

1. Soil Regions of DE



- a. Piedmont Region
 - i. Northern New Castle County
 - ii. Steeper slopes
 - iii. Soil formed from bedrock parent material

- b. Atlantic Coastal Plain Region
 - i. Everything south of Piedmont Region
 - ii. More flat
 - iii. Soil formed from sediment deposits

Figure 1. Physiographic Provinces of Delaware. Adapted from "A Summary of the Geologic History of Delaware," by The Delaware Geological Survey. Special Publication No. 20, 1998.

2. Interpreting Soil Maps

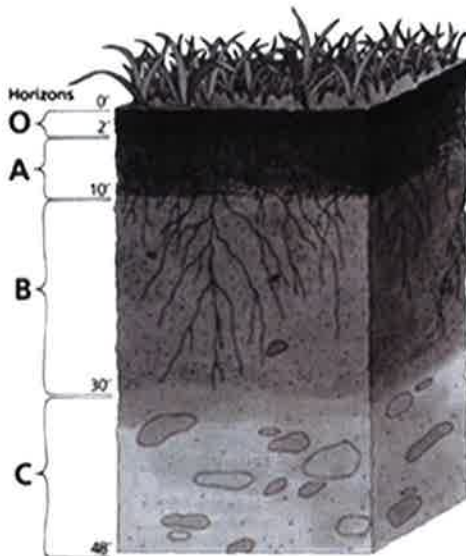


Figure 2. A Soil Profile. nracs.usda.gov

The Basics

-Soil Profile- a soil's arrangement of layers or horizons

O Horizon- decaying organic matter (dead plant & animal materials); absent in tilled cropland

A Horizon- mineral particles & some organic matter; organic matter adds darker color

B Horizon- accumulated clay, iron oxides that leached from A horizon; may be lighter color than A horizon

C Horizon- least weathered horizon

Terms you will see on a soil map:

i. Soil Series

-Group of soils that have the same profile (though surface texture may vary)
-Named for place where soil was first mapped
ex: Matapeake, Sassafras, Elkton are series names

-Some soils don't have a series = miscellaneous type
ex: Urban Lands

ii. Soil Complex

-Several soil series are inter-mixed in same area
ex: Glenelg-Wheaton-Urban Land complex

iii. Soil Map Unit Name

-Full name includes Series, Surface Texture, and Slope

ex: **Fallsington Sandy Loam, 0-2%** is full name

Fallsington: soil series

Sandy Loam: surface texture

0-2%: slope

iv. Soil Map Unit Symbol

-Abbreviated soil map unit name for use on maps
-First 2 or 3 letters represent soil series, and second capital letter is slope

ex: **FadA** is Fallsington sandy loam, 0-2% slopes

Fad: Fallsington series with surface texture of sandy loam

A: A slope of 0-2%

ex: **PpB** is Pepperbox loamy sand, 2-5% slopes

Pp: Pepperbox series with surface texture of loamy sand

B: B slope of 2-5%

*****Slope categories vary by region!*****

Piedmont has steeper slopes overall, so "B" slope in Piedmont is steeper than "B" slope in Coastal Plain, etc:

Region	A slope	B slope	C slope	D slope	E slope
Piedmont	0-3%	3-8%	8-15%	15-25%	25-45%
Coastal Plain	0-2%	2-5%	5-10%	10-15%	>15%

For the examples under "iv. Soil Map Unit Symbol," what region are they in?

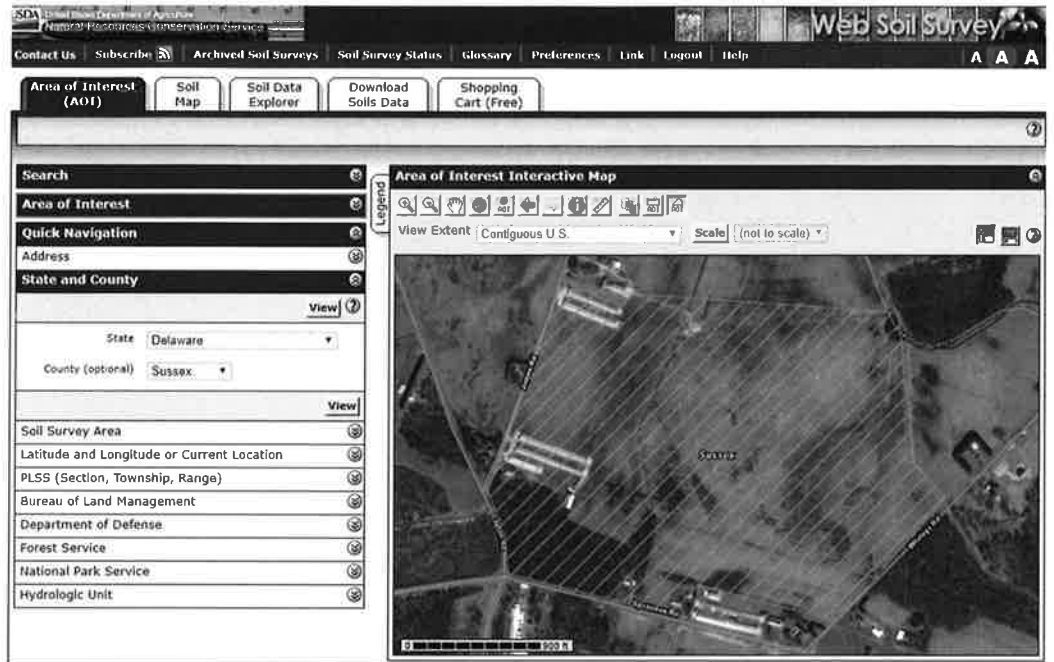
v. Soil Survey – a book of soil maps covering an entire county; also contain information on soil characteristics and land uses – it is now available online on the Web Soil Survey.

vi. Web Soil Survey – online soil survey where soil data can be found:

