

North Kettle Creek Watershed Evaluation Project

Conservation Cropland Planning Options at Farm No. 2

Figure 1: Field Topography and Other Details

Field Analysis

50 hectare watershed, linear in shape with a 1700 metre long drainageway

Average of 1% grade through entire length (19 m fall)

Clay loam and loam soils

Corn-soybean-winter wheat rotation

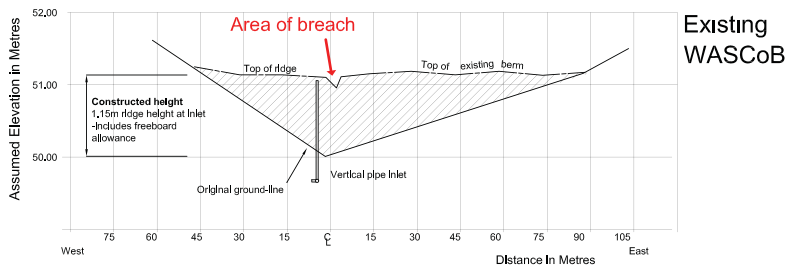
There are three earthen berms with tile drainage outlets (water and sediment control basins/WASCoBs) on the farm. They run in an east-west direction with the first two 230 m apart and the third a further 260 m downslope.





Existing Terrace Breach

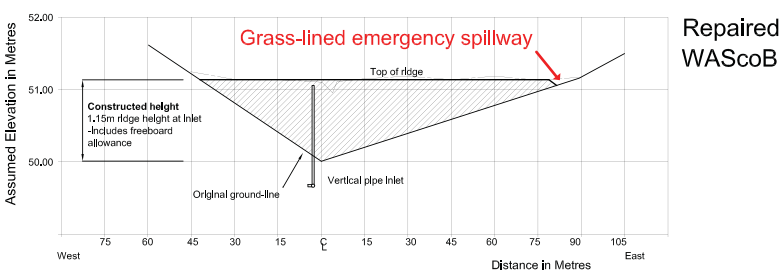
Figure 2: Existing Berm Cross-section



Existing WASCoB

Background

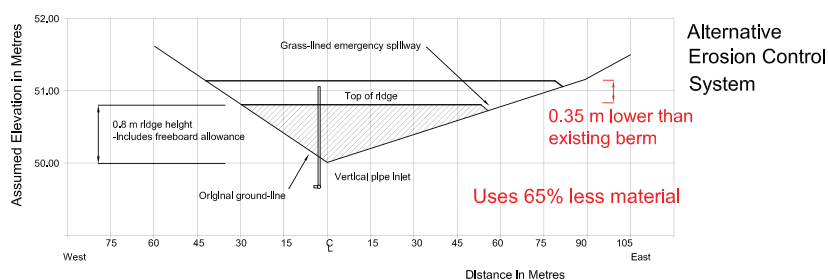
- 3 existing narrow based berms
- extensive rill erosion between berms along drainageway
- rubble/earth berm added along fence line upslope of upper berm



Repaired WASCoB

The Problem

- existing berms work well but have breached
- field survey indicated lack of emergency overflow spillways
- during runoff flows exceeding capacity, water created channel through center of berms
- landowner unsuccessfully attempted repair using brick and rubble



