Bulloo Shire

TECHNICAL SPECIFICATION

SEALED ROADS RESTORATION WORKS – INNAMINCKA ROAD

PART 4

CONTRACT No.
T2026-2027-205

CONTRACT SERVICES

Bulloo Shire Council is seeking tenders from appropriately qualified and experienced contractors to complete works associated with Contract 2026-2027-205 – Sealed Roads Restoration Works – Innamincka Road in Bulloo Shire.

The Works Under Contract will be provided in accordance with the tendered Schedule of Rates as submitted in *Schedule K1 Contract Works Pricing Schedule, Schedule K2 Additional Works Pricing Schedule and Schedule K3 Rates for Variation.*

This Technical Specification is intended for use with contracts for the restoration and reconstruction of road assets damaged by natural disaster events and funded, in whole or in part, under the Disaster Recovery Funding Arrangements and administered in Queensland through the Queensland Reconstruction Authority.

SCOPE AND SPECIFICATION DOCUMENTS

This Part 4 Technical Specification document shall be read in conjunction with the following documents:

- Part 2 - Conditions of Contract;
- Part 3 - General Specification;
- K1 Contract Pricing Schedule;
- Site maps, drawings, and any approved treatment schedules;
- Queensland Reconstruction Authority Treatment Guide 2020-21; and
- Applicable Transport and Main Roads Technical Specifications, current Australian Standards and manufacturer requirements.

DOCUMENT PURPOSE

The purpose of this Technical Specification is to define the treatment-specific workmanship, material, quality, inspection, record-keeping and measurement requirements for the approved items included in the Contract.

Except where this Technical Specification states otherwise, all general requirements for work health and safety, contract management, approvals, program, quality management, reporting, environmental protection, waste management, biosecurity, traffic management, as-constructed records, operation and maintenance information, and practical completion shall be in accordance with the General Specification and the Conditions of Contract.

CONTRACT SPECIFIC CLAUSES

CSC1 BRIDGE APPROACH EMBANKMENT RECONSTRUCTION

General

The Contractor shall reconstruct the flood-damaged bridge approach embankments within the authorised treatment limits using the applicable Schedule K1 excavation and imported bulk fill treatments.

The works shall reinstate the embankments to the lines, levels, geometry and configuration nominated by the Principal, generally based on the historical 2012 bridge approach design drawings.

The Contractor shall ensure that the reconstruction is undertaken in a manner that maintains the stability of the existing bridge, abutments, adjoining embankments, concrete restraints and retained embankment protection.

Excavation and Foundation Preparation

The Contractor shall remove flood-damaged, loose, unsuitable or unstable material within the authorised excavation limits to expose a suitable foundation for reconstruction.

Existing temporary fill shall only be removed where necessary to complete the authorised permanent reconstruction works.

The Contractor shall:

- Protect sound existing embankment material and adjoining infrastructure from unnecessary disturbance.
- Avoid undermining the bridge structure, abutments, foundations, concrete restraints or retained revetment mattress protection.
- Remove unsuitable material and prepare a stable foundation for placement of new fill.
- Bench into sound existing embankment material where required by the nominated reinstatement details to provide a stable connection between existing and reconstructed material.
- Maintain suitable drainage and erosion protection throughout the reconstruction.

Where excavation exposes unexpected voids, scour, unstable foundation material or other conditions that may affect the stability of the embankment or bridge structure, the Contractor shall cease the affected work, make the area safe and immediately notify the Superintendent.

HP **Hold Point:** The Contractor shall not commence placement of embankment fill until the exposed foundation, excavation limits and any required benching have been inspected and accepted by the Superintendent.

Embankment Reconstruction

Imported bulk fill shall comply with the requirements of Section 3 of this Technical Specification and shall be suitable for use in the reconstruction of the bridge approach embankments.

Fill shall be placed, moisture conditioned and compacted in controlled layers not exceeding 150mm compacted thickness, unless an alternative layer thickness has been accepted by the Superintendent.

The Contractor shall ensure that:

- Each layer is adequately compacted before the next layer is placed.
- Fill is placed and compacted to achieve a stable connection with existing embankment material.
- The reconstructed embankment achieves the specified compaction requirements.
- Completed batters are trimmed to the nominated geometry and provide suitable support for the embankment protection system.
- Surface runoff is controlled to prevent erosion, scour or damage to partially completed embankment works.

The historical drawings indicate embankment batters generally constructed at a slope of approximately 1 vertical to 2 horizontal. The Contractor shall reconstruct the batters to the geometry confirmed by the Principal for the permanent reinstatement works.

HP **Hold Point:** The completed embankment shall be inspected and its geometry, compaction and finished condition verified before placement of pavement materials or reinstatement of embankment protection.

CSC2 BRIDGE APPROACH PAVEMENT AND SEAL RECONSTRUCTION

The Contractor shall reconstruct the damaged road pavement and bituminous seal at the bridge approaches using the applicable Schedule K1 Insitu Stabilisation Including 50mm Corrector and Bitumen Spray Seal treatments, subject to the project-specific pavement construction requirements detailed in this Clause.

The completed pavement shall be reinstated to the structural configuration, thickness, lines, levels and finished geometry in accordance with the 2012 design, providing a smooth and stable transition between the existing bridge, approach pavement and adjoining road.

Pavement Reconstruction

The Contractor shall prepare the underlying formation in accordance with the requirements of this Technical Specification before placing pavement materials.

The Contractor shall place pavement material in accordance with the requirements of the 2012 design drawings and the additional requirements of this Clause.

The pavement design incorporates a granular base course, modified with a cement/fly ash blend comprising 40% cement and 60% fly ash, applied at a rate of 3% by dry mass of the pavement material. The pavement shall be constructed via the addition of approved granular bulk fill material and the corrector pavement material. Upon completion of pavement material placement the material shall be stabilised to a depth of 200mm using the nominated cementitious binder.

The Contractor shall undertake stabilisation, placement, moisture conditioning and compaction in accordance with the nominated pavement requirements and applicable standards.

All granular pavement materials, stabilising agents, construction methods, compaction and testing shall comply with the applicable requirements of this Technical Specification.

The Contractor shall ensure that:

- The underlying formation provides suitable and uniform support for the reconstructed pavement.
- The completed pavement achieves the nominated pavement thickness, strength and compaction requirements.
- The finished surface provides appropriate crossfall, longitudinal grade and transitions to adjoining pavement.
- The reconstructed pavement integrates with the existing bridge approach, concrete edge restraints, subsurface drainage and shoulder construction.
- Surface and subsurface drainage are maintained to prevent water accumulation within the pavement and adjoining embankment.
- The construction methods do not damage or compromise geosynthetic reinforcement or subsurface drainage installations.

The 2012 drawings nominate a pavement crossfall of 3%. The finished pavement shall be constructed to match the nominated design geometry and tie into undisturbed pavement areas without creating abrupt changes in crossfall, longitudinal grade or other conditions that may adversely affect vehicle stability.

Where the nominated crossfall differs from the general road formation requirements elsewhere in this Technical Specification, the nominated bridge approach geometry shall apply.

Pavement Geosynthetic Reinforcement

The Contractor shall supply and install two separate layers of Tensar-type pavement reinforcement geogrid, or an equivalent geosynthetic reinforcement product accepted by the Principal, within the reconstructed pavement.

The geosynthetic reinforcement shall be installed at the following locations:

1. **Lower reinforcement layer:** Directly over the prepared and accepted subgrade, beneath the first 150 mm compacted layer of cement/fly ash-modified pavement material.

2. **Upper reinforcement layer:** Between the first and second 150 mm compacted layers of cement/fly ash-modified pavement material, over the prepared and accepted surface of the lower pavement layer.

The reinforcement shall extend across the full width of the reconstructed pavement within the nominated treatment limits, including the specified shoulder areas, and shall terminate at the concrete edge restraints and existing pavement interfaces in accordance with the accepted installation details.

The geosynthetic reinforcement shall comply with the applicable requirements of MRTS58 Geosynthetics for Subgrade and Pavement Reinforcement and shall be suitable for use with the nominated pavement materials and construction methods.

Prior to procurement, the Contractor shall submit the following information to the Superintendent for review and acceptance:

- Manufacturer's product specifications and technical data;
- Proposed geogrid type, strength, aperture configuration and reinforcement properties;
- Evidence of compatibility with the specified cement/fly ash-modified pavement materials;
- Proposed installation methodology, including placement, orientation, overlaps, joints and terminations;
- Proposed method of incorporating the geosynthetic between the two stabilised pavement layers without compromising the required pavement performance;
- Details of proposed interfaces with existing pavement, concrete edge restraints and subsurface drainage; and
- Manufacturer's installation and construction traffic requirements.

The Contractor shall ensure that the geosynthetic reinforcement is installed on a suitably prepared, firm and uniform surface, free from sharp protrusions, loose material, excessive surface irregularities or other conditions that may damage the reinforcement.

The geosynthetic shall be placed flat, without folds, wrinkles or excessive slack, and shall be adequately secured to prevent movement or displacement during placement of the overlying pavement material.

All overlaps, joints and terminations shall comply with the accepted installation details and manufacturer's requirements.

The Contractor shall ensure that pavement stabilisation and mixing operations do not damage or displace the installed geosynthetic reinforcement. Mixing, scarification or other construction activities shall not penetrate or otherwise disturb an installed reinforcement layer.

The placement methodology shall maintain the required pavement layer thicknesses and compaction while preventing damage to the reinforcement through construction plant loading, excessive deformation or direct contact with equipment.

~~The Contractor shall not operate construction plant directly on the installed geosynthetic unless expressly permitted by the manufacturer and the accepted construction methodology.~~

~~The Contractor shall demonstrate that the incorporation of the upper reinforcement layer does not compromise the required structural performance, including the necessary interlayer load transfer and resistance to horizontal movement between the stabilised pavement layers.~~

~~HP **Hold Point:** The Contractor shall not procure or install the geosynthetic reinforcement until the proposed product, installation methodology and reinforcement details have been accepted by the Superintendent following confirmation of their suitability for the nominated permanent pavement design.~~

~~HP **Hold Point:** Each geosynthetic reinforcement layer shall be inspected and accepted by the Superintendent before placement of the overlying pavement material.~~

~~Any damaged, displaced or incorrectly installed geosynthetic reinforcement shall be rectified or replaced at the Contractor's cost before the subsequent pavement layer is constructed.~~

Longitudinal Subsurface Drainage

The Contractor shall supply and install longitudinal subsurface drainage along both sides of the reconstructed bridge approach pavement, adjacent to the inner faces of the reinforced concrete edge beams.

The drainage system shall comprise one continuous longitudinal subsurface drain on each side of the reconstructed pavement, positioned at or immediately below subgrade level, within the road formation between the concrete edge beams.

The drainage system shall collect and convey subsurface water from the pavement and adjacent edge restraint interfaces to the existing drainage system, preventing the accumulation of water within the reconstructed pavement and associated embankment.

The longitudinal drains shall comprise perforated or slotted corrugated high-density polyethylene (HDPE) subsurface drainage pipe, nominally 100 mm diameter, incorporating a factory-fitted permeable geotextile filter sock suitable for the surrounding pavement and drainage materials, unless otherwise specified in the accepted permanent drainage details.

The Contractor shall ensure that the drainage pipe and filter sock are suitable for the intended application and comply with the relevant Australian Standards and manufacturer's requirements.

Prior to installation, the Contractor shall inspect and confirm the location, alignment, condition, invert levels and serviceability of the existing drainage system into which the new subsurface drains are to be connected.

The Contractor shall submit the proposed drainage arrangement to the Superintendent for review and acceptance, including:

- Proposed pipe type, diameter and material specifications;
- Details of the filter sock and its compatibility with the adjoining pavement and drainage materials;
- Longitudinal drain locations, levels and gradients;
- Proposed drainage trench dimensions and filter aggregate;
- Details of connections to the existing drainage system;
- Proposed pipe junctions, fittings, outlets and flushing or inspection provisions; and
- Proposed construction methodology and measures to protect the concrete edge beams, existing pavement and retained revetment mattress protection.

The Contractor shall excavate and prepare the drainage trenches to the nominated lines and levels, ensuring that the works do not undermine or compromise the foundations or structural integrity of the concrete edge beams.

The drainage pipes shall be installed on a suitably prepared foundation and surrounded with clean, durable, free-draining filter aggregate compatible with the pipe perforations, filter sock and adjoining material.

The filter aggregate shall be placed and compacted using methods that prevent damage, crushing or displacement of the drainage pipe and filter sock.

Where specified in the accepted drainage arrangement, the drainage aggregate shall be enclosed within a suitable geotextile filter fabric to prevent migration of surrounding fine material into the drainage system.

The Contractor shall ensure that:

- The drainage pipes are installed at a continuous positive grade towards their nominated outlets.
- Pipe alignments and invert levels allow effective gravity drainage without creating low points or sections where water may accumulate.
- The filter socks remain intact and free from excessive sediment contamination during installation.
- Connections, joints and fittings are secure and do not allow uncontrolled leakage or loss of surrounding embankment material.
- The drainage trench and filter materials are installed to maintain effective collection of subsurface water.
- The drainage installation does not reduce the required pavement thickness, compromise the concrete edge beam foundations or adversely affect the stability of adjoining embankment materials.

Connections to Existing Drainage

The Contractor shall connect the new longitudinal subsurface drains to the existing drainage system at the locations and levels confirmed by the Superintendent.

The Contractor shall expose and inspect the existing drainage infrastructure before making any connection.

Connections shall be undertaken using suitable fittings, junctions and connecting pipes that provide a secure, durable and free-draining connection without restricting the hydraulic capacity of the new or existing drainage system.

Where a non-perforated connecting pipe is required between the longitudinal subsurface drain and an existing outlet or drainage structure, the Contractor shall provide a suitable solid-wall carrier pipe and associated fittings.

The Contractor shall ensure that the completed connections do not discharge water into the reconstructed embankment, beneath the revetment mattress protection or against concrete restraints in a manner that may cause erosion, scour, piping or other damage.

Where the existing drainage infrastructure is damaged, blocked, unsuitable or does not provide a suitable connection point or discharge level, the Contractor shall notify the Superintendent and obtain direction before proceeding with the affected connection works.

The Contractor shall not construct additional drainage outlets or alter existing drainage discharge arrangements without prior written direction from the Superintendent.

HP **Hold Point:** The Contractor shall not commence installation of the longitudinal subsurface drains until the existing drainage system has been inspected and the proposed pipe locations, invert levels, gradients, connection details and drainage arrangement have been accepted by the Superintendent.

HP **Hold Point:** The installed drainage pipes, filter materials, connections and outlet arrangements shall be inspected and accepted by the Superintendent before they are concealed by pavement or other construction materials.

The Contractor shall demonstrate that the completed drainage system is continuous, unobstructed and capable of conveying water to the nominated existing drainage system.

The Contractor shall undertake flushing, visual inspection, flow testing or other appropriate verification as required by the Superintendent to confirm the functionality of the completed installation.

All drainage pipes, junctions and connections shall be protected against damage or obstruction during the remaining pavement and embankment reconstruction works.

Bituminous Sealing
Following completion and acceptance of the reconstructed pavement, including the geosynthetic reinforcement and subsurface drainage installations, the Contractor shall undertake the specified two-coat bituminous sealing in accordance with the applicable requirements of this Technical Specification and the 2012 design drawings.

The completed seal shall provide a continuous, safe and durable interface with the adjoining sealed pavement, including suitable edge treatment and surface drainage arrangements.

The Contractor shall ensure that the completed seal and pavement edge interfaces prevent uncontrolled infiltration of surface water into the pavement layers, behind the concrete edge restraints or beneath the revetment mattress protection.

HP **Hold Point:** The reconstructed pavement shall be proof rolled, inspected and accepted by the Superintendent before application of the bituminous seal.

The Contractor shall provide all inspection records, material compliance documentation, testing results and as-constructed information associated with the pavement reinforcement and subsurface drainage installations in accordance with the quality management requirements of this Technical Specification.

CSC3 CONCRETE EDGE RESTRAINTS AND ASSOCIATED CONCRETE WORKS

The Contractor shall reconstruct damaged reinforced concrete edge restraints, perimeter beams, cut-off elements and other concrete components included within the authorised Schedule K1 Reconstruct Reinforced Concrete treatment limits.

The works shall reinstate the function and configuration of the existing concrete elements, including their role in supporting, restraining and protecting the bridge approach embankments and associated revetment mattress protection.

The Contractor shall retain sound existing concrete wherever practicable and shall not demolish concrete outside the authorised reconstruction limits without prior written direction from the Superintendent.

The Contractor shall:

- Identify and expose the full extent of damaged concrete requiring reconstruction.
- Prepare sound and suitable foundations for the replacement concrete.
- Provide neat and stable connections between existing and reconstructed concrete.
- Install reinforcement, dowels, joints and other embedded elements in accordance with the nominated construction details.
- Protect adjoining revetment mattresses, embankment material and existing infrastructure during demolition and concreting.
- Reinstate adjoining surfaces and interfaces to ensure the completed concrete elements provide the required restraint and protection.

Concrete materials, reinforcement, formwork, placement, compaction, finishing, curing, testing and inspection shall comply with Section 7 of this Technical Specification.

The historical drawings include concrete edge restraint and cut-off details associated with the revetment mattress system. The Contractor shall verify the existing dimensions and interfaces before undertaking replacement works.

Where the original reinforcement, connection, foundation or joint details cannot be established or are unsuitable for reinstatement, the Contractor shall notify the Superintendent and obtain the required permanent reconstruction detail before proceeding.

HP **Hold Point:** The Contractor shall not place concrete until the prepared foundation, reinforcement, formwork, joints, connections and embedded items have been inspected and the applicable Hold Point released by the Superintendent.

CSC4 EXISTING REVETMENT MATTRESS PROTECTION – INTERFACES WITH ADJOINING WORKS

The bridge approach embankments include existing concrete-filled geotextile revetment mattress protection installed as part of previous flood restoration works.

The Contractor shall undertake all excavation, embankment reconstruction, compaction, concrete works, pavement construction and associated activities in a manner that protects existing revetment mattress sections and associated concrete restraints, anchorage arrangements and drainage components designated for retention.

The Contractor shall ensure that adjoining construction activities do not undermine, displace, damage or otherwise compromise the integrity or performance of the retained protection system.

Where the Contractor identifies existing damage, inadequate support or other conditions that may compromise the stability or performance of retained protection, the Contractor shall notify the Superintendent and obtain direction before undertaking work that may disturb, conceal or worsen the condition.

Any damage to existing protection caused by the Contractor's operations shall be rectified at the Contractor's cost in accordance with the requirements of the Contract.

The inspection, protection, selective removal and reconstruction of damaged revetment mattress sections shall be undertaken in accordance with Clause CS5 – Selective Revetment Mattress Reconstruction.

The Contractor shall not remove or replace existing revetment mattress protection outside the authorised reconstruction limits without prior written direction from the Superintendent.

CSC5 SELECTIVE REVETMENT MATTRESS RECONSTRUCTION

Purpose and Extent

The Contractor shall undertake selective reconstruction of flood-damaged sections of the existing concrete-filled geotextile revetment mattress protection system on the bridge approach embankments, predominantly associated with the western bridge approach.

The extent of reconstruction shall be limited to those areas identified through the joint pre-construction inspection, recorded on an agreed marked-up repair plan and authorised by the Superintendent.

The Contractor shall retain and protect all existing revetment mattress sections which remain sound, adequately supported, securely anchored and capable of continuing to perform their intended erosion protection function.

Wholesale replacement of the existing revetment mattress protection system shall not be undertaken unless expressly directed by the Superintendent.

Historical Reinstatement Reference
The Brandon & Associates Nappa Merrie Bridge Approaches design drawings, Job No. 131028, prepared in 2012, provide the historical construction details for the existing revetment mattress protection system.

Drawing 13102806 identifies the previously adopted concrete-filled geotextile revetment mattress system, designated as "200 HF Hydrostatic Filter", with a nominal mattress thickness of 150 mm, embankment batters generally constructed at 1 vertical to 2 horizontal, and associated concrete edge restraints, cut-off walls and rock protection. Drawing 13102804 identifies the historical arrangement and extent of the approach protection works.

The Contractor shall note that the drawings represent the historical construction arrangement and do not establish the current condition, extent or suitability of the existing protection system.

The original manufacturer, current product availability, material properties and compatibility of replacement systems have not been independently verified by the Principal.

The Contractor shall utilise a replacement mattress system that is compatible with the existing protection and capable of reinstating the intended erosion protection function, subject to the requirements of this Clause and acceptance of the proposed permanent repair arrangement by the Principal.

Any proposed alternative to the historical mattress system shall be supported by sufficient technical information to demonstrate equivalent or superior performance in relation to hydraulic stability, permeability, filtration, durability, strength, thickness and connection to the retained protection system.

Any change affecting the permanent design or hydraulic performance of the protection system shall be referred to the Superintendent for engineering assessment and direction prior to procurement.

Pre-Construction Inspection and Repair Limits
Prior to commencing work, the Contractor and Superintendent shall jointly inspect the existing revetment mattress protection system to establish the extent and nature of the damage and identify the sections requiring reconstruction.

The inspection shall identify and record, as a minimum:

- Sound and serviceable mattress sections to be retained;
- Damaged, torn, displaced, undermined or missing mattress sections;
- Areas where the existing protection has lost support or anchorage;
- The condition of exposed embankment and founding materials;
- Existing mattress edges, joints, terminations and connection arrangements;
- The condition of concrete perimeter restraints, cut-off walls and associated rock protection; and
- Evidence of erosion, scour, settlement or other deterioration affecting the performance of the protection system.

The Contractor shall record the location and extent of the proposed reconstruction works, including relevant chainages, offsets, slope lengths, dimensions, boundaries, adjoining interfaces and supporting photographic evidence.

The Contractor shall clearly identify and mark the authorised repair boundaries on site and identify adjoining sound mattress sections requiring protection.

The Contractor shall not remove or disturb existing mattress protection outside the authorised repair limits without prior written direction from the Superintendent.

HP **Hold Point:** The Contractor shall not commence removal of existing revetment mattress protection until the extent of reconstruction has been established, recorded and authorised by the Superintendent.

Removal and Foundation Preparation

The Contractor shall carefully remove the authorised damaged mattress sections, including associated concrete filling, geotextile materials and other components requiring replacement.

Removal shall be undertaken using methods that minimise disturbance to adjoining sound mattress sections, existing concrete restraints, retained embankment material and other infrastructure.

The Contractor shall:

- Establish neat and stable boundaries between retained and removed mattress sections;
- Avoid lifting, tearing, cracking, displacing or undermining adjoining sound protection;
- Cut or separate existing mattress materials using methods compatible with the construction of the existing system;
- Protect exposed edges of retained mattresses against displacement, erosion and loss of underlying support; and
- Remove and dispose of damaged and unsuitable materials at an approved disposal location in accordance with the Contract.

Where removal exposes additional damage or conditions requiring reconstruction beyond the authorised limits, the Contractor shall immediately notify the Superintendent and obtain direction before proceeding.

Following removal of damaged protection, the Contractor shall prepare the underlying embankment surface to the lines, levels and batter geometry nominated for reinstatement.

The prepared surface shall be firm, stable and free of loose, saturated, unsuitable or otherwise deleterious material that may adversely affect the support or performance of the replacement mattress.

Where embankment reconstruction or replacement of unsuitable material is required, the work shall be undertaken in accordance with the applicable authorised earthworks treatment and the relevant requirements of this Technical Specification.

The Contractor shall ensure that the prepared surface provides uniform and continuous support for the replacement mattress, without significant depressions, protrusions, voids or irregularities that may cause localised damage, unsupported areas or premature deterioration.

The Contractor shall verify the suitability of the prepared foundation through inspection and appropriate testing in accordance with the requirements of the Contract. Proof rolling shall only be undertaken where practicable and appropriate for the slope and site conditions, and shall not replace specified earthworks compaction testing.

The Contractor shall ensure that any required filtration, subsurface drainage and hydrostatic pressure relief arrangements are reinstated or maintained in accordance with the nominated permanent reconstruction details.

HP **Hold Point:** The Contractor shall not commence installation of the replacement revetment mattress until the prepared embankment surface, foundation condition, geometry and required drainage or filtration arrangements have been inspected and accepted by the Superintendent.

Replacement Mattress System

The Contractor shall supply a concrete-filled geotextile revetment mattress system compatible with the existing protection system and suitable for the hydraulic and environmental conditions at the bridge approaches.

The replacement system shall reinstate the intended erosion protection function of the historical installation and provide a continuous and durable transition to the retained protection.

The historical design indicates a nominal finished mattress thickness of 150 mm. The proposed system shall achieve the nominated design thickness and associated performance requirements, allowing for the manufacturer's documented thickness characteristics and tolerances. Any departure from the nominated thickness or mattress configuration shall require prior written acceptance of the permanent repair detail.

Prior to procurement, the Contractor shall submit the following information to the Superintendent for review and acceptance:

- Manufacturer's product information, technical specifications and installation instructions;
- Details of the proposed mattress type, configuration, nominal filled thickness and dimensions;
- Geotextile material properties, including strength, durability, abrasion resistance and relevant filtration characteristics;
- Details of the proposed concrete or cementitious grout filling material, including mix design, strength, workability and compatibility with the mattress system;
- Proposed mattress panel sizes, layout and installation sequence;
- Details of seams, joints, overlaps, anchors, terminations and connections to existing protection;
- Proposed methods for connecting replacement mattress sections to retained sound mattress sections;
- Filtration, permeability and hydrostatic pressure relief provisions;
- Details of the proposed interfaces with concrete edge restraints, cut-off walls and rock protection;
- Manufacturer's recommended filling, curing and inspection procedures; and
- Any proposed departures from the historical construction arrangement.

The Contractor shall ensure that the proposed system is suitable for the intended application and that all materials and components are compatible with the existing infrastructure.

HP **Hold Point:** The Contractor shall not procure or install the replacement revetment mattress system until the proposed product and permanent installation details have been accepted in writing by the Superintendent following any necessary engineering assessment by the Principal.

Installation and Interfaces

The Contractor shall install the replacement revetment mattress system in accordance with the accepted installation details, manufacturer's requirements and the nominated permanent reconstruction arrangement.

The Contractor shall ensure that:

- The prepared embankment surface provides continuous and adequate support for the mattress;
- Mattress panels are positioned, aligned, secured and anchored to the required geometry;
- Panel joints, seams, connections and terminations are constructed in accordance with the accepted details;
- Connections to retained protection are secure and do not compromise the integrity or performance of adjoining existing mattress sections;
- The mattress is installed without excessive folds, wrinkles, unsupported areas or other defects that may compromise its performance;
- Required filtration and hydrostatic pressure relief features remain functional and are not obstructed by concrete, grout, soil or other materials; and
- The installation does not create pathways for erosion, piping or loss of underlying embankment material.

The Contractor shall supply and place the specified concrete or cementitious grout filling material using the methods and sequence recommended by the manufacturer and accepted by the Superintendent.

Filling operations shall be controlled to ensure the mattress achieves the required configuration, thickness and degree of filling without excessive pressure, bursting, displacement, damage to seams or disturbance of adjoining protection.

The Contractor shall monitor the filling operations and rectify any areas exhibiting inadequate filling, excessive deformation, leakage or other defects before the filling material has hardened, where practicable.

All filling ports, construction joints and other openings shall be appropriately finished in accordance with the accepted system details, while maintaining the required filtration and hydrostatic pressure relief function.

The completed mattress shall be adequately cured and protected against damage, premature loading, erosion and other conditions that may adversely affect its performance.

Connections and Terminations

The Contractor shall ensure that the reconstructed mattress is securely integrated with retained mattress sections, concrete edge restraints, cut-off walls, rock protection and other adjoining infrastructure.

Connections and terminations shall be constructed to prevent displacement, undermining, progressive erosion or loss of embankment material beneath or behind the protection system.

The Contractor shall ensure that:

- The replacement mattress is securely connected or terminated against the retained protection;
- Existing sound mattress sections are not weakened, displaced or damaged during connection works;
- Required edge restraints, anchors and cut-off arrangements are reinstated in accordance with the nominated construction details;
- Surface runoff does not concentrate at joints, edges or interfaces in a manner likely to cause erosion or scour; and
- The completed protection system maintains the intended hydraulic performance and continuity of the existing installation.

Where a satisfactory connection cannot be achieved using the accepted repair details, the Contractor shall notify the Superintendent and obtain direction before proceeding.

Quality, Inspection and Testing

The Contractor shall prepare and implement a contract-specific Inspection and Test Plan for the selective reconstruction of the revetment mattress protection in accordance with Clause 1.4 Inspection and Test Plans of this Technical Specification.

The Inspection and Test Plan shall identify the construction sequence, inspection requirements, acceptance criteria, testing requirements, Hold Points and Witness Points applicable to the work.

As a minimum, the following Hold Points shall apply:

1. Confirmation and authorisation of repair boundaries before removal of existing protection;
2. Inspection and acceptance of the prepared embankment foundation, geometry and required filtration and drainage arrangements before mattress installation;
3. Acceptance of the proposed replacement mattress system and permanent installation details before procurement;
4. Inspection of installed mattress panels, seams, anchors, connections, edge restraints and other concealed components before filling; and
5. Final inspection and acceptance of the completed mattress protection following filling, curing and completion of associated connections and terminations.

The Contractor shall undertake all material testing, inspections and verification necessary to demonstrate compliance with the accepted product requirements, manufacturer's specifications and nominated installation details.

The Contractor shall maintain complete construction and quality records, including:

- Product identification, manufacturer details and relevant material compliance certificates;
- Mattress panel locations, dimensions and installed areas;
- Details of joints, seams, anchors, connections and terminations;
- Concrete or grout mix information, batch records and quantities placed;
- Filling and curing records;
- Inspection, testing and Hold Point release records;
- Details of any non-conformances and corrective actions; and
- Dated photographs showing conditions before, during and following reconstruction.

The Contractor shall provide the Superintendent with all completed quality records and as-constructed information required by the Contract.

All non-conforming work shall be rectified or replaced in accordance with the Contract at the Contractor's cost.

Measurement and Payment

The Contractor shall maintain accurate records of the extent of selective revetment mattress reconstruction undertaken, including the dimensions and net surface area of each completed repair section.

The reconstructed mattress area shall be determined in square metres (m^2), measured along the actual finished embankment surface within the authorised replacement boundaries.

The measured area shall include only the net surface area of new, completed and conforming revetment mattress protection. No additional area shall be allowed for material overlaps, wastage, excess material outside the authorised boundaries or temporary protection.

Existing mattress sections retained in place shall not be included in the measured replacement area.

The measured area shall be supported by agreed pre-construction records, completed work measurements and photographic evidence sufficient to verify the extent of reconstruction.

The measurement of reconstructed mattress area under this Clause is provided for quantity verification purposes and shall not, of itself, establish a separate Schedule K1 treatment item or payment entitlement.

Payment for authorised revetment mattress reconstruction shall be made in accordance with the applicable treatment item and unit of measurement expressly nominated in Schedule K1 and the measurement and payment provisions of Part 3 General Specification.

The applicable treatment allocation and basis of payment for the revetment mattress reconstruction shall be expressly identified in the Contract documents prior to tender issue.

The applicable tendered rate shall include all costs associated with the supply and installation of the revetment mattress system, including removal and disposal of the damaged mattress, incidental foundation trimming and preparation, materials, delivery, handling, placement, anchors, joints, connections, concrete or grout filling, curing, inspection, testing, protection, finishing and associated incidental works necessary to complete the specified reconstruction.

Where separate authorised Schedule K1 treatments provide for substantive embankment excavation, imported bulk fill or reconstruction of reinforced concrete perimeter restraints, those works shall be measured and paid for in accordance with their respective treatment items.

The concrete or cementitious grout used to fill the geotextile mattress shall form part of the revetment mattress reconstruction and shall not be separately measured as reinforced concrete reconstruction unless expressly specified otherwise in the Contract.

No work component shall be measured or paid for under more than one treatment item.

Any additional work or change to the authorised reconstruction scope shall be referred to the Superintendent for direction and, where applicable, valued in accordance with the Conditions of Contract.

CONTRACT SECTIONS

SECTION 1 – SERVICE LEVELS AND QUALITY

1.1 SERVICE LEVEL, SCOPE AND QUALITY

The Contractor shall ensure that the specified Works Under Contract are delivered in accordance with the requirements of the Contract, within the required timeframe and to the required quality standards. The table below details the requirements and standards, against which the Contractor will be assessed.

The Superintendent will review the Contractor's delivery performance of the Works Under Contract against the following Service Levels at the frequency stated in the table below. The Superintendent may seek a written explanation and proposed solution from the Contractor if any Service Levels detailed below are breached or the completed work does not meet the specified standards.

Service Level	Requirement	Review Period
Delivery of Works Program accepted by Superintendent	As per contractor program supplied at time of tender award	Reviewed at progress meetings held at start of each agreed day of roster commencement.
Scope of works delivery	In accordance with the requirements of this Technical Specification and the QRA Treatment Guide	Review at daily inspections with Superintendent's site personnel.
Quality of works	In accordance with the requirements of this Technical Specification, the QRA Treatment Guide and industry best practice.	Review at daily inspections with Superintendent's site personnel.
Work health and safety	Zero incidents and near misses.	Review at daily inspections with Superintendent's site personnel.
Environmental management	Zero incidents and near misses.	Review at daily inspections with Superintendent's site personnel.

1.2 QUALITY AND CONFORMANCE

General

The Works Under Contract will be supervised by the nominated Superintendent's site personnel. The Contractor shall report to Superintendent's site personnel daily regarding the progress and completion of works on site.

The Contractor shall plan, undertake, inspect, test and record the WUC in accordance with the Contract, the endorsed Quality Management Plan, the endorsed Inspection and Test Plans and any direction of the Superintendent.

Hold Points and Witness Points

The Hold Points and Witness Points identified in this clause, elsewhere in the Contract, and in the Contractor's endorsed ITPs shall apply to the WUC.

The Hold Points and Witness Points specified in the Contract are minimum requirements only. The Contractor shall include any additional Hold Points, Witness Points, inspections or tests in its ITPs where required by the Contract, the Contractor's work methods, site conditions, site constraints, the nature of the work, or good construction practice.

The Contractor shall provide not less than 48 hours notice when work is ready for a Hold Point, Witness Point or final inspection, unless otherwise agreed by the Superintendent.

HP Hold Point: Work shall not proceed beyond a Hold Point until the Superintendent has inspected, verified or otherwise accepted the work and released the Hold Point.

WP Witness Point: The Contractor shall give the Superintendent the required notice and provide reasonable opportunity for the Superintendent to witness the relevant work, inspection or test. The Contractor may proceed past a Witness Point if the Superintendent advises that attendance is not required, or if the Superintendent does not attend within the time agreed or directed, unless the Superintendent directs that the Witness Point is to be treated as a Hold Point.

Minimum Hold Points and Witness Points
The following minimum Hold Points and Witness Points shall apply:

Work	Work Stage	Inspection Type
All works	Lot Identification	Hold Point
All works	Set out and/or confirming set out of works	Hold Point
Material quality	Use of quarry, gravel pit or other material source	Hold Point
Material quality	Compliance of materials prior to haulage to the works	Hold Point
Subgrade / embankment / exposed foundation	Preparation, trimming, proof rolling or other verification prior to placement of fill, pavement material, bedding, concrete or other overlying work	Hold Point
Heavy formation grading incorporating imported material and gravel resheeting	Ripping, scarifying or loosening of existing pavement or formation surface prior to placement of additional material	Witness Point
Heavy formation grading incorporating imported material and gravel resheeting	Placement of imported or additional material onto the prepared road surface	Witness Point
Medium formation grading, heavy formation grading, heavy formation grading incorporating imported material and gravel resheeting	Completed surface proof roll	Witness Point
Granular pavement works	Depth of granular pavement material	Witness Point
All works	Geometry, finished surface shape, alignment, level and drainage	Witness Point
All works	Non-conformance to any specified requirement	Hold Point
All works	Final inspection prior to Practical Completion	Hold Point

1.3 PROOF ROLLING

Proof Rolling Procedure
The Contractor shall undertake proof rolling of completed heavy formation grading, heavy formation grading incorporating imported material and gravel resheeting works.

The Contractor shall also undertake proof rolling of all exposed subgrade and formation, areas prior to placement of new material, unless the area is too small or constrained to allow a meaningful proof roll to be undertaken.

