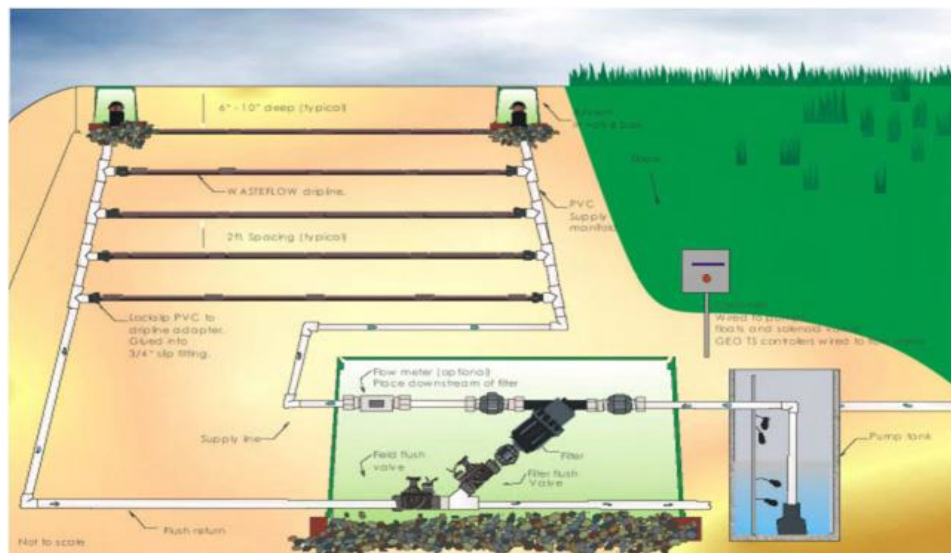


Geoflow Wastewater Subsurface Dripfield (GWSD)

Technology in Oregon.

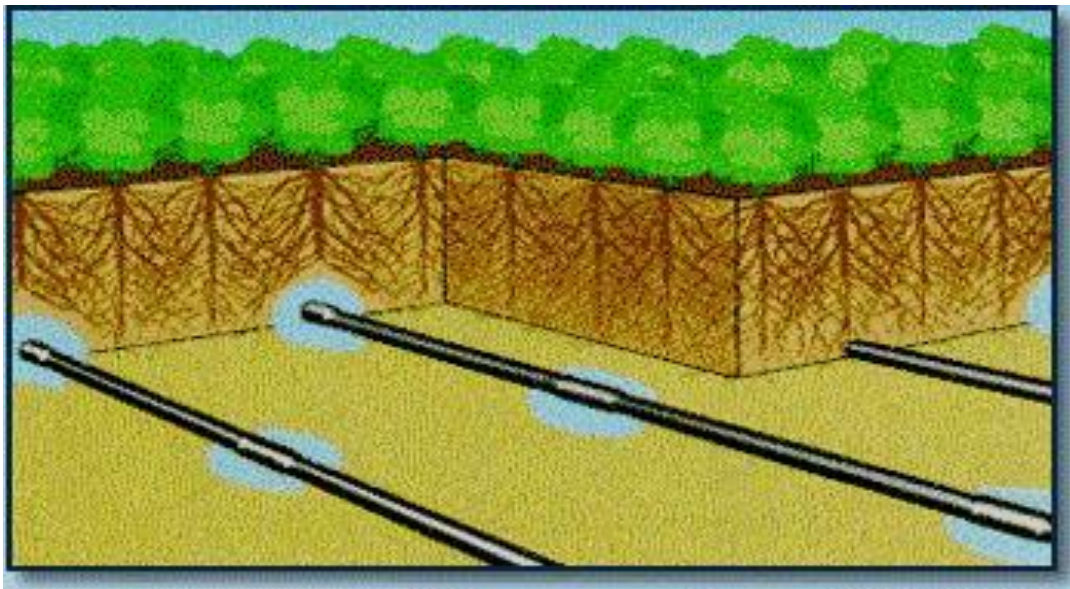
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Environmental Management Systems, Inc. (EMS) is now authorized by Geoflow to act as an independent third party agent to gain formal approval for Geoflow's Wastewater Subsurface Dripfield (GWSD) technologies in Oregon. The Oregon Department of Environmental Quality (ODEQ) has established an approval process for innovative technologies, and Geoflow will be the first dripfield manufacturer to begin this rigorous process. EMS has designed approximately three dozen wastewater subsurface dripfield systems. Five of these are in Oregon and most of the others are in Washington, where the technology is already approved and in use. EMS has monitored the performance of several of these systems for over the past 15 years. GWSD Systems are already approved and currently in use in about 20 other states.



General Conceptual Layout of Geoflow Dripfield Following Secondary Treatment.

Soil Dispersal. GWSD systems work by Un-Saturated Flow. Very small doses are taken-up in the soil via capillary action thereby making better use of the soil's natural biological capacity to treat wastewater – returning the nutrients and water to the environment for beneficial use.



Geoflow Dripfields Inhibit Nearby Root Growth, While Providing Nutrients.

Installation. There are several effective ways to install GWSD driplines. Trenching, Vibratory Plow, Plowing / Disking or by Engineered Fill in Raised Bed. All of these methods require professional soil evaluation and design to make sure that the receiving soil & planned vegetation are properly considered.



