CHANGES TO TP90 – DECEMBER 2007

Chapter B1 – Section 1.6.3 Mulching

Changes to Pages 13- 14

Definition
The application of a protective layer of straw or other suitable material to the soil surface.

Purpose
To protect the soil surface from the erosive forces of raindrop impact and overland flow. Mulching also helps to conserve moisture, reduce runoff and erosion, control weeds, prevent soil crusting and promote the establishment of desirable vegetation.

Application
This practice applies to any site where vegetation establishment is important for the protection of bare earth surfaces.

Mulching can be used at any time where the instant protection of the soil surface is desired. Mulching can be used in conjunction with seeding to establish vegetation, or by itself to provide temporary protection of the soil surface.

Mulching is used during the winter months (30 April to 1 October) to provide immediate stabilisation. Because grass germination will be too slow to establish effective grass cover using conventional sowing methods.

Design
Not Applicable.

Construction Specifications

Site Preparation
Before Mulching install any needed erosion and sediment control practices such as Runoff Diversion Channels and sediment retention structures.

Mulching
When mulching, use unrotted small grain straw applied at a density of 6,000 kg per ha such that the coverage is consistent or no bare soil is visible though the mulch layer. The mulch layer should remain until alternative stabilisation is achieved. Note that hay does not last long on the ground and remulching may be required.

Ensure the material is free of any noxious plants as identified under the Auckland Regional Council policy. Call the ARC on 0800-80-60-40 or 09-377-3107.

Mulching needs to be spread uniformly. For smaller areas hand spreading of mulch material can be adequate. For larger sites, apply mulch mechanically to ensure an even spread and appropriate application.

Apply fertiliser with Mulching as outlined in Table 1.6 of these Guidelines.

Alternatives such as wood chips and chemical soil binders can be utilised where appropriate.
Wood chips are suitable for areas that will not be closely mowed around such as ornamental plantings. They do not require the application of a tackifier and if readily available can be a relatively inexpensive mulch. They are slow to break down and normally require nitrogen application to prevent nutrient deficiency in plants. Do not use woodchips around watercourses or in areas where water can pond.

To avoid water contamination, any alternative to straw mulch must be approved by the Auckland Regional Council.

Another alternative are rovings which are fibres that are teased out from spools of yarn by compressed air and woven onto the surface of the land. They are then stabilised with a tackifier, with seed sown beforehand. These alternatives should be discussed with ARC before their implementation.

A wide range of synthetic mulching compounds are available to stabilise and protect the soil surface. These include emulsions, acrylimides and dispersions of vinyl compounds. They do not insulate the soil or retain moisture when used alone and therefore do little to aid seed establishment. They are also easily damaged by traffic, decompose relatively quickly and can be quite expensive in comparison to organic mulches.

Anchoring Mulch

Anchor Mulch in place immediately after application to avoid or minimise loss by wind or water. Numerous methods are available. Generally, although the Mulch is ‘settled’ in place by the first rainfall, the Auckland Regional Council also requires it be retained by crimping into the soil with discs or spraying a tackifier with the Mulch. When using some chemical tackifiers, take care to avoid adverse offsite effects of runoff particularly around watercourses.

Chapter B1 – Section 1.8 Stabilised Construction Entrance

Changes to Pages 20 - 21

Definition
A stabilised pad of aggregate on a woven geotextile base located at any point where traffic will be entering or leaving a construction site.

Purpose
To prevent site access points from becoming sediment sources and to help minimise dust generation and disturbance of areas adjacent to the road frontage by giving a defined entry/exit point.

Application
Use a Stabilised Construction Entrance at all points of construction site ingress and egress with a construction plan limiting traffic to these entrances only. They are particularly useful on small construction sites but can be utilised for all projects.

Design
- Clear the entrance and exit area of all vegetation, roots and other unsuitable material and properly grade it.
- Lay woven geotextile; pin down edges and overlap joins;
- Provide drainage to carry runoff from the Stabilised Construction Entrance to a sediment control measure;
- Place aggregate to the specifications below and smooth it.