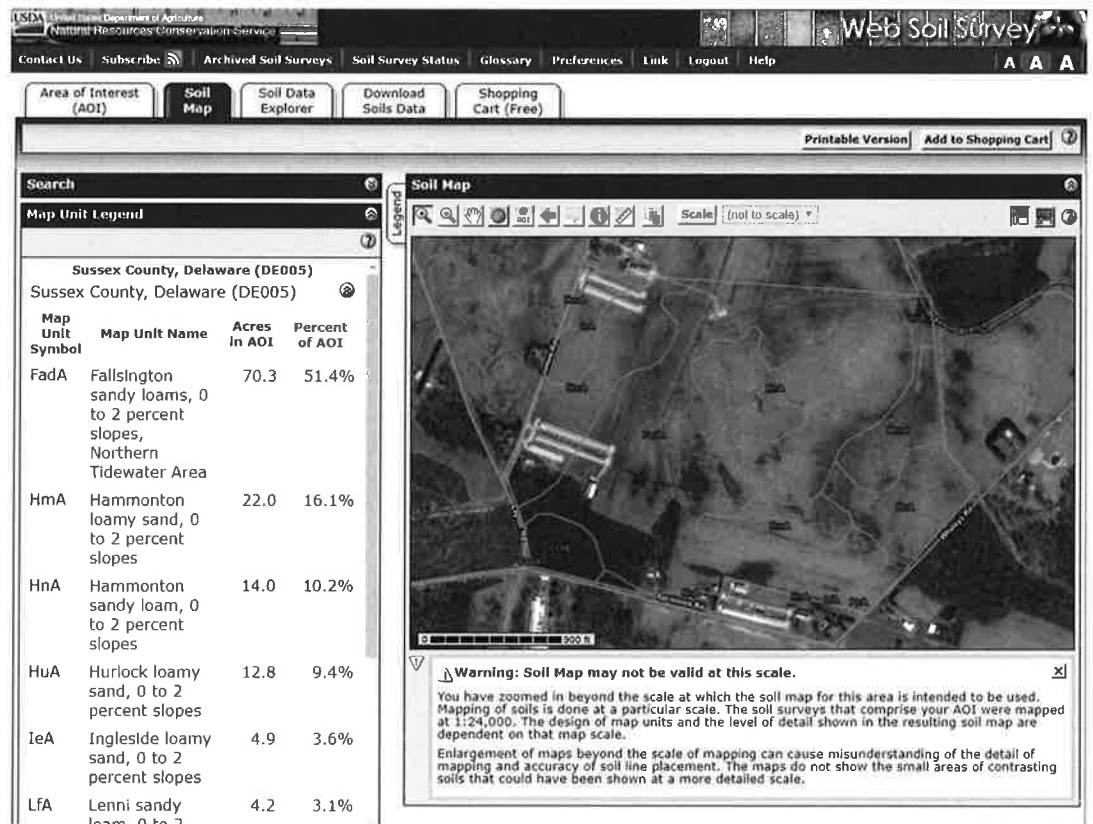
websoilsurvey.nrcs.usda.gov/

-How to make a map in Web Soil Survey:

- a. Navigate to your location using an address or county.
- b. Draw your Area of Interest (AOI).



c. Click Soil Map tab to generate soil map.



d. Click Soil Data Explorer tab to find report options- choose one and click View Rating.

ex: Land Capability Class (choose Irrigated or Nonirrigated)

Click Legend tab to display map legend.

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
FadA	Fallsington sandy loams, 0 to 2 percent slopes, Northern Tidewater Area	5	70.3	51.4%
HmA	Hammonton loamy sand, 0 to 2 percent slopes	2	22.0	16.1%
HnA	Hammonton sandy loam, 0 to 2 percent slopes	2	14.0	10.2%
HuA	Hurlock loamy sand, 0 to 2 percent slopes	3	12.8	9.4%
IeA	Ingleside loamy sand, 0 to 2 percent slopes	1	4.9	3.6%
IFA	Ironi sandy loam, 0 to 2 percent slopes	4	4.7	3.5%

3. Soil Characteristics

a. Color

i. use Munsell Soil Color Book

page name on tab = Hue; vertical axis = Value; horizontal axis = Chroma

notation = **Hue value / chroma** ; opposite page gives name of color

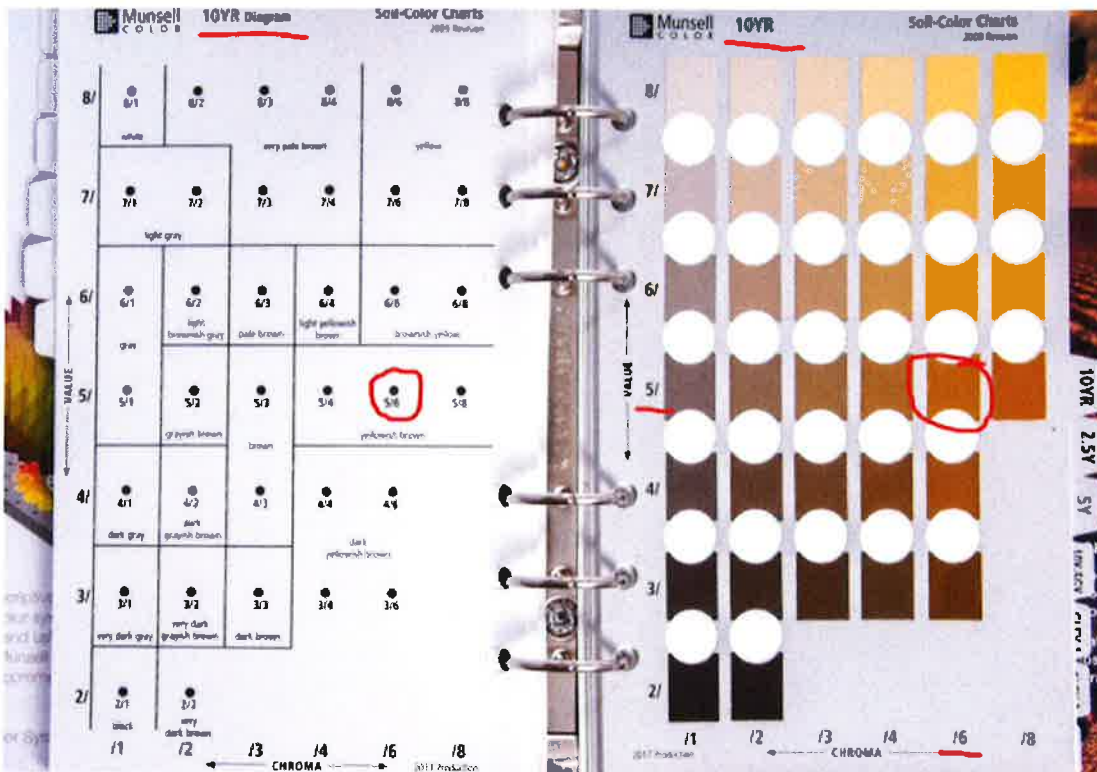


Figure 3. Soil Color. nrcs.usda.gov

ex. 10YR 5/6 is yellowish brown
10YR: Hue
5: Value 6: Chroma

Mottled color is caused when **poorly drained soils** have intermittent wetness, leading to oxidation and reduction of iron and manganese. Color concentrates when oxygen reaches the area. See pic below.