Proof rolling shall be undertaken using plant and loading appropriate to the work being tested and shall demonstrate that the surface or subgrade is firm, stable, non-yielding and suitable for the next stage of work to proceed. The Contractor shall not place new material over any area which displays pumping, rutting, heaving, yielding, instability, excessive deflection or any other sign of unsuitable material.

Where an area is too small or constrained to be proof rolled, the Contractor shall use another method accepted by the Superintendent to demonstrate that the subgrade or prepared foundation is solid and suitable for placement of new material. Such methods may include Dynamic Cone Penetrometer testing, compaction testing, hand probing, plate compaction assessment, photographic evidence, or other verification accepted by the Superintendent.

Proof Roll Records
Proof rolls shall be witnessed in person by the Superintendent where practicable.

Where the Superintendent is unable to attend in person, the Contractor shall provide clear video footage of the proof roll. The video footage shall show the full proof roll area, the plant used, the response of the surface under load, the road name, site identification number, chainage and direction of travel. The video footage shall show at a suitable point clear identification points which enable the location to be independently verified.

Proof roll records shall be included in the relevant ITP records and, where required by the Superintendent, uploaded to the Principal's infield application program.

Failed Proof Roll
If a proof roll or alternative verification method identifies yielding, pumping, rutting, heaving, instability, excessive deflection or other non-conformance, the Contractor shall immediately notify the Superintendent and shall not proceed with the next stage of work until the matter has been addressed and the relevant Hold Point has been released.

Any rework, drying back, removal, replacement, additional compaction, further proof rolling, further testing or other corrective action required due to the Contractor's work methods, sequencing, moisture control, trafficking, failure to protect the WUC or other act or omission shall be undertaken at the Contractor's cost.

Records and Payment
The Contractor shall maintain complete and contemporaneous records of all Hold Points, Witness Points, inspections, tests, proof rolls, alternative verification methods, Superintendent releases and corrective actions.

No separate payment shall be made for complying with the requirements of this clause. All costs associated with inspections, testing, proof rolling, video records, alternative verification methods, ITP records, Hold Points and Witness Points shall be deemed to be included in the Contractor's tendered Contract rates.

1.4 INSPECTION AND TEST PLANS (ITPs)

General
The Contractor shall develop, implement and maintain contract specific Inspection and Test Plans (ITPs) for all significant work activities associated with the Works Under Contract.

The ITPs shall form part of the Contractor's Quality Management Plan and shall provide a structured framework for demonstrating that the Works Under Contract conform to the requirements of this Specification, the applicable Main Roads Technical Specifications (MRTS) and the Queensland Reconstruction Authority Treatment Guide, as relevant to the work being undertaken.

The ITPs shall be contract specific and relate exclusively to the Works Under Contract, the locations at which the works will be undertaken and the methods and sequence of construction proposed by the Contractor. Generic or corporate ITPs shall not be used unless they have been adapted and revised to address the specific requirements of this Contract.

No work to which an ITP applies shall commence on site until the corresponding ITP has been submitted to, and endorsed by, the Superintendent.

Preparation and Content
The Contractor shall prepare ITPs for each major work type and/or construction activity, including but not limited to:

- Earthworks and subgrade preparation;
- Granular pavement construction and reconstruction;
- Surface treatment and sealing works;
- Drainage works including culverts, table drains and rock protection;
- Concrete and flowable concrete works; and
- Any other works identified by the Contractor or directed by the Superintendent.

Each ITP shall as a minimum:

1. Identify the specific work activity, location(s), lot definition and applicable drawing, specification and QRA Treatment references.
2. Identify all inspection, test and verification activities required to demonstrate conformity, including those specified in Clause 1.2 Quality and Conformance and any additional requirements of the relevant MRTS.
3. Clearly identify Hold Points and Witness Points, including:
    - the stage of work at which the Hold or Witness Point occurs;
    - the party responsible for requesting the inspection or test; and
    - the Superintendent's role and the requirement for approval or sign-off before work may proceed beyond a Hold Point.
4. Nominate the method of inspection or test, the frequency of inspections or tests, and the acceptance criteria, by reference to this Specification, the relevant MRTS and/or QRA Treatment Guide, without restating detailed tolerances.
5. Allocate responsibilities for carrying out inspections, sampling, testing, verification and sign-off, including subcontractors and testing laboratories where applicable.
6. Provide for the recording of:
    - date and time of the inspection or test;
    - location and lot identification;
    - results and conformity / non-conformity status; and
    - name and signature (or electronic equivalent) of the person performing the inspection or test and the person authorising the result.
7. Provide for the cross-referencing and attachment of supporting evidence, including test certificates, calibration certificates, photographs, as-built records and Fulcrum App records where relevant.

ITPs shall be prepared using a structured, tabular format that clearly sets out the sequence of work activities and associated inspections and tests in the order they are to be performed on site.

Submission, Review and Endorsement
The Contractor shall submit all ITPs to the Superintendent for review and endorsement in accordance with Part 3 General Specification, Clause 1.16 Contract Management Plan Submission, Review and Endorsement, and not less than ten business days prior to the intended commencement of the associated work on site, unless otherwise agreed with the Superintendent.

The Superintendent's endorsement of an ITP signifies that the ITP has been reviewed for general conformity with the requirements of the Contract. Endorsement shall not relieve the Contractor of its responsibility for the adequacy, implementation and effectiveness of the ITP or for the conformity of the Works Under Contract.

The Superintendent may direct the Contractor to amend an ITP where, in the opinion of the Superintendent, it does not adequately address the requirements of the Contract or does not provide sufficient control over the quality of the work. The Contractor shall promptly revise and resubmit any such ITP for further review and endorsement.

Implementation On Site
The Contractor shall implement the endorsed ITPs for all relevant activities and shall ensure that work is not carried out in advance of the inspections and tests required by the ITPs.

The Contractor shall ensure that current endorsed copies of all relevant ITPs are available at the worksite at all times while the corresponding activities are being undertaken. ITPs may be made available in hard copy or electronic form, provided they are readily accessible to site personnel, the Superintendent and any authorised auditors.

The Contractor shall ensure that all relevant personnel, including subcontractors and testing providers, are familiar with the requirements of the applicable ITPs and understand their responsibilities in relation to inspection, testing, record keeping and sign-off.

Work subject to a Hold Point shall not proceed beyond that Hold Point until the Superintendent has inspected the work, verified conformity (or otherwise accepted the work) and released the Hold Point.

Records, Traceability and Reporting
The Contractor shall complete and maintain ITP records contemporaneously with the inspections and tests undertaken. Under no circumstances shall ITP records be compiled retrospectively for work that has already been covered up or progressed beyond the relevant inspection or test stage.

The Contractor shall ensure that ITP records:

- are legible, complete and accurate;
- clearly identify the lots, locations and work activities to which they relate;
- cross-reference all associated test results, certificates, calibration records and Fulcrum App entries; and
- clearly indicate whether each inspection or test has achieved a conforming result.

Completed ITPs and associated records shall be submitted to the Superintendent:

- upon request at any time during the Contract Period;
- as part of the supporting documentation for progress claims relating to the associated work; and
- at or prior to Practical Completion for inclusion in the quality records for the Works Under Contract.

All ITP records shall be retained by the Contractor for the duration of the Contract and any defects liability or maintenance period and shall be made available to the Superintendent on request.

Revisions, Non-Conformances and Corrective Actions
The Contractor shall promptly amend ITPs to reflect changes in construction methods, materials, hold points, witness points, testing requirements or other relevant aspects of the work. Revised ITPs shall be submitted to the Superintendent for review and endorsement prior to their implementation on site.

Where a non-conformance with the requirements of an ITP, this Specification or the relevant MRTS is identified (whether by the Contractor, the Superintendent or an auditor), the Contractor shall:

- record the non-conformance on the relevant ITP and within its non-conformance management system;
- notify the Superintendent at the earliest practical opportunity;
- propose appropriate corrective actions and timeframes for their implementation; and
- record verification that the corrective actions have been completed and that the work has been returned to a conforming condition, or otherwise managed in accordance with the Superintendent's direction.

Non-Compliance with ITP Requirements
Failure by the Contractor to:

- prepare and submit contract specific ITPs in accordance with this Clause;
- implement the endorsed ITPs for the relevant work activities; or
- maintain complete and accurate ITP records,

may be treated by the Superintendent as a failure to comply with the Contractor's quality obligations under the Contract.

Without limiting any other rights under the Contract, the Superintendent may, in the event of such failure:

- direct the suspension of affected work until satisfactory ITPs and/or records are submitted;
- withhold certification of payment for work that is not supported by adequate ITP records;
- require additional inspections and tests to be undertaken at the Contractor's cost; and/or
- direct the removal, rework or replacement of non-conforming work at the Contractor's cost.

All costs associated with the preparation, implementation, maintenance and revision of ITPs and the keeping of related records shall be deemed to be included in the Contractor's tendered Contract rates and no separate payment shall be made.

1.5 TESTING REQUIREMENTS / FREQUENCY

The following testing requirements and frequency shall apply to work associated with the WUC.

Construction Activity	Property	Minimum Specification	Minimum Testing Frequency
Supply of unbound pavement material (where applicable)	CBR	As per Principal's Gravel Specification	When directed by the Superintendent
	Material Quality	As per Principal's Gravel Specification	When directed by the Superintendent
Rock protection	General	-	Contractor ITP as approved by Superintendent
Bulk fill - imported	Compaction (roadway only)	95%	Evidence of complying proof roll (ITP and .MOV file)

Construction Activity	Property	Minimum Specification	Minimum Testing Frequency
	Compaction (table drain)	-	Contractor ITP as approved by Superintendent
Medium formation grading	General	-	Contractor ITP as approved by Superintendent
Heavy formation grading	General	-	Contractor ITP as approved by Superintendent
	Compaction	As per MRTS05	Evidence of complying proof roll (ITP and .MOV file)
Heavy formation grading incorporating 50mm/75mm of imported material	General	-	Contractor ITP as approved by Superintendent
	Compaction	As per MRTS05	Evidence of complying proof roll (ITP and .MOV file)
Gravel Resheeting 100mm/150mm	General	-	Contractor ITP as approved by Superintendent
	Compaction	100%	Evidence of complying proof roll (ITP and .MOV file)
Reconstruct reinforced concrete	Compressive Strength	As specified by Superintendent	NA
	Indirect Tensile Strength	As specified by Superintendent	NA
	Slump	As specified by Superintendent	1 per batch
	Reinforcing Steel	As specified by Superintendent	Contractor ITP as approved by Superintendent Photographic evidence Onsite inspection as required
Reconstruct unbound granular pavement. Excludes seal	General	-	Contractor ITP as approved by Superintendent
	Subgrade Compaction	As per MRTS05	Evidence of complying proof roll (ITP and .MOV file)
	Pavement Compaction	100%	Evidence of complying proof roll (ITP and .MOV file)
Bitumen spray seal, 2-coat	General	-	Contractor ITP as approved by Superintendent
	Field spread rate of Cover aggregate	As per MRTS12	5/site

Bridge Approach Embankment Reconstruction – Additional Testing Requirements

For imported bulk fill used in the reconstruction of the Burke and Wills Bridge approach embankments, the Contractor shall demonstrate compliance with the minimum compaction requirements of MRTS04 for embankment fill and subgrade in addition to embankment Structure Zone areas, or any more onerous requirement specified for the applicable material or work.

As a minimum, field density testing shall be undertaken:

- At a frequency of not less than one test for each 250 m³ of compacted fill placed within each discrete embankment repair area; and
- At a frequency of not less than one test for each 500 mm of vertical fill depth within each discrete embankment repair area;

whichever requires the greater number of tests.

Testing locations shall be representative of the reconstructed embankment, including interfaces with existing material and batter reconstruction areas where practicable.

The Contractor shall undertake and document all required testing in accordance with its endorsed Inspection and Test Plan.

Proof rolling may be undertaken as supplementary verification of stability but shall not replace the specified compaction testing.

Non-conforming material shall be reworked and retested before additional fill is placed over the affected area.

SECTION 2 – SITE WORKS – GENERAL

2.1 WORK SITE SET OUT

The initial identification and set out of work sites will be undertaken by the Superintendent. The set out will include the following:

- Queensland Reconstruction Authority site Identification number
- Chainage start and end.
- Direction of works.
- Treatment type – (QRA) Contract Treatment Code.

Part 4 Technical Specification, Appendix C contains an example template depicting the standard manner in which pegs are set out and the detail contained on them.

The Contractor shall check and confirm all work details at each site, prior to the commencement of work at a site. If discrepancies are identified, they shall be immediately communicated to the Superintendent and direction sought.

2.2 ROAD LOCATION VERIFICATION AND UNCERTAINTY

General

The Contractor acknowledges that the precise location of unsealed, formed and unformed roads within the Principal's road network may not always be readily identifiable from the physical condition of the site. Roads may have been damaged by flood events, may have low traffic volumes, may have limited or no formal pavement structure, and may be affected by side tracks, temporary traffic paths, stock routes, property access tracks, maintenance tracks or informal deviations which do not necessarily form part of the road asset to be restored under the Contract.

Prior to commencing WUC on any road or at any site, the Contractor shall satisfy itself as to the correct location of the relevant road, the approved treatment location, the treatment start and end points, the approved treatment extent, and the relationship of the proposed work area to the road reserve and adjoining land.

The Contractor's due diligence shall include, as a minimum, review of:

- the Contract documents, treatment maps, site maps, drawings, treatment schedules and Schedule of Rates;
- the Principal's infield application program and any site information made available through that program;
- the physical site conditions, including existing road formation, table drains, shoulders, signs, guide posts, culverts, grids, gates, property accesses and other road-related assets;
- publicly available mapping, aerial imagery, cadastral information and road reserve information, including government mapping and GIS data; and
- any other publicly available information which a competent contractor would reasonably use to verify the location of a road before commencing road restoration works.

Side Tracks and Informal Traffic Paths

The Contractor shall not rely solely on the existence, condition, traffic use, visibility or apparent prominence of a side track, informal deviation, temporary access track, property access track or other traffic path as evidence that the track forms part of the road asset to be restored under the Contract.

Where a side track, informal deviation, temporary access track, property access track or other traffic path appears to be more heavily trafficked, better defined, more accessible or more prominent than the original road

formation, the Contractor shall nevertheless verify the correct road location in accordance with this clause prior to commencing work.

Discrepancy or Uncertainty
If the Contractor identifies any discrepancy, ambiguity or uncertainty concerning the correct location of a road, the approved treatment location, the chainage, the treatment start or end point, the treatment extent, the road reserve, or the relationship between an apparent track and the road asset to be restored, the Contractor shall immediately notify the Superintendent in writing and shall not commence WUC at the affected location unless and until the Superintendent has provided direction.

The Contractor's notification shall include, as a minimum:

- the road name, site identification number and relevant chainage;
- a description of the discrepancy, ambiguity or uncertainty;
- photographs and, where appropriate, video footage of the affected location;
- marked-up maps, screenshots, aerial imagery or other mapping information relied upon by the Contractor;
- GPS coordinates or other location information sufficient to identify the affected location;
- the Contractor's proposed interpretation of the correct road location and the basis for that interpretation; and
- any risk to safety, access, adjacent property, environmental values, cultural heritage, utility services, road users or the WUC if work proceeds without direction.

Superintendent Direction and Principal Road Data
Where further information is required, the Contractor shall seek that information through the Superintendent. The Superintendent may, where available and considered appropriate, provide or facilitate access to Council road data, GIS information, government Digital Road Network information, road centreline information, asset records or other information held by or available to the Principal.

Any information provided by or through the Superintendent under this clause is provided to assist identification of the approved work location and does not relieve the Contractor of its obligation to verify the location, set out the WUC, comply with the Contract, and promptly notify the Superintendent of any remaining discrepancy, ambiguity or uncertainty.

HP **Hold Point:** Where a discrepancy, ambiguity or uncertainty is identified under this clause, the Contractor shall not commence or continue WUC at the affected location until the Superintendent has provided direction and released the Hold Point. The evocation of this clause and need for any subsequent hold points shall not be used by the Contractor to facilitate delay claims for completion of the WUC.

Work Undertaken at Incorrect Location
If the Contractor undertakes work at an incorrect location, outside the approved treatment extent, on a side track, on an informal deviation, outside the road reserve, on private land, or otherwise contrary to the Contract or the Superintendent's direction, the work shall not be measured or paid for unless the Superintendent directs otherwise in writing.

The Contractor shall, at its cost, make safe, reinstate, rectify, remove or otherwise address any work undertaken at an incorrect or unauthorised location, including any damage to roads, road-related assets, private property, utilities, vegetation, drainage paths, environmental values, cultural heritage or other assets.

The Contractor shall not be entitled to an extension of time, delay costs, a variation or any other adjustment to the contract sum arising from the Contractor's failure to verify the correct road location, failure to identify a discrepancy or uncertainty, failure to seek direction, or undertaking work at an incorrect or unauthorised location.

Payment
All costs associated with verifying road locations, undertaking due diligence, reviewing publicly available information, inspecting the site, preparing notices, seeking direction, providing supporting records and complying with this clause shall be deemed to be included in the Contractor's tendered Contract rates and no separate payment shall be made.

2.3 ROCK AND GRANULAR PAVEMENT MATERIAL SOURCES AND ACCESS

Rock and Granular pavement material shall be sourced from Principal nominated gravel pits, unless directed otherwise by the Superintendent. The nominated sources of rock and granular pavement material for each worksite is detailed in the Pricing Schedule. Rock and granular pavement material shall be loaded and supplied to worksites by the Contractor.

Granular Pavement Material Procurement
All rock and granular pavement material required to complete the Contract will be stockpiled at the nominated gravel pit sites, ready for loading and haulage by the Contractor. Rock and granular Pavement material will be supplied as "free issue" to the Contractor from the nominated gravel pits unless otherwise noted in the Contract.

The Contractors shall provide at least 72 hours notice to the Superintendent of the intention to procure material from a nominated gravel pit.

All costs associated with the procurement and supply of rock and granular pavement material to complete the WUC shall be included in the Contractor's Tendered rates.

Granular Pavement Material Records
The Contractor shall record the quantity of all material sourced from each gravel pit. The quantity measure shall be recorded via the weight of material removed from the pit.

The Contractor shall keep records of all rock and granular pavement material used for the delivery of the WUC. All records shall be supplied to the Superintendent on a weekly basis. The records supplied shall detail the following information as a minimum:

- Quantity of material loaded and delivered to site.
- Source of the materials.
- Location that the material is being delivered to.
- Roads used for carting materials.

The quantity of material sourced shall be measured via the use of loader mounted scales such as the LoadRite system or similar arrangement. The Contractor shall not load materials without the use of loader mounted scales and the ability to accurately record the quantity of material loaded for delivery to site.

The Contractor shall ensure that that the loader mounted scales remain calibrated throughout the duration of material procurement and loading works. The Contractor shall record all scale calibration operations to ensure the records can be audited if required.

Gravel Pit Access
The Contractor shall be responsible for facilitating access to the nominated pit. The Contractor shall maintain the pit access road and ensure no damage occurs from the extraction operations to support the WUC. The Contractor shall undertake any required maintenance to the access road before, during and upon completion of the extraction operations to ensure safe pit access is maintained.

2.4 MATERIAL BULK DENSITY AND BULKING FACTOR

The Contractor shall complete the WUC using a nominated bulk density material rate and bulking factor as detailed below.

Material Bulk Density	2.2T/m^3
Material Bulking Factor	30%

2.5 PAVEMENT AND MATERIALS TESTING

The Principal may elect to undertake material and/or pavement testing throughout the Contract Period on any of the worksites. The Principal will pay the costs associated with completion of the testing work.

The Contractor shall ensure the Principal is afforded the time and safe worksite area to undertake the required material sampling and/or testing. The Contractor shall not be entitled to costs or an extension of time to provide the assistance and/or worksite area required to facilitate the testing work to be completed.

The Contractor shall be responsible for all costs associated with the rework or replacement of sub-standard materials and/or completed work where test results do not meet the specified limits.

The Contractor shall ensure that only fit-for-purpose materials which meet the specification requirements are utilised to deliver the Works Under Contract. If materials are identified, without testing occurring, that appear to not meet the required quality or specification requirements, the Contractor will be required to provide test results to prove suitability or replace the materials at its expense with mutually agreed suitable materials.

2.6 GRANULAR PAVEMENT MATERIAL – LINEAR STOCKPILES

Some Contract works require the Contractor to place significant quantities of granular pavement material onto the roads to replace lost or damaged material.

To assist in providing efficient work practices the Contractor may elect to place linear stockpiles of granular pavement material along the length of road to be treated. Where the Contractor elects to operate in this manner, the maximum length of linear stockpiled material allowed in advance of each work front is five kilometres. The Contractor will be instructed to immediately remove stockpiled material from the road which is identified as being longer than five kilometres in length.

All linear stockpiles shall be placed in a manner which does not adversely impact road safety or the ability of the road to easily drain if there is rainfall.

Appropriate temporary traffic management signage shall be provided along the length of linear stockpiles, in accordance with the endorsed Temporary Traffic Management Plans. For clarity, the Contractor's Temporary Traffic Management Plans shall include a plan which covers the use and placement of linear stockpiles. Signage provided shall alert drivers to the presence of the stockpiles and changed road conditions, to ensure safe passage along the length of the road being worked on.

2.7 WATER PROCUREMENT

The Contractor shall be responsible for sourcing and supplying all water required for completion of the WUC.

Creeks and Rivers
Extraction of water from creeks and rivers will require a written permit from the relevant authority. The Contractor is responsible for applying and obtaining any permit(s) to extract the water required to complete the WUC. The Contractor shall pay all costs associated with obtaining and meeting the ongoing compliance requirements of the permit(s). The Contractor shall supply a copy of the permit to the Superintendent within ten working days of its receipt and prior to the extraction of any water.

Private Sources
If the Contractor wishes to obtain water from private property and/or source, the Contractor shall negotiate the use and extraction of the water with the property and/or water rights owner. The Contractor shall pay all costs sought by the owner for the extraction and use of the water. The Contractor shall ensure the details of the agreement with the private property and/or water rights owner are documented in writing. The Contractor shall supply a copy of the written agreement to the Superintendent within ten working days of the agreement's finalisation and prior to the extraction of any water.

2.8 HAUL ROADS

The Contractor shall be responsible for the condition and maintenance of haul roads used for the delivery of the WUC. Maintenance works shall include, but not be limited to:

- The use of water carts to maintain the road surface and for dust suppression.
- Grading of the road surface to remove potholes, corrugations and reinstate shape.
- Sealed surface pothole repairs.

Haulage of materials shall not occur during the following periods or situations:

- On closed roads as defined by the Principal's Road Report.
- During periods of wet weather.
- On roads affected or damaged by wet weather.
- Between the hours of 6pm and 6am during delivery of the WUC.

The Contractor's Tendered rates shall allow for maintenance works to be undertaken on all haul roads utilised in the delivery of the WUC.

2.9 TURN AROUND FACILITIES

Contractors shall only utilise existing turnaround facilities across the Principal's road network. The Contractor shall not form new turnaround facilities unless specific approval for each facility is provided in writing by the Superintendent.

The Contractor's Tendered rates shall include all costs associated with material haulage and trafficking between turnaround areas. The Contractor shall make allowance for any impact on production rates and the Contract program of the need to account for any extra distance and inefficiencies introduced by the location of approved turn around facilities.

2.10 ROAD SAFETY & SPEED LIMITS

The Contractor and its personnel shall operate all vehicles and plant in a manner which ensures the safe passage of all vehicles through the worksite and road users sharing haul roads and other areas where the Contractor is operating.

To help enhance road safety and protect the condition and integrity of infrastructure the Principal has implemented a required speed limit of 10km/h when heavy vehicles and plant are passing across cattle grids. Reduced speeds when traversing cattle grid structures will help to reduce the impact loading on the structure and degradation of the infrastructure.

2.11 GENERAL EXECUTION REQUIREMENTS

The Contractor shall establish and clearly define the treatment extents before commencing work and shall protect all adjacent pavement, shoulders, drains, structures, services, fences, property accesses, signs and other assets from damage arising from the WUC.

The Contractor shall maintain drainage through and around the worksite at all times. No windrows, spoil, stockpiles or construction activities shall be left in a position that impedes drainage, causes ponding, concentrates runoff or creates unsafe conditions for road users.

The Contractor shall not recover local material, open borrow areas, strip vegetation or undertake excavation outside the approved work area without the prior written approval of the Superintendent.

2.12 GRASS AND VEGETATION WITHIN ROAD FORMATION AND TREATMENT AREAS

General
This clause applies to all WUC which requires disturbance, trimming, grading, scarifying, ripping, reshaping, excavation, filling, resheeting, compaction, shoulder work, pavement work, table drain work, drainage work, material recovery or other work within the road formation, shoulders, table drains or approved treatment area.

For the purposes of this clause, road formation area means the road surface, running surface, pavement, formation, shoulders, verges, batters, table drains, drain interfaces, floodway approaches, culvert approaches, grid approaches, tie-ins, turnouts and other road-related areas within the approved treatment extent which are required to be disturbed, shaped, trimmed, compacted, drained or otherwise treated to complete the WUC.

The Contractor acknowledges that, due to low traffic volumes, flood damage, seasonal conditions, rainfall, siltation, reduced maintenance access or other conditions, grass, weeds, light vegetation, minor shrubs, regrowth, roots, organic matter or other vegetation may be present within the road formation area at the time of tender or during the Contract Period.

Vegetation Removal Included in WUC
Unless the Contract expressly states otherwise, the Contractor shall remove all grass, weeds, light vegetation, minor shrubs, regrowth, roots, organic matter and other vegetation within the road formation area or approved treatment area to the extent necessary to:

- undertake the relevant treatment;
- recover, rework, blend, place, compact or proof roll material;
- reinstate the road surface, formation, shoulders, table drains and drainage function;
- achieve the required finished shape, crossfall, superelevation, profile and tie-ins;
- prevent organic matter or unsuitable material being incorporated into the WUC;
- prevent vegetation from inhibiting compaction, proof rolling, trimming, drainage or surface finish;
- allow the completed WUC to be safe, trafficable, stable and free draining; and
- return the road asset to the condition and function required by the Contract.

Vegetation removal under this clause includes all slashing, cutting, trimming, stripping, grubbing, raking, windrowing, loading, carting, disposal, clean up and associated work required to complete the relevant treatment.

The Contractor shall not incorporate grass, roots, topsoil, organic matter, woody vegetation, contaminated material or other deleterious matter into the completed road formation, pavement, shoulder, table drain, fill, resheeting material or other WUC.

Application to Treatment Types
Without limiting the general application of this clause, the Contractor's obligations under this clause apply to:

- medium formation grading;
- heavy formation grading;
- heavy formation grading incorporating imported material;
- gravel resheeting;
- gravel or material supply where material is incorporated into the road formation;
- heavy shoulder grading;
- shoulder reconstruction or shoulder repair;
- edge repair where shoulder support, seal edge support or road shoulder interface work is required;
- bulk fill, local fill and imported fill;
- bulk excavation and clearing work;
- table drain reshaping, drain interface work and drainage reinstatement; and
- any other WUC which requires disturbance of the road surface, shoulders, table drains or approved treatment area.

Table Drains and Drainage Function
Where the relevant treatment requires the road surface, shoulders or table drains to be reinstated, the Contractor shall remove grass, vegetation, silt, debris, loose material, windrows and organic material to the extent necessary to leave the completed WUC free draining and functioning as a road asset.

The requirement to return the road to its pre-disaster condition and function does not require or permit the Contractor to leave grass, vegetation, debris, silt, windrows, ponding, blocked table drains, ineffective drainage paths, unsafe shoulders or other conditions which prevent the completed WUC from functioning safely and effectively.

Where table drain reshaping, shoulder matching, material recovery or grading operations form part of the relevant treatment, all incidental removal of grass, vegetation and organic matter necessary to complete those operations shall be deemed to be included in the relevant tendered rate.

Vegetation Outside the Road Formation Area
The Contractor shall not clear, strip, grub, remove or disturb trees, mature vegetation, significant vegetation, vegetation outside the approved treatment extent, vegetation outside the road reserve, or vegetation on private land unless:

- the work is expressly included in the Contract;
- the work is required by an approval, permit or legislative requirement; or
- the Superintendent has directed the work in writing.

If the Contractor considers that vegetation outside the road formation area or approved treatment area must be removed to complete the WUC, the Contractor shall notify the Superintendent and shall not remove or disturb that vegetation unless and until the Superintendent has provided written direction.

Environmental and Biosecurity Requirements
All vegetation removal shall be undertaken in accordance with the Contractor's endorsed Environmental Management Plan, biosecurity obligations, legislative requirements, approvals, permits, landowner requirements and any direction of the Superintendent.

Vegetation, roots, organic matter and other waste material removed under this clause shall be disposed of lawfully and in an approved manner that does not obstruct drainage, create a traffic hazard, spread biosecurity matter, damage adjoining land, or create a nuisance.

Payment

All costs associated with identifying, removing, managing, loading, hauling, disposing of and cleaning up grass, weeds, light vegetation, minor shrubs, regrowth, roots, organic matter and other vegetation within the road formation area or approved treatment area shall be deemed to be included in the Contractor's tendered Contract rates.

The Contractor shall not be entitled to a variation, extension of time, delay costs or any other adjustment to the contract sum by reason only that grass, weeds, light vegetation, minor shrubs, regrowth, roots, organic matter or other vegetation is present within the road formation area, whether or not the Contractor inspected the relevant road during the tender period.

Where the Superintendent directs the Contractor to remove mature trees, significant vegetation, vegetation outside the road formation area, vegetation outside the approved treatment extent, vegetation outside the road reserve, or vegetation not reasonably incidental to the relevant treatment, that work shall be measured and valued in accordance with the Contract.

SECTION 3 – EARTHWORKS AND FORMATION CONSTRUCTION

3.1 GENERAL REQUIREMENTS FOR EARTHWORKS AND FOMATION CONSTRUCTION

The Contractor shall ensure that all WUC relating to earthworks and formation construction are delivered in accordance with the requirements detailed in this Technical Specification and the QRA Treatment Guide.

3.2 BULK EXCAVATE SURPLUS MATERIAL AND REMOVE FROM SITE

The Contractor shall undertake bulk excavation where surplus silt, sand, gravel or other deposited material is required to be removed from the roadway, shoulders, drains, waterways or other nominated areas to reinstate the approved road corridor and/or drainage function.

The work shall be completed in a manner that restores the approved treatment extent, leaves the area stable and free draining, and does not disturb sound adjoining formation or drainage works more than is necessary to complete the approved works.

The work shall include but not be limited to:

- excavation of the nominated surplus material to the required line, level and extent;
- loading, haulage and removal of excavated material to an approved disposal location off site, unless otherwise directed by the Superintendent;
- trimming of the excavation and adjoining surfaces so that the completed area is stable, safe and free draining;
- protection of adjacent road formation, drainage structures, utilities, vegetation and other assets not required to be removed; and
- clean up of the worksite and disposal of waste in accordance with legislative requirements.

Execution Requirements
The Contractor shall define the limits of excavation before commencing the work and shall not over-excavate, undermine adjacent road formation or leave abrupt changes in level which may cause water to pond, trap sediment or create a hazard to traffic or maintenance operations.

Where the excavation forms part of a table drain, drain outlet or floodway approach, the completed profile shall match the existing or approved line and level of the drainage path so that the area remains free draining and no residual bunds, windrows or local depressions remain.

Material Disposal
Excavated surplus material shall be disposed of at a location approved by the Contractor under its environmental and waste management obligations and shall not be placed within drainage flow paths, on private property, or elsewhere within the road corridor where it may re-enter the roadway or cause scour, silting, blockage or other nuisance.

This treatment does not include reconstruction of the road formation, filling of scours or reshaping of drains beyond that necessary to leave the excavated area safe, stable and free draining. Any such additional work shall only be undertaken where included elsewhere in the approved scope or directed by the Superintendent.

3.3 BULK FILL – IMPORTED

The Contractor shall undertake imported bulk filling works at the locations specified in the Contract where scour, erosion or loss of formation material has occurred and suitable local material is not available or is not approved for use.

The work shall be completed in accordance with the approved treatment extent and shall reinstate the pre-disaster road, formation or drain profile to the level appropriate for the class of road and adjoining works.

The work shall include but not be limited to:

- supply and haulage of approved imported fill material to the worksite;
- preparation of the receiving surface, including removal of loose, contaminated or unsuitable material and trimming to receive the fill;
- placement of fill in layers of suitable thickness for the material used and compaction plant used;
- moisture conditioning and compaction of each layer to produce a firm, stable and non-yielding fill; and
- trimming of the completed fill to match the approved formation, subgrade or table drain profile, as applicable.

Imported Bulk Fill Material
Imported fill shall be sourced from an approved source and shall be fit for purpose, free of organic matter, oversized debris and other deleterious material, and capable of being compacted to form a stable road or drain foundation. The Contractor shall not haul imported material to the site until the source has been accepted in accordance with the Contract quality requirements.

Bulk Fill Construction
Unless otherwise approved, imported fill shall be placed in uniform layers not exceeding 150mm compacted depth. The Contractor shall condition each layer to the required optimum moisture content and compact each layer sufficiently to prevent subsequent rutting, settlement, instability or erosion under traffic and stormwater flow.

Finished Surface
Bulk fill material shall be used to reinstate roads in the following manner.

- To a road's natural surface level for unformed roads
- To the top of formation for formed roads.
- To the top of the road subgrade for gravel and sealed roads or table drains.
- To the finished level within table drains which allows the drain to function as part of the overall road drainage and not cause or all ponding of water.

Finished road surface crossfall on straight sections shall be 5%, unless the adjoining geometry requires otherwise, to allow for effective drainage of the road surface. The Contractor shall ensure transitions to and from changes to road cross sections are shaped in a manner that does not cause adverse stability issues for vehicles with high centres of mass due to sudden significant changes in crossfall.

Finished road surface superelevation within bends, shall be constructed with a grade of 6% and not be greater than 7% in any location. The Contractor shall ensure transitions to and from superelevated road cross sections are shaped in a manner that does not cause adverse stability issues for vehicles with high centres of mass.

The Contractor shall also ensure that filled areas, following completion of the work match in accordance with the following requirements:

- Table drains – the adjacent table drain sections match the existing table drain, allowing for free drainage of water with no ponding.
- Shoulders – the finished shoulder pavement surface match the adjacent table drain and pavement areas allowing effective drainage of the road and shoulder areas.
- Pavement – the finished pavement surface match the adjacent shoulder and pavement areas allowing effective drainage of the road pavement areas.

The Contractor shall ensure the completed work is free draining and does not cause water to pond against the road or discharge in a manner that will lead to renewed erosion.

3.4 BULK FILL – LOCAL

The Contractor shall undertake local bulk filling works where the approved treatment requires restoration of scours or loss of formation material using material recovered from within the approved road corridor or other local source approved by the Superintendent.

Local bulk fill shall only be used where the source area, material type and winning method have been accepted by the Superintendent and where the proposed source can be worked without creating unsafe conditions, drainage problems or unnecessary disturbance beyond the approved treatment extent.

The work shall include but not be limited to:

- winning of approved local material from the nominated source area;
- haulage of the material to the worksite;
- preparation of the receiving surface, placement, moisture conditioning, compaction and trimming of the fill; and
- leaving both the source area and the completed work area in a safe, stable and free draining condition with no rutting or surface deviations.

Local Bulk Fill Material
Recovered local material shall be free of vegetation, roots, topsoil, rubbish, oversized debris and other deleterious matter and shall be capable of acting as stable and durable fill material. Material visibly contaminated by organic matter or saturated to the extent that it cannot be compacted shall not be incorporated into the WUC.

Source Area Requirements
The Contractor shall not create new borrow pits, leave unsafe hollows, undermine batters or the road formation, obstruct drainage paths, damage utility services or adjoining property in winning local material. Any local source area within the road corridor shall be shaped on completion so that it is stable, safe to maintain and does not allow water to pond, cause scouring or present a hazard to road users.

Bulk Fill Construction
Unless otherwise approved, local fill shall be placed in uniform layers not exceeding 150mm compacted depth. Fill material shall be moisture conditioned and compacted to produce a firm, stable and non-yielding reinstated area.

Finished Surface
Bulk fill material shall be used to reinstate roads in the following manner.

- To a road's natural surface level for unformed roads
- To the top of formation for formed roads.
- To the top of the road subgrade for gravel and sealed roads or table drains.
- To the finished level within table drains which allows the drain to function as part of the overall road drainage and not cause or all ponding of water.