Table 1.8 Stabilised Construction Entrance Aggregate Specifications

Aggregate Range	50 – 150mm washed aggregate
Thickness	150mm minimum or 1.5 x aggregate size
Length	10m minimum length recommended
Width	4m minimum

Maintenance
Maintain the Stabilised Construction Entrance in a condition to prevent sediment from leaving the construction site. After each rainfall inspect any structure used to trap sediment from the Stabilised Construction Entrance and clean out as necessary.

When wheel washing is also required, ensure this is done on an area stabilised with aggregate which drains to an approved sediment retention facility.

Changes to Page 21

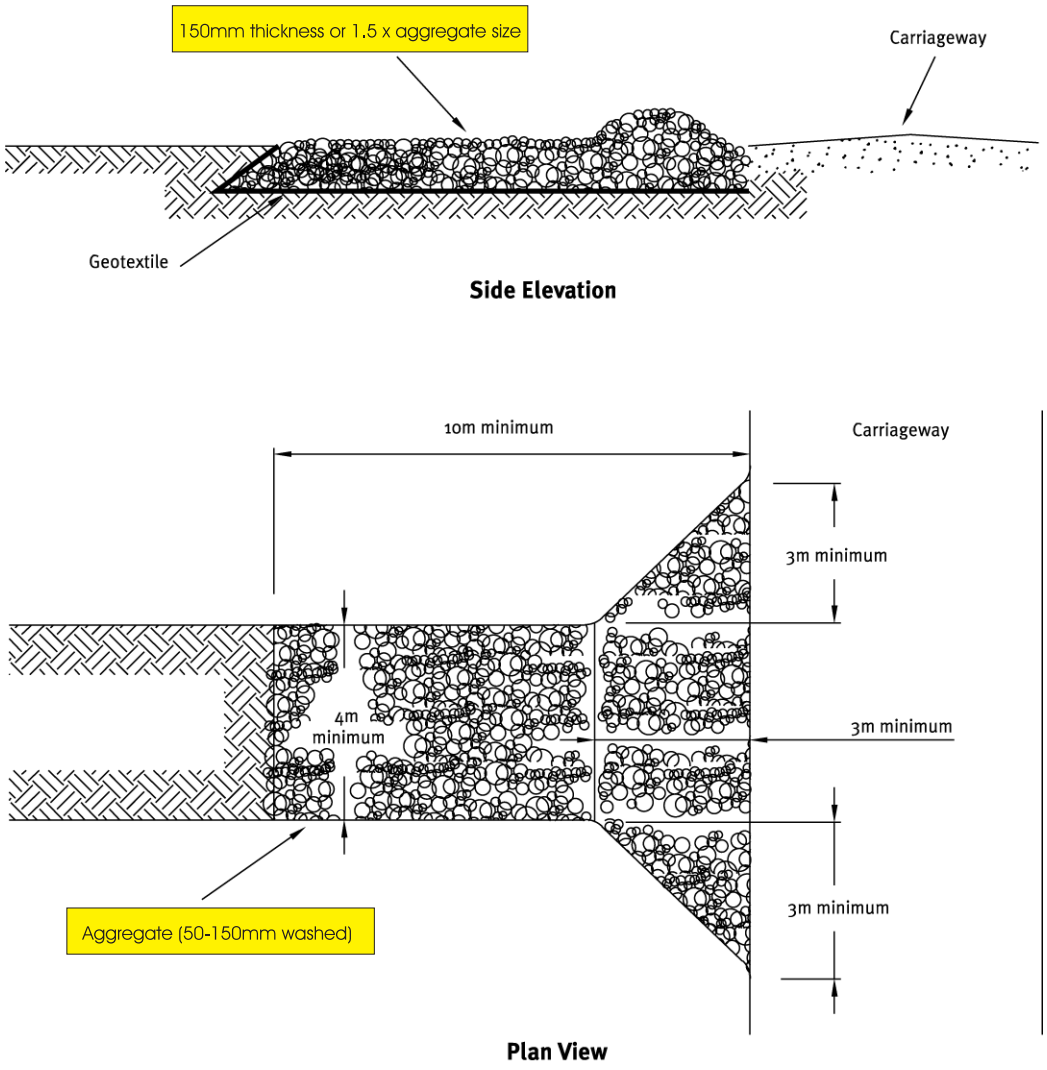

Figure 1.8 *Stabilised Construction Entrance*

Changes to Pages 12 - 14

Definition

A temporary barrier of woven geotextile fabric used to intercept runoff, reduce its velocity, filter and impound sediment laden runoff from small areas of disturbed soil.