Figure 4. Field Indicators of Hydric Soils. nrcs.usda.gov

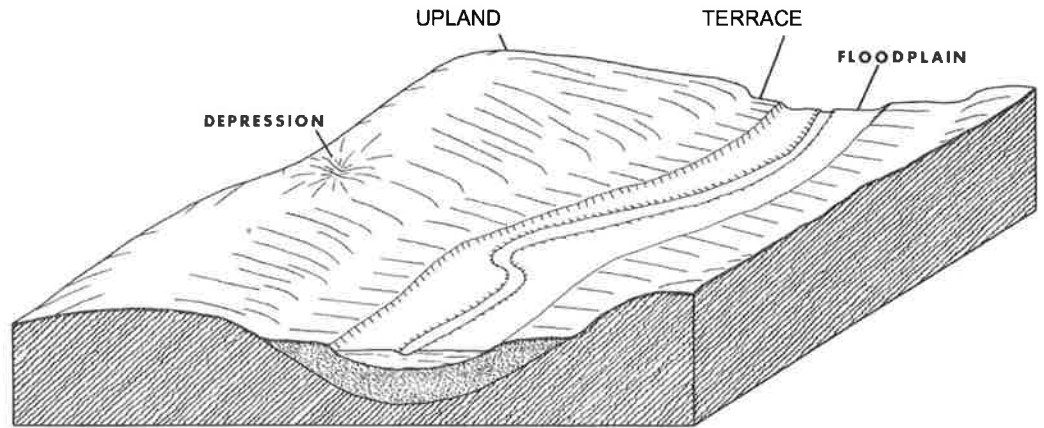
a. Landscape Position

i. *floodplains* are near streams that flood periodically

ii. *upland depressions* or drainageways form on concave land where water pools

iii. *uplands* are unaffected by stream activity, higher elevation with rolling and convex topography

iv. *terraces* are step-like landforms that are flat and bounded by steeper landforms



b. Land Capability Class

i. soil characteristic based on its ability to produce crops & pasture without deteriorating over time

ii. notation: number (class) sometimes followed by letter (subclass)

iii. higher number = more limitations (steep, rocky, wet) that negatively affect agricultural use

iv. Classes

- I No limiting factors, nearly level
- II Gently sloping, or moderately well drained, or moderately deep
- III Strongly sloping, or somewhat poorly drained, or shallow
- IV Moderately steep, or poorly drained, or occasionally flooded
- V Nearly level and very stony, rock outcrop, very poorly drained, or frequently flooded
- VI Steep, or gently sloping through steep with a very stony surface or rock outcrop
- VII Very steep with or without a very stony surface or rock outcrop, or very shallow soils
- VIII Swamp, tidal marsh, coastal beach, rock outcrop, or urban land

v. Subclasses

- e Risk of erosion
- w Wetness
- s Shallow, droughty, or stony
- c Too cold OR too dry

ex. a soil with Land Capability Class **Ile** is pretty good for agriculture but has a risk of erosion.

class: **II**, subclass: **e**

c. Drainage Class- a soil's ability to drain water

i. classes range from Excessively Well Drained to Very Poorly Drained

ii. *Well drained soils* do not stay wet long and are good for building basements

iii. *Poorly drained soils* often stay wet, affect plant growth, and may be hydric soils

e. Site Suitability

- i. the soil type affects a site's suitability for various uses: septic tanks, basements, etc
- ii. use soil's map unit symbol to look up its Site Suitability in charts- see pages 20-21
- iii. estimating site suitability & limitations for an unknown soil sample:

Fill out below chart by circling the correct answer in each column;

Then choose limitation rating (*Slight, Moderate, or Severe*) based on the most limiting factor:

Example: Site Suitability for Septic Tank Absorption Fields

Limitation Rating	Slope	Depth to Bedrock	Depth to Grey (wetness)	Permeability
<i>SLIGHT</i>	Nearly level, gentle slope	>72"	>72"	Moderately rapid or moderate
<i>MODERATE</i>	Strongly sloping	40-72"	40-72"	Moderately slow
<i>SEVERE</i>	Moderately steep to very steep	<40"	<40"	Slow or rapid

In this example based on the highlighted items, the site suitability would be MODERATE

f. Prime Farmland

- i. land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses
- ii. each state develops a list
- iii. qualities of Prime Farmland soils: capability classes I & II, with adequate moisture supply, favorable temperature and growing season, acceptable pH, acceptable salt and sodium content, few or no rocks/permeable to water and air, not excessively erodible or saturated with water for long periods, not frequently flooded during growing season or protected from flooding.

g. Effective Rooting Depth

- i. measure of how deep plant roots can grow before they reach a restricting layer (such as bedrock, fragipan, etc.)
- ii. effective rooting depth = depth to bedrock in most soils without additional restricting layers

h. Available Water Capacity (AWC)

- i. amount of water that a soil can store and release to plants
- ii. calculated based on top 40" of soil profile; each horizon is calculated separately

iii. Available Water Capacity categories:

Very Low	< 2.5" water in 40" soil
Low	2.6 – 4.5" water in 40" soil
Medium	4.6 – 7.0" water in 40" soil
High	> 7.0" water in 40" soil

iv. Available Water Capacity by texture:

Coarse (sand, loamy sand)	0.05" water / 1" soil
Moderately coarse (sandy loam, fine sandy loam)	0.14" water / 1" soil
Medium (loam, sandy clay loam, silt loam)	0.23" water / 1" soil **highest AWC
Fine (silty clay, sandy clay, clay)	0.13" water / 1" soil