Finished road surface crossfall on straight sections shall be 5%, unless the adjoining geometry requires otherwise, to allow for effective drainage of the road surface. The Contractor shall ensure transitions to and from changes to road cross sections are shaped in a manner that does not cause adverse stability issues for vehicles with high centres of mass due to sudden significant changes in crossfall.

Finished road surface superelevation within bends, shall be constructed with a grade of 6% and not be greater than 7% in any location. The Contractor shall ensure transitions to and from superelevated road cross sections are shaped in a manner that does not cause adverse stability issues for vehicles with high centres of mass.

The Contractor shall also ensure that filled areas, following completion of the work match in accordance with the following requirements:

- Table drains – the adjacent table drain sections match the existing table drain, allowing for free drainage of water with no ponding.
- Shoulders – the finished shoulder pavement surface match the adjacent table drain and pavement areas allowing effective drainage of the road and shoulder areas.
- Pavement – the finished pavement surface match the adjacent shoulder and pavement areas allowing effective drainage of the road pavement areas.

The Contractor shall ensure the completed work is free draining and does not cause water to pond against the road or discharge in a manner that will lead to renewed erosion.

3.5 CLEAR MIXED DEBRIS AND REMOVE FROM SITE

The Contractor shall clear mixed debris from the roadway, shoulders, drains, culvert inlets and outlets, road reserve and other nominated areas where flood deposited material or storm damage obstructs traffic, drainage, maintenance access or the proper functioning of the asset.

The work shall include but not be limited to:

- collection, loading and removal of vegetation, rubbish, rock, gravel, sand, silt, driftwood and other mixed debris from the approved treatment area;
- segregation of reusable material where directed by the Superintendent;
- disposal of debris at an approved location in accordance with legislative and environmental requirements; and
- final clean up of the affected area so that it is safe, tidy and free of obstructions to drainage or traffic.

Execution Requirements
The Contractor shall undertake the work in a manner that minimises disturbance to sound road formation, remaining vegetation, drainage structures, culvert linings, geotextiles and other existing works. Mixed debris shall not be pushed or stockpiled into drains, on private property, or elsewhere within the road reserve where it may re-enter the roadway, present a hazard to road users, obstruct sightlines or obstruct stormwater flows.

Limits of Treatment
This treatment is limited to clearing and removal of mixed debris. It does not include reconstruction of pavement, filling of scours, reshaping of drains, desilting of drainage structures beyond minor incidental cleaning, or removal of large deposits of surplus material requiring excavation under a separate treatment item.

Completed Work
On completion, the affected area shall be left clean, safe and neat, with no residual debris capable of causing a hazard to traffic or the safe use of the road, blocking drainage or creating a nuisance during subsequent maintenance or construction operations.

3.6 UNSUITABLE SUBGRADE MATERIAL

General
The Contractor may encounter material below the existing pavement, road formation, shoulder, drainage structure, fill area or other work area which is not suitable to support the nominated restoration or reconstruction treatment.

For the purpose of this Contract, unsuitable subgrade material means material which, in the opinion of the Superintendent, is not capable of being reasonably worked, conditioned, compacted or otherwise treated to

provide a stable and durable foundation for the WUC. Unsuitable subgrade material may include, but not be limited to:

- Saturated, soft, yielding or pumping material;
- Material which displays excessive rutting, heaving or deformation during construction trafficking, proof rolling or compaction;
- Material containing organic matter, roots, logs, stumps, rubbish, deleterious matter or other contamination;
- Material which cannot be moisture conditioned and compacted to the specified requirements;
- Material having inadequate bearing capacity or strength for the proposed work;
- Material which has been adversely affected by poor drainage, ponded water or flood damage;
- Material affected by biosecurity matter or other environmental constraints; and
- Any other material which satisfies the definition of Unsuitable Material under MRTS04 General Earthworks.

The treatment of unsuitable subgrade material shall be undertaken generally in accordance with the relevant requirements of MRTS04 General Earthworks, including the identification, notification, excavation, disposal, replacement, treatment, compaction, proof rolling and record keeping requirements applicable to the nature of the work.

Notification and Hold Point

Where the Contractor identifies unsuitable or potentially unsuitable subgrade material, the Contractor shall immediately notify the Superintendent and shall not remove, cover, treat, replace or otherwise disturb the material beyond that necessary to make the area safe and protect the WUC.

The Contractor's notification shall include, as a minimum:

- The road name, site identification number and chainage;
- The location and extent of the affected area;
- A description of the observed condition;
- Photographs and video evidence of the affected area;
- Proof rolling, compaction, Dynamic Cone Penetrometer, moisture content or other relevant test results where available;
- The Contractor's proposed method of treatment; and
- Any immediate safety, traffic, drainage or environmental controls implemented by the Contractor.

HP **Hold Point:** Work shall not proceed beyond this Hold Point until the Superintendent has inspected the affected area, determined whether unsuitable subgrade material is present, and provided direction regarding the required treatment and treatment extent. The direction may be given orally and followed up in writing at a later time.

The Contractor shall allow reasonable time in its program for inspection, testing, treatment determination and record collection associated with unsuitable subgrade material.

Treatment Selection

The treatment to be adopted shall be as directed by the Superintendent having regard to the material encountered, the location of the unsuitable material, the required function of the completed works, the approved QRA treatment, the pavement or formation type, site drainage conditions, available test results and the requirements of MRTS04 General Earthworks.

The Superintendent may direct one or more of the following treatment types, consistent with the standard subgrade treatment approach in MRTS04 General Earthworks:

- Type A – compact existing material;
- Type B – remove unsuitable material and replace with suitable earth fill material;

- Type C – remove unsuitable material and replace with approved unbound granular material;
- Type D – insitu stabilise existing material;
- ~~Type E – remove unsuitable material and replace with plant-mixed stabilised material;~~
- ~~Type F – provide a drainage layer and plant-mixed stabilised upper layer;~~
- Type G – provide an insitu stabilised drainage layer;
- ~~Type H – provide a plant-mixed stabilised drainage layer;~~
- Type I – provide a high-permeability drainage layer;
- Type J – provide a bridging layer; or
- ~~Type K – provide a special treatment as directed by the Superintendent.~~

The Contractor shall not select or substitute a treatment type without the prior written direction of the Superintendent.

Where the unsuitable material is isolated, shallow and localised, the Superintendent may direct removal and replacement with suitable material to an agreed depth and extent. Where the unsuitable material is extensive, deep, associated with groundwater or drainage, or not capable of being addressed by simple removal and replacement, the Superintendent may direct further testing, geotechnical advice, drainage treatment, stabilisation, bridging or other special treatment before work proceeds.

Excavation and Preparation

The Contractor shall excavate unsuitable subgrade material only to the limits and depth directed by the Superintendent. Excavation shall be undertaken in a controlled manner so that sound adjoining pavement, formation, shoulders, drains, structures, services, property accesses, vegetation and other assets are not unnecessarily disturbed.

The Contractor shall not over-excavate, undermine adjacent pavement or formation, create abrupt changes in level, create ponding, obstruct drainage paths or leave excavations in an unsafe condition.

The bottom and sides of the excavation shall be trimmed to expose firm, stable and suitable material. Loose, softened, contaminated or disturbed material shall be removed. The prepared excavation shall be inspected by the Superintendent prior to placement of replacement material or commencement of any treatment.

Where a free-draining excavation base cannot be achieved, the Contractor shall notify the Superintendent and seek direction prior to backfilling. The Contractor shall not trap water beneath replacement pavement, fill or subgrade treatment works.

Replacement, Treatment and Compaction

Replacement material, stabilised material, drainage layer material, bridging material, geotextile, geosynthetic reinforcement and any other treatment material shall be approved by the Superintendent prior to use.

Unless otherwise directed by the Superintendent, replacement material shall be placed at the appropriate moisture content and compacted in uniform layers not exceeding 100mm compacted depth. Each layer shall be compacted and trimmed prior to the next layer being placed.

The completed treatment shall provide a firm, stable, non-yielding and free-draining foundation suitable for the nominated pavement, formation, shoulder, fill, drainage or other restoration treatment to be constructed upon.

The Contractor shall undertake proof rolling, compaction testing, or other testing as directed by the Superintendent or required by the endorsed Inspection and Test Plan. Where proof rolling or testing indicates yielding, rutting, pumping, instability or other non-conformance, the Contractor shall undertake further removal, replacement, drying back, moisture conditioning, stabilisation, compaction or other corrective action as directed by the Superintendent.

Contractor-Caused Unsuitable Material
Where suitable material becomes unsuitable as a result of the Contractor's construction activities, failure to protect the WUC, poor surface drainage, damage caused by construction traffic, contamination, excessive loading, wetting up of exposed surfaces, or other act or omission of the Contractor, all costs associated with reworking, drying back, treating, removing or replacing that material shall be borne by the Contractor.

No additional payment will be made for treatment of unsuitable material caused or contributed to by the Contractor's work methods, sequencing, traffic management, drainage management, environmental management or failure to comply with the Contract.

Records and QRA Evidence
The Contractor shall keep complete contemporaneous records of all unsuitable subgrade material identification, treatment and replacement works. Records shall be sufficient to support assessment of the work by the Superintendent and, where applicable, assessment under QRA variation or funding processes.

Records shall include, as a minimum:

- Road name, QRA site identification number and chainage;
- Date and time the unsuitable material was identified;
- Location, length, width, depth and calculated quantity of material removed or treated;
- Photographs before excavation, during excavation, at the completed excavation base, during placement of replacement material and at completion;
- Video evidence of proof rolling where required;
- Test results and inspection records;
- Superintendent directions and Hold Point releases;
- Material source, material type and delivery records for replacement material;
- Disposal location and disposal records for removed material;
- Survey, level or measurement records where required;
- Fulcrum App records; and
- Completed ITP records and associated sign-off documentation.

Photographs shall be clear, dated, location-referenced and sufficient to demonstrate the condition encountered, the extent of material removed, the suitability of the exposed foundation, the replacement material placed, and the completed treatment.

Measurement and Payment
Measurement and payment for unsuitable subgrade material treatment shall only apply where the work has been directed in writing by the Superintendent and is not the result of Contractor-caused unsuitable material.

Unless a specific Schedule K1 rate applies, payment for directed unsuitable subgrade material treatment shall be assessed under the applicable Schedule K3 rates or as a variation under the Conditions of Contract.

The Contractor shall not be entitled to payment for unsuitable subgrade material treatment unless the Contractor has complied with the notification, Hold Point, inspection, testing and record keeping requirements of this clause.

All costs associated with identifying, notifying, protecting, temporarily making safe, documenting and providing access for inspection of potentially unsuitable material shall be deemed to be included in the Contractor's tendered rates, except to the extent that additional treatment work is directed by the Superintendent and valued in accordance with the Contract.

SECTION 4 – UNSEALED ROAD CONSTRUCTION

4.1 GENERAL REQUIREMENTS FOR UNSEALED ROAD CONSTRUCTION

The Contractor shall ensure that all WUC relating to unsealed road construction are delivered in accordance with the requirements detailed in this Technical Specification and the QRA Treatment Guide.

4.2 TREATMENT WIDTH AND LINEAR MEASUREMENT

General
This clause applies to all unsealed road WUC where the applicable Schedule of Rates item is measured and paid by linear metre, including medium formation grading, heavy formation grading, and any other treatment item which the Contract provides is to be measured by length.

This clause also applies where the Contract identifies a road, site, treatment type, treatment length or treatment extent but does not expressly nominate a treatment width.

No Nominal Width Unless Expressly Stated
Unless the Contract expressly states a treatment width for a specific site or treatment item, no nominal treatment width is provided by the Principal. The absence of a stated treatment width shall not be treated as an ambiguity, discrepancy, omission or basis for a variation.

The Contractor shall make its own assessment of the width of the existing road formation, the nature of the road asset, the apparent pre-disaster formation, the treatment width reasonably required to complete the WUC, and the work methods necessary to reinstate the road to the required condition and function.

For clarity, where no treatment width is expressly stated, the Contractor shall not be entitled to rely on any assumed width, typical width, minimum width, trafficable width, historical width, formation width, grader width or construction width as a basis for a claim, variation or adjustment to the contract sum.

Extent of Work
Where the Contract identifies a treatment by length and does not expressly state a treatment width, the Contractor shall undertake all work necessary across the approved treatment extent and existing road formation area to reinstate the road surface, shape, drainage function, shoulders, table drain interface and safe trafficable condition required by the Contract.

The work shall include all grader passes, trimming, scarifying, tyne work, watering, compaction, proof rolling, recovery of suitable material, removal of unsuitable material, tie-ins, transitions, shoulder matching, table drain interface works, cleaning up and other incidental work required to complete the treatment, whether or not the actual width varies along the treatment length.

If the Contractor considers that the existing road formation or required treatment width cannot be identified, or that work is required outside the approved treatment extent, the Contractor shall immediately notify the Superintendent and seek direction before proceeding.

Measurement and Payment
Where a treatment item is measured by linear metre, measurement shall be made along the approved treatment length only, unless the Contract expressly states otherwise. The measured quantity shall not be increased or decreased by reason only of:

- the actual width of the existing road formation;
- the actual width of the completed treatment;
- the number of grader passes, roller passes and/or water cart passes required;
- the width of scarifying, trimming, compaction or proof rolling;

- the width of the trafficable running surface;
- the width between table drains;
- the width between shoulders, batters or verges;
- the existence of local widening, intersections, turnouts, accesses, floodway approaches or curves; or
- any difference between the actual width and any width assumed by the Contractor.

The Contractor's tendered linear metre rates shall be deemed to include all costs associated with completing the relevant treatment for the full width required by the Contract and the site conditions, regardless of whether the width is greater or less than any width assumed by the Contractor.

The Contractor shall not be entitled to a variation, extension of time, delay costs or any other adjustment to the contract sum by reason only that the actual treatment width is wider or narrower than expected, wider or narrower than six metres, wider or narrower than the visible trafficked path, or wider or narrower than the width assumed by the Contractor at the time of tender.

Expressly Stated Widths
Where the Contract expressly states a treatment width for a site or treatment item, the Contractor shall complete the WUC to that stated width unless otherwise directed by the Superintendent.

The Contractor shall not extend the treatment beyond an expressly stated width or approved treatment extent without the prior written direction of the Superintendent. Work undertaken beyond an expressly stated width or approved treatment extent without written direction shall not be measured or paid for unless the Superintendent directs otherwise.

Records
The Contractor shall record the completed treatment length, observed treatment width, road formation condition, treatment start and end points, and any changes in formation width or treatment extent in the Principal's infield application program or other records directed by the Superintendent.

Records provided under this clause are for verification, quality, audit and funding purposes and do not alter the basis of measurement and payment unless the Contract or a written direction of the Superintendent expressly provides otherwise.

4.3 GRAVEL / MATERIAL SUPPLY

The Contractor is responsible for all costs and aspects of supplying the materials required to deliver the specified WUC to the nominated sites to enable the specified works to be completed.

The Contractor shall supply granular pavement material from the approved quarries to the location that material is required on the road. The Contractors Tendered rates for the completion of specified works requiring the use of imported granular pavement material shall include all costs associated with loading, hauling and placement of the required material.

The Contractor shall be responsible for loading, hauling and placement of other materials required to deliver the specified works. The Contractors Tendered rates for the completion of specified works shall include all costs associated with loading, hauling and placement of these materials.

~~4.4 MEDIUM FORMATION GRADING~~

~~The Contractor shall undertake medium formation grading works along the sections of road specified in the Contract where sufficient roadway material remains in place and the approved treatment requires reinstatement of the pre-disaster road profile without import of additional material.~~

The work shall include but not be limited to:

- scarifying the road pavement to a depth of up to 50mm using a grader;
- clearing, grubbing and removal of grass, weeds, light vegetation, minor shrubs, roots, organic matter and other unsuitable material from the road formation area and approved treatment area in accordance with Clause 2.11 Grass and Vegetation within Road Formation and Treatment Areas where required to facilitate the grading operation, recover suitable material, reinstate the road profile, achieve compaction and leave the completed work free draining;
- recovery and incorporation of suitable displaced material from adjacent table drains or the immediate road reserve;
- watering and compaction of the reworked material; and
- trimming of the completed surface to a smooth, safe and free draining profile.

Material Recovery

Only suitable material shall be recovered and incorporated into the finished surface. Material contaminated by vegetation, organic matter, debris or excessive moisture such that it cannot be compacted to a stable finish shall be removed from the work area and disposed of in an approved manner.

Limits of Treatment

Medium formation grading does not include the importation of additional gravel or fill material. Where the extent of material loss is such that the required pre-disaster profile cannot be reinstated with recovered in-situ material, the Contractor shall notify the Superintendent and shall not proceed on the basis that additional material is included in this treatment.

Finished Surface

All grading works shall ensure the finished surface is free from significant deviations in longitudinal and horizontal geometry and provides a smooth and safe wearing course.

Finished road surface crossfall on straight sections shall be 5%, unless the adjoining geometry requires otherwise, to allow for effective drainage of the road surface. The Contractor shall ensure transitions to and from changes to road cross sections are shaped in a manner that does not cause adverse stability issues for vehicles with high centres of mass due to sudden significant changes in crossfall.

Finished road surface superelevation within bends, shall be constructed with a grade of 6% and not be greater than 7% in any location. The Contractor shall ensure transitions to and from superelevated road cross sections are shaped in a manner that does not cause adverse stability issues for vehicles with high centres of mass.

The Contractor shall also ensure that completed grading areas match the adjacent table drain and allow effective drainage of the road and shoulder areas.

Payment for medium formation grading will be made in accordance with the applicable tendered rate in Schedule K1.

4.5 HEAVY FORMATION GRADING

The Contractor shall undertake heavy formation grading works where rutting, distortion or general loss of road shape is more extensive and a heavier reworking of the existing surface is required to reinstate the road formation and pre-disaster profile.

The work shall include but not be limited to:

- clearing, grubbing and removal of grass, weeds, light vegetation, minor shrubs, roots, organic matter and other unsuitable material from the road formation area and approved treatment area in accordance with Clause 2.11 Grass and Vegetation within Road Formation and Treatment Areas where required

to facilitate the grading operation, recover suitable material, reinstate the road profile, achieve compaction and leave the completed work free draining;

- recovery of suitable material from adjacent table drains and/or the road reserve;
- scarifying of the road pavement to a depth of 100mm, or up to 150mm where required by the depth of pavement damage and instructed by the Superintendent;
- trimming, watering and compaction to reinstate the road profile; and
- removal from the work area of unsuitable material that cannot be incorporated into the completed formation.

Material Recovery and Unsuitable Material

Where possible the Contractor shall recover as much suitable pavement material as practicable from adjacent drains and the immediate road reserve. Material that is contaminated, unsuitable or surplus to the approved formation profile shall be removed from the work area and disposed of in an approved manner.

Limits of Treatment

Heavy formation grading excludes gravel or material supply. Where imported material is required to reinstate the required shape or pavement material thickness, the Contractor shall seek approval from the Superintendent and use the relevant heavy formation grading with imported material treatment or other separately approved item.

Finished Surface

All grading works shall ensure the finished surface is free from significant deviations in longitudinal and horizontal geometry and provides a smooth and safe wearing course.

Finished road surface crossfall on straight sections shall be 5%, unless the adjoining geometry requires otherwise, to allow for effective drainage of the road surface. The Contractor shall ensure transitions to and from changes to road cross sections are shaped in a manner that does not cause adverse stability issues for vehicles with high centres of mass due to sudden significant changes in crossfall.

Finished road surface superelevation within bends, shall be constructed with a grade of 6% and not be greater than 7% in any location. The Contractor shall ensure transitions to and from superelevated road cross sections are shaped in a manner that does not cause adverse stability issues for vehicles with high centres of mass.

The Contractor shall also ensure that completed grading areas match the adjacent table drain and allow effective drainage of the road and shoulder areas.

Payment for heavy formation grading will be made in accordance with the applicable tendered rate in Schedule K1.

4.6 HEAVY FORMATION GRADING INCORPORATING IMPORTED MATERIAL

The Contractor shall undertake heavy formation grading incorporating imported material where the approved treatment requires reinstatement of the formation and profile together with the placement of imported granular pavement material. The work shall include all work required under Clause 4.4 Heavy Formation Grading and Clause 2.11 Grass and Vegetation within Road Formation and Treatment Areas, together with the supply, haulage, spreading, blending, watering and compaction of approved imported material..

The work shall include all work required under Clause 4.4 Heavy Formation Grading together with the supply, haulage, spreading, blending, watering and compaction of approved imported material.

The work shall include but not be limited to:

- all work operations described in Clause 4.4 Heavy Formation Grading;
- supply and haulage of approved imported material;

- ~~uniform spreading and blending of the imported material with the reworked formation to provide the additional granular pavement material at the nominated compacted depth; and~~
- ~~final trimming, watering and compaction of the completed surface.~~

~~Imported Material~~

~~Imported granular pavement material shall be approved prior to haulage and consistent with the material currently specified by the Principal for unsealed road maintenance works. The material shall be free of deleterious matter and capable of being trimmed and compacted to a stable, durable and free draining surface.~~

~~Construction Requirements~~

~~The included imported material is intended to restore the road geometry, profile and granular pavement material thickness. The Contractor shall blend the imported material and recovered in-situ material to form a uniform, stable and durable running surface.~~

~~Where the approved treatment quantity or observed loss of gravel exceeds the scope of this item, the Contractor shall notify the Superintendent to receive direction.~~

~~Finished Surface~~

~~All grading works shall ensure the finished surface is free from significant deviations in longitudinal and horizontal geometry and provides a smooth and safe wearing course.~~

~~Finished road surface crossfall on straight sections shall be 5%, unless the adjoining geometry requires otherwise, to allow for effective drainage of the road surface. The Contractor shall ensure transitions to and from changes to road cross sections are shaped in a manner that does not cause adverse stability issues for vehicles with high centres of mass due to sudden significant changes in crossfall.~~

~~Finished road surface superelevation within bends, shall be constructed with a grade of 6% and not be greater than 7% in any location. The Contractor shall ensure transitions to and from superelevated road cross sections are shaped in a manner that does not cause adverse stability issues for vehicles with high centres of mass.~~

~~The Contractor shall also ensure that completed grading areas match the adjacent table drain and allow effective drainage of the road and shoulder areas.~~

~~Payment for heavy formation grading incorporating imported material will be made in accordance with the applicable tendered rate in Schedule K1.~~

4.7 GRAVEL RESHEETING

The Contractor shall undertake gravel resheeting where loss of both road shape and pavement material has occurred, and the approved treatment requires reinstatement of the running surface using a nominal compacted depth of imported granular pavement material.

The work shall be completed in accordance with the requirements of the QRA treatment type Gravel Resheeting and shall include all formation preparation necessary to achieve the approved surface profile and thickness.

The work shall include but not be limited to:

- preparation of the existing formation in accordance with the requirements of Clause 4.4 Heavy Formation Grading;
- supply, haulage, spreading and compaction of approved imported granular pavement material to achieve the specified nominal compacted depth;
- watering, trimming and rolling of the completed surface to produce a uniform pavement surface wearing course;

- blending and tie-in to the existing road surface at the limits of work; and
- removal of unsuitable or contaminated material made redundant by the work.

Imported Gravel Material
Imported granular pavement material shall be approved prior to haulage and consistent with the material currently specified by the Principal for unsealed road maintenance works. The material shall be free of deleterious matter and capable of being trimmed and compacted to a stable, durable and free draining surface.

Formation Preparation
Formation preparation shall include removal of grass, weeds, light vegetation, minor shrubs, roots, organic matter, contaminated material and other unsuitable material from the road formation area and approved treatment area in accordance with Clause 2.11 Grass and Vegetation within Road Formation and Treatment Areas where required to prepare a stable formation, recover suitable material, place imported granular pavement material, achieve compaction and leave the completed work free draining.

The Contractor shall prepare the existing formation in accordance with the requirements of Clause 4.4 Heavy Formation Grading and by recovering suitable displaced material from adjacent table drains or the road reserve where practical.

Unsuitable or contaminated material exposed during preparation shall be removed to ensure the imported granular pavement material is placed on a stable and suitable foundation. Unsuitable, contaminated or excess material that cannot be incorporated into the completed works shall be removed from the work area.

Resheeting and Compaction
Imported gravel shall be spread uniformly over the prepared formation area so the completed compacted thickness is not less than the specified treatment depth. The Contractor shall make allowance for trimming loss, moisture conditioning and settlement required to achieve the specified compacted thickness and finished profile.

The Contractor shall ensure imported granular pavement material is thoroughly mixed, moisture conditioned and compacted to produce a stable surface without segregation, loose stone or laminations.

Finished Surface
All resheeting works shall ensure the finished surface is free from significant deviations in longitudinal and horizontal geometry and provides a smooth and safe wearing course.

Finished road surface crossfall on straight sections shall be 5%, unless the adjoining geometry requires otherwise, to allow for effective drainage of the road surface. The Contractor shall ensure transitions to and from changes to road cross sections are shaped in a manner that does not cause adverse stability issues for vehicles with high centres of mass due to sudden significant changes in crossfall.

Finished road surface superelevation within bends, shall be constructed with a grade of 6% and not be greater than 7% in any location. The Contractor shall ensure transitions to and from superelevated road cross sections are shaped in a manner that does not cause adverse stability issues for vehicles with high centres of mass.

The Contractor shall also ensure that completed resheet areas match the adjacent table drain and allow effective drainage of the road and shoulder areas.

Payment for gravel resheeting will be made in accordance with the applicable tendered rate in Schedule K1.

4.8 WITNESS POINTS – RIPPING AND MATERIAL PLACEMENT

General
This clause applies to heavy formation grading incorporating imported material and gravel resheeting works.

The Contractor shall include the Witness Points required by this clause in the relevant ITPs. These Witness Points apply in addition to the requirements of Clause 1.2 Quality and Conformance, Clause 1.4 Inspection and Test Plans and any other Hold Points, Witness Points, inspections or tests required by the Contract.

Ripping of Existing Pavement Surface

WP **Witness Point:** The Contractor shall provide the Superintendent with not less than 48 hours notice prior to ripping, scarifying or otherwise loosening the existing pavement or formation surface before placement of imported or additional material.

The purpose of this Witness Point is to allow the Superintendent to verify that the existing pavement or formation surface is being adequately ripped, scarified or loosened to promote bonding, blending and integration of the additional material with the existing surface.

The Contractor shall not place imported or additional material on an unripped, unprepared or otherwise unsuitable surface unless approved by the Superintendent.

Placement of Material

WP **Witness Point:** The Contractor shall provide the Superintendent with not less than 48 hours notice prior to the placement of imported or additional material.

The purpose of this Witness Point is to allow the Superintendent to verify that the material being delivered and placed is from the approved source, is consistent with the approved material type, is free from unsuitable or deleterious matter, and is being placed at the correct location and in a manner suitable for incorporation into the WUC.

The Contractor's notice shall identify the road name, site identification number, chainage limits, treatment type, proposed date and time of the activity, material source, proposed quantity and the plant to be used.

Photographic and Video Evidence

Where the Superintendent is unable to attend a Witness Point in person, the Contractor shall record and provide clear photographic and video evidence of the relevant work activity.

For ripping, scarifying or loosening of the existing pavement or formation surface, the evidence shall show the location, treatment extent, plant used, depth and effectiveness of ripping or scarifying, and the condition of the prepared surface prior to material placement.

For material placement, the evidence shall show the location, material delivery, material source where identifiable, material type and condition, placement method, spread depth, and general consistency of the placed material across the treatment area.

All photographs and video footage shall be dated, location-referenced, and sufficient to allow the Superintendent to verify the activity undertaken. The records shall be included in the relevant ITP records and, where required by the Superintendent, uploaded to the Principal's infield application program.

Non-Conformance

If the Superintendent considers that the pavement surface has not been adequately ripped or prepared, or that the material delivered or placed is unsuitable, non-conforming or inconsistent with the approved material source, the Contractor shall stop the affected work and undertake any corrective action directed by the Superintendent.

Any delay, rework, removal, replacement, additional preparation, additional inspection, additional testing or other cost arising from the Contractor's failure to comply with this clause shall be borne by the Contractor.

SECTION 5 – SEALED ROAD CONSTRUCTION

5.1 GENERAL REQUIREMENTS FOR SEALED ROAD CONSTRUCTION

The Contractor shall ensure that all WUC relating to sealed road construction are delivered in accordance with the requirements detailed in this Technical Specification and the QRA Treatment Guide.

Road Geometry
Reconstructed road surfaces shall meet the appropriate minimum and maximum horizontal and vertical grade requirements. The Contractor shall seek to achieve the following requirements:

- Minimum straight road crossfall – 1.0%
- Maximum straight road crossfall – 3.0%
- Minimum superelevation – 3.0%
- Maximum superelevation – 6.0%

In situations where short road sections are being reconstructed, and the adjacent existing road geometry does not match the above minimum and/or maximum horizontal and vertical grade requirements, the existing road profile shall be matched to ensure no sudden geometry changes which may cause vehicle instability or wearing course drainage issues.

The Contractor shall also ensure that completed reconstructed road pavement areas match the adjacent table drains and allow effective drainage of the road and shoulder areas.

The Contractor shall ensure that all reconstructed road pavement areas are swept following completion of reconstruction works. The road wearing course shall be swept to ensure that loose material is not left on the road surface upon completion of work on site.

Pavement Excavation
The Contractor shall saw cut all sealed wearing course edges prior to the removal of or stabilisation of pavement materials to ensure only straight edges are present across the final treatment area.

The Contractor shall ensure that wearing course and pavement layers are broken out and removed cleanly to facilitate replacement of pavement material and that clean vertical edges to the area to be restored are created.

5.2 HEAVY SHOULDER GRADING INCORPORATING IMPORTED MATERIAL

The Contractor shall undertake heavy shoulder grading works where shoulder scour or loss of material has occurred adjacent to an otherwise serviceable sealed pavement and the approved treatment requires reinstatement of the shoulder profile with additional imported material.

The work shall include, but not be limited to:

- clearing, grubbing and removal of grass, weeds, light vegetation, minor shrubs, roots, organic matter and other unsuitable material from the shoulder, table drain interface and approved treatment area in accordance with Clause 2.11 Grass and Vegetation within Road Formation and Treatment Areas where required to reinstate the shoulder profile and drainage function;
- recovery of suitable material from adjacent table drains where appropriate;
- scarifying of the shoulder to a minimum depth 100mm;
- supply and incorporation of up to 50mm of approved imported material;
- trimming, watering and compaction of the shoulder to the required profile; and
- brooming of the adjacent sealed pavement on completion.

Shoulder Material
Where possible the Contractor shall recover as much suitable material as practicable from adjacent table drains for reuse in the damaged shoulder areas. If the recovered material is not suitable for reuse it shall be removed from site and disposed of in an approved manner. Imported material used for shoulder top-up shall be approved prior to haulage and consistent with the material currently specified by the Principal for unsealed shoulder maintenance works.

If further material is required, in addition to the specified 50mm, the Contractor shall seek approval from the Superintendent to supply and place the additional material.

Shoulder Construction
Completed shoulders shall match the sealed pavement edge, ensuring there is no drop between the adjacent wearing course pavement surface and unsealed shoulder surface. Shoulders shall allow the wearing surface to be free draining and not be left higher than the adjacent wearing course pavement surface, creating a dam.

Shoulder crossfall shall be between 1% and 2% greater than the adjacent road crossfall. For example, if the adjacent road crossfall is 3% then the shoulder area crossfall requires a completed surface crossfall of between 4% and 5%.

The Contractor shall also ensure that completed shoulder areas match the adjacent table drain and allow effective drainage of the road and shoulder area.

The Contractor shall ensure that areas of road pavement adjacent to the shoulder repairs are swept following completion of the shoulder repair works. The road wearing course shall be swept to ensure that loose material is not left on the road surface upon completion of work on site.

Seal Edge Interface
Where damage to the shoulder has also caused breakage or loss of the seal edge, the work shall be completed in accordance with the requirements of Clause 5.3 Edge Repair unless the approved scope expressly includes the seal edge work with the approved heavy shoulder grading work. The Contractor shall nevertheless ensure that the completed shoulder repair work supports the seal edge and does not leave an unsupported or vulnerable sealed pavement edge.

Damaged seal edges shall be repaired using a suitable bituminous product which will provide a waterproof seal and prevent water ingress into the granular pavement material. The bituminous product shall be able to be sealed over shortly after placement without causing flushing due to high bitumen or volatiles content. All bituminous products proposed for use shall be approved by the Superintendent prior to their use on site. For clarity the intention of the edge repair work described above is to create a straight wearing course seal edge and provide a consistent lane width.

~~5.3 EDGE REPAIR~~

~~The Contractor shall undertake edge repair where localised damage to the seal edge and/or immediate pavement edge has occurred due to flood damage, trafficking in saturated conditions or scour, and where the extent of damage does not warrant pavement reconstruction.~~

~~The work shall include, but not be limited to:~~

- ~~trimming and preparation of the damaged edge back to sound material;~~
- ~~application of tack coat as required;~~
- ~~supply, placement and compaction of asphalt, bituminous premix or other approved repair material to restore the pavement edge;~~
- ~~forming a straight and durable seal edge to create a consistent adjoining carriageway width;~~

- placement of shoulder material to support the repaired shoulder and remove any drop offs or lips between the shoulder and sealed wearing course; and
- brooming and cleaning of the adjacent pavement on completion.

Repair Materials

Repair materials shall be suitable for the site conditions and shall be capable of forming a durable and waterproof edge treatment. Any proprietary bituminous repair product proposed for use shall be approved by the Superintendent prior to use and shall be compatible with any subsequent sealing work.

Execution Requirements

The Contractor shall cut back to sound material and shall remove loose and shattered seal, edge breaks and unsound shoulder material so that the completed repair bonds effectively to the existing pavement. The repaired edge shall be compacted flush with the adjoining pavement surface to prevent water ingress into the pavement or ponding of water against the repaired wearing course edge.

Interface with Shoulder Work

The Contractor shall ensure that the finished seal edge transitions neatly to the adjacent shoulder and does not leave a lip, dam or trap for water. Where shoulder work is undertaken adjacent to the repaired edge, the shoulder shall be trimmed and compacted to support the seal edge. Any substantial shoulder reinstatement shall be measured under the relevant shoulder treatment item.

This treatment does not include line marking.

Where the damage extends beyond the seal edge into the underlying pavement such that a durable repair cannot be achieved by edge repair alone, the Contractor shall notify the Superintendent so that the area may be addressed under the appropriate pavement repair or reconstruction treatment. Any such additional pavement repair work shall be approved by the Superintendent prior to the commencement of work.

5.4 IN-SITU STABILISATION – INCLUDING 50MM CORRECTOR

The Contractor shall undertake in-situ stabilisation where the approved treatment requires reinstatement of pavement shape and structural performance without exposing or reconstructing the subgrade.

The work shall include, but not be limited to:

- removal of material not suitable for stabilisation;
- supply and placement of approved unbound granular pavement material to replace unsuitable material and to provide the included 50mm corrector layer;
- pulverisation of the existing pavement to the specified treatment depth;
- supply and incorporation of the approved stabilising agent;
- moisture conditioning, mixing, shaping, compaction and curing of the stabilised layer; and
- protection of the treated surface until the next stage of work is undertaken.

Preconstruction Requirements

Prior to commencement, the Contractor shall submit the proposed stabilisation methodology for review and endorsement by the Superintendent, including,

- proposed stabilising agent;
- sequence of work;
- moisture conditioning approach;
- compaction methodology; and
- curing requirements.

HP **Hold Point:** No stabilisation work shall proceed until the methodology has been reviewed and endorsed by the Superintendent and the site is ready for the relevant hold point release.

Corrector and Unsuitable Material

The included 50mm corrector shall be used to restore shape and replace any limited areas of unsuitable material not capable of being stabilised. Material unsuitable for incorporation into the stabilised layer, including organic matter, excessive oversize stone and/or saturated and contaminated material, shall be removed prior to the commencement of stabilisation works.

Stabilisation Works

The Contractor shall stabilise the nominated road areas in accordance with the following requirements:

Cementitious Binder Type	Cement / Fly ash 40 / 60
Percentage Incorporation Rate	3.0%
Measurement Method	Mass

The Contractor shall ensure the existing pavement and stabilising agent are thoroughly mixed and that the completed stabilised layer is uniform in composition, moisture conditioned for compaction and finished to the required line, level and crossfall. The treated layer shall be compacted promptly after mixing and shall be protected from premature drying, wetting, traffic damage and contamination during curing.

