

24 Drainage Improvements

24.1 Scope

This section sets out the requirement for improving the existing **drainage** facilities.

24.2 Definitions

Terms defined in Table 3.2, Definitions appear in **bold**.

24.3 Response Times

The Contractor must complete all work required by this Section by the dates shown on the agreed **programme**.

24.4 Specific Requirements

24.4.1. Extent of Work

The extent of work is as follows:

- i) shaping of **side slopes**
- ii) cleaning and/or regarding of surface water **channels** and **side drains**
- iii) disposal of surplus material
- iv) provision of traffic control, and quality control testing required to facilitate the work
- v) temporary removal and permanent replacement of existing edge marker posts, **culvert** marker posts, and permanent signs, that are affected by the work
- vi) grassing of **side slopes**.

The intention of the works contained within this contract is to ensure that runoff water from the highway can be readily conveyed through the **drainage network**, to avoid excessive penetration into the road **shoulder**. As such the Contractor shall ensure that the required crossfalls and **drainage** paths are suitably constructed.

The work is not to extend beyond a point 0.5m from existing fence lines, except for '**drainage** cut out' work. Excavation into banks or **batter** slopes above 1.5m in height is not required.

24.4.2. Monthly Programming

Further to Section 4 of the maintenance specification, the Contractor shall identify and **programme** the following:

- i) **side slope** shaping sites (cut 1:6)
- ii) surface water **channels** that require cleaning and/or regrading
- iii) **side drains** that require cleaning and/or regrading
- iv) subsoil drains that require **flushing**

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Unless the **drainage** deficiency is a safety issue or hazardous to motorists, all **drainage** work covered by this section of the contract may be **programmed** with a priority 3 or 4 to allow the Contractor better efficiencies in completing the work. The **programme** shall be agreed with the Engineer prior to any work commencing on site.

The Contractor shall also identify **drainage system** deficiencies that arise beyond the boundary of the highway reserve. These sites shall be identified as part of the monthly **programme** and shall include the following:

- i) location (i.e. RS, RP, and side of road)
- ii) nature of the defect (e.g. blockage)
- iii) remedy required (e.g. clean and regrade drain for 20m)

24.4.3. Disposal of Material

No spreading of material within the State Highway road reserve is permitted. All trimmed or excavated material shall be removed from site.

24.4.4. Plant

No tracked construction plant shall be used in the contract works.

Construction plant and methodology shall be chosen to enable the following requirements to be met.

- i) disruption to traffic flow shall be the minimum possible
- ii) surplus material is to be removed within the area of excavation and shall not be dragged or placed onto the seal.

In wet or unstable ground (eg. in situ gravel), once the required edge shape has been achieved, construction plant shall not disturb the finished surface.

24.4.5. Cleaning of Sealed Surfaces

Any **debris** spilled onto the road as a result of the Contractor's operations shall be totally removed from the sealed surface as part of the Contractor's daily operation and before work ceases on site for the day.

In wet weather and in circumstances beyond the control of the Contractor which prevent complete removal of all **debris** before work ceases on site for the day, the Contractor shall, with the agreement of the Engineer, employ a temporary holding strategy. The temporary holding strategy shall ensure traffic is not exposed to **debris** or a greasy **sealed carriageway** surface during periods of inclement weather, and ensure that the surface remains in a safe and trafficable condition throughout the period of the cleaning operation. If the **sealed carriageway** surface becomes unsafe, which in this context includes consideration of skid resistance, texture, roughness and **debris**, the Contractor shall immediately remove all **debris** from the road surface. The

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Contractor shall ensure that the temporary holding strategy used is not detrimental to the **sealed carriageway** surface.

24.4.6. Side Slope Shaping (Cut1:6's)

24.4.6.1. Quality Control Testing

The Contractor will be expected to carry out (and may be required to provide to the Engineer records of these) measurements at 20m intervals which confirm that the dimensions and **side slope** gradient comply with the contract requirements, including:

- i) width between edgeline and cut away point
- ii) width between cut away point and the outer extremity of the **side slope**
- iii) gradient of the shaped **side slope**
- iv) confirmation that the check with a two metre long straight edge reveals no gaps greater than 25mm on each shaped **batter**.

24.4.6.2. Location of Sites and Setting Out

The lateral dimension of the cut away point shall commence at a nominal distance of 100mm from the edge of seal. This will be true for all 1:6 sites completed under this contract unless specifically stated otherwise.

24.4.6.3. General Cross Section

The objective is to shape the **verges** to provide a nominal 1:6 **side slope** over a minimum of 2.5 metres from the outside edge of the 100mm **unsealed shoulder** to the invert of the **surface water channel**.

At locations where the shaping of the **side slopes** creates a high **verge** beyond the **surface water channel**, the cut **batter** sloping away from the **channel** shall be constructed with a backslope of 1 to 2.

However, where there is a **side drain** or ground shape that is lower than the new **surface water channel** and within 2 metres of it, then the **verge** shall be further excavated, shaped and trimmed to provide a crossfall beyond the **surface water channel** of 1 :12 to shed the runoff into the lower **side drain** or onto the lower ground.

The tolerance for the **side slope** shall be no steeper than 1:5.75 and no flatter than 1:6.25. However, the Contractor shall undertake additional excavation as necessary to ensure that a positive crossfall of at least 1:12 exists between the edge of seal and the cutaway point at any particular cross section.

24.4.6.4. Special Cross Section

At locations where vehicles frequently pull onto or off the **carriageway**, such as at side roads, entranceways, scenic spots and **rest areas** which do not have specifically formed or defined access points, the **side slopes** shall be no steeper than 1:7 and no flatter than 1:9 extending over a

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minimum width of 3.0 metres at this slope. If there is any uncertainty about the shaping of **side slopes** at entranceways, the Engineer is to be consulted before construction takes place.

Opposite private entranceways where **sealed carriageway** width is less than 6.2 metres and existing **shoulder** is within the slope parameters referred to in the paragraph above, then a 10m length of **shoulder** on the approach side of the entranceway shall be retained.

At locations where the **side slopes** are intercepted by side roads the slope shall be transitioned to the side road over a distance of 30m and at property entranceways over a distance of 5 metres (refer appended plan of side road or private access way drawing included in the Appendix of the Operational Requirements).

24.4.6.5. General Requirements

All work shall be carried out to provide adequate disposal of water from the newly formed **drainage channels**. Ponding of water will not be acceptable.

Wherever practicable watertables shall have cut outs at not more than 50 metre intervals and at low points so that water drains away from the **pavement**. The cut outs shall be sites to avoid risk of **damage** to roadside structures from washout.

Care shall be exercised to avoid **damage** to the seal edge.

The Contractor shall have available on site at all times suitable equipment for ensuring the correct **side slopes** are achieved and **side drains** are graded adequately.

The shaped and trimmed surfaces shall be even and consistent. For inspection purposes, the surface shall be unacceptable if gaps in excess of 25mm and evident beneath a 2 metre long straight edge placed anywhere on the **batter**.

The finished surface shall be dense and consolidated, and free of large clods of earth or **vegetation** and large stones which could **damage** the mowers.

Final **trimming** may not be required provided the surface is not undercut and is left tight and compacted. If the surface is undercut in error beyond the design limits, then the shortfall is to be remade with TNZ M/4 basecourse and shaped and compacted by rolling at the Contractor's expense.

24.4.6.6. Grass Seeding

All areas of the shaped **side slopes** and **verges** shall be grassed by spreading seed on the finished surfaces. The seed mix shall be spread at a rate of 12.0g/m². The seed mix ratio shall be:

- one third Brown Top (*Agrostis Capillaris*)
- one third White Clover (*Trifolium repens*)
- one third Sheep's Burnet (*Sanguisorba minoe spp Muricata*)

24.4.6.7. Replace Culvert Marker

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The Contractor shall replace **damaged** or missing **culvert** and subsoil marker posts as approved by the Engineer.

The marker posts shall be installed on the left hand side of the highway and shall be clearly visible from the highway. Where practical **culvert** marker posts shall be between 2m and 6m from the edge of seal and perpendicular to where the **culvert** inlet or outlet or **flushing** eye is situated. **Culvert** marker posts shall have the **culvert** number printed on the top of the marker post in black and subsoil marker posts shall have the letters SS are to be printed in the top of the marker post.

The marker shall be a plastic flexi post and the colour of the marker shall be olive green.

24.5 Performance Criteria

The performance of the Contractor during the Contract Period will be measured by the following criteria:

- a) that all activities are carried out within the timeframes in the agreed monthly **programme** of **maintenance** activities.