- i. Texture- determined by proportions of sand, silt, and clay- refer to Textural Triangle
 - i. affects many soil properties, such as AWC, Land Capability Class, and Site Suitability
 - ii. soil texture & structure determine the rate at which water moves through the soil
- j. Parent Material- what a soil forms from
 - i. Piedmont region- parent material is bedrock
 - residual parent material that stayed in place
 - ii. Coastal Plain region- parent material is sediment deposited by water bodies of the past
 - colluvium & alluvium parent material that moved to the site by water/geologic events

4. Soil Concerns

a. Erosion- the process of soil being removed from a site by water, wind, or other forces

i. Wind erosion-

- Saltation: medium sized sands lifted a short distance and dropped back down, this dislodges more particles.
- Suspension: very fine particles (clay & silt) are lifted high in the air and carried a long distance; removes the most fertile part of soil.
- Creep: sand-sized particles roll along the ground.

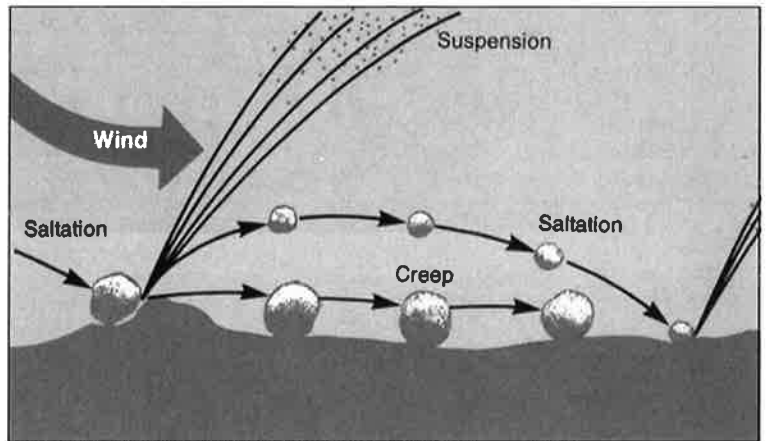


Figure 5. Wind Erosion: Problems, Processes and Control. nrcs.usda.gov

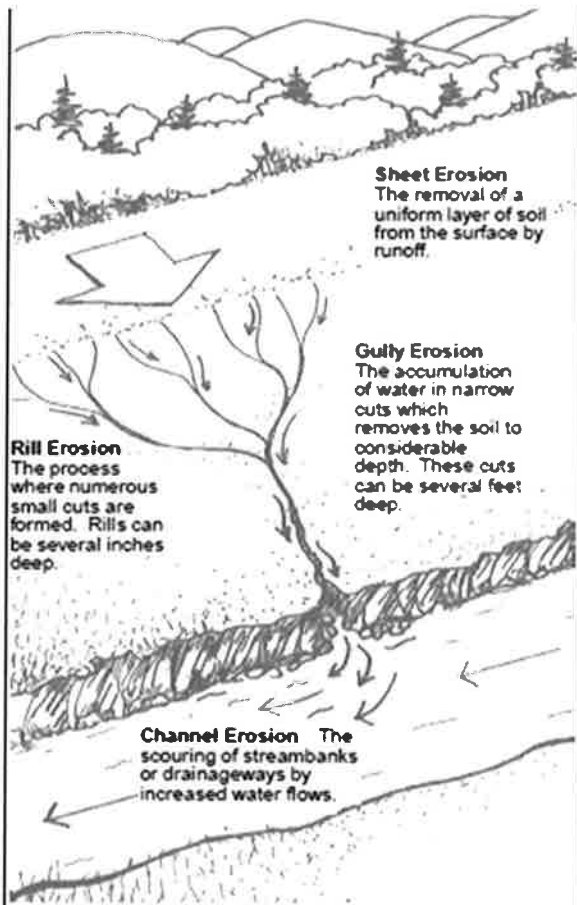


Figure 6. Soils and Drainage- You and Your Land. Northern Virginia Soil and Water Conservation District. fairfaxcounty.gov

ii. Water erosion-

- Sheet erosion: rain falls faster than soil can absorb it; water starts to flow across the ground carrying soil particles dislodged by raindrops; like removing sheets of paper.
- Rill erosion: surface flow starts to form small channels or "rills"; rills are small enough to be erased by tillage.
- Gully erosion: channelized water cuts deeper than rills; can't be removed by tillage; gully will continue to grow uphill.
- Slump (or mass) erosion - saturated hillside starts to slide or creep downhill

iii. Geologic erosion-

- landslides, glaciers- usually not influenced by humans

iv. Highly Erodible Land (HEL)

- soil types and slopes that are at high risk to erosion
- subject to protection requirements if landowner wants to participate in USDA programs

v. Calculating erosion

- “RUSLE” equation takes into account soil type, rainfall, length, slope, crop residues, and conservation practices
- wind erosion equations exist that account for unsheltered distance, surface texture, wind speed, and soil type

b. Hydric Soils

- i. soil formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic (lack of oxygen) conditions in the upper part
- usually grey within 10” of surface

-very poorly drained or poorly drained (water stays in soil rather than draining)

-support hydrophytic (water tolerant) vegetation

- ii. wetlands contain hydric soils and are protected by federal legislation

c. Other Regulations involving Soils

- i. steep slope ordinances
- ii. erosion control laws
- iii. floodplain ordinances
- iv. prime farmland restrictions