The Contractor shall leave completed patches proud of the surrounding road surface to allow for hydration and/or settlement of the patch. The Contractor shall ensure that sufficient time is allowed for this to occur. Prior to sealing the Contractor shall final trim the patches to line and level to ensure a smooth transition from the surrounding road surface to and from the patch area. The trimmed (proud) material shall not form part of the material placed as the specified top up material.

Stabilisation and Sealing Width

Tenderers shall consider the operating width of their proposed stabilisation plant relative to all nominated treatment widths. The use of plant wider than the nominated treatment width is permitted. Tendered rates shall be all-inclusive of any additional works arising from the selected plant width, including overcutting, additional stabilisation, pavement correction, trimming, finishing and sealing beyond the nominated treatment width. No additional payment will be made for such works.

Finished Surface and Protection

The finished stabilised surface shall match the adjoining pavement profile and shall provide a sound and uniform platform for the subsequent seal treatment.

This treatment excludes sealing work. Sealing work shall be undertaken in accordance with the requirements of Clause 6.2 Bituminous Surfacing.

The Contractor shall not open the stabilised surface to unrestricted traffic until it has gained sufficient strength and the Superintendent is satisfied that the sealing work and/or temporary trafficking arrangements can proceed without adverse impacts on the repaired pavement.

5.5 BINDER APPLICATION RATE

In some locations the Superintendent may request for the cementitious binder application rate to be changed to suit local conditions or the nature of the work and insitu materials.

The Contractor shall note that the application rate may be increased as well as decreased from the default binder rate.

5.6 PATCH REPAIR – PATCH LOCAL UNBOUND PAVEMENT FAILURE

The Contractor shall undertake patch repair where isolated localised pavement failures have occurred and a full-width pavement treatment or rehabilitation is not required.

The work shall include, but not be limited to:

- saw cutting or otherwise forming neat, regular and durable edges to the patch area;
- removal of failed pavement material and unsuitable material;
- compaction of exposed subgrade;
- supply, placement and compaction of approved unbound granular pavement material in layers to match the adjoining pavement;
- sweeping and preparation of the completed patch; and
- application of a two-coat sprayed bituminous seal to the repaired area, including overlap of the existing seal.

Patch Extents and Layout
The Contractor shall in consultation with the Superintendent form patch areas with neat and practical shapes that minimise corners where compaction of granular pavement material is unable to occur, and any unnecessary joints. The treatment shall not be extended simply to create a regular shape where doing so would unnecessarily remove sound pavement, however the final patch shall have edges capable of providing a durable seal and sound tie to the existing pavement.

Excavation and Replacement
Failed pavement and unsuitable material shall be removed to the depth required to expose a sound foundation. The Contractor shall seek approval from the Superintendent prior to placing replacement pavement material over the prepared excavation subgrade. Replacement pavement material shall be placed at optimum moisture content in layers not exceeding 100mm compacted depth unless otherwise approved.

Granular pavement material removed from the road pavement and deemed unsuitable for reuse shall be removed from site and disposed of by the Contractor in an approved manner at the Contractor's expense.

Sealing
The repaired pavement area shall be swept clean and sealed in accordance with the requirements of Clause 6.2 Bituminous Surfacing,

The seal shall extend beyond the patch area in accordance with the requirements of Clause 6.2 Bituminous to provide a waterproof tie-in into the existing sealed surface and to prevent water ingress at the patch perimeter.

Finished Surface
The finished patch shall match the adjoining surface line, level, profile and crossfall and shall not create ponding, abrupt lips, wheel path depressions or weak seal edges.

Where multiple potholes or failures occur in close proximity such that a localised patch will not provide a durable result, the Contractor shall notify the Superintendent so that the area may be considered for a larger pavement treatment.

5.7 RECONSTRUCT UNBOUND GRANULAR PAVEMENT

The Contractor shall undertake reconstruction of unbound granular pavement where extensive pavement failure, contamination or loss of material has occurred and the damaged pavement cannot be economically or suitably treated by localised patching, overlay or stabilisation.

The work shall include, but is not limited to:

- excavation and removal of failed pavement material to the specified depth;
- reasonable allowance for excavation and replacement of unsuitable material encountered beneath the failed pavement;
- trimming and compaction of the exposed subgrade;
- supply, placement and compaction of approved unbound granular pavement in layers to match the adjoining pavement thickness and profile; and
- sweeping and preparation of the completed pavement for any subsequent seal treatment.

Excavation and Subgrade
The Contractor shall remove all failed or contaminated pavement material and shall not place replacement granular pavement material over yielding, saturated or otherwise unsuitable material. The exposed excavation subgrade shall be trimmed, compacted and approved by the Superintendent prior to placement of replacement granular pavement material.

Pavement Construction
The placement and compaction of all granular pavement material shall be consistent with the design intent of the adjoining pavement structure.

Replacement granular pavement material shall be placed at optimum moisture content in layers not exceeding 100mm compacted depth unless otherwise approved. Each layer shall be uniformly compacted and trimmed before the next layer is placed.

Imported granular pavement material used for pavement reconstruction shall be approved prior to haulage and consistent with the material currently specified by the Principal for sealed road pavement maintenance works.

Geometry and Finished Surface
The reconstructed pavement shall match the adjoining pavement levels, widths and cross-section and shall provide a smooth and safe riding surface.

The horizontal and vertical geometry of the completed works shall be in accordance with the requirements of Clause 6.1 General Requirements for Sealed Road Construction.

Sealing
This treatment item excludes bituminous sealing of the completed pavement repairs. The Contractor shall not leave reconstructed pavement exposed for longer than necessary and shall protect the finished unsealed pavement from damage, contamination and loss of shape prior to sealing or further work.

While a separate treatment, all sealing work undertaken to provide a seal to reconstructed road pavements shall be undertaken in accordance with the requirements of Clause 6.2 Bituminous Surfacing.

SECTION 6 – SURFACE TREATMENTS

6.1 FINISHED SURFACE

The quality and integrity of the finished wearing course surface following the completion of works is an important feature of the road. The finished surface of all sealed and unsealed wearing courses shall be completed in manner that ensures the following requirements are achieved:

- The wearing course surface of the treated area provides a smooth and safe interface with the surface of the adjacent untreated roadway.
- The Contractor shall ensure the finished road surface is free draining with no ponding of water.
- The Contractor shall ensure the finished pavement levels match all driveways and accesses to property.
- The Contractor shall ensure the finished pavement levels match all intersections and side roads.
- The quality of surface finish for unsealed surfaces shall match the existing road surfacing and provide improved performance in terms of water and skid resistance.
- The type of surfacing and quality of surface finish for sealed surfaces shall match the existing road surfacing and provide improved performance in terms of water and skid resistance.

6.2 BITUMENINOUS SURFACING

The Contractor shall undertake sprayed bituminous sealing where the approved treatment requires reinstatement of a sealed wearing course following pavement restoration, stabilisation reconstruction or other approved works.

Spray sealing shall be undertaken by a suitably qualified and experienced contractor using plant, materials and personnel capable of delivering a durable two-coat seal to the required standard.

Unless otherwise specified or approved the seal shall match the pre-disaster wearing course treatment. The following wearing course treatment shall be applied unless otherwise specified:

Wearing Course Type	Two coat bituminous seal
Aggregate Size – First Coat	14mm
Aggregate Size – Second Coat	10mm
Wearing Course Designation	Double/Double Seal

Bituminous sealing shall be undertaken in accordance with the requirement of the applicable TMR sprayed bituminous treatment specification.

The work shall include, but not be limited to:

- preparation and sweeping of the existing surface;
- line spotting where required to set out the treatment;
- application of a bituminous prime where required;
- heating and application of binder, cutter and additives as required by the adopted seal design;
- supply, spreading and rolling of pre-coated aggregate for each seal coat; and
- lapping into the existing seal to form a waterproof tie-in.

Seal Design and Materials
The Contractor shall ensure the following items are accounted for in the seal specification and design process:

- binder type;
- aggregate size; and
- binder application rates.

The Contractor shall ensure the seal specification and design process also appropriately accounts for:

- the existing pavement surface;
- traffic conditions at the site;
- climatic conditions at the site; and
- ambient sealing temperature and overall weather conditions.

All supplied materials shall comply with the applicable TMR specification and shall be stored, heated and handled in accordance with the manufacturer's recommendations and industry best practice requirements.

Surface Preparation
Prior to sealing, the pavement surface shall be dry, firm, correctly shaped and free of loose material, dust, mud, vegetation and other matter which may impair adhesion or compromise the seal integrity.

The Contractor shall sweep the surface immediately prior to priming or sealing and shall remove all surplus granular material from the adjacent existing seal to prevent lamination or loss of adhesion at seal overlaps.

Application and Tie-Ins
All sealing work shall overlap the existing sealed wearing course areas by not less than 300mm, to ensure a waterproof connection between the new work and existing wearing course. The Contractor shall maintain appropriate traffic control and shall undertake additional rolling, sweeping and aftercare as required to embed aggregate and remove loose stone from the trafficked surface.

Finished Surface
The completed seal shall present a uniform texture and appearance, shall be free from streaking, flushing, tearing, fatty patches, bare areas and loose aggregate. The sealed wearing course shall provide a smooth and safe interface with the adjoining pavement surface.

Line marking is not included in this treatment unless expressly stated elsewhere in the Contract.

SECTION 7 – CONCRETE AND DRAINAGE WORKS

7.1 GENERAL REQUIREMENTS FOR CONCRETE AND DRAINAGE WORKS

The Contractor shall ensure that all WUC relating to concrete and drainage construction are delivered in accordance with the requirements detailed in this Technical Specification and the QRA Treatment Guide.

For all concrete and drainage works the Contractor shall identify existing services, maintain drainage through the site, and provide all temporary drainage, dewatering and protection measures necessary to keep the works stable and to prevent erosion, scour, flooding or damage to adjoining assets during construction.

Replacement drainage structures shall be reinstated to a size, arrangement and hydraulic function commensurate with the pre-disaster asset unless the drawings or Superintendent direct an equivalent or updated arrangement.

All excavations required for the installation of pipes, box culverts, end walls and concrete works shall be kept to the minimum practical extent necessary for safe construction and shall be backfilled with approved material placed and compacted in controlled layers.

7.2 RECONSTRUCT REINFORCED CONCRETE

The Contractor shall reconstruct damaged reinforced concrete assets including but not limited to floodways, batter protection, aprons, cutoff walls, slabs, end walls, footpaths or similar works where the approved treatment requires replacement rather than local repair.

The work shall include, but not be limited to:

- demolition and removal of damaged concrete and any unsound adjoining material;
- preparation of the base and interfaces with existing work;
- placement and fixing of reinforcing steel, formwork, dowels, jointing materials and other embedded items as required;
- supply, placement, compaction, finishing and curing of concrete; and
- backfilling and reinstatement of adjoining surfaces and materials where required.

Demolition and Preparation
The Contractor shall saw cut or otherwise neatly define the limits of demolition where the new work adjoins sound existing concrete. Unsound material shall be removed to expose a firm and suitable base. Existing reinforcement to remain shall be cleaned and preserved, and new reinforcement shall be lapped, dowelled or otherwise connected as required to achieve a sound structural tie.

Concrete and Reinforcement
The Contractor shall submit the proposed concrete mix design to the Superintendent five working days prior to the commencement of concrete work on site. The concrete mix strength and properties shall be in accordance with the contract and/or applicable TMR or Australian Standards, whichever is the more onerous.

Reinforcement, formwork and construction and expansion joints shall comply with the requirements of the Contract and/or the applicable TMR or Australian Standard requirements and the approved drawings or standard details, whichever is the more onerous. The Contractor shall ensure reinforcement is securely fixed in position, cover is maintained and all embedded items are accurately located prior to pouring concrete.

Concrete Quality, Reinforcement Inspection and Slump Testing
Concrete works shall be inspected and recorded in accordance with Clause 1.2 Quality and Conformance and the Contractor’s endorsed ITP.

The Contractor shall include the following minimum Hold Point and Witness Point in its ITP for reinforced concrete works:

Work Stage	Inspection Type	Requirement
Steel reinforcement, dowels, formwork, cover, embedded items and prepared base prior to concrete placement	Hold Point	Concrete shall not be placed until the Superintendent has inspected the work and released the Hold Point
Slump testing of each delivered concrete batch	Witness Point	The Contractor shall give the Superintendent reasonable opportunity to witness slump testing prior to concrete placement.

HP **Hold Point:** The Contractor shall provide not less than 48 hours notice when the steel reinforcement inspection Hold Point is ready for inspection, unless otherwise agreed by the Superintendent.

Slump testing shall be undertaken for each delivered batch of concrete prior to placement. The Contractor shall record the slump result, batch details, delivery docket number, concrete mix, time of batching, time of delivery and location of placement within the relevant ITP records.

Concrete shall not be placed if the slump result is outside the specified or approved mix tolerance, if the concrete has exceeded the allowable delivery or placement time, or if the Superintendent reasonably considers that the concrete is not suitable for placement.

No concrete cylinders, compressive strength testing or indirect tensile strength testing is required for concrete works under this Contract unless advised otherwise by the Superintendent. Concrete conformity shall be demonstrated by the approved mix design, delivery dockets, slump testing, inspection records, ITP records, placement records, photographic records, and compliance with the specified placement, compaction, finishing and curing requirements.

Finishing and Curing

Concrete shall be placed, compacted and finished so the completed work matches the lines, levels, thicknesses and surface finish of the pre-disaster asset or the approved reconstruction standard. The Contractor shall cure the concrete for the required period and by the method appropriate to the concrete mix used and site and/or weather conditions. The Contractor shall protect all concrete work from traffic, premature loading, drying, wetting or impact damage during curing.

Interfaces and Reinstatement

Any connection to existing concrete shall be neatly formed and dowelled or otherwise tied in where required to provide continuity. Adjoining pavement, shoulders, batters, drains and protection works disturbed by the reconstruction shall be reinstated to ensure the repaired works are protected and a safe road environment is maintained for all users.

7.3 REPAIR WITH FLOWABLE CONCRETE

The Contractor shall undertake repairs with flowable concrete where voids, undermining or local loss of support has occurred around bridges, culverts, headwalls, aprons, protection works or other structures and the approved treatment requires filling or support rather than full reconstruction.

The work shall include, but not be limited to:

- preparation of the void or repair area, including removal of loose material and provision of suitable formwork, shutters, plugs or containment as required;

- supply and placement or pumping of approved flowable concrete to completely fill the void;
- finishing and curing as necessary to prevent shrinkage cracking, washout or loss of material; and
- removal of temporary restraints or plugs only when the repair has stabilised sufficiently to prevent loss of fill.

Preparation of Repair Area
The Contractor shall ensure that the repair area is suitably prepared and that all loose, unstable or washout-prone material is removed prior to placement. Any drainage paths, weepholes, culvert cells or other openings intended to remain functional shall be protected so that they are not blocked by the flowable concrete.

Placement
Flowable concrete shall be placed in a controlled manner so that the void is completely filled without displacing sound structural elements, creating excessive pressure on the existing infrastructure or allowing segregation, leakage or washout. Where pumping is used, the Contractor shall control pump pressure and sequencing to suit the condition of the structure being repaired.

Protection and Finished Work
The completed repair shall provide the intended support or void filling function and shall not adversely affect drainage performance, future maintenance access or the behaviour of adjoining protection works. Any excess material shall be trimmed off neatly and the work area shall be left clean and stable on completion.

7.4 TABLE DRAINS AND TAIL OUT DRAINS

The Contractor shall undertake table drain reshaping where a separate table drain treatment has been specified and where the required work is not already included in adjoining formation grading or gravel resheeting works.

All table drain works shall ensure the effective collection and discharge of surface water to prevent ponding, erosion or damage to the adjacent road surfaces and infrastructure.

Extent of Works
The scope of works includes, but is not limited to:

Cleaning: Removal of accumulated silt, debris, and vegetation that obstructs the flow within the table drains. Cleared material shall be disposed of in a manner approved by the Superintendent.

Repair: Repair of eroded or undermined sections of the table drains. This includes backfilling of scoured areas with approved materials to reinstate the original formation.

Reconstruction: Where required, reconstruction of table drains to ensure uniform depth and alignment is achieved. This shall involve re-excavation, shaping, and stabilisation of drain batters.

Reprofiling: Reprofiling of table drains to restore the correct cross-sectional shape, gradient, and longitudinal fall. The reprofiled drain shall maintain a minimum gradient to ensure effective drainage and shall be matched to adjacent road formation levels.

Drain Alignment and Shape
The reshaped table drain shall match the existing or approved drain alignment, longitudinal grade and cross-sectional form to the extent practicable. The Contractor shall maintain a neat and regular drain section and shall ensure that the completed drain captures runoff from the adjacent shoulder or formation without allowing water to pond on the roadway or bypass the drain.

All table drains shall be constructed with a minimum base width of 1 meter, where practical, and side slopes not steeper than 1:3. Drain depth shall be maintained to a minimum of 150mm below the adjacent road formation to ensure effective water collection.

Tail Out Drains
The Contractor shall ensure that existing tail out drains present within the treated length are cleaned, repaired and reprofiled to allow captured water in the table drains to be directed away from the road. The reinstated tail out drain entrance shall be profiled in a manner which prevents water from bypassing it and flowing further along the road. The tail out drain shall be re-profiled in a manner which prevents water from re-entering the road formation further downstream.

This treatment does not include formation of new tail out drains unless expressly directed by the Superintendent.

Limits of Treatment
This treatment does not include import of material, addition of water, compaction, heavy deposits of silt requiring bulk excavation, or filling of major scour requiring bulk fill. Where large deposits of silt or major scour are encountered, the Contractor shall notify the Superintendent so that the work may be addressed under the appropriate separate treatment item.

Completed Work
On completion, table drains shall be free draining and neatly tied into adjoining drains, culverts, floodways, access culverts and natural discharge points. The completed work shall not leave spoil windrows, flow blockages or unstable batters within the road corridor.

Inspection and Approval
The Contractor shall notify the Superintendent when repaired table drains are ready for inspection. All completed works shall be inspected and approved by the Superintendent prior to progressing to subsequent construction activities.

Measurement and Payment
Payment for cleaning, repairing, reconstructing, and reprofiling table drains shall be made in accordance with the applicable rates in Schedule K1 – Contract Works Pricing Schedule. The tendered rate shall include all costs associated with labour, materials, plant, overheads, and any other resources necessary to complete the specified works.

7.5 DESILT DRAIANGE STRUCTURE – REMOVAL OF SILT AND DEBRIS

The Contractor shall undertake desilting of drainage structures to remove accumulated silt, sediment and debris and to restore the free flow capacity of culverts, pipes, pits and similar drainage structures.

The work shall include, but not be limited to:

- cleaning and flushing of the drainage structure using hand tools, water pressure blasting, pull-through equipment, plant or other suitable means;
- removal of lodged silt, debris and obstructions from the structure and its immediate inlet and outlet zones to the extent necessary to restore function;
- disposal of removed material at an approved location clear of drainage flow paths; and
- leaving the cleaned structure and surrounding area safe, tidy and free draining.

Cleaning Methods
The Contractor shall use methods appropriate to the type and condition of the drainage structure. The Contractor shall take care not to damage pipe walls, culvert cells, joints, linings, end structures, grouted protection or surrounding formation during the cleaning process.

Extent of Desilting
Desilting shall extend sufficiently into the inlet and outlet zones to remove any local blockage or trapped sediment that would materially reduce the hydraulic capacity of the structure. This treatment does not include excavation of major silt deposits within drains or waterways beyond the immediate structure area where separate bulk excavation may be required.

Disposal of Removed Material
Removed material shall not be left where it may wash back into the structure, block drainage or create a nuisance to adjoining land or maintenance operations. Removed material shall be disposed of off site by the Contractor at an approved location.

The Contractor shall leave the work area in a condition that is safe for all road users, does not promote future erosion and allows stormwater flow from future storm events.

7.6 REPAIR DRAINAGE STRUCTURE – EXCAVATE, REPAIR AND REINSTATE

The Contractor shall repair drainage structures where culvert or RCBC units have separated, shifted, settled, been undermined or otherwise require excavation, repair and reinstatement rather than complete replacement.

The work shall include, but not be limited to:

- excavation to expose the affected structure;
- lifting, resetting, realigning, jointing, packing, grouting or otherwise repairing the structure as required;
- backfilling with suitable material and compaction around and over the structure;
- reinstatement of pavement, shoulders, batters and drains disturbed by the work; and
- restoration of drainage through the structure and its inlet and outlet zones.

Excavation and Exposure
The Contractor shall excavate only to the extent necessary to safely expose the affected structure and shall support adjoining formation and structure components so that additional damage does not occur. Existing utility services shall be identified and protected throughout the repair works in accordance with the requirements of the asset owner.

Repair and Reinstatement
The Contractor shall repair the structure so that the line, level, jointing and hydraulic function are restored. Any voids, scour or local loss of support encountered around the structure shall be made good with suitable material, concrete or flowable fill, as appropriate to the approved repair method.

The trench base shall be prepared to the required line and level and shall provide uniform support for the pipe or box culvert. Any soft, loose or unsuitable foundation material shall be removed and replaced before pipe or box culvert installation proceeds. Bedding material shall be placed and shaped so that the installed pipe or box culvert is fully supported over its intended bearing area.

Backfill placed around and over the structure shall be moisture conditioned and compacted to avoid future settlement or loss of support. The placement and compaction of fill material surrounding culvert pipes and box culverts shall be undertaken in accordance with the requirements of the appropriate Australian Standards. Application of the Australian Standards associated with reinstatement shall ensure the haunch, side and overlay zone areas of the structure are protected from damage and provide the required long term support to the structure and road pavement.

Pipe and Box Culvert Joints
Where the Contractor's work uncovers pipes or box culverts which do not have sealed joints, the Contractor shall, where reasonably practicable, install joint seals to help prevent the future ingress of water into the fill

material and the eroding of fill material over time. Pipe and box culvert joint seals shall be suitable for the situation and include options such as rubber rings, sand bands or bitumen impregnated tape.

The Contractor shall ensure that where installed the joint seal shall provide the best possible seal with accumulated dirt and debris removed from the pipe or box units prior to the application of the seal materials.

Finished Requirements
On completion, the repaired structure shall provide a continuous flow path for water and shall be integrated with adjoining end walls, aprons, batters and pavement surfaces.

This treatment excludes complete structure replacement, sprayed seal and separate rock protection unless those items are specifically included elsewhere in the approved scope.

7.7 REPLACE CONCRETE PIPE <600MM DIA.

The Contractor shall supply and replace damaged concrete pipe culverts having nominal diameter less than 600mm where the approved treatment requires full replacement of the pipe unit.

The work shall include, but not be limited to:

- excavation and disposal of the existing damaged pipe and any associated unsound material;
- preparation of the trench base and granular pipe bedding material;
- supply and installation of new reinforced concrete pipe of the specified size and class, including jointing materials;
- installation of pipe backfill support material or other support details where required by the drawings, standard detail or manufacturer's recommendations;
- backfilling and compaction with suitable material; and
- reinstatement of disturbed pavement, formation, shoulders and drains.

Pipe Materials
Replacement concrete pipe shall be of the specified diameter and class and shall comply with the applicable Australian Standard. Pipe joints shall be provided with suitable seals so that infiltration or exfiltration likely to cause erosion or loss of support does not occur.

Excavation and Bedding
The Contractor shall excavate only to the extent necessary to safely expose the damaged culvert structure and shall support adjoining formation and structure components so that additional damage does not occur. Existing utility services shall be identified and protected throughout the repair works in accordance with the requirements of the asset owner.

The trench base shall be prepared to the required line and level and shall provide uniform support for the pipe. Any soft, loose or unsuitable foundation material shall be removed and replaced before pipe installation proceeds. Bedding material shall be placed and shaped so that the installed pipe is fully supported over its intended bearing area.

Pipe Installation and Backfill
The pipe shall be installed to the correct line and grade so that a smooth and continuous flow path is achieved through the culvert. Backfill and surround material shall be placed and compacted in a controlled manner to avoid displacement or damage to the pipe and to provide the required support to the completed installation.

Backfill placed around and over the structure shall be moisture conditioned and compacted to avoid future settlement or loss of support. The placement and compaction of fill material surrounding pipes shall be undertaken in accordance with the requirements of Australian Standard AS3725 Design for Installation of buried Concrete Pipes. Application of the Australian Standards associated with reinstatement shall ensure the

haunch, side and overlay zone areas of the structure are protected from damage and provide the required long term support to the pipe and road pavement.

Finished Requirements
On completion, the culvert shall provide a continuous flow path for water and shall be integrated with adjoining end walls, aprons, batters and pavement surfaces.

Related Works
Replacement of associated headwalls, end walls, scour protection or sealing works is not included in this treatment unless those items are separately listed in the approved scope.

7.8 REPLACE END WALL <600MM PIPE OR RCBC

The Contractor shall replace damaged or displaced end walls associated with pipes or RCBC units of less than 600mm diametre equivalent size where the approved treatment requires full replacement of the end structure.

The work shall include, but not be limited to:

- removal and disposal of the existing damaged end wall structure;
- preparation of the base and interfaces with the existing pipe or culvert unit;
- supply and installation of approved precast units or construction of in-situ concrete end wall, as directed or specified;
- backfilling, compaction and trimming around the completed structure; and
- reinstatement of inlet or outlet shaping disturbed by the work.

Type of End Structure
Unless otherwise specified, the Contractor may propose either precast or in-situ construction provided the proposed solution is compatible with the existing drainage structure, fit for purpose and approved by the Superintendent. Where multiple cells, unusual geometry or other site constraints are present, the Superintendent may direct the type of replacement required.

Excavation and Bedding
The Contractor shall excavate only to the extent necessary to safely expose the damages end wall structure and shall support adjoining formation and structure components so that additional damage does not occur. Existing utility services shall be identified and protected throughout the repair works in accordance with the requirements of the asset owner.

The end wall base shall be prepared to the required level and shall provide uniform support for the end wall. Any soft, loose or unsuitable foundation material shall be removed and replaced before end wall installation proceeds. Bedding material shall be placed and shaped so that the installed end wall is fully supported over its intended bearing area.

Construction Requirements
The completed headwall or end wall shall be securely integrated with the pipe or culvert unit, aligned to the drainage path and founded on a stable base. Concrete, reinforcement, jointing and other materials shall comply with the Contract requirements and applicable standards. Any connection to existing structures shall be neat, durable and watertight to prevent piping erosion around the structure.

Reinstatement and Scour Interface
Backfill around the completed structure shall be compacted so that loss of support or future settlement does not occur. Inlet and outlet shaping shall be reinstated so that flow enters and leaves the structure cleanly.

Separate scour protection works are not included in this item unless expressly included elsewhere in the approved scope.

SECTION 8 – PROTECTION WORKS

8.1 GENERAL REQUIREMENTS FOR PROTECTION WORKS

Protection works shall restore the damaged asset commensurate with the pre-disaster arrangement unless the approved design adopts a contemporary equivalent system to achieve a better value for money outcome.

Geotextile, filter layers, bedding, anchorage, toe keying and the extent of rock or mattress placement shall be sufficient to produce a durable erosion protection system suited to the local hydraulic environment.

~~8.2 CONSTRUCT ROCK MATTRESS~~

~~The Contractor shall construct rock mattress protection where the approved treatment requires a caged rock system to provide erosion protection and stability of drains, culvert inlets and outlets, batters, embankments or other nominated locations.~~

~~The work shall include, but not be limited to:~~

- ~~preparation of the work area and subgrade including removal of debris and accumulated vegetation;~~
- ~~placement of geotextile filter material where specified or directed;~~
- ~~supply and installation of mattress cages, diaphragms, lacing wires, ties and other proprietary components required for the system;~~
- ~~supply, placement, packing and wiring of approved rock within the cages;~~
- ~~anchoring and tying of adjoining units to prevent movement, bulging, opening or bunching; and~~
- ~~all reinstatement work to ensure the surrounding areas and material integrate into the completed structure and surrounding environment.~~

~~Mattress Materials~~

~~The Contractor shall use cage, wire and tie materials suitable for the service environment and compatible with the proprietary system adopted. The rock fill shall be sound, durable and of a grading and size suitable for the basket dimensions and expected hydraulic exposure.~~

~~Foundation Preparation~~

~~The surface on which the mattress is to be placed shall be trimmed to a stable and uniform profile. Any soft, loose or unsuitable foundation material shall be removed and replaced before mattress installation proceeds. Any protrusions and local hollows that would prevent the mattress from bearing evenly shall be corrected prior to placement.~~

~~Bedding material shall be placed and shaped so that the installed mattress is fully supported over its intended area. Geotextile, where required, shall be placed continuously beneath the mattress and overlapped in accordance with the manufacturer's recommendations.~~

~~Installation and Filling~~

~~The Contractor shall assemble, align and fix the mattress units so that they form a continuous and stable protective layer. Rock shall be placed and packed to minimise voids and to produce a neat and even finish without overstressing or distorting the cages. Lacing and internal ties shall be installed as required by the adopted system so that the completed mattress remains stable under design flow conditions.~~

~~Finished Work~~

~~The completed mattress protection shall conform to the specified lines, levels, thickness and extent. The mattress shall be securely tied to adjoining protection works where applicable, and shall not leave exposed edges or unsupported zones likely to unravel, scour or fail in service.~~

8.3 REPAIR STONE PITCHING

The Contractor shall repair damaged stone pitching where the approved treatment requires reinstatement of existing pitched stone protection to margins, batters, retaining faces, culvert end walls, aprons or similar structures.

The work shall include, but not be limited to:

- preparation and cleaning of the damaged area;
- removal of loose, displaced and unsound material;
- supply and replacement of displaced or damaged stone units, bedding and mortar or grout where required to match the existing construction; and
- reinstatement of the pitched surface to a neat, stable and durable finish consistent with the adjoining work.

Existing Work and Matching

The Contractor shall, as far as practicable, match the size, shape, orientation, jointing and finish of the existing stone pitching and shall retain and reuse serviceable displaced stone where approved by the Superintendent. Replacement materials shall be fit for purpose and compatible with the existing work.

Foundation Preparation

The surface on which the stone pitching is to be placed shall be trimmed to a stable and uniform profile so that the repaired pitching is properly supported and integrated with adjoining undamaged areas. Any soft, loose or unsuitable foundation material shall be removed and replaced before stone pitching installation proceeds. Any protrusions and local hollows that would prevent the stone pitching from bearing evenly shall be corrected prior to placement.

Bedding material shall be placed and shaped so that the installed stone pitching is fully supported over its intended area. Geotextile, where required, shall be placed continuously beneath the stone pitching and overlapped in accordance with the manufacturer's recommendations.

Repair Method

Edges of the repair shall be keyed or otherwise tied into the existing work to prevent unraveling, loss of stones or washout of bedding material.

Finished Surface

The completed pitching shall present a neat and stable surface free from rocking stone, open joints, loose bedding and abrupt steps between old and new work. Where the existing pitching cannot be economically or practically reinstated to provide a durable result, the Contractor shall notify the Superintendent for direction prior to proceeding.

8.4 ROCK PROTECTION

The Contractor shall install or reinstate bulk rock protection where the approved treatment requires scour protection to batters, embankments, drains, culvert inlets and outlets, floodways or other exposed locations.

The work shall include, but not be limited to:

- preparation of the work area and removal of loose or undermined material;
- placement of geotextile where specified or directed;
- recovery and reuse of serviceable displaced rock where available and approved;
- supply and placement of approved rock to the required thickness, extent and profile, including toe keying where required; and

- trimming and finishing of the completed protection so that it integrates with adjoining works and drainage paths.

Rock Material
Rock shall be sound, durable and of a size and grading suitable for the anticipated hydraulic exposure and the thickness of protection required. Elongated, fractured, weathered or otherwise unsuitable rock shall not be incorporated into the completed works.

Rock sizes shall be in accordance with the table below:

Rock Size	150 – 300mm minus
Source	Burke and Wills Bridge stockpile site

The Contractor shall be responsible for loading, hauling and placement of rock protection required to deliver the specified works.

Foundation and Geotextile
The surface on which the rock protection is to be placed shall be trimmed to a stable and uniform profile. Any soft, loose or unsuitable foundation material shall be removed and replaced before rock protection installation proceeds. Any protrusions and local hollows that would prevent the rock protection from bearing evenly shall be corrected prior to placement.

Geotextile, where required, shall be placed continuously beneath the rock protection and shall be protected from tearing, puncture and displacement during rock placement. Geotextile shall be overlapped in accordance with the manufacturers specification requirements.

Placement
Rock shall be placed in a controlled manner to achieve interlocking, required thickness and full coverage of the nominated treatment area. The Contractor shall key the rock into the toe and tie into adjoining protection so that the risk of future undermining, edge unraveling and local scour are minimised.

Finished Work
The completed rock protection shall be stable, follow the approved profile and shall not obstruct intended drainage paths or leave exposed geotextile, unsupported edges or local depressions likely to trap water, debris or sediment.

SECTION 9 – ROAD FURNITURE AND DELINEATION

9.1 GENERAL REQUIREMENTS FOR ROAD FURNITURE AND DELINEATION

Road furniture shall be reinstated in numbers, location and general function commensurate with the pre-disaster arrangement, using current standard equivalent systems, products and installation details.

The Contractor shall set out replacement items so that they provide the required offsets, clearances, heights, orientation and performance for the road environment, traffic speed and ensure the safety of all road users.

~~9.2 REPLACE GUARDRAIL~~

~~The Contractor shall supply and replace damaged guardrail and supporting infrastructure where the approved treatment requires reinstatement of a roadside safety barrier system.~~

~~The work shall include, but not be limited to:~~

- ~~removal and disposal of the damaged rail, posts, blockouts, fasteners and other damaged components;~~
- ~~supply and installation of replacement components, including posts, rail elements, spacer blocks, bolts, washers and associated fittings compatible with the existing system;~~
- ~~setting out, alignment, height control and post installation to the requirements of the adopted barrier system;~~
- ~~installation of delineation markers attached to the barrier system in accordance with the required standard and horizontal road geometry; and~~
- ~~reinstatement of disturbed ground.~~

~~Barrier System Requirements~~

~~Replacement components shall be compatible with the existing barrier system or with the system directed by the Superintendent and shall comply with the current applicable roadside barrier standards and manufacturer's requirements.~~

~~The Contractor shall not mix incompatible systems or components without the Superintendent's approval.~~

~~Removal and Installation~~

~~Damaged components shall be removed without causing unnecessary disturbance to adjoining serviceable barrier elements. New posts shall be installed at the required spacing, depth and offset, and rail elements shall be lapped, bolted and tensioned in accordance with the requirements of the adopted system.~~

~~Posts on road structures shall be designed and installed in accordance with the required standards which provide the structural integrity up to and including the adopted Test Level requirement for the insitu road environment.~~

~~Alignment and Finished Work~~

~~The completed barrier shall present a smooth and continuous alignment, correct working height and proper transition into adjoining existing barrier.~~

~~Disturbed shoulders, batters and footings shall be reinstated so that support to the barrier is maintained and no hazard remains to traffic or maintenance operations.~~

~~This item excludes replacement of terminal end treatments unless separately scheduled.~~

9.3 REPLACE GUARDRAIL END TREATMENT

The Contractor shall replace damaged guardrail end treatments where the approved treatment requires replacement of the terminal assembly.

The work shall include, but not be limited to:

- removal and disposal of the damaged end treatment and any incompatible components;
- supply and installation of a complete replacement end treatment compatible with the adjoining guardrail system;
- setting out and installation in accordance with the manufacturer's requirements and the adopted roadside barrier standard;
- installation of delineation markers attached to the barrier system in accordance with the required standard and horizontal road geometry; and
- reinstatement of disturbed ground.

Terminal System Requirements

The replacement terminal shall be of an approved type, compatible with the adjoining guardrail system and suited to the installation conditions and road Test Level requirements. All proprietary components shall be installed strictly in accordance with the manufacturer's requirements, including length of need, post spacing, anchor arrangements, rail height and flare or tangent alignment.

Installation

The Contractor shall ensure that the completed terminal is correctly connected to the adjoining guardrail and that transitions, anchorage and foundation support are properly reinstated. No substitution of individual terminal components shall be made where the adopted system requires complete assembly replacement.

Finished Work

The completed terminal installation shall present a smooth and continuous alignment, correct working height and proper transition into adjoining barrier system.

Disturbed shoulders, batters and footings shall be reinstated so that support to the barrier is maintained and no hazard remains to traffic or maintenance operations.

