to redox features:*

*Accumulations:* 13 to 55 inches

*Depletions:* Greater than 60 inches

*Content of clay in the control section:* 15 to 45 percent

*Content of rock fragments in the control section:* 0 to 30 percent

*Kind of rock fragments:* Angular and subangular gravels and channers of shale siltstone, sandstone, gneiss, and schist

*Reaction:* Where unlimed, reaction ranges from very strongly acid to neutral in the solum and moderately acid to neutral in the substratum.

*Ap horizon:*

Hue=10YR and 7.5YR

Value=3 or 4

Chroma=3 or 4

Texture of the fine earth fraction=silt loam

Content of rock fragments=0 to 3 percent

*C horizon:*

Hue=10YR, 5YR, and 2.5YR

Value=3 through 5

Chroma=4 through 6

Texture of the fine earth fraction=silt loam, silty clay loam and clay loam

Content of rock fragments=5 to 30 percent

*2C horizon:(where present)*

Hue=10YR

Value=4 through 6

Chroma=3 through 5

Texture of the fine earth fraction=silt loam

Content of rock fragments=5 to 25 percent

## ***Udorthents, Sandy***

*Depth class:* Very deep, and deep to very deep to gravels.

*Drainage class:* Moderately well, well, or somewhat excessively drained

*Permeability:* Rapid to very rapid throughout.

*Landform:* Mid-Atlantic northern coastal plain

*Position on the landform:* Nearly level to strongly sloping broad flats and terraces

*Distinctive landscape features:* This soil consists of areas that have been cut and filled during grading for roads, railroads, building site developments, recreation areas, and other similar uses and now have been converted to lawns, playgrounds, or stormwater control structures for aesthetic or recreational uses in close proximity to large urban areas. Slopes are very complex.

*Special surface features:* Cuts and fill areas are so intermingled that it is impractical to separate them in mapping at this scale

*Parent material:* sandy and gravelly alluvium and glacial outwash sediments from mixed sedimentary, metamorphic, and igneous rocks

*Slope range:* 0 to 15 percent

*Associated soils:* Udorthents, gravelly, Alton, Delaware, Othello, Nanticoke, Pits and quarries, Urban land, water, and Hatboro  
**Taxonomic class:** Udorthents

#### General Pedon

Udorthents, sandy Bucks Co., PA, Falls Township, 1200 feet ENE of Tyburn Road overpass of Warner Access Road, 2300 feet NW of the junction of Tyburn Road and New Ford Mill Road, 900 feet E of the Morrisville Lake outlet pipe, in a disturbed area.; USGS Trenton West topographic quadrangle; Lat. 40 degrees 10 minutes 58 seconds N. and Long. 74 degrees 46 minutes 50 seconds W. Colors are for moist soil unless specified otherwise.

A=0 to 4 inches; brown (10YR 4/3), interior, coarse sand; weak very fine and fine granular structure; very friable, non-sticky and non-plastic; common very fine and fine roots throughout; common very fine to medium moderate continuity void between rock fragments pores; 10 percent well rounded gravels of mixed-igneous-metamorphic & sedimentary rocks; moderately acid; clear smooth lower boundary.

C=4 to 38 inches; olive (5Y 5/4), interior, gravelly loamy sand; single grain; very friable, non-sticky and non-plastic; common very fine to medium high continuity void between rock fragments pores; 20 percent well rounded gravels of mixed-igneous-metamorphic & sedimentary rocks; moderately acid; gradual wavy lower boundary.

2C=38 to 62 inches; brown (7.5YR 4/4), interior, extremely gravelly coarse sand; common medium distinct light gray (10YR 7/2) moist irregular mottles throughout and common medium distinct dark yellowish brown (10YR 4/6) moist irregular mottles throughout; single grain; very friable, non-sticky and non-plastic; many very fine to coarse high continuity void between rock fragments pores; 35 percent well rounded gravels of mixed-igneous-metamorphic & sedimentary rocks and 40 percent well rounded cobbles of mixed-igneous-metamorphic & sedimentary rocks; moderately acid.