5. Soil Management Tools

a. Conservation Plans- developed for farms by employees of USDA and partners

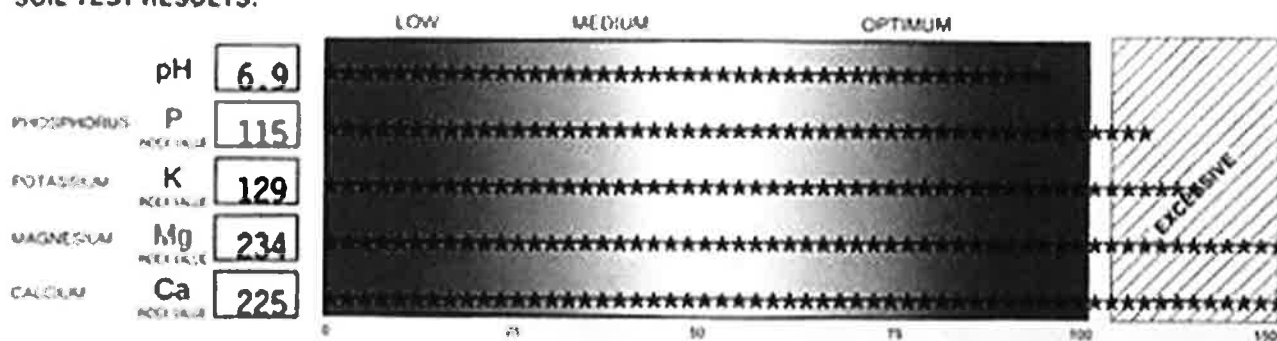
- i. a list of planned activities that will protect soil and water resources
- ii. also may address wildlife, air quality, plant health
- iii. includes map of farm, soil map, and soil report

b. Land Use Decisions- items for a landowner to consider:

- i. Land Capabilities based on soil type
- ii. costs to overcome any limitations described in Site Suitability rating
- iii. environmental impacts (effects on groundwater, surface water, wildlife, etc.)

- c. Soil Tests- send soil sample to a lab for testing every 1-3 years
 - i. soil test will determine nutrient levels, pH, organic matter
 - goal is to have nutrients in Optimum range
 - pH 6 – 6.5 is best for most crops
 - ii. follow soil test recommendations for nutrient additions for optimum plant growth
 - Nitrogen, Phosphorus, and Potassium (N, P, & K) are most vital plant macronutrients
 - iii. overapplication of nutrients can result in water pollution
 - iv. Nitrogen levels may not be reported because N is difficult to measure; N recommendations will be given based on planned crop

SOIL TEST RESULTS:



2.2	153.0	19.1	22.8	5.4		7.89	45.0	15.3	94.2	1.11
B	Mn	Zn	SO ₄ S	% ORGANIC MATTER	SOL. SALTS (MNH ₄ OCM)	BUFFER pH	% Phosphate Saturation	CEC (meq/100g)	% Base Saturation	ENCLOSURES

SUGGESTED FERTILIZER PROGRAM:

CROP: VEGETABLE GARDEN

YIELD GOAL: N/A

*****SEE BELOW*****					
1/4	TYPE	N	P ₂ O ₅	K ₂ O	S
LIME		LB/A	LB/A	LB/A	LB/A

1. Apply 1 lb of N per 1000 square feet of garden area. This can be supplied by 3 lbs ammonium nitrate (34-0-0) or 2.5 lbs of urea (46-0-0). If these two fertilizers are not available, select an alternate source that is low in P as soil levels of P and K are already in the "Optimum" or "Excessive" range.
Apply recommended fertilizer to the soil surface and rake in just before planting.
2. For nitrogen sidedressing instructions, see Soil Test Note 11 (enclosed).

Practice Questions.

Circle the correct answer.

1. What is the layer normally present on the surface of the soil in cropped fields?
a. O c. Ap e. B g. R
b. A d. E f. C
2. Available water/moisture capacity is the amount of water that a soil _____.
a. holds when it is saturated with water
b. holds during long dry periods
c. can store and release to plants
d. provides to plants during wet periods
3. _____ is defined as a measure of the ability of air or water to move through the soil profile.
a. Density d. Bulk density
b. Texture e. Permeability
c. Structure f. Mottling
4. What is the most important physical property that controls the rate water moves through the soil to the groundwater?
a. Depth d. Structure
b. Organic Matter e. Topography
c. Color f. Slope
5. The key factor for texture differences in soils in Delaware is _____.
a. Climate d. Time
b. Position in the landscape e. Living organisms
c. Parent material
6. If a soil profile exhibits relatively thin layers of light and dark colored materials stratified approximately parallel to the surface, it is likely that the soil _____.
a. is eroding c. is located on the floodplain
b. needs lime d. has been used as a garden
7. A typical soil is composed of:
a. 33% solids, 33% water, 33% air c. 80% solids, 10% water, 10% air
b. 50% solids, 25% water, 25% air d. 90% solids, 5% water, 5% air
8. Soil texture refers to the amounts of _____ sized particles in the soil.
a. sand, silt, and clay
b. coarse, medium and fine
c. large, average and small
9. The B-horizon in a soil profile is the layer of:
a. partially disintegrated parent material
b. maximum biological activity
c. accumulation of organic material
d. brighter/lighter color where leached material accumulates
e. bedrock
10. Soil colors are identified using:
a. a color wheel
b. a Munsell chart
c. a soil survey
d. local convention

11. Soil colors are described using the following elements:
- shade, intensity, and darkness
 - hue, value, chroma, and gley
 - value, chroma, and gley
 - hue, chroma, and value
12. Which TWO of the following drainage classes would a hydric soil most likely have? (Circle both.)
- well drained
 - excessively drained
 - moderately well drained
 - very poorly drained
 - poorly drained
13. The presence of mottles in a soil indicates these TWO characteristics: (Circle both.)
- old root channels
 - the presence of earthworms
 - impeded soil drainage
 - high iron concentrations
14. Wind moves soil in the following ways EXCEPT for _____.
- abrasion
 - saltation
 - suspension
 - surface creep
15. Which soil will have the greatest potential for erosion if cropped?
- GgA
 - GgB
 - GgC
 - GgD
16. In the soil name Chester silt loam, the "silt loam" refers to the texture of the:
- parent material
 - surface material
 - subsoil
 - substratum
17. Which TWO soils tend to be most susceptible to wind erosion? (Circle both)
- silty
 - clayey
 - sandy
18. Silty soils tend to have _____ available water/moisture than sandy soils.
- more
 - less
19. Hydric soils are which of the following? (Circle ALL the correct answers.)
- wet soils
 - soils that can support hydrophytic vegetation
 - soils used to define wetlands
 - soils developed under wet conditions (anaerobic within 10")
20. Which of the following is NOT a form of erosion?
- wind
 - gully
 - sheet
 - compaction
 - rill

21. If a soil sample has a pH of 5.1 to 5.5, it is _____.
- neutral
 - strongly acid
 - extremely acid
 - mildly alkaline
22. What is the limitation rating class for Septic Tank Absorption Fields for a soil with the following shaded characteristics?