Alternative Erosion Control System

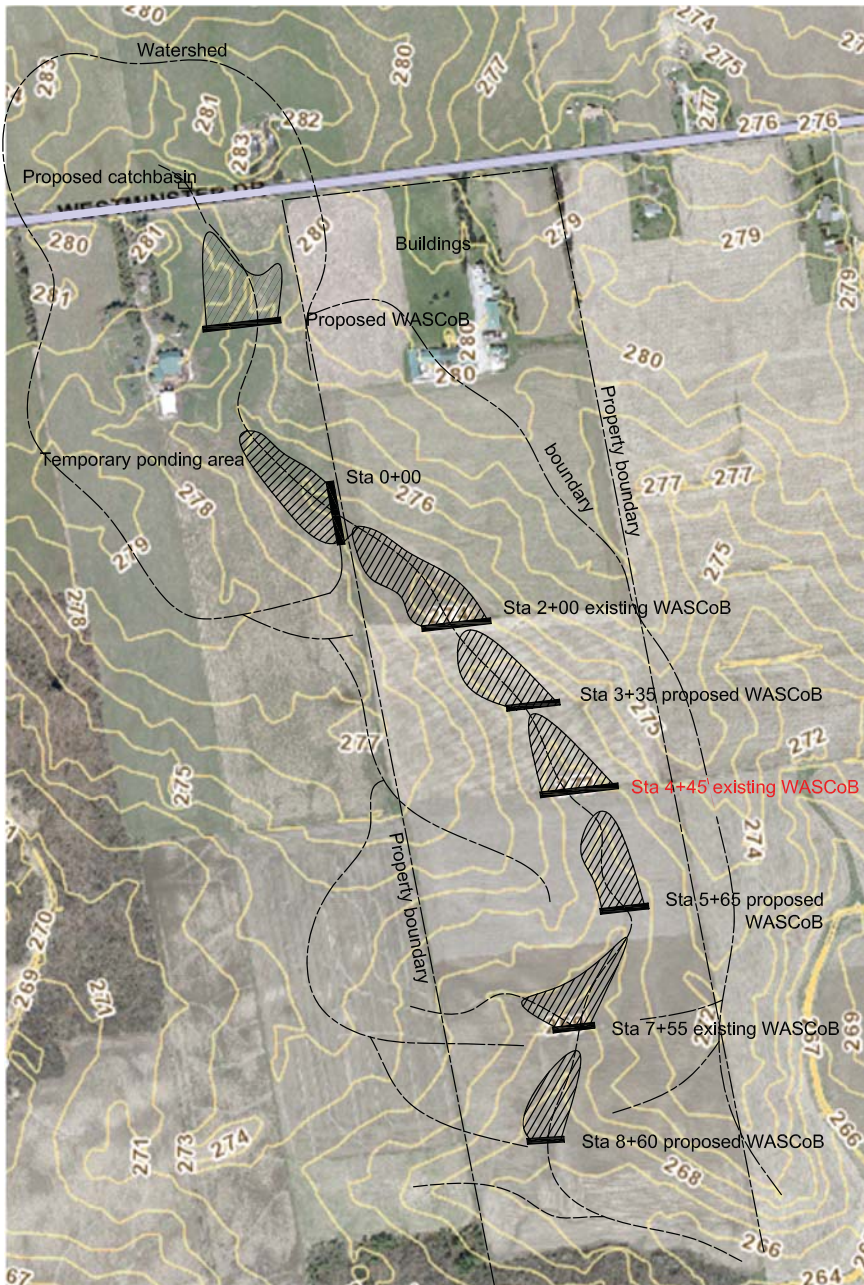


Figure 3: Existing WASCoB versus Alternative System

In reviewing the entire system, other ideas may be considered.

1. Add erosion control structures upslope of this property, including:
 - a) A catchbasin above the road to the north.
 - b) A WASCoB on the property to the west.
 - c) Improve the berm at the line-fence and install a standpipe inlet.

2. In following erosion control standards, it is best if WASCoBs are located no more than about 120 m apart for optimal erosion control. The existing structures are about twice this far apart. Therefore, consider adding up to three additional berms and standpipe inlets. These additions would allow for smaller berms on the property, including lowering the existing structures. The result would be more efficient interception of surface runoff, less extensive individual temporary ponding areas and reduced chance of problems developing.

Solutions

- To repair the existing berms, excavate the breached area and remove all rubble and non-clean fill. This should be done at a minimum 45 degree angle.
- Repair the damaged area with clean, clay-based fill (similar to original construction material), compacted adequately and covered with topsoil, and establish grass vegetation.
- To allow for settlement, the repair area should be about 10% higher than the rest of the berm.
- Create a properly sized overflow spillway at the berm end and carry out any tile drainage and standpipe inlet maintenance as required.

