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Catch basins are typically of open grate design and are usually installed on main drains.

Photo courtesy of Sid Vander Veen, OMAF

SURFACE INLETS – Their Role and Management

Surface inlets in sub-surface cropland drainage systems generally fall into three categories – catch basins, blind inlets and standpipe inlets (e.g. Hickenbottom). Each must be used with care so they can provide their intended benefit with minimal risk for downstream water quality and to avoid damage to downstream channels.

Catch basins are typically of open grate design and are usually installed on main drains, most often at property boundaries. If they are installed in a surface water flow path, then the drain effectively becomes a storm sewer that carries soil sediment, debris and other agricultural materials. Drain size must be large enough to accommodate this surface water. Grass buffers should always be maintained around these inlets. In some cases a loose stone berm may be built around the inlet to reduce the water flow and sediment load into the inlet. Some engineers have designed main drains with offset catch basins. These catch basins are connected to the drain but located to the side of it and at a higher elevation. This avoids the main surface water flow yet it allows air into the drain so the water can flow freely – an important feature on long drains, and the main drain size and flow volume will be smaller as the intended load will be from sub-surface field drains.

Blind inlets have been installed in areas where water collects and cannot easily enter a drain pipe because of

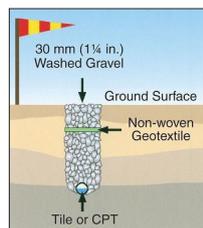


Photo courtesy of Sid Vander Veen, OMAF

soil condition. Typically, coarse gravel or drainage stone is used to fill the drain pipe trench for a short distance to allow easy water access to the drain. This type of inlet is attractive because it does not allow a rush of water into the drain pipe and field work is expected to continue right over them. However, blind inlets will become less effective if the pores in the stone fill with soil. They also contribute to water quality risk as they can be access points for manure, nutrient and other crop production products. To use blind inlets safely and to keep them functioning as intended, their location should be marked (memories are short) and they should be avoided during all field operations. Geofabric over the stone and under a layer of topsoil will help maintain drainability.

Stand pipe inlets are designed to allow surface water to slowly enter sub-surface drain pipe where water has been ponded behind terraces or water and sediment control basins (check dams/WASCoBs). They are an extremely important feature in surface water management for soil erosion control. They should always be used on no-till fields in conjunction with check dams to avoid gully formation on



Photo courtesy of Hickenbottom® Inc.

concentrated flow paths. In many cases, the use of check dams and stand pipe inlets are a more attractive option than grass waterways. If stand pipe inlets are used as intended, they will also contribute to improved downstream water quality and flow management. To do this, they must be equipped with calibrated flow restrictors so that in a storm event water will slowly leave the field in up to 24 hours rather than immediately as unrestricted runoff. The restrictors ensure that much of the sediment can settle out rather than enter the drain, and it also prevents overload on the field drainage system that it is connected to. A drainage silt sock is available to pull over the stand pipe as a precaution against excessive silt and debris entering and plugging a drain. A stand pipe inlet should be protected by a grass buffer that will help collect sediment and reduce the potential for other unwanted materials to enter the drain.

All surface inlet options have a place; however, how they are used and managed makes a difference in their value to a drainage system and their downstream impacts.



The Land Improvement Contractors of Ontario (LICO) is an association of professional drainage contractors and suppliers of drainage pipe and equipment. The focus of their business is soil moisture management to enhance crop production in Ontario.