

Thomas Scherer

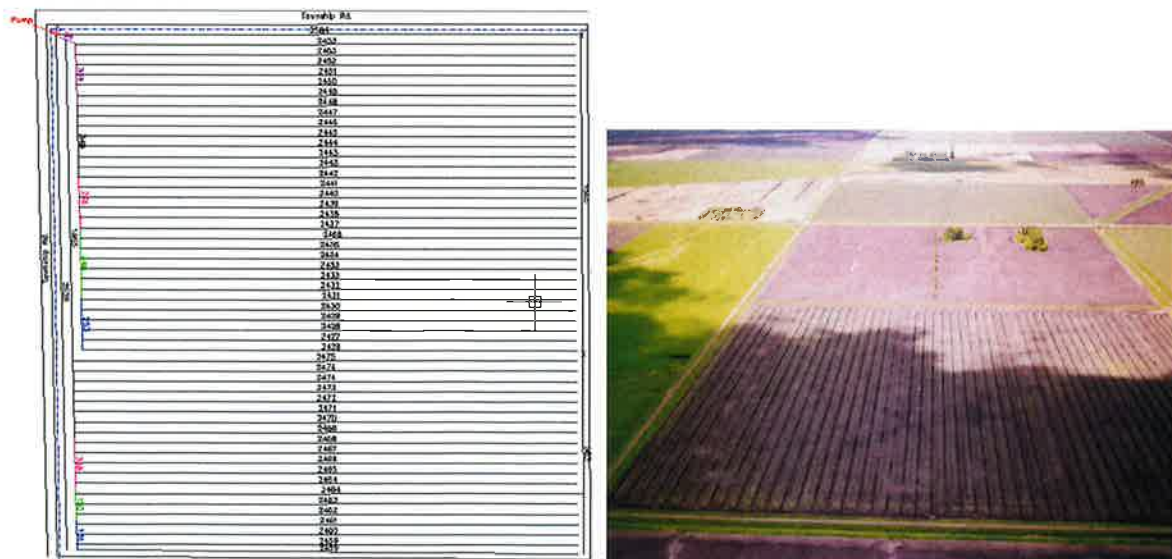
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Since 1999, my colleagues from the University of Minnesota, South Dakota State University, Manitoba and I have organized and conducted annual Subsurface (tile) Drainage Design workshops. We have trained over 2500 people in the fundamentals of subsurface drainage design which included installation safety concerns. I have been involved with several on-farm subsurface drainage research projects that included controlled drainage and sub-irrigation using tile. I have also conducted a 5-year subsurface drainage water quality and flow study. However, I am not an installer of tile systems.

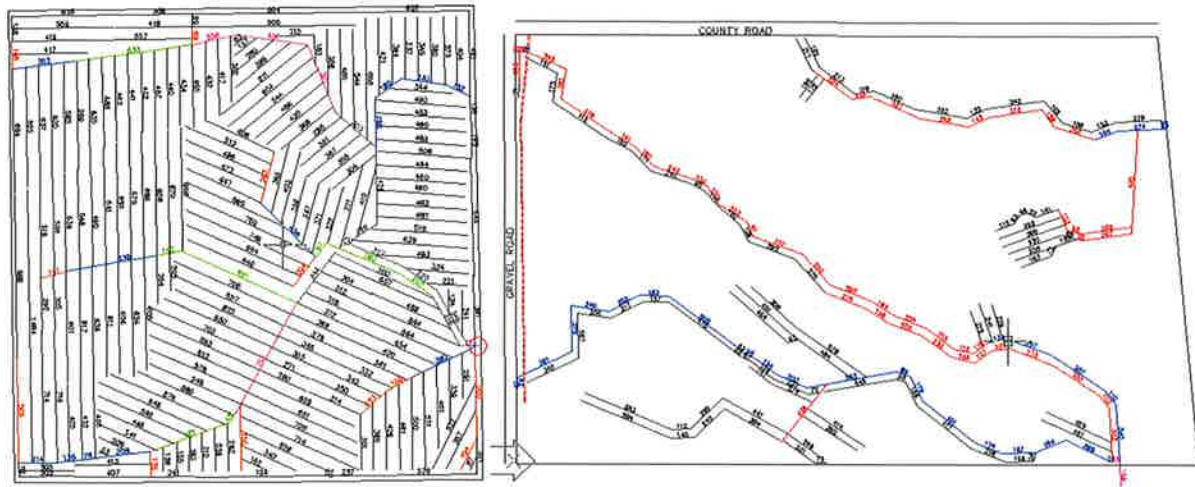
A typical subsurface drainage system consists of laterals, submains and mains. Fields can have from 1 to 4 outlets for water discharged from the tile. Typical laterals are either 3 or 4 inches in diameter. Submains and mains can have diameters that vary from 5 to 18 inches depending on the area that drains to each. In soils with a relatively high amount of fine sand, tile covered with a sock or fine slot tile is used to prevent sand migration into the tile lines.