9.4 REPLACE GUIDE POSTS OR MARKERS

The Contractor shall replace damaged or missing guide posts or delineation markers where the approved treatment requires reinstatement of roadside delineation.

The work shall include, but not be limited to:

- removal and disposal of damaged posts or markers;
- supply and installation of replacement posts or markers, including post, marker plate and fittings where required;
- setting out at the approved spacing, offset and orientation; and
- reinstatement of disturbed ground around the installed post or marker.

Replacement Standard

Guide posts or markers shall be replaced with the current standard equivalent type adopted by the Principal for the road concerned, unless otherwise directed by the Superintendent. The number and location of replacement guide posts shall be commensurate with current standards unless the Contract or Superintendent directs an alternative arrangement.

Installation
Posts shall be installed plumb and to the required embedment depth, offset and height. Marker plates shall face approaching traffic in the correct direction and shall be securely fixed so that they remain visible and serviceable under normal traffic and environmental conditions.

Removal and Replacement
The Contractor may need to remove and replace guideposts to complete the specified works safely and effectively. Existing guideposts requiring removal and replacement shall be agreed in advance with the Superintendent.

The Contractor shall ensure that the method of guidepost removal and replacement used does not damage the post. The Contractor must notify the Superintendent if any damaged and/or missing posts are identified to seek approval for replacement posts to be installed.

Finished Work
On completion, the replacement delineation shall present a neat and consistent roadside delineation and shall not leave loose material, holes or hazards within the shoulder or verge.

9.5 REPAIR ROAD SIGNAGE

The Contractor shall repair existing road signage where the approved treatment identifies the sign assembly as suitable for repair to a durable and compliant condition.

The work shall include, where relevant:

- realignment, resetting or straightening of the existing post and sign assembly;
- tightening, replacement or adjustment of minor fittings, brackets and fasteners where required;
- local reinstatement of disturbed footing or surrounding ground; and
- clean up of the site and disposal of minor waste materials.

Assessment of Repairability
Repair of road signage shall be undertaken where the sign face, post and footing remain suitable for continued service. Where the sign face no longer provides adequate retroreflective performance, the post is materially damaged, or the footing cannot be reinstated to provide a durable result, the Contractor shall notify the Superintendent so that the sign can be considered for replacement under the appropriate separate treatment item.

Repair Work
The Contractor shall ensure the repaired sign is set plumb, correctly oriented to approaching traffic, and securely fixed with all fittings tightened or replaced as necessary. The finished sign shall comply with the required mounting height, lateral clearance, setback and visibility requirements and shall not obstruct drainage, access or the effective use of adjoining road furniture.

Finished Arrangement
On completion, the sign shall be stable, clearly visible and fit for continued service. Disturbed ground around the post footing shall be compacted and trimmed so that no local ponding, trip hazard or maintenance issue remains.

~~9.6 REPLACE SIGN (COMPLETE) - STANDARD ROAD SIGN, INCLUDES POST~~

~~The Contractor shall replace complete standard road sign assemblies where the approved treatment requires replacement of the sign face, post, fittings and footing.~~

~~The work shall include, but not limited to:~~

- removal and disposal of the existing damaged sign assembly;
- supply and installation of the new post, footing, brackets, fixings and sign face;
- setting out and orientation of the sign to achieve the required visibility, clearance and legibility; and
- trimming and compaction of the ground around the completed footing.

Sign Assembly

The replacement sign face shall display the approved sign code, symbol legend or text and shall provide the required retroreflective performance for the road environment. Posts, brackets and fixings shall be suitable for the sign size, wind loading and site conditions and shall comply with the applicable road authority requirements.

Installation

The Contractor shall install the complete sign assembly plumb, correctly oriented to approaching traffic, and securely fixed with all fittings installed and tensioned appropriately. The finished sign shall comply with the required mounting height, lateral clearance, setback and visibility requirements and shall not obstruct drainage, access or the effective use of adjoining road furniture.

Finished Arrangement

On completion, the sign shall be stable, clearly legible and fit for service, with disturbed ground reinstated and all removed materials disposed of from site.

9.7 REPLACE SIGN FACE ONLY - STANDARD ROAD SIGN

The Contractor shall replace sign faces only where the existing post and footing remain serviceable and the approved treatment requires replacement of the damaged or obsolete sign panel only.

The work shall include, but not be limited to:

- removal and disposal of the existing sign face;
- supply and installation of a replacement sign face of the required type, legend text and retroreflective class;
- replacement of brackets and fasteners where required to ensure a secure and durable installation; and
- final adjustment of the sign face to the correct height, offset and orientation.

Existing Post and Fittings

Prior to replacing the sign face, the Contractor shall confirm that the existing post, footings and retained fittings are suitable for continued use. Where the existing support arrangement is not serviceable or compliant, the Contractor shall notify the Superintendent and the sign shall be replaced under the complete sign replacement item unless otherwise directed.

Replacement Face

The replacement sign face shall match the approved sign code, symbol, legend or text and shall provide the required retroreflective performance for the road environment. All brackets, clips and fasteners shall be compatible with the existing post and shall be tightened or replaced as required to provide a secure installation.

Finished Arrangement

The completed sign face shall be correctly oriented to traffic, free from distortion or visible damage, and securely fixed to the existing support so that it provides a neat and durable finished installation.

STANDARD SECTIONS

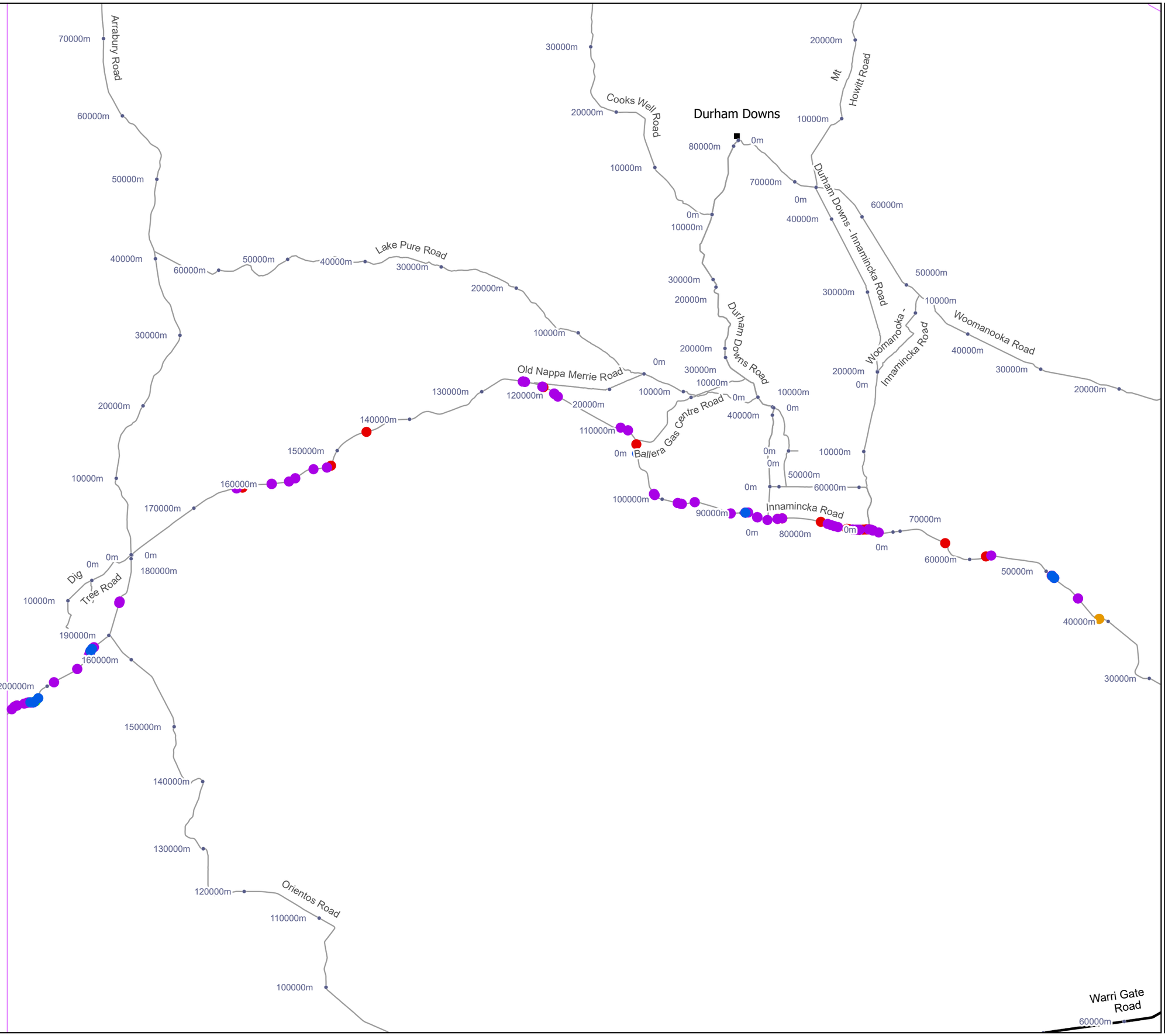
MAIN ROADS TECHNICAL SPECIFICATION

Notwithstanding the requirements of the Technical Specification Clauses, where applicable, the Works Under Contract shall be subject to the following Main Roads Technical Specifications (MRTS). In delivering the Works Under Contract the Contractor shall ensure the requirements of the relevant specification are adhered to, where applicable.

The table below details the MRTS documents relevant to this Contract.

Reference Number	Specification Name
MRTS04	General Earthworks
MRTS05	Unbound Pavements
MRTS11	Sprayed Bituminous Treatments (Excluding Emulsion)
MRTS14	Road Furniture
MRTS17	Bitumen and Multigrade Bitumen
MRTS22	Supply of Cover Aggregate

APPENDIX A – SITE LOCATION MAPS



Bulloo Shire Council

Submission 79

Legend

- City or Town
- Chainage (m)
- Local Road
- Major Road
- Local Government Area

Treatment Category (Code)

- Clearing and Earthworks (BER, BFI, CMD)
- Concrete Works (RFC, RRC)
- Drainage Structures (DDS, RCBC1200, RCBCMORE, RCP600, RDS, RHW1200, RHWMORE)
- Protection Works (RKP)
- Road Furniture and Delineation (RGP, RRS, RSF)
- Sealed Pavement Repairs (BSS, POT, RUGP, HSG, ISS, PRP)
- Unsealed Pavements (GMS, RTD)

Reference Scale: 0
Relative Scale @ A3 size: 1:496,000
Spatial Reference: WGS 1984 (EPSG:3857)

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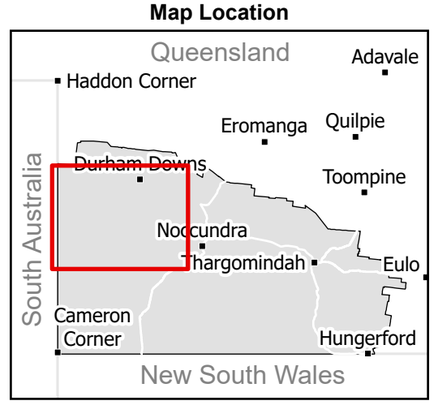
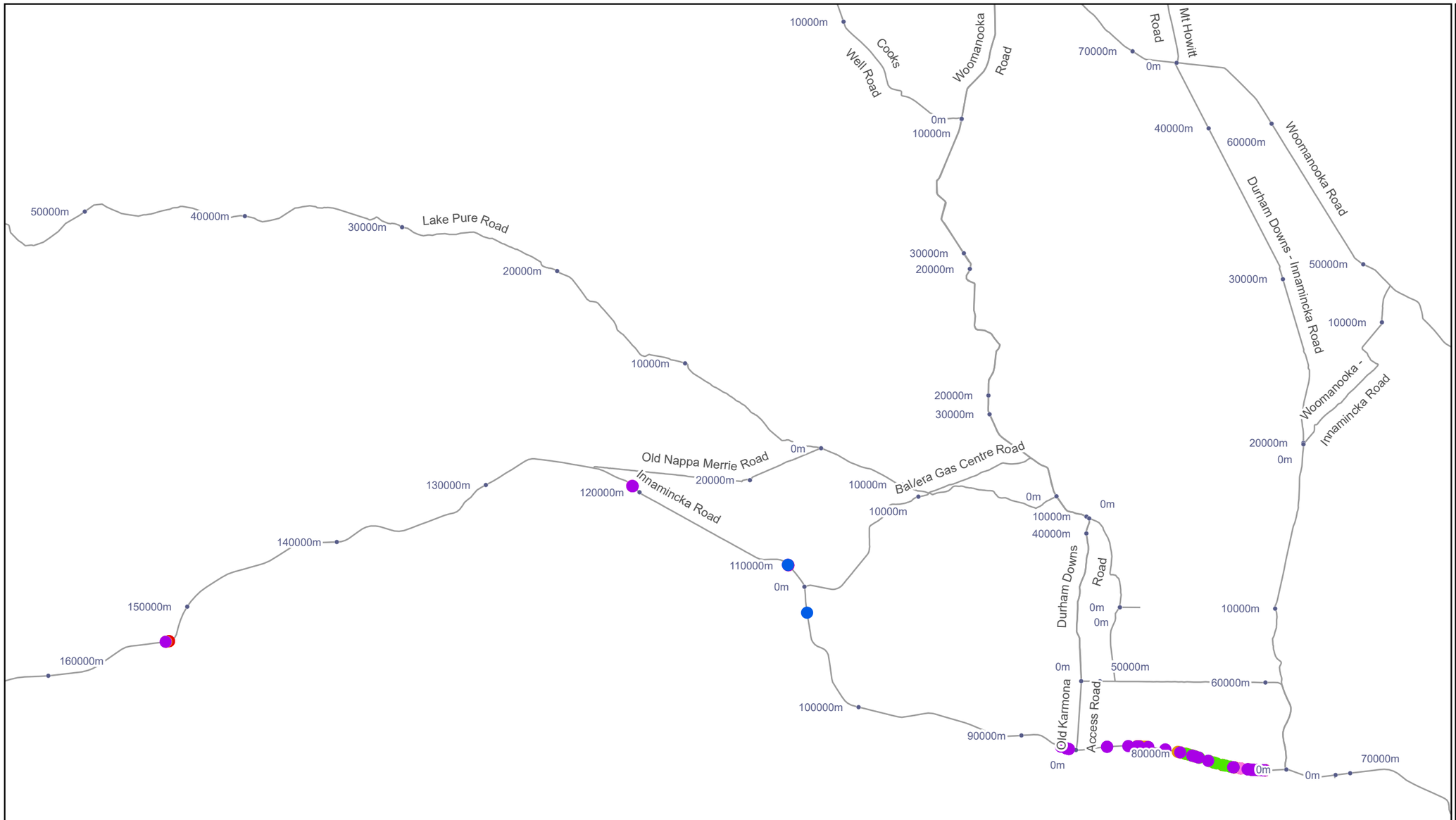
Metres

Disclaimer: Whilst permitting use of the data, Shepherd Services make no representations and give no warranties about its accuracy, reliability, completeness, currency or suitability for a particular purpose, and disclaim all responsibility and liability, (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to use of this data.

Date: 31/08/2026

Map Location





Bulloo Shire Council

Submission 87

Legend

- City or Town
- Chainage (m)
- Local Road
- Major Road
- Local Government Area

Treatment Category (Code)

- Clearing and Earthworks (BER, BFI, CMD)
- Concrete Works (RFC, RRC)
- Drainage Structures (DDS, RCBC1200, RCBCMORE, RCP600, RDS, RHW1200, RHWMORE)
- Protection Works (RKP)
- Road Furniture and Delineation (RGP, RRS, RSF)
- Sealed Pavement Repairs (BSS, POT, RUGP, HSG, ISS, PRP)
- Unsealed Pavements (GMS, RTD)

Reference Scale: 0
Relative Scale @ A3 size: 1:289,000
Spatial Reference: WGS 1984 (EPSG:3857)

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Metres

Disclaimer: Whilst permitting use of the data, Shepherd Services make no representations and give no warranties about its accuracy, reliability, completeness, currency or suitability for a particular purpose, and disclaim all responsibility and liability, (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to use of this data.

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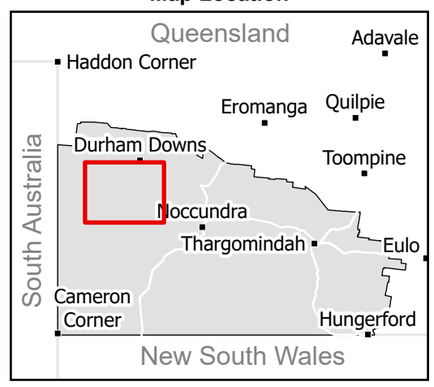
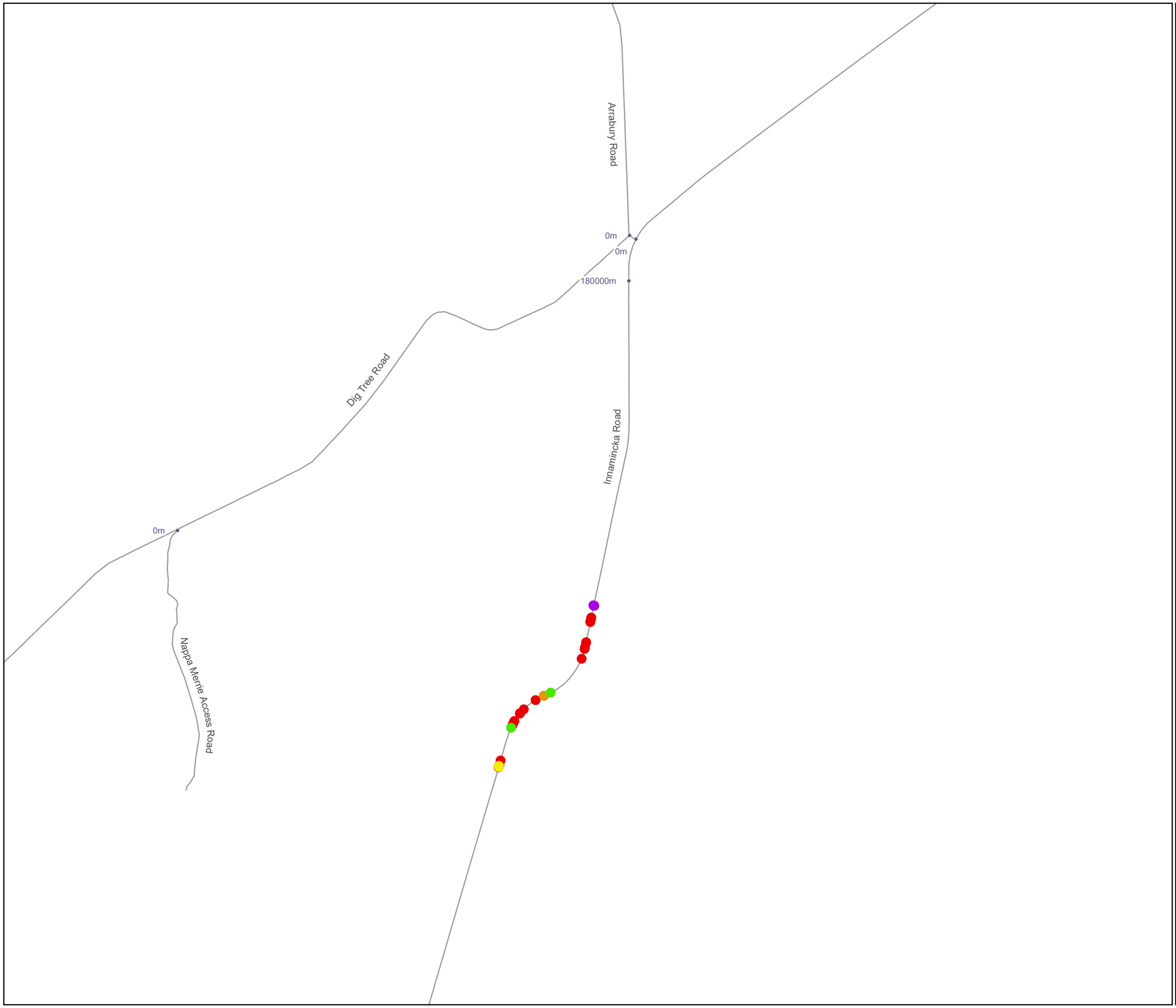
Map Location





Bulloo Shire

Bulloo Shire Council

Submission 81

Legend

- City or Town
- Chainage (m)
- Local Road
- Major Road
- Local Government Area

Treatment Category (Code)

- Clearing and Earthworks (BER, BFI, CMD)
- Concrete Works (RFC, RRC)
- Drainage Structures (DDS, RCBC1200, RCBCMORE, RCP600, RDS, RHW1200, RHWMORE)
- Protection Works (RKP)
- Road Furniture and Delineation (RGP, RRS, RSF)
- Sealed Pavement Repairs (BSS, POT, RUGP, HSG, ISS, PRP)
- Unsealed Pavements (GMS, RTD)

Reference Scale: 0
Relative Scale @ A3 size: 1:42,000
Spatial Reference: WGS 1984 (EPSG:3857)

0 504 1,008 1,512 2,016 2,520
Metres

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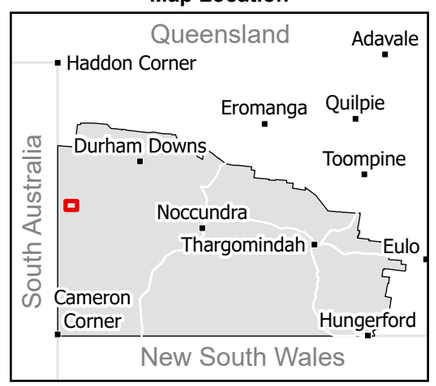
Date: 31/08/2026

Map Location



APPENDIX B – QRA TREATMENT GUIDE

QRA QUEENSLAND RECONSTRUCTION AUTHORITY

Treatment Guide 2020–21



July 2021

Queensland Government

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Foreword

Prepared by the Queensland Reconstruction Authority (QRA), this *QRA Treatment Guide* provides a common set of treatments for the scoping of road reconstruction works following damage by natural disasters.

The treatment list represents the most commonly used treatments across the state. Detail of each treatment is provided to enable consistency of language and a common understanding of treatment inclusions/exclusions. A consistent treatment set also provides for consistency in the methodology for benchmarking local rates.

The guide will be reviewed from time to time to ensure emerging or common treatments are documented.

Treatment list

Category	Reference	Treatment	Unit
Unsealed pavements	USP_LFG	Light formation grading	m
	USP_MFG	Medium formation grading	m
	USP_HFG	Heavy formation grading	m
	USP_HFG50	Heavy formation grading incorporating 50mm of imported material	m^3
	USP_HFG75	Heavy formation grading incorporating 75mm of imported material	m^3
	USP_GR	Gravel resheeting (excludes supply of material)	m^3
	USP_GR100	Gravel resheeting 100mm	m^3
	USP_GR150	Gravel resheeting 150mm	m^3
	USP_GMS	Gravel/material supply	m^3
	USP_RSTD	Reshape table drain (1 side)	m
Sealed pavement repairs	SPR_STB	In-situ stabilisation - including 50mm corrector. Excludes seal	m^2
	SPR_GO	Granular overlay - overlay with imported material (≤150mm). Excludes seal	m^2
	SPR_FBS	Foamed bitumen stabilisation - including 50mm corrector. Excludes seal	m^2
	SPR_RR	Reconstruct unbound granular pavement. Excludes seal	m^2
	SPR_RB	Reconstruct unbound granular base Excludes seal	m^2
	SPR_PRL	Pavement repair - patch unbound pavement failure (≤20m2). Includes 2 coat bitumen seal	m^2
	SPR_POT	Pothole repair ≤1m2	each
	SPR_SCR	Crack repair	m
	SPR_PER	Edge repair	m
	SPR_USF	Reconstruct unsealed shoulder - repair isolated shoulder failure	m^2
	SPR_HSG	Heavy shoulder grading - incorporating 50mm of imported material	m
	SPR_RSAC	Asphalt surfacing, ≤50mm thickness	m^2
	SPR_RSSR	Bitumen spray seal, 2-coat	m^2
Clearing and earthworks	EXC_HVC	Clear mixed debris and remove from site	m^3
	EXC_RSOS	Bulk excavate surplus material and remove from site	m^3
	EXC_RSS	Bulk excavate surplus material to spoil	m^3
	BKF_IMP	Bulk fill - imported	m^3
	BKF_LOC	Bulk fill - local	m^3
Concrete works	CON_KER	Reconstruct concrete kerb	m
	CON_RCN	Reconstruct reinforced concrete	m^3
	CON_RFC	Repair with flowable concrete	m^3

Treatment list (cont)

Category	Reference	Treatment	Unit
Drainage structures	CUL_RP	Repair drainage structure - excavate, repair and reinstate	m
	CUL_SIL	Desilt drainage structure - removal of silt and debris	m^3
	CUL_RBC<600	Replace RCBC, nominal span ≤600mm.	m
	CUL_RBC<900	Replace RCBC, nominal span ≤900mm.	m
	CUL_RBC<1200	Replace RCBC, nominal span ≤1200mm.	m
	CUL_RBC>1200	Replace RCBC, nominal span >1200mm.	m
	CUL_RCP<375	Replace concrete pipe ≤375mm dia.	m
	CUL_RCP<600	Replace concrete pipe ≤600mm dia.	m
	CUL_RCP<900	Replace concrete pipe ≤900mm dia.	m
	CUL_RCP<1200	Replace concrete pipe ≤1200mm dia.	m
	CUL_RCP>1200	Replace concrete pipe >1200mm dia.	m
	CUL_RHW<375	Replace head/end wall ≤375mm pipe or RCBC	unit
	CUL_RHW<600	Replace head/end wall ≤600mm pipe or RCBC	unit
	CUL_RHW<900	Replace head/end wall ≤900mm pipe or RCBC	unit
	CUL_RHW<1200	Replace head/end wall ≤1200mm pipe or RCBC	unit
	CUL_RHW>1200	Replace head/end wall >1200mm pipe or RCBC	unit
Protection works	RK_RKP	Rock protection	m^3
	RK_STP	Repair stone pitching	m^2
	RK_MAT	Construct rock mattress	m^3
Road furniture and delineation	RFD_RGET	Replace guardrail end treatment	each
	RFD_RG	Replace guardrail	m
	RFD_RP	Replace guide posts or markers	each
	RFD_RRS	Repair road signage	each
	RFD_RSF	Replace sign face only - standard road sign	each
	RFD_RCS	Replace sign (complete) - standard road sign, includes post	each
	RFD_RLN	Reinstate line marking	m
Other	OTHER	Other - including structures, retaining items	lump sum

Unsealed roads overview

Treatment selection for the restoration of unsealed roads should be commensurate with the classification of the asset and its maintained condition prior to the disaster. Unsealed road assets are generally classified as either unformed, formed or gravelled.

Unformed road

An unformed road is a road that has no constructed or maintained formation, or surface drainage.



Figure 1 - Unformed road

Unformed roads may have had vegetation intentionally cleared, or may simply be the result of vehicles travelling the same path over a period of time.

Unless the asset owner is able to demonstrate an appropriate level of maintenance has occurred (bulk-fill or clearing), works to unformed assets are generally ineligible. The treatments applicable to a maintained unformed road are bulk fill of scours using local material (BKF_LOC), clearing of mixed debris (EXC_HVC) and bulk excavation to spoil (EXC_RSS).

Formed road

A formed road is a road that has a constructed formation and, in most cases, table drains. A formed road is often constructed through grading of materials from the road reserve onto the road, resulting in the creation of table drains and a shaped formation.

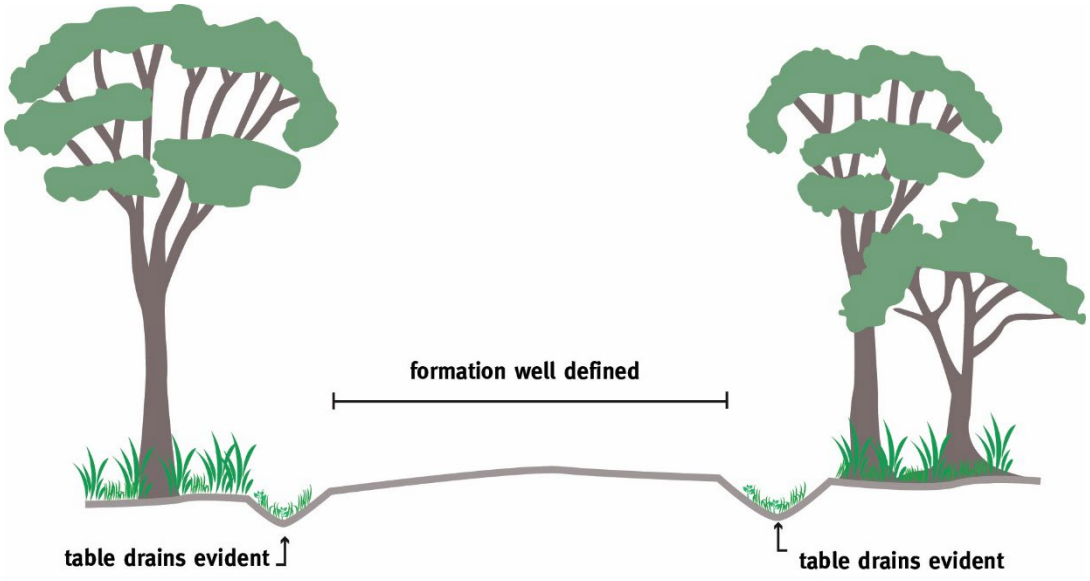

Figure 2 - Formed road

As no gravel is generally imported for this road classification, the import of gravel is generally not eligible. Where scouring or loss of material has occurred, bulk fill using local material (BKF_LOC) from within the road corridor should be used.

Where sufficient material remains on the road, but loss of shape has occurred, the treatment should be limited to a **Medium formation grading (USP_MFG)**.

Where rutting and loss of shape is extensive, **Heavy formation grading (USP_HFG)** may be considered. The displaced formation material should be recovered from the table drains or within the road corridor.

Gravel road

A gravel road is a road that has had a layer of gravel imported, compacted and maintained atop the formation. Gravel may vary from a material won from borrow pits, nearby ridges or quarries.

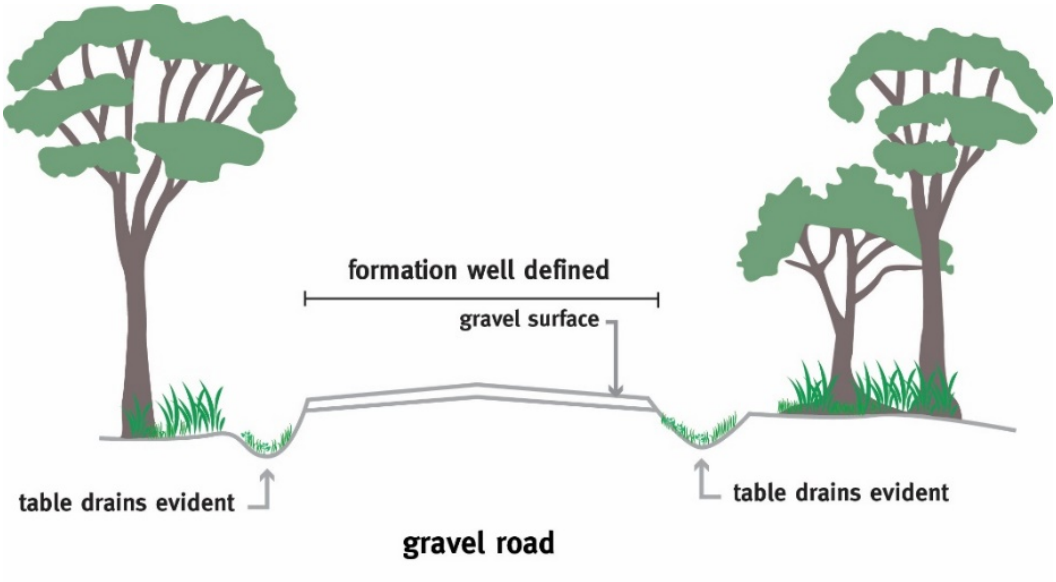

Figure 3 – Gravel road

Where rutting, loss of shape and gravel displacement has resulted, a **Medium formation grading (USP_MFG)** should be nominated. Where displaced gravel is suitable and recoverable from drainage lines, it should be used as a component of the Medium formation grading.

Where the displaced gravel is non-recoverable/heavily contaminated and extensive damage to the roadway has resulted, import of material will likely be required. Considerations of the use of Heavy Formation Grade and Gravel resheet treatments is provided below:

- Where gravel remains on the roadway (i.e. ≥25mm thickness), but gravel displacement and loss of shape is evident, a **Heavy formation grading (USP_HFG)** + **Gravel/material supply (USP_GMS)** should be nominated. The gravel supply volume should be commensurate with the volume of material lost as a result of the event. A minimum gravel thickness of 75mm (inclusive of gravel remaining on roadway) is generally required for constructability purposes
  - to achieve this, where ≥25mm thickness remains on the roadway, a **Heavy formation grading incorporating 50mm of imported material (USP_HFG50)** should be nominated
  - where loss of gravel as a result of the event exceeded 50mm, a Heavy formation grading incorporating 75mm of imported material **(USP_HFG75)** may be nominated
  - where loss of gravel as a result of the event exceeded 75mm, a Gravel Re-sheet should be nominated
- Where loss of both shape and gravel is evident, and no useable gravel remains on the roadway (i.e. <25mm depth), a **100mm Gravel resheet (USP_GR100)** should be nominated. A **150mm Gravel resheet (USP_GR150)** may be nominated only where supported by asset registers and maintenance records. Imported material should be consistent with material in-place pre-disaster or material currently utilised by the asset owner in maintaining the asset.
- Where loss of shape has occurred, but no loss of gravel is evident as a result of the event, a **Heavy formation grading (USP_HFG)** should be nominated. As gravel loss is not evident, Gravel/material supply is not eligible.
- Where road subgrade is exposed, loss of shape is general only (wear and tear), and no loss of gravel is evident as a result of the event, works would be considered ineligible.

Unsealed road treatments

All grading and resheet treatments include the following work operations:

- site establishment and disestablishment of all plant, labour and materials
- establishment and disestablishment of traffic control
- determination of work area
- removal and re-instatement of roadside furniture (e.g. guide posts, signs etc.) as required
- clean up of site and disposal of any waste/removed material in accordance with applicable State Government legislation or Local Government by-laws

Reference	Treatment	Unit
USP_LFG	Light formation grading	m
USP_MFG	Medium formation grading	m
USP_HFG	Heavy formation grading	m
USP_HFG50	Heavy formation grading incorporating 50mm of imported material	m^3
USP_HFG75	Heavy formation grading incorporating 75mm of imported material	m^3
USP_GR	Gravel resheeting (excludes supply of material)	m^3
USP_GR100	Gravel resheeting 100mm	m^3
USP_GR150	Gravel resheeting 150mm	m^3
USP_GMS	Gravel/material supply	m^3
USP_RSTD	Reshape table drain (1 side)	m

Light formation grading

For gravel roads damage as a result of an activated event, a **Light formation grading** is often undertaken during the emergency works period to restore rideability prior to restoration works. Where the road is formed only (not gravelled), and loss of shape and material is minor only, a **Light formation grading** may be appropriate for restoration works to restore shape.

