



Fairfield Soil and Water Conservation District

831 College Avenue, Suite B
Lancaster, OH 43130-1081

Telephone: (740) 653-8154

Drainage 101

Some of the first things taught in real estate courses are sayings you've likely heard before: "location, location, and location" and "buyer beware." The following information describes what FSWCD looks at when we receive a call concerning drainage.

SOILS:

Most people don't think about soil when looking to purchase an empty lot or one with a home already on it. Soils affect everything you build on your property. We can provide you with a soil map (Photo1 below) that shows the approximate soil boundary locations on the property. Years ago, soil scientists mapped the county and drew approximate soil boundaries on a map. They did not evaluate every square inch of the county, but they evaluated topography, colors, vegetation, etc. to interpolate the soil boundaries. We have soil descriptions for each of the 125 soils in Fairfield County which we use during our review. Pe soil is shown in the example below:



Soil Properties & Qualities

- Drainage class – range from very poorly drained to well drained
- Seasonal high water table – the upper surface of ground water or level at which the soil is saturated with water. It can range from **above ground surface** to any depth below ground. Approximately 85% of Ohio soils are affected by a seasonal high water table.
- Distinctive soil properties – Is it a hydric (wet) soil? Hydric soils form under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic (low oxygen) conditions in its upper layers. Perfect for wetlands.

Use & Management - soil descriptions list whether the soil is unsuited to well suited and provides a list of limitations and management measures for:

- Cropland
- Pasture
- Woodland
- Buildings
- Septic tank absorption fields

Parts of soil description example from central soil identified in Photo1:

Pe-Pewamo silty clay loam

Drainage class: Very poorly drained

Permeability: Moderately slow

Seasonal high water table: +1.0 (above) to -1.0 feet (below ground)

Distinctive soil properties: Hydric soil

Use and Management

Land use: Dominant uses-cropland and pasture; other uses-woodland, wetland and homesites

Building Suitability: Poorly suited

Major management concerns: Dwellings with basements-ponding, wetness, shrink-swell

Management measures:

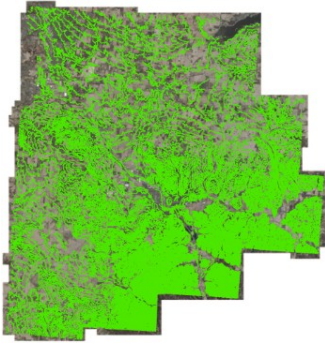
Agricultural drainage systems are generally not adequate in size or depth to handle excess water from building sites.

Because the apparent water table is difficult to lower, dwellings without basements will have fewer problems with wetness.

Elevating the first floor of the building, installing foundation drains and grading the surface to provide positive surface drainage away from the building will reduce ponding of surface water.

Angled excavation walls & granular backfill material placed between soil and basement walls, will reduce the pressure of swelling clays.

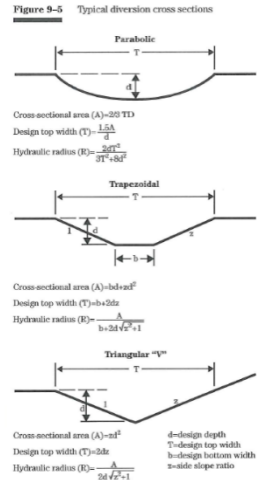
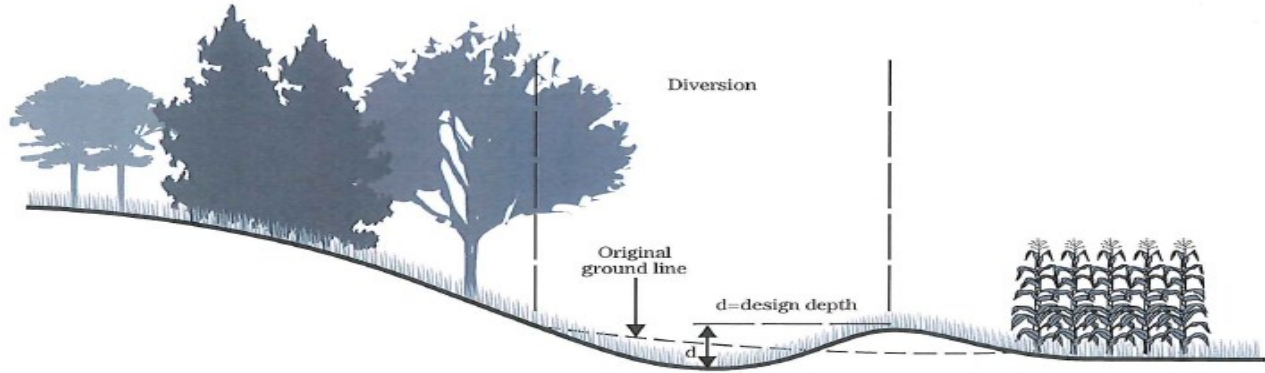
TOPOGRAPHY:



