



## Chapter 8

# Earthworks, Trenching and Reinstatement



## TABLE OF CONTENTS

### CHAPTER 8 EARTHWORKS, TRENCHING AND REINSTATEMENT MANAGEMENT

<b>INTRODUCTION .....</b>	<b>1</b>
<b>8 PURPOSE .....</b>	<b>1</b>
<b>8.1 Performance Outcomes.....</b>	<b>1</b>
<b>8.2 Referenced Documents .....</b>	<b>1</b>
8.2.1 Resource Management Plan Requirements.....	1
8.2.2 External Standards .....	1
<b>STANDARDS .....</b>	<b>2</b>
<b>8.3 Design .....</b>	<b>2</b>
Mandatory Matters .....	2
8.3.1 General .....	2
8.3.2 Corridor Access Requests .....	2
<b>8.4 Construction .....</b>	<b>3</b>
Mandatory Matters .....	3
8.4.1 General .....	3
8.4.2 Notice.....	3
8.4.3 Street closure.....	4
8.4.4 Underground services.....	4
8.4.5 Road marking .....	4
8.4.6 Managing Disturbances .....	5
8.4.7 Restoration and Remediation .....	6
8.4.8 Surface Excavation .....	7
Good Practice.....	8
<b>8.5 Excavation .....</b>	<b>9</b>
Mandatory Matters .....	9
8.5.1 General .....	9
8.5.2 Footpath Reinstatement .....	10
8.5.3 Berms and Shoulders .....	11
Good Practice.....	11
<b>8.6 Subsoil drainage .....</b>	<b>12</b>
Mandatory Matters .....	12
Good Practice.....	13

### LIST OF TABLES

Table 8-1 Standards and Publications Related to the Design and Construction of Water Supply Services ....	2
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## **CHAPTER 8 EARTHWORKS, TRENCHING AND REINSTATEMENT MANAGEMENT**

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### **INTRODUCTION**

### **8 PURPOSE**

The purpose of this section is to clearly outline Council's requirements for excavation, backfilling and reinstatement work, and sub-soil drains, within the road reserve and public property.

#### **8.1 Performance Outcomes**

Earthworks, trenching, reinstatement and sub-soil drains performance outcomes for network assets sought by these standards are as follows:

- a) The health and safety of the public, particularly the local community, has been ensured;
- b) The level of the service is as good as or better than the existing standard of service following the new excavation works;
- c) All practicable steps have been taken to minimise the level of disruption;
- d) Council has been informed of excavation works and all steps have been taken to follow standards and conditions of notification;
- e) Any affected or potentially affected persons have been notified in advance of the proposed disruption;
- f) Remediation and reinstatement works have been completed to the same or higher standard than prior to the initiation of works;
- g) Sub-soil drains are designed and constructed to manage the effects of mass earthworks, without the need for on-going monitoring and maintenance by Council;
- h) All sub-soil drains are geotechnically designed and certified.

#### **8.2 Referenced Documents**

##### **8.2.1 Resource Management Plan Requirements**

The Standards set out in this chapter address matters that are specific to Council asset creation or activities that may have an impact on an asset. They are subject to the Nelson City and Tasman District Resource Management Plans. Key sections of the plans that may relate to trenching and reinstatement works are earthworks and land disturbance provisions.

##### **8.2.2 External Standards**

Unless otherwise specified within the standards of this document, earthworks, trenching and reinstatement management networks will be designed and constructed in a manner consistent with the standards set out in Table 8-1. Where an Act or National Standard document is referenced, this will be the current version including any associated amendments.

**Table 8-1 Standards and Publications Related to Earthworks, Trenching and Reinstatement**

Standard	Comment
National Code of Practice for Utilities, Access to the Transport Corridors.	Working on the Road - for Temporary Traffic Control and Safety at Roadwork Sites
NZS 6803	Acoustics – Construction Noise
NZS 3116	Concrete segmental and flagstone paving
NZS 4402	Methods of Testing Soils for Civil Engineering purposes
NZS 4404	Land development and subdivision infrastructure
NZS 4431	Code of practice for earth fill for residential development
Ministry for the Environment	National Environment Standard – Telecommunication Facilities

## STANDARDS

### 8.3 Design

This set of standards relates to the general preparation and process requirements of trenching and reinstatement on public land.

#### Mandatory Matters

Council requires the following standards to be met with trenching and reinstatement works:

#### 8.3.1 General

- 8.3.1.1 Except for transformers and cabinets and unless resolved otherwise by the Council, all new telecommunications, broadcasting and electricity cables, fittings and equipment in the road reserve will be laid underground.
- 8.3.1.2 Only operators approved by the Council will be permitted to undertake trenching and reinstatement works within road reserves within the Council's area. See Chapter 2, Qualifications, Process and Information Requirements.

#### 8.3.2 Corridor Access Requests

- 8.3.2.1 A Corridor Access Request (CAR) as set out in the 'National Code of Practice for Utilities, Access to the Transport Corridors' is required to be lodged by the operator at the Council for each separate job or section of a continuing job, which involves excavation, or the lifting of the surface within a road reserve. Further information about CAR applications and fees is available on the Council's website.
- 8.3.2.2 For minor work the CAR must be lodged at least five working days before work starts, unless otherwise agreed. For major and project work, the CAR must be lodged at least fifteen working days before work starts, unless otherwise agreed.
- 8.3.2.3 Where emergency maintenance is necessary, the notice will be lodged on the next working day. If the road involved is a State Highway, the notice will require confirmation that the New Zealand Transport Agency has been notified and if any special conditions imposed by that body have been received.

- 8.3.2.4 Plans of the proposed work will be submitted to the Council with the CAR. The plans will be to a scale of 1:500 or 1:200 where needed for clarity and shall show the location and size of all existing and proposed cables, conduits, pipes, underground structures, property boundaries and kerb lines. Unless agreed otherwise, dimensions to boundaries and kerbs will be shown and proposed depths below existing surface levels shall be shown at regular intervals.
- 8.3.2.5 As-built plans will be made available on request of the Corridor Manager and no later than three months following the completion of the works.
- 8.3.2.6 The operator will advise other affected Service Authorities a minimum of 15 days prior to any proposed construction works. Confirmation that other affected Service Authorities have been advised of planned works shall be indicated on the CAR.
- 8.3.2.7 Providing that all required information has been supplied with the CAR, the Council will issue a Work Approval Notice (WAN) and advice of existing Council services in the locality and any specific conditions related to the proposal. No works may commence in advance of the WAN being issued. WAN are valid for six months from the date of issue unless agreed otherwise by the Engineering Manager.
- 8.3.2.8 A charge for each WAN issued will be made in accordance with the fees and charges that may be set by the Council from time to time.

## **8.4 Construction**

This set of standards relates to the physical works associated with trenching and reinstatement construction practices.

### **Mandatory Matters**

Council requires the following standards to be met when undertaking trenching and reinstatement of underground services:

#### **8.4.1 General**

- 8.4.1.1 Normal work hours will be between 0700-1800 hours, Monday to Saturday. Works on arterial streets may be limited to 0900-1600 hours or other hours as may be appropriate.
- 8.4.1.2 Work hours within the Nelson Central City, Stoke, Richmond, Motueka and Takaka town centres, will be as approved by the Council.
- 8.4.1.3 During any construction in the street, the disruption to the public and adjacent residents will be kept to a minimum.
- 8.4.1.4 Noise created by construction will be kept to a minimum and shall not exceed the levels described in Part 5 of NZS 6803.
- 8.4.1.5 Trench reinstatement in carriageways and footpaths will be as shown in SD801 and SD802.

#### **8.4.2 Notice**

- 8.4.2.1 Prior to planned excavation commencing, the operator will give written notice (48 hours) to all affected residents and business owners of the nature of the work and who to contact for further information or to convey complaints.

- 8.4.2.2 There will be 24 hours' notice given to the occupiers of any property which will have its access blocked for more than one hour and will be notified in writing and in sufficient time to enable them to remove any vehicles etc from their property. The operator will also ensure parked cars etc are moved off the site.
- 8.4.2.3 All operators who carry out work which may impact on the normal use of the roads and/or footpaths must submit a Traffic Management Plan to Council for approval before commencing works.
- 8.4.2.4 The operator will, as a minimum, comply with the requirements of the Council Traffic Management Guidelines and submit a Traffic Management Plan prior to the commencement of work.
- 8.4.2.5 The operator will be responsible for the supply, erection and maintenance of all necessary barricades, lights, warning notices, traffic control signs etc.