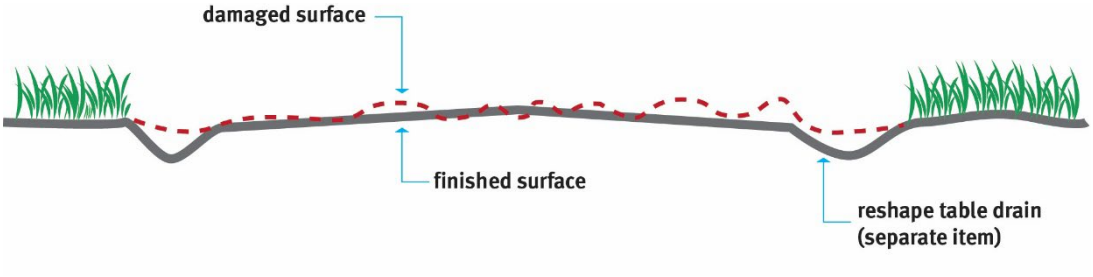

Figure 4 – Light formation grading

Treatment:	**USP_LFG**
Unit of measurement:	m
Summary:	Light trimming by grader of unsealed road surface to restore rideability
Description:	Light trimming by grader of the existing roadway to fill holes and other depressions.
Exclusions:	Scarifying, compaction, import of water or material, table drain works (separate item)
Indicative plant:	Grader

Medium formation grading

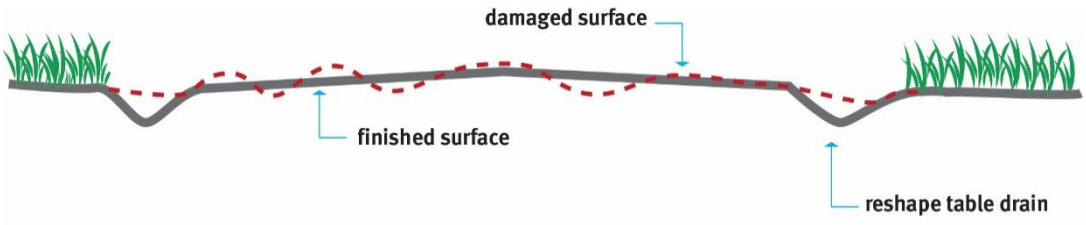

Figure 5 – Medium formation grading

Treatment:	**USP_MFG**
Unit of measurement:	m
Summary:	Grading of unsealed roadway to reinstate the pre-disaster profile.
Description:	Grading to restore the road surface to pre-disaster profile and condition. Includes roughening of up to 50mm of roadway top (by grader), clearing and grubbing to remove light vegetation and grass, recovery of suitable material from table drains (by grader), incorporation of water and compaction.
Exclusions:	No import of material
Indicative plant:	Grader, water truck, rollers

Heavy formation grading

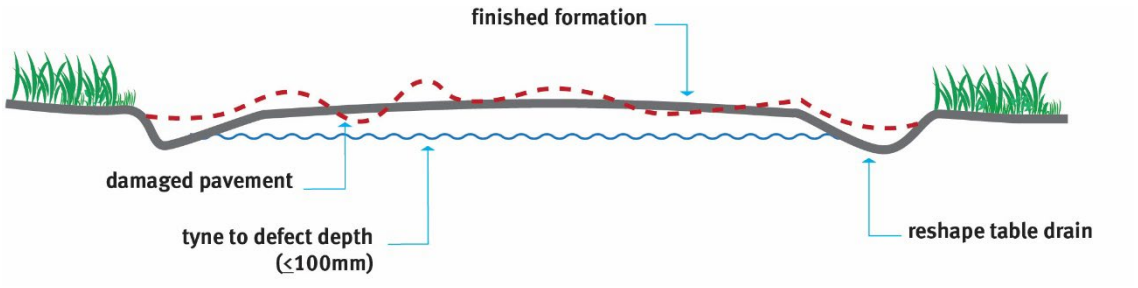

Figure 6 – Heavy formation grading

Treatment:	**USP_HFG** **USP_HFG50** **USP_HFG75**
Unit of measurement:	m
Summary:	Reinstatement of formation and profile.
Description:	Clearing and grubbing and recovery of suitable material from table drains (by grader), tyne ≤100mm depth (150mm if supported by depth of rutting), incorporation of additional gravel/material (excluding USP_HFG), trimming, and compaction.
Exclusions:	USP_HFG (only) – No gravel/material supply
Indicative plant:	Grader, water truck, roller, front end loader and truck (for disposal of unsuitable)

Gravel/material supply

Treatment:	**USP_GMS**
Unit of measurement:	m^3
Summary:	Supply of gravel/material to the work site.
Description:	Supply of gravel/material to the work site for inclusion with material reclaimed through grading operations. Top up gravel/material only. Imported gravel/material should be consistent with material in-place pre-disaster or material which the asset owner currently uses for maintenance in the area.
Exclusions:	Excludes all operations for placement, trimming and rolling
Indicative plant:	Gravel truck, front end loader/excavator

Gravel resheeting

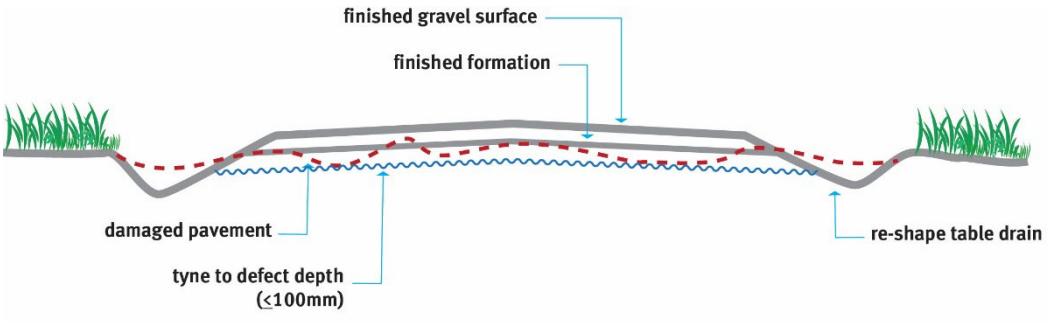

Figure 7 – Gravel resheeting

Treatment:	**USP_GR** **USP_GR100** **USP_GR150**
Unit of measurement:	m^3
Summary:	Addition of imported gravel/material to the roadway to reinstate the running surface and correct profile.
Description:	Preparation of the formation through Heavy Formation Grading. Supply and spreading of imported gravel/material. Imported material should be consistent with material in-place pre-disaster or material which the asset owner currently uses for maintenance in the area.
Exclusions:	Additional material required for incorporation in **the Heavy Formation Grading** (prior to resheet) is not included. Any additional volume should be included as **Gravel/material supply or Bulk Fill** **USP_GR** (only) relates to the work operations of resheeting and excludes import of gravel/material. **USP_GR** should be used in conjunction with **USP_GMS** (Gravel/material supply) where works are being undertaken by Council day labour (**USP_GR** item estimate based on benchmark rate) and a commercial supply for material is required (**USP_GMS** rate based on market pricing)
Indicative plant:	Grader, truck, water truck, roller, front end loader and truck (for disposal of unsuitable)

Reshape table drain

Consequential re-shaping of existing table drains/vee drains, through recovery of displaced material, will occur when carrying out **Medium Formation Grade, Heavy Formation Grading** or **Gravel Resheet** operations. In these instances, no separate item is required for the inclusion of re-shaping existing table drains.

In the absence of, or where not included in the adjacent pavement work item, a separate treatment item, and evidence of event related damage demonstrating silting, scour or blockage of the table drains is required for inclusion.

Treatment:	**USP_RSTD**
Unit of measurement:	m
Summary:	Cleaning and reshaping of existing surface drains adjacent the road formation (allowance for one drain only)
Description:	Reshaping of existing table drains by grader.
Exclusions:	No scarify, no import of material, no addition of water, no compaction
Indicative plant:	Grader, front end loader and job truck (for disposal of unsuitable)

Where minor scours or minor deposits of silt exist along a drainage line, repair should be achieved through reshaping of the table drain.

Where drainage lines are filled with large deposits of silt, **Bulk Excavate** (**EXC_RSOS** or **EXC_RSS**) should be nominated to allow for removal of the material.

Where major scours exist along a drainage line, **Bulk Fill** (**BKF_IMP** or **BKF_LOC**) should be nominated to allow for filling of the scours.

Sealed pavement repairs

All sealed pavement repair treatments include the following work operations:

- site establishment and disestablishment of all plant, labour and materials
- establishment and disestablishment of traffic control
- determination of work area
- removal and re-instatement of roadside furniture (e.g. guide posts, signs etc.) as required
- clean up of the site and disposal of any waste/removed material in accordance with applicable State Government legislation or Local Government by-laws

Treatment selection for the restoration of sealed pavements should be appropriate to the road type, functionality, pre-disaster condition and Value for Money outcomes with reference to site specific constraints.

Reference	Treatment	Unit
SPR_STB	In-situ stabilisation - including 50mm corrector. Excludes seal	m^2
SPR_GO	Granular overlay - overlay with imported material (≤150mm). Excludes seal	m^2
SPR_FBS	Foamed bitumen stabilisation - including 50mm corrector. Excludes seal	m^2
SPR_RR	Reconstruct unbound granular pavement. Excludes seal	m^2
SPR_RB	Reconstruct unbound granular base Excludes seal	m^2
SPR_PRL	Pavement repair - patch unbound pavement failure (≤20m2). Includes 2 coat bitumen seal	m^2
SPR_POT	Pothole repair ≤1m2	each
SPR_PER	Edge repair	m
SPR_SCR	Crack repair	m
SPR_USF	Reconstruct unsealed shoulder - repair isolated shoulder failure	m^2
SPR_HSG	Heavy shoulder grading - incorporating 50mm of imported material	m
SPR_RSAC	Asphalt surfacing, ≤50mm thickness	m^2
SPR_RSSR	Bitumen spray seal, 2-coat	m^2

Localised damage

Pothole repair

Where a small pavement failure in the form of a pothole emerges (generally under a wheel path), a **Pothole repair** may be considered appropriate.

Treatment:	**SPR_POT**
Unit of measurement:	each
Summary:	Repair of localised damage with asphalt or premix
Description:	Removal of water and debris, cut back to sound pavement and squaring of sides. Fill with asphalt-mix and compact to match adjacent road surface.
Exclusions:	Line-marking
Indicative plant:	Work truck, pneumatic hammer, cutting saw, blower, plate compacter

Where multiple potholes appear in close proximity, a **Pavement Repair** may be better suited.

Pavement repair

Where a road is damaged in isolated areas, a **Pavement Repair** is considered the most appropriate treatment.

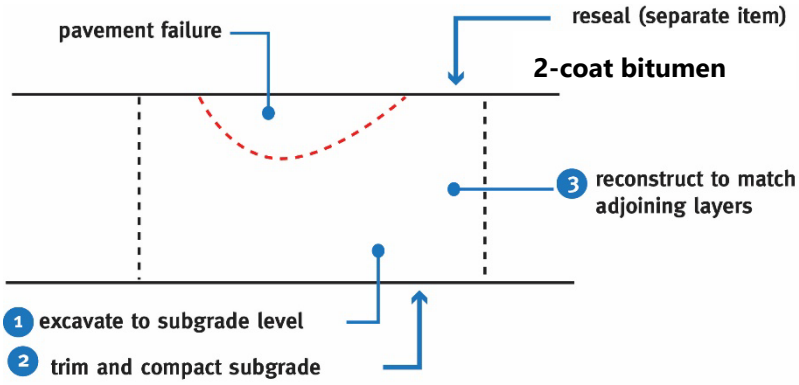

Figure 8 – Pavement repair

Treatment:	**SPR_PRL**
Unit of measurement:	m^2
Summary:	Removal and reconstruction of isolated pavement failures
Description:	Removal of failed pavement material, reasonable allowance for replacement of unsuitable, compaction of subgrade, import and placement of unbound granular material in layers to match adjoining. 2-coat bitumen seal.
Exclusions:	nil
Indicative plant:	Excavator, truck, grader, water truck, rollers

Edge repair

Where damage to the edge of seal and/or pavement has occurred due to trafficking in saturated conditions or excessive volumes or velocities of water, **Edge repair** (**SPR_PER**) should be nominated.

Treatment:	**SPR_PER**
Unit of measurement:	m
Summary:	Repair of pavement edge failures
Description:	Supply and application of tack coat; and supply, application and compaction of asphalt or premix.
Exclusions:	linemarking
Indicative plant:	Roller or manual compaction, truck, flowcon (where required)

Crack repair

Where damage to the road seal has developed as a result of shrink/swell of the underlying material during saturation/inundation, **Crack repair** (**SPR_SCR**) should be nominated.

Treatment:	**SPR_SCR**
Unit of measurement:	m
Summary:	Repair of pavement seal cracking
Description:	Clean out (blow) of loose material, partial filling, application of crack seal to manufacturers specifications, application of cover material.
Exclusions:	linemarking
Indicative plant:	Hand tools and minor compaction equipment

Continuous damage

Where continual or long lengths of damage has occurred across the width of the road, a full-width treatment is likely to be required. Selection of an appropriate full-width treatment requires consideration of the pavement failure mechanism, the usefulness of the in-situ pavement, the surrounding environment and any constructability issues (e.g. plant or material availability).

Where limited damage to the underlying subgrade has occurred, but loss of shape is extensive, excavation of existing pavement material may pose significant risk. Risks include subgrade disturbance and subsequent need for treatment or replacement, or interference with drainage or utilities. In such circumstances, **in-situ stabilisation (SLP_STB)** or reworking of the existing pavement (tyne, shape and compact – select **USP_HFG**) may be suitable. Where additional pavement strength is required, and where still able to represent a value for money option compared to the use of pavement reconstruction, a **Granular Overlay (SPR_GO)** may also be considered.

In-situ stabilisation

Where limited damage to the underlying subgrade has occurred, but loss of shape is extensive, **In-situ stabilisation** may be appropriate**. In-situ Stabilisation** using cement, fly ash or hydrated lime or **Foamed bitumen stabilisation** allow repair of damaged pavement without exposing the subgrade.

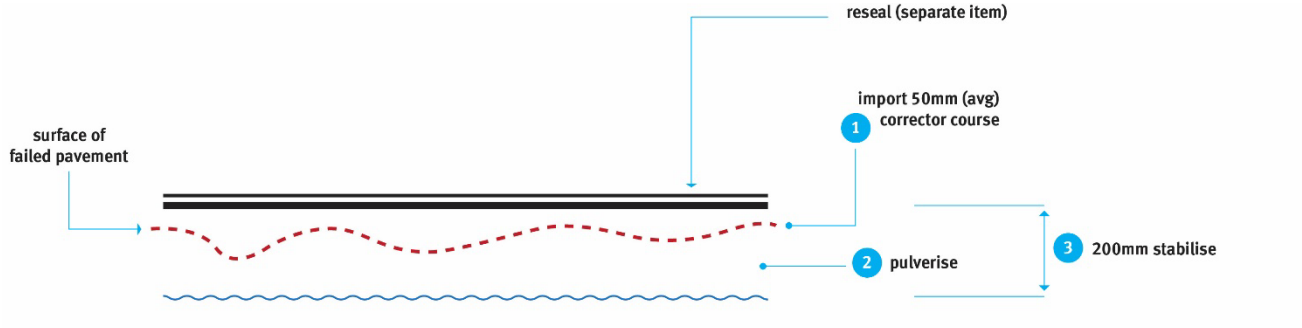

Figure 9 – In-situ stabilisation

Treatment:	**SPR_STB** (in-situ stabilisation), **SPR_FBS** (Foamed bitumen stabilisation)
Unit of measurement:	m^2
Summary:	In-situ stabilisation of base course material
Description:	Removal of material not suitable for stabilisation, import and spreading of unbound granular material to replace unsuitable and for shape-correction (50mm), pulverisation, supply and spreading of stabilising agents, stabilisation, compaction and curing
Exclusions:	Excludes all seal items
Indicative plant:	Gravel truck, grader, stabiliser, water truck and roller, cement spreader/ prime spreader (for prime or foam bitumen stabilisation)

The selection of an appropriate stabilisation type requires consideration of plant availability, suitability of work force, environmental conditions and constitution of the existing pavement.

In some cases, the condition and composition of the existing pavement may preclude in-situ stabilisation treatments. The availability of plant, size of the site and future performance of the stabilised pavement in the context of the surrounding pavement should also be considered when selecting insitu-stabilisation and the stabilisation type.

Granular overlay

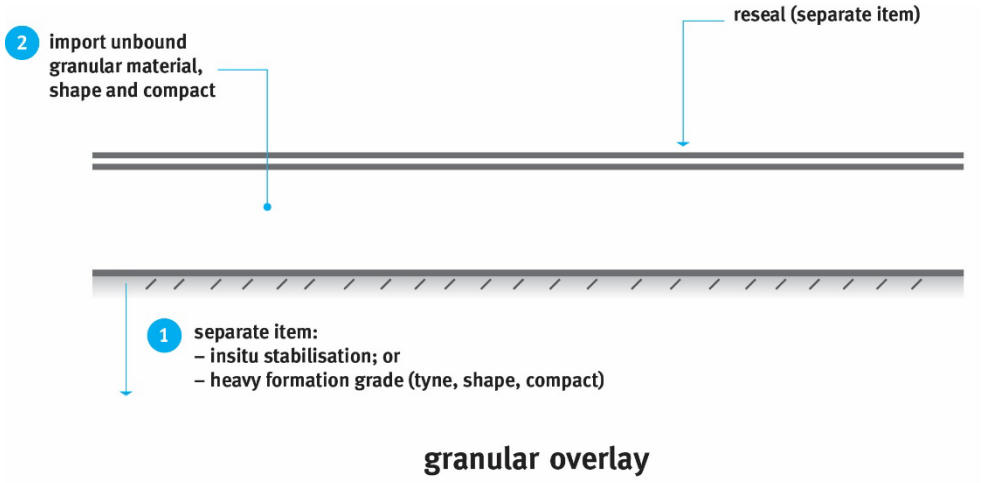

Figure 10 – Granular overlay

Treatment:	**SPR_GO**
Unit of measurement:	m^2
Summary:	Overlay of treated pavement with unbound granular material
Description:	Import and spreading unbound granular material, shaping and compaction, ≤150mm thickness
Exclusions:	Excludes treatment of in-situ material/preparation of subbase (refer alternative treatments)
	Excludes formation work in accommodation of extra pavement height
	Excludes all seal items
Indicative plant:	Gravel truck, grader, water truck, roller

The use of an overlay can reduce material spoilage, reduce risks of exposing unsuitable subgrade and reduce the duration of construction. However, the use of a granular overlay may not be appropriate in the event of vertical constraints (e.g. afflux/flow issues, short site, tie-in to structures, kerb and channel or property accesses) or horizontal constraints, for example insufficient formation width to accommodate overlay. In these circumstances, a treatment maintaining existing levels may need to be adopted.

The overall cost of the pavement treatment, including the treatment of the in-situ material, and formation works to accommodate the overlay, as well as the granular overlay itself needs to be considered in comparison to the likely cost of the alternative, Reconstruct Road treatment.

Reconstruct unbound granular pavement

Where extensive subgrade failure or material contamination has occurred, and the use of an overlay or stabilised layer cannot economically or suitably bridge the failure, reconstruction of the road will likely be required.

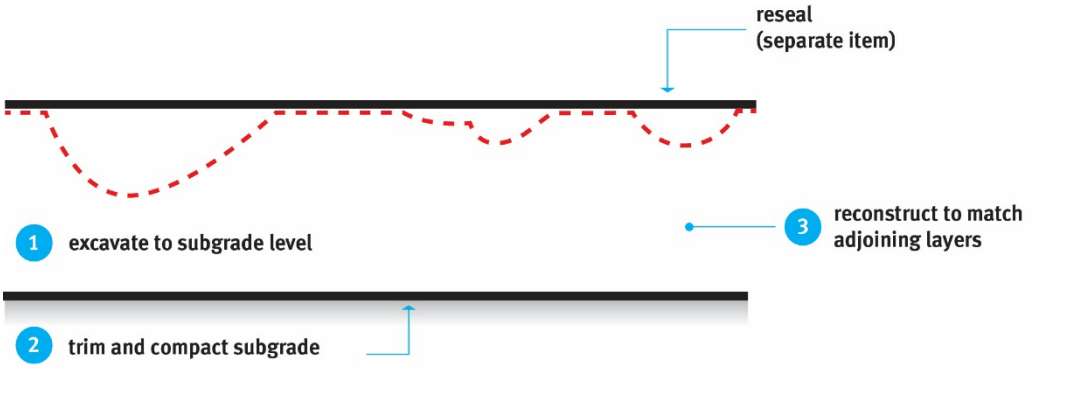

Figure 11 – Reconstruct unbound granular pavement. Excludes seal

Treatment:	**SPR_RR**
Unit of measurement:	m^2
Summary:	Removal and reconstruction of failed pavement
Description:	Removal of failed pavement material, reasonable allowance for replacement of unsuitable, compaction of subgrade, import and placement of unbound granular material in layers to match adjoining
Exclusions:	Excludes all seal items (separate item)
Indicative plant:	Excavator, truck, grader, water truck, roller

Reconstruct unbound granular base

Where road pavement damage such as peeling/stripping of seal (due to overland flow) or shallow pavement failures (i.e. above subgrade) have occurred, **Reconstruct unbound granular base** should be nominated. This treatment allows for repair/replacement of the top 150mm of unbound pavement ready for sealing.

Treatment:	**SPR_RB**
Unit of measurement:	m^2
Summary:	Reconstruction of isolated base course pavement failures
Description:	Removal of failed pavement material (where material cannot be reused), compaction of underlying pavement layer, import and placement of unbound granular base pavement to match adjoining
Exclusions:	Excludes all seal items
Indicative plant:	Excavator/profiler, truck, grader/skid-steer, water truck, roller

Shoulders

Shoulder scour

Where damage to the verge/shoulder (clear of the table drain) has occurred, and no damage sustained to the sealed roadway, a shoulder restoration treatment will likely be appropriate.

Where a pavement failure has occurred and the damage is localised, **Reconstruct unsealed shoulder** should be nominated. Where loss of shoulder material or scour has occurred due to overland or longitudinal flow, a **Heavy shoulder grading** should be nominated.

Reconstruct unsealed shoulder

For treatment of localised areas of severely damaged or contaminated shoulders or verges, **Reconstruct Unsealed Shoulder** should be used. This item is quantified in m² and should be used for localised repairs only.

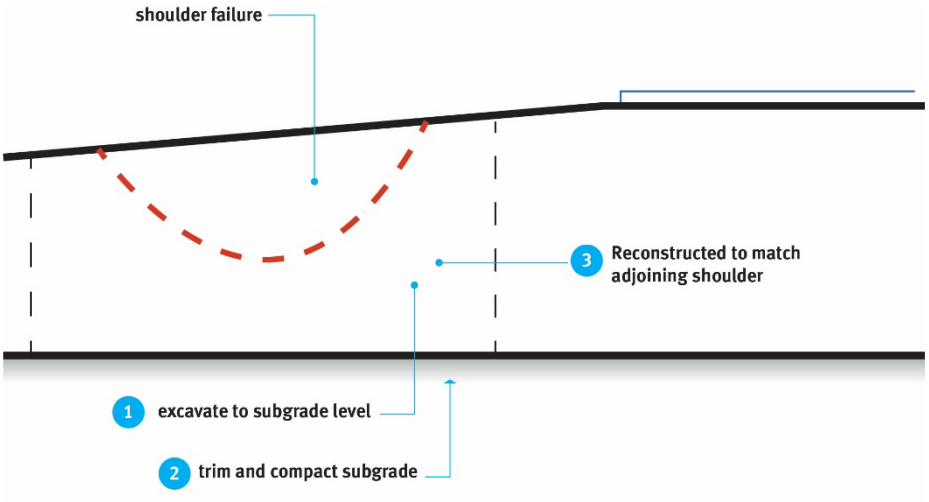

Figure 12 – Reconstruct unsealed shoulder

Treatment:	**SPR_USF**
Unit of measurement:	m²
Summary:	Placement and compaction of gravel into isolated potholes in a gravel shoulder or verge
Description:	Removal of failed material, reasonable allowance for replacement of unsuitable, compaction of subgrade, supply, placement and compaction of granular material
Exclusions:	No reshaping of table drains – refer USP_RSTD
	Brooming of adjacent seal only, no works to sealed pavement
Indicative plant:	Excavator, water truck, roller, truck, grader

Heavy shoulder grading

Where loss of shoulder material or scour has occurred due to overland or longitudinal flow, a **Heavy shoulder grading** should be carried out.

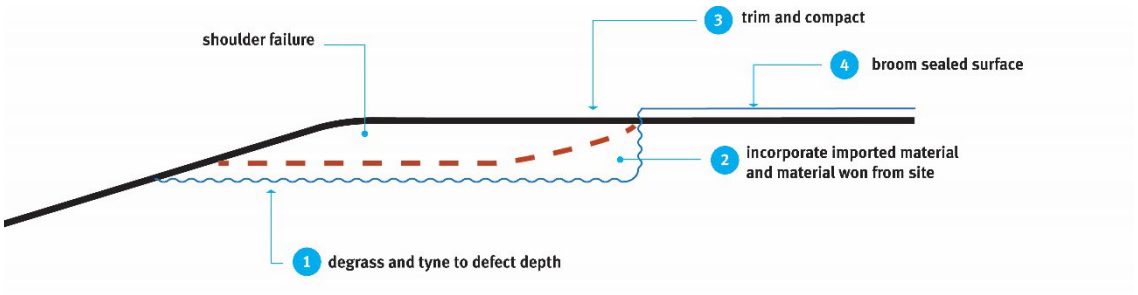

Figure 13 – Heavy shoulder grading

Treatment:	**SPR_HSG**
Unit of measurement:	m
Summary:	Grading of unsealed shoulder to reinstate correct profile
Description:	Reinstatement of formation and profile Includes recovery of material from adjacent table drains where appropriate (by grader), incorporation of additional 50mm top up material, tyne ≤100mm depth, trimming and rolling, and brooming of adjacent sealed surface. Where material additional to the included 50mm is required, include Gravel/material supply
Exclusions:	No works to sealed pavement
Indicative plant:	Grader, water truck, roller

Pavement seals

Where a road reconstruction, granular overlay or stabilisation has occurred as part of the restoration works, a seal will need to be applied. An asphalt surface or bitumen spray seal (2-coat) should be nominated consistent with the pre-disaster road surface.

Asphalt surfacing, ≤50mm thickness

Treatment:	**SPR_RSAC**
Unit of measurement:	m^2
Summary:	Asphalt surfacing ≤50mm
Description:	Preparation of the existing surface, supply and application of tack coat, supply, laying and compaction of asphalt, line spotting as required
Exclusions:	Line-marking
Indicative plant:	Truck, paver, roller

Bitumen spray seal, 2-coat

Treatment:	**SPR_RSSR**
Unit of measurement:	m^2
Summary:	Bitumen spray seal, 2-coat to local applied standard (including prime)
Description:	Preparation of the existing surface, supply, carting, heating and application of prime and spraying of bitumen seal (including cutter and additive), supply, carting, spreading and rolling of pre-coated aggregate, line spotting as required. Includes allowance for lapping of seal with existing.
Exclusions:	Line-marking
Indicative plant:	Truck, bitumen sprayer, roller

Clearing and earthworks

All clearing and earthworks treatments include the following work operations:

- site establishment and disestablishment of all plant, labour and materials
- establishment and disestablishment of traffic control
- determination of work area
- clean up of the site and disposal of any waste/removed material in accordance with applicable State Government legislation or Local Government by-laws

Reference	Treatment	Unit
EXC_HVC	Clear mixed debris and remove from site	m^3
EXC_RSOS	Bulk excavate surplus material and remove from site	m^3
EXC_RSS	Bulk excavate surplus material to spoil	m^3
BKF_IMP	Bulk fill - imported	m^3
BKF_LOC	Bulk fill - local	m^3

Bulk fill

Where scour or loss of road or formation has occurred, a bulk fill item should be selected to reinstate the road to natural surface level (for unformed roads), top of formation (for formed roads) or top of road subgrade (for gravel and sealed roads or table drains).

Where material can be sourced within vicinity of the works, **Bulk fill - local** (**BKF_LOC**) should be selected.

Where material, consistent with that lost, is unable to be won within vicinity of the works, **Bulk fill - imported** (**BKF_IMP**) should be selected, allowing for the purchase of general fill and haulage.

For a gravel or sealed road, bulk fill items should be used to reinstate material to subgrade level, and an appropriate pavement treatment selected to reinstate the road to the pre-disaster condition.

Treatment:	varies (**BKF_LOC**; **BKF_IMP**)
Unit of measurement:	m^3
Summary:	Bulk fill to localised scours
Description:	Sourcing and cartage of bulk fill material (varies as per below), preparation of underlying material, placement, incorporation (where required) and compaction
Exclusions:	Bulk fill material should be selected consistent with the displaced/scoured material.
Indicative plant:	Excavator (or backhoe or loader), grader (where dispersed over large areas), truck, water cart, roller

Excavation

Where mixed debris (including rocks, gravel, sand or silt mixed with vegetation or rubbish) has been deposited on a roadway or drainage lines, **Clear mixed debris and remove from site** (**EXC_HVC**) should be nominated.

Treatment:	**EXC_HVC**
Unit of measurement:	m^3
Summary:	Clear mixed debris and remove from site
Description:	Clearing of mixed debris material, loading and removal from site.
Exclusions:	Reshaping of roadway or drainage lines
Indicative plant:	Excavator (or backhoe or loader), grader (where dispersed over large areas), truck

Where large deposits of silt have been deposited on the roadway or within drainage lines, **Bulk excavate** (**EXC_RSOS** or **EXC_RSS**) should be nominated.

Treatment:	varies (**EXC_RSOS**, **EXC_RSS**)
Unit of measurement:	m^3
Summary:	Bulk excavation of surplus material
Description:	Excavation of surplus material, loading and removal from site (**ESC_RSOS**) or to spoil (**EXC_RSS**)
Exclusions:	Reshaping of roadway or drainage lines
Indicative plant:	Excavator (or backhoe or loader), truck, grader (where dispersed over large area of roadway)

Concrete works

Damage to concrete may include scouring, undermining, structural cracking, or total loss as a result of large or intense rainfall events.

All concrete works treatments include the following work operations:

- site establishment and disestablishment of all plant, labour and materials
- establishment and disestablishment of traffic control
- determination of work area
- clean up of the site and disposal of any waste/removed material in accordance with applicable State Government legislation or Local Government by-laws

Reference	Treatment	Unit
CON_KER	Reconstruct concrete kerb	m
CON_RCN	Reconstruct reinforced concrete	m^3
CON_RFC	Repair with flowable concrete	m^3

Reconstruct concrete kerb

Where damage to concrete kerb is suffered as a result of scour, or rendered unusable as a result works to underlying pavement, **Reconstruct concrete kerb** should be nominated. The kerb should be consistent with the pre-disaster kerb/adjoining sections.

Treatment:	**CON_KER**
Unit of measurement:	m
Summary:	Reconstruct concrete kerb
Description:	Saw cut and remove existing kerb. Prepare base and extrude/construct kerb. Backfill with suitable material
Exclusions:	Revegetation/turfing, removal/realignment of utilities.
Indicative plant:	Concrete saw, pavement breaker, bobcat/backhoe, kerb & channel machine, concrete agitator

Reconstruct reinforced concrete

Reinforced concrete assets include floodways, concrete batters, margins and footpaths. Damage to reinforced concrete assets including scouring, undermining, debris impact or total loss can occur during large or intense rainfall events. Where the damage suffered necessitates replacement, **Reconstruct reinforced concrete** should be nominated.

Treatment:	**CON_RCN**
Unit of measurement:	m^3
Summary:	Reconstruct reinforced concrete
Description:	Demolish and remove existing concrete. Prepare base, form and position reinforcing. Pour concrete, cure (where required) and finish surface. Backfill adjoining surface (where required).
Exclusions:	Revegetation/turfing, removal/realignment of utilities
Indicative plant:	Job truck, concrete saw, pavement breaker, bobcat/backhoe, and concrete agitator.

Repair with flowable concrete

Damage often results around bridges and drainage structures during disasters as a result of high velocity waters. **Repair with flowable concrete** may be used for filling of undermined reinforced concrete or for repair of grouted rock protection.

Treatment:	**CON_RFC**
Unit of measurement:	m^3
Summary:	Repair with flowable concrete
Description:	Pouring/pumping of flowable concrete to fill voids.
Exclusions:	Rock protection
Indicative plant:	Job truck, concrete truck, concrete pump

Drainage structures

Damage to drainage structures including scouring, undermining, debris impact, separation of units, silting or total loss can occur during large or intense rainfall events.

All drainage structure treatments include the following work operations:

- site establishment and disestablishment of all plant, labour and materials
- establishment and disestablishment of traffic control
- determination of work area
- the removal and re-instatement of roadside furniture (e.g. guide posts, signs etc.) as required
- clean up of the site and disposal of any waste/removed material in accordance with applicable State Government legislation or Local Government by-laws

Reference	Treatment	Unit
CUL_RP	Repair drainage structure - excavate, repair and reinstate	m
CUL_SIL	Desilt drainage structure - removal of silt and debris	m^3
CUL_RBC‹600	Replace RCBC, nominal span ≤600mm.	m
CUL_RBC‹900	Replace RCBC, nominal span ≤900mm.	m
CUL_RBC‹1200	Replace RCBC, nominal span ≤1200mm.	m
CUL_RBC›1200	Replace RCBC, nominal span ›1200mm.	m
CUL_RCP‹375	Replace concrete pipe ≤375mm dia.	m
CUL_RCP‹600	Replace concrete pipe ≤600mm dia.	m
CUL_RCP‹900	Replace concrete pipe ≤900mm dia.	m
CUL_RCP‹1200	Replace concrete pipe ≤1200mm dia.	m
CUL_RCP›1200	Replace concrete pipe ›1200mm dia.	m
CUL_RHW‹375	Replace head/end wall ≤375mm pipe or RCBC	unit
CUL_RHW‹600	Replace head/end wall ≤600mm pipe or RCBC	unit
CUL_RHW‹900	Replace head/end wall ≤900mm pipe or RCBC	unit
CUL_RHW‹1200	Replace head/end wall ≤1200mm pipe or RCBC	unit
CUL_RHW›1200	Replace head/end wall ›1200mm pipe or RCBC	unit

Where access issues exist, or there is uncertainty in quantities or cost of works, a market price may need to be sought to establish an estimate of cost following design.

Repair drainage structure

Where separation of culvert cells has occurred, but no damage to the pipes eventuated, **Repair drainage structure** should be nominated. Repair drainage structure allows for excavation of the drainage structure, resetting of the units, backfill with suitable material (representing value for money) and reinstatement of pavement.

Treatment:	**CUL_RP**
Unit of measurement:	m
Summary:	Repair drainage structure
Description:	Excavate, repair and reinstate drainage structure, backfill with suitable material and reinstatement of pavement.
Exclusions:	Pavement seal, import of rock protection
Indicative plant:	Excavator, lifting equipment, truck, roller

Clearing of culverts, pipes and pits

Where a culvert has been blocked, **Desilt drainage structure** should be selected to remove the silt and debris from the culvert where it is not possible to undertake the clearing by an excavator or small plant.

Treatment:	**CUL_SIL**
Unit of measurement:	m^3
Summary:	Clearing of culverts, pipes and pits
Description:	Cleaning or flushing of blocked culverts from debris or silt by hand tools, water pressure blasting or pull-back/pull-through system.
Exclusions:	Import of materials, import of rock protection, removal of spoil.
Indicative plant:	Watercart, high pressure water blaster, generator

Replace concrete pipe/RCBC

Where replacement of a drainage structure is required, replacement of concrete pipe/RCBC should be to the same size/arrangement as per pre-disaster. Where replacement to pre-disaster size and arrangement is not possible due to current requirements of cover, or not economical (due to obsolete sizes or combination of pipes) a concrete pipe/RCBC arrangement with a cross-sectional area equivalent to the pre-disaster arrangement should be nominated.

Treatment:	various (**CUL_RBC‹600, CUL_RBC‹900, CUL_RBC‹1200, CUL_RBC›1200, CUL_RCP‹600, CUL_RCP‹900, CUL_RCP‹1200, CUL_RCP›1200**)
Unit of measurement:	m
Summary:	Replacement of concrete pipes/RCBC
Description:	Excavate and dispose of existing drainage structure. Prepare base, form and construct base slab (where required) supply and place drainage structure, replace sand band (where required), backfill with suitable material and reinstate pavement.
Exclusions:	Head/end walls (end structures), scour protection, pavement seals
Indicative plant:	Excavator/ backhoe, hydraulic breaker, lifting equipment, truck, roller, concrete truck, concrete agitator. Concrete vibrator, rotary screed & concrete pump (if required)

Replace head/end wall

Where a culvert/RCBC end structure has been dislodged or damaged by an activated event, or rendered unusable as a result of reconstruction work to the adjoining culverts, replacement of the head/end wall should be nominated.

Unless nearby concrete works (floodways, margins etc.) is being undertaken, it is often more economical to use pre-cast units. Where multiple cell arrangements are in-place, this may not be possible or efficient due to manufacturing time etc. It is the responsibility of the asset owner to identify the best value for money solution for replacing the head/end wall.

Treatment:	various (**CUL_RHW‹600, CUL_RHW‹900, CUL_RHW‹1200, CUL_RHW›1200**)
Unit of measurement:	unit
Summary:	Replacement of culvert/RCBC end structures
Description:	Remove and dispose of existing end structure. Prepare base, supply and install OR construct end structure, backfill with suitable material.
Exclusions:	Pavement works, scour protection
Indicative plant:	Excavator, hydraulic breaker, lifting equipment, truck, roller

Protection works

Damage to rock protection (including mass/dumped rock, rock pitching and rock mattress) can occur from result of high velocity flows, undermining or debris impact during large or intense rainfall events.

Subject to the ability to achieve value for money, damaged protection works should be restored commensurate with pre-disaster arrangements. Where reconstruction to pre-disaster arrangements is uneconomical (due to material or labour availability), or not feasible (due to obsolete construction techniques) contemporary techniques may be employed.

All protection works treatments include the following work operations:

- site establishment and disestablishment of all plant, labour and materials
- establishment and disestablishment of traffic control
- determination of work area
- removal and re-instatement of roadside furniture (e.g. guide posts, signs etc.) as required
- preparation of work area
- placement of geotextile (where required)
- construction/placing of protection works
- clean up of the site and disposal of any waste/removed material in accordance with applicable State Government legislation or Local Government by-laws\

Reference	Treatment	Unit
RK_RKP	Rock protection	m^3
RK_STP	Repair stone pitching	m^2
RK_MAT	Construct rock mattress	m^3

Rock protection

Bulk rock for scour protection is commonly affected by large inundation or high intensity events due to its interaction high velocity waters. **Rock protection**, although low-tech, can be effective in mitigating against high velocity waters and requires limited preparation of the underlying surface prior to placement. Rock type should be selected subject to local availability.

Treatment:	**RK_RKP**
Unit of measurement:	m^3
Summary:	Rock protection works (bulk)
Description:	Preparation of work area, placement of geotextile (where required), recovery of displaced rock, placement of bulk rock.
Exclusions:	Pavement works
Indicative plant:	Excavator, truck

Where adequate sized rock in not economically viable, alternative solutions such as rock-mattresses may be considered.

Stone pitching

Stone pitching, whilst not commonly used in modern construction, is commonly encountered in older head-walls, margins, retaining walls and abutments. The extent of damage and the likely cost of repair needs to be considered. Alternatives such as shotcreting, gabions, rock-mattress, reinforced concrete or pre-cast elements may need to be considered where a repair option with stone pitching is not economically viable.

Treatment:	**RK_STP**
Unit of measurement:	m^2
Summary:	Repair stone pitching
Description:	Preparation of work area, cleaning of damaged area, supply and replacement of displaced or damaged stone and pitching.
Exclusions:	Pavement works
Indicative plant:	Truck, excavator, concrete agitator

Rock mattresses

Where bulk rock relies on its mass to withstand scouring waters, **rock mattresses** provide an alternative, able to utilise smaller rock through a caging system. Although more labour intensive, and requiring the purchase/manufacturing of cages, significantly less rock, and more easily sourced rock (due to size) may result in a value for money alternative.

Treatment:	**RK_MAT**
Unit of measurement:	m^3
Summary:	Installation of rock-mattresses
Description:	Preparation of the work area, placement of geotextile (where required), supply and installation cages, recovery of displaced rock, filling and wiring of cages.
Exclusions:	Pavement works
Indicative plant:	Excavator, truck

Note: Environmental conditions leading to corrosion of the cages/wires and estimated flow velocities (with potential to lead to failure of the cage or bunching of the rock) needs to be considered during specification.

Road furniture and delineation

Road furniture is often damaged during natural disasters as a result of flood waters or debris impacts. Where damage has occurred to road furniture, the number of units replaced should be commensurate with the pre-disaster arrangements, however a current standard of the pre-disaster system/item should be used.

All road furniture works include the following work operations:

- site establishment and disestablishment of all plant, labour and materials
- establishment and disestablishment of traffic control
- determination of work area
- removal of damaged road furniture
- re-instatement of roadside furniture
- clean up of the site and disposal of any waste/removed material in accordance with applicable State Government legislation or Local Government by-laws

Following restoration of sealed pavements, line-marking is generally required. Line marking should be consistent with either the adjoining sections of road or the pre-disaster arrangement.

Reinstate line-marking includes the following work operations:

- establishment and disestablishment of traffic control
- determination of work area
- cleaning the pavement in the work area (as required)
- spotting/symbolising
- application of marking material

Reference	Treatment	Unit
RFD_RGET	Replace guardrail end treatment	each
RFD_RG	Replace guardrail	m
RFD_RP	Replace guide posts or markers	each
RFD_RRS	Repair road signage	each
RFD_RSF	Replace sign face only - standard road sign	each
RFD_RCS	Replace sign (complete) - standard road sign, includes post	each
RFD_RLN	Reinstate line marking	m

Where a depth marker or similar has been damaged or destroyed, select **Replace sign (complete**) (**RFD_RCS**).

Other

Where works require engineering investigations/testing or detailed design, **OTHER** should be nominated. This includes landslips, coastal protection, structures, gabions, shotcreting etc.

Reference	Treatment	Unit
OTHER	Other - including structures, retaining items	lump sum

Specifics of the scope should be outlined and priced by the applicant for consideration.

APPENDIX C – SET OUT PEG TEMPLATE

Peg Information Layout



QRA Submission and Line Number

Start Chainage

Finish Chainage

Quantity / Unit
(Damage in unit of measure + length)

Treatment Description Abreviation

Direction Of Work From Peg Location

SHEPHERD
asset management solutions

APPENDIX D – 2012 NAPPA MERRIE BRIDGE APPROACHES DRAWINGS

STATION	EASTING	NORTHING	LEVEL	DESCRIPTION
101	513652.686	6947484.713	70.983	STATION
201	511180.622	6950652.398	57.301	STATION
202	514834.842	6949897.646	67.512	STATION
203	513107.574	6945711.042	79.528	STATION
204	513645.103	6947526.468	69.129	STATION
205	513914.518	6948363.577	59.047	STATION
206	515419.338	6949825.684	57.344	STATION
207	514884.843	6945599.537	58.682	STATION
208	512386.21	6945790.451	73.846	STATION
209	513978.875	6948336.101	57.746	BENCHMARK
103316	513774.411	6947963.933	57.238	PSM
8687F	509945.624	6943370.843	56.748	PSM
87132F	507452.171	6944570.352	52.091	PSM
8687 2A	509945.623	6943370.848	56.727	PSM
87132 2A	507452.183	6944570.358	52.088	PSM

ALS SURVEY DATA PROVIDED HAS AN ACCURACY LEVEL OF 200mm.

SURVEYOR: BOLAND SURVEY & DESIGN

NAPPA MERRIE BRIDGE
LEVEL DATUM: AHD
SOURCE: PSM 103316 - ASSUMED
LOCAL AUTHORITY: BULLOO SHIRE COUNCIL
ZONE 54
MGA CO-ORDINATES

SURVEY CONTAINS BOTH AIRBOURNE LASER SCANNING AND SURVEYOR DATA MERGED TOGETHER.

CONTRACTOR IS TO CONFIRM SURVEY INFORMATION WITH THE ORIGINAL SURVEYOR

NAPPA MERRIE BRIDGE

STN 103316

N

ISSUE FOR CONSTRUCTION

20 10 0 20 40 60 80 100m
SCALE 1:1000m (A1)

SURVEY LEGEND

SYMBOL	DESCRIPTION
53.50	EXISTING CONTOURS (INTERVAL 0.5m)
	EXISTING BRIDGE
	EXISTING ROAD CROWN
	EXISTING CHANGE OF GRADE

	Issue Status/Amendment	Date
A	ISSUE FOR CONSTRUCTION	24/09/2012

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BULLOO SHIRE COUNCIL

NDRRA REPAIR WORKS - NAPPA MERRIE BRIDGE APPROACHES

COOPER CREEK, QUEENSLAND

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Designed	Checked
SRB	GG
Drawn	Checked
SRB	GG
Approved	
RPEQ 8199	

SURVEY PLAN

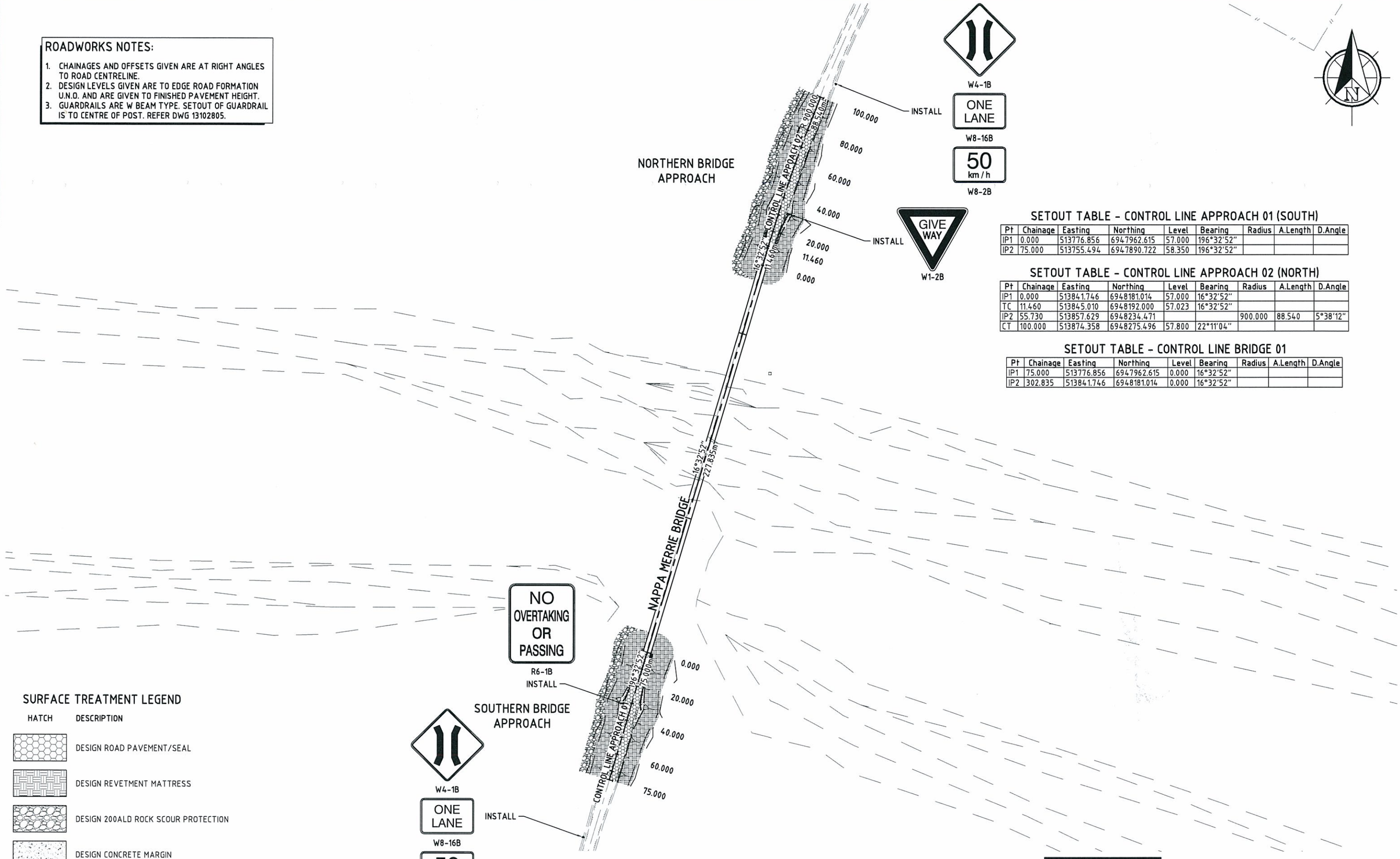
Job Number	Drawing Number	Issue
131028	13102802	A

Number 02 of 14 Drawings | Full Size A1

CAD REF: P:\13 Jobs\131028 - Nappa Merrie Bridge Approaches - Bulloo SC\CAD Files\13102802.dwg

ROADWORKS NOTES:

1. CHAINAGES AND OFFSETS GIVEN ARE AT RIGHT ANGLES TO ROAD CENTRELINE.
2. DESIGN LEVELS GIVEN ARE TO EDGE ROAD FORMATION U.N.O. AND ARE GIVEN TO FINISHED PAVEMENT HEIGHT.
3. GUARDRAILS ARE W BEAM TYPE. SETOUT OF GUARDRAIL IS TO CENTRE OF POST. REFER DWG 13102805.



SETOUT TABLE - CONTROL LINE APPROACH 01 (SOUTH)

Pt	Chainage	Easting	Northing	Level	Bearing	Radius	A.Length	D.Angle
IP1	0.000	513776.856	6947962.615	57.000	196°32'52"			
IP2	75.000	513755.494	6947890.722	58.350	196°32'52"			

SETOUT TABLE - CONTROL LINE APPROACH 02 (NORTH)

Pt	Chainage	Easting	Northing	Level	Bearing	Radius	A.Length	D.Angle
IP1	0.000	513841.746	6948181.014	57.000	16°32'52"			
TC	11.460	513845.010	6948192.000	57.023	16°32'52"			
IP2	55.730	513857.629	6948234.471			900.000	88.540	5°38'12"
CT	100.000	513874.358	6948275.496	57.800	22°11'04"			

SETOUT TABLE - CONTROL LINE BRIDGE 01

Pt	Chainage	Easting	Northing	Level	Bearing	Radius	A.Length	D.Angle
IP1	75.000	513776.856	6947962.615	0.000	16°32'52"			
IP2	302.835	513841.746	6948181.014	0.000	16°32'52"			

SURFACE TREATMENT LEGEND

HATCH	DESCRIPTION
	DESIGN ROAD PAVEMENT/SEAL
	DESIGN REVETMENT MATTRESS
	DESIGN 200ALD ROCK SCOUR PROTECTION
	DESIGN CONCRETE MARGIN

DESIGN LEGEND

SYMBOL	DESCRIPTION
— — —	DESIGN ROAD CENTRELINE (CONTROL LINE)
—— ——	DESIGN EDGE ROAD FORMATION
— — — —	DESIGN EDGE BITUMEN
—— ——	DESIGN CHANGE OF GRADE

FOR SURVEY LEGEND REFER DWG 13102802.

ISSUE FOR CONSTRUCTION

SCALE 1:1000m (A1)

	Issue Status/Amendment	Date
A	ISSUE FOR CONSTRUCTION	24/09/2012

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BULLOO SHIRE COUNCIL

NDRRA REPAIR WORKS - NAPPA MERRIE BRIDGE APPROACHES

COOPER CREEK, QUEENSLAND

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Designed	Checked
SRB	GG
Drawn	Checked
SRB	GG
Approved	
RPEQ 8699	

GENERAL LAYOUT

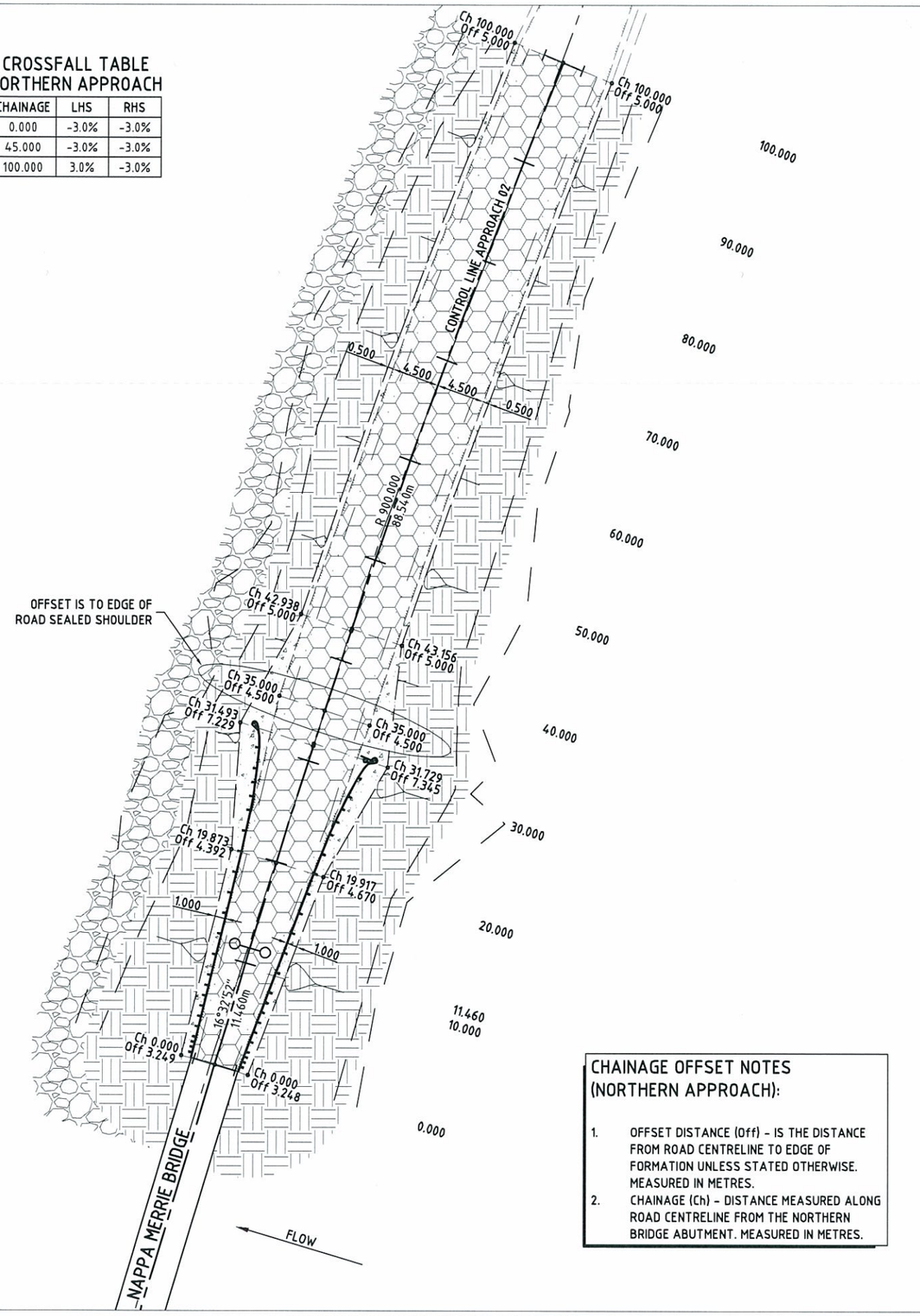
Job Number	Drawing Number	Issue
131028	13102803	A

Number 03 of 14 Drawings | Full Size A1

CAD REF: P:\13 Jobs\131028 - Nappa Merrie Bridge Approaches - Bulloo SC\CAD Files\13102803.dwg

CROSSFALL TABLE NORTHERN APPROACH

CHAINAGE	LHS	RHS
0.000	-3.0%	-3.0%
45.000	-3.0%	-3.0%
100.000	3.0%	-3.0%



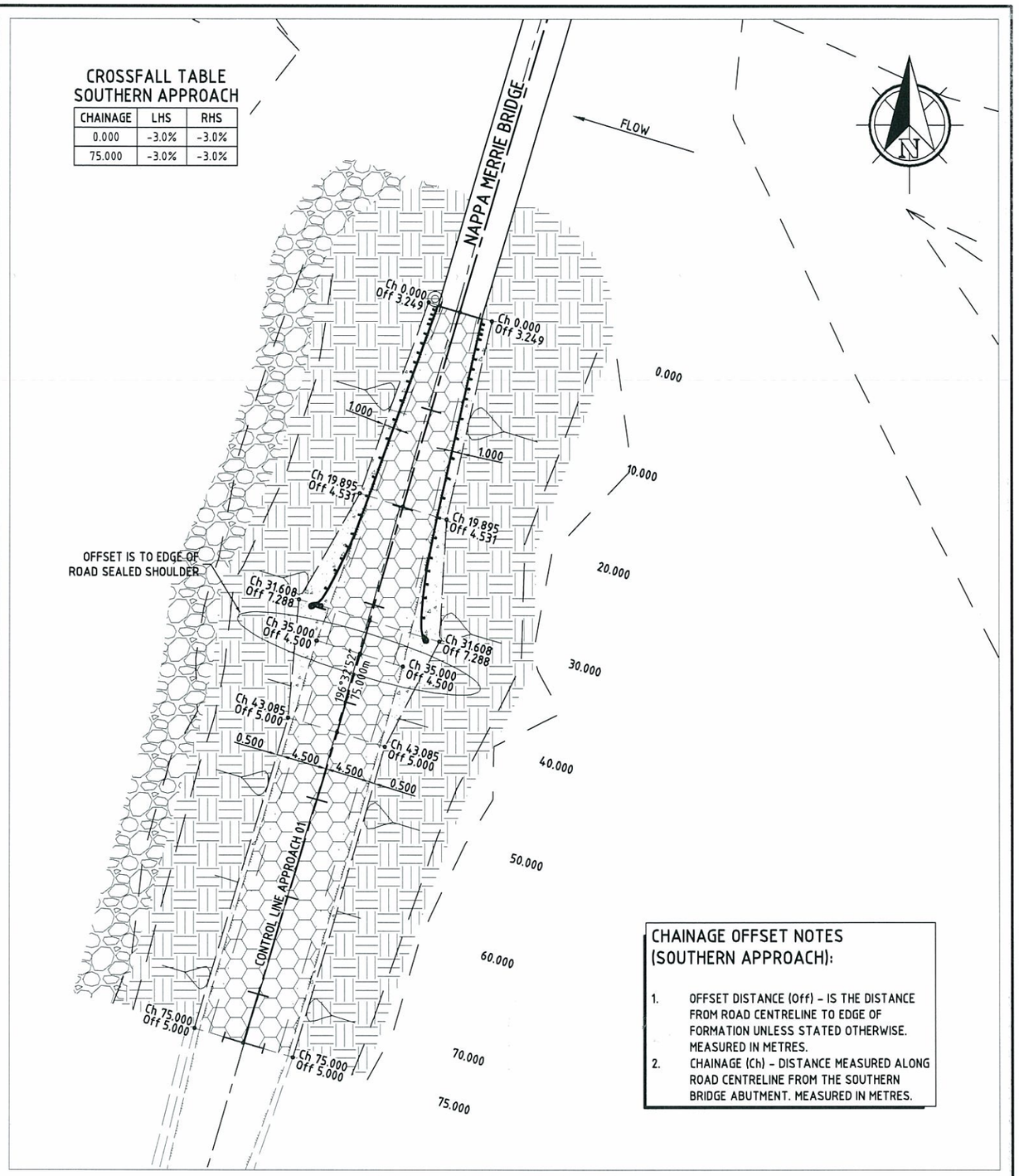
CHAINAGE OFFSET NOTES (NORTHERN APPROACH):

1. OFFSET DISTANCE (Off) - IS THE DISTANCE FROM ROAD CENTRELINE TO EDGE OF FORMATION UNLESS STATED OTHERWISE. MEASURED IN METRES.
2. CHAINAGE (Ch) - DISTANCE MEASURED ALONG ROAD CENTRELINE FROM THE NORTHERN BRIDGE ABUTMENT. MEASURED IN METRES.

NORTHERN BRIDGE APPROACH DETAIL
SCALE 1:250 (A1)

CROSSFALL TABLE SOUTHERN APPROACH

CHAINAGE	LHS	RHS
0.000	-3.0%	-3.0%
75.000	-3.0%	-3.0%



CHAINAGE OFFSET NOTES (SOUTHERN APPROACH):

1. OFFSET DISTANCE (Off) - IS THE DISTANCE FROM ROAD CENTRELINE TO EDGE OF FORMATION UNLESS STATED OTHERWISE. MEASURED IN METRES.
2. CHAINAGE (Ch) - DISTANCE MEASURED ALONG ROAD CENTRELINE FROM THE SOUTHERN BRIDGE ABUTMENT. MEASURED IN METRES.

SOUTHERN BRIDGE APPROACH DETAIL
SCALE 1:250 (A1)

ISSUE FOR CONSTRUCTION

5 0 5 10 15 20 25m
SCALE 1:250m (A1)

FOR SURVEY LEGEND REFER DWG 13102802.
FOR SURFACE TREATMENT & DESIGN LEGEND REFER DWG 13102803.

	Issue Status/Amendment	Date
A	ISSUE FOR CONSTRUCTION	24/09/2012

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BULLOO SHIRE COUNCIL

NDRRA REPAIR WORKS - NAPPA MERRIE BRIDGE APPROACHES

COOPER CREEK, QUEENSLAND

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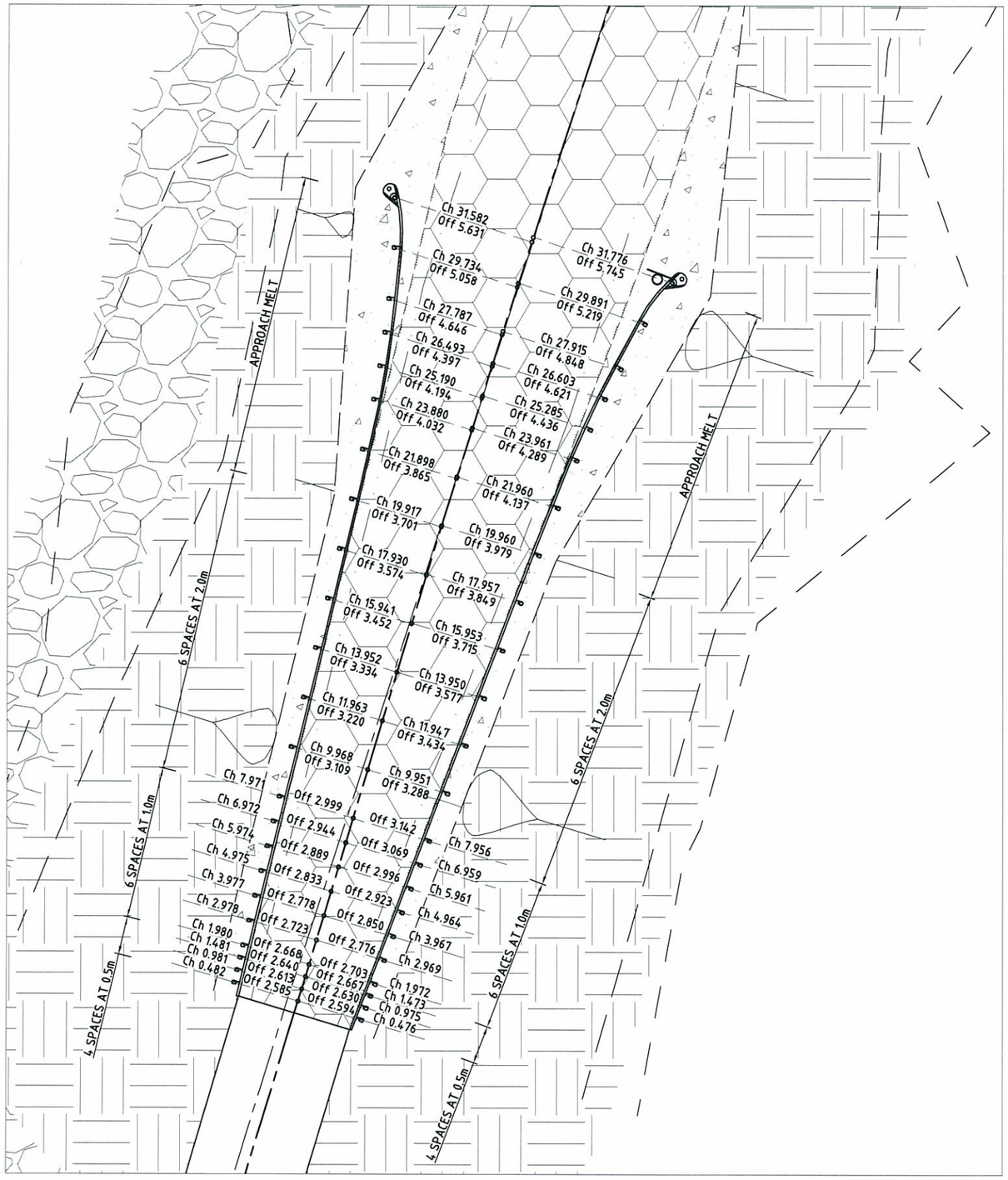
Designed	SRB	Checked	GG1
Drawn	SRB	Checked	GG1
Approved	RPEQ 8699		

BRIDGE APPROACHES LAYOUT

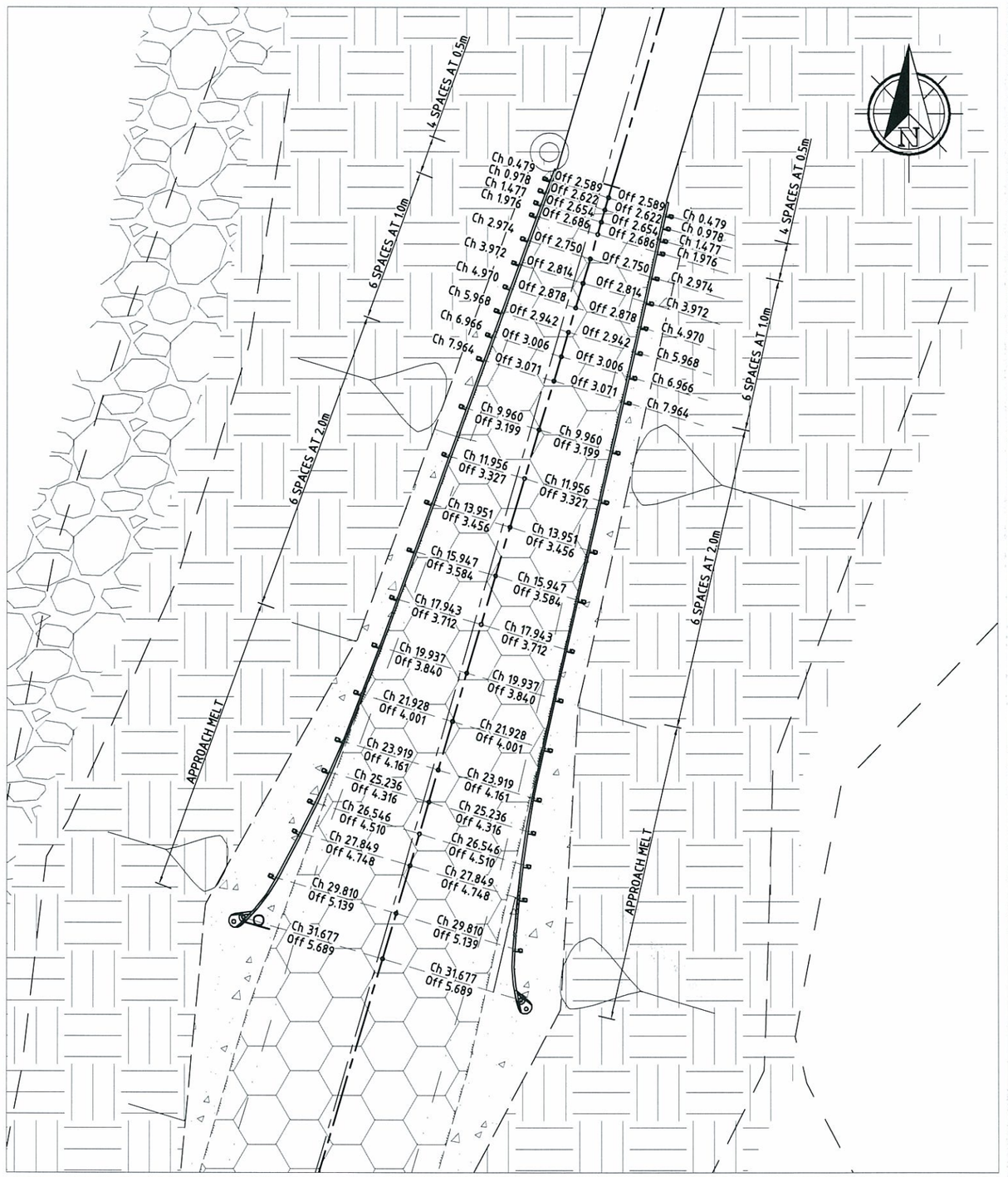
Job Number	Drawing Number	Issue
131028	13102804	A

Number 04 of 14 Drawings | Full Size A1

CAD REF: P:\13_Jobs\131028 - Nappa Merrie Bridge Approaches - Bulloo SC\CAD Files\13102804.dwg



SOUTHERN GUARDRAIL DETAIL
SCALE 1:250 (A1)



NORTHERN GAURDRAIL DETAIL
SCALE 1:250 (A1)

W BEAM GUARDRAIL NOTES:

1. GUARDRAIL TYPES ARE W BEAM
2. LENGTH GUARDRAIL 20.0m + APPROACH MELT
3. LENGTH OF GUARDRAIL DETERMINED BY QUEENSLAND RECONSTRUCTION AUTHORITY.
4. FOR GUARDRAIL INSTALLATION, SETOUT, COMPONENTS, ASSEMBLY AND CONNECCTIONS REFER DTMR STD DWGS 1467, 1474, 1475, 1476, 1477, 1478, 1480 & 1482

FOR SURVEY LEGEND REFER DWG 13102802.
FOR SURFACE TREATMENT & DESIGN LEGEND REFER DWG 13102803.

ISSUE FOR CONSTRUCTION

20 10 0 20 40 60 80 100m
SCALE 1:1000m (A1)

	Issue Status/Amendment	Date
A	ISSUE FOR CONSTRUCTION	24/09/2012

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BULLOO SHIRE COUNCIL

NDRRA REPAIR WORKS - NAPPA MERRIE BRIDGE APPROACHES

COOPER CREEK, QUEENSLAND

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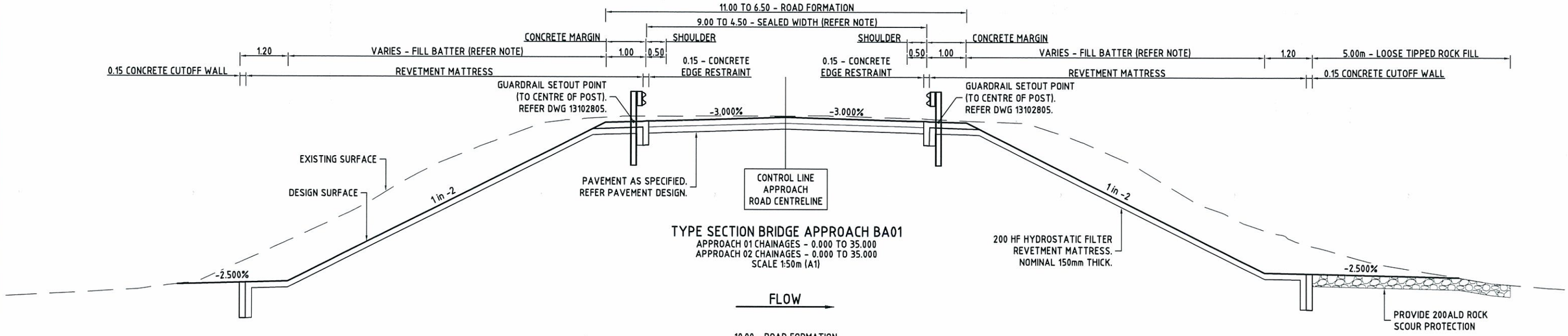
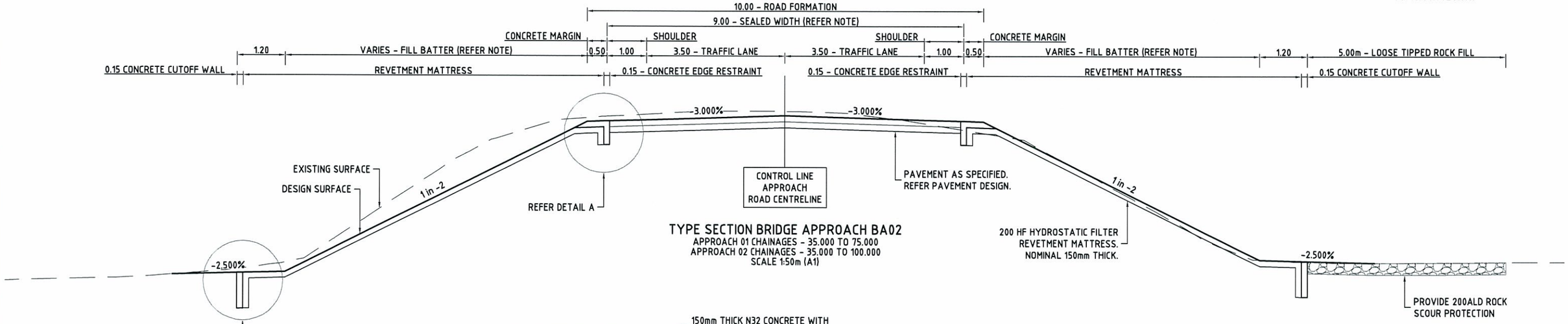
Designed SRB	Checked GGI	GUARDRAIL SETOUT DETAILS	
Drawn SRB	Checked GGI		
Approved RPEQ 8699		Job Number 131028	Drawing Number 13102805
		Issue A	
		Number 05 of 14 Drawings	Full Size A1

CAD REF: P:\13 Jobs\131028 - Nappa Merrie Bridge Approaches - Bulloo SC\CAD Files\13102805.dwg



TYPE SECTION BRIDGE APPROACH BA01

APPROACH 01 CHAINAGES - 0.000 TO 35.000
APPROACH 02 CHAINAGES - 0.000 TO 35.000
SCALE 1:50m (A1)



TYPE SECTION BRIDGE APPROACH BA02

APPROACH 01 CHAINAGES - 35.000 TO 75.000
APPROACH 02 CHAINAGES - 35.000 TO 100.000
SCALE 1:50m (A1)

PAVEMENT DESIGN

300mm BASE COURSE SUBTYPE 4.2 CBR 60 MODIFIED WITH 3.0% CEMENT/FLYASH BLEND. (CONSTRUCTED IN 2 LAYERS OF 150mm)

BITUMEN SURFACING NOTES

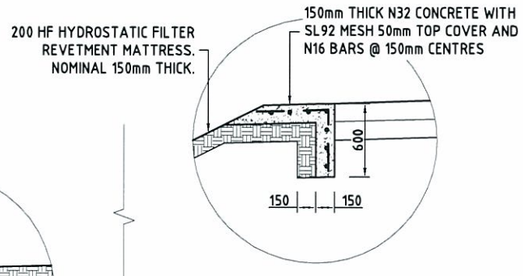
PRIMERSEAL: AMC5 1.8L/m^2 WITH 14mm AGGREGATE @ 90m^2/m^3
RESEAL: CL170 1.2L/m^2 WITH 10mm AGGREGATE @ 120m^2/m^3

SEAL DESIGN TO BE CONFIRMED WITH ENGINEER PRIOR TO COMMENCEMENT OF SURFACING WORKS

FILL BATTER NOTES:

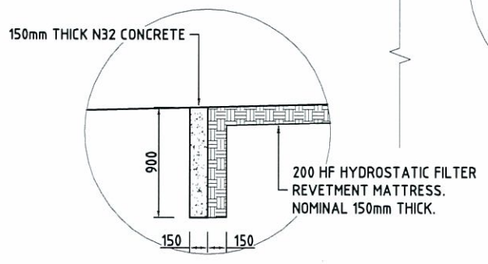
FILL MAYBE LEFT IN PLACE AND NOT EXCAVATED TO THE DESIGN WIDTH AND SLOPE IF:

1. THE BATTERS ARE TRIMMED TO A HARD SMOOTH SURFACE FREE OF LARGE ROCKS AND HOLES;
2. EXISTING BATTER IS NOT STEEPER THAN 1 in 2;
3. THE SUPERVISING ENGINEER APPROVES THE VARIATION.



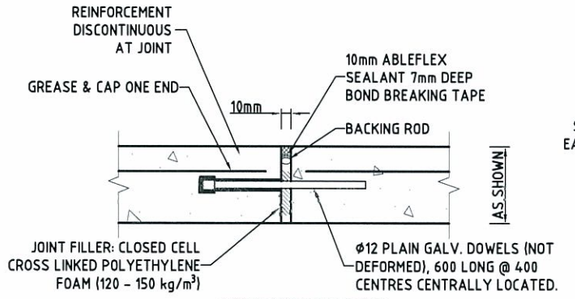
DETAIL A

SCALE 1:25mm (A1)



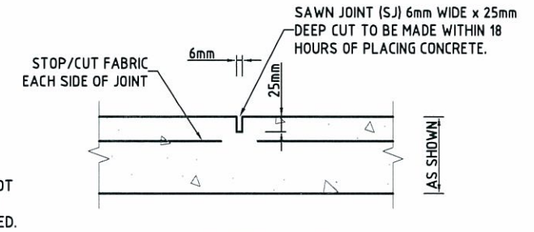
DETAIL B

SCALE 1:25mm (A1)



CONCRETE MARGIN EXPANSION JOINT (EJ) DETAIL

N.T.S.



CONCRETE MARGIN SAWN JOINT (SJ) DETAIL

N.T.S.

ISSUE FOR CONSTRUCTION

SCALE 1:25mm (A1)
SCALE 1:50m (A1)

Issue Status/Amendment	Date
A ISSUE FOR CONSTRUCTION	24/09/2012

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BULLOO SHIRE COUNCIL

NDRRA REPAIR WORKS - NAPPA MERRIE BRIDGE APPROACHES

COOPER CREEK, QUEENSLAND

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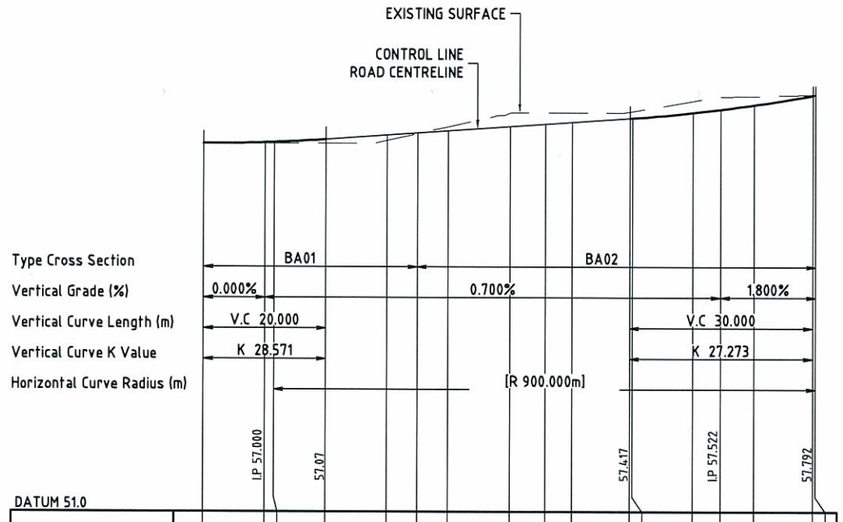
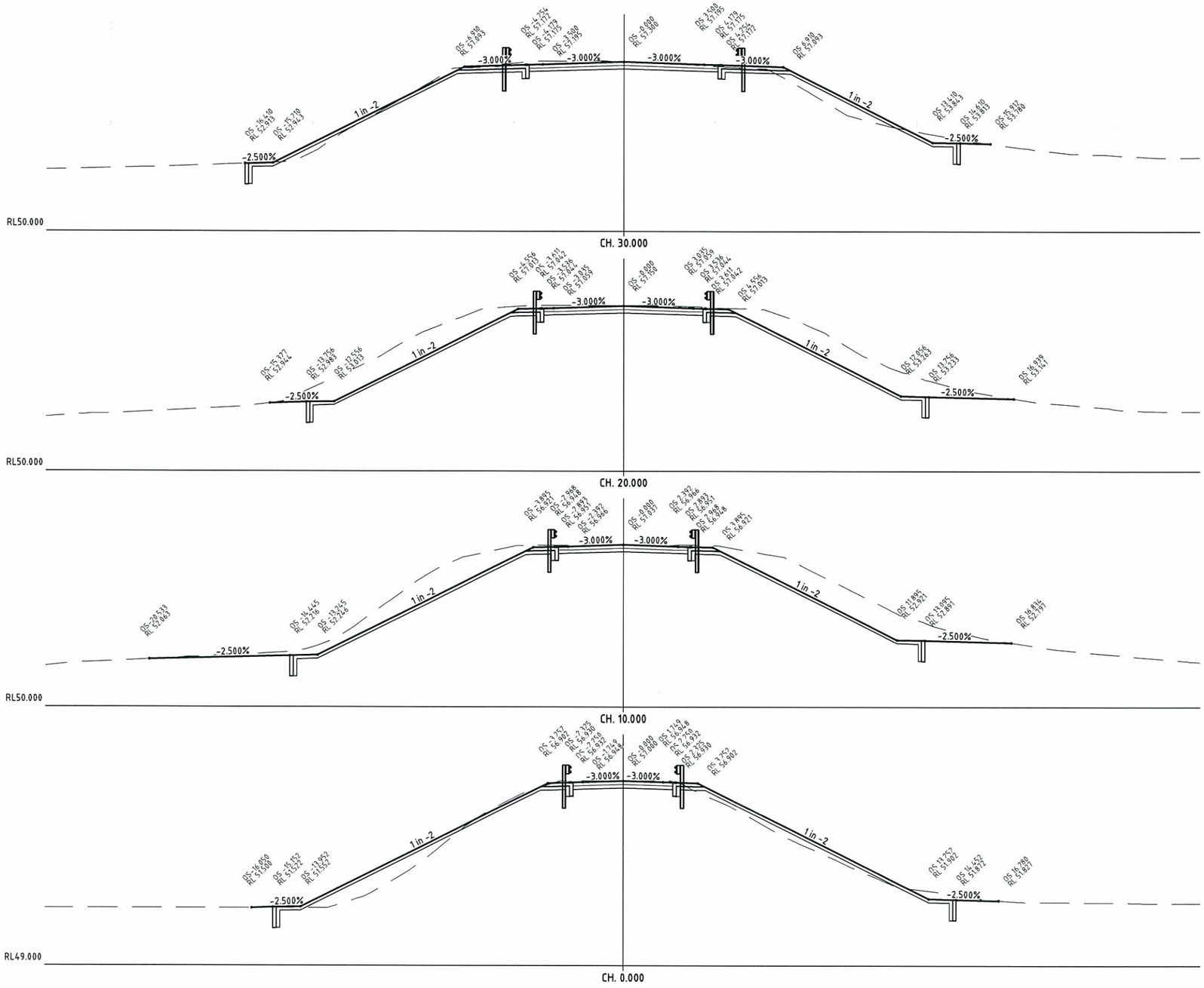
Designed SRB	Checked GG1	TYPE CROSS SECTION & DETAILS	
Drawn SRB	Checked GG1		
Approved RPEQ 8499		Job Number 131028	Drawing Number 13102806 / Issue A
		Number 06 of 14	Drawings / Full Size A1

CAD REF: P:\13 Jobs\131028 - Nappa Merrie Bridge Approaches - Bulloo SC\CAD Files\131028\06.dwg


EXISTING SURFACE
CONTROL LINE
ROAD CENTRELINE
Type Cross Section
Vertical Grade (%)
Vertical Curve Length (m)
Vertical Curve K Value
Horizontal Curve Radius (m)
BA01
BA02
0.000%
0.700%
1.800%
V.C 20.000
V.C 30.000
K 28.571
K 27.273
[R 900.000m]
IP 57.000
57.07
57.417
IP 57.522
57.792
DATUM 51.0

| | | |



ISSUE FOR CONSTRUCTION

SCALE 1:100m (A1)

	Issue Status/Amendment	Date
A	ISSUE FOR CONSTRUCTION	24/09/2012

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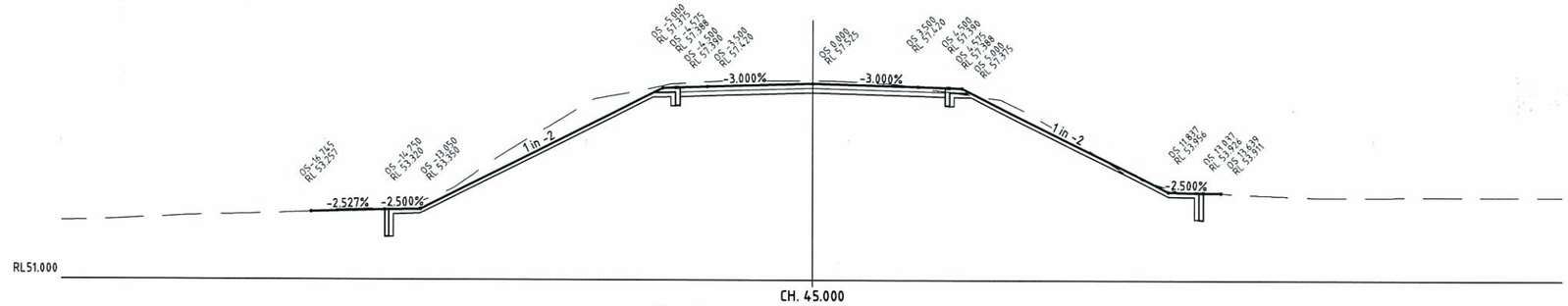
Designed	SRB	Checked	GG1
Drawn	SRB	Checked	GG1
Approved			

CROSS SECTIONS (1 OF 3)
CONTROL LINE APPROACH 01
(SOUTHERN)

Job Number	Drawing Number	Issue
131028	13102808	A

Number 08 of 14 Drawings | Full Size A1

CAD REF- P:\13 Jobs\131028 - Nappa Merrie Bridge Approaches - Bulloo SC\CAD Files\13102808.dwg



ISSUE FOR CONSTRUCTION

2 1 0 2 4 6 8 10m
SCALE 1:100m (A1)

	Issue Status/Amendment	Date
A	ISSUE FOR CONSTRUCTION	24/09/2012

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NDRRA REPAIR WORKS - NAPPA MERRIE BRIDGE APPROACHES

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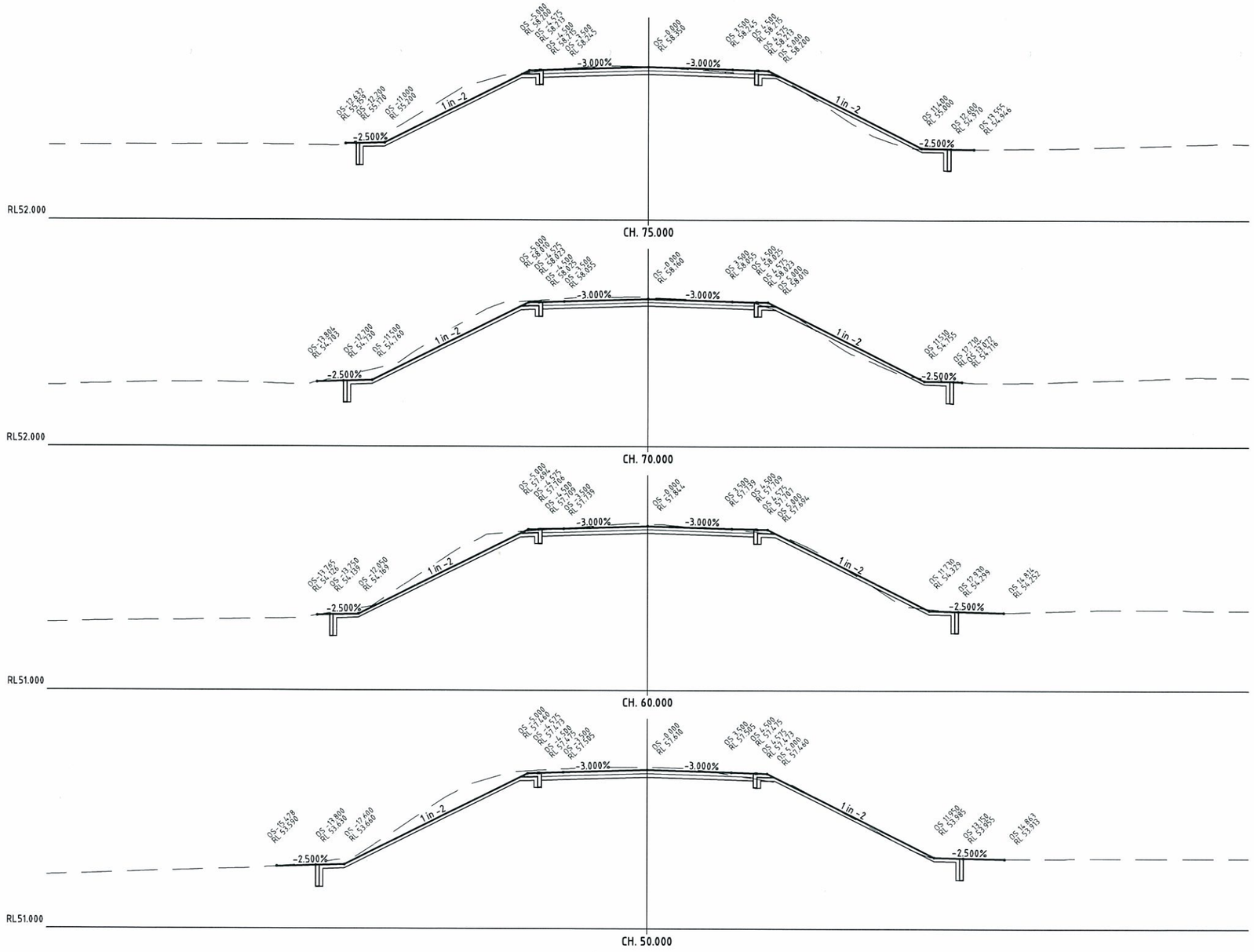
Designed	Checked
SRB	CGJ
Drawn	Checked
SRB	CGJ
Approved	
RPEQ 8699	

CROSS SECTIONS (2 OF 3)
CONTROL LINE APPROACH 01
(SOUTHERN)

Job Number	Drawing Number	Issue
131028	13102809	A

Number 09 of 14 Drawings | Full Size A1

CAD REF: P:\13 Jobs\131028 - Nappa Merrie Bridge Approaches - Bulloo SCICAD Files\13102809.dwg



ISSUE FOR CONSTRUCTION

SCALE 1:100m (A1)

	Issue Status/Amendment	Date
A	ISSUE FOR CONSTRUCTION	24/09/2012

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NDRRA REPAIR WORKS - NAPPA MERRIE BRIDGE APPROACHES

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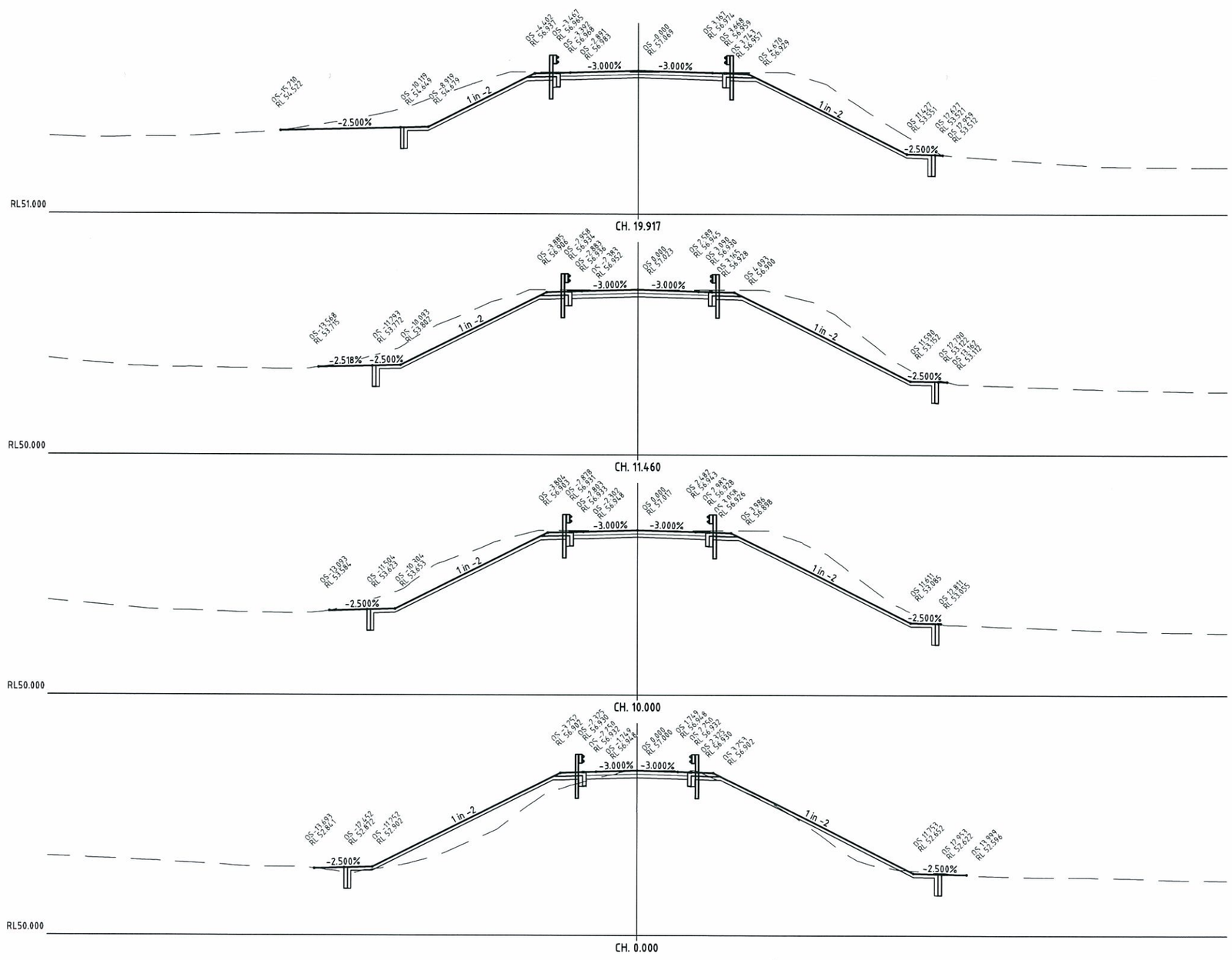
Designed SRB	Checked GGI	CROSS SECTIONS (3 OF 3) CONTROL LINE APPROACH 01 (SOUTHERN)	
Drawn SRB	Checked GGI		
Approved		Job Number 131028	Drawing Number 13102810
		Issue A	
		Number 10 of 14 Drawings	Full Size A1

14 FEB 8699

CAD REF: P:\13 Jobs\131028 - Nappa Merrie Bridge Approaches - Bulloo SC\CAD Files\13102810.dwg



ISSUE FOR CONSTRUCTION

2 1 0 2 4 6 8 10m
SCALE 1:100m (A1)

	Issue Status/Amendment	Date
A	ISSUE FOR CONSTRUCTION	24/09/2012

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NDRRA REPAIR WORKS - NAPPA MERRIE BRIDGE APPROACHES

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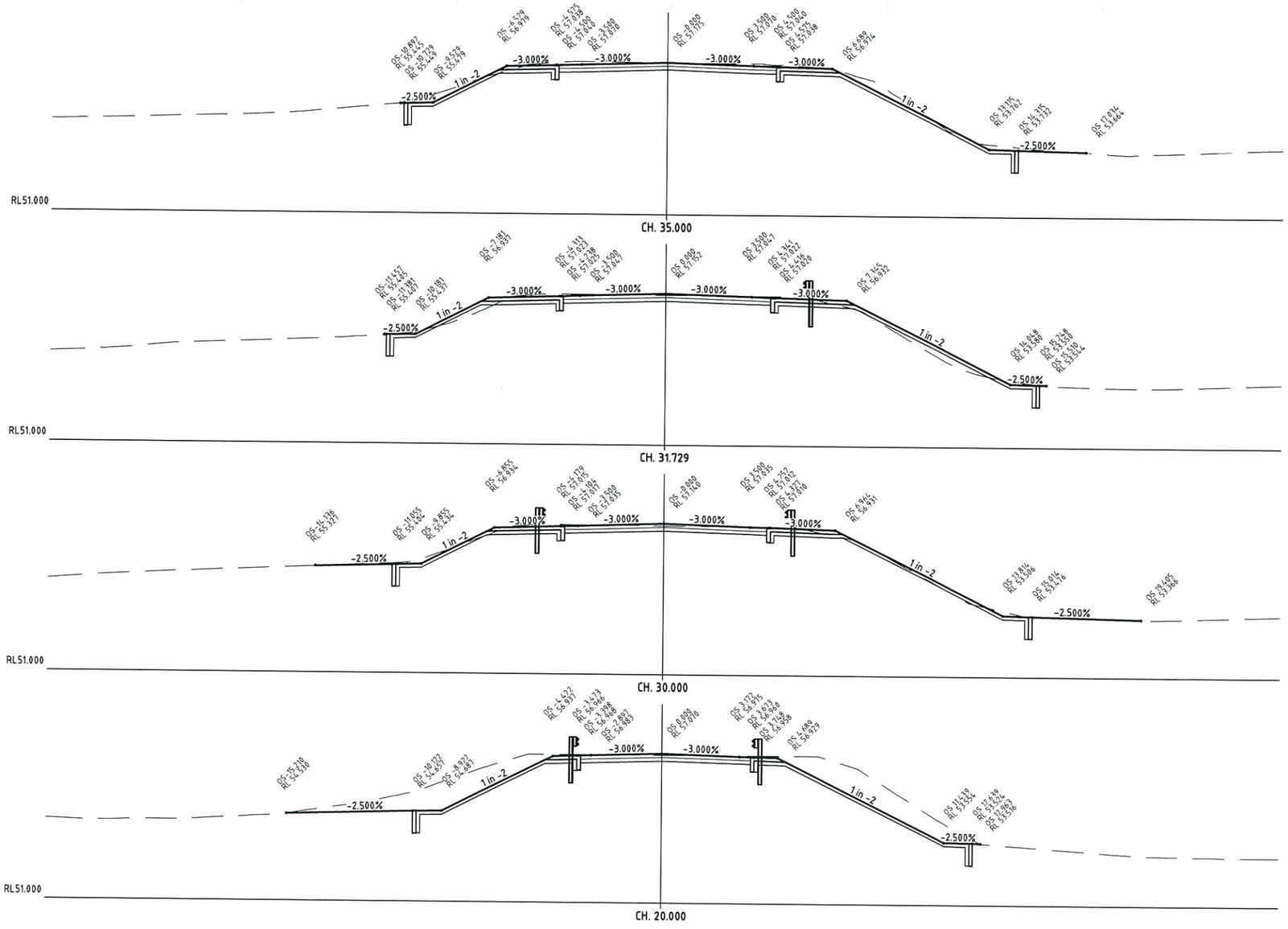
Designed	Checked
SRB	661
Drawn	Checked
SRB	661
Approved	
RPEQ 8699	

CROSS SECTIONS (1 OF 4)
CONTROL LINE APPROACH 02
(NORTHERN)

Job Number	Drawing Number	Issue
131028	13102811	A

Number 11 of 14 Drawings Full Size A1

CAD REF: P:\13 Jobs\131028 - Nappa Merrie Bridge Approaches - Bulloo SC\CAD Files\13102811.dwg



ISSUE FOR CONSTRUCTION

SCALE 1:100m (A1)

Issue Status/Amendment	Date
A ISSUE FOR CONSTRUCTION	24/09/2012

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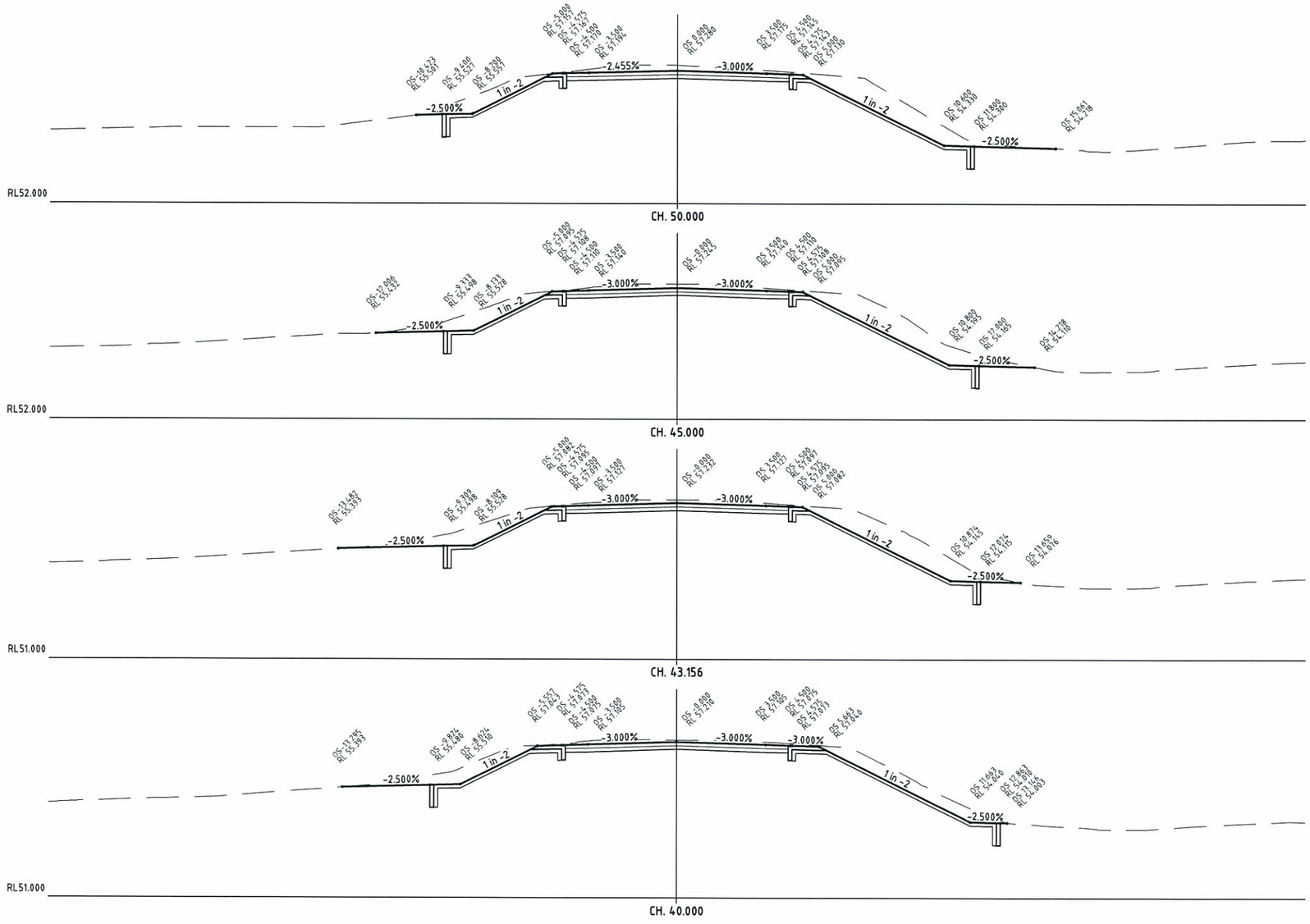
Designed	Checked
SRB	661
Drawn SRB	Checked 661
Approved	

CROSS SECTIONS (2 OF 4)
CONTROL LINE APPROACH 02
(NORTHERN)

Job Number	Drawing Number	Issue
131028	13102812	A

Number 12 of 14 Drawings | Full Size A1

CAD REF: P:\13 Jobs\131028 - Nappa Merrie Bridge Approaches - Bulloo SC\CAD Files\13102812.dwg



ISSUE FOR CONSTRUCTION

SCALE 1:100m (A1)

	Issue Status/Amendment	Date
A	ISSUE FOR CONSTRUCTION	24/09/2012

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BULLOO SHIRE COUNCIL

NDRRA REPAIR WORKS - NAPPA MERRIE BRIDGE APPROACHES

COOPER CREEK, QUEENSLAND

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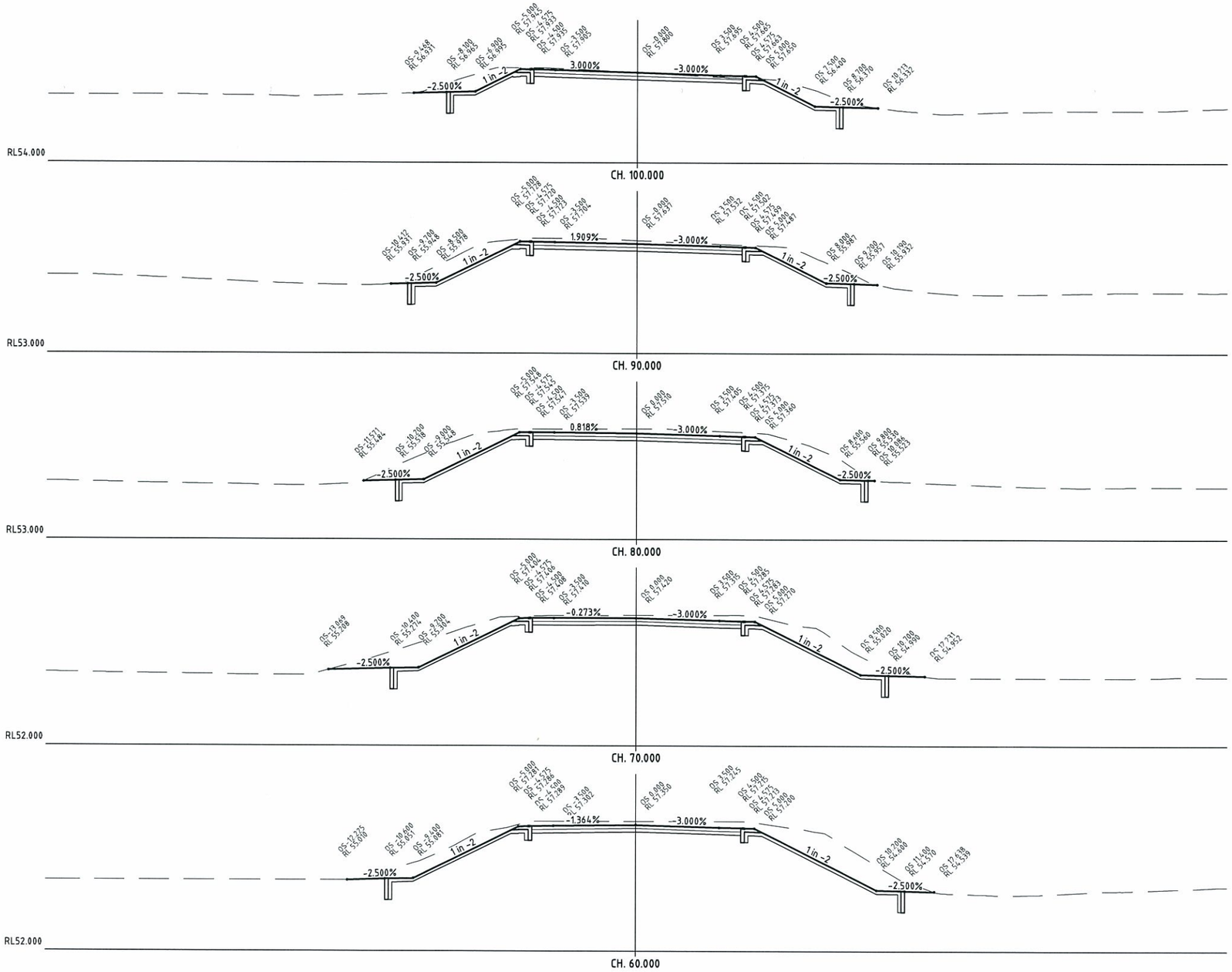
Designed SRB	Checked GGL	CROSS SECTIONS (3 OF 4) CONTROL LINE APPROACH 02 (NORTHERN)	
Drawn SRB	Checked GGL		
Approved KREQ 8199		Job Number 131028	Drawing Number 13102813
		Issue A	
		Number 13 of 14 Drawings	Full Size A1

CAD REF: P:\13 Jobs\131028 - Nappa Merrie Bridge Approaches - Bulloo SC\CAD Files\13102813.dwg



ISSUE FOR CONSTRUCTION

SCALE 1:100m (A1)

	Issue Status/Amendment	Date
A	ISSUE FOR CONSTRUCTION	24/09/2012

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BULLOO SHIRE COUNCIL

NDRRA REPAIR WORKS - NAPPA MERRIE BRIDGE APPROACHES

COOPER CREEK, QUEENSLAND

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Designed	Checked
SRB	Cabl
Drawn	Checked
SRB	Cabl
Approved	

RPEQ 8699

CROSS SECTIONS (4 OF 4) CONTROL LINE APPROACH 02 (NORTHERN)

Job Number	Drawing Number	Issue
131028	13102814	A

Number 14 of 14 Drawings | Full Size A1

CAD REF: P:\13 Jobs\131028 - Nappa Merrie Bridge Approaches - Bulloo SC\CAD Files\13102814.dwg