The lay of the land should be looked at also. We have topographic maps in Fairfield County that range from 2’ - 5’ contour elevation increments. Glaciers stopped partway through the county creating very different landforms. The map to the left has 30-foot contours. The dense green area is where the steeper parts of the county are located. If needed, we can create 1-foot contour maps for areas that are very flat. Each line represents either a decrease or increase in elevation. More and more often, we see homes or buildings erected in or adjacent to a natural water pattern. Where will that water now flow? Once the structure is built, grading may be necessary to convey the water around it to keep it out of the basement or underneath the structure.

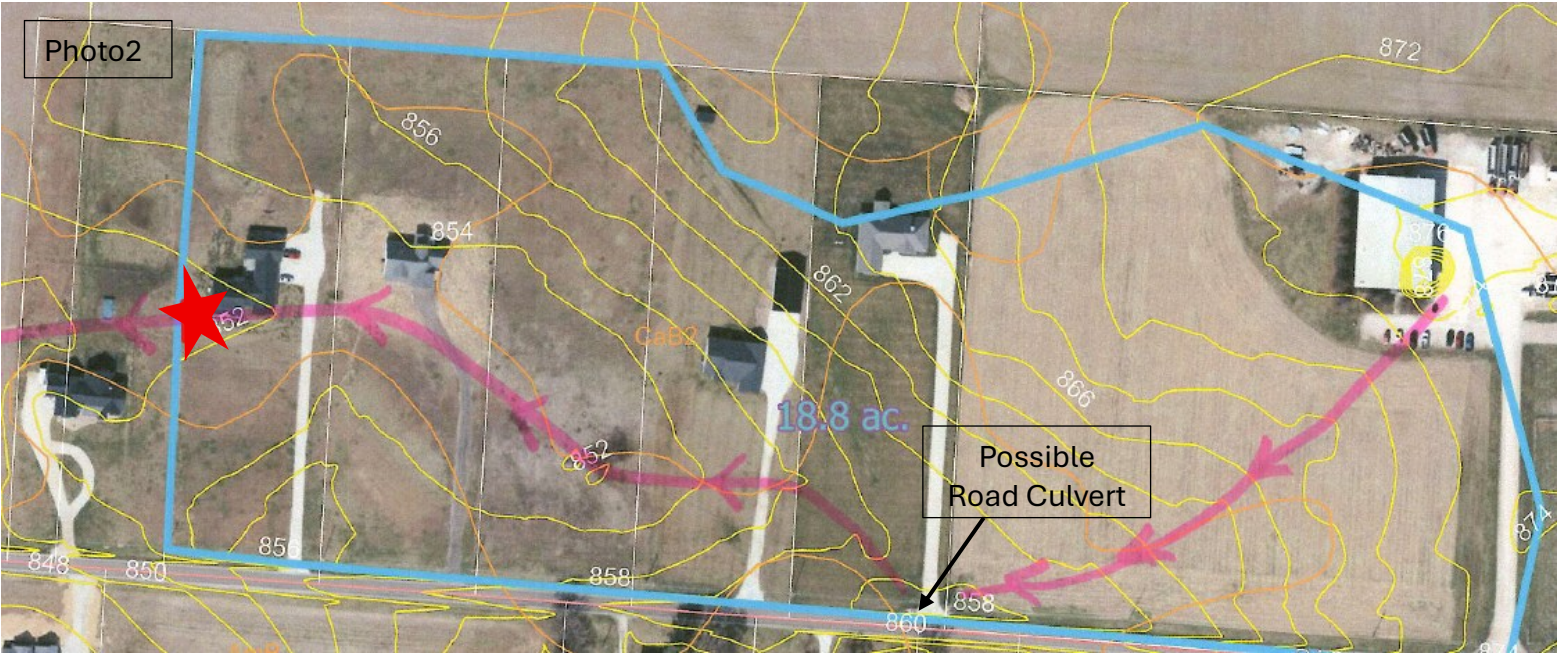
We recommend using a parabolic swale-diversion combo (in example Figure 9-4 below – replace corn with your building) to achieve this. Avoid trapezoidal or triangular shape as they are more susceptible to erosion.