A subsurface drainage system design can follow a set pattern or be a targeted (sometimes called random) design. Subsurface drainage systems in the Red River Valley area typically are pattern tiled with many having lift stations because of shallow outlets.

A plan view of a typical pattern installation along with an aerial view are shown below. As can be seen, to install a pipeline through a field like this would require cutting and marking at least 50 tile lines.

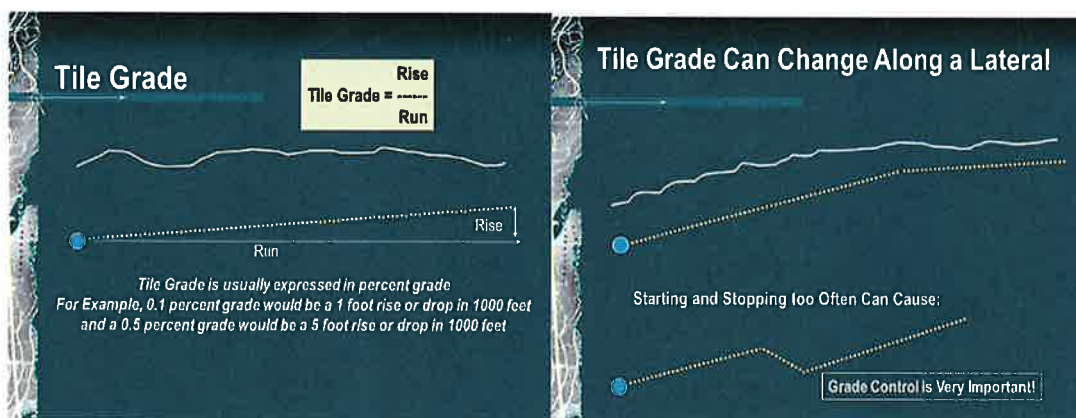


As you go farther west and south, there is more topography and pattern tile can look more like the plan view shown below or the tile can be installed in a targeted fashion.



The different colored lines indicate different diameter of tile thus a pipeline through this type of tile field could require more work and attention to detail.

An important aspect of tile drainage systems is to maintain a uniform grade on each tile line whether a lateral, submain or main at the time of installation so that all water intercepted by the tile is channeled to the outlet. Typical tile grades are 0.1 to 0.3 percent which means they have 1 to 3-foot drop in 1000 lineal feet. To repair a cut tile line would mean the repair line would have to be installed with the same grade.



When digging, finding tile lines can sometimes be difficult because the tile is black and so is the soil. The plans I have shown above are pre-installation but the actual “as-installed” plans may be different due to field conditions. Although many tile systems have been installed with GPS coordinates, many farmers or installers do not have good “as-installed” plans sometimes making it hard to find tile lines. Also, sometimes the depth of the tile lines may be different.