Purpose

To detain flows from runoff so that deposition of transported sediment can occur through settlement and filtering through the fabric. Silt fences can only be used to intercept sheet flow. Do not use them as velocity checks in channels or place them where they will intercept concentrated flow.

Application

- On low gradient sites or for confined areas where the contributing catchment is small, such as short steep batter fills and around watercourses.
- To delineate the limit of disturbance on an earthworks site such as riparian areas or bush reserves.
- To store runoff behind the Silt Fence without damaging the fence or the submerged area behind the fence.
- Do not install Silt Fences across watercourses or in areas of concentrated flows.

Design

- Ensure Silt Fence height is a minimum of 600mm above ground level.
- Place supporting posts/waratahs for Silt Fences no more than 2m apart unless additional support is provided by tensioned wire (2.5mm HT) along the top of the Silt Fence. Where a strong woven fabric is used in conjunction with a wire support, the distance between posts can be extended up to 4m. Double the Silt Fence fabric over and fasten to the wire and posts with wire ties, cloth fastening clips or hog rings at 150mm spacings. Ensure supporting posts/ waratahs are embedded a minimum of 400mm into the ground.
- Always install Silt Fences along the contour. Where this is not possible or where there are long sections of Silt Fence, install short Silt Fence returns projecting up slope from the Silt Fence to minimise concentration of flows. Silt Fence returns are a minimum 2m in length, can incorporate a tie back and are generally constructed by continuing the Silt Fence around the return and doubling back, eliminating joins.
- Join lengths of Silt Fence by doubling over fabric ends around a wooden post or batten or by stapling the fabric ends to a batten and butting the two battens together or by overlapping at least 2m as shown in Figure 2.2.

- Maximum slope lengths, spacing of returns and angles for Silt Fences are shown in Table 2.2.
- Install Silt Fence wings at either end of the Silt Fence projecting upslope to a sufficient height to prevent outflanking.
- Where impounded flow may overtop the Silt Fence, crossing natural depressions or low points, make provision for a riprap splash pad or other outlet protection device.

Table 2.2 Silt Fence Design Criteria

Slope Steepness %	Slope Length (m) (Maximum)	Spacing of Returns (m)
< 2%	N/A	Unlimited
2 – 10%	40	60
10 – 20%	30	50
20 – 33%	20	40
33 – 50%	15	30
> 50%	6	20

Construction Specifications

- Where water may pond behind the Silt Fence, provide extra support for the Silt Fence with tie backs from the Silt Fence to a central stable point on the upward side. Extra support can also be provided by stringing wire between support stakes and connecting the filter fabric to this wire.
- Excavate a trench a minimum of 200mm wide and 200mm deep along the proposed line of the Silt Fence. Install the support posts on the downslope edge of the trench and Silt Fence fabric on the upslope side of the support posts to the full depth of the trench, then backfill the trench with compacted soil.
- Use of Silt Fences in catchments of more than 0.5ha requires careful consideration of specific site measures, and other control measures may be better, such as a Super Silt Fence.
- Where water may pond behind the Silt Fence, provide extra support for the Silt Fence with tie backs from the Silt Fence to a central stable point on the upward side. Extra support can also be provided by stringing wire between support stakes and connecting the filter fabric to this wire.
- The fabric cloth must meet the following requirements for Geotextile fabric.

  Grab Tensile Strength: >440N (ASTM D4632)

  Tensile Modulus: 0.140 pa (minimum)

  Apparent Opening Size 0.1 – 0.5mm (ASTM D4751)

- Use supporting posts of tanalised timber a minimum of 50mm square, or steel waratahs at least 1.5m in length.
- Reinforce the top & bottom of the Silt Fence fabric with a wire support made of galvanised wire of a minimum diameter of 2.5mm. Tension the wire using permanent wire strainers attached to angled waratahs at the end of the Silt Fence.
- Where ends of Silt Fence fabric come together, ensure they are overlapped, folded and stapled/screwed to prevent sediment bypass.