Figure 9-4 Combination diversion



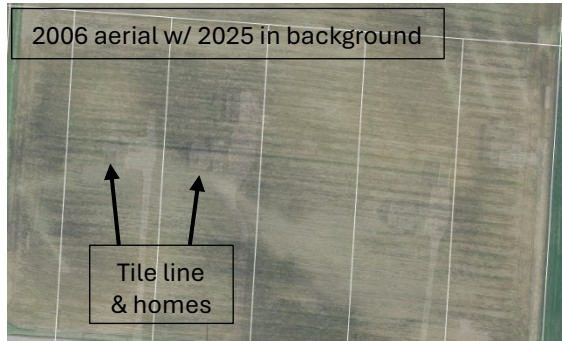
WATERSHED:

A watershed can be described as where a raindrop goes when it hits the ground. Topo maps are used to draw the boundaries of the watershed or drainage area. On the map (Photo2) below, you will see orange soil boundaries along with yellow contour lines shown in 2-foot elevation increments. The light blue boundary is the approximate watershed for the parcel with the red star. This map indicates that it is approximately 18.8 acres. The water flows across the landscape following the pink line. There may be a culvert under the road where the pink line separates, so field investigation is needed to verify. If you notice, the home next to the star was built in the natural water pattern where water flows when it rains. Hopefully grading to divert water around the house was properly done to prevent water from entering.



HISTORY:

In Fairfield County, we have aerial images from 1938-2025 that we can review to learn the history of a property. We often can see field tile lines in them. Below left is a 2006 aerial with old tile lines (lighter in color) visible and



the 2025 aerial blended into the background to show the home locations. When the airplane flew over this property to photograph the land, conditions were favorable for seeing areas drained by tile. They can be identified by the lighter in color on bare soil or darker in color in grass. Whether these houses have a basement or not, we would recommend the old tile be routed around them. No agency is designated to inspect these conditions. Remember the saying, buyer beware?

We have a document called “What is Tile” that explains field tile, why it fails, etc. It also has instructions on how you can look through aerial images at home on a computer using Google Earth.

<https://fairfieldswcd.org/tile-or-subsurface-drainage/>

TILE:

Field tile, drainpipe, tubing, conduit – whatever you call it – can be utilized to keep water underground. Again, the “What is Tile” document should be reviewed for our recommendations. Tiles may be desired for:

- Roof runoff drainage
- Basement drainage
- Sump pump drainage
- Subsurface drainage to lower the high water table

Rules of thumb:

- First and foremost, call OUPS at 811 to determine if there are underground utilities to avoid.
- Sizing - Roof runoff and sump pumps can generate an abundance of water. A 4” tile is likely not large enough.
- Depth – 4” or 6” single wall corrugated, perforated tile needs a minimum of 2’ earthen cover over it to prevent from crushing by mowers, vehicles, equipment. If crossing under a driveway, use PVC, double wall or rigid pipe. Tile larger than 6” needs a minimum of 30” cover. If minimum cover can’t be achieved, double wall is recommended.
- Material – tile needs to be perforated to take in subsurface water. If non-perforated is used, a surface inlet is needed to get water into the tile. Avoid perforated tile in areas close to trees and landscaping as roots can plug it. If tile needs added strength (under a driveway), use PVC, double wall or rigid pipe.
- Outlet – An ideal outlet is a stream, creek or ditch. If the outlet is a road ditch, a permit may be required, and sump pump water may not be allowed to discharge. Installers should start a tile at the outlet and work their way up to the building. At the outlet, PVC is recommended (20’ or more if there are trees) due to strength and UAV protection. Start the tile a minimum of 1’ above a stream, creek or ditch bottom if possible so it is not under water. The end should not be over the bank as drippage will cause erosion. Add an animal guard to prevent critters from crawling in and getting stuck. Tile works by gravity, so it has to continue to drop in elevation as it extends away from the inlet. The more grade or elevation changes, the faster the water will flow out. The steeper the grade, the more water it can accommodate. Therefore, a tile on a greater slope can accommodate more water than the same size on a flatter grade. Use a laser or GPS unit to maintain grade. With all that being said, do you have a suitable outlet on your own property? If not, will you have to approach a neighbor or multiple neighbors for permission to get to an outlet? Even if there is existing field tile there, it will need to be in good condition and have ample size to accommodate your drainage AND what it is already draining. If you install a tile through neighboring property, a written easement is recommended to be able to access for maintenance or replacement in the event of future changes in ownership. If you don’t have a proper outlet, and instead choose to “daylight” a tile (outlet it on the surface uphill of or near the property line), consider your neighbor downhill as they may now experience water like they have not before, which leads us to the next topic...