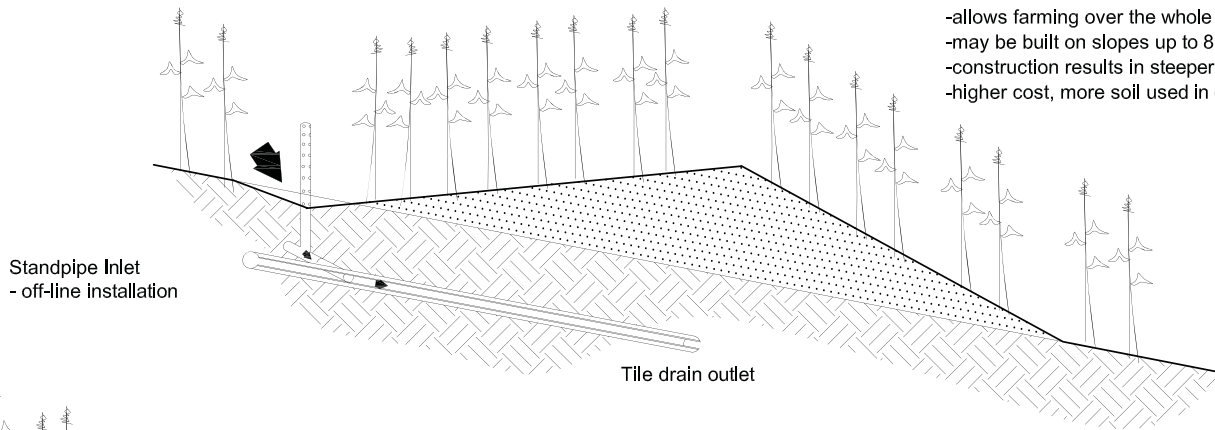
Improvement Opportunities

Water and sediment control basins (WASCoBs) may be designed for watersheds in a range of sizes, but work best on drainage areas of less than 10 ha and ideally less than 5 ha. This is a challenge on this property as more than 17 ha drain onto the farm from the north-west. Ideally, a cropland conservation plan would incorporate the lands upslope of the farm and carry out erosion control measures on the neighbouring farm(s).



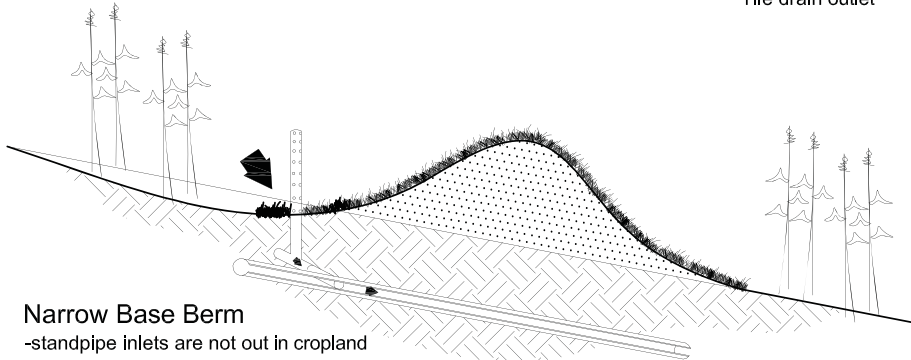
Broad Base Berm

- allows farming over the whole structure
- may be built on slopes up to 8 percent
- construction results in steeper land slopes
- higher cost, more soil used in construction



Standpipe Inlet
- off-line installation

Tile drain outlet



Narrow Base Berm

- standpipe inlets are not out in cropland
- may be built on slopes up to 14 percent
- permanent vegetative cover
- lowest cost, least soil moved in construction
- safety advantage as steep slopes are not farmed

Tile drain outlet

- If additional WASCoBs are added on this property, consideration may be given to *broad-based berms*.
- The proposed alternative design would use about 35% less soil (84m³) for construction than the existing system and the whole area could be cropped.



Existing Narrow Base Berm

Proposed Broad Base Berm

The North Kettle Creek Watershed Evaluation Project is aimed at evaluating the impact of agricultural BMP's on water quality, soil health and practical application. The project comes 25 years after the Soil and Water Environmental Enhancement Project (SWEET)* was completed in the same 1200 acre watershed. This case study is one in a series that attempts to relay the lessons learned from 25 years ago and applying them to today's farming landscape.

UPPER THAMES RIVER
CONSERVATION AUTHORITY



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