Dripline Insertion by Trenching with Single-Reel. Multiple Reels Also Possible

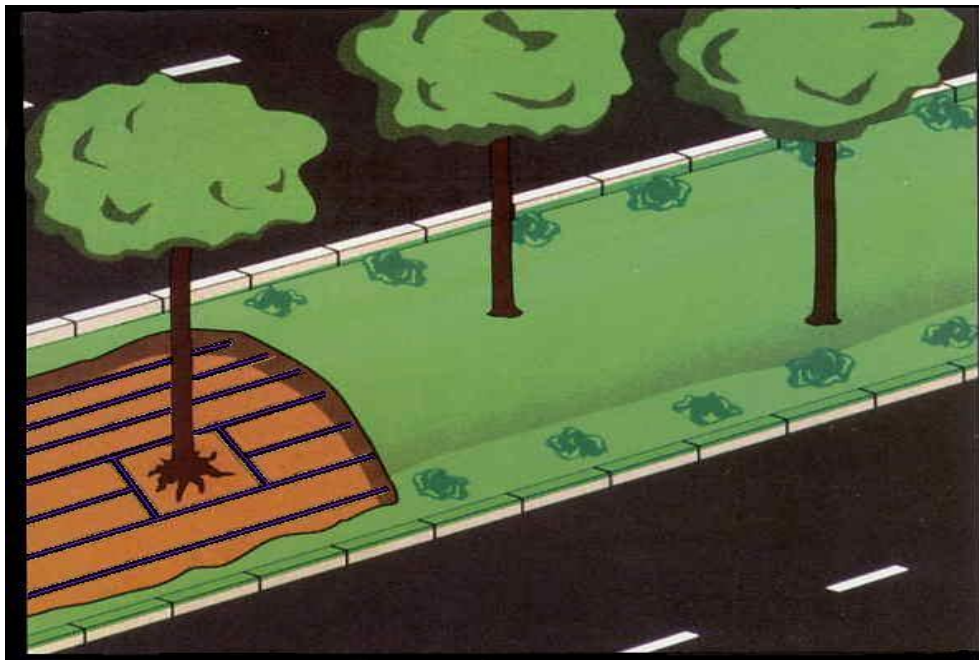


Dripfield Installed Without Trenching. Cover with 6 to 9 inches of Soil & Vegetate.

Proven Technology. Drip irrigation has decades of experience efficiently delivering water to agricultural growing fields, especially where water is scarce. This evolved for onsite wastewater use and is now accepted by over 20 US states. Dripfields are inherently pressure distribution systems that deliver small, controlled doses of water to the root zone where capillary action wicks it horizontally and vertically. This nourishes and hydrates the soil, biota and plants effectively. Normally installed at a depth of 6 to 9 inches, this strategy minimizes potential human contact with the effluent while maximizing evapotranspiration and nutrient uptake. A proper design requires the designer to account for water flow over, into and through the soil, storage of water in the soil column, plant uptake and seasonal evapotranspiration.

Benefits. Properly designed, Geoflow Wastewater Subsurface Dripfields have a number of benefits:

1. Water can be re-used for irrigation of lawns, shrubs, or trees;
2. The final deeper soil can remain intact, preserving the same area for a drainfield if needed;
3. Designs can take advantage of either natural or modified landscape strategies;
4. Beneficial wastewater nutrients are available for plant uptake; and
5. Drip technology works in almost any climate or soil condition.



Dripfield Routed Around Landscape Features



Dripfield on a Steep Slope without removing Existing Trees

Test Protocol. Drip systems are significantly different from trench technologies, making it difficult for ODEQ merely to insert an approval. As a result, these systems are not approved for routine use in Oregon. That will soon change, starting with pilot protocol offered by EMS & Geoflow, which will demonstrate to ODEQ that the GWSD systems provide better final treatment than traditional disposal technologies. GWSD incorporates filters, small turbulent flow piping, orifices, and controls to overcome site limitations, but which increase the complexity of the system. During the initial pilot testing, design control and installation quality will be scrutinized at a higher level to insure that we know exactly what was designed, installed and how it was operated. As of September 2016, fifteen (15) systems are in progress under the protocol.

Practitioners seeking to design or install GWSD will be required to: attend training, submit designs for 3rd party review, have the system inspected by the DEQ and EMS. EMS will initially perform all operational monitoring and reporting during the protocol. Geoflow has suggested a minimum two year protocol, which will start early in 2016, and end when at least 18 systems have been followed for at least two years while the ODEQ reviews the results and determines how to issue permanent requirements for acceptance.

During the protocol, EMS will report progress at least annually and will notify ODEQ of any and all failures that occur. EMS will investigate any reported failures.

Self-Funding. Geoflow has kept the price of this product low, so there is very little funding for the study. This means that use of the product will be “Self-Funded”: In effect, the end user will need to pay for it. That is the way it should be and ultimately always works. As part of the certification process, EMS will incorporate cost-estimating into the training sessions.

If you are a qualified Onsite Wastewater Designer or Installation Professional and would like more information about becoming certified, please contact EMS. 503-353-9691

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