INTERCEPTOR SWALES

(a.k.a. diversion swales, cut-off swales)

Interceptor/diversion swales are conveyance systems that intercept, collect and convey runoff away from bare soil areas and towards sediment control measures. They may be used along or constructed with compacted earthen dikes alongside.

The purpose of these types of swales – which may be installed on a temporary or permanent basis - is to reduce erosion on susceptible areas by collecting and transporting runoff around a construction site in a defined and (ideally) stabilized flow path. They also facilitate site drainage after a wet weather event, preventing storm flows from accumulating in unwanted areas (e.g. adjacent properties, site areas where construction is underway).

Application

While interceptor swales can be an effective erosion prevention practice for conveying runoff through any unstabilized areas, they are particularly important in the following circumstances:

- When the upslope drainage area is greater than 2 ha, and in particular in areas with highly erodible soils.
- When the following is true:

  $(S^2 \times L) \geq 0.75$ m

  Where S is the slope of the upslope drainage area (dimensionless), and L is length of the upstream slope (m).

Figure B1-4: Stabilized interceptor swale

Priority areas where interceptor swales should be applied include:

- Along the top of unstabilized long or steep slopes (in conjunction with slope drains).
- Along the perimeter of the site.
- Along the toe of slopes.
- Adjacent to valley and stream corridors.
- Where flows are being diverted around an area that is being stabilized/restored, in order to allow vegetation to become established.

Design and installation

- Interceptor/diversion swales and dikes are intended to convey small flows along low-gradient channels. They should be directed towards a suitable sediment control measure, like sediment traps or sediment control ponds.

- Calculate the appropriate capacity of the swale and provide on ESC plan drawings. Sizing should consider the expected service life of the swale and potential consequences if it is overtopped.
- Calculate the gradient of the swale and provide on ESC plan drawings. Gradient should be calculated based on the intended capacity of the swale and the desired flow rate within the swale. In general, slopes should be the minimum possible that will maintain positive drainage. Velocities greater than 1.2 m/s will erode the invert of a grassed swale.

Making the Grade

Interceptor swales should have a grade of at least ***1%*** to maintain positive drainage, but grades steeper than ***2%*** could cause erosion.

- Dikes/berms greater than 1 m in height should be designed by a geotechnical engineer. The consequences of failure must be considered. Use a multi-barrier approach if swale overtopping would result in sediment release to natural features or other private property.
- Swales should be shaped like an inverted trapezoid, with side slopes no steeper than 2H:1V (Figure B1-5). Where dikes are used, they should be compacted and also constructed with side slopes no steeper than 2H:1V.
- An interceptor swale should be stabilized with a suitable erosion control BMP (e.g. vegetation, RECP, stone), particularly if it will be in place for more than 30 days. Swale inlets and outlets are important to stabilize due to their susceptibility to erosion. Unstabilized swales contribute to suspended sediment loads in runoff being conveyed, ultimately resulting in more sediment accumulation in downslope sediment control measures.
- In order to reduce the potential for swale erosion and provide opportunity for sediment settling, flow interruption devices (e.g. check dams, filter socks, coir logs) should be installed within the swales. See individual flow interruption BMPs for guidance on spacing in swale applications.

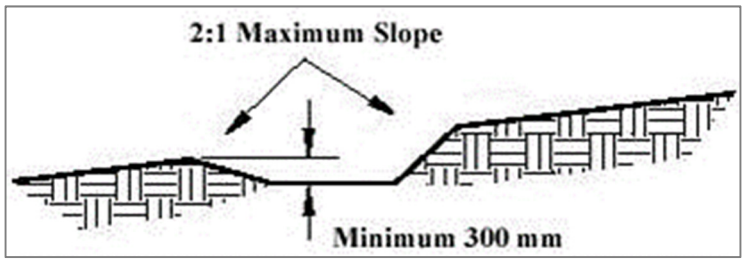

Figure B1-5: Cross-section of recommended interceptor swale design.

Inspection and maintenance

- Inspect weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection.
- Look for any signs of erosion, in the swale and/or dike, particularly at the inlet and outlet.
- Where stabilization measures are already in place, fill and re-stabilize eroded areas. Consider whether stabilization measures should be upgraded to hardier materials.
- Where erosion is observed and stabilization measures are absent or inadequate, consider adding stabilization measures as described under “Design and installation” above.

- Determine whether high flow rates are causing excessive erosion and if so, consider adding flow interruption devices, reducing the size of the area draining to the swale, or re-grading the swale to a flatter slope.
- Inspect all flow interruption devices to ensure they are properly installed and functioning as intended. Sediment and/or debris accumulation behind the device should be removed before it reaches approximately 30% of the device height.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.

Decommissioning

- Ensure flows are re-routed appropriately prior to decommissioning of the swale, to mitigate erosion or flooding issues.
- Fill swale, stabilize and restore the disturbed area.
- Ensure flow interruption devices are properly disposed of.