#### Range in Characteristics

*Solum thickness:* 4 to 12 inches

*Depth to Bedrock:* 6 to 10 feet or more

*Depth to redox features:*

*Accumulations:* 30 to 60 inches

*Depletions:* 30 to 60 inches

*Content of clay in the control section:* 1 to 6 percent

*Content of rock fragments in the control section:* 20 to 45 percent

*Kind of rock fragments:* Rounded and well rounded gravels and cobbles of mixed igneous, metamorphic and sedimentary rocks

*Reaction:* Where unlimed, reaction ranges from very strongly acid to slightly alkaline throughout.

#### *A horizon:*

Hue=2.5Y, 10YR, 7.5YR, 5YR, 2.5YR

Value=2 through 4

Chroma=2 through 4

Texture of the fine earth fraction= fine and coarse sand or loamy sand

Content of rock fragments=5 to 20 percent

#### *C horizon:*

Hue=neutral, 5GY, 5G, 2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, 5Y

Value=2 through 8

Chroma=1 through 8

Texture of the fine earth fraction= fine and coarse sand or loamy sand

Content of rock fragments=25 to 35 percent

#### *2C horizon:*

Hue=neutral, 5GY, 5G, 2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, 5Y

Value=2 through 8

Chroma=1 through 8

Texture of the fine earth fraction= coarse sand or loamy sand

Content of rock fragments=50 to 95 percent

### ***Washington Series***

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate in the surface and subsoil and moderate to moderately rapid in the substratum

*Landform:* Uplands

*Position on the landform:* Sideslopes and hilltops

*Parent material:* Glacial till overlying limestone

*Slope range:* 0 to 75 percent

*Associated soils:* Clarksburg, Ryder, Clarksburg

**Taxonomic class:** Fine-loamy, mixed, mesic Ultic Hapludalfs

#### **Typical Pedon**

Washington silt loam, 0 to 3 percent slopes in Lehigh County, Whitehall Township, 1 3/8 miles east southeast of Mechanicsville, 2,000' South of the intersection of 39037 (Mechanicsville road) and Rural Drive, 28 feet east of Rural Drive; USGS Cememton topographic quadrangle; Lat. 40 degrees 38 minutes 35 seconds N. and Long. 75 degrees 31 minutes 20 seconds W. Colors are for moist soil unless specified otherwise.

Ap=0 to 9 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; friable, non-sticky and non-plastic; 10 percent rounded gravels of mostly sandstone; neutral; abrupt smooth lower boundary.

Bt1=9 to 17 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; 5 percent rounded gravels of mostly sandstone; common distinct clay films; neutral; clear wavy lower boundary.

Bt2=17 to 31 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; firm, sticky and plastic; 5 percent rounded gravels of mostly sandstone; common distinct clay films; neutral; gradual wavy boundary.

Bt3=31 to 37 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; firm, sticky and plastic; 5 percent rounded gravels of mostly sandstone; common distinct clay films; neutral; clear wavy lower boundary.

Bt3=37 to 42 inches; yellowish red (5YR 5/6) silty clay loam; moderate medium blocky structure; firm, sticky and plastic; 5 percent rounded gravels of mostly sandstone; common distinct clay films; neutral; clear wavy lower boundary.

C=42 to 61 inches; yellowish brown (10YR 5/6) silt loam; massive; firm, non-sticky and non-plastic; neutral; friable, sticky and plastic; 5 percent rounded gravels of mostly sandstone.

#### **Range in Characteristics**

*Solum thickness:* 40 to 60 inches

*Depth to Bedrock:* 60 to 240 inches

*Content of clay in the control section:* 25 to 34 percent

*Content of rock fragments in the control section:* 2 to 35 percent

*Kind of rock fragments:* Rounded through subangular gravels of sandstone, quartz, limestone

*Reaction:* Where unlimed, reaction ranges from medium acid to neutral, generally becoming less acid with depth.