	Slope	Depth to Bedrock	Depth to Gray (wetness)	Permeability
SLIGHT	Nearly level	>72"	>72"	Moderately rapid or moderate
MODERATE	Strongly sloping	40-72"	40-72"	Moderately slow
SEVERE	Moderately to very steep	<40"	<40"	Slow to rapid

- Slight
 - Moderate
 - Severe
23. What are the THREE major plant nutrients? (Circle all three.)
- carbon
 - potassium
 - nitrogen
 - phosphorous
24. The landscape position for the site where this building sits is:
- Floodplain
 - Terrace
 - Upland depression or drainage way
 - Upland

Use pages 15-23 to answer the following questions.

Assuming that you have an area of interest on a soil map with the symbol of DoB, answer the following questions.

- What is the soil series for this symbol? _____
- What is the surface soil texture? _____
- What is the slope class? _____
- What is the Map Unit Name? _____
- What is the capability class and subclass? _____
- What is the flooding potential of this unit? _____
- What tree will produce at least 70 cu. ft. of boards on this site? _____

- What is the depth to the seasonal high water table? _____

33. What is the degree of limitation for a home with a basement? _____
34. If the soil was EmA, undrained, what would limit the site for roads? _____

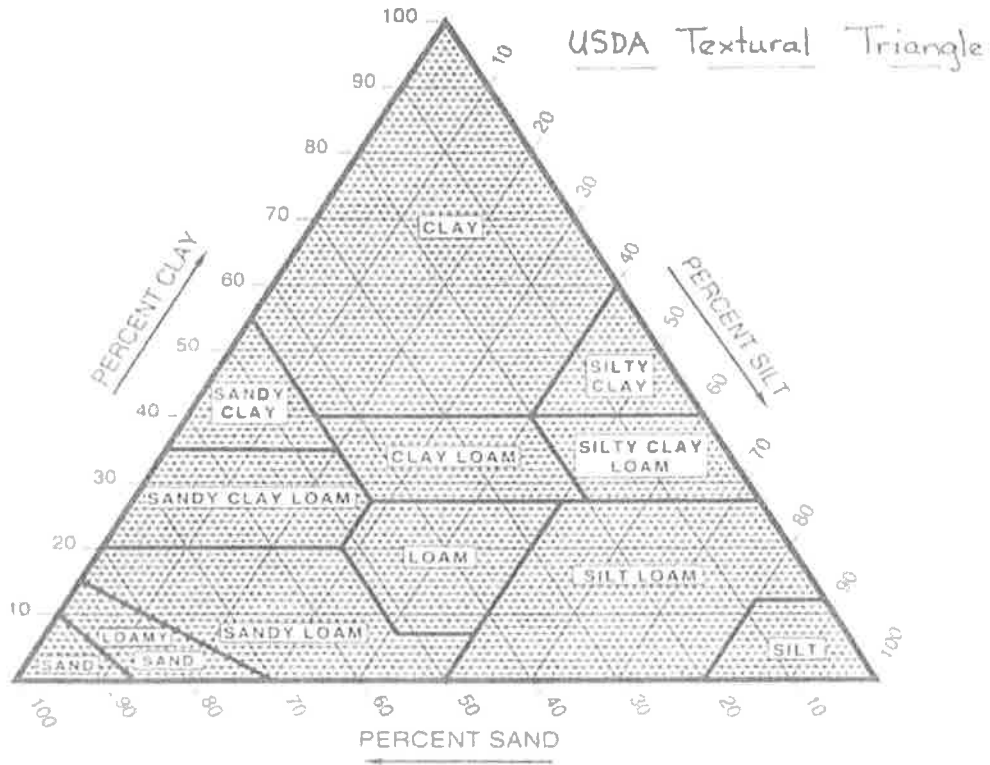
35. What is the drainage class for DoB? _____
36. For DoB the crop yield for non-irrigated corn is 120 bushels per acre. How does that compare with non-irrigated Greenwich loam on a 2-5% slope? _____

37. What is the Available Water Capacity? _____
38. What other Minor Components might be found in this map unit? _____

39. Where is this soil found in the landscape? _____

40 – 42. **See Textural Triangle.** (page 14)

Using the Textural Triangle, determine the name of each soil symbolized by a pie chart (#40-42).

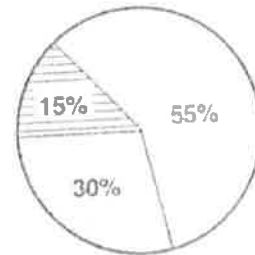
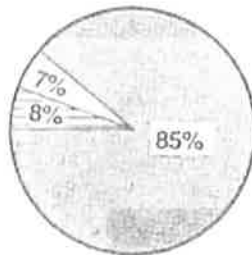
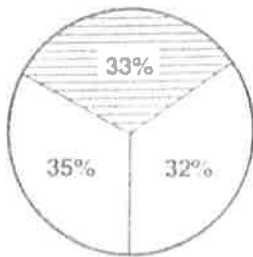


Identify the soil textures for the 3 examples below.

40.) _____

41.) _____

42.) _____



Sand

Silt

Clay

Figure 5.

Percentage of sand, silt and clay in various textural classes.