Maintenance

- Inspect Silt Fences at least once a week and after each rainfall. Make any necessary repairs when bulges occur or when sediment accumulation reaches 50% of the fabric height.
- Any areas of collapse, decomposition or ineffectiveness need to be immediately replaced.
- Remove sediment deposits as necessary to continue to allow for adequate sediment storage and reduce pressure on the Silt Fence. Ensure that the sediment is removed to a secure area.
- Do not remove Silt Fence materials and sediment deposition until the catchment area has been appropriately stabilised. Stabilise the area of the removed Silt Fence.

Changes to Pages 15 - 17

Definition

A temporary barrier of woven geotextile fabric over chain link fence that is used to intercept runoff, reduce their velocity, filter and impound sediment-laden runoff from small areas of disturbed soil.

Purpose

To reduce runoff velocity so that deposition of transported sediment can occur through settlement and filtering through the fabric.

A Super Silt Fence provides much more robust sediment control than a standard Silt Fence and allows up to four times the catchment area to be treated by an equivalent length of standard Silt Fence.

Application

- Provides a barrier that can collect and hold debris and soil, preventing the material from entering critical areas, watercourses and streets.
- Can be used where the installation of an Earth or Topsoil Bund would destroy sensitive areas such as bush and wetlands.
- Should be placed as close to the contour as possible. No section of the fence should exceed a grade of 5% for a distance of more than 15m.

Design

When considering Super Silt Fence installation for larger catchments (greater than 0.5ha) as in Table 2.3, carefully consider the specific site conditions and other alternative control measures available. Base the length of the Super Silt Fence on the limits shown in Table 2.3.

Limits imposed by ultraviolet light affect the stability of the fabric and will dictate the maximum period that the Super Silt Fence may be used.

Where ends of the geotextile fabric come together, overlap, fold and staple the fabric ends to prevent sediment bypass.

Table 2.3 Super Silt Fence Design Criteria

Slope Steepness %	Slope Length (m) (Maximum)	Spacing of Returns (m)
0 -10%	Unlimited	60
10 – 20%	60	50
20 – 33%	30	40
33 – 50%	30	30
> 50%	15	20

Construction Specifications

- Use a Silt Fence fabric that is appropriate to the site conditions and fits the manufacturer's specifications.
- Excavate a trench 200mm wide by 300mm deep along the line of the Super Silt Fence.
- Position the posts (No. 3 rounds, No. 2 half rounds or waratahs) at no greater than 3m centres on the downslope side of the trench. While there is no need to set the posts in concrete, ensure the 1.8m long posts are driven to an appropriate depth (1metre minimum).
- Install tensioned galvanised wire (2.5 mmHT) at 400mm and again at 800mm above ground level using permanent wire strainers.
- Secure chain link fence to the fence posts with wire ties or staples, ensuring the chain link fence goes to the base of the trench.
- Fasten two layers of geotextile fabric securely to the Super Silt Fence with ties spaced every 600mm at the top and mid section of the Super Silt Fence.
- Place the two layers of geotextile fabric to the base of the trench (a minimum of 300mm into the ground) and place compacted backfill back to the original ground level.
- Embed geotextile support into the ground by 300mm upslope for 200mm.
- When two sections of geotextile fabric adjoin each other, ensure they are doubled over a minimum of 300mm, wrapped around a batten and stapled at 75mm spacings to prevent sediment bypass.
- The geotextile fabric must meet the following requirements:

Grab Tensile Strength:	>440N (ASTM D4632)
Tensile Modulus:	0.140 pa (minimum)
Apparent Opening Size	0.1 – 0.5mm (ASTM D4751)

Maintenance

Inspect regularly and before and after storm events.

Undertake maintenance as needed and remove silt buildups when bulges develop in the Super Silt Fence or when sediment deposition reaches 50% of the Super Silt Fence height.