#### *Ap horizon:*

Hue=10YR or 7.5YR

Value=3 or 4

Chroma=2 to 4

Texture of the fine earth fraction=silt loam

Content of rock fragments= 5 to 15 percent

#### *B horizon:*

Hue=7.5YR or 10YR

Value=5 or 6

Chroma=4 to 8

Texture of the fine earth fraction=silty clay loam, silt loam, loam, or clay loam

Content of rock fragments= 2 to 35 percent

#### *C horizon:*

Hue=10YR to 5YR

Value=5 or 6

Chroma=3 to 8

Texture of the fine earth fraction=silt loam, loam, or clay loam

Content of rock fragments=2 to 35 percent

### ***Weikert Series***

*Depth class:* Shallow

*Drainage class:* Well drained to somewhat excessively drained

*Permeability:* Moderately rapid

*Landform:* Convex uplands

*Position on the landform:* Broad tops and sides of hills

*Parent material:* Residuum from interbedded gray and brown acid shale, siltstone and fine grained sandstone

*Slope range:* 3 to 35 percent

*Associated soils:* Bedington, Berks, Culleoka, Klinessville

**Taxonomic class:** loamy-skeletal, mixed, mesic Lithic Dystrochrepts

#### **Typical Pedon**

Weikert channery silt loam in an area of Weikert-Berks complex, 15 to 25 percent slopes in Berks County, Penn Township, 2.5 miles north of Pleasant Valley, 1.4 miles northwest of Bern Church, 1040 feet south of t521; USGS Bernville topographic

quadrangle; Lat. 40 degrees 24 minutes 33 seconds N. and Long. 76 degrees 03 minutes and 21 seconds W. Colors are for moist soil unless specified otherwise.

Ap=0 to 8 inches; brown (10YR 4/3) channery silt loam; weak fine granular structure; friable, non-sticky and non-plastic; 30 percent angular and subangular channers of shale; neutral; abrupt smooth lower boundary.

Bw=8 to 15 inches; yellowish brown (10YR 5/6) very channery silt loam; weak medium subangular blocky structure; friable, non-sticky and non-plastic; 50 percent angular and subangular channers of shale; moderately acid; gradual wavy lower boundary.

C=15 to 18 inches; yellowish brown (10YR 5/6) extremely channery silt loam; massive; friable, non-sticky and non-plastic; 80 percent angular and subangular channers of shale; moderately acid; clear wavy lower boundary.

R=18 to 19 inches; yellowish brown (10YR 5/4) weathered fractured shale.

#### **Range in Characteristics**

*Solum thickness:* 8 to 20 inches

*Depth to Bedrock:* 10 to 20 inches

*Content of clay in the control section:* Less than 35 percent

*Texture of the fine earth in the control section:* Silt loam or loam

*Content of rock fragments in the control section:* 35 to 55 percent

*Kind of rock fragments:* Angular and subangular channers of shale with some siltstone and sandstone

*Reaction:* Where unlimed, reaction ranges from moderately acid to very strongly acid in the Surface and moderately acid to extremely acid in the subsoil and substratum.

*Ap horizon:*

Hue=7.5YR or 10YR

Value=4 or 5

Chroma=3 or 4

Texture of the fine earth fraction=silt loam or channery or very channery silt loam

Content of rock fragments= 5 to 50 percent

*B horizon:*

Hue=7.5YR or 10YR

Value=4 to 6

Chroma=3 to 6

Texture of the fine earth fraction=very channery silt loam or very channery loam

Content of rock fragments= 35 to 60 percent

*C horizon:*

Hue=7.5YR to 2.5Y

Value=4 to 6

Chroma=3 to 8

Texture of the fine earth fraction= extremely channery silt loam or extremely channery loam

Content of rock fragments=60 to 85 percent