Map Unit Legend

New Castle County, Delaware

Map symbol	Map unit name
Ba	Broadkill-Appoquinimink complex, very frequently flooded, tidal
BbB	Baile-Glenville complex, 0 to 8 percent slopes
BkD	Brinklow channery loam, 15 to 25 percent slopes
BnF	Brinklow-Blocktown complex, 25 to 65 percent slopes
Br	Broadkill mucky peat, very frequently flooded, tidal
BrvF	Brinklow channery loam, 25 to 65 percent slopes, very stony
Ch	Codorus silt loam, 0 to 3 percent slopes, occasionally flooded
CnB	Collington fine sandy loam, 2 to 5 percent slopes
CnD	Collington fine sandy loam, 5 to 15 percent slopes
CoA	Corsica mucky loam, 0 to 2 percent slopes
Cp	Comus silt loam, 0 to 3 percent slopes, occasionally flooded
CsA	Crosiadore silt loam, 0 to 2 percent slopes
DaB	Delanco silt loam, 3 to 8 percent slopes
DcB	Delanco-Codorus-Hatboro complex, 0 to 8 percent slopes, flooded
DoA	Downer sandy loam, 0 to 2 percent slopes
DoB	Downer sandy loam, 2 to 5 percent slopes
DoC	Downer sandy loam, 5 to 10 percent slopes
EmA	Elkton silt loam, 0 to 2 percent slopes
EnB	Elsinboro silt loam, 3 to 8 percent slopes
ErB	Elsinboro-Delanco-Urban land complex, 0 to 8 percent slopes
ESA	Endoaquepts and Sulfaquepts, 0 to 5 percent slopes
FaA	Fallsington sandy loam, 0 to 2 percent slopes
FgA	Fallsington loam, 0 to 2 percent slopes
FzB	Fallsington-Urban land complex, 0 to 5 percent slopes
GaC	Gaila loam, 8 to 15 percent slopes
GaD	Gaila loam, 15 to 25 percent slopes
GaE	Gaila loam, 25 to 45 percent slopes
GeA	Glenelg loam, 0 to 3 percent slopes
GeB	Glenelg loam, 3 to 8 percent slopes
GeC	Glenelg loam, 8 to 15 percent slopes
GgA	Glenelg silt loam, 0 to 3 percent slopes
GgB	Glenelg silt loam, 3 to 8 percent slopes
GgC	Glenelg silt loam, 8 to 15 percent slopes
GgD	Glenelg silt loam, 15 to 25 percent slopes
GhB	Glenelg-Wheaton-Urban land complex, 0 to 8 percent slopes
GhC	Glenelg-Wheaton-Urban land complex, 8 to 15 percent slopes
GnA	Glenville silt loam, 0 to 3 percent slopes
GnB	Glenville silt loam, 3 to 8 percent slopes
GnC	Glenville silt loam, 8 to 15 percent slopes
GrA	Greenwich loam, 0 to 2 percent slopes
GrB	Greenwich loam, 2 to 5 percent slopes
GuB	Greenwich-Urban land complex, 0 to 5 percent slopes
HbA	Hambrook sandy loam, 0 to 2 percent slopes
HbB	Hambrook sandy loam, 2 to 5 percent slopes
HkB	Hambrook-Urban land complex, 0 to 5 percent slopes
HnA	Hammonlon sandy loam, 0 to 2 percent slopes
HoA	Hammonlon-Fallsington-Mullica complex, 0 to 2 percent slopes
Hi	Hatboro silt loam, 0 to 3 percent slopes, frequently flooded
Hw	Hatboro-Codorus complex, 0 to 3 percent slopes, frequently flooded

Map Unit Description

New Castle County, Delaware

DoB Downer sandy loam, 2 to 5 percent slopes

Setting

Landscape: Coastal plains, uplands
Elevation: 20 to 70 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 58 degrees F
Frost-free period: 175 to 220 days

Composition

Downer and similar soils: 80 percent
Minor components: 20 percent

Description of Downer

Setting

Landform: Flats, knolls, fluvio-marine terraces
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loamy fluvio-marine sediments

Properties and Qualities

Slope: 2 to 5 percent
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate maximum: 0 percent
Gypsum maximum: 0 percent
Available water capacity: Low (about 5.7 inches)

Interpretive Groups

Land capability classification (Irrigated): 2e
Land capability (non irrigated): 2e

Typical Profile

0 to 11 inches: sandy loam
11 to 35 inches: sandy loam
35 to 80 inches: loamy sand

Minor Components

Phalanx soils

Percent of map unit: 10 percent
Landform: Divides

Russett

Percent of map unit: 5 percent

Hammonton

Percent of map unit: 5 percent

Map Unit Description (Brief, Generated)

New Castle County, Delaware

[Minor map unit components are excluded from this report]

Map unit: DcB - Downer sandy loam, 2 to 5 percent slopes

Component: Downer (80%)

The Downer component makes up 80 percent of the map unit. Slopes are 2 to 5 percent. This component is on uplands, flats. The parent material consists of loamy fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2e. Irrigated land capability classification is 2E. This soil does not meet hydric criteria.

Map unit: EmA - Elkton silt loam, 0 to 2 percent slopes

Component: Elkton, undrained (40%)

The Elkton, undrained component makes up 40 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, lowlands. The parent material consists of silty eolian deposits and/or fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is not flooded. It is occasionally ponded. A seasonal zone of water saturation is at 5 inches during January, February, March, April. Organic matter content in the surface horizon is about 57 percent. Nonirrigated land capability classification is 5w. This soil meets hydric criteria.

Component: Elkton, drained (35%)

The Elkton, drained component makes up 35 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, lowlands. The parent material consists of silty eolian deposits and/or fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is not flooded. It is rarely ponded. A seasonal zone of water saturation is at 14 inches during January, February, March, April. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 3w. This soil meets hydric criteria.

Map unit: FaA - Fallsington sandy loam, 0 to 2 percent slopes

Component: Fallsington, undrained (40%)

The Fallsington, undrained component makes up 40 percent of the map unit. Slopes are 0 to 2 percent. This component is on uplands, flats. The parent material consists of loamy fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is occasionally ponded. A seasonal zone of water saturation is at 5 inches during January, February, March, April. Organic matter content in the surface horizon is about 68 percent. Nonirrigated land capability classification is 4w. This soil meets hydric criteria.

Component: Fallsington, drained (40%)

The Fallsington, drained component makes up 40 percent of the map unit. Slopes are 0 to 2 percent. This component is on flats, uplands. The parent material consists of loamy fluviomarine sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is rarely ponded. A seasonal zone of water saturation is at 14 inches during January, February, March, April. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3w. Irrigated land capability classification is 3w. This soil meets hydric criteria.