OHIO DRAINAGE LAW:

Ohio Drainage Law generally states that you have to accept the water that naturally flows in your property and allow it to exit your property in the natural pattern. You can do grading in between, such as swales around your house, etc. as long as you don't divert water to somewhere it never went before and don't back up water across the property line by blocking the natural flow. More on this law is on our website at <https://fairfieldswcd.org/urban/>. There are no governmental agencies that police drainage laws. It is a civil matter and decided on a case-by-case basis. If a property owner feels that a neighbor has unreasonably harmed their property, they would have to work together to get the issue resolved or go to court for a judge to decide the outcome. Unlike major subdivisions, lot splits do not require a plan for drainage on the seller's part, it is up to each landowner to accommodate his/her own drainage. A petition can be filed with the county commissioners for a tile or ditch, but those need the support of most, if not all, property owners in the watershed and the improvements have to be deemed necessary. All owners in the watershed would be assessed on their property taxes for costs of installation, maintenance or replacement if a project is approved.

The example maps are from a recent inquiry. This parcel had many challenges:

- It has Pewamo (Pe) soil (hydric/wet with a seasonal high water table of 1' above ground to 1' below ground).
- The house was built in a natural water pattern.
- There is evidence of an existing old field tile where the home now sits.

These issues did not prevent the property from being sold. In most cases, these issues can be remedied but at a higher cost than a property with ideal conditions.

Image1:



We can provide you with the above mentioned maps and soil descriptions. We can also review our database to see if we have any old engineering plans (Image1), etc.

Guides/info/resources we have on our website that are sometimes provided related to drainage:

www.fairfieldswcd.org

<https://fairfieldswcd.org/tile-or-subsurface-drainage/>

- [What is Field Tile?](#)

<https://fairfieldswcd.org/urban/>

- [Pond Design & Management](#)
- [Stream Management Guide](#)
- [Rural Land Ownership Guide](#)
- [Google Earth](#) - https://earth.google.com/web/@0,-0.33859994,0a,22251752.77375655d,35y,0h,0t,0r/data=CgRCAggBQgllAEoNCP_____wEQAA
- [Web Soil Survey](#) - <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>
- [Wet Backyards](#)
- [Horse Information Guide](#)
- [Ohio Drainage Law info](#)

Contractor lists - <https://fairfieldswcd.org/district-programs-and-links/>

For educational posts, follow us on Facebook - <https://www.facebook.com/profile.php?id=100064591723640#>

SEPTIC SYSTEMS:

The Fairfield County Health Department (FCHD) oversees on-site septic systems. The soils evaluations conducted by a professional Scientist are required and kept in FCHD records. You can request to review this record. FCHD strives to permit septic systems on all properties, evaluated on a case-by-case basis. There are various system types, and the soil evaluation will determine the type of system. Soils suitable for on-site septic are cheaper than unsuitable soils. Upon request and with permission from the current owner, FCHD offers a real estate inspection of an existing system prior to purchase. Contact their environmental health division to inquire at 740-652-2800 extension 3.

<https://www.fairfieldhealth.org/Environmental-Division/FDH-Household-Sewage-Treatment-Systems.html>