### **8.4.3 Street closure**

- 8.4.3.1 The carriageway will be fully open to traffic during hours of darkness and not more than half the carriageway shall be closed at any one time, except with the express permission in writing of the Council.
- 8.4.3.2 Any street closed to any traffic must obtain specific written approval of the Council.
- 8.4.3.3 The closure of any streets requires public notification.
- 8.4.3.4 Application to close a street for infrastructure-related activities must be lodged at Council at least 40 days prior to the day of the proposed closure.
- 8.4.3.5 Approval for street closure will only be given where all other options are unsatisfactory.

### **8.4.4 Underground services**

- 8.4.4.1 The positioning of services or mains, wherever possible, will be in accordance with SD412 and SD413.
- 8.4.4.2 The operator will make itself fully aware of the position of all underground services in the locality, before commencing work.
- 8.4.4.3 Variations from these alignments will be by written agreement from the Council, following discussions with other affected Service Authorities.
- 8.4.4.4 Where existing services are damaged as a result of the construction work, the operator will immediately advise the owner of the damaged services, (public or private).
- 8.4.4.5 The cost of repair or reinstatement of any disturbances or damage to any water pipe, sewer or stormwater drain, other underground services or structure, will be borne by the operator.

### **8.4.5 Road marking**

- 8.4.5.1 All works that are likely to cause damage to any road markings must be brought to the attention of the Council in order that they may be replaced at the earliest possible opportunity for the safety of the general public.
- 8.4.5.2 The operator will be responsible for the cost of any remarking that is necessary.



- 8.4.5.3 All road marking will be undertaken by a registered Road Marking Contractor to the current New Zealand Transport Agency standards.
- 8.4.5.4 Road marking will be completed within five days of resurfacing. Limit lines must be replaced when trafficked. This can be a temporary marking for the first five days.
- 8.4.5.5 All edgelines, centrelines, continuity lines and limit lines will be reflectorised road markings.

#### **8.4.6 Managing Disturbances**

- 8.4.6.1 The operator will avoid disturbance to any survey marks within the vicinity of their work. Where any survey marks are disturbed, the cost of replacing and re-surveying the mark shall be met by the operator.
- 8.4.6.2 Reinstatement of geo-fabrics and geogrids will be undertaken as detailed on SD806.
- 8.4.6.3 Trenchless technology will only be used in specific circumstances where approved by the Engineering Manager.
- 8.4.6.4 The maximum permitted length of trench to be open shall be 100m unless specifically authorised by the Council. Notwithstanding this, the operator will not exceed any length that is not capable of being backfilled and opened to traffic in the same day, nor will it interfere with two-way traffic flow.
- 8.4.6.5 Trench widths will be kept to the minimum necessary to lay the service and correctly compact the backfill.
- 8.4.6.6 Open trenches will not be permitted overnight without the prior authority of the Council.
- 8.4.6.7 All works that are likely to cause damage to any trees, shrubs, or ornamental gardens within the road reserve, will be brought to the attention of the Council prior to work commencing. It will be the operator's responsibility to make good or replace any damaged trees, shrubs or ornamental gardens.
- 8.4.6.8 All open trenches will be maintained in a dewatered condition and water-logged material removed to the satisfaction of the Council. Sediment laden water from any excavation will be disposed of to the stormwater main via a sediment retention device or settlement tank to minimise sedimentation and avoid damage or nuisance.
- 8.4.6.9 The operator will take all due care to prevent excavated and stockpiled material from being washed into the stormwater system in the event of rain occurring during a trenching operation
- 8.4.6.10 Where damage occurs to existing kerb and channel the damage will be made good to the satisfaction of the Council. Where any kerb and channel requires replacing this shall be done by the Council's approved kerbing contractor at the operator's expense.
- 8.4.6.11 Where work is to take place within 50m of traffic signals the operator will consult with the Council.
- 8.4.6.12 The operator will liaise with the Council to locate the traffic signals communication network.
- 8.4.6.13 All earthworks and land disturbance activity will cease immediately upon the discovery of cultural heritage artefacts, in accordance with the Heritage New Zealand Pouhere Taonga Act 2014.

8.4.6.14 Where there is a known high risk of accidental discovery, a cultural heritage monitor must be present during all excavation works.

#### **8.4.7 Restoration and Remediation**

8.4.7.1 As work proceeds the operator will progressively carry out all restoration and tidying up work.

8.4.7.2 On completion of the work, the operator will remove all plant, materials and other things that may have been brought upon the site in aid of the works, and generally clear away all rubbish and leave the site in a similar or better condition to that which existed before the work was commenced.

8.4.7.3 Any trees or branches cut down or tree stumps uprooted during the work will be removed.

8.4.7.4 If regular tidying up and restoration is not being done, the Council will require and instruct the operator concerned to carry out this work immediately.

8.4.7.5 The operator will, at its own expense, clean out all sumps and repair or reinstate all road surfaces, fencing, walls, floors, lawns, gardens, paths, inclusive of transplanting trees and shrubs, and make good all damage which may have been caused through his operations to at least as good as the "as found condition" in connection with the work.

8.4.7.6 Surface reinstatement (including the final or temporary sealing) will be completed prior to vehicle and pedestrian traffic being permitted to use the surface. Surface reinstatement shall be completed within five days of the trench being opened or such other period agreed by the Council.

8.4.7.7 Where work is required within an area that has been re-surfaced within the last two years an alternative route must be identified. If this is not possible then, depending on the position and nature of the excavation, a full width reinstatement may be required. Where a full width reinstatement is required, then the length of the reinstatement will be not less than the width of the carriageway (or footpath).

8.4.7.8 All temporary markings to locate services will be removed on completion of the works.

8.4.7.9 All permanent surface reinstatement on carriageways will be completed with the finished wearing surface depth, matching that of the existing road and finishing flush with the final seal level or as per Section 4.17.5.4. All parts of the surface damaged during or as a result of the work will have a reinstated sealed surface. Excavations that are closer than 1.0m horizontal to the existing edge of the seal, kerb and channel, or previous excavation reinstatement, or joint will have a reinstated sealed surface that extends to join with the existing edge of seal, kerb and channel or adjacent reinstatement.

8.4.7.10 Subject to favourable weather conditions, appropriate Polymer Modified Bandage (PMB) 100mm wide by 1.5mm thick, will be completed within five days of resurfacing.

8.4.7.11 Service boxes, e.g. water hydrant boxes, manholes etc will be installed in their final location during trench compaction and their finished level shall be finished flush with or no more than 5mm above the reinstated pavement surface. All service boxes and lids will be raised and adjusted to final level prior to placement of surfacing seal coat.

8.4.7.12 For State Highways, refer to New Zealand Transport Agency requirements.

- 8.4.7.13 All permanent surface reinstatement on footpaths will be completed with a finished surface matching the existing and finishing flush with the existing surface. The minimum dimension of any reinstated portion of the footpath will not be less than 600mm wide. The width of remaining undamaged footpath will not be less than 1.0m. If these criteria cannot be met the reinstatement will be across the full width of the footpath. Also, the full width of the footpath will be replaced when trenching in footpaths within the Central Business District (CBD) areas, or Arterial, and Principal roads or new footpaths with a sealed surface less than two years old, see SD803, SD804 and SD805.
- 8.4.7.14 In concrete footpaths the depth will match the existing with a minimum thickness of 100mm and the concrete shall attain a minimum compressive strength of 27.5 MPa after 28 days, as per SD406 and SD407. Construction joints will be formed at 6.0m centres and the line and level of the finished surface shall match the crossfall and level of the adjacent undamaged surface.
- 8.4.7.15 In footpaths, service boxes, e.g. water hydrant boxes, manholes etc will be installed in their final location during trench compaction and their finished level will be finished flush with the reinstated pavement surface. All surface boxes and lids will be raised and adjusted to final level prior to placement of surfacing seal coat.
- 8.4.7.16 For reinstatement within grassed berms see Chapter 4, Section 4.15.2.
- 8.4.7.17 Alternatively, turfs may be cut from the berm 75mm in thickness and 50mm wider than the trench and stacked for re-use. Full reinstatement will be achieved within 48 hours with screened top soil being raked into all cut joints, with all turfs being adequately watered immediately following completion of reinstatement.
- 8.4.7.18 Service boxes etc will be finished to the tolerances specified in Chapter 4, Section 4.17.5.4 unless in a planted/landscaped (non-pedestrian) area then surface lids will be finished to 40mm higher than surrounding finished surface.
- 8.4.7.19 The operator will notify the Council (via a Works Completion Notice) immediately upon the completion of final reinstatement so that an inspection may be made of the completed surface reinstatement works.
- 8.4.7.20 The operator will be held responsible for any street maintenance work required as a result of the excavation and reinstatement operations for a minimum of 24 months after notification to the Council that the final surfacing material has been applied including Polymer Modified Bitumen (PMB) and Road Marking. Any such maintenance work required by Council will be undertaken by the operator at the operator's cost within five working days of being notified by the Council to undertake repair works.
- 8.4.7.21 If on the grounds of safety, there is a need for more immediate action this remedial work will be completed within 48 hours or such other time as may be directed by the Council. Should this not be complied with, Council reserves the right to arrange or undertake such maintenance work and this work will be at the cost of the operator. The maintenance period will start from the time that the Council is notified of completion of remedial works.

## **8.4.8 Surface Excavation**

- 8.4.8.1 When an excavation is required to be made through any cement concrete, asphaltic concrete or chip seal surface, the proposed edges of the excavation or trench will be cut with a power saw prior to the excavation of the trench. The cut is to extend through the full thickness of the surface layer in

a clean straight vertical line. The cut will be 150mm beyond and parallel to the edge of the trench or to a line outside any pavement damage, whichever is greater. Within footpaths all saw cuts will be parallel to or at right angles to the centreline of the footpath.

- 8.4.8.2 Only wet cutting will be permitted in the CBD, in the vicinity of Suburban Shopping Centres or where directed by the Council, to minimise the problems caused by dust.
- 8.4.8.3 Unless approved otherwise by the Engineering Manager, all excavated material will be removed from the site immediately as excavation proceeds.
- 8.4.8.4 Areas adjacent to the excavation will not be undercut. If slumping of material from the sides of the excavation causes depressed areas adjacent to the excavation or if the edges of the pavement are lifted during excavation, additional saw cutting outside of the original line of the excavation and outside the area of damage will be required before reinstatement is permitted.

### **Good Practice**

The following matters provide additional guidance and direction in the provision of trenching and reinstatement of underground services.

- 8.4.8.5 Arrangements may need to be made to damp down work areas and excavated material as required from time to time to eliminate any dust nuisance.
- 8.4.8.6 The operator's attention is drawn to the employees' and sub-contractor's obligations under the Health and Safety at Work Act 2015.
- 8.4.8.7 Should the operator wish to use any alternative methods of traffic control, the prior consultation with and approval of the Council will be required.
- 8.4.8.8 Should the Police, Worksafe or the Council consider at any time there is a risk to traffic, the general public or the operator's employees, the operator will immediately provide such other traffic control necessary to achieve the required standards. This includes the erection of additional barricades, lights, warning notices or traffic control signs including, where necessary, the provision of staff to control traffic.
- 8.4.8.9 Failure by the operator to provide adequate safety measures may result in a work suspension notice being issued by the Council, until such time as adequate control is provided.
- 8.4.8.10 The position of existing water mains, sewers and other services or structures above or below ground, as far as they are known, are available for the information of the operator at the offices of the Council and respective Service Authorities, but their positions are not guaranteed.
- 8.4.8.11 Limit lines must be replaced when trafficked, but can be a temporary marking for the first five days.
- 8.4.8.12 Trenchless technology may be preferable for alignments passing through or under:
  - a) Environmentally sensitive areas;
  - b) Built-up or congested areas to minimise disruption and reinstatement or major road crossings;
  - c) Significant vegetation;

- d) Vehicle crossings and areas with high quality paving surface exist.

8.4.8.13 Where there is a large number of existing services the following details including location of access pits and exit points will be submitted to the Engineering Manager for approval:

- a) Clearances from services and obstructions;
- b) The depth at which the pipeline is to be laid to ensure minimum cover is maintained;
- c) The pipe support and ground compaction;
- d) How pipes will be protected from damage during construction;
- e) Any assessed risk to abutting surface and underground structures.

8.4.8.14 See Section 6.10 of the Wastewater section for further details on trenchless technology.

8.4.8.15 Special conditions when working near traffic signals may be imposed by the Council to protect the detector loops and the operation of the signals, see Section 8.4.6.11.

8.4.8.16 Branches that require removal should be cut by saw and not broken by machinery.

## 8.5 Excavation

This section deals with excavation, back filling, and surface re-instatement.

### Mandatory Matters

Council requires the following standards to be met in all excavation and re-instatement works:

#### 8.5.1 General

8.5.1.1 The backfilling of excavations will be undertaken in accordance with SD801 and SD803 using imported backfill material that comply with New Zealand Transport Agency specifications.

8.5.1.2 Basecourse used in the Pavement section of the backfill will be to New Zealand Transport Agency (TNZ) M/4 Specifications.

8.5.1.3 The material used for bedding underneath and around the service or service duct will be as required in Chapter, 7, Section 7.8.6.

8.5.1.4 Surface reinstatement (including the final or temporary sealing) will be completed prior to vehicle and pedestrian traffic being permitted to use the surface. In all other situations, surface reinstatement will be completed within five days of the trench being opened or such other period as directed by the Council.

8.5.1.5 Variation from this condition will require the written agreement of the Council. For works within the CBD or Arterial Roads, surface reinstatement will be completed within 24 hours of the trench being opened or such other period as directed by the Council.

8.5.1.6 Failure to complete reinstatement within the specified period may result in Council arranging reinstatement at the operator's expense.

- 8.5.1.7 All excavations will be backfilled, as detailed on SD801, SD802 and SD803 to the underside of the proposed wearing surface, or to the finished level if permanent reinstatement is not being undertaken immediately. This temporary over filling will be removed when permanent reinstatement is carried out.
- 8.5.1.8 If permanent reinstatement cannot be undertaken immediately, in areas to be reopened for vehicle or pedestrian use, the operator will arrange for a 10mm thick layer of fine 'Cold Mix' or a rubberised pre-fabricated chip seal with 100mm over lap laid to manufacturer's instructions to be applied to the trench immediately backfilling is completed.
- 8.5.1.9 Where work is required within an area that has been re-surfaced within the last two years an alternative route must be identified. If this is not possible then, depending on the position and nature of the excavation, a full width reinstatement may be required. Where a full width reinstatement is required, then the length of the reinstatement will be not less than the width of the carriageway (or footpath).
- 8.5.1.10 All temporary markings to locate services will be removed on completion of the works.
- 8.5.1.11 All parts of the surface damaged during or as a result of the work will be reinstated to maintain the cross-fall slope. Finished levels will be compatible with the existing pavement.
- 8.5.1.12 All permanent surface reinstatement and sealed surface on carriageways will be completed as shown on SD801, SD802, SD803 and SD806, with the finished wearing surface depth, matching that of the existing road and finishing flush with or no more than 5mm above the existing surface.
- 8.5.1.13 Excavations (including the final saw cut edge) that are closer than 1.0m horizontal to the existing edge of the seal, kerb and channel, previous excavation reinstatement, or joint will have a reinstated sealed surface that extends to join with the existing edge of seal, kerb and channel or adjacent reinstatement.
- 8.5.1.14 Subject to favourable weather conditions, an appropriate Polymer Modified Bandage (PMB) 100mm wide by 1.5mm thick, will be completed within five days of resurfacing.
- 8.5.1.15 On unsealed rural roads and metal shoulders backfilling will be as for chip sealed carriageways with 50mm of top course being placed as the final reinstatement. Finished levels will be compatible with the existing pavement.
- 8.5.1.16 Service boxes, for example; water hydrant boxes, manholes etc will be installed in their final location during trench compaction and their finished level will be finished flush with or no more than 5mm above the reinstated pavement surface. All service boxes and lids will be raised and adjusted to final level prior to placement of surfacing seal coat.
- 8.5.1.17 For State Highways, refer to New Zealand Transport Agency requirements.

## **8.5.2 Footpath Reinstatement**

- 8.5.2.1 All permanent surface reinstatement on footpaths will be completed as shown on SD803-SD806 with a finished surface matching the existing and finishing flush with the existing surface. The minimum dimension of any reinstated portion of the footpath will not be less than 600mm wide.
- 8.5.2.2 The width of remaining undamaged footpath will not be less than 1.0m. (See SD803). If these criteria cannot be met the reinstatement will be across the full width of the footpath. Also, the full

width of the footpath will be replaced when trenching in footpaths within the Nelson Central City, Stoke, Richmond, Motueka and Takaka Centre areas, or Arterial, and Principal roads or new footpaths with a sealed surface less than two years old.

- 8.5.2.3 Vehicle crossings which are affected by the work will be reinstated with a minimum of 150mm thick concrete for residential crossings, 200mm thick concrete for commercial crossings, while industrial crossings are to match existing with a minimum of 300mm thick concrete. Concrete for commercial and industrial entrance slabs will be reinforced with 665 WWF (see SD409).
- 8.5.2.4 Note: In asphaltic concrete and chip sealed footpaths the depth of basecourse at vehicle crossings will match the depth of the existing basecourse, with a minimum depth of 300mm for industrial crossings, 200mm for commercial and 150mm for residential crossings.
- 8.5.2.5 With interlocking pavers, the blocks removed during excavation or new blocks of identical shape, thickness and colour will be replaced on a subgrade similar to that in adjoining undisturbed areas and compacted and filled to give a true surface in accordance with NZS3116.
- 8.5.2.6 All paving work will be carried out by staff competent in this work. Gaps between blocks shall be 2-3mm. Jointing sand will be 'Pavelock' or similar approved sand. A neoprene sheet will be used to protect blocks when a plate compactor is used. The minimum size of part blocks used will be a half block.

### 8.5.3 Berms and Shoulders

- 8.5.3.1 Surface reinstatement to grassed berms and shoulders will be completed as per Chapter 4, Sections 4.15.2.4 to 4.15.2.7.
- 8.5.3.2 Full reinstatement will be achieved within 48 hours with screened topsoil being raked into all cut joints, with all turfs being adequately watered immediately following completion of reinstatement.

#### Good Practice

The following matters provide additional guidance and direction in all excavation works.

- 8.5.3.3 If 'Cold Mix' is not available a temporary seal of sprayed Emulsion and Grade 5 or 6 chip may be substituted with the approval of the Council. This is to be regarded as a temporary seal only and will be removed before the permanent resurfacing of the trench is carried out. The operator will maintain this surface, even and free draining, until the final restoration is complete. The cost of all temporary resurfacing and subsequent removal will be borne by the operator.
- 8.5.3.4 Patching of small areas of permanent surfacing, such as service boxes, may be permitted by Council).
- 8.5.3.5 Regarding the reinstatement of grassed berms, turfs may be cut from the berm 75mm in thickness and 50mm wider than the trench and stacked for re-use. Full reinstatement of this solution will be achieved within 48 hours with screened top soil being raked into all cut joints, with all turfs being adequately watered immediately following completion of reinstatement.
- 8.5.3.6 Alternative surface dressings may be used with the Corridor Manager's approval (see Chapter 4 Transportation).

## 8.6 Subsoil drainage

This section deals with the use, design and construction of sub-soil drains.

### Mandatory Matters

Council requires the following standards to be met where sub-soil drains are used:

- 8.6.1.1 Geotechnical assessments will be carried out by a geotechnical professional whenever the situations stated in NZS4404 Clause 2.1 are present.
- 8.6.1.2 The geotechnical professional will carry out the functions listed in NZS4404 Clause 2.2.4, as well as the following:
  - a) Provide Geotechnical Report, including Site Investigation, Interpretation and Analysis;
  - b) Incorporate and describe how Engineering Redundancy is achieved within the design;
  - c) Demonstrate engineering redundancy via a Quantitative Slope Stability Analysis.
- 8.6.1.3 A risk review will be undertaken by the geotechnical professional and will be recorded as a risk register. The risk review will include:
  - a) Compiling a list of geo-hazards present at the site;
  - b) Compiling a list of risks to the sub soil drainage system (such as geo-hazards, tree roots, post construction, directional drilling, construction errors, vandalism, future infrastructure for example; house foundations, retaining wall foundations etc) and listing proposed mitigation techniques (such as subsoil drainage zones, limits of deep foundations, application of contingency designs (directional drilling));
  - c) Assessing the impact of a worst-case slope failure which considers risk to the private properties, council infrastructure and adjoining properties.
- 8.6.1.4 Type A Subsoil drains are defined as subsoil drains that are an integral part of the mass earthworks, and the Geotechnical Certification is subject to these drains remaining in good working order at all times and operating as designed.
- 8.6.1.5 Type-A Subsoil Drains will not be permitted in Nelson or Tasman regions either as a public or private asset.
- 8.6.1.6 Type B subsoil drains are defined as subsoil drains that are a requirement of the earthworks design and construction, but the guaranteed ongoing operation of these drains is not required for ongoing land stability and there is no requirement by the certifying Geotechnical Engineer that these drains need to be monitored and maintained.
- 8.6.1.7 Council will not accept these drains as a vested asset pursuant to any development of private land.
- 8.6.1.8 Subsoil drains must be designed and constructed in a way that allows them to be inspected internally using CCTV. This will be undertaken after trench backfill is completed but prior to major earthworks, and the information including video and a short report provided to the Council.
- 8.6.1.9 Prior to 224 certification, subsoil drains are to be inspected by CCTV and that CCTV inspection is to be reviewed by the certifying Geotechnical Engineer and certified as acceptable.

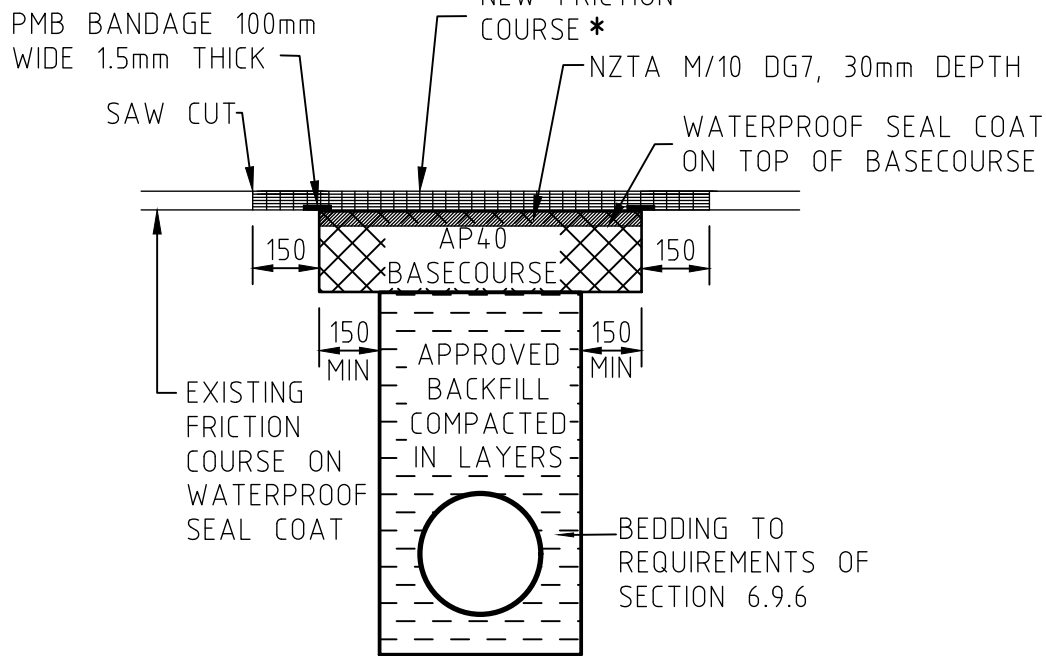


- 8.6.1.10 Prior to 224 certification, Geotechnical Certification must be provided to Council by the certifying Geotechnical Engineer confirming that the subsoil drains are not required as a means of instability risk management. Geotechnical Certification must be made by a suitably qualified Chartered Professional Engineer.
- 8.6.1.11 Prior to 224 certification, As-Built plans for the entire subsoil drain system will be provided to Council, detailing the surveyed alignment and depth to finished ground levels for the entire subsoil drain system.
- 8.6.1.12 Prior to 224 certification, subsoil drains must be legally protected (for example; through easement) from being built or constructed over, including appropriate requirements, detailed by the certifying Geotechnical Engineer, if building adjacent or over the subsoil drains is anticipated.

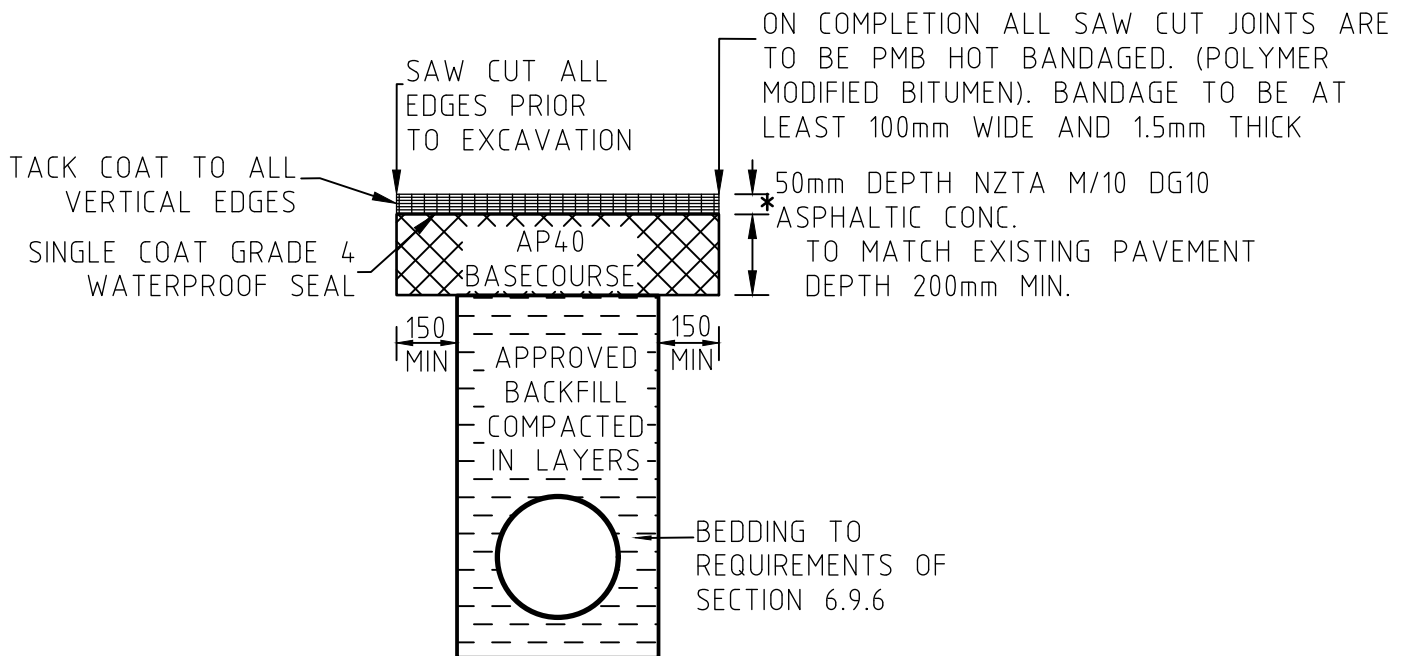
### **Good Practice**

The following matters provide additional guidance and direction in all subsoil drainage activities.

- 8.6.1.13 Consideration should be given to avoiding disturbance of wet areas. Wet areas should be assessed during the concept and design phase to ensure they are not flood flow paths, intermittent waterways or wetlands.
- 8.6.1.14 Subsoil drainage will generally be required for significant areas of fill. More extensive sub-soil drains may be necessary on flatter ground in wet areas.
- 8.6.1.15 Sub-soil drains are discouraged under proposed building envelopes as they may be damaged in piling or excavations for the future dwelling.
- 8.6.1.16 The certifying Geotechnical Engineer may rely on ongoing monitoring and maintenance requirements over the life of the drain.





FOR FRICTION COURSE

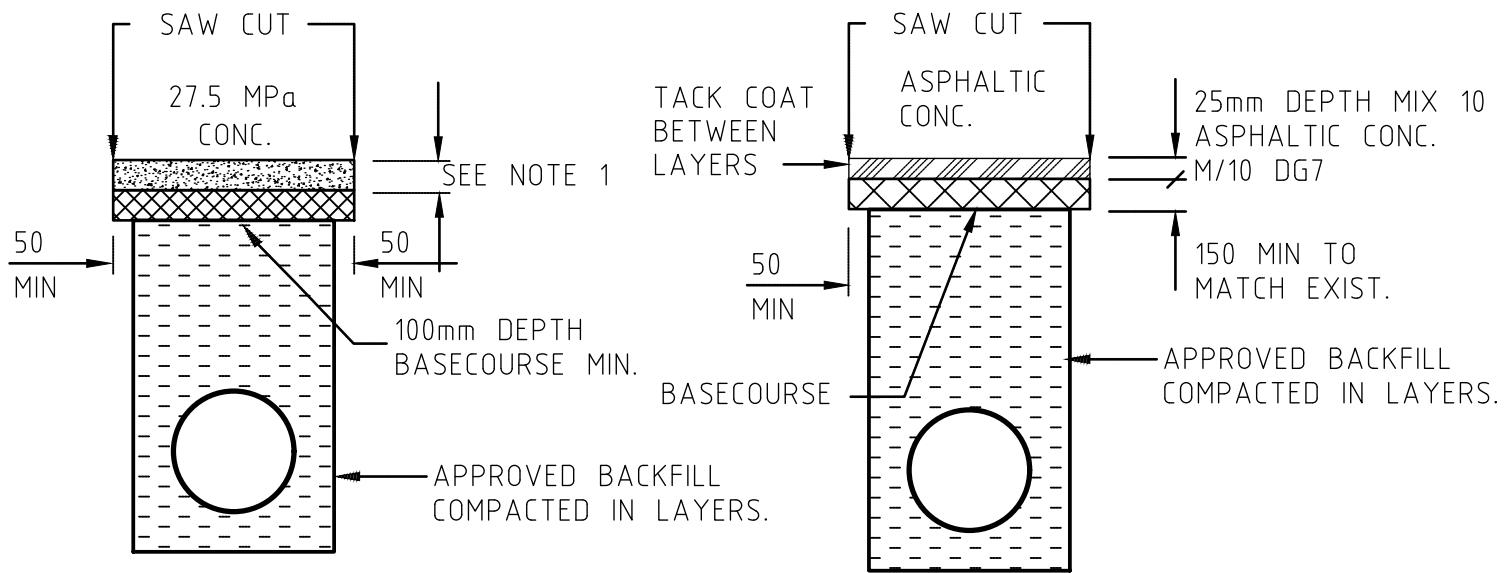


FOR CHIP SEAL, THIN ASPHALT & DEEP ASPHALT

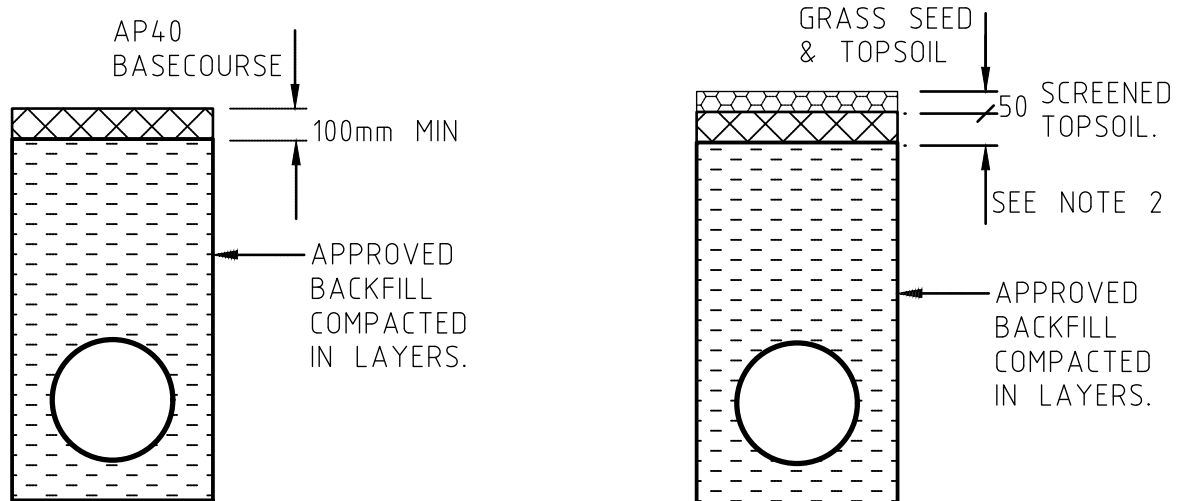
NOTES

1. UNSEALED ROADS & SHOULDERS. REINSTATEMENT TO BE 150MM DEPTH OF 40MM BASECOURSE TOPPED OFF WITH 50MM DEPTH OF 20MM BASECOURSE
2. FOR FINISHED SEAL LEVEL TOLERANCES SEE SECTION 8.4.8 & 4.18.5
3. \*DEPTH TO MATCH EXISTING BITUMINOUS LAYER DEPTH, WHERE DEPTH IS GREATER THAN 50mm

<b>NELSON CITY COUNCIL</b>  GROUP MANAGER INFRASTRUCTURE, NELSON		<b>TRENCH REINSTATEMENT IN CARRIAGEWAY</b>	
<b>TASMAN DISTRICT COUNCIL</b>  ENGINEERING SERVICES MANAGER, TASMAN	<b>DATE</b> 01/07/19	NELSON - TASMAN LAND DEVELOPMENT MANUAL	<b>801</b>



CONCRETE THIN ASPHALTIC  
(FOR CHIP SEAL FOOTPATHS ALSO)



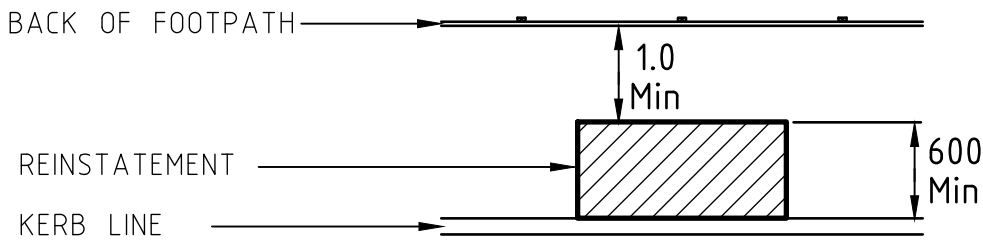
GRAVEL

GRASS

NOTES

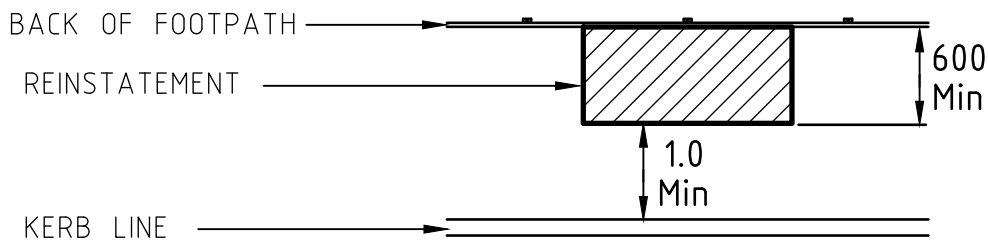
1. 100mm FOR FOOTPATH. 150mm FOR RESIDENTIAL CROSSING. 200mm FOR COMMERCIAL CROSSING WITH 665 MESH. FOR INDUSTRIAL CROSSING PAVEMENT TO SPECIFIC DESIGN (TO MATCH EXISTING).
2. UNSCREENED TOPSOIL (50mm FOR CLAY FILLS, 100mm FOR GRAVEL OR SAND FILLS).

<p>NELSON CITY COUNCIL</p> <p><i>[Signature]</i></p> <p>GROUP MANAGER INFRASTRUCTURE, NELSON</p>		<p>TRENCH REINSTATEMENT IN FOOTPATH</p>	
<p>TASMAN DISTRICT COUNCIL</p> <p><i>[Signature]</i></p> <p>ENGINEERING SERVICES MANAGER, TASMAN</p>	<p>DATE</p> <p>01/07/19</p>	<p>NELSON - TASMAN LAND DEVELOPMENT MANUAL</p>	<p>802</p>



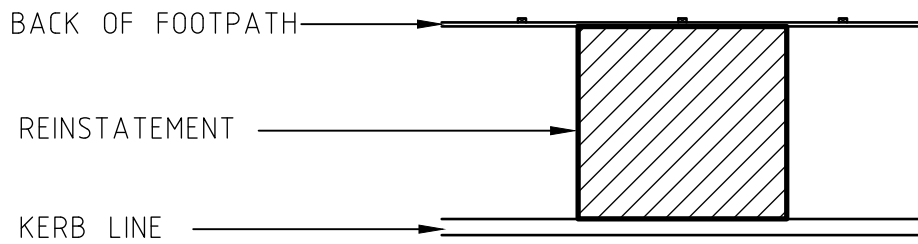
APPROVED

(EXCLUDING ARTERIAL & PRINCIPAL ROADS & CBD AREAS OR FOOTPATH SURFACES LESS THAN 5 YEARS OLD)

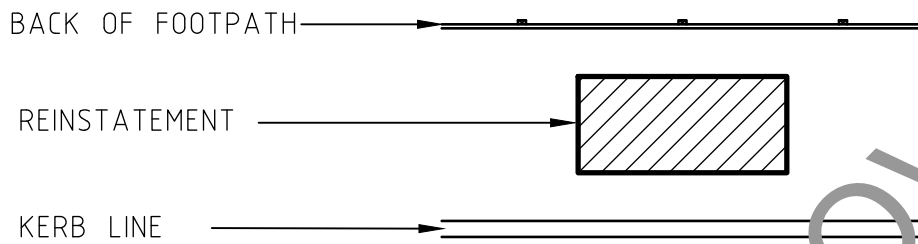


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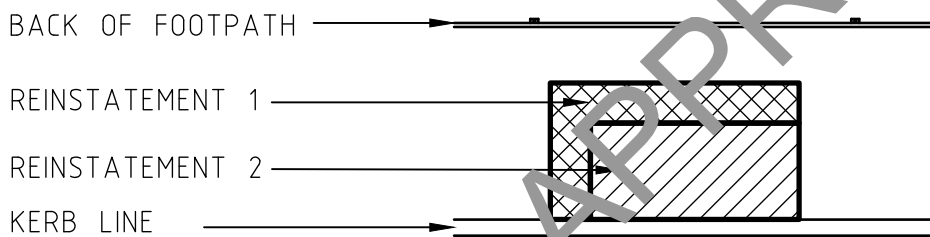
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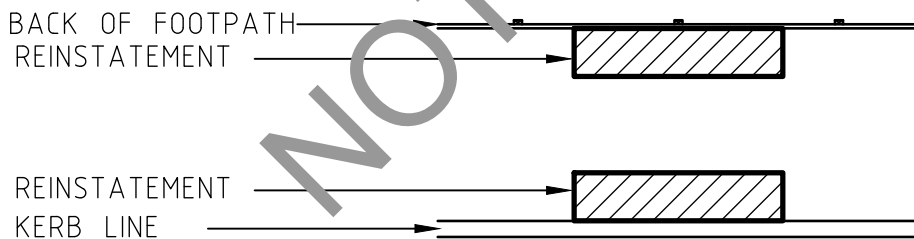
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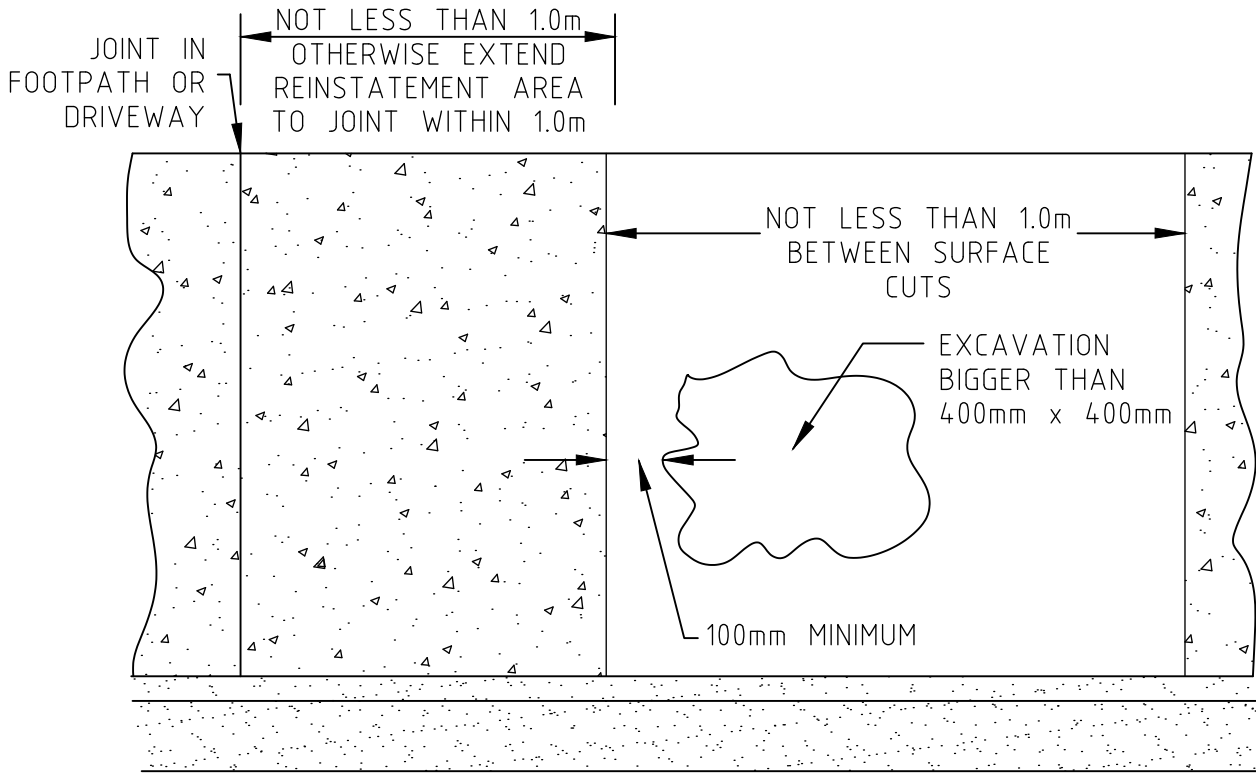
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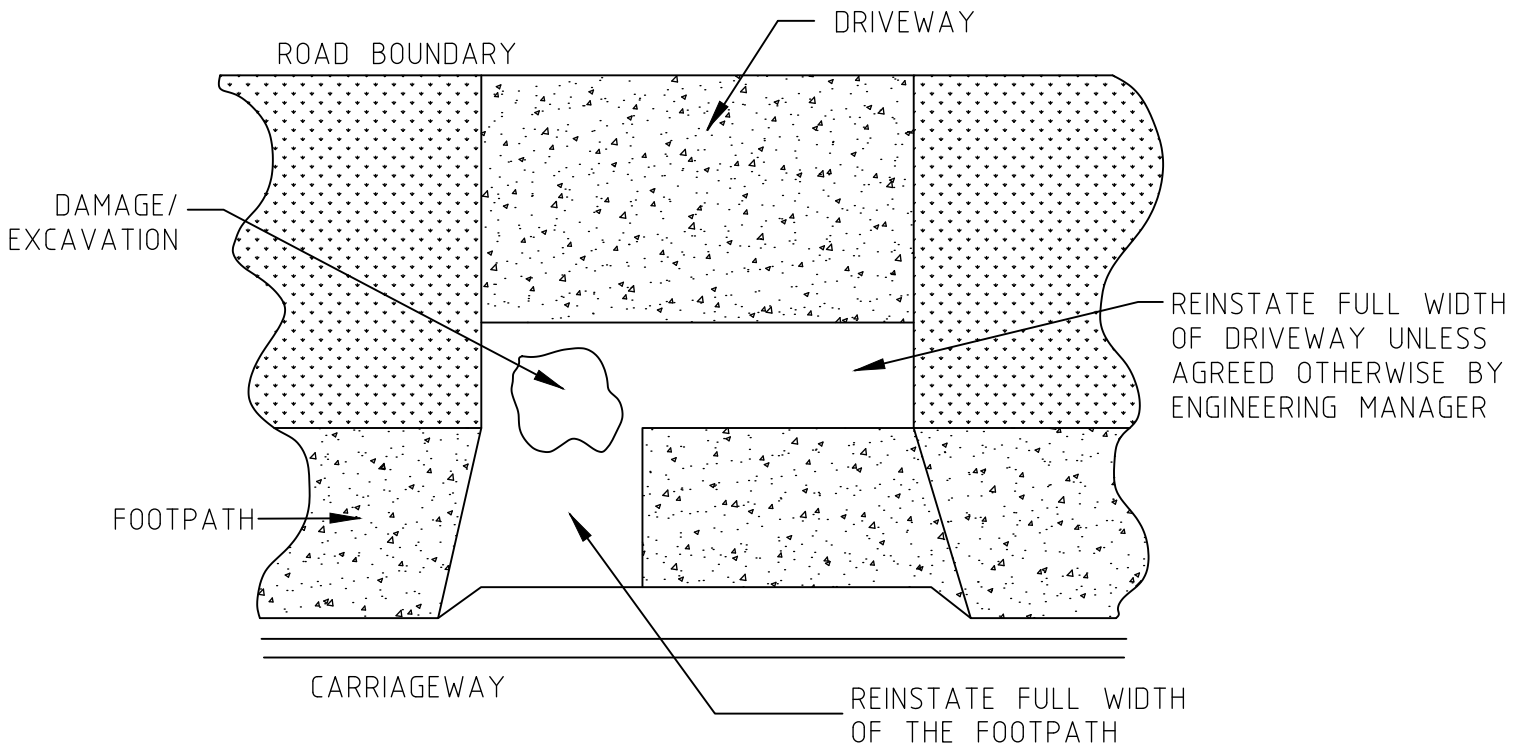
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<p><b>NELSON CITY COUNCIL</b></p> <p>GROUP MANAGER INFRASTRUCTURE, NELSON</p>	<p><b>FOOTPATH SURFACE REINSTATEMENT</b></p>		
<p><b>TASMAN DISTRICT COUNCIL</b></p> <p>ENGINEERING SERVICES MANAGER, TASMAN</p>	<p>DATE</p> <p>01/07/19</p>	<p>NELSON - TASMAN</p> <p>LAND DEVELOPMENT MANUAL</p>	<p style="font-size: 24px; font-weight: bold;">803</p>

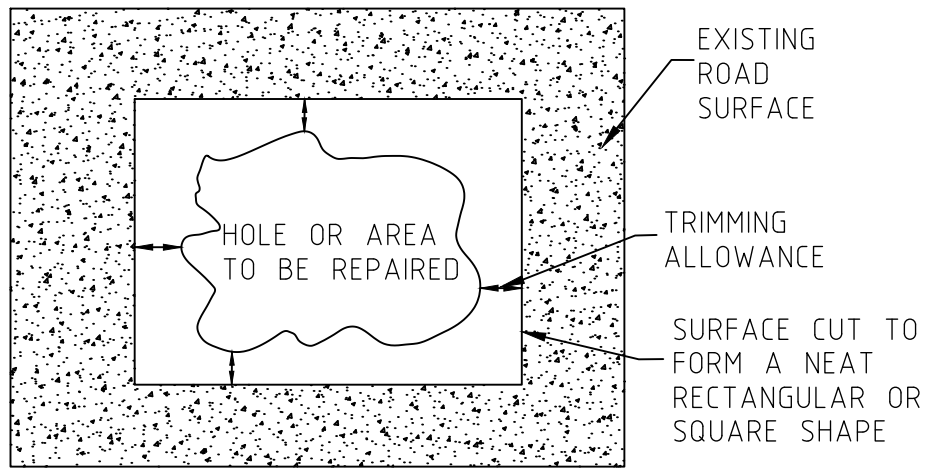


REINSTATEMENT OF CONCRETE PATH OR DRIVEWAY

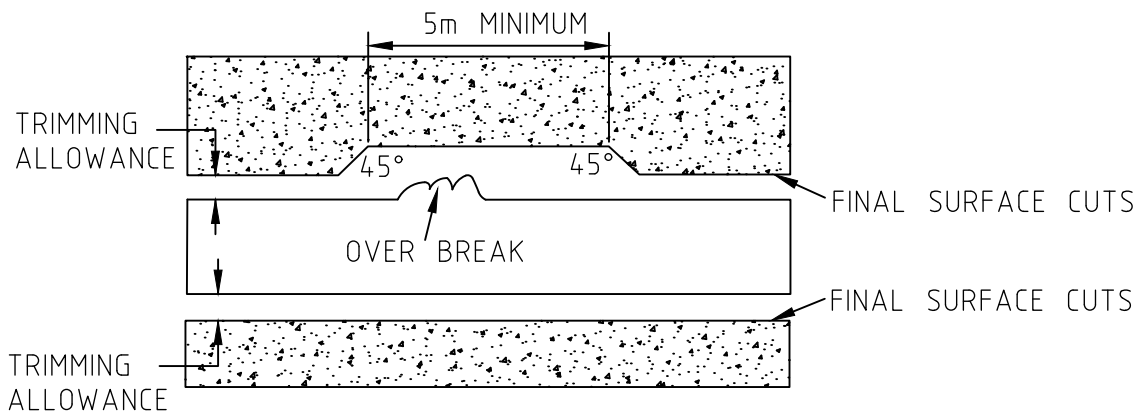


EXCAVATION IN FOOTPATH OR DRIVEWAY

NELSON CITY COUNCIL  GROUP MANAGER INFRASTRUCTURE, NELSON		<b>FOOTPATH SURFACE REINSTATEMENT</b>	
TASMAN DISTRICT COUNCIL  ENGINEERING SERVICES MANAGER, TASMAN	DATE 01/07/19	NELSON - TASMAN LAND DEVELOPMENT MANUAL	<b>804</b>



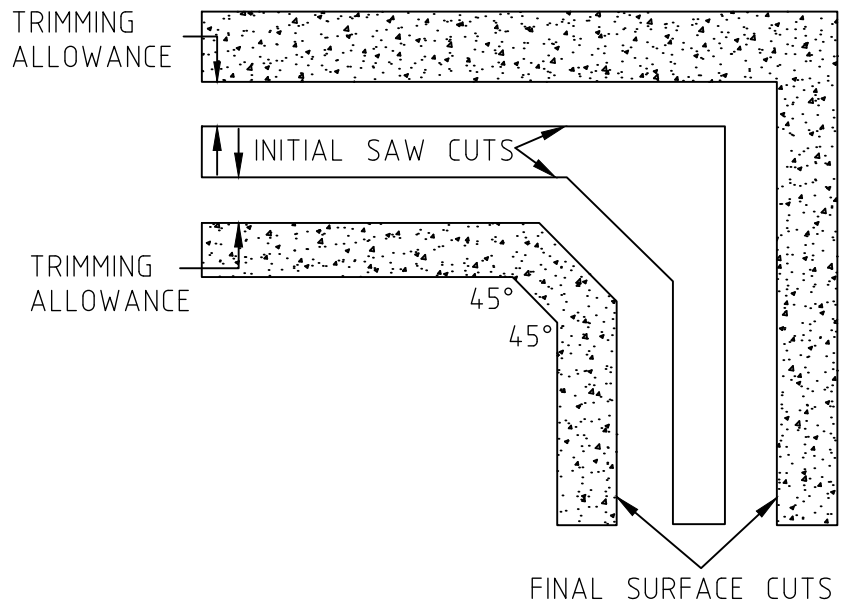
**FIG 1 - FINISHING OF IRREGULAR SHAPED EXCAVATIONS  
PLAN VIEW**





**FIG 2 - PARALLEL CUTTING OF JOINTS  
PLAN VIEW**

**NOTES**

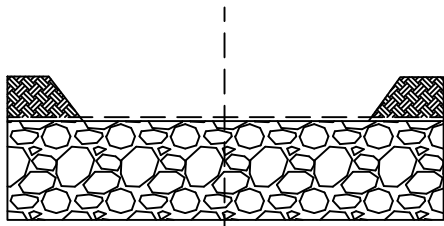
1. A MINIMUM TRIMMING ALLOWANCE OF 150mm
2. TOTAL LENGTH OF OVER BREAK OF THE TRENCH MUST NOT EXCEED 10% OF ITS LENGTH. THE LENGTH OF TRIM AT ANY SINGLE SECTION OF OVER BREAK SHOULD NOT BE LESS THAN 5m (SEE FIG. 2). THE PURPOSE OF THESE REQUIREMENTS IS TO AVOID AN UNDESIRABLE VISUAL IMPACT.



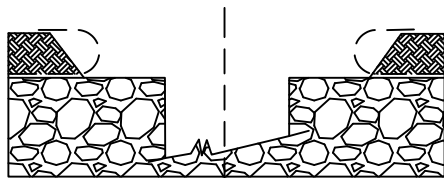
**FIG 3 - TRENCH EXCAVATION WITH CORNERS  
PLAN VIEW**

NELSON CITY COUNCIL  GROUP MANAGER INFRASTRUCTURE, NELSON		<b>SURFACE REINSTATEMENT TRIMMING ALLOWANCE</b>	
TASMAN DISTRICT COUNCIL  ENGINEERING SERVICES MANAGER, TASMAN	DATE 01/07/19	NELSON - TASMAN LAND DEVELOPMENT MANUAL	<b>805</b>

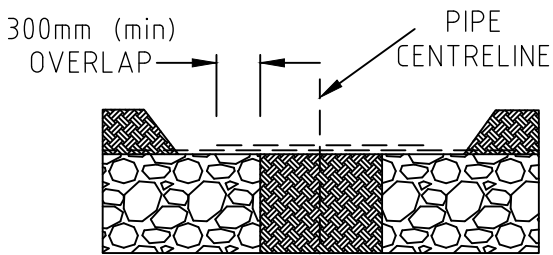
## METHOD 1 - THE "PEEL BACK" METHOD



CAREFULLY REMOVE FILL TO EXPOSE GEOGRID AND CUT THE GROUND AT THE PIPE CENTRELINE

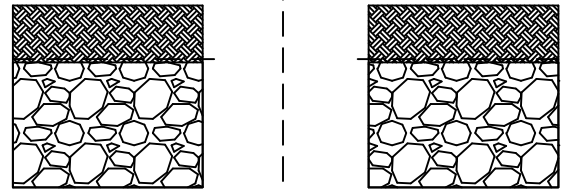


ROLL BACK THE GEOGRID TO EACH SIDE TO ENABLE THE EXCAVATION

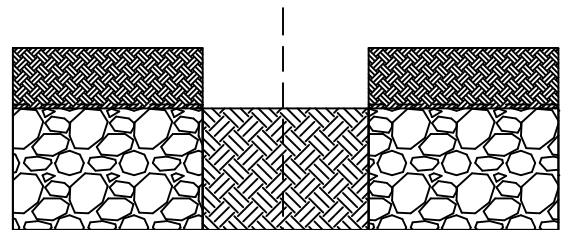


UPON BACKFILLING THE TRENCH EXCAVATION, RELOCATE THE GEOGRIDS AND PLACE A 600mm (min) SEALING STRIP OF GEOGRID. REPLACE THE FILL

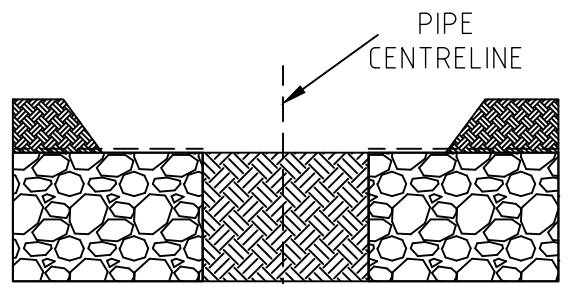
## METHOD 2 - THE "DIG THROUGH" METHOD



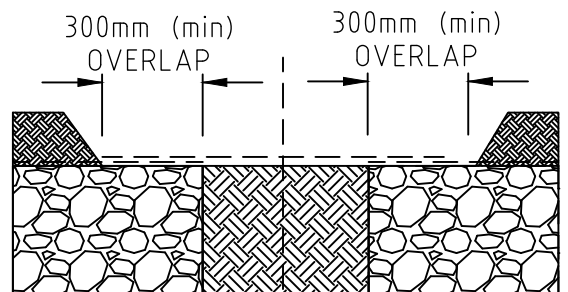
EXCAVATE TRENCH AND BREAK THROUGH THE GEOGRID



BACKFILL TRENCH TO GEOGRID LEVEL



TRIM BACK THE FILL TO EXPOSE 300mm OF GEOGRID



PLACE SEALING STRIP of GEOGRID. REPLACE THE FILL.

NELSON CITY COUNCIL

GROUP MANAGER INFRASTRUCTURE, NELSON

## REINSTATING BIAXIAL GEOGRIDS FOLLOWING TRENCH EXCAVATIONS

TASMAN DISTRICT COUNCIL

ENGINEERING SERVICES MANAGER, TASMAN

DATE

01/07/19

NELSON - TASMAN  
LAND DEVELOPMENT MANUAL

806