Forestland Productivity

New Castle County, Delaware

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Volume of wood fiber	
<i>Cu ft/ac</i>				
DoB:				
Downer	Loblolly pine	70	101	Eastern white pine, Loblolly pine, Northern red oak, Southern red oak, White oak, Yellow-poplar
	Northern red oak	80	62	
	Red maple	75	47	
	Southern red oak	85	75	
	Sweetgum	80	79	
	White oak	80	55	
	Yellow-poplar	90	90	
EmA				
Elkton, undrained	Blackgum	70	75	Cherrybark oak, Loblolly pine, Swamp chestnut oak, Water oak, Willow oak
	Loblolly pine	80	110	
	Red maple	70	43	
	Southern red oak	70	50	
	Swamp chestnut oak	75	57	
	Sweetgum	80	79	
	White oak	75	47	
	Willow oak	75	62	
Elkton, drained	---	---	---	Cherrybark oak, Loblolly pine, White oak, Willow oak
FaA:				
Fallsington, undrained	Blackgum	70	75	Loblolly pine, Northern red oak, Southern red oak, White oak, Yellow-poplar
	Loblolly pine	90	129	
	Red maple	70	43	
	Southern red oak	75	57	
	Swamp chestnut oak	75	57	
	Sweetgum	80	79	
	White oak	75	47	
	Willow oak	75	62	
Fallsington, drained	---	---	---	Loblolly pine, Northern red oak, Southern red oak, White oak, Yellow-poplar

C

Irrigated and Nonirrigated Yields by Map Unit Component

New Castle County, Delaware

Map symbol and soil name	Land capability		Corn		Soybeans		Wheat	
	N	I	N	I	N	I	N	I
			Bu	Bu	Bu	Bu	Bu	Bu
DoB:								
Downer	2e	2e	120	150	40	50	45	—
EmA:								
Elkton, undrained	5w	—	—	—	—	—	—	—
Elkton, drained	3w	—	120	150	40	50	30	—
FaA:								
Fallsington, drained	3w	3w	130	160	40	50	35	—
Fallsington, undrained	5w	—	—	—	—	—	—	—
GrB:								
Greenwich	2e	2e	135	170	45	55	50	55

C

Dwellings and Small Commercial Buildings

New Castle County, Delaware

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Map symbol and soil name	Pct of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
DoB:							
Downer	80	Not limited		Not limited		Not limited	
EmA:							
Eikton, undrained	40	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
Eikton, drained	35	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
FaA:							
Fallsington, undrained	40	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
Fallsington, drained	40	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00

C

Roads and Streets, Shallow Excavations, and Lawns and Landscaping

New Castle County, Delaware

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
DoB:							
Downer	80	Not limited		Very limited Unstable excavation walls	1.00	Not limited	
EmA:							
Elkton, undrained	40	Very limited Ponding Depth to saturated zone Frost action Low strength	1.00 1.00 1.00 1.00	Very limited Ponding Depth to saturated zone Unstable excavation walls	1.00 1.00 0.10	Very limited Ponding Depth to saturated zone	1.00 1.00
Elkton, drained	35	Very limited Frost action Low strength Depth to saturated zone	1.00 1.00 0.96	Very limited Depth to saturated zone Unstable excavation walls	1.00 0.10	Somewhat limited Depth to saturated zone	0.96
FaA:							
Fallsington, undrained	40	Very limited Ponding Depth to saturated zone Frost action	1.00 1.00 0.50	Very limited Ponding Depth to saturated zone Unstable excavation walls	1.00 1.00 1.00	Very limited Ponding Depth to saturated zone	1.00 1.00
Fallsington, drained	40	Somewhat limited Depth to saturated zone Frost action	0.96 0.50	Very limited Depth to saturated zone Unstable excavation walls	1.00 1.00	Somewhat limited Depth to saturated zone	0.96

Water Features

New Castle County, Delaware

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding						
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency					
				ft	ft	ft									
DoB: Downer	B	Low	Jan-Dec												
EmA: Elkton, undrained	D	Negligible	January	0.0-0.8	>6.0	0.0-0.3	Brief	Occasional							None
			February	0.0-0.8	>6.0	0.0-0.3	Brief	Occasional							None
			March	0.0-0.8	>6.0	0.0-0.3	Brief	Occasional							None
			April	0.0-0.8	>6.0	0.0-0.3	Brief	Occasional							None
			May	0.9-1.7	>6.0	0.0-0.3	Brief	Occasional							None
			June	3.3->6.0	>6.0			Rare							None
			July					Rare							None
			August					Rare							None
			September					Rare							None
			October					Rare							None
			November	3.3->6.0	>6.0	0.0-0.3	Brief	Rare							None
			December	1.7-3.3	>6.0	0.0-0.3	Brief	Occasional							None
Elkton, drained	C	Negligible	January	0.8-1.7	>6.0			Rare							None
			February	0.8-1.7	>6.0			Rare							None
			March	0.8-1.7	>6.0			Rare							None
			April	0.8-1.7	>6.0			Rare							None
			May	1.2-3.3	>6.0			Rare							None
			June	3.3->6.0	>6.0			None							None
			November	3.3->6.0	>6.0			Rare							None
			December	1.7-3.3	>6.0			Rare							None

This report shows only the major soils in each map unit. Others may exist.

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USDA Natural Resources Conservation Service

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Water Features

New Castle County, Delaware

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding				
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency			
				ft	ft	ft							
Fallsington, undrained	D	Negligible	January	0.0-0.8	>6.0	0.0-0.3	Brief	Occasional	—	None			
			February	0.0-0.8	>6.0	0.0-0.3	Brief	Occasional	—	None			
			March	0.0-0.8	>6.0	0.0-0.3	Brief	Occasional	—	None			
			April	0.0-0.8	>6.0	0.0-0.3	Brief	Occasional	—	None			
			May	0.8-1.7	>6.0	0.0-0.3	Brief	Occasional	—	None			
			June	3.3->6.0	>6.0	—	—	None	—	None			
			November	3.3->6.0	>6.0	0.0-0.3	Brief	Occasional	—	None			
			December	1.7-3.3	>6.0	0.0-0.3	Brief	Occasional	—	None			
			Fallsington, drained	C	Negligible	January	0.8-1.7	>6.0	—	—	Rare	—	None
						February	0.8-1.7	>6.0	—	—	Rare	—	None
						March	0.8-1.7	>6.0	—	—	Rare	—	None
						April	0.8-1.7	>6.0	—	—	Rare	—	None
May	1.2-3.3	>6.0				—	—	Rare	—	None			
June	3.3->6.0	>6.0				—	—	None	—	None			
November	3.3->6.0	>6.0	—	—	Rare	—	None						
December	1.7-3.3	>6.0	—	—	Rare	—	None						

FaA: