Tender 8 of 2014

INVITATION TO TENDER ACKNOWLEDGEMENT

Date:

Northam Town Site Drainage Improvements – Stage 1

Our Company wish to confirm our interest in providing a tender submission for the above mentioned project. The following contact details are provided for the purpose of receiving tender addendums.

Email:	
Contact Name:	
Contact Phone Number:	

Note: Addendums will be sent via email to all registered Tenderers.

Yours faithfully

For and on behalf of:

Date:

Request for Tender

Request for Tender:	*NORTHAM TOWNSITE DRAINAGE IMPROVEMENTS - Stage 1*

Deadline:	*21ST OCTOBER 2014*

Address for Delivery:	*Tender Box* *Shire of Northam* *395 Fitzgerald Street Northam WA 6401* *[electronic mail, and facsimile tenders will not be accepted]*

RFT Number:	*8 Of 2014*

Contents

Part 1 - CONDITIONS OF TENDERING

Tender Documents

This Request for Tender is comprised of the following parts (not in priority order)

Part 1 – Request For Tender

Part 2 - Formal Instrument of Agreement

Part 3 – General Conditions of Contract

Part 4 – Annexure Part A (Contract Specifics)

Part 5 – Specifications

Part 6 – Drawings

Part 7 - Schedule of Rates

Separate Documents

a) Addendums and any other special correspondence issued to Tenderers by the Principal.

b) Any other policy or document referred to but not attached to the Request.

How to Prepare Your Tender

a) Carefully read all parts of this document;

b) Ensure you understand the Requirements;

c) Complete and return the Offer (Part 3) in all respects and include all Attachments;

d) Make sure you have signed the Offer form and responded to all of the Selection Criteria; and

e) Lodge your Tender before the Deadline.

Contact Persons

Tenderers should not rely on any information provided by any person other than the person listed below:

Name:	***CLINTON KLEYNHANS***
Telephone:	***(08)9622 6100***
Email:	***emes@northam.wa.gov.au***

Part 1 READ AND KEEP THIS PART

Lodgement of Tenders and Delivery Method

The tender must be lodged by the Deadline. The Deadline for this request is by 4.00pm Monday 21ST October 2014.

The Tender is to be:

a) Placed in a sealed envelope clearly endorsed with the tender number and title as shown on the front cover of this Request; and

b) Delivered by hand and placed in the Tender Box at 395 Fitzgerald Street Northam WA 6401 (by the Tenderer or the Tenderer's private agent) or sent through the mail to the Chief Executive Officer Shire of Northam 395 Fitzgerald Street Northam WA 6401.

Electronic mail Tenders and Tenders submitted by Facsimile will not be accepted.

Tenderers must ensure that they have provided two signed copies of their Tender; one to be marked "ORIGINAL" and unbound and clipped (not stapled) and the other(s) to be marked "COPY" and bound. All pages must be numbered consecutively and the Tender must include an index. Any brochures or pamphlets must be attached to both the original and the copies.

Rejection of Tenders

A Tender will be rejected without consideration of its merits in the event that:

a) It is not submitted before the Deadline; or

b) It is not submitted at the place specified in the Request; or

c) It may be rejected if it fails to comply with any other requirements of the Request.

Late Tenders

Tenders received:

a) After the Deadline; or

b) In a place other than that stipulated in this Request;

will not be accepted for evaluation.

Acceptance of Tenders

Unless otherwise stated in this Request, Tenders may be for all or part of the Requirements and may be accepted by the Principal either wholly or in part. The Principal is not bound to accept the lowest Tender and may reject any or all Tenders submitted.

Part 1 READ AND KEEP THIS PART

Disclosure of Contract Information

Documents and other information relevant to the contract may be disclosed when required by law under the Freedom of Information Act 1992 or under a Court order.

All Tenderers will be given particulars of the successful Tenderer be advised that no Tender was accepted.

Tender Validity Period

All Tenders will remain valid and open for acceptance for a minimum period of ninety (90) days from the Deadline or forty-five (45) days from the Principal's resolution for determining the Tender, whichever is the later unless extended on mutual agreement between the Principal and the Tenderer in writing.

Precedence of Documents

In the event of there being any conflict or inconsistency between the terms and conditions in this Request and those in the General Conditions of Contract, the terms and conditions appearing in this Request will have precedence.

Alternative Tenders

All Alternative Tenders may be accompanied by a conforming Tender.

Tenders submitted as Alternative Tenders or made subject to conditions other than the General and Special Conditions of Contract must in all cases be clearly marked "**Alternative Tender**".

The Principal may in its absolute discretion reject any Alternative Tender as invalid.

Any printed "General Conditions of Contract" shown on the reverse of a Tenderer's letter or quotation form will not be binding on the Principal in the event of a Contract being awarded unless the Tender is marked as an Alternative Tender.

Tenderers to Inform Themselves

Tenderers will be deemed to have:

a) examined the Request and any other information available in writing to Tenderers for the purpose of tendering;
b) examined all further information relevant to the risks, contingencies, and other circumstances having an effect on their Tender which is obtainable by the making of reasonable enquires;
c) satisfied themselves as to the correctness and sufficiency of their Tenders including tendered prices which will be deemed to cover the cost of complying with all the Conditions of

Tendering and of all matters and things necessary for the due and proper performance and completion of the work described therein;

d) acknowledged that the Principal may enter into negotiations with a chosen Tenderer and that negotiations are to be carried out in good faith; and

e) satisfied themselves they have a full set of the Request documents and all relevant attachments.

f) Completed site investigations to be fully aware of ground conditions, buried services and any issue that may potentially impact works.

Alterations

The Tenderer must not alter or add to the Request documents unless required by these Conditions of Tendering.

The Principal will issue an addendum to all registered Tenderers where matters of significance make it necessary to amend or supplement the issued Request documents before the Deadline.

Risk Assessment

The Principal may have access to and give consideration to:

a) any risk assessment undertaken by any credit rating agency;

b) any financial analytical assessment undertaken by any agency; and

c) any information produced by the Bank, financial institution, or accountant of a Tenderer;

so as to assess that Tender and may consider such materials as tools in the Tender assessment process.

Tenderers may be required to undertake to provide to the Principal (or its nominated agent) upon request all such information as the Principal reasonably requires to satisfy itself that Tenderers are financially viable and have the financial capability to provide the Services for which they are submitting and meet their obligations under any proposed Contract. The Principal reserves the right to engage (at its own cost) an independent financial assessor as a nominated agent to conduct financial assessments under conditions of strict confidentiality. For this assessment to be completed, a representative from the nominated agent may contact you concerning the financial information that you are required to provide.

The financial assessment is specifically for use by the Principal for the purpose of assessing Tenderers and will be treated as strictly confidential.

Evaluation Process

This is a Request for Tender.

Part 1	**READ AND KEEP THIS PART**

Your Tender will be evaluated using information provided in your Tender.

The following evaluation methodology will be used in respect of this Request:

a) Tenders are checked for completeness and compliance. Tenders that do not contain all information requested (eg completed Offer form and Attachments) may be excluded from evaluation.

b) Tenders are assessed against the Selection Criteria. Contract costs are evaluated (eg tendered prices) and other relevant whole of life costs are considered.

c) The most suitable Tenderers may be short listed and may also be required to clarify their Tender, make a presentation, demonstrate the product/solution offered and/or open premises for inspection. Referees may also be contacted prior to the selection of the successful Tenderer.

A Contract may then be awarded to the Tenderer whose Tender is considered the most advantageous Tender to the Principal.

Selection Criteria

The Contract will be awarded to a sole who best demonstrates the ability to provide quality products and/or services at a competitive price. The tendered prices will be assessed together with qualitative and compliance criteria to determine the most advantageous outcome to the Principal.

The Principal has adopted a best value for money approach to this Request. This means that, although price is considered, the Tender containing the lowest price will not necessarily be accepted, nor will the Tender ranked the highest on the qualitative criteria.

A scoring system will be used as part of the assessment of the qualitative criteria. Unless otherwise stated, a Tender that provides all the information requested will be assessed as satisfactory. The extent to which a Tender demonstrates greater satisfaction of each of these criteria will result in a greater score. The aggregate score of each Tender will be used as one of the factors in the final assessment of the qualitative criteria and in the overall assessment of value for money.

Compliance Criteria

These criteria are detailed within this document and will not be point scored. Each Tender will be assessed on a Yes/No basis as to whether the criterion is satisfactorily met. An assessment of “No” against any criterion may eliminate the Tender from consideration.

Part 1 READ AND KEEP THIS PART

Qualitative Criteria

In determining the most advantageous Tender, the Evaluation Panel will score each Tenderer against the qualitative criteria as detailed within this document. Each criterion will be weighted to indicate the relative degree of importance that the Principal places on the technical aspects of the goods or services being purchased.

It is essential that Tenderers address each qualitative criterion. Information that you provide addressing each qualitative criterion will be point scored by the Evaluation Panel. Failure to provide the specified information may result in elimination from the tender evaluation process or a low score.

Regional Price Reference

Tenderers for the contract may be afforded a preference in accordance with Regulation 24(A-G) of the Local Government (Functions and General) Regulations and the Shire's Regional Preference

Price Basis

All prices for completion of Works Under Contract offered under this Request are to be fixed for the term of the Contract. Tendered prices must include Goods and Services Tax (GST).

Unless otherwise indicated prices tendered must include all associated costs with performing the works and all applicable levies, duties, taxes and charges. Any charge not stated in the Tender, as being additional will not be allowed as a charge for any transaction under any resultant Contract. Any exclusions should be clearly and separately listed in the Offer.

Ownership of Tenders

All documents, materials, articles and information submitted by the Tenderer as part of or in support of the Tender will be become upon submission the absolute property of the Principal and will not be returned to the Tenderer at the conclusion of the Tender process PROVIDED that the Tenderer be entitled to retain copyright and other intellectual property rights therein, unless otherwise provided by the Contract.

Canvassing of Officials

If the Tenderer, whether personally or by an agent, canvasses any of the Principal's Commissioners or Councillors Officers (as the case may be) with a view to influencing the acceptance of any Tender made by it or any other Tenderer, then regardless of such canvassing having any influence on the acceptance of such Tender, the Principal may at its absolute discretion omit the Tenderer from consideration.

Part 1	READ AND KEEP THIS PART

Identity of the Tenderer

The identity of the Tenderer and the Contractor is fundamental to the Principal. The Tenderer will be the person, persons, corporation or corporations named as the Tenderer in *Contract* and whose execution appears on the Offer Form in of this Request. Upon acceptance of the Tender, the Tenderer will become the Contractor.

Costs of Tendering

The Principal will not be liable for payment to the Tenderer for any costs, losses or expenses incurred by the Tenderer in preparing their Offer.

Tender Opening

Tenders will be opened in the Principal's offices, following the advertised Deadline. All Tenderers and members of the public may attend or be represented at the opening of Tenders.

The names of the persons who submitted the Tender by the due Deadline will be read out at the Tender Opening. No discussions will be entered into between Tenderers and the Principal's officers present or otherwise, concerning the Tenders submitted.

The Tender Opening will be held on or as soon as practicable after the Deadline at 4.10pm in the administration office Shire of Northam 395 Fitzgerald Street Northam.

In House Tenders

The Principal does not intend to submit an In House Tender.

Compliance Criteria

Please select with a "Yes" or "No" whether you have complied with the following compliance criteria:

Description of Compliance Criteria	
Tenderers are to provide acknowledgment that your organisation has submitted in accordance with the Conditions of Tender including completion of the Offer Form and provision of your pricing submitted in the format required by the Principal.	Yes / No
Tenderers are to provide their a) Current Insurance Certificates b) High Risk Work Licenses	Yes / No
c) Compliance with the Quality Assurance requirement for this Request.	Yes / No

d) Compliance with the Delivery Date.	Yes / No
e) Risk Assessment Tenderers must address the following information in an attachment and label it "Risk Assessment": • *An outline of your organisational structure inclusive of any branches and number of personnel.* • *Are you acting as an agent for another party? If Yes, attach details (including name and address) of your Principal.* • *Do you intend to subcontract any of the Requirements? If Yes provide details of the subcontractor(s) including; the name, address and the number of people employed; and the Requirements that will be subcontracted.* • *Will any actual or potential conflict of interest in the performance of your obligations under the Contract exist if you are awarded the Contract, or are any such conflicts of interest likely to arise during the Contract? If Yes, please supply in an attachment details of any actual or potential conflict of interest and the way in which any conflict will be dealt with.* • *Are you presently able to pay all your debts in full as and when they fall due?* • *Are you currently engaged in litigation as a result of which you may be liable for $50,000 or more? If Yes please provide details.*	Yes / No

Qualitative Criteria

Before responding to the following qualitative criteria, Tenderers must note the following:

a) All information relevant to your answers to each criterion are to be contained within your Tender;

b) Tenderers are to assume that the Evaluation Panel has no previous knowledge of your organisation, its activities or experience;

c) Tenderers are to provide full details for any claims, statements or examples used to address the qualitative criteria; and

d) Tenderers are to address each issue outlined within a qualitative criterion.

Part 1	**READ AND KEEP THIS PART**

A. PRICING Tenderers must address the following information in Pricing Schedules	**Weighting** **50%**
a) Mobilisation and Demobilisation *b) Management and Supervision* *c) Works Under Contract* *d) Dayworks Rates* *e) Cash flow Forecast*	**Tick if attached** ☐ ☐ ☐ ☐ ☐
B. Relevant Experience Tenderers must address the following information in an attachment and label it **"Relevant Experience"**:	**Weighting** **25%**
a) Provide details of similar work completed b) *Project reference sheet.*	**Tick if attached** ☐ ☐

C. Timeliness & Ability to Deliver Works Tenderers shall provide a program of works in sufficient detail for the Principal to properly assess the offer. The project program of works submitted shall form part of the contract agreement. The Contractor undertakes to perform the work in accordance with the approved Project (Timeline) Schedule and relevant Quality Control requirements	**Weighting** **15%**
a) A proposed timeline construction schedule must be provided showing start and finish dates for each proposed location, as well as overall construction duration. Key milestone dates to be identified *b) Quality Management Plan provided identifying key HOLD POINTS, to be agreed by Principal prior to works commencing.*	**Tick if attached** ☐ ☐

Part 1	**READ AND KEEP THIS PART**

D. Safety & Risk Management Tenderers must prepare a OSH Management Documentation covering the following criteria.	**Weighting** **10%**
a) Project Risk Assessment *b) Contractor / Subcontractor inductions procedures.* *c) Current Lost Time Injury Statistics* *d) Proposed JSA's* *e) Procedures for managing the interface with pedestrians & Public* *f) Community consultation procedures.* *g) Safety Management Plan*	**Tick if attached** ☐ ☐ ☐ ☐ ☐ ☐ ☐

Part 3	READ AND KEEP THIS PART

Part 2 - FORMAL INSTRUMENT OF AGREEMENT

AGREEMENT made on the _____ of _____ 2014

BETWEEN:

_____

ABN_____

of:_____

_____

(the Contractor)

AND

Shire of Northam
ABN:
375 Fitzgerald Street NORTHAM WA 6104
(the Principal)

IT IS AGREED that the annexed documents marked as follows form the Contract between the parties and are listed in order of precedence:

Part 2 - Formal Instrument of Agreement

Part 3 – General Conditions of Contract

Part 4 – Annexure Part A (Contract Specifics)

Part 5 – Specifications

Part 6 – Drawings

Part 7 - Schedule of Rates

Part 1 – Request For Tender

sign here
►

Contractor Representative

print name

sign here
►

Chief Executive Officer

print name

Part 3 - GENERAL CONDITIONS OF CONTRACT (AS4000)

(It is the responsibility of the tenderer to obtain their own copy of AS 4000)

Part 3	READ AND KEEP THIS PART

Part 4 – ANNEXURE PART A

Part 5	COMPLETE AND RETURN THIS PART

Part 5 - SPECIFICATIONS

The following Specifications are included in these contract works

- WALGA Appendix 2 - Granular Pavement Materials
- WALGA Appendix 3 - IPWEA - AAPA Asphalt
- WALGA Appendix 6 - Earthworks & Pavement Construction
- WALGA Appendix 8 - Aggregates & Cementitious Binders
- WALGA Appendix 10 - Traffic Management

March 2012

SPECIFICATION

WALGA SPECIFICATIONS

Appendix Two - Granular Pavement Materials

Submitted to:
Mr Andrew Blitz
Western Australian Local Government Association
PO Box 1544
WEST PERTH WA 6872

Golder Associates

WALGA SPECIFICATION
GRANULAR PAVEMENT MATERIALS SPECIFICATIONS
REVISION REGISTER

Date	Clause Number	Description of Revision	Authorised By

Table of Contents

TABLES

1.0 SCOPE

This standard specifies the requirements of unbound (and lightly bound) granular pavement materials including basecourse and sub-base materials. The standard covers crushed or otherwise manufacture materials and naturally occurring materials such as laterite gravels. Specifications for the supply of road making materials sourced from by-products of the construction and demolition industry are provided in IPWEA Specification and Performance of Recycled Road Pavements.

Specifications are provided to suite a range of traffic and climatic conditions to allow selection to the optimum local materials to suite the conditions of use.

The specifications are based on use of the materials in a well drained sealed pavement and assume good practice road construction processes will be used.

The gravel specifications are based on lateritic materials but alternative materials may be used if local experience supports their use.

Quotations are to be supplied as set out in a Schedule of Rates included in Annexure A1 and in a Lump Sum Bill of Quantities included in Annexure A2.

Acknowledgment: *The use of Main Roads WA specifications and guidelines and the Institute of Public Works Engineering Australia (WA Division) Local Government Guidelines for Subdivisional Development are gratefully acknowledged as the basis for these specifications.*

2.0 REFERENCES

Australian standards, MAIN ROADS Western Australia Standards And Main Roads Western Australia Test Methods are referred to in abbreviated form (e.g. AS 1234, MRS 67-08-43 or WA 123). For convenience, the full titles are shown below.

Equivalent Australian Standard test methods may be substituted for the Main Roads test methods quoted in the specifications.

Australian Standards

AS 1141	Methods for Sampling and Testing Aggregates
AS 1289	Methods of Testing Soils for Engineering Purposes
AS 1672	Limes and Limestones for Building
AS 3972	Portland and Blended Cement
AS 2008	Residual Bitumen for Pavements
AS 1160	Bitumen Emulsion for Construction and Maintenance of Pavements
AS 4133.4.1	Point Load Index
AS 1141.22	Wet/Dry Strength Variation
AS 1141.26	Secondary Mineral Content
AS 1141.29	Accelerated Soundness

Austroads Test Methods

AG:PT/T053 Determination of Permanent Deformation and Resilient Modulus Characteristics of Unbound Granular Materials Under Drained Conditions

MAIN ROADS Publications

A guide to the Selection and Use of Naturally Occurring Materials as Base and Subbase inroads in Western Australia

MAIN ROADS Test Methods

WA 0.1	Random Sample Site Location
WA 100.1	Sampling Procedures for Soil and Granular Pavement Materials
WA 105.1	Preparation of Disturbed Soil and Granular Pavement Material Samples
WA 110.1	Moisture Content: Convection Oven Method
WA 110.2	Moisture Content: Microwave Oven Method
WA 115.1	Particle Size Distribution: Sieving and Decantation Method
WA 115.2	Particle Size Distribution: Abbreviated Method for Coarse Materials
WA 120.2	Liquid Limit: Cone Penetrometer Method
WA 122.1	Plasticity Index
WA 123.1	Linear Shrinkage
WA 133.1	Dry Density/Moisture Content Relationship: Modified Compaction Fine and Medium Grained Soils
WA 133.2	Dry Density/Moisture Content Relationship: Modified Compaction Coarse Grained Soils
WA 134.1	Dry Density Ratio
WA 136.1	Moisture Ratio (Percent)
WA 140.1	Maximum Dry Compressive Strength
WA 141.1	California Bearing Ratio
WA 143.1	Determination of the Unconfined Compressive Strength of Laboratory Compacted Specimens
WA 216.1	Flakiness Index
WA 220.1	Los Angeles Abrasion Value
WA 220.2	Los Angeles Abrasion Value of Crushed Limestone
WA 717.1	Dispersion of Bitumen in Soil
WA 717.1	Bitumen Dispersion
WA 910.1	Chlorides and Total Soluble Salts in Soils and Water
WA 915.1	Calcium Carbonate Content

MAIN ROADS Specifications

SPECIFICATION 501	PAVEMENTS
SPECIFICATION 201	QUALITY SYSTEMS

WALGA Specifications

WALGA SPECIFICATION	GRANULAR PAVEMENT MATERIALS
WALGA SPECIFICATION	SPRAYED BITUMINOUS SURFACING
IPEA/AAPA TECHNICAL SPECIFICATION FOR SUPPLY AND LAYING OF ASPHALT	
WALGA SPECIFICATION	EARTHWORKS AND PAVEMENT CONSTRUCTION

Acts and Regulations

Environmental Protection Act 1986
Environmental Protection Regulations 1987
Aboriginal Heritage Act 1972
Wildlife Conservation Act 1950
Environmental Protection (Clearing of Native Vegetation) Regs 2004
Health Pesticide Regulations 1956
Dangerous Goods Safety (Road and Rail Transport of Non-explosives) Regulations 2007
Occupational Safety and Health Act 1984
Occupational Safety and Health Regulations 1996
Rail Safety Act
Road Traffic Code 2000
Main Roads Act 1930

3.0 DEFINITIONS

The following particular definitions shall apply:

- ”pavement” shall be any layer above subgrade and will include shoulders.
- “basecourse” shall be any granular layer immediately beneath the bituminous wearing surface of a sealed road or the top layer of a granular pavement structure.
- “sub-base” shall be the material laid on the subgrade below the base to provide extra pavement thickness or to provide a working platform.
- “equivalent standard axle” (ESA), the number of standard axle loads that are equivalent in damaging effect on a pavement to a standard axle load of 8.2 tonne applied over a single axle with dual tyred wheels at each end of the axle.

4.0 CRUSHED ROCK BASECOURSE MATERIALS

4.1 Type 1.1 Crushed Rock Basecourse Material

4.1.1 Applications

Type 1.1 Crushed rock basecourse material is suitable for use on all classes of road including freeways and controlled access highways.

4.1.2 General

All crushed rock base shall consist of a uniformly blended mixture of coarse and fine aggregate.

Coarse aggregate (retained 4.75 mm sieve) shall consist of clean, hard, durable, angular fragments of rock produced by crushing sound unweathered rock and shall not include materials which break up when alternately wetted and dried.

Fine aggregate (passing 4.75 mm sieve) shall consist of crushed rock fragments or a mixture of crushed rock fragments with natural sand or clayey sand. Crushed rock fine aggregate from each source shall, except as to size, comply with all the provisions specified for coarse aggregate.

The mixture of fine and coarse aggregate forming the rock base shall be free from vegetable matter, lumps of clay, overburden, or any other deleterious matter.

4.1.3 Particle Size Distribution

The Particle Size Distribution of the material when tested in accordance with Test Method WA 115.1 shall comply with the requirements shown in Table 1. The grading of material passing the 37.5 mm sieve shall vary from coarse to fine in a uniform and consistent manner. The material shall not be gap graded as represented by the grading crossing from the maximum limit for one sieve size to the minimum limit for another sieve size, and shall conform as closely as possible to the specified target grading.

Table 1: Type 1.1 Crushed Rock Base Particle Size Distribution

AS 1152 Sieve Size (mm)	% Passing by Mass Target Grading	% Passing by Mass Minimum and Maximum Limits
26.5		100
19.0	100	95-100
13.2	82	70-90
9.5	70	60-80
4.75	50	40-60
2.36	38	30-45
1.18	25	20-35
0.600	19	13-27
0.425	17	11-23
0.300	13	8-20
0.150	10	5-14
0.075	8	5-11

4.1.4 Other Acceptance Limits

The crushed rock base shall also meet the other limits as shown in Table 2.

Table 2: Type 1.1 Crushed Rock Base Other Acceptance Limits

Test	Limits	Test Method
Dust Ratio (% passing 0.075 mm sieve/% passing 0.425 mm sieve)	0.35 to 0.6	-
Liquid Limit (Cone Penetrometer)	25% Maximum	WA120.2
Linear Shrinkage	2.0% Maximum 0.4% Minimum	WA123.1
Flakiness Index	30% Maximum	WA 216.1
Los Angeles Abrasion Value	35% Maximum	WA 220.1
Maximum Dry Compressive Strength	1.7 MPa Minimum	WA 140.1
California Bearing Ratio (Soaked 4 days) at 99% of MDD and 100% of OMC	100% Minimum	WA141.1
Wet/Dry Strength Variation	35% Maximum	AS1141.22
Secondary mineral content in basic igneous rock	25% Maximum	AS 1141.26
Accelerated soundness index by reflux	94% Minimum	AS 1141.29

Notes:

1) The Secondary Mineral Content in Basic Igneous Rock test in Table 2 is only applicable to basic igneous rock.
2) The Accelerated Soundness Index test in Table 2 is only applicable to basic igneous rock.

4.1.5 Moisture Content

Crushed rock base shall be thoroughly mixed with water using a pugmill to produce a homogeneous product suitable for placement into final position.

Crushed rock base shall be pre-wet to greater than 95% of the Optimum Moisture Content as determined by Test Method WA 133.1.

4.2 Type 1.2 Crushed Rock Basecourse Material

4.2.1 Applications

Type 1.2 Crushed rock basecourse material is suitable for use on most WALGA Member roads.

4.2.2 General

All crushed rock base shall consist of a uniformly blended mixture of coarse and fine aggregate.

Coarse aggregate (retained 4.75 mm sieve) shall consist of clean, hard, durable, angular fragments of rock produced by crushing sound unweathered rock and shall not include materials which break up when alternately wetted and dried.

Fine aggregate (passing 4.75 mm sieve) shall consist of crushed rock fragments or a mixture of crushed rock fragments with natural sand or clayey sand. Crushed rock fine aggregate from each source shall, except as to size, comply with all the provisions specified for coarse aggregate.

The mixture of fine and coarse aggregate forming the rock base shall be free from vegetable matter, lumps of clay, overburden, or any other deleterious matter.

4.2.3 Particle Size Distribution

The Particle Size Distribution of the material when tested in accordance with Test Method WA 115.1 shall comply with the requirements shown in Table 3. The grading of material passing the 37.5 mm sieve shall vary from coarse to fine in a uniform and consistent manner. The material shall not be gap graded as represented by the grading crossing from the maximum limit for one sieve size to the minimum limit for another sieve size, and shall conform as closely as possible to ton he specified target grading.

Table 3: Type 2.1 Crushed Rock Base Particle Size Distribution

AS 1152 Sieve Size (mm)	% Passing by Mass Target Grading	% Passing by Mass Minimum and Maximum Limits
19.0	100	100
9.5	75	70-80
4.75	52	40-65
2.36	40	30-50
0.425	21	12-30
0.075	7	3-12

4.2.4 Other Acceptance Limits

The crushed rock base shall also meet the other limits as shown in Table 4.

Table 4: Type 2.1 Crushed Rock Base Other Acceptance Limits

Test	Limits	Test Method
Dust Ratio (% passing 0.075 mm sieve/% passing 0.425 mm sieve)	0.4 to 0.6	-
Plastic Limit	20% Maximum	WA 120.2
Liquid Limit (Cone Penetrometer)	25% Maximum	WA120.2
Plasticity Index	5% Maximum	WA 120.2
Linear Shrinkage	1% Maximum	WA123.1
Flakiness Index	30% Maximum	WA 216.1
Los Angeles Abrasion Value	35% Maximum	WA 220.1
Maximum Dry Compressive Strength	1.75 MPa Minimum	WA 140.1
California Bearing Ratio (Soaked 4 days) at 99% of MDD and 100% of OMC	100% Minimum	WA141.1
Wet/Dry Strength Variation	35% Maximum	AS1141.22
Secondary mineral content in basic igneous rock	25% Maximum	AS 1141.26
Accelerated soundness index by reflux	94% Minimum	AS 1141.29

Notes:

2) The Secondary Mineral Content in Basic Igneous Rock test in Table 4 is only applicable to basic igneous rock.

3) The Accelerated Soundness Index test in Table 4 is only applicable to basic igneous rock.

4.2.5 Moisture Content

Crushed rock base shall be thoroughly mixed with water using a pugmill to produce a homogeneous product suitable for placement into final position.

Crushed rock base shall be pre-wet to greater than 95% of the Optimum Moisture Content as determined by Test Method WA 133.1.

5.0 GRAVEL BASECOURSE MATERIALS

5.1 Type 2.1 Gravel Basecourse Material

5.1.1 Applications

Type 2.1 Gravel basecourse material is suitable for use with a design traffic loading of up to 1×10^7 ESAs except on freeways and controlled access highways in the metropolitan area (Gravel basecourse is not suitable for use in freeways and controlled access highways in the metropolitan area).

5.1.2 General

Gravel basecourse material shall consist of durable pebble in soil mortar. The material shall be free from particles having any dimension greater than 50 mm and free from clods, stumps, roots, sticks, vegetable matter or other deleterious materials. Basecourse material having any particle dimension greater that 50 mm shall be deemed oversize and shall not be accepted.

5.1.3 Particle Size Distribution

The Particle Size Distribution shall be determined in accordance with Test Method WA 115.1. The particle size distribution of the portion passing a 37.5 mm AS sieve shall conform to the grading limits shown in Table 5. The grading of material passing the 37.5 mm sieve shall vary from coarse to fine in a uniform and consistent manner. The material shall not be gap graded as represented by the grading crossing from the maximum limit for one sieve size to the minimum limit for another sieve size, and shall conform as closely as possible to the specified target grading.

Table 5: Type 2.1 Basecourse Particle Size Distribution

As Sieve Size (mm)	% Passing by Mass Target Grading	% Passing by Mass Minimum and Maximum Limits
37.5	100	100
19.0	80	72-100
9.5	57	50-78
4.75	43	36-58
2.36	31	25-44
1.18	23	18-35
0.600	18	13-28
0.425	15	11-25
0.300	13	9-22
0.150	9	6-17
0.075	7	4-13
0.0135	4	2-9

5.1.4 Other Acceptance Limits

The material shall also comply with the limits shown in Table 6.

Table 6: Type 2.1 Gravel Basecourse Other Acceptance Limits

Test	Limits	Test Method
Dust Ratio (% passing 0.075 mm sieve/% passing 0.425 mm sieve)	0.3 to 0.6	-
Liquid limit	25% Maximum	WA 120.2
Linear Shrinkage	2% Maximum	WA 123.1
Maximum Dry Compressive Strength	2.3 MPa Minimum	WA140.1
California Bearing Ratio (Soaked 4 days) at 96% of MDD and 100% of OMC	80% Minimum	WA 141.1
Secondary mineral content in basic igneous rock	25% Maximum	AS 1141.26
Accelerated soundness index by reflux	94% Minimum	AS 1141.29

Notes:

1) The Secondary Mineral Content in Basic Igneous Rock test in Table 6 is only applicable to basic igneous rock.
2) The Accelerated Soundness Index test in Table 6 is only applicable to basic igneous rock.

5.2 Type 2.2 Gravel Basecourse Material

5.2.1 Applications

Type 2.2 Gravel basecourse material is suitable for use on roads with a design traffic loading of less than 5×10^6 ESAs (Gravel basecourse is not suitable for use in freeways and controlled access highways in the metropolitan area).

5.2.2 General

Gravel basecourse material shall consist of durable pebble in soil mortar. The material shall be free from particles having any dimension greater than 50 mm and free from clods, stumps, roots, sticks, vegetable matter or other deleterious materials. Basecourse material having any particle dimension greater that 50 mm shall be deemed oversize and shall not be accepted.

5.2.3 Particle Size Distribution

The Particle Size Distribution shall be determined in accordance with Test Method WA 115.1. The particle size distribution of the portion passing a 37.5 mm AS sieve shall conform to the grading limits shown in Table 7. The grading of material passing the 37.5 mm sieve shall vary from coarse to fine in a uniform and consistent manner. The material shall not be gap graded as represented by the grading crossing from the maximum limit for one sieve size to the minimum limit for another sieve size, and shall conform as closely as possible to the specified target grading.

Table 7: Type 2.2 Gravel Basecourse Particle Size Distribution

As Sieve Size (mm)	% Passing by Mass Target Grading	% Passing by Mass Minimum and Maximum Limits
37.5	100	100
19.0	74	71-100
9.5	54	50-81
4.75	40	36-66
2.36	29	25-53
1.18	21	18-43
0.425	13	11-32
0.075	6	4-19
0.0135	3	2-9

5.2.4 Other Acceptance Limits

The material shall also comply with the limits shown in Table 8.

Table 8: Type 2.2 Gravel Basecourse Other Acceptance Limits

Test	Limits	Test Method
Dust Ratio (% passing 0.075 mm sieve/% passing 0.425 mm sieve)	0.3 to 0.7	-
Liquid limit	25% Maximum	WA 120.2
Plasticity Index	6% Maximum	WA 120.2
Linear Shrinkage	3% Maximum	WA 123.1
Maximum Dry Compressive Strength	2.3 MPa Minimum	WA140.1
California Bearing Ratio (Soaked 4 days) at 96% of MDD and 100% of OMC	80% Minimum	WA 141.1
$P_{0.425}$ × Linear Shrinkage	150 Maximum	-
Secondary mineral content in basic igneous rock	25% Maximum	AS 1141.26
Accelerated soundness index by reflux	94% Minimum	AS 1141.29

Notes:

1) The Secondary Mineral Content in Basic Igneous Rock test in Table 8 is only applicable to basic igneous rock.
2) The Accelerated Soundness Index test in Table 8 is only applicable to basic igneous rock.

5.3 Type 2.3 Gravel Basecourse Material

5.3.1 Applications

Type 2.3 Gravel basecourse material is suitable for use on roads with a design traffic loading of less than 5×10^6 ESAs in arid or semi-arid hot or warm areas of the state. It is also suitable for use on roads with a design traffic of less than × 10^6 ESAs in sub-humid hot and sub-humid warm areas of the state (See map in Annexure B for suitable areas).

5.3.2 General

Gravel basecourse material shall consist of durable pebble in soil mortar. The material shall be free from particles having any dimension greater than 50 mm and free from clods, stumps, roots, sticks, vegetable matter or other deleterious materials. Basecourse material having any particle dimension greater that 50 mm shall be deemed oversize and shall not be accepted.

5.3.3 Particle Size Distribution

The Particle Size Distribution shall be determined in accordance with Test Method WA 115.1. The particle size distribution of the portion passing a 37.5 mm AS sieve shall conform to the grading limits shown in Table 9. The grading of material passing the 37.5 mm sieve shall vary from coarse to fine in a uniform and consistent manner. The material shall not be gap graded as represented by the grading crossing from the maximum limit for one sieve size to the minimum limit for another sieve size, and shall conform as closely as possible to the specified target grading.

Table 9: Type 2.3 Basecourse Particle Size Distribution

As Sieve Size (mm)	% Passing by Mass Target Grading	% Passing by Mass Minimum and Maximum Limits
37.5		100
19.0	100	95-100
9.5	75	50-100
4.75	58	36-81
2.36	45	25-66
1.18	35	18-53
0.425	25	11-39
0.075	13	4-23
0.0135	6	2-11

5.3.4 Other Acceptance Limits

The material shall also comply with the limits shown in Table 10.

Table 10: Type 2.3 Gravel Basecourse Other Acceptance Limits

Test	Limits	Test Method
Dust Ratio (% passing 0.075 mm sieve/% passing 0.425 mm sieve)	0.3 to 0.7	-
Liquid limit	30% Maximum	WA 120.2
Plasticity Index	10% Maximum	WA 120.2
Linear Shrinkage	5% Maximum	WA 123.1
Maximum Dry Compressive Strength	1.7 MPa Minimum	WA140.1
California Bearing Ratio (Soaked 4 days) at 96% of MDD and 100% of OMC	80% Minimum	WA 141.1
$P_{0.425}$ × Linear Shrinkage	200 Maximum	-
Secondary mineral content in basic igneous rock	25% Maximum	AS 1141.26
Accelerated soundness index by reflux	94% Minimum	AS 1141.29

Notes:

1) The Secondary Mineral Content in Basic Igneous Rock test in Table 5.03.02 is only applicable to basic igneous rock.
2) The Accelerated Soundness Index test in Table 5.03.02 is only applicable to basic igneous rock.

5.4 Type 2.4 Gravel Basecourse Material

5.4.1 Applications

Type 2.4 Gravel basecourse material is suitable for use on roads with a design traffic loading of less than 5×10^5 ESAs in arid hot, arid warm areas of the state, less than 10^5 ESAs in semi-arid hot areas of the state and less than 5×10^4 ESAs in semi-arid warm areas of the state (See map in Annexure B for suitable areas).

5.4.2 General

Gravel basecourse material shall consist of durable pebble in soil mortar. The material shall be free from particles having any dimension greater than 50 mm and free from clods, stumps, roots, sticks, vegetable matter or other deleterious materials. Basecourse material having any particle dimension greater that 50 mm shall be deemed oversize and shall not be accepted.

5.4.3 Particle Size Distribution

The Particle Size Distribution shall be determined in accordance with Test Method WA 115.1. The particle size distribution of the portion passing a 37.5 mm AS sieve shall conform to the grading limits shown in Table 11. The grading of material passing the 37.5 mm sieve shall vary from coarse to fine in a uniform and consistent manner. The material shall not be gap graded as represented by the grading crossing from the maximum limit for one sieve size to the minimum limit for another sieve size, and shall conform as closely as possible to the specified target grading.

Table 11: Type 2.4 Basecourse Particle Size Distribution

As Sieve Size (mm)	% Passing by Mass Target Grading	% Passing by Mass Minimum and Maximum Limits
37.5		100
19.0	100	95-100
9.5	75	50-100
4.75	58	36-81
2.36	45	25-66
1.18	35	18-53
0.425	25	11-39
0.075	13	4-23
0.0135	6	2-11

5.4.4 Other Acceptance Limits

The material shall also comply with the limits shown in Table 12.

Table 12: Type 2.4 Gravel Basecourse Other Acceptance Limits

Test	Limits	Test Method
Dust Ratio (% passing 0.075 mm sieve/% passing 0.425 mm sieve)	0.3 to 0.7	-
Liquid limit	35% Maximum	WA 120.2
Plasticity Index	16% Maximum	WA 120.2
Linear Shrinkage	8% Maximum	WA 123.1
Maximum Dry Compressive Strength	1.7 MPa Minimum	WA140.1
California Bearing Ratio (Soaked 4 days) at 96% of MDD and 100% of OMC	80% Minimum	WA 141.1
$P_{0.425}$ × Linear Shrinkage	250 Maximum	-
Secondary mineral content in basic igneous rock	25% Maximum	AS 1141.26
Accelerated soundness index by reflux	94% Minimum	AS 1141.29

Notes:

1) The Secondary Mineral Content in Basic Igneous Rock test in Table 12 is only applicable to basic igneous rock.
2) The Accelerated Soundness Index test in Table 12 is only applicable to basic igneous rock.

5.5 Type 2.5 Gravel Basecourse Material

5.5.1 Applications

Type 2.5 Gravel basecourse material is suitable for use on most local government roads with a design traffic loading of less than 5×10^6 ESAs.

5.5.2 General

Gravel basecourse material shall consist of durable laterite pebble in soil mortar. The material shall be free from particles having any dimension greater than 50 mm and free from clods, stumps, roots, sticks, vegetable matter or other deleterious materials. Basecourse material having any particle dimension greater that 50 mm shall be deemed oversize and shall not be accepted.

5.5.3 Particle Size Distribution

The Particle Size Distribution shall be determined in accordance with Test Method WA 115.1. The particle size distribution of the portion passing a 37.5 mm AS sieve shall conform to the grading limits shown in Table 13. The grading of material passing the 37.5 mm sieve shall vary from coarse to fine in a uniform and consistent manner. The material shall not be gap graded as represented by the grading crossing from the maximum limit for one sieve size to the minimum limit for another sieve size, and shall conform as closely as possible to the specified target grading.

Table 13: Type 2.5 Basecourse Particle Size Distribution

As Sieve Size (mm)	% Passing by Mass Target Grading	% Passing by Mass Minimum and Maximum Limits
19.0	100	100
4.75	58	45-65
2.36	45	30-50
0.425	25	12-30
0.075	13	0-12

5.5.4 Other Acceptance Limits

The material shall also comply with the limits shown in Table 14.

Table 14: Type 2.5 Gravel Basecourse Other Acceptance Limits

Test	Limits	Test Method
Dust Ratio (% passing 0.075 mm sieve/% passing 0.425 mm sieve)	0.4 to 0.67	-
Plastic Limit	20% Maximum	WA 120.2
Liquid limit	25% Maximum	WA 120.2
Plasticity Index	5% Maximum	WA 120.2
Linear Shrinkage	1% Maximum	WA 123.1
Maximum Dry Compressive Strength	1.7 MPa Minimum	WA140.1
California Bearing Ratio (Soaked 4 days) at 96% of MDD and 100% of OMC	80% Minimum	WA 141.1
$P_{0.425}$ × Linear Shrinkage	250 Maximum	-
Secondary mineral content in basic igneous rock	25% Maximum	AS 1141.26
Accelerated soundness index by reflux	94% Minimum	AS 1141.29

Notes:

1) The Secondary Mineral Content in Basic Igneous Rock test in Table 14 is only applicable to basic igneous rock.
2) The Accelerated Soundness Index test in Table 14 is only applicable to basic igneous rock.

6.0 FERRICRETE BASECOURSE MATERIALS

6.1 Type 3.1 Ferricrete Basecourse Material

6.1.1 Application

Type 3.1 Ferricrete basecourse material is generally suitable for use on most roads except freeways and controlled access highways.

6.1.2 Source Rock

Ferricrete basecourse shall predominantly consist of crushed indurated ferricrete and may include natural fragmented ferricrete and lateritic gravel. For blended materials the proportion of crushed material shall not be less than 50%. The material shall be generally free from organic matter and other deleterious materials.

The source rock shall also conform to the following limits shown in Table 15.

Table 15: Source Rock Acceptance Limits (Ferricrete Basecourse)

Test	Limits	Test Method
Los Angeles Abrasion Value	60% Maximum	WA 220.1

6.1.3 Particle Size Distribution

The Particle Size Distribution of the material when tested in accordance with Test Method WA 115.1 shall comply with the requirements shown in Table 16. The grading of material passing the 37.5 mm sieve shall vary from coarse to fine in a uniform and consistent manner. The material shall not be gap graded as represented by the grading crossing from the maximum limit for one sieve size to the minimum limit for another sieve size, and shall conform as closely as possible to the specified target grading.

Table 16: Type 3.1 Ferricrete Basecourse Particle Size Distribution

AS Sieve Size (mm)	% Passing by Mass Target Grading	% Passing by Mass Minimum and Maximum Limits
37.5	100	100
19	80	72-100
9.5	57	50-78
4.75	43	36-58
2.36	31	25-44
1.18	23	18-35
0.600	18	13-28
0.425	15	11-25
0.300	13	9-22
0.150	9	6-17
0.075	7	4-13
0.0135	4	2-9

6.1.4 Other Acceptance Limits

The material shall also conform to the following limits shown in Table 17.

Table 17: Type 3.1 Ferricrete Basecourse Other Acceptance Limits

Test	Limits	Test Method
Dust Ratio (% passing 0.075 mm sieve/% passing 0.425 mm sieve)	0.3 to 0.7	-
Liquid limit	25% Maximum	WA 120.2
Linear Shrinkage	2% Maximum	WA 123.1
Maximum Dry Compressive Strength	2.3 MPa Minimum	WA 140.1
Maximum Dry Density	2.0 t/m^3 Minimum	WA 133.1
California Bearing Ratio (Soaked 4 days) at 96% of MDD and 100% of OMC	80% Minimum	WA 141.1
Flakiness Index	20% Maximum	WA 216.1

6.2 Type 3.2 Ferricrete Basecourse Material

6.2.1 Application

Type 3.2 Ferricrete basecourse material is suitable for use on roads with a design traffic loading of up to 5 × 10^6 ESAs.

6.2.2 Source Rock

Ferricrete basecourse shall predominantly consist of crushed indurated ferricrete and may include natural fragmented ferricrete and lateritic gravel. For blended materials the proportion of crushed material shall not be less than 50%. The material shall be generally free from organic matter and other deleterious materials.

The source rock shall also conform to the following limits shown in Table 18.

Table 18: Source Rock Acceptance Limits (Ferricrete Basecourse)

Test	Limits	Test Method
Los Angeles Abrasion Value	60% Maximum	WA 220.1

6.2.3 Particle Size Distribution

The Particle Size Distribution of the material when tested in accordance with Test Method WA 115.1 shall comply with the requirements shown in Table 19. The grading of material passing the 37.5 mm sieve shall vary from coarse to fine in a uniform and consistent manner. The material shall not be gap graded as represented by the grading crossing from the maximum limit for one sieve size to the minimum limit for another sieve size, and shall conform as closely as possible to the specified target grading.

Table 19: Type 3.2 Ferricrete Basecourse Particle Size Distribution

AS Sieve Size (mm)	% Passing by Mass Target Grading	% Passing by Mass Minimum and Maximum Limits
37.5	100	100
19	74	71-100
9.5	54	50-81
4.75	40	36-66
2.36	29	25-53
1.18	21	18-43
0.425	13	11-32
0.075	6	4-19
0.0135	3	2-9

6.2.4 Other Acceptance Limits

The material shall also conform to the following limits shown in Table 20.

Table 20: Type 3.2 Ferricrete Basecourse Other Acceptance Limits

Test	Limits	Test Method
Dust Ratio (% passing 0.075 mm sieve/% passing 0.425 mm sieve)	0.3 to 0.7	-
Liquid limit	25% Maximum	WA 120.2
Linear Shrinkage	3% Maximum	WA 123.1
Maximum Dry Compressive Strength	2.3 MPa Minimum	WA 140.1
Maximum Dry Density	2.0 t/m^3 Minimum	WA 133.1
California Bearing Ratio (Soaked 4 days) at 96% of MDD and 100% of OMC	80% Minimum	WA 141.1
Flakiness Index	20% Maximum	WA 216.1

6.3 Type 3.3 Ferricrete Basecourse Material

6.3.1 Application

Type 3.3 Ferricrete basecourse material is suitable for use on most local government roads.

6.3.2 Source Rock

Ferricrete basecourse shall predominantly consist of crushed indurated ferricrete and may include natural fragmented ferricrete and lateritic gravel. For blended materials the proportion of crushed material shall not be less than 60%. The material shall be generally free from organic matter and other deleterious materials.

The source rock shall also conform to the following limits shown in Table 21.

Table 21: Source Rock Acceptance Limits (Ferricrete Basecourse)

Test	Limits	Test Method
Los Angeles Abrasion Value	45% Maximum	WA 220.1
Point Load Index I50 (average of tests on 20 samples)	0.5 MPa Minimum	AS 4133.4.1

6.3.3 Particle Size Distribution

The Particle Size Distribution of the material when tested in accordance with Test Method WA 115.1 shall comply with the requirements shown in Table 22. The grading of material passing the 37.5 mm sieve shall vary from coarse to fine in a uniform and consistent manner. The material shall not be gap graded as represented by the grading crossing from the maximum limit for one sieve size to the minimum limit for another sieve size, and shall conform as closely as possible to the specified target grading.

Table 22: Type 3.3 Ferricrete Basecourse Particle Size Distribution

AS Sieve Size (mm)	% Passing by Mass Target Grading	% Passing by Mass Minimum and Maximum Limits
37.5	100	100
19	74	71-100
9.5	54	50-81
4.75	40	36-66
2.36	29	25-53
1.18	21	18-43
0.425	13	11-32
0.075	6	4-19
0.0135	3	2-9

6.3.4 Other Acceptance Limits

The material shall also conform to the following limits shown in Table 23.

Table 23: Type 3.3 Ferricrete Basecourse Other Acceptance Limits

Test	Limits	Test Method
Dust Ratio (% passing 0.075 mm sieve/% passing 0.425 mm sieve)	0.4 to 0.6	-
Liquid limit	30% Maximum	WA 120.2
Plasticity Index	6% Maximum	WA 120.2
Linear Shrinkage	3% Maximum	WA 123.1
Maximum Dry Compressive Strength	2.3 MPa Minimum	WA 140.1
Maximum Dry Density	2.0 t/m^3 Minimum	WA 133.1
California Bearing Ratio (Soaked 4 days) at 96% of MDD and 100% of OMC	80% Minimum	WA 141.1
Flakiness Index	20% Maximum	WA 216.1

7.0 STABILISED BASECOURSE MATERIALS

7.1 Type 4.1 Bitumen Stabilised Limestone Basecourse Material

7.1.1 Application

Bitumen stabilised limestone (Tamala limestone) basecourse material is suitable for use on all classes of road except freeways and controlled access highways.

7.1.2 General

Bitumen stabilised limestone (BSL) shall be produced by the addition of 2.0% residual bitumen by dry mass of crushed limestone material as specified in this Clause. The limestone shall be free from sand, roots and other foreign material.

The bitumen emulsion used to stabilise (modify) the crushed limestone shall comply with the requirements of AS 1160, “Bitumen Emulsion for Construction and Maintenance of Pavements” for Grade ASS/170-60 emulsion. The emulsifier used in the manufacture of the emulsion shall be Vinsol resin unless otherwise agreed by the WALGA Member Representative. The bitumen used in the manufacture of the emulsion shall be class 170 bitumen conforming to AS 2008, Residual Bitumen for Pavements. Contractors shall nominate the source of supply of bitumen emulsion with their quotation. The Contractor shall make arrangements for the Superintendent to sample the emulsion or any of its components at any time during normal working hours. These arrangements shall include a means of identifying lots of emulsion or the component material, which will be used in the Works.

All water added during the mixing process and field moisture requirements during construction, shall contain a wetting agent such as “Teepol”, “Comprox”, or similar, which shall be added at a rate of 1 L of wetting agent per 4000 L of water used.

All stabilised limestone shall be stockpiled for at least three days before delivery to site. The mixture shall have a moisture content of at least 95% of the Optimum Moisture Content as determined by Test Method WA 133.1. The Moisture Content shall be determined in accordance with Test Method WA 110.1 from samples taken from trucks prior to delivery.

The mixing process shall produce a homogeneous mixture of limestone, bitumen and water in which the bitumen is uniformly distributed in the form of a thin film covering the particles of the crushed limestone. Mixing shall be carried out as either a batch or continuous process in a suitable plant. This plant shall include measuring equipment which will determine the mass of bitumen emulsion added to a known mass of crushed limestone at all stages of the mixing process.

Prior to the use of the plant proposed to be used for the modification process, the Contractor shall certify to the Superintendent that the plant is capable of determining the amount of bitumen emulsion added to the basecourse to within -0.0% to +0.2% of the dry mass of the limestone.

Prior to modification of the basecourse, the Contractor shall give the Superintendent at least three (3) working days notice of such modification.

7.1.3 Particle Size Distribution

The Particle Size Distribution of the BSL after mixing and delivery shall be determined in accordance with Test Method WA 730.1 and shall comply with the details shown in Table 24.

Table 24: Type 4.1 BSL Particle Size Distribution

As Sieve Size (mm)	% Passing by Mass Minimum and Maximum Limits
26.50	100
19.00	90-100
4.75	60-90
1.18	35-75
0.075	0-15

7.1.4 Other Acceptance Limits

The Bitumen Stabilised Limestone shall also meet the other acceptance limits as shown in Table 25

Table 25: Type 4.1 BSL Other Acceptance Limits

Test	Limits	Test Method
Los Angeles Abrasion Value of Crushed Limestone	20% Minimum 60% Maximum	WA 220.2
Calcium Carbonate Content	60% Minimum 80% Maximum	WA 915.1
Dispersion of Bitumen in Soil #	Class 1	WA 717.1
Bitumen Content - Centrifuge Method	2.0% Minimum 2.2% Maximum	WA 730.1
Maximum Dry Compressive Strength (unconfined, cured for 1 day and oven dried for 16 hours)	10.5 kPa Minimum	WA 140.1

Compliance for bitumen dispersion of any lot shall be based on the results of the assessment of 3 samples randomly selected from the lot being judged and tested in accordance with Test Method WA 717.1. All results must have a dispersion of Class 1; however the Superintendent may accept the material if one of the three samples has a dispersion of Class 2.

8.0 SUB-BASE MATERIALS

8.1 Type 5.1 Gravel Sub-Base Material

8.1.1 General

Gravel sub-base material shall consist of durable pebble in 4soil mortar. The material shall be free from cobbles greater than 75.0 mm and free from clods, stumps, roots, sticks, vegetable matter or other deleterious materials.

8.1.2 Particle Size Distribution

The sub-base material shall meet the grading requirements shown in Table 26 when tested in accordance with Test Method WA 115.1. The grading of material passing the 75.0 mm sieve shall vary from coarse to fine in a uniform and consistent manner. The material shall not be gap graded as represented by the grading crossing from the maximum limit for one sieve size to the minimum limit for another sieve size.

Table 26: Type 5.1 Gravel Sub-Base Particle Size Distribution

AS Sieve Size (mm)	% Passing by Mass Minimum and Maximum Limits
75.0	100
37.5	80-100
19.0	50-100
9.5	36-81
4.75	25-66
2.36	18-53
1.18	13-43
0.425	8-32
0.075	3-19

8.1.3 Other Acceptance Limits

The material shall also comply with the limits shown in Table 27.

Table 27: Type 5.1 Gravel Sub-Base Other Acceptance Limits

Test	Limits	Test Method
Liquid limit	30% Maximum	WA 120.2
Plasticity Index	10% Maximum	WA 122.1
Linear Shrinkage	4% Maximum	WA 123.1
California Bearing Ratio (Soaked 4 days) at 94% of MDD and 100% of OMC	30% Minimum	WA 141.1

8.2 Type 5.2 Crushed Limestone Sub-Base Material

8.2.1 General

The source material for the supply of crushed limestone (Tamala limestone) shall be free of organic material, clay lumps, cap rock or any other foreign material deleterious to its performance in the pavement.

Note Type 5.2 Crushed Limestone Sub-Base Material may be used as a basecourse material on very low traffic roads where the performance of material from a known source has been proven to provide satisfactory performance for this type of use.

8.2.2 Particle Size Distribution - WA 115.1

The material shall comply with the grading limits shown in Table 28.

Table 28: Type 5.2 Crushed Limestone Sub-Base Particle Size Distribution

AS Sieve Size (mm)	% Passing by Mass Minimum and Maximum Limits
75	100
19	55-85
2.36	35-65
0.075	0-15

8.2.3 Other Acceptance Limits

The material shall also comply with the limits shown in Table 29.

Table 29: Type 5.2 Crushed Limestone Sub-Base Other Acceptance Limits

Test	Limits	Test Method
Los Angeles Abrasion Value of Crushed Limestone	20% Minimum 60% Maximum	WA 220.2
Calcium Carbonate Content	60% Minimum 80% Maximum	WA 915.1
California Bearing Ratio (Soaked 4 days) at 94% of MDD and 100% of OMC	50% Minimum	WA 141.1

9.0 MATERIAL QUALITY

The pavement material supply Contractor shall implement a quality control system to ensure material supplied under this contract complies in all respects to the specified requirements for the type of material purchased.

The quality system shall include the minimum testing requirements given in Table 30 unless otherwise approved by the WALGA Member.

Testing shall be carried out in accordance with the relevant Main Roads or equivalent Australian Standard test method. Unless otherwise approved by the WALGA Member all Test Reports/Certificates shall be NATA endorsed.

Prior to the supply of any material the Contractor shall certify that material supplied by the Contractor complies in all respects with the specified requirements and shall provide test certificates that demonstrate compliance.

The Contractor shall provide ready access of WALGA Member representative to inspect the quarry, pit or production and or manufacturing site and to take samples.

Table 30: Minimum Testing Frequency

Sub-Base	**for control of SUB-BASE SUPPLIED BY THE CONTRACTOR:**	
	• PSD (WA 115.1)	1 per 1,000 m^3 of stockpile
	• LA Abrasion (WA 220.2)	1 per 5,000 m^3 of stockpile
	• $CaCO_3$ (WA 915.1)	1 per 5,000 m^3 of stockpile
	• MDCS (WA 140.1)	1 per 5,000 m^3 of stockpile
	• Liquid Limit (WA 120.2)	1 per 1,000 m^3 of stockpile
	• Plasticity Index (WA 122.1)	1 per 1,000 m^3 of stockpile
	• Linear Shrinkage (WA 123.1)	1 per 1,000 m^3 of stockpile
	• Soaked CBR (WA 141.1)	1 per 5,000 m^3 of stockpile
Basecourse	FOR CONTROL OF BASECOURSE SUPPLIED BY THE CONTRACTOR	
	• PSD (WA 115.1)	1 per 1,000m^3 of stockpile
	• LA Abrasion (WA 220.1)	1 per 5,000m^3 of stockpile
	• Flakiness Index (WA 216.1)	1 per 5,000m^3 of stockpile
	• $CaCO_3$ (WA 915.1)	1 per 5,000m^3 of stockpile
	• MDCS (WA 140.1)	1 per 5,000m^3 of stockpile
	• Liquid Limit (WA 120.2)	1 per 1,000m^3 of stockpile
	• Plasticity Index (WA 122.1)	1 per 1,000m^3 of stockpile
	• Linear Shrinkage (WA 123.1)	1 per 1,000m^3 of stockpile
	• Dust Ratio (Contract)	1 per 1,000m^3 of stockpile
	• Soaked CBR (WA 141.1)	1 per 5,000m^3 of stockpile
	• Wet/Dry Strength Variation (AS 1141.22)	1 per 5,000m^3 of stockpile
	• Secondary mineral content in basic igneous rock (AS 1141.26)	1 per 10,000m^3 of stockpile
	• Accelerated soundness index by reflux (AS 1141.29)	1 per 10,000m^3 of stockpile
	• PSD & Bitumen Content (WA 730.1)	1 per 5,000m^3 of stockpile
	• LA Abrasion for bitumen stabilised limestone (WA 220.2)	1 per 5,000m^3 of stockpile
	• Bitumen Emulsion (AS 1160)	1 per 10,000m^3 of stockpile
	• Bitumen Dispersion (WA 717.1)	1 per 1,000m^3 of stockpile
	• Emulsifiers & Wetting Agents (as per Tech Spec)	Information to be provided by the Supplier

10.0 SUPPLY OF MATERIALS

The source of the pavement materials supplied by the Contractor shall be nominated with the quotation.

Where specified, the Contractor shall supply the materials into nominated stockpile sites at the time specified by the WALGA Member and shall make all necessary arrangements with the WALGA Member Representative concerning load size, rate for supply, timing of the delivery and documentation. Different material types shall be placed in clearly identified and separate stockpiles.

Any contamination of material during delivery or stockpiling that is due in any way to the Contractor's activities shall be corrected at no cost to the WALGA Member.

Where specified, the Contractor shall provide for the WALGA Member to have ready access to the quarry or pit and shall load the WALGA Member trucks with the specified material.

11.0 REGULATORY REQUIREMENTS

The Contractor shall conform to all statutory and regulatory requirements concerning the environment, aboriginal heritage, wildlife conservation, dangerous goods, occupational safety and health, rail safety, and road safety.

12.0 ANNEXURE A1 – SCHEDULE OF RATES

The quantities in this Schedule of Rates are the estimated quantities of the Works and are not to be taken as the actual or correct quantities. The Contractor shall be paid for the measured quantity of each section or item of work described below and executed under the contract at the rates and amounts entered applicable thereto.

Item	Description	Unit	Qty	Rate (i)	Amount	
					$	¢
1	Type 1.1 CRB	m^3				
2	Type 1.2 CRB	m^3				
3	Type 2.1 Gravel	m^3				
4	Type 2.2 Gravel	m^3				
5	Type 2.3 Gravel	m^3				
6	Type 2.4 Gravel	m^3				
	Type 2.5 Gravel	m^3				
	Type 3.1 Ferricrete	m^3				
	Type 3.2 Ferricrete	m^3				
	Type 3.3 Ferricrete	m^3				
	Type 4.1 BSL	m^3				
	Type 5.1 Gravel Sub-base	m^3				
	Type 5.2 Crushed Limestone Sub-base	m^3				
	Cartage	m^3/km				
GST EXCLUSIVE TOTAL						
GST AMOUNT						
TOTAL AMOUNT OF QUOTE						

Note (i): Rate to include all overheads, incidentals, mobilisation and demobilisations, testing and aggregate loading.

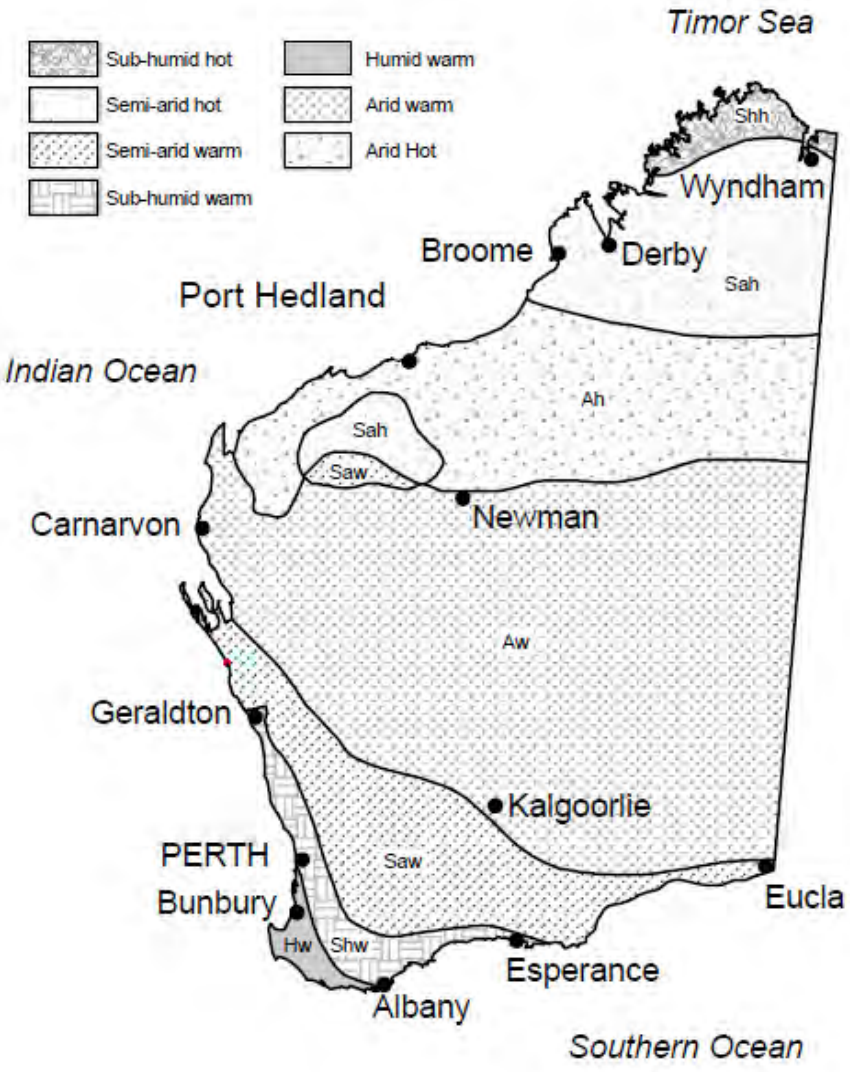
13.0 ANNEXURE A2 – PRICE SCHEDULE (LUMP SUM BILL OF QUANTITIES)

All items in this Bill of Quantities shall be priced and extended by the Contractor and the lump sum accepted by the WALGA Member shall equal the TOTAL AMOUNT GST INCLUSIVE. Any errors in the rates or prices entered in this Schedule shall be corrected by agreement between the Contractor and the WALGA Member. Where no agreement can be reached, any errors shall be corrected as determined by the WALGA Member so that the total amount of quotation for all items in this Schedule continues to equal the lump sum accepted by the WALGA Member.

Item	Description	Unit	Qty	Rate (i)	Amount	
1	Type 1.1 CRB	m^3			$	¢
2	Type 1.2 CRB	m^3				
3	Type 2.1 Gravel	m^3				
4	Type 2.2 Gravel	m^3				
5	Type 2.3 Gravel	m^3				
6	Type 2.4 Gravel	m^3				
	Type 2.5 Gravel	m^3				
	Type 3.1 Ferricrete	m^3				
	Type 3.2 Ferricrete	m^3				
	Type 3.3 Ferricrete	m^3				
	Type 4.1 BSL	m^3				
	Type 5.1 Gravel Sub-base	m^3				
	Type 5.2 Crushed Limestone Sub-base	m^3				
	Type 1.1 CRB	m^3				
	Type 1.2 CRB	m^3				
	Type 2.1 Gravel	m^3				
	Type 2.2 Gravel	m^3				
	Type 2.3 Gravel	m^3				
	Type 2.4 Gravel	m^3				
	Type 2.5 Gravel	m^3				
	Type 3.1 Ferricrete	m^3				
	Type 3.2 Ferricrete	m^3				
	Type 4.1 BSL	m^3				
	Type 5.1 Gravel Sub-base	m^3				
	Type 5.2 Crushed Limestone Sub-base	m^3				
	Cartage	m^3/km				
				GST EXCLUSIVE TOTAL		
				GST AMOUNT		
				TOTAL AMOUNT OF QUOTE		

Note (i): Rate to include all overheads, incidentals, mobilisation and demobilisations, testing and aggregate loading.

14.0 ANNEXURE B - GRAVEL TYPE SELECTION FOR CLIMATIC REGIONS AND TRAFFIC



Climatic Regions of Western Australia
Thornthwaite's Method (After Gentilli 1972)

Gravel Type Selection for Climatic Regions and Traffic

Climatic Region	Traffic Loading (ESAs)				
	≤5 × 10^6	≤10^6	≤5 × 10^5	≤10^5	≤5 × 10^4
	Type of Gravel				
Sub-humid hot	2.2	2.2	2.2	2.3	2.3
Semi-arid hot	2.3	2.3	2.3	2.4	2.4
Arid hot	2.3	2.3	2.4	2.4	2.4
Arid warm	2.3	2.3	2.4	2.4	2.4
Semi-arid warm	2.3	2.3	2.3	2.3	2.4
Sub-humid warm	2.2	2.2	2.2	2.3	2.3
Humid warm	2.2	2.2	2.2	2.2	2.2

Note gravel selection in accordance with these criteria assumes that the pavement will be well drained and not subject to inundation.

Report Signature Page

GOLDER ASSOCIATES PTY LTD

Reg Leach
Senior Consultant - Pavements and Surfacing

RDL/DK/shp

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APPENDIX THREE – IPWEA/APPA SPECIFICATION FOR THE SUPPLY AND LAYING OF HOT ASPHALT ROAD SURFACING

WALGA greatfully acknowledges the consent of IPWEA and APPA to apply this industry standard specification to it's Preferred Supplier Contract.

The Specification below is an approved draft. Should any variations be made through the period of Tender, an addendum will be issued, or an approved final variation will be adopted through contracting.

WALGA has, in accordance with the terms of use, not amended this Specification. The following points are made with respect to its use by WALGA Members for the purposes of WALGA's preferred Supply:

- For the purposes of Preferred Supply the term "Council" is interchangable with "WALGA Member"

- Clause 1.3 should be operated in conjunction with the WALGA General Conditions of Contract. In the instance of any conflict of Terms, the WALGA General Conditions of Contract will take precedence.

- For the purposes of Preferred Supply, Clause 1.4 should read "Where applicable this specification should be read in conjunction with the WALGA General Conditions of Contract."

- Througout the document the word "Tenderer" should be replaced by "WALGA Member"

- Throughout the document the word "tender" should be replaced by the word "quotation".

- Clause 5 relates to disputes over testing only. All other disputes resolution is in accordance with the WALGA General Conditions of Contract.

- Clause 9.5, Traffic Management Control, will not be applicable where otherwise covered by the WALGA Preferred Supplier Contract.

- Clause 11 may be applied in conjunction with the WALGA General Conditions of Contract. Should any conflict arise, the WALGA General Conditions of Contract will take precedence.

- Clause 12 will not be applicable to the WALGA Preferred Supply. Local Government access to the WALGA Contract will be on the basis of quotation, and the WALGA E-Quotes facility is available to support this. Local Governments may however choose to apply the weightings recommended within this clause to the consideration of their quote.

- The covernote to Appendix 4 “Form of Tender” will similarly not bear relevance to the WALGA Preferred Supplier contract structure, particularly though the E-Quotes medium of access. The price schedule templates however may be utilised by WALGA Members through the quotation process.

The WALGA Contract Manager is able to advise on any other matters pertaining to the application of this Specification to the WALGA Preferred Supplier Contract for Roadbuilding and Related Services.

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA (WA BRANCH)

AUSTRALIAN ASPHALT PAVEMENT ASSOCIATION (WA BRANCH)

TECHNICAL SPECIFICATION, TENDER FORM AND SCHEDULE
FOR SUPPLY AND LAYING OF HOT ASPHALT ROAD SURFACING

Revision No 3
Date: March 2012

1. TABLE OF CONTENTS

TECHNICAL SPECIFICATION, TENDER FORM AND SCHEDULE

FOR SUPPLY AND LAYING OF HOT ASPHALT ROAD SURFACING

FOREWORD

This specification has been produced jointly by the Institute of Public Works Engineering Australia WA Division (IPWEA) and the Australian Asphalt Pavement Association WA Branch (AAPA) to complement Australian Standards AS 2150 – Hot Mix Asphalt – A Guide to Good Practice and, AAPA Stone Mastic Asphalt Design & Application Guide – 2000

This document is the third revision of the original IPWEA Asphalt Specification produced in December 1995 and based on the very original AAPA specification which had been in use by both Local Government and private for some 20 years previous. This revision has been undertaken jointly by IPWEA and AAPA.

This Specification is a stand-alone document and no part should be altered . Any user wishing to make variations must nominate all variances in the Table of **Variations to Specification** in Appendix 1.

The issue of penalty deductions for pavements not meeting the required conformance criteria is an important issue. Most Contractors involved in the industry are highly professional organisations committed to providing a high standard of service to their Customers. Penalty deductions should be given careful consideration before application, and it is recommended that Superintendents apply penalties prudently, specifically in cases where Contractors are continuously failing to meet the specification requirements and are not making any effort to overcome the problem. It would not be recommended that penalty deductions be made for isolated occurrences of conditional conformance or when there is obvious effort by the Contractor to determine the cause of a problem and work towards a solution.

RECORD OF REVISIONS

REVISION No.	DATE	DETAILS
0	December 1995	Original Version.
1	May 1998	Testing requirements modified; several minor amendments.
2	April 2002	Amended clauses and tables throughout.
3	September2 011	Major re write

FOR SUPPLY AND LAYING OF HOT ASPHALT ROAD SURFACING

1. SCOPE OF SPECIFICATION

1.1 Specification Documents

This Specification is to be read in conjunction with Australian Standards AS 2150 - Hot Mix Asphalt – A guide to Good Practice, AS 2008 - Residual Bitumen for Pavements, AAPA Stone Mastic Asphalt Design & Application Guide – 2000.

Where conflict exists, the requirements of this specification will be met.

Interpretation of Terms

"Australian Standard (AS)" refers to, the quoted Australian Standard document, current at March 2008.

"All tonnages" - Where all tonnages is included in the schedule of rates, the Contractor will charge these rates when the Council presents the contractor with a programme of works, not including hand work, that totals more than 650 tonne. The contractor shall have the sole discretion to submit a tender in such form.

"Contract" - shall mean and include the Tender, Contract, General Conditions, Schedule of Quantities, Schedule of Rates, Specifications and all plans, drawings and other schedules.

"Contractor" - shall mean the person or persons, corporation or corporations whose tender is accepted by the Council, and shall include the executors or administrators, successors and assigns of such person or persons, corporation or corporations.

"Council" - shall mean Council specified in the General Conditions of Tender and/or Contract.

"Job Mix" - The job mix is the mix design produced within the broad targets of the specification, and subject to tolerance given in Table 11 of AS 2150.

"Job Size" – shall mean the number of asphalt tonnes laid at one location. If it is possible to lay asphalt at a number of locations in one day and mobilization of machinery is not required, the day's production shall be considered in total. If however, plant and machinery must be mobilized, the sites shall be considered individually.

"MRWA Test Methods" are the Main Roads WA test method, current at time of tender. "Mobilization"

shall be defined as the requirement for machinery to be transported by truck.

"Pay factor" means the calculated proportion of the whole payment to be paid to the Contractor subject to conformance with this document.

"Payment penalty" means the actual reduction in payment resulting from the pay factor.
"Superintending Officer" - shall mean any person who from time to time shall be entrusted to superintend the works on behalf of the Council.

"Test Lot" – refers to any area subjected to conformance testing and the extent of the test lot shall be defined by the Superintending Officer. The test lot may be a days work on a large job, a single street, or two or more small jobs or streets providing that the mix used is

homogeneous within the lot. It may also consist of a subsection of a section of pavement surfacing as determined by the Superintending Officer.

"Works" or "Work" - shall mean the work to be done by the Contractor under the Contract.

Extent Of Works

As specified in Appendix 2- Table of special requirements

Tender Prices, Mix Designs And Rise and Fall

Tender prices shall be submitted as being fixed for the initial twelve month period, except for the rise and fall in the cost of bitumen which will constitute an adjustment at any time in the contract period.

At the end of each 12 month period of the contract, an increase in the tender price based on CPI (Perth) shall be applied based on the initial tender price**.** All increases must be submitted for approval within 60 days of occurrence and contract anniversary date in the case of CPI.

Adjustments for the cost of bitumen will only be allowed for each $20/t increment in the price of bitumen, and will not be considered until the price has moved by more than $20/t from the tender price and subsequent already varied prices thereafter.

At each request for a price increase due to the rise and fall in the price of bitumen, the contractor shall supply supporting documentation for the nominated bitumen supplier.

Should it be discovered that the Contractor has not passed on to the Council any price reduction due to a fall in the price of bitumen, then the Council may immediately terminate the contract, and the contractor shall, whether the contract is terminated or not, pay to the Council the sum determined as being overpaid to the Contractor.

The calculation for the new contract prices for bitumen variation shall be as follows: - $P = A +$

$(B_c \times B_v)$

The annual calculation for the new contract prices for CPI shall be as follows: -

$$P = A + (I \times CPI)$$

Where:

$P =$ adjusted or new price.
$I =$ initial tender price or adjusted tender price for CPI only from previous years adjustment/s at end of each year.
$A =$ tender price or existing price from previous adjustment.
$B_c =$ the percentage bitumen content by mass of mix as ascertained in Clause 3.2 Job Mixes.
$B_v =$ the variance in the cost of bitumen from tender price or previous varied price.
CPI = variation in Consumer Price Index for Perth as published by Australian Bureau of Statistics for the previous 12 month period.

As there may not be a correspondence between tender anniversary date and CPI publications the previous known12 month figures shall be used for the calculation.

Tender prices for each mix design shall be submitted on the Form of Tender in Appendix 4. Tenderers should give prices for each of the mixes designed to this specification. The tenderer shall provide prices for any additional mix types specified in the Table of Special Requirements in Appendix 2 and shall include any additional costs that may be applicable resulting from Variations to Specification in Appendix 1. Any additional information required by the Table of Special Requirements should be appended to the Tender Form.

Contracts may be awarded for a 1, 2, 3 or 4 year term.

Where the contractor elects, a uniform price for all tonnages may be submitted, and the Council may elect to accept the tender on the basis of "All Tonnages" OR "Job Size" but once the tender is accepted, the method shall remain binding. The contractor must submit prices based on the Job Size listed in the schedule of rates, but is not required to submit a price for all tonnages.

General Conditions of Tender / Contract

Where applicable this specification should be read in conjunction with the Council's General Conditions of Tender and/or Contract.

2. MATERIALS

Aggregate

All aggregates used will meet the requirements of AS 2758.5 – Asphalt Aggregates. The aggregate shall be produced from a source rock designated in the table of special requirements (Appendix 2).

Bitumen

Bitumen will be Class 170 or 320 (as specified for the mix types in Appendix 3) unless otherwise directed by the Superintending Officer and will meet the requirements of AS 2008 – Residual Bitumen for Pavements. Where Class 170 is specified, Class 320 may be substituted in lieu of Class 170, but Class 170 may not be substituted for Class 320.

Polymer modified binders (plastomers or elastomers) shall meet the requirements of Austroads AGPT – T190 unless specified otherwise by the Superintending Officer

3. MIX DESIGNS

General

All mix supplied for this contract will generally be as detailed in Appendix 3, though other mix types may be used at the direction of the Superintending Officer.

Job Mixes

Prior to the commencement of the Contract, the Contractor will submit 'Job Mixes' for each mix type which conform to the properties listed in Appendix 4.'Job Mixes' shall be resubmitted prior to any subsequent changes due to mix re-designs.

The grading curve of the aggregate shall not vary from the low limit on one size of sieve to the high limit on adjacent sieves, or vice versa. The particle size distribution of the aggregates when plotted, shall give a smooth curve throughout the whole range of sieve sizes.

On written acceptance of a 'Job Mix', the permissible variation of aggregate grading and bitumen content shall not exceed Table 11 of AS 2150. The minimum calculated bitumen film thickness shall be 7.5 micron using the Austroads test method AGPT/T237.

The calculated bitumen film thickness is a required design property of the job mix, but is not be used as a conformance requirement of the mix.

Alternative Mixes

Should Tenderers wish to submit alternative mix designs which are outside of the specifications, details of the mix designs and tender prices shall be included. Mixes with properties other than those listed in Appendix 3 may be specified and these shall be listed in the Table of Special Requirements (Appendix 2)

All tenders will be evaluated based on conforming prices as listed in Appendix 4. However Council may consider alternatives during the course of the contract after full evaluation of an alternative and accordingly alternative submissions are encouraged.

4. SAMPLING AND TESTING

The contractor shall be responsible for sampling and testing of the asphalt supplied to the council. The contractor shall organise testing by a laboratory accredited by the National Association of Testing Authorities of Australia (NATA). The laboratory must have included in its Scope of accreditation the current test methods requested by this specification.

For the purpose of testing the production mix, the contractor shall sample production lots at the minimum frequencies set out in the Quality Plan and Inspection Test Plan supplied by the Contractor. If during the duration of the Contract, the Contractor makes changes to the quality plan, these changes shall be referred to the Superintending Officer, who shall have the right to reject the changes if it is considered the changes will result in greater risk to the client.

The testing frequency requirement shall apply to each asphalt mix type. The test results shall be related to production intervals with samples representing the full lot of production of the specific mix.

The costs associated with the lot sampling and testing of the production mix shall be borne by the contractor.

Where the Contractor is directed to undertake compliance testing, and this testing is not part of the Contractor's Quality Assurance System, the cost of the compliance testing shall be paid by the Council.

When the Council requires audit testing, the cost of testing shall be paid by the Council.

5. DISPUTE RESOLUTION

If a payment penalty or rejection of work or requirement for warrantee is in dispute, the Contractor may apply to have a retest carried out at the Contractor's cost. The retest shall consist of removal of a random sample of the compacted asphaltic mat (1m x 1m). This shall be divided into two samples, one sample to be tested by a laboratory of the Contractor's choice, and the other sample tested by a laboratory of Council's choice. These tests are to be carried out in accordance with the current Australian and/or Main Roads WA standard. The mean result of the two tests shall be the definitive result.

The Superintending Officer and or the Contractor may witness any testing that is part of dispute procedures.

The costs of retesting shall remain the responsibility of the Contractor should the rejection of work be confirmed, otherwise they shall be borne by Council.

Where the Contractor considers that failure to achieve the specified quality of the asphaltic mat is due to deficiencies in the base preparation, the Contractor shall arrange independent testing of the base compaction by a NATA registered laboratory. In the event that the base work is found to be deficient, the cost of the additional testing and any remedial measures shall be borne by the Council.

Alternatively, either party may request the pavement and test results be referred to an independent specialist Consultant who shall be agreed by both parties to examine and report on the suitability of the asphalt surface or underlying pavement if that is in dispute.

The findings of the specialist Consultant shall be binding.

6. MANAGEMENT SYSTEMS

At the tender submission the Contractor shall supply all the documentation listed below in relation to its managements systems for quality, safety and environment.

Any new Company who wishes to submit a tender may do so by submitting documentary evidence of its management systems currently in place and an undertaking that it will complete its third party accreditation within the first year of contract.

Quality management

The Contractor shall supply to the Superintending Officer a copy of the Contactors third party certification to AS/NZS ISO 9001 (current version) and Quality Management Plan.

The Contractor's Quality Assurance System shall include a Process Control System conforming to the requirements of ISO 9001 - Quality Systems for Production and Installation and the AAPA publication Asphalt Plant Process Control Guide.

The Contractor's process control records may be made available to the Council and in all cases the control intervention levels should be within the limits of the specification.

The Contractor's Quality Assurance System shall be used to identify areas/lots of suspect mix where audit testing shows that the mix does not meet the specification.

Safety Management

The Contractor shall supply to the Superintending Officer a copy of the Contractors third party certification to AS/NZS 4801 (current version) including:

- Health and Safety Management Plan.
- Cyclone Contingency Plan. in the case where the Council is in a designated cyclone region.

Environmental Management

The Contractor shall supply to the Superintending Officer a copy of the Contractors third party certification to AS/NZS ISO 14001 (current version) including the Environmental Management Plan

7. MANUFACTURE

Applicable Standards

All mixes shall be manufactured according to the requirements of AS 2150, except in the case of Stone Mastic Asphalt, which shall be manufactured in accordance with Appendix A3.3 of this specification.

8. PREPARATION

Programming

Prior to commencement of any works in this Contract a “pre start” meeting will be held to determine procedure and protocol for programming and allocating work together with the regularity, if any of ongoing programming meetings.

Prior to the commencement of each project throughout the Contact period, a pre start meeting shall be held with the Superintending Officer to determine specific requirements.

The works within the contract need not be continuous but the Contractor shall have the approval of the Superintending Officer prior to stopping work. The point of cessation shall be approved and in no circumstances shall it be in a location considered to be detrimental to the completed job.

Responsibility

The quality of the base, either new or old will have an affect on the level of compaction and ride quality of the finished asphalt mat.

The Superintending Officer accepts full responsibility for the quality of the surface to be overlaid. Where the Superintending Officer is aware of any deficiencies in the surface , these will be brought to the attention of the Contractor and confirmed in writing.

Site Inspection

The Contractor will inspect every paving job with the Superintending Officer prior to paving commencing. Should the Contractor be concerned with any aspect of the surface preparation, base construction or irregularities in the base prior to or during paving

operations, such concerns shall be brought to the attention of the Superintending Officer. This shall be confirmed in writing.

Keying In

The Council will be responsible for keying in work at each end of the job. This may be done by burning and 'chasing' or milling, and removing the existing asphalt. The method used will be that agreed with the Superintending Officer. Alternative methods may also be negotiated between the Contractor and the Superintending Officer.

The responsibility for keying in may also be passed on to the Contractor and the cost will be paid by the Council at pre determined rates.

Sweeping

The Council shall be responsible for the sweeping of pavements within 24 hours of asphalt laying. Where some areas may have incurred unsuspected entry of debris and they can easily be swept by hand, this work shall be undertaken by the contractor without further charge to Council.

Tack Coat

Tack Coat shall be sprayed in accordance with AS 2150 - Hot-mix Asphalt – A Guide to Good Practice, Section 11.

Material shall be a bitumen emulsion and shall be in accordance with AS 1160 – Bituminous Emulsions for the Construction and Maintenance of Pavements.

The application rate shall generally be sufficient to fully coat the surface with a residual binder content of 0.10 litres per square metre, except between structural layers where the rate shall be 0.15 litres per square metre. However, the application rate may be varied or even omitted to suit particular conditions when approved or instructed by the Superintending Officer.

Corrector Course

When directed by the Superintending Officer, preparatory to resurfacing, a separate regulating course shall be placed for correction of both longitudinal and transverse pavement shape. Unless directed otherwise, the maximum compacted thickness of any one layer of corrector course shall not exceed five times the size of the largest aggregate in the asphalt used.

In the case that the Council instructs the contractor to supply and lay a corrector course due to ride quality inconsistency in the original surface, then the ride quality of the surface shall become the responsibility of the Contractor

The "pre start" meeting can also include as part of the agenda discussions and agreement on corrector course asphalt and ride quality improvement in general. On reaching agreement on methods of ride quality improvement the contractor will apply those methods to applicable roads.

9. LAYING OF MIX

Undue Delays

Should the Contractor be unable to carry out the required works within 14 days of request in situations where a road is under construction, or within 28 days for routine maintenance overlays, Council reserves the right to obtain the services of another Contractor after consultation with the Contractor. Alternatively the Contractor may supply the service by using any other Contractor approved by the Superintending Officer and additional costs incurred shall be the responsibility of the Contractor.

In an emergency situation, where un-scheduled works arise that are beyond the control of the superintending officer to foresee, the Council may obtain the services of another contractor, at its own expense, should the Contractor be unable to supply in any period that is determined by the Superintending Officer.

Delivery

All mix shall be delivered according to the requirements of AS 2150 - Hot Mix Asphalt, Guide to Good Practice, Section 8, unless otherwise directed by the Superintending Officer.

Delivery shall be made during the hours approved by the Superintending Officer.

Weather Conditions

The surface on which asphalt is to be laid shall be free from ponding water. The Superintending Officer reserves the right to stop paving operations under adverse weather conditions. Mix that has been produced prior to the Superintending Officers directive to cease work may still be laid, but the risk shall remain with the contractor.

Protection of Drains & Removal of Debris

During the progress of the work the Contractor shall cover all drainage gullies and at the completion of the days work, remove all sweepings, spoil and excess or rejected material from the site to the satisfaction of the Superintending Officer. The disposal of such materials shall be in accordance with any requirements of Council and at the Contractors expense.

Traffic Management/Control

Traffic management can be a significant cost on any project but can vary in extremes depending on road layout and importance, and cannot be included in the tender price.

The Superintending Officer shall be responsible to provide traffic management to the requirements of the current version of the MRWA Traffic Management for Works on Roads Code of Practice. The Contractor and the Council have a duty of care to ensure safety of workers and public, and therefore the Contractor must bring any concerns regarding traffic management to the attention of the Superintending Officer. Works should not proceed until both parties have agreed on traffic management and site safety.

Joints

Unless otherwise directed by the Superintending Officer, longitudinal joints shall be:

- continuous and parallel;
- within 150mm of line of change in crossfall;
- offset by at least 150mm from joints in underlying layers;
- located away from traffic wheel paths; and
- located beneath proposed traffic line markings where feasible, in the case of a wearing course.

Where practical, adjacent paving runs will be completed to within 5 metres of each other daily. However where the paving thickness is equal to or less than 40mm longitudinal joints which are greater than 5 metres in length may be ramped down and milled out prior to continuing. This can also be done when the Contractor has been caught in the rain and is unable to square off the paving runs.

The Council will be responsible for the preparation of longitudinal joints where new work abuts old work such as that encountered in road widenings.

Survey Control

Where the Council has provided survey control, it shall be the Contractor's responsibility to ensure that the levels are maintained to within ± 10mm of the survey control points provided also that two consecutive survey points do not go from positive to negative or vice versa. Inability to maintain the required level may result in rejection of this section. The requirement of achieving level control may constitute a variation in rates.

Spreading And Compaction

Spreading and compaction of the asphalt shall be carried out in a manner such that the finished pavement meets this specification.

Delivery Dockets

A delivery docket showing the empty and loaded masses of the vehicle shall be handed to the Superintending Officer at the point of delivery by the Contractor's representative. In addition, the following written information shall be supplied:

- the date and time of loading;
- the name of the supplier;
- the identification number of the vehicle;
- the size and Marshall blows of the asphalt and the location reference of the plant at which the asphalt was manufactured
- the temperature of the asphalt.

10. ACCEPTANCE OF ASPHALT PAVEMENT

10.1 Grading And Bitumen Content

When the results of an individual test undertaken by the Council or the Contractor show that the mix does not meet the specification and where the Contractor has in place a Process Control System as part of an accredited Quality Assurance System, the Superintending Officer shall take into consideration the Process Control Records before deciding on a course of action.

If minor non-conformances are detected by either the Council's or the Contractor's testing, the Council may request that the Contractor produce evidence that corrective and/or preventative action, in accordance with their management systems have been taken in order to achieve specified requirements.

Table 9.1 provides a guideline for the treatment of more significant non-conformances of mix properties.

TABLE 9.1 – SUGGESTED ACTIONS FOR DEVIATIONS IN MIX PROPERTIES

Property	Deviation from Specified Limits in job mix	Action
Bitumen Content	>0.3% below minimum	A penalty equal to 4.8 x (%age below) x bitumen price per tonne is to be applied.
	> 0.5% below minimum	Negotiated settlement using dispute resolution or specialist technical advice at contractors cost. A penalty equal to 4.8 x (%age below) x bitumen price per tonne is to be applied should the mix be accepted.
	>0.3% above maximum	If air voids not are conforming, 5 yr written guarantee against flushing or shoving for all mixes.
Particle Size Distribution	Single Sieve: >5% on 2.36mm or greater >3% on 1.18mm or under	Seek 5yr written guarantee if air voids are conforming and bitumen film thickness < 7.5μm min.
	>10% Cumulative	
	Single Sieve: >8% on 2.36mm or greater >5% on 1.18mm or under	Negotiated settlement using dispute resolution or specialist technical advice at contactors cost
	>15% Cumulative	
Filler Content (75 micron)	>1.0% below minimum	Seek 5yr written guarantee if air voids are non-conforming.
	> 1.0% above maximum	Seek 5yr written guarantee if air voids are non-conforming and bitumen film thickness < 6.5μm min.

For conformance conditions that are not covered in the above table, a negotiated agreement may be reached which may necessitate the obtaining of expert advice from a mutually agreed source. The cost of providing expert advice shall be the responsibility of the Contractor.

Where a 5 year guarantee is applied, the terms of the guarantee shall be to the satisfaction of the Superintending Officer.

Marshall Characteristics

The Marshall characteristics of voids, stability, flow and quotient of a test lot when tested in accordance with the current Australian and/or Main Roads WA Standard, shall form part of the determination for quality level of the asphalt.

The Marshall quotient is the calculated ratio of stability to flow which represents an approximation of the ratio of load to deformation and may be used as a measure of the asphalt's resistance to permanent deformation under load.

Asphaltic Mat Voids

The asphaltic mat voids is the relationship between the maximum density of a sample of mix produced on the day and the mean core density of a sample test lot.

It is considered that the asphalt mat voids offer the best appreciation of the asphalt field performance.

Asphalt mat voids are calculated as follows:

$$AMV = 100\left(\frac{MD-CD}{MD}\right)$$

where:

AMV = Asphaltic mat voids
MD = The maximum density of a test lot
CD = The mean core density of a test lot

It shall be judged on one of three quality levels:

- Conformance
- Conditional Conformance
- Non-Conformance

The determination of Conformance, Conditional Conformance and Non-Conformance will be in accordance with Table 9.2.

An example of the use of table 9.2 is; In the case of 35 blow mixes:

Where the asphalt mat voids are greater than or equal to 2.5 or 1.5 in bottom layers and less than or equal to 8.0 or 7.0 in bottom layers, it shall be deemed as conforming.

Where the asphalt mat voids are greater than 8.0 (7.0 in bottom layers) but less than or equal to 10.0 (9.0 in bottom layers), it shall be deemed as conditional conformance and a pay factor shall apply as shown in Table 9.2.

Where the asphalt mat voids are less than 2.5 (1.5 in bottom layers) or greater than 10.0 (9.0 in bottom layers), it shall be deemed as non-conforming.

TABLE 9.2 PAYMENT FACTORS FOR NON-CONFORMANCE IN ASPHALT MAT VOIDS

Total Voids	Quality Level	Pay Factor
8.0 > AMV > 2.5 (35 blow) 7.0 > AMV > 1.5 (35 blow bottom layer) 11.0 > AMV > 3.5 (50 blow 4-6 voids) 10.0 > AMV > 3.0 (50 blow 3-5 voids) 11.0 > AMV > 3.5 (75 blow) 11 > AMV > 3.0 (SMA) 11.0 > AMV > 3.0 (Laterite mix) 9.0> AMV > 3.0 (AC20 Intermediate) 8.0>AMV>1.5 (AC20 Base)	Conformance	1.000
10.0 > AMV > 8.0 (35 blow) 12.0 > AMV >10.0 (50 blow) 12.0 > AMV > 11.0 (75 blow) 12> AMV > 10 (SMA) 12.0 > AMV > 11.0 (Laterite mix) 11.0> AMV > 9.0 (AC20 Intermediate) 10.0>AMV>8.0 (AC20 Base)	Conditional Conformance	0.95
AMV > 10.0 (35 blow) AMV > 12.0 (50 & 75 blow) AMV > 12? (SMA) AMV > 12 (Laterite mix) AMV > 11.0 (AC20 Intermediate) AMV>10.0 (AC20 Base)	Non-Conformance	0.90
AMV < 2.5 (35 blow) AMV < 3.0 (50 blow 3-5 voids) AMV < 3.5 (50 blow 4-6 voids) AMV < 2.5 (75 blow) AMV < 3.5 (Laterite mix) AMV < 3.0 (AC20 Intermediate) AMV<1.0 (AC20 Base)	Non-Conformance	5 Year Guarantee

Where: AMV is the asphalt mat voids in the asphalt pavement.

NOTE: No penalties shall be applied to Lateritic mixes for conditional performance, and for non conformance the penalty shall be 0.95

Thickness

The nominal thickness (NT) of asphalt to be laid shall be specified by the Superintending Officer. It should be noted that the nominal thickness will be greater than the minimum thickness, and the Superintending Officer should specify a nominal thickness greater than the required minimum thickness taking into account the roughness of the surface to be overlaid.

On any specific occasion the Superintending officer may request the Contractor to try and achieve a required spread rate. After consultation and agreement between the Superintending Officer and Contractor's representative, the contractor shall make its best endeavour to achieve the required spread rate. Where the Superintending Officer has requested a specific spread rate, the Council shall take responsibility for the performance of such works.

Where the average thickness exceeds the nominal thickness by more than 15% excluding corrector, and the Contractor has not raised concerns regarding the existing pavement levels, the Council shall only be required to pay for that portion of the mix as determined by the following equation:

Area x 1.15Nt/1000 x 2.4 x tender rate for mix .

Shape

Provided that the base pavement conforms with the requirements for the intermediate course as defined in Table 15 of AS 2150, the shape of the asphalt wearing course shall conform to the values as detailed in Table 15 of AS 2150.

11. PAYMENT

Payment shall be made on the basis of the actual mass of asphalt used unless the pavement is considered a conditional conformance or non-conformance pavement where a proportional factor shall apply. The final payment factor shall be the worst individual or lowest of all payment factors.

Payment shall be paid at the rate applicable for the job size as tendered in the Form of Tender plus price variations applicable at the time of laying the asphalt.

Where a job requires different asphalt mixes across the road surface, such as the case with red laterite cycle lanes and or medians, with granite running lanes, or bus bays, etc., each type of asphalt shall be considered as a separate job and payment shall be made at the rate applicable for tonnes of that mix laid. (eg if 270T of granite asphalt is laid, and 55T of laterite asphalt is laid, then the payment for the granite asphalt will be paid at the 200T-300T rate and the laterite asphalt at the 50T-100T rate)

12. GUIDE TO TENDER EVALUATION

Tenders will be evaluated such that the Council is most likely to receive best value for money from its Contractor. It is considered that the best value for money is derived from more than just the lowest price. Accordingly in the tender evaluation process Council will take the following into consideration:
-

- Price
- Company experience
- Experience of key personnel
- Financial Stability
- Innovation
- Commitment to research and development
- Management Systems including
  - Quality
  - Safety
  - Environment

APPENDIX A Variations to Specification

Any variation to this specification must be detailed in this appendix

Insert variations here

APPENDIX B TABLE OF SPECIAL REQUIREMENTS

Clause	Description	Requirement
1.3	Extent of Work	**Insert Requirement**
2.1	Aggregate Type – Granite, Diorite, or Basalt	**Insert Requirement**
3.3	Alternative Mixes	**Insert Requirement**

1. APPENDIX C ASPHALT MIXES

A3.1 DENSE GRADED: Highways, Arterial, Industrial and Distributor Roads

Property		Mix Designation		
		AC10	AC14	AC20
Grading Limits % passing AS Sieve				
26.5mm				100
19.0mm			100	90-100
13.2mm		100	85-100	75-90
9.5mm		90-100	70-85	60-80
6.7mm		70-90	62-75	50-70
4.75mm		58-76	53-70	40-60
2.36mm		40-58	35-52	25-43
1.18mm		27-44	24-40	18-35
600µm		17-35	15-30	14-27
300µm		11-24	10-24	9-21
150µm		7-16	7-16	6-15
75µm		4-7	4-7	3-7
Bitumen Content		5.0-7.0	4.5-6.5	4.0-6.0
Marshall Voids (%)		4.0-6.0	4.0-6.0	4.0-6.0
Voids in Mineral Aggregates	(Min)	15	14	14
Refusal voids (350 cycles gyropac) 75 blow Marshal mixes only		2.5	2.5	2.5
Minimum Marshall Stability	50 blow 75 blow	6.5kN 8.0kN	6.5kN 8.0kN	6.5kN 8.0kN
Marshall Flow (mm)		2.0-4.0	2.0-4.0	2.0-4.0
Marshall Quotient (min) (kN/mm)	50 blow 75 blow	1.7 2.0	1.7 2.0	1.7 2.0

Recommendations for 20 year design traffic

Range/Type	Mix	Bitumen Type
Heavy truck traffic	75 blow	Class 320
Less than 2,000,000 ESA	50 blow	Class 170
Greater than 2,000,000 ESA	75 blow	Class 320
Maintenance	50 blow	Class 170
Intersections	75 blow	Class 320

A3.2 DENSE GRADED: Residential Streets/Cul-de-sacs/Recreational areas

Property	Mix Designation			
	AC5	AC7	RAC10	RAC14
Grading Limits % passing AS Sieve				
19.0mm				100
13.2mm			100	90-100
9.5mm		100	95-100	70-90
6.7mm	100	80-100	80-95	62-75
4.75mm	85-100	70-90	65-80	47-67
2.36mm	55-75	45-60	45-60	34-52
1.18mm	38-57	35-50	35-50	25-41
600µm	26-43	22-35	25-40	16-32
300µm	15-28	14-25	15-25	9-21
150µm	8-18	8-16	7-15	5-13
75µm	4-11	5-8	4-7	4-7
Bitumen Content	5.0-7.0	5.0-7.0	5.0-7.0	4.5-6.5
Marshall Voids (%) 35 blow 50 blow	2.5-4.5 3.0-5.0	2.5-4.5 3.0-5.0	2.5-4.5 3.0-5.0	2.5-4.5 3.0-5.0
Voids in Mineral Aggregate (VMA) (%) 35 blow 50 blow	-	17	16	15
Minimum Marshall Stability 35 blow 50 blow	4.0kN 5.0kN	4.0kN 5.5kN	4.0kN 6.5kN	5.5kN 6.5kN
Marshall Flow (mm) 35 blow 50 blow	2.0-5.0 2.0 - 4.0	2.0-5.0 2.0-4.0	2.0-5.0 2.0-4.0	2.0-5.0 2.0-4.0
Marshall Quotient(min) (kN/mm) 35 blow 50 blow	1.0 1.7	1.0 1.7	1.0 1.7	1.0 1.7

Recommendations for 20 year design traffic

Range/Type	Mix	Bitumen Type
Greater than 500,000 ESA	Use distributor road mix	
Greater than 50,000 ESA	50 blow	Class 170
Less than 50,000 ESA	35 blow	Class 170
Maintenance	50 blow	Class 170

A3.3 STONE MASTIC : SPECIAL APPLICATIONS

Property		Mix Designation			
		SMA 5	**SMA 7**	**SMA 10**	**SMA 14**
Grading Limits % passing AS Sieve					
26.5mm					
19.0mm					100
13.2mm				100	90-100
9.5mm			100	90-100	30-40
6.7mm		100	90-100	25-40	20-30
4.75mm		90-100	25-45	18-30	18-30
2.36mm		25-40	15-28	15-28	15-28
1.18mm		13-24	13-24	13-24	13-24
600µm		12-21	12-21	12-21	12-21
300µm		10-18	10-18	10-18	10-18
150µm		9-14	9-14	9-14	9-14
75µm		8-12	8-12	8-12	8-12
Bitumen Content		6.0-8.0	6.0-8.0	6.0-8.0	5.5-7.5
Marshall Voids (%) 50 blow		3-5.5	3-5.5	3-5.5	3-5.5
Voids at 80 Cycles of the Gyratory Compactor (%) (Mix Design Process only)		3-5.5	3-5.5	3-5.5	3-5.5
VMA (min) (%)		19	19	18	17
Binder Draindown (max) (%)		0.3	0.3	0.3	0.3
Cantabro Abrasion Loss (Max) (%)	Unconditioned	25	25	25	25
	Conditioned	35	35	35	35

Recommendations:

Range/Type	Mix	Bitumen Type
Special applications requiring good, rut resistance and fatigue performance	50 blow	Class 320

A3.4 DEEP LIFT: SPECIAL APPLICATION

Property	Mix Designation			
	AC14 Base Course	**AC20 Base Course**	**AC20 Intermediate Course**	**AC28 Base Course**
Grading Limits % passing AS Sieve				
37.5mm				100
26.5mm		100	100	90-100
19.0mm	100	90-100	90-100	73-88
13.2mm	85-100	71-86	71-86	58-76
9.5mm	70-85	58-75	58-75	47-67
6.7mm	62-75	46-64	46-64	37-58
4.75mm	53-70	37-55	37-55	30-50
2.36mm	35-52	24-42	24-42	20-37
1.18mm	24-40	15-32	15-32	13-28
600µm	15-30	10-24	10-24	9-22
300µm	10-24	7-17	7-17	6-16
150µm	7-16	4-12	4-12	4-10
75µm	4-7	3-6	3-6	3-6
Bitumen Content (%)	4-6	4.8-5.4	3.8-5.8	3-5
Marshall Voids (%) 75 blow	2.5-4.5	2.5-4.5	2.5-4.5	2.5-4.5
Voids at 350 Cycles of the Gyratory Compactor (%) (Mix Design Process only)	2.5	2.5	2.5	2.5
VMA (min) (%)	14	13	13	12
Minimum Marshall Stability 75 blow	8kN	8.0kN	8.0kN	8kN
Marshall Flow (mm) 75 blow	2.0-4.0	2.0-4.0	2.0-4.0 .0	2.0-4.0
Marshall Quotient(min) 75 blow (kN/mm)	2	2	2	2

2. APPENDIX D FORM OF TENDER

INSERT COUNCIL NAME

TENDER FORM FOR TENDER NO

for the SUPPLY and LAYING of HOT ASPHALT ROAD SURFACING

COUNCIL NAME
ADDRESS

I/We_____, the undersigned, offer, undertake and agree, to supply and deliver in accordance and conformity in all respects with the Technical Specification all such quantities as may be ordered by the Council, of those items for which a price has been tendered on the attached Schedule.

This offer shall be deemed a separate offer in respect to each price endorsed by me/us on the aforesaid Schedule and may be accepted in respect to any or all of the items for which a price has been tendered.

I/We acknowledge that no tender may be deemed to be accepted until the tenderer is so advised in writing. However, in the event of acceptance of any tender offered on attached Schedule, I/We, the undersigned, agree to attend at a time mutually agreed, but within 1 month of the Council's acceptance of tender, at the Council offices, for the purpose of signature to a Memorandum of Agreement to incorporate such tender as a binding contract.

SIGNATURE OF TENDERER:_____DATE: _____

PRINT NAME: _____

ADDRESS: _____

_____POST CODE _____

TELEPHONE: _____

APPENDIX 4 SCHEDULE OF RATES

SUPPLY AND LAY

Tender Price ($ / tonne)

		JOB SIZE (TONNES)							
Mix Type	**Marshall Blow**	**0-25**	**25-50**	**50-100**	**100-200**	**200-300**	**300-400**	**400 +**	**All Tonnages* (0 +)**
AC20	50								
AC20	75								
AC14	50								
AC14	75								
RAC14	35								
RAC14	50								
AC10	50								
AC10	75								
RAC10	35								
RAC10	50								
AC7	35								
AC7	50								
AC5	35 (Handwork)								
AC5	50 (Handwork)								
SMA14	50								
SMA10	50								
SMA7	50								

***Where the contractor elects, a uniform price for all tonnages may be submitted, and the Council may elect to accept the tender on the basis of "All Tonnages" or "Job Size" but once the tender is accepted, the method shall remain binding**

SIGNED - TENDERER _____ **COMPANY** _____

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WEEKEND OPENING FEE

Where the Superintending Officer has specifically programmed the works, the weekend and public holiday opening fee shall be:

$ _____

SUPPLY ON COUNCIL TRUCKS EX-PLANT

Mix Type	**Marshall Blow**	**Tender Price ($ / tonne)**
AC14mm	35	
AC14mm	50	
AC14mm	75	
RAC14mm	35	
RAC14mm	50	
AC10mm	35	
AC10mm	50	
AC10mm	75	
RAC10mm	35	
RAC10mm	50	
AC7mm	35	
AC7mm	50	
AC5mm	50	
AC5mm	35	

SIGNATURE OF TENDERER _____

FOR _____

Specification
Traffic Management

This Specification was developed at industry level by the Members of the Traffic Management Association (WA) with the concept of engendering consistent and appropriate standards into industry activity.

To appropriately reflect the roles and responsibilities of the parties to a contract, the following documentation will support standards and agreed obligations. The following table may further assist to assign contractual responsibility:

Task Description	Contractor	Client	Other
Define the scope of works			
Clearly Mark the Boundaries of the Works			
Set out proposed timing of works			
Decide what level of plans required.			
Agree on Staff levels to complete all tasks required on site.			
Inform any effected stakeholders			
Grant permission for works			
Equip staff with PPE requirements for site			
Supply staff, vehicles and equipment to meet site requirements			
Set out site as per plan supplied for site			
Maintain site until end of shift or end of works			
Ensure shift and or works are completed			
Remove all devices not required			
Ensure all devices left as aftercare are correctly positioned and secured			
Ensure Road is safe for all users before returning to normal operation			

Tasks that are not applicable or not required must be struck through and initialed by all parties to the contract.
Tasks performed by others are specified in ..... attached to this document as .....pages.

WALGA acknowledges the efforts and permission of the TMAWA to apply the attached standards to its Preferred Supplier Panel.

This document is supported by a template Traffic Management Site Audit Form accessible through WALGA eQuotes as part of the contract documentation; Reference Appendix 10B Traffic management Site Audit Template.

Contents

Traffic Management Specification

1. Scope

1. This specification outlines the minimum requirements for establishing, implementing and managing a Traffic Management Plan for the works under the WA Local Government Authority (WALGA) Contract.
2. The Contractor shall establish, implement and manage a Contract specific Traffic Management Plan complying with this specification, the Main Roads' Traffic Management for Works on Roads Code of Practice, Australian Standard AS 1742.3, AustRoads Guide to Roadside Design Part 6, the Occupational Safety and Health Act 1984 and the Occupational Safety and Health Regulations 1996.
3. The Traffic Management Plan shall form part of the Contractor's OSH Plan.
4. The Traffic Management Plan shall also addresses the impact of each Traffic Management Scheme on traffic flow and movements on the local road network. The Contractor shall ensure that the road system, including the surrounding road network, continues to operate efficiently and any disruption to road users is minimized.

2. References

Reference	Title & Description
OSH Act 1984	Occupational Health and Safety Act 1984
OSH Reg 1996	Occupational Health and Safety Regulations 1996
RTC 2000	Road Traffic Code 2000
MRWA Act	Main Roads Act 1930
MUTCD	AS 1742.3-2009 Manual of Uniform Traffic Control Devices
GRD 6	AustRoads Guide to Roadside Design Part 6 (Incl MRWA Supplement)
	Main Roads WA Traffic Management for works on roads Code of Practice
	Main Roads WA Utility Providers Code of Practice
	Main Roads WA Code of Practice for Events
AS1348	Road and Traffic Engineering – Glossary of Terms
AS 4292.1	Railway Safety Management
FG81.1	Field Guide for Works on Roads
ISO 31000	Risk Management
AS 4801	Occupational Health and Safety Management Systems

3. Terms & Definitions

Term	Definition
TMP	Traffic Management Plan (TMP) shall be the document that addresses the management of hazards and risks associated with the traffic environment. The Traffic Management Plan shall also detail the Contract traffic management objectives and targets and shall specify the necessary operational processes, procedures, and the related resources to achieve the specific requirements of the Contract.
TCD	A Traffic Control Diagram (TCD) shall be the document either developed in accordance with the Contractor's TMP or may be diagram that is site specific, generic, or derived from a Field Guide.
Contractor	The organisation named in in the contract charged with providing services for the planning, directing, controlling or management of traffic.
Aftercare	Aftercare refers to the provision of signs and devices, periodic checks, and other related services associated with a long term worksite (as defined in AS1742.3) when left unattended.
BWTM	A person accredited by Main Roads WA at the level of Basic Worksite Traffic Management
AWTM	A person accredited by Main Roads WA at the level of Advanced Worksite Traffic Management.
RSA	A person accredited by Main Roads WA at the level of Road Safety Auditor
RTM	A person accredited by Main Roads WA at the level of Roadworks Traffic Manager.

4. Planning

1. The Contractor shall prepare a Traffic Risk Assessment & Treatment Register in accordance with MUTCD for hazards associated with traffic including network traffic performance and road users.
2. The Traffic Risk Assessment & Treatment Register shall be prepared by the Contractor using persons who hold a minimum competency accreditation in accordance with the Code of Practice. The Traffic Management Plan shall be authorized by the Contractor's Representative.
3. The completed Traffic Risk Assessment & Treatment Register shall form part of the Traffic Plan.

5. Legal and other requirements

1. The Contractor shall maintain at least the current published editions of the following documents at the Contractor's office on site for the period of the Contract;

   a) Traffic Management for Works on Roads Code of Practice

   b) Standards – AS 1742.3 – Traffic Control Devices for Works on Roads

   c) Guidance Notes – Safe Movement of Vehicles in the Workplace

2. Application of the Contract requirements, Standards and Codes of Practice in no way relieves the Contractor from undertaking any activity, function, process or procedure necessary to meet its duty of care obligations as prescribed in the OSH Act 1984 or other relevant legislation or standards.

3. The Contractor providing services for the planning, directing, controlling or managing of traffic shall as a minimum requirement of this contract provide the following:

1. Copy of business name certificate or extract
2. Copy of certificate or extract for ABN or ACN
3. Copy of Public liability Insurance certificate of currency (Minimum $20million)
4. Copy of Professional liability Insurance certificate of currency (Minimum $20million)
5. Copy of 3rd Party Motor vehicle insurance certificate of currency for vehicle fleet
6. Copy of Workers Compensation insurance certificate of currency
7. Full details of business with detailed experience attached
8. Minimum of Two referees (contact numbers and email addresses)
9. Maintain a ratio of 1:20 Traffic Controllers with AWTM accreditation
10. Copy of National Code of Compliance certificate for the construction industry.

6. Objectives and targets

1. The Contractor shall determine the Contract traffic management objectives and targets for the Contract and clearly detail these Contract objectives and targets in the Traffic Management Plan.
2. The Contractor shall detail the procedure that ensures the Contractor's Representative and the Principal regularly review the Contract performance against the prescribed traffic management objectives and targets.
3. The Contractor shall incorporate any staging requirements, and traffic restrictions, into the Traffic Management Plan.
4. Aftercare signs, devices, periodic checks and other related services are specifically excluded from this specifications and shall be charged separately at mutually agreed rates. Where no such agreement is in place, the provision of aftercare shall remain the responsibility of the principal.

7. Traffic Management Plan (TMP)

1. The Traffic Management Plan shall address all the work under the Contract and shall detail all procedures, processes, work practices and information required by the Contract.
2. The Traffic Management Plan shall be consistent with all requirements of the Contractor's OSH Plan, and suit the Contractor's method of operation.
3. The Traffic Management Plan shall be prepared and/or reviewed and endorsed by a person with accreditation in Advanced Worksite Traffic Management or where 'complex traffic arrangements' are involved, a Roadworks Traffic Manager (RTM).
4. Prior to the commencement of works on Site, the Contractor shall certify to the Principal that the Traffic Management Plan conforms to the requirements of the Contract.
5. Where any of the following events occur the Contractor shall review the Traffic Management Plan and submit suitable amendments to the Principal within 1 week of the event, or other time-frame directed by the Principal:
   a) a non-conformance;
   b) the Contractor's practice no longer reflecting the Traffic Management Plan; or
   c) an incident occurring.
6. If the Contractor proposes to amend the Traffic Management Plan, or the Contractor is required to make Mandatory Changes to the Traffic Management Plan, the amended Traffic Management Plan shall be resubmitted to the Principal in accordance with requirements of the Hold Point associated with the Traffic Management Plan. The amended Traffic Management Plan shall not be used until the Principal has released the Hold Point.

8. The Contractor shall provide the Principal with a controlled copy of the Traffic Management Plan for the duration of the Contract. This copy is to be held on site.

9. The Contractor shall establish, implement and maintain detailed procedures in the Traffic Management Plan for all essential traffic engineering aspects as required by AS 1742.3 for the development of TCDs.

10. The outcomes of the following considerations shall be included in any TCD:

    a) The capacity required to accommodate traffic demand over the affected section of road and surrounding road network at a Level of Service (LoS) acceptable to the Principal during the term of the construction activity or particular work activity.

    b) The number and width of traffic lanes and road space that will be required to accommodate traffic demand taking into account property access, right turning movements and passing requirements, parking needs and special events that may impact on the available space and traffic flows.

    c) Intersection capacity analysis where construction activities, traffic controls or traffic routing impact on an intersection, where the intersection is either under signal control or at least one leg of the intersection includes a road with a classification of district distributor or higher classification as defined by the MRWA, Metropolitan Functional Road Hierarchy.

    d) The needs of other road users such as pedestrians, people with disabilities, children, cyclists, motor cyclists, users of public transport and heavy vehicles

    e) Traffic flows associated with public transport and the interruption to transport facilities including bus stops, exclusive bus lanes etc.

    f) Traffic flows and needs of special vehicles such as road trains, high/wide loads and emergency vehicles.

    g) The need to accommodate the continued safe operation of warden controlled school crossings.

8. Structure and responsibility

1. The Contractor shall nominate a Traffic Management Representative (TMR) for the duration of the Contract. The TMR shall have Main Roads' Advanced Worksite Traffic Management accreditation in accordance with Section 8 of Main Roads' Traffic Management for Works on Roads Code of Practice.

2. The TMR shall be available at short notice to deal with all activities relating to the execution of the work under the Contract are taking place requiring Traffic Management Control. The TMR shall have the necessary authority and resources to meet the TMR's responsibilities under the Contract.

3. The TMR shall have the authority to shut down a site, require the removal of any vehicle, plant or person where;

    a) Serious safety breach has or may occur.

    b) When any WorkSafe notifiable event occurs.

    b) Where the safety of site personnel, pedestrians, motorists or others may be jeopardized as a result of work activities, weather conditions, or other such event likely to result in injury or property damage.

4. Responsibilities and accountabilities for all Contract management personnel including employees and subcontractors shall be detailed and applied in accordance with the principles of AS4801.

5. The Contractor shall be responsible for the management and control of all traffic management issues on Site in accordance with the Contract including work under the Contract undertaken by Subcontractors in relation to Traffic Management.

6. Where a Subcontractor is engaged by the Contractor, or on the Contractor's behalf to perform Traffic Management work under the Contract, the Contractor shall provide the Subcontractor with all relevant Contract information and the parts of the Traffic Management Plan that are relevant to the work to be performed by the Subcontractor.

7. In the event of 6 (above) it shall be a responsibility of the Contractor to ensure the sub-contractor as described in section 5(3) and shall be able to provide evidence that all personnel are properly accredited.

8. Training and competency

1. The Contractor shall have on Site at all times when the worksite is manned, a supervisory person that holds a current minimum accreditation in "Basic Worksite Traffic Management"
2. Personnel who hold a competency in accordance with Main Roads' Traffic Management for Works on Roads Code of Practice shall be recorded on the Skills Register and documentary evidence maintained for the duration of the Contract in accordance with MRWA Specification 203.
3. The Contractor shall incorporate at least the following traffic information into the site specific OSH induction training program;
    a) Training related to hazards likely to be encountered on site and control measures that have been developed in response to these hazards;
    b) Roles and Responsibilities; and
    c) The requirements of the Traffic Management Plan.

9. Communication

1. Traffic management information shall be communicated to workers in accordance with the principles of AS4801
2. The Principal shall develop and detail procedures that ensure relevant requirements of the TMP and proposed traffic controls are advised to all affected personnel including the public, property owners and occupiers, businesses, transport and government agencies and emergency services.
3. Where the Contractor's TMP involves complex traffic management arrangements such as but not limited to, extensive detours, lane closures and contra flows, the Contractor must notify Main Roads' Heavy Vehicle Operations Branch, 2 Adams Drive, Welshpool, WA 6106 (HVO) at least 14 days prior to implementation of such plans. Where the Contractor's TMP contemplates restrictions on the road network such as a reduction of existing lane widths, overall carriageway width, vertical height clearance or the like, the Contractor must consult with HVO prior to finalising the plan which must be at least 14 days prior to implementation. Restrictions that would preclude existing heavy vehicle operations are not acceptable.
4. Not less than 7 days prior to the implementation of the Contractor's proposed placement of any restrictions on the road network, the Contractor shall certify to the Principal that the Contractor has obtained acknowledgement from HVO of its proposed restrictions on the road network where applicable.
5. The principal is responsible for ensuring that where applicable, parking meters, ticketing machines, parking signs, as applicable, are covered or replaced with No Stopping signs, and that areas running adjacent from or parallel to, to intended worksite have parking restrictions imposed by midnight on the day preceding the commencement of works. And the principal shall have in place a strategy for the removal of vehicles in violation of such parking restrictions. The principal shall provide the TMR with the necessary contact details of a tow truck company which may be contacted for the removal of such vehicles.
6. Prior to the implementation of any restrictions on the road network, the Contractor shall erect warning devices and signs in a text height and placement in accordance with AS 1743, in advance of the restriction stating the minimum clearances.
7. Prior to the installation of warning devices and signs in advance of any restriction, the Contractor shall certify to the Principal that the advance warning devices and signs conform to the requirements of the Contract.

10. Documentation

1. The Contractor shall establish, implement and maintain a current controlled copy of all traffic management plan on Site.

11. Document and data control

1. The Control of documents and the Control of records shall be in accordance with accepted quality standards such as ISO9001.

12. Operational controls

1. Occupational Safety and Health hazards shall be addressed in accordance with the principles of AS4801
2. The Contractor shall assess the likelihood and consequence of traffic hazards and the categorisation of each traffic risk occurring during the Works.
3. The Contractor shall develop all traffic management schemes based on a maximum lane capacity as detailed in AS 1742.3 unless the Contractor can demonstrate to the Principal's satisfaction alternative lane capacities that could be suitably applied to the section of the network that will be subject to the traffic management scheme.
4. All works in the vicinity of Railway Crossings shall be subject to detailed risk assessment and managed in accordance with the requirements of the Traffic Management for Works on Roads Code of Practice.
5. Works such as trenches or spoil heaps and other hazards shall be individually signed and barricaded at all times in accordance with AustRoads GRD 6, notwithstanding that the area in question may not be opened to traffic or the public at any time.
6. The Contractor shall detail and implement procedures that ensure traffic control measures are evaluated for effectiveness and modified to manage the hazard. The evaluation procedure shall detail the responsibilities, timelines and records that will be kept as part of the process.

13. Emergency preparedness and response

1. The Traffic Management Plan shall detail procedures that ensure access for emergency vehicles past or through the construction site shall be maintained at all times and that emergency vehicles are not unduly delayed.
2. While the Contractor is working on Site they shall render assistance in the event of a crash, or vehicle breakdown where it affects the overall safety of the site.
3. The Contractor shall document as part of the Traffic Management Plan the nominated key personnel for emergency situations with their contact details and the contact details of the emergency service providers and relevant Main Roads' personnel (e.g. Traffic Operations Centre Manager, Heavy Vehicle Operations Manager).

14. Sidetracks and detours

1. Sidetracks and detours for the purpose of moving traffic through or around the Works shall be designed, constructed and maintained for both wet and dry conditions.
2. Temporary driving surfaces shall be maintained to a standard that permits safe and comfortable travel of all road users at the design speed of the sidetrack or detour. The Principal shall ensure that the design of temporary driving surfaces shall, as far as practicable, address the environment and the road users.
3. Temporary driving surfaces shall be sealed.

4. Where bituminous surfacing has not been specified as the temporary driving surface, the Contractor shall undertake and detail the hazard identification, risk assessment and controls for the alternative surfacing, ensuring all environmental issues and vehicle types, including motor cycles, caravans and out-of-dimension vehicles and cyclists have been taken into account as part of the risk assessment.

5. Sidetrack, detours and temporary surfaces through or around work sites for shared paths, cycleways and footpaths shall be designed and constructed to ensure they meet the Standards detailed in Austroads Guidelines.

15. Traffic control devices

1. Prior to implementing any proposed traffic control measures for the work under the Contract, particularly the installation of regulatory control devices such as temporary speed restrictions, the Contractor shall certify to the Principal that the Traffic Control Diagram conforms to the requirements of the Contract.

2. All traffic control measures shall be in place and fully operational before the Contractor commences the execution of any work activity requiring traffic management.

3. If the Contractor proposes to amend the TMP, the amended TMP shall be resubmitted to the Principal in accordance with requirements of the Hold Point associated with the TMP. The amended TMP shall not be used until the Principal has released the Hold Point.

5. The Contractor shall provide the Principal with a controlled copy of the TMP for the duration of the use of the TMP.

6. The Contractor shall supply erect and maintain all traffic control devices in good condition in accordance with AS1742.3-2009 and the Main Roads WA Traffic Management for Works on Roads Code of Practice.

7. The Contractor shall remove any traffic control devices that are no longer required.

8. The Contractor shall provide and station accredited Traffic Controllers as required by AS1742.3-2009 to ensure the safety of motorists and workers. Traffic Controllers will be stationed to guide public vehicles past hazards that cannot be suitably signed.

16. Monitoring and measurement

1. The Contractor shall establish, implement and maintain detailed procedures, in the Traffic Management Plan, for the monitoring and measurement of traffic management practices to achieve the Contract Traffic Management objectives and targets.

2. The monitoring and measurement of traffic controls and traffic management practices shall be undertaken by the Contractor through regular inspection of traffic management activities.

3. Traffic controls shall be inspected throughout the day and at night in accordance with the requirements of AustRoads AP-R403-12 Implementing National Best Practice for Traffic Control at Worksites – Risk Management, Audit and Field Operations.

4. The inspection program shall be adjusted to suit changing circumstances and/or risk environment such as during times of increased traffic flows or speeds, contra-flow arrangements or when changed controls are introduced.

17. Incident investigation, corrective and preventative action

1. Detected non-conformances shall be managed in accordance with accepted standards for the Control of Non-Conforming Product.

2. Corrective and preventative actions shall be managed in accordance with accepted standards for the Improvement of the Traffic Management Plan.

3. All traffic incidents shall be reported and investigated in accordance with accepted standards for OCCUPATIONAL SAFETY AND HEALTH.

4. LTI, and MTI Reports must be forwarded to the Principal within 48 hours of the incident occurring or becoming apparent.
5. The Contractor may use the Contractor's internal Incident Reporting Form for the purpose of reporting.
6. The Traffic Management Plan shall detail the reporting and investigation procedures for incident investigation. The procedures shall include the investigating officer responsible and the time limits imposed for reporting and investigating the incident and to close-out the incident in a timely manner to prevent a recurrence.
7. The Principal may participate in or undertake an investigation into the incident and the Contractor shall co-operate with and provide assistance to the investigation organised or undertaken by the Principal.

18. Records and records management

1. Traffic Management records shall be in accordance with AS 1742.3-2009.
2. The Control of Records shall be kept for the site in accordance with the Quality Plan for the Contract and these procedures shall be supplemented with procedures that are OSH specific for Records and Records Management in accordance with ISO 31000
3. Records shall be registered, ordered and retained on Site for the duration of the Contract.
4. A daily diary shall be kept for the site and details recorded in accordance with AS 1742.3-2009 for each inspection of the traffic controls and traffic guidance schemes in place throughout the Contract. The record shall identify the Traffic Control Diagram (TCD) in place at the time of the inspection and details of any variations to the TCD.

19. Traffic management audits

1. The Principal shall reserve the right to conduct second party audits on the Contractor and any of the Contractor's sub-contractors and suppliers in relation to Traffic Management.
2. The Contractor shall incorporate traffic audits into the Audit Schedule developed and implemented as part of the contract.

20. Review

1. A review of the Traffic Management Plan shall be undertaken at the same time and in the same manner as the OSH Plan
2. The Principal shall be issued a Certificate of Compliance by the Contractor certifying that the site procedures, practices and operations are in accordance with the Contract.

21. Occupational Health & Safety - additional

1. Excluding short term works, the Principal shall provide toilet facilities suitable for either gender, unless such public facilities are available within a short walk of the work site.
2. AS1742.3-2009 requires that "Traffic Controllers have a 15 minute break every two hours." This requirement shall be interpreted as the absolute maximum permissible. On days when the temperature exceeds or is expected to exceed 38 degrees, or in the event of strong winds, or where traffic controllers are subject to high levels of dust or noxious fumes, the period between fatigue breaks shall be reduced to 45 minutes.

March 2012

WALGA SPECIFICATIONS

Appendix 6 - Earthworks & Pavement Construction

Submitted to:
Mr Andrew Blitz
Western Australian Local Government Association
PO Box 1544
WEST PERTH WA 6872

SPECIFICATION

Report Number. 117642113-004-S-Rev0

Distribution:

1 Electronic copy - WALGA
1 Electronic copy - Golder Associates

Golder Associates

WALGA SPECIFICATION
EARTHWORKS AND PAVEMENT CONSTRUCTION
REVISION REGISTER

Date	Clause Number	Description of Revision	Authorised By

Table of Contents

TABLES

GENERAL

1.0 SCOPE

1. The work under this specification consists of all stages of work associated with earthworks and road construction to the profiles, levels and surface finishes as specified or as shown in the Drawings. It does not include earthworks at Bridge Sites, such as excavations, foundations and backfill at abutments.

2. The scope includes construction of all types of unbound granular and modified granular pavement layers, including stabilisation of layers.

Acknowledgment: ***The use of Main Roads WA specifications and guidelines and the Institute of Public Works Engineering Australia (WA Division) Local Government Guidelines for Subdivisional Development are gratefully acknowledged as the basis for these specifications.***

2.0 REFERENCES

Australian Standards, MAIN ROADS Western Australia Standards and MAIN ROADS Western Australia Test Methods are referred to in abbreviated form (e.g. AS 1234, MRS 67-08-43 or WA 123). For convenience, the full titles are shown below:

Australian Standards

AS 1141	Methods for Sampling and Testing Aggregates
AS 1160	Bitumen Emulsion for Construction and Maintenance of Pavements
AS 1289	Methods of Testing Soils for Engineering Purposes
AS 1672	Limes and Limestones for Building
AS 2008	Residual Bitumen for Pavements
AS 2350	Methods of Testing Portland and Blended Cements
AS 3705	Geotextiles - Identification, Marking and General Data
AS 3706	Geotextiles - Methods of Test
AS 3972	Portland and Blended Cement
AS 2187	Parts 1 and 2 - Rules of Storage, Transport and Use of Explosives

Austroads Test Methods

AG:PT/T053	Determination of Permanent Deformation and Resilient Modulus Characteristics of Unbound Granular Materials under Drained Conditions

MAIN ROADS Publications

Road Note No 5	Interim Guide to Prediction of Pavement Moisture for Strength Assessment of Granular Basecourse and Sub-Base Materials
Road Note No 8	Statistically Based Quality Control for Density in Road Construction
Road Note No 9	Procedure for the Design of Flexible Pavements
6706-02-133	Water to be used in Pavement Construction

MAIN ROADS Test Methods

WA 0.1	Random Sample Site Location
WA 100.1	Sampling Procedures for Soil and Granular Pavement Materials
WA 105.1	Preparation of Disturbed Soil and Granular Pavement Material Samples
WA 110.1	Moisture Content: Convection Oven Method
WA 110.2	Moisture Content: Microwave Oven Method
WA 115.1	Particle Size Distribution: Sieving and Decantation Method
WA 115.2	Particle Size Distribution: Abbreviated Method for Coarse Materials
WA 120.2	Liquid Limit: Cone Penetrometer Method

WA 122.1	Plasticity Index
WA 123.1	Linear Shrinkage
WA 133.1	Dry Density/Moisture Content Relationship: Modified Compaction Fine and Medium Grained Soils
WA 133.2	Dry Density/Moisture Content Relationship: Modified Compaction Coarse Grained Soils
WA 134.1	Dry Density Ratio
WA 136.1	Moisture Ratio (Percent)
WA 140.1	Maximum Dry Compressive Strength
WA 141.1	California Bearing Ratio
WA 143.1	Determination of the Unconfined Compressive Strength of Laboratory Compacted Specimens
WA 216.1	Flakiness Index
WA 220.1	Los Angeles Abrasion Value
WA 220.2	Los Angeles Abrasion Value of Crushed Limestone
WA 313.2	Surface Profile: Three Metre Straight Edge
WA 324.2	Dry Density and Moisture Content: Nuclear Method
WA 330.1	Layer Thickness: Direct Measurement
WA 717.1	Dispersion of Bitumen in Soil
WA 730.1	Bitumen Content and Particle Size Distribution of Asphalt and Stabilised Soil: Centrifuge Method
WA 910.1	Chlorides and Total Soluble Salts in Soils and Water
WA 915.1	Calcium Carbonate Content

MAIN ROADS Standards

MRS 67-08-43 Main Roads Western Australia Survey and Mapping Standard 67-08-43 “Digital Ground Survey”

MRS 67-08-90 Main Roads Western Australia Survey and Mapping Standard 67-08-90 “Earthwork Volume Calculations”

Road Note 8 Engineering Road Note 8 “Statistically Based Quality Control for Density in Road Construction” (October 2003)

MAIN ROADS Specifications

Specification 100 GENERAL REQUIREMENTS
Specification 201 QUALITY SYSTEMS
Specification 202 TRAFFIC
Specification 203 OCCUPATIONAL HEALTH AND SAFETY
Specification 302 EARTHWORKS
Specification 303 PITS AND QUARRIES
Specification 501 PAVEMENTS
Specification 503 BITUMINOUS SURFACING
Specification 504 ASPHALT SURFACING
Specification 510 FULL DEPTH ASPHALT PAVEMENT
Specification 204 ENVIRONMENT
Specification 301 CLEARING
Specification 304 REVEGETATION AND LANDSCAPING
Specification 801 EXCAVATION AND BACKFILL FOR STRUCTURES

Other Test Methods

RC 131.01 Vic Roads test method - Lime Saturation Point of Soil (pH Method)

Acts and Regulations

Environmental Protection Act 1986
Environmental Protection Regulations 1987
Aboriginal Heritage Act 1972
Wildlife Conservation Act 1950
Environmental Protection (Clearing of Native Vegetation) Regs 2004
Health Pesticide Regulations 1956
Dangerous Goods Safety (Road and Rail Transport of Non-explosives) Regulations 2007
Occupational Safety and Health Act 1984
Occupational Safety and Health Regulations 1996
Rail Safety Act
Road Traffic Code 2000
Main Roads Act 1930

3.0 DEFINITIONS

1. The following particular definitions shall apply:

   a) ”pavement” shall be any layer above subgrade and will include shoulders.

   b) ”retained pavement” shall be that portion of existing pavement remaining after removal of the existing seal.

2. Water used in any pavement construction or pavement material manufacture process shall comply with the requirements of Main Roads Western Australia publication 6706-02-133 “Water to be used in Pavement Construction” and shall be free from significant quantities of suspended material, organic matter, oil or acid.

EARTHWORKS

4.0 PERMITS AND CLEARANCES

1. No clearing or earthworks shall commence until all permits and clearances have been obtained in accordance with all statutory and regulatory requirements.

2. Management plans shall be developed and implemented where necessary to ensure compliance with all statutory and regulatory requirements.

3. The Contractor shall investigate the location of all services in the area of the works and take all precautions necessary to prevent damage of all existing services. The Contractor shall be fully responsible for damage to existing services and the cost of repairing and making good any losses by other parties for costs incurred as a result of damage to services by the Contractor.

5.0 SURVEY SET OUT

The works shall be set out and constructed in accordance with the alignments, levels, grades and cross sections as shown in the approved drawings.

The works shall be set out using appropriate survey equipment from the pegs and bench marks given and these shall be used constantly during the progress of the works to check accuracy. Care shall be taken not to disturb any survey pegs, survey recovery pegs or survey marks.

Where it is necessary to cover a survey peg, such a peg shall have a substantial stake driven in beside it and this stake shall extent at least 75 mm above the finished surface and be appropriately marked to clearly identify it. The Contractor shall be responsible for the accuracy of setting out the works.

Any State Survey Mark affected by the works shall be identified and reported to the Department of Land Administration for replacement or relocation.

6.0 PRODUCTS AND MATERIALS EARTHWORKS

6.1 General

1. Unless specified otherwise, earthworks material for embankments shall be suitable material extracted from cuttings in the Works or, should such material be totally exhausted or not available, be imported onto the Site by the Contractor from other sources.

2. Material for embankments shall be free from boulders having any dimension as detailed in the Oversize Material Clause and shall be free from clods, stumps, roots, sticks, vegetable matter or other deleterious materials.

6.2 Use of Materials

1. The Contractor shall be responsible for any assumptions made by the Contractor in relation to the nature and types of materials encountered in excavations and the bulking and compaction characteristics of materials incorporated in embankments.

2. Where material from excavations is suitable for use in embankments, but the Contractor elects to:

a) spoil it, or

b) use it for the Contractor's own purposes, or

c) use it as a source of pavement materials, or

d) construct embankments with dimensions other than those shown on the Drawings, or to dimensions as otherwise authorised by the WALGA Member Representative, and a deficiency of material for embankment construction is thereby created, the Contractor shall make good that deficiency from sources of suitable material. The making good of such deficiency of material shall be affected at no cost to the WALGA Member.

6.3 Imported Material for Embankments

1. Imported material for embankments shall be a non cohesive or moderately cohesive granular material with no dimension greater than 100 mm in accordance with Annexure A unless otherwise specified or approved by the WALGA Member Representative. The imported fill shall clean and free from vegetation, contamination and be certified as "Dieback-free" where dieback is a known risk.

6.4 Select Fill

Unless otherwise specified or approved by the WALGA Member Representative, select fill shall be non cohesion granular material complying with the particle size distribution of
Table 1.

Table 1: Selected Fill Particle Size Distribution

Sieve Size	% Passing
37.5	100
19.0	80 - 100
9.5	60 - 100
4.75	45 - 100
2.36	30 - 100
1.18	20 - 100
0.425	5 - 100
0.150	3 - 30
0.075	1 - 10

2. The linear shrinkage for the portion of the material passing the 0.425mm sieve of the distribution of the select fill shall not exceed 1.0%.

3. The source for the select fill material shall be clean and free from vegetation, contamination and be certified as “Dieback-free” in areas where dieback is a known risk.

6.5 Stockpile Sites

1. Where provided the WALGA Member’s nominated stockpile sites for topsoil and imported fill are listed in Annexure A. The Contractor may nominate alternative stockpile sites, subject to the WALGA Member Representative’s approval that the Site complies with the Contract requirements.

3. Stockpile sites for the storage of topsoil shall be prepared and managed in accordance with Figure B1 Typical Cross Section for Stockpiles of Topsoil shown in Annexure B.

7.0 CLEARING

7.1 Dieback Controls

1. Clearing and earthworks operations shall be undertaken in accordance with the procedures for dieback control and shall comply with all statutory and regulatory requirements and relevant management plans (where dieback is a known risk).

7.2 Weed Control

1. Clearing and earthwork operations shall be undertaken to meet the requirements for weed control and shall comply with all statutory and regulatory requirements and relevant management plans.

2. The Contractor shall implement an approved weed control program as necessary to control all weed species prior to undertaking any other works.

3. The Contractor shall avoid spreading weeds during clearing operations and shall remove all weeds from the ground surface and dispose of them in an authorised waste disposal site prior to clearing operations.

7.3 Erosion Control

Clearing and earthwork operations shall be undertaken to minimise all erosion and sedimentation and meet all statutory and regulatory requirements for erosion and sedimentation control.

7.4 Clearing Extent

Clearing of all vegetation shall be completed only to an extent sufficient to facilitate the construction works. Natural vegetation shall be retained where possible.

Where the WALGA Member specifies the extent of clearing in drawings or otherwise the Contractor shall limit the clearing to the area specified. The Contractor shall clearly mark out the extent of the area specified with pegs and tags.

7.5 Clearing Operations

1. Clearing shall include but not be limited to;

e) the felling, cutting and removal of all trees standing or fallen;

f) the removal of all brush, shrubs, grasses and other vegetation;

g) the removal of rubbish and debris;

h) the removal of surface boulders and boulders dislodged during vegetation removal; and

i) the grubbing out of all stumps and roots larger than 80mm diameter or with any dimension greater than 300mm to a depth of 600mm below either the existing surface or the finished subgrade surface, whichever is the lower.

Depressions caused by grubbing out tree roots and stumps, in cleared areas with no topsoil removal, shall be promptly backfilled with clean fill and compacted to the density and surface levels of the surrounding undisturbed ground.

Material cleared shall be either removed from site and disposed of in an approved manner or chipped and mulched in accordance with WALGA Member policies.

8.0 TOPSOIL REMOVAL

8.1 Definition

1. Suitable topsoil shall only be the top surface layer that consists of disease-free and weed-free surface soil and vegetable matter stripped and stockpiled after clearing for later re-spreading.

2. Suitable topsoil may include approved processed vegetative material incorporated during the clearing operations.

8.2 General

1. During the removal of topsoil the Contractor shall take all precautions necessary to prevent damage to any retained vegetation within or adjoining the limits of clearing. Retained vegetation shall not be covered or buried with topsoil.

8.3 Topsoil Removal within Limits of Clearing

1. Prior to the commencement of the removal of topsoil from all Designated and Other Areas, the Contractor shall certify to the WALGA Member Representative that:

a) Topsoil to be stripped and stockpiled or removed to spoil is correctly pegged on Site;

b) The location of stockpile sites for topsoil and other materials are correctly pegged on Site, including any alternative locations as nominated by the Contractor;

c) Areas of weed infestation have been identified and pegged for removal to spoil;

d) Identified vegetation to be retained and declared rare flora have protective measures in place; and

e) Environmental controls are in place.

2. Cleared vegetation dropped to ground during the clearing operations and not to be removed shall be mixed into the existing topsoil, using suitable cultivation equipment or land conditioners, prior to the removal and stockpiling of the topsoil.

3. Topsoil shall be removed to the depth as specified in the Drawings or otherwise specified. If not specified a nominal depth of 75mm of topsoil shall be removed unless otherwise approved by the WALGA Member Representative.

4. The Contractor shall ensure that appropriate plant and equipment are utilised by competent operators to ensure that the subsoil and topsoil layers are not mixed and the subgrade integrity is not affected during the stripping and stockpiling process.

5. All topsoil and vegetation from identified weed infested areas shall be stripped separately to the nominated depth and deposited in the nominated spoil sites or authorised waste disposal sites in accordance with Clause 7 CLEARING.

6. The Contractor shall ensure that all machinery, used in the removal of weed-infested topsoil, shall be cleaned down before and between operations to prevent the introduction and spread of weeds outside weed infested areas across the Site

7. The burial on Site of weed infested topsoil may only occur if the Contractor can demonstrate that appropriate control of the weed infestation will occur to the satisfaction of the WALGA Member Representative.

8. Topsoil containing weeds, if approved by the WALGA Member Representative for burial on Site, shall be placed at least one metre below the finished ground surface level within 30 days of the commencement of stripping operations.

9. All machinery used in weed-infested areas shall be wash down in approved wash down bays prior to moving to other areas of the Site.

10. Topsoil to be windrowed shall be stripped to the nominated depth and bladed outwards away from the centreline of the alignment or from other areas of excavation within the limits of clearing. For other areas of excavation, the topsoil shall be windrowed to the downstream side of the area wherever practical to avoid creating a dam effect for surface drainage.

8.4 Topsoil Stockpiles

1. Stockpiling operations shall occur in a manner to ensure that the properties of the topsoil are not degraded and the topsoil made unsuitable for use in revegetation.

2. Stockpiles of topsoil shall be free from stones, soil, rubbish, and other materials, and shall not be contaminated with matter toxic to plant growth.

3. Except for short-term storage during cartage operations, all stockpiles of topsoil shall be placed and managed in accordance with Typical Cross Section for Stockpiles of Topsoil in Annexure B

4. The Contractor shall protect and stabilise stockpiles by appropriate measures, to minimise erosion and loss of materials, as approved by the WALGA Member Representative.

5. The Contractor shall manage and maintain the topsoil stockpile sites weed free.

6. Weed infestations shall be treated as many times as necessary to control the nominated weed species in accordance with the approved weed control program.

9.0 EXCAVATIONS

9.1 General

1. Excavations in cut sections including benching shall be carried out to the shapes shown in the Drawings and to the specified tolerances. General requirements for benching of stepped cut batters are given in the Drawings

2. Cut batters other than in rock, greater than three metres in height shall be benched or stepped to provide drainage and erosion control as shown in the Drawings or in Annexure B.

3. Benches shall be maintained free of loose materials until the finishing of batters and ground surfaces.

4. Each bench shall drain back away from the lowest cut face and provide for longitudinal drainage.

5. Cut batters in rock shall be treated as shown in the Drawings or in Annexure B.

6. All suitable materials from excavations may be used in embankment construction. No material resulting from cutting operations of the existing pavement shall be incorporated into the road pavement, but may be utilised as oversize material.

7. Any over-excavation below the subgrade surface and table drains shall be backfilled with embankment quality material. Any backfilled material more than 150mm below the subgrade surface shall be compacted as specified for embankment construction.

9.2 Existing Pavement

9.2.1 Road Widening

1. The existing seal shall be cut where new pavement is to be blended into existing work, or where widening is required. In this context "seal" shall be deemed to mean the existing bituminous surfacing which may be a primerseal, single or double coat seal or asphalt surfacing.

2. The existing seal shall be cut along a marked alignment and the area to be treated shall be excavated to the depth as detailed in the Drawings and to the specified tolerances.

3. The Contractor shall mark the alignment of the cut by painting spots on the existing seal, not exceeding 50mm in width at intervals of not greater than 3 metres.

4. Prior to any cutting of the existing seal the Contractor shall mark out and indicate to the WALGA Member Representative the position of the proposed line of cut of the seal.

5. The cut edges of the seal and the wall of the excavation shall be in a smooth straight line, have no tears, jagged edges, or undercutting to the materials to be retained. The sides of the cut shall be made at a slope of 1 vertical to 1 horizontal sloping down and away from the material to be retained. There shall be no separation of the retained seal from its base material. The cut edge shall be to a smooth alignment within 50mm of its marked position. The rate of change of the position of the cut edge shall not exceed 1 in 100 from the desired line. The Contractor shall ensure that the cut seal edge and the wall of the excavation are not damaged and remain in the specified condition until the pavement stabilisation has been completed.

6. Where any portion of existing pavement is shown on the Drawings as "unused", the pavement shall be rehabilitated, and the unused pavement including bituminous products and manufactured pavements shall be ripped and removed from the roadway. Natural gravels used in pavements may be left. The removed material may be used in embankment construction provided the material complies with the oversize limitations for Oversize Material or otherwise shall be removed to spoil areas shown in Annexure B or where no such sites are listed the material shall be disposed to an authorised waste disposal site in accordance with Clause 7 CLEARING.

7. All removed seal is defined as spoil unless otherwise specified and shall be removed to spoil areas or disposed of in an authorised waste disposal site.

9.2.2 Overlays

1. The existing bituminous seal shall be maintained for as long as practicable before its removal.

2. The WALGA Member Representative will measure the width of the existing seal in accordance with MRS 67-08-43.

3. Prior to any measurement of the width of the existing seal and its subsequent removal, the Contractor shall give the WALGA Member Representative at least 48 hours' notice of when such measurement is required.

4. After the seal width has been measured the existing bituminous seal shall be removed from the roadway by grader blade methods or cold milling. This removal shall be completed with as little disturbance to the underlying pavement as possible.

5. Following the removal of the existing seal, the exposed surface of the retained pavement shall be prepared to provide a suitable surface prior to the addition of new pavement material. This preparation work shall include, but shall not be limited to, watering, rolling, and trimming of high spots.

6. After the surface has been prepared, the Contractor shall supply notice to the WALGA Member Representative in accordance to the Survey requirements of the Specification for the WALGA Member Representative to undertake a digital ground survey. These levels will be used as the basis for the calculation of the volume of any additional pavement material required to complete the construction of the overlay pavement.

9.3 Rock Excavation

9.3.1 General

1. Prior to under taking a digital ground survey, the top surface of rock shall be exposed and clear of all loose material as far as practicable.

2. "Rock excavation material" shall describe all material to be excavated to achieve the road design cross section including table drains which cannot be ripped and excavated with a track dozer in good condition with matching hydraulic single shank ripper of combined mass not less than 52 tonnes (e.g. Caterpillar D10R or its equivalent) at a rate in excess of 90m³ (solid) per hour. Isolated boulders each greater than 0.8m³ in volume shall be defined as rock excavation.

3. In rock cuttings, a 150mm compacted thickness subgrade layer shall be constructed using embankment material to the requirements for Subgrade Preparation. The surface of the exposed rock shall be trimmed to allow free drainage to the table drains prior to the placement of subgrade.

4. Rock cuttings and exposed rock surfaces adjacent to the roadway shall be trimmed to provide a natural appearance similar to local cliff faces. Any overhanging, loose or unstable material whether outside or behind the specified slope shall be removed. Trimming of the batters to the required standard shall be carried out by pulling down rock from a face excavated near the design line, breaking the rock on natural joints where possible.

5. Rock excavation in table drains, including independently graded table drains, is defined as that material that cannot be ripped and excavated as specified above at an effective total rate in excess of 40m³ (solid) per hour. Annexure C, Figure C.1 Definition of 'Rock in Table Drain' shows a diagrammatic definition for rock in table drains.

6. Rock excavation in other drains is defined as that material that cannot be ripped and excavated as specified above at an effective total rate in excess of 40m³ (solid) per hour.

7. Rock excavation in trenches is defined as that material that cannot be ripped and excavated by a combination loader backhoe in good condition capable of exerting a minimum breakout force of 30kN at the bottom of the excavation with a 450mm wide rock bucket fitted with teeth (e.g. CASE 480E or its equivalent).

9.3.2 Blasting

9.3.2.1 General Requirements

1. The Contractor shall be liable for any accident, damage or injury to any person, property or thing resulting from the use of explosives. The Contractor shall conduct a survey of all structures within the region of influence of the proposed site of blasting to determine their pre-blast condition.

2. All purchase, manufacture, handling, transport, storage and use of explosives shall be in accordance with the provisions of:-

a) The Western Australian Explosives and Dangerous Goods Act,

b) By-Laws of the relevant Local Authority, and

c) AS 2187, Parts 1 and 2 - Rules of Storage, Transport and Use of Explosives.

3. Should any conflict of requirements occur between those provisions, the requirements of the Act shall take precedence, followed by the By-Laws of the relevant Local Authority.

4. Where explosives are used during the course of this Contract or any Works associated with this Contract, the use, transportation and storage of explosives shall be under the direct control of, and be the responsibility of, an appointed qualified person who possesses a current Shot-firer's Permit issued by the Chief Inspector of Explosives for Western Australia.

5. At least three (3) weeks prior to any blasting or storage of materials on Site, the Contractor shall submit to the WALGA Member Representative details of all equipment, materials and procedures to be used for blasting and storage magazines, including the qualifications of the person in charge of blasting operations.

6. If the appointed Shot-firer leaves the Site, the Contractor shall notify the WALGA Member Representative in writing of the name and permit number of the replacement Shot-firer at least three days prior to any Works associated with the use, transportation and storage of explosives being carried out.

9.3.2.2 Blasting Records

1. The Contractor shall keep and maintain all necessary records of blasting as required by the relevant Acts, Regulations and By-Laws. These records shall be made available to the WALGA Member Representative on request.

10.0 UNSUITABLE MATERIAL

10.1 Definition

1. Material which the WALGA Member Representative deems to be unsuitable for use in Embankment Construction, Subgrade Preparation, or Embankment Foundation shall be excavated and then disposed of as spoil.

10.2 Contaminated Soil

1. Soil which the WALGA Member Representative deems to be unsuitable because it is 'contaminated' shall be isolated from all other work under the Contract and subsequently disposed of in a manner and to a site in accordance with all statutory and regulatory requirements. When the soil has been contaminated as a result of the Contractor's activities then its disposal in accordance with this Clause shall be at no cost to the WALGA Member.

10.3 Removal and Replacement

1. A void created from the excavation of unsuitable material during Embankment Foundation or Subgrade preparation shall be backfilled with suitable embankment quality material or as directed by the WALGA Member Representative and compacted in accordance with the Clause for Embankment Construction.

2. Prior to the backfilling of a void created from the excavation of unsuitable material the Contractor shall give the WALGA Member Representative at least 48 hours notice of when a digital ground survey is required for the purpose of unsuitable material measurement.

3. The WALGA Member Representative will take levels of the excavation after the removal of any unsuitable material prior to its replacement with the suitable backfill material in accordance with MRS 67-08-43.

11.0 OVERSIZE MATERIAL

11.1 Definition

1. All oversize material having any dimension greater than 100mm shall be reduced in size or shall be removed from excavated material intended to be used as fill within 300mm of the subgrade and/or shoulder surfaces and/or batter face.

2. All oversize material having any dimension greater than 300mm shall be reduced in size or shall be removed from excavated material intended to be used as fill within 500mm of the subgrade and/or shoulder surfaces and/or batter face.

3. Notwithstanding the last sub-Clause material having any dimension greater than 300mm shall not be placed where other work under the contract is to be completed such as but not limited to; the installation of underground drainage and services, signs, street lighting, safety barrier systems etc.

4. All oversize material having any dimension greater than 500 mm shall not be used as fill and shall be removed to spoil.

5. Oversize material not used in the embankment shall be stockpiled in uniformly shaped heaps in spoil areas.

11.2 Disposal

1. Oversize material shall be disposed to the spoil sites as listed in Annexure A. Where no such sites are listed, oversize material shall be disposed to an authorised waste disposal site.

12.0 EMBANKMENT FOUNDATION

12.1 General

1. After the completion of clearing and topsoil removal, the material upon which embankment is to be constructed shall be compacted as specified in this Clause to the depth as shown in Annexure A.

2. Where the embankment is to be founded on the existing road, the existing seal shall be cut and removed and the retained pavement prepared in accordance with the Existing Pavement Clause.

3. Subject to the other requirements of the Contract, the existing seal may be incorporated into the embankment foundation by means of a stabiliser to pulverise the seal to size that passes the 37.5mm sieve and compacted in a layer of not less than 100mm.

4. No seal material shall be placed within 500mm of the subgrade surface or batter face.

5. The embankment foundation shall be maintained in its Conforming Condition until embankment construction commences. No embankment materials shall be placed until the embankment foundation has been levelled as specified in the Embankment Foundation Section.

12.2 Compaction: End Product Specification

1. Where the material in the embankment foundation contains 20% or less by mass of material retained on a 37.5mm sieve the compaction shall be to the Characteristic Dry Density Ratio as shown in Annexure D or greater.

2. The Characteristic Dry Density Ratio (Rc) shall be determined in accordance with Clause 24 QUALITY CONTROL.

3. During the compaction process, the embankment foundation shall be lightly watered or dried as required to maintain appropriate moisture content in order to achieve the required density.

12.3 Compaction: Contractor's Developed Method Specification

1. Where the material in the embankment foundation contains 20% or less by mass of material retained on a 37.5mm sieve, the Contractor may develop a method of compaction, with suitable controls that will demonstrate the achievement of the Characteristic Dry Density Ratio as shown in Annexure D or greater.

2. Where this option of compaction is chosen, the effectiveness of the Contractor's proposed method shall be demonstrated to the WALGA Member Representative prior to its implementation.

3. During the whole of the compaction process the Construction Characteristic Moisture Content of the embankment foundation material shall be within 90% - 110% of the optimum moisture content for that material as determined by WA 133.1 or 133.2.

4. The Construction Characteristic Moisture Content (CMc) shall be determined in accordance with Clause 24.0 QUALITY CONTROL.

5. Where the embankment foundation is not of constant quality and consists of various types of embankment foundation material the Contractor shall:

a) establish a method of compaction for each type of foundation material; and

b) select lots which are of constant quality without obvious changes in attribute values.

6. During the compaction process, the embankment foundation shall be lightly watered or dried as required to maintain the specified moisture content.

12.4 Compaction: Principal's Method Specification

1. Where the material in the embankment foundation contains more than 20% by mass of material retained on a 37.5mm sieve the compaction shall be by a vibratory pad-foot or grid roller or similar approved by the WALGA Member Representative. The area shall be scarified to the depth shown in Annexure A and shall be compacted by not less than five (5) complete coverage of the roller. Each roller pass shall overlap the previous one by not less than 10%.

2. During the whole of the compaction process the Construction Characteristic Moisture Content (CMc) of that portion of the embankment foundation material which would pass a 37.5mm sieve shall be within 90% - 110% of the optimum moisture content for that material as determined by WA 133.2.

3. The Construction Characteristic Moisture Content shall be as defined in Embankment Foundation Compaction: Contractor's Developed Method Specification Clause.

4. The vibratory pad-foot roller shall be a self-propelled roller with a total static mass not less than ten (10) tonnes and a centrifugal force on the drum not less than 150kN in the frequency range of 20 to 30 Hertz. The rolling speed for the vibratory roller shall not exceed 7km per hour. Only driven drum rollers shall be utilised.

5. The grid roller shall have an open mesh drum of approximately 1.7m diameter and 1.8m width. The drum mesh shall be 125mm x 125mm. The roller including ballast shall have a total mass not less than 13 tonnes. The grid roller shall be towed by a rubber tyred tractor and each pass shall be made at speeds between 15 and 25km per hour.

6. During the compaction process the embankment foundation shall be lightly watered or dried as required to maintain the specified moisture content.

13.0 EMBANKMENT CONSTRUCTION

13.1 General

1. Prior to embankment construction, the Contractor shall certify to the WALGA Member Representative that the embankment foundation conforms to the requirements of the Specification.

2. Embankment materials shall be placed to the shapes and levels shown in the Drawings with specified batter tolerances.

3. Embankment material shall be worked in compacted layers not greater than 300mm or less than 100mm. Where less than 100mm is required to be worked the underlying material shall be grader scarified or stabiliser mixed to such a depth that the resulting thickness of the layer to be worked is greater than 100mm.

4. Each layer worked shall be generally parallel to the finished pavement surface and shall where practicable extend to the full width of the embankment at that particular level. The Contractor shall at all times prevent the ponding of water on the embankment. No layer of embankment shall be placed until the preceding layer conforms to all requirements.

5. Embankment material shall be placed uniformly without abrupt changes in material type, quality or size.

13.2 Compaction: End Product Specification

1. Where the embankment material contains 20% or less by mass of material retained on a 37.5mm sieve then the embankment shall be compacted to the Characteristic Dry Density Ratio(s) as shown in Annexure A or greater.

2. The Characteristic Dry Density Ratio shall be determined in accordance with Clause 24 QUALITY CONTROL.

13.3 Compaction: Contractor's Developed Method Specification

1. Where the embankment material contains 20% or less by mass of material retained on a 37.5mm sieve the Contractor may develop a method of compaction with suitable controls to demonstrate the achievement of the Characteristic Dry Density Ratio(s) as shown in Annexure A, or greater.

2. Where this option of compaction is chosen, the Contractor's proposed method shall be approved by the WALGA Member Representative prior to its implementation.

3. During the whole of the compaction process the Construction Characteristic Moisture Content of the embankment material shall be within 90% - 110% of the optimum moisture content for that material as determined by WA 133.1 or 133.2.

4. The Construction Characteristic Moisture Content shall be determined in accordance with Clause 24 QUALITY CONTROL.

5. Where the embankment construction is not of constant quality and consists of various types of embankment construction material the Contractor shall:

a) establish a method of compaction for each type of embankment material; and

b) select lots which are of constant quality without obvious changes in attribute values.

13.4 Compaction: Principal's Method Specification

1. Where embankment material contains more than 20% by mass of material retained on a 37.5mm sieve then compaction of the embankment shall be deemed to be satisfactory when the fill has been compacted with not less than five (5) complete coverage of a vibratory pad-foot roller followed by not less than four (4) complete coverage of a grid roller. Each pass shall overlap the previous one by not less than 10%.

2. During the whole of the compaction process the Construction Characteristic Moisture Content of that part of the embankment material which would pass a 37.5mm sieve shall be within 90% - 110% of the optimum moisture content.

3. The Construction Characteristic Moisture Content shall be as defined in the Embankment Foundation Compaction: Contractor's Developed Method Specification Clause.

14.0 SUBGRADE PREPARATION

14.1 General

1. Subgrade preparation shall be completed in all areas where a pavement is to be constructed, except where the pavement is to be placed directly onto any retained pavement surface.

2. The subgrade surface shall be constructed to the shape and levels as shown in the Drawings and to specified requirements and tolerances of this Clause.

3. During the whole of the compaction process the Construction Characteristic Moisture Content of the subgrade material shall be within 90% - 110% of the optimum moisture content for that material as determined by WA 133.1 or 133.2.

4. The Construction Characteristic Moisture Content shall be determined in accordance with Clause 24 QUALITY CONTROL.

5. The completed subgrade layer shall be in a homogeneous uniformly bonded condition with no evidence of layering or disintegration.

6. The completed subgrade surface shall be maintained in its conforming condition until pavement construction commences and shall be watered as necessary to prevent shrinkage cracking, dusting or loosening of its surface.

14.2 Compaction: End Product Specification

1. Where material for a depth of 150mm below the subgrade surface contains 20% or less by mass of material retained on a 37.5mm sieve then that material shall be compacted to the Characteristic Dry Density Ratio as shown in Annexure A or greater.

2. The Characteristic Dry Density Ratio (Rc) shall be determined in accordance with Clause 24 QUALITY CONTROL.

14.3 Compaction: Principal's Method Specification

Where material for a depth of 150mm below the subgrade surface contains more than 20% by mass of material retained on a 37.5mm sieve then that material shall be compacted with not less than five (5) complete coverage of a vibratory pad-foot roller followed by no less than six (6) complete coverages of a fully ballasted 15 tonne rubber tyred roller and by not less than four (4) complete coverage of a grid roller. Each pass shall overlap the previous one by not less than 10%.

14.4 Surface Width

1. The outer top edge of the subgrade shall be no closer to the road centreline and no more than 100mm further from the road centreline than the position shown in the Drawings.

14.5 Surface Shape

1. The shape of the subgrade surface shall be deemed to be conforming when the maximum deviation from a 3 metre straight edge placed in any position on the surface does not exceed 15mm.

2. Additionally, for widening of the existing roadway the cross fall measured at right angles to the road centreline shall be within 0.5% of the existing cross fall, or within 0.5% of any cross fall detailed on the Drawings.

14.6 Surface Levels

14.6.1 Construction or Overlay/Reconstruction Sections

1. The level of the completed subgrade surface shall be deemed to be conforming when the level measured at any point on the surface is within -35mm, + 5mm of the subgrade level at that point as determined from the Drawings.

14.6.2 Seal Widening Sections

1. The level of the completed subgrade surface shall be deemed to be conforming when the levels at its junction with the existing pavement are within -35mm, +5mm of the levels as determined from the total pavement depth making due allowance for the existing cross fall of the pavement.

15.0 SPOIL

15.1 Definition

1. Spoil is defined as surplus material from excavations under the Contract which is not required to complete the Works, or material from excavations under the Contract whose quality renders it unacceptable for incorporation in the Works.

15.2 Spoil Areas

1. Where nominated the WALGA Member's on site and off site spoil sites are shown in Annexure A. Where no such areas are shown in Annexure A, the Contractor shall dispose spoil to an authorised waste disposal site in accordance with Clause 7 CLEARING.

2. The Contractor may nominate alternative spoil sites, subject to the WALGA Member Representative's approval that the Site complies with the Specifications.

15.3 Use of Surplus Materials

1. Materials deemed surplus for road construction purposes may be used for revegetation and landscaping purposes as approved by the WALGA Member Representative.

2. Spoil material that may be suitable for use in revegetation and landscaping shall not contain contaminated materials, debris or rubbish or other deleterious materials that are considered environmentally hazardous or other materials as specified by the WALGA Member Representative.

3. To use any approved spoil material, the final placement shall have a minimum of 500 millimetres cover of clean embankment material.

4. The placement of surplus material in areas on the Site designated for revegetation and landscaping shall achieve and or maintain the landform nominated in the Drawings.

5. Material authorised by the WALGA Member Representative for placement must remain stable and free draining in the long term and be compacted to a similar density to the surrounding ground.

16.0 REHABILITATION

16.1 General

1. Following the completion of construction operations, all batter and ground surfaces as nominated shall be prepared for revegetation and landscaping.

2. The finishing operations shall include as nominated the cultivation or ripping of soil surfaces, the spreading of topsoil and or vegetation mulch, and batter protection works.

16.2 Finishing of Batters and Ground Surfaces.

1. Except during the construction of benched or stepped batters, batter slopes shall be smoothly shaped to a uniform plane from top to bottom and shall not at any point vary from the specified slope by more than 150mm measured normal to the specified batter slope.

2. The top and toe of all batters shall be rounded, where practical, to match the shape of the surrounding topography as shown in Annexure B Figure B2 Typical cross section for rounding of batter line edges, unless otherwise specified in the Contract.

3. The surface of all batters and other areas nominated for revegetation and landscaping works shall be excavated and filled, shaped and/or graded as necessary to achieve the finished soil levels and contours nominated in the Drawings, prior to any surface preparation and soil improvements.

4. The toe of mounds shall be graded evenly to meet adjoining surface levels. The ground surface shall be shaped and/or graded evenly to avoid abrupt changes in levels abutting structures and paved surfaces.

5. Median or traffic island areas nominated for revegetation shall be prepared by ripping the soil surface to a depth of 500mm at 500mm spacing, but not closer than 500mm from the rear face of the kerb and/or edge of paving. Soil preparation within 500mm of the kerb and/or edge of paving shall only be performed by hand.

6. Soil surfaces within 500mm of a compacted shoulder, rear face of kerb and edge of paving shall only be cultivated by hand.

7. Unless shown otherwise in the Drawings or in Annexure B all existing redundant pavement shall be ripped and removed as spoil to an authorised waste disposal site in accordance with Clause 6 CLEARING.

8. These areas shall then be prepared by grading or other means to form a loose and roughened surface.

9. Unless shown otherwise in the Drawings or in Annexure B, when all Other Areas are no longer required all soil surfaces and trafficked areas shall be cleared, excavated and filled, shaped and or graded to achieve and or maintain the landform nominated in the Drawings.

10. Topsoil from windrows and or stockpiles shall be uniformly respread over the areas. The areas shall then be ripped to a minimum depth of 300mm and at no more than 500mm spacing in a direction parallel to the natural contours of the surrounding surface.

11. The Contractor shall place any large rocks or boulders retained for use in landscaping as shown in the Drawings ensuring that the rocks or boulders are not scarred or broken by equipment during placement.

12. Unless specified otherwise in the Drawings, each rock or boulder shall be buried 30-50% below finished soil levels.

13. As shown in the Drawings or in Annexure B the Contractor shall place nominated tree trunks salvaged from clearing operations, and ensure that the tree trunks are not broken by equipment during placement.

14. Unless specified otherwise in the Drawings, each tree trunk shall be placed parallel to the contours.

15. Where nominated the Contractor shall evenly spread sheeting grade gravel over all stepped and sand fill batters to a nominal depth of 25mm over the surface unless otherwise in the Drawings or in Annexure B.

16. Sheeting gravel shall be naturally occurring gravel that is free from clods, stumps, roots, sticks, vegetative matter, weed seed, disease or other deleterious materials prior to loading and carting.

17. Where nominated the finished soil surface of sand or other suitable soil batters shall be marked by tracked vehicles running perpendicular to the contours of the slope, unless shown otherwise in the Drawings or in Annexure B.

18. Where nominated the Contractor shall incorporate chipped vegetation mulch into sand or other suitable soils, as shown in the Drawings or in Annexure B. The nominated depth of mulch shall be spread on the soil surface and incorporated into the soil with suitable equipment.

19. Where nominated, chipped vegetation mulch shall be tracked into the soil to a nominal depth of 100mm, by a tracked vehicle running perpendicular to the contour, unless shown otherwise in the Drawings or in Annexure B.

20. The finished soil surface of all batters and embankment slopes shall be left in a roughened state to facilitate revegetation works, unless shown otherwise in the Drawings or in Annexure B.

21. The Contractor shall ensure that all finished surfaces are protected from soil erosion and weed infestation until the revegetation and landscaping works have commenced or a Certificate of Practical Completion has been issued.

22. The Contractor shall implement appropriate measures where necessary to divert upslope runoff and excessive surface water flows away from areas to be treated for revegetation and landscaping.

23. All weed control measures shall be in accordance with the approved weed control program and as shown in Annexure B.

24. Any erosion or scouring of the surfaces nominated for revegetation shall be filled with embankment quality material and lightly compacted to match the surrounding ground level or nominated design levels.

25. The use of erosion control matting, mulch, seeding or hydro-mulching for soil surface protection and erosion control shall be in accordance with a plan approved by the WALGA Member.

16.3 Topsoil Respread

1. Topsoil shall be placed as soon as practical following basecourse operations and/or other construction operations, unless shown otherwise in the Drawings or in Annexure B.

2. Topsoil shall be placed to the depth shown in the Drawings or in Annexure B.

3. If a depth is not specified a nominal depth of 75mm of topsoil but not more than 100mm shall be placed, unless otherwise approved by the WALGA Member Representative.

4. Topsoil shall be uniformly spread over the nominated finished and prepared ground surfaces to the depth, levels and slope as shown in the Drawings or in accordance with Annexure B.

5. The finished surface of the placed topsoil shall be free from stones, lumps and clods.

16.4 Mulch Respread

1. Unless shown otherwise in the Drawings or in Annexure B, approved mulch shall be placed as a soil cover as soon as is practical after finishing and preparation of batters and ground surfaces.

2. Mulch shall be placed to the depth shown in the Drawings or in Annexure B.

3. If not specified a nominal depth of 75mm of mulch but not more than 100mm shall be placed, unless otherwise approved by the WALGA Member Representative.

4. Mulch shall be uniformly spread over the ground surface to the depth, levels and slope as shown in the Drawings or in with Annexure 302D.

5. Where shown in the Drawings or Annexure D, mulch shall be spread by hand, machine or air blower unit over the areas and the surface raked as necessary to present an even surface.

6. Unless shown otherwise in the Drawings or in Annexure B, mulch shall not be mixed or buried in the soil during the spreading operations.

PAVEMENT CONSTRUCTION

17.0 PAVEMENT PRODUCTS AND MATERIALS

Except where otherwise specified all materials shall conform to WALGA Specification Granular Pavement Materials.

17.1 Cement and Lime for Stabilised Pavements

Cement for stabilisation of any pavement layer shall comply with the requirements of AS 3972, Type LH. Any sampling and testing of cement shall be in accordance with AS 2350. The cement shall be sufficiently dry to flow freely during application.

2. Lime for stabilisation of any pavement layer shall comply with the requirements of AS 1672. The lime shall be sufficiently dry to flow freely during application.

3. The Contractor shall arrange cement and lime delivery and have on site bulk storage facilities. The Contractor shall be responsible for all arrangements in regard to the transfer of cement and lime between delivery vehicles, on site bulk storage facilities and cement and lime spreaders.

4. The Contractor shall use cement and lime in approximately the chronological order in which it is delivered from the manufacturer. Transportation units and storage bins for bulk cement shall be weatherproof and shall be constructed so that there is no dead storage. The Contractor shall demonstrate that the storage bins for bulk cement do not have any dead storage. If dead storage exists the bins shall be emptied completely at least once every three months. Cement and lime delivered in bags shall be stored in weatherproof structures having floors raised above the ground. Cement and lime that is more than three months old shall not be used.

5. Prior to commencing cement or lime stabilisation, the Contractor shall certify to the WALGA Member Representative that the cement or lime is no more than 3 months old.

17.2 Bitumen Emulsion for Stabilised Pavements

1. The bitumen emulsion used to stabilise (modify) the crushed limestone shall comply with the requirements of AS 1160, “Bitumen Emulsion for Construction and Maintenance of Pavements” for Grade ASS/170-60 emulsion. The emulsifier used in the manufacture of the emulsion shall be Vinsol resin. The bitumen used in the manufacture of the emulsion shall be class 170 bitumen conforming to AS 2008, Residual Bitumen for Pavements. WALGA Members shall nominate the source of supply of bitumen emulsion with their quotation. The Contractor shall make arrangements for the Local Government Representative to sample the emulsion or any of its components at any time during

normal working hours. These arrangements shall include a means of identifying lots of emulsion or the component material, which will be used in the Works.

18.0 PAVEMENT CONSTRUCTION GENERAL

1. Pavement construction includes the supply, placing, compacting and finishing of pavement material in accordance with the Specifications and Drawings to the prepared sub-grade surface.

2. Pavement construction shall include construction of stabilised pavements.

3. Where a drainage layer has been constructed on the prepared subgrade surface, the drainage layer shall be the foundation for the subsequent pavement layer(s).

4. Prior to the construction of any pavement layer, the Contractor shall certify to the WALGA Member Representative that the underlying layer has been constructed as specified.

5. Pavers that utilise transverse augers shall not be used for pavement construction.

19.0 DRYBACK REQUIREMENTS

19.1 Subgrade

1. Pavement construction shall not commence until the layer 150mm below the subgrade surface has dried back such that the Dryback Characteristic Moisture Content (DMc) is equal to or less than the proportion of the Optimum Moisture Content as shown in Annexure D as determined by Test Method WA 133.1 or Test Method WA 133.2 as appropriate. The Dryback Characteristic Moisture Content shall be determined in accordance with Clause 24 QUALITY CONTROL. Where the material in the layer 150mm below the subgrade surface contains more than 20% by mass of material retained on a 37.5mm sieve the Optimum Moisture Content and the Dryback Characteristic Moisture Content shall be determined on that portion of the material that passes a 37.5mm sieve.

19.2 Sub-Base

1. Basecourse construction shall not commence until the sub-base has dried back such that the Dryback Characteristic Moisture Content (DMc) is equal to or less than the proportion of Optimum Moisture Content as shown in Annexure D as determined by WA 133.1 or 133.2. The Dryback Characteristic Moisture Content shall be determined in accordance with Clause 24 QUALITY CONTROL.

2. Where the sub-base material contains more than 20% by mass of material retained on a 37.5mm sieve the Optimum Moisture Content and the Dryback Characteristic Moisture Content shall be determined on that portion of the material that passes a 37.5mm sieve.

19.3 Basecourse

1. No bituminous surfacing shall be applied to a basecourse lot until it has dried back such that the Dryback Characteristic Moisture Content of both the upper half and lower half of the basecourse layer is less than or equal to the proportion of the Optimum Moisture Content (OMC) as shown in Annexure 1A as determined by WA 133.1 or 133.2. Where no such proportion of OMC is shown in Annexure D, the Dryback Characteristic Moisture Content of the basecourse shall be dried back to 85% of OMC or less. The Dryback Characteristic Moisture Content shall be determined in accordance with Clause 24 QUALITY CONTROL.

20.0 SPREADING

20.1 General

1. Each pavement layer worked shall be generally parallel to the finished pavement surface and shall extend the full width of the layer.

20.2 Sub-Base

1. Sub-base shall be worked in compacted layers not greater than 250mm nor less than 100mm. Where less than 100mm is required to be worked the underlying sub-base shall be scarified to such a depth that the resulting compacted thickness of the layer to be worked is not less than 100mm.

20.3 Basecourse

1. Basecourse shall be worked in compacted layers not more than 230mm nor less than 100mm compacted thickness.

2. For insitu rehabilitation works the WALGA Member Representative may give approval for the basecourse to be worked in a compacted layer of up to 300 mm compacted, thickness. This approval shall not be unreasonably withheld, but can be withdrawn at any time if the WALGA Member Representative is not satisfied that all the requirements of the contract are being met.

21.0 COMPACTION

21.1 General

1. Pavement material shall be spread, mixed and compacted to achieve uniformity free from any evidence of segregation.

2. Compaction shall be carried out at a Construction Characteristic Moisture Content (CM_C) that is greater than 95% of the Optimum Moisture Content and with a uniform compactive effort applied longitudinally and transversely to the road alignment to achieve the density as shown in Annexure D as well as the width, shape, level and surface finish as specified.

21.2 Bitumen Stabilised Limestone (BSL)

1. During the construction process the bitumen stabilised limestone (BSL) shall not be ripped up and reworked more than once. If the BSL has dried back to less than 80% of OMC it shall not be reworked. BSL trimmed from one lot shall not be incorporated into another basecourse lot.

22.0 CEMENT AND LIME STABILISATION

22.1 General

1. The Contractor shall cement or lime stabilise the specified pavement layer with the proportion of cement or lime and to the depth of the pavement layer as shown in Annexure D

2. The cement or lime stabilised pavement layer shall be constructed at the locations shown in Annexure D and to the tolerances and requirements specified for this type of pavement.

22.2 Trial Section

1. The Contractor shall carry out a preliminary trial of the proposed stabilising operations. The trial shall determine:

a) the effectiveness of the plant;

b) the number of passes of the stabilising machine necessary to achieve the specified mixing;

c) the desirable moisture content for compaction operations; and

d) the compacted depth of layer being worked, including the allowance for trimming to spoil and level tolerances.

2. The trial section shall be located within the Works area.

3. Prior to conducting such a trial the Contractor shall agree with the WALGA Member Representative the location, length and width of trial section(s) within the Works.

4. The Contractor shall not change the method developed during the trial without approval from the WALGA Member Representative.

22.3 Plant and Equipment

a) Cement Spreader/Lime Spreader

1. The spreading equipment shall be a stabilising agent spreader, which has been specifically designed for such work. The spreader shall be capable of uniformly distributing cement and accurately controlling the spread rate such that when mixing is complete, the cement content shall be in accordance with the requirements of the Spreading of Cement or Lime Clause 23.5.

2. The spreader shall be equipped with gates to vary the width of spread and with electronic weigh scales to give daily totals of product used.

b) Stabilising Machine

1. Cutting, pulverising, mixing, adding water and spreading of mixed material shall be accomplished using a stabilising machine specifically designed for stabilisation.

2. The stabilising rotor action shall be such that the rotor revolves in an upwards and forwards cutting direction. The rotor shall be of the recycler type and fitted with bullet teeth cutting tips.

3. The stabilising machine shall also satisfy the following requirements:

a) It shall be capable of producing a uniformly mixed material throughout the specified depth of the work.

b) It shall be equipped with a variable depth of cut control, and an accurate gauge to measure depth of cut which is readily visible to the operator.

c) It shall have provision for adding water automatically through a system comprising a pump, flow meter, variable control valve and full width spray bar. Each nozzle on the spray bar shall be fully and independently adjustable, and the water pump shall have the capacity to supply up to 1500 litres per minute.

22.4 Preliminary Treatment

1. It shall be the Contractor's responsibility to determine whether pre-ripping the in-situ pavement material is necessary. Under no circumstances shall ripping to a depth exceeding the depth to be stabilised be permitted.

22.5 Spreading of Cement or Lime

1. The cement or lime stabilised pavement layer shall contain the proportion of cement or lime as a percentage of the dry mass of pavement material as shown in Annexure D. Cement or lime shall be spread uniformly at a controlled rate over the area to be stabilised using a suitable cement or lime spreader.

2. The Contractor shall provide to the WALGA Member Representative daily records of the amounts of cement or lime used and actual spread rates obtained per section treated.

3. The percentage cement or lime shall be determined by either:

a) placing three (3) trays each of one third one square metre in area in front of the cement or lime spreader and measuring the mass of cement or lime deposited on the trays for each lot, or

b) by use of an on-board calibrated electronic weight scale system.

4. The percentage cement or lime (P%) shall be calculated thus:

$$P\% = (M \times 100)/ (A \times T \times MDD)$$

Where M = total mass of cement or lime (kg) as determined by one of the following methods:

a) on each tray
b) on-board calibrated electronic weight scale system.

A = method a): total area of the trays (m^2)
method (b): total measured area spread (m^2)

T = Thickness to be stabilised (mm) (including allowances for tolerances and trimming)

MDD = Maximum Dry Density of the pavement material without the addition of cement or lime (kg/m^3)

4. The percentage cement or lime determined for each tray in accordance with this Clause shall be maintained within ± 10% by mass of the cement or lime content specified in this Clause throughout the stabilisation works.

5. The use of method (b) in determining the values 'M' and 'A' is subject to satisfactory calibration of the measuring device and the production of associated certification in accordance with the Contractor's Quality System. Audits on this method shall be carried out using the measuring tray method.

6. Once the cement or lime has been spread, no other plant other than that needed for spreading, or for mixing and spreading the mixed material, shall be permitted to travel over the area to be stabilised.

22.6 Incorporation of Cement or Lime

1. The spreading of cement or lime shall not proceed when rain is imminent. The spread cement or lime shall be incorporated into the pavement layer immediately following the spreading operation. All spread cement or lime shall be incorporated into the pavement layer within the same working day. Cement or lime shall not be spread when the prevailing wind velocity is sufficient to make the cement particles airborne.

2. Cutting, stabilising, mixing, adding water and spreading of mixed material shall take place as a single operation within the stabilizing machine.

3. Cutting, stabilising, mixing, adding water and spreading of mixed material shall continue until the maximum size of all material (other than rock) is not greater than 25mm, and the cement and water are uniformly incorporated into the mixed material without streaks or pockets of cement or lime.

22.7 Moisture Content

1. The required moisture content shall be based on the results of any trials and/or density testing carried out.

2. The Contractor shall be responsible for achieving and maintaining the required moisture content by controlling the amount of water added during the mixing process within the stabilising machine.

22.8 Compaction

1. Compaction and trimming of the mixed material to shape and level shall be completed within six (6) hours of the completion of incorporation of cement or lime into the pavement layer and shall be compacted to the Characteristic Dry Density Ratio as shown in Annexure D or greater.

2. The required moisture content shall be based on the results of the trials and density testing carried out. The Contractor shall achieve and maintain the required moisture content of the mixed material by controlling the amount of water added during the mixing process within the stabilising machine.

22.9 Rework

1. If a completed layer of cement stabilisation does not satisfy all of the requirements of the Specification and has to be reworked, the Contractor shall repeat all the requirements for Cement and Lime

Stabilisation including the addition of 50% of the original cement or lime content at no cost to the WALGA Member.

2. Rework shall include any disturbance to the surface of the cement or lime stabilized layer during trimming to meet shape or level requirements that occurs more than six (6) hours after the completion of incorporation of cement into the pavement layer or after the working day that the lime is incorporated into the pavement. The rework depth shall not be less than the full depth of the affected layer.

22.10 Construction Joints

1. If the stabilized work is such that it cannot be completed in one continuous operation, the Contractor shall provide construction joints at each discontinuity in the operation.

2. All construction joints shall be made transverse to and/or parallel to the direction of the stabilised run, and shall be made just prior to the commencement of the next stabilised run.

3. The joints shall be formed by cutting back into the compacted stabilised material to form a vertical face. The loose trimmed material shall be removed from the joint before the next section is mixed and compacted.

22.11 Blend Areas

1. In areas denoted as “blend areas” or “match existing pavement” on the drawings, the cut edge of the existing bituminous surfacing and the wall of the excavation shall comply with specified requirements.

2. The work shall comprise removal of the existing pavement to a sufficient depth to place the new pavement to the required levels, shaping and compaction.

3. Pavement shall be supplied, placed and compacted in accordance with this Specification.

4. Within the blend areas the level of the subgrade or pavement layer shall be in accordance with the detail shown on the Drawings.

5. The appropriate bituminous surfacing treatment shall then be applied in accordance with WALGA Specification SPRAYED BITUMINOUS SURFACING and, where applicable, with WALGA Specification ASPHALT SURFACING to provide a flush join and smooth transition between new and old construction, including any required matching of concrete kerbing to line and level.

23.0 DRAINAGE LAYER

23.1 General

1. The drainage layer shall consist of a Geotextile lining and a sand material of the material type and thickness as shown in Annexure D. The drainage layer shall be constructed immediately above the subgrade to the details shown in the drawings.

23.2 Geotextile

1. The Geotextile shall be a non-woven fabric consisting of long chain synthetic polymer fibres composed of at least 85% by mass of polyesters, polyolefins or polyamides. The fibres shall be formed into a fabric by needle punching, heat or chemical bonding processes such that they are capable of retaining their relative position in the Geotextile.

2. In addition, the fibres shall be stabilised against ultra-violet (UV) radiation and shall have low water absorbency.

3. The Geotextile shall be free of any flaws or defects that may adversely affect the mechanical or physical properties of the fabric.

4. Each roll of Geotextile shall be provided with a suitable covering to protect the fabric against moisture and ultra-violet radiation. Each roll shall be marked in conformance with AS 3705.

5. Rolls shall be stored on site under a waterproof cover and shall be supported off the ground. The Contractor shall take appropriate measures to protect the Geotextile from damage.

6. The Geotextile shall comply with the requirements shown in Table D5 and Table D6 of Annexure D.

7. All properties represent minimum roll values, that is, the test result from any sampled roll shall exceed the minimum value in Table D5.

23.3 Construction

a) Geotextile

1. The Contractor's process of installation of the Geotextile shall ensure that fabric is not damaged.

2. The initial lift thickness of fill materials placed directly over the Geotextile shall be a minimum uncompacted thickness of 300mm. The use of vibratory compaction equipment over the Geotextile should be minimized for the initial lift.

3. Unless otherwise shown on the Drawings, the minimum overlap requirement shall be 300mm. Successive sheets of Geotextile shall be overlapped a minimum of 300mm with the upslope section overlying the down slope.

4. The period of time between laying out and cover of the Geotextile shall not exceed 14 days.

5. Damaged areas of Geotextile may be repaired by overlaying the damaged section with a patch. The patch shall extend a minimum of 1 metre beyond the area of damage.

6. The Contractor shall certify that the Geotextiles delivered to site meet the Specification requirements. Sampling, conditioning and statistical analysis of results shall be carried out in accordance with AS 3706.1. Sampling frequency shall be in accordance with Appendix A of the standard. If directed otherwise, duplicate samples shall be provided to the WALGA Member Representative.

b) Drainage Layer Sand

1. The drainage layer sand shall comply with the following requirements:

i) Particle Size Distribution (WA 115.1) as shown in Table D7 of Annexure D.

ii) Linear Shrinkage (WA 123.1) - The portion of the sample which passes the 0.425mm sieve (soil mortar) shall have a linear shrinkage not exceeding 1.0%.

iii) Construction - Construction of the drainage layer shall be as specified for sub-base.

24.0 QUALITY CONTROL

24.1 General

The Contractor shall implement a quality control system to ensure that all construction and material supplied complies in all respects to the specified requirements.

Testing shall be carried out in accordance with the relevant Main Roads or equivalent Australian Standard test method. Unless otherwise approved by the WALGA Member all Test Reports/certificates shall be NATA endorsed.

Prior to the supply of any material the Contractor shall certify that the material supplied by the Contractor complies in all respects with the specified requirements and shall provide test certificates that demonstrate compliance.

Test reports/certificates shall be provided for each production lot. Production lots shall be no more than one (1) days production and shall be homogeneous in terms of quality.

The quality control system shall include the minimum testing requirements given in Annexure E unless otherwise approved by the WALGA Member.

24.2 Density Testing

For the Works in general, density shall be measured in-situ by use of a nuclear moisture/density meter in accordance with WA 324.2. All measurements shall be made using the direct transmission mode.

If the in-situ density is outside the range of densities 1.5-3.05t/m³ for which the nuclear moisture/density meter can be calibrated then WA 324.1 shall be used.

For the purpose of measuring conformance of all work under the Contract, the in-situ density shall be expressed as a percentage of the maximum dry density. This percentage shall be calculated in accordance with WA 134.1.

The maximum dry density shall be determined by WA 133.1 or WA 133.2. Where the pavement material is stabilised or modified with Portland Cement, the maximum dry density determinations shall be commenced two (2) hours after mixing is complete and shall be completed within a further two (2) hours. If Low Heat (LH) Cement or Lime is used for the stabilisation or modification, these determinations shall be commenced three (3) hours after mixing is complete and shall be completed within a further three (3).

The conformance of every Lot of the work under the Contract with respect to density shall be determined by comparing the Characteristic Dry Density Ratio of the Lot and the limits specified in the Specification.

The dry density ratio shall be determined at the at no less than the number of test locations per Lot defined in Table 2. The locations shall be selected in accordance with WA 0.1.

The Characteristic Dry Density Ratio, R_C, of a Lot shall be calculated thus:

$$R_C = R - ks$$

where; R is the mean of the results of dry density ratio tests on the Lot being assessed, reported to the nearest 0.1 percent

k is the multiplier as detailed in Table 2

s is the standard deviation of the results of dry density ratio tests (or the standard deviation of the results of the on the Lot being assessed.

Table 2: Number of Tests per Lot Density and Moisture Content

Works Component	Primary Distributors		District and Local Distributors		Access Streets	
	No. of tests/lot	k	No. of tests/lot	k	No. of tests/lot	k
Embankment Foundation	6	0.72	5	0.46	4	0.21
Embankment Construction;	6	0.72	5	0.46	4	0.21
Select Fill	6	0.72	5	0.46	4	0.21
Bedding & Embankment Backfill for Culverts and Drainage Structures	6	0.72	5	0.46	4	0.21
Subgrade Preparation	6	0.72	5	0.46	4	0.21
Sub-base	9	0.81	7	0.54	4	0.21
Basecourse	9	0.81	7	0.54	4	0.21

24.3 Moisture Content Testing

The Moisture content shall be determined using WA 110.1. If it is not practicable to use this method, then WA 110.2 or WA 324.2 may be used. However, correlation must be established with WA 110.1 before proceeding with the subsidiary methods WA 110.2 and WA 324.2.

The conformance of any Lot with respect to insitu moisture shall be determined by comparing the Dryback Characteristic Moisture Content or Construction Characteristic Moisture Content of the Lot and the limits specified in the Specification.

The moisture contents shall be determined at not less than the number of test locations per Lot defined in Table 2. The test locations shall be selected in accordance with WA 0.1.

(i) Construction Moisture Control

The Construction Characteristic Moisture Content CM_C, of a Lot shall be calculated thus:

$$CM_C = m \pm ks$$

where; m is the mean of the results of in-situ moisture content tests on the Lot being assessed, reported to the nearest 0.01 percent

k is the multiplier as detailed in Table 2

s is the standard deviation of the results of insitu moisture content tests on the Lot being assessed, calculated in accordance with Clause 1.4 and reported to the nearest 0.01 percent.

(ii) Basecourse Dryback

The Dryback Characteristic Moisture Content DM_C, of a Lot shall be calculated thus:

$$DM_{Upper} = m_1 + ks_1 \text{ and}$$
$$DM_{Lower} = m_2 + ks_2$$

where; m_1 average of the sample moisture contents on the Lot being assessed, taken from the upper half of the Basecourse layer and determined in accordance with WA 110.1 reported to the nearest 0.01 percent.

m_2 average of the sample moisture contents on the Lot being assessed, taken from the lower half of the Basecourse layer and determined in accordance with WA 110.1 reported to the nearest 0.01 percent.

k is the multiplier as detailed in Table 201A-2

S_1 standard deviation of the sample moisture content determinations taken from the upper half of the layer, calculated using the following relationship and reported to the nearest 0.01.

ACCEPTANCE

25.0 ACCEPTANCE GENERAL

All earthworks and each pavement layer shall be constructed in accordance with this Specification to satisfy the criteria shown in Annexure A to D.

Where a pavement material has been supplied by the Contractor, the Contractor must undertake sufficient testing of that material sampled from the stockpiles, in accordance with Clause 24 QUALITY CONTROL, to demonstrate that the material complies in all respects with the specified requirements.

Prior to the construction of any pavement layer, the Contractor shall certify to the WALGA Member Representative that the pavement material supplied by the Contractor complies in all respects with the specified requirements.

Where a pavement material has been supplied by the Contractor, the Contractor must undertake sufficient testing of that material sampled from the pavement, after compaction is completed, to demonstrate that the pavement material particle size distribution and linear shrinkage complies with the specified requirements.

Prior to the Date of Practical Completion, the Contractor shall certify to the WALGA Member Representative that the pavement material supplied by the Contractor complies with the specified linear shrinkage and particle size distribution after compaction into the pavement

25.1 Acceptance Compaction and Dryback

1. Each pavement layer shall be constructed to the dimensions and details shown on the Drawings and to the requirements of the Specification and shall be compacted to the Characteristic Dry Density Ratio shown in Annexure D or greater. Each pavement layer shall be dried back to the Dryback Characteristic Moisture Content shown in Annexure D or lower. Where the sub-base material contains more than 20% by mass of material retained on a 37.5mm sieve, the Optimum Moisture Content and the Maximum Dry Density shall be determined on that portion of the material that passes a 37.5mm sieve.

25.2 Acceptance Layer Width

1. The outer top edge of any layer of the pavement shall be no closer to the road centreline and no more than 100mm further from the road centreline than the positions shown in the drawings.

25.3 Acceptance Surface Shape

25.3.1 Sub-Base

1. The shape of the sub-base shall be judged to be acceptable when the maximum deviation from a 3 metre straight edge placed in any position on the surface does not exceed 10mm.

2. Additionally, for pavement widening work, the cross fall at any position on the new surface measured at right angles to the centreline shall be within 0.5% of the existing cross fall on the outer 2 metres of the adjacent traffic lane at that location.

25.3.2 Basecourse

1. The shape of the basecourse shall be judged to be acceptable when the maximum deviation from a 3 metre straight edge placed in any position on the surface does not exceed 6mm.

2. Additionally, for widening work, the cross fall measured at any position on the new surface at right angles to the centreline shall be within 0.5% of the existing cross fall or of the cross fall on the outer 2 metres of the adjacent traffic lane at that location.

25.4 Acceptance Surface Levels

25.4.1 Sub-Base

a) Construction or Reconstruction Sections

1. The level of the completed sub-base surface shall be deemed to be conforming when the level measured at any point on the surface is within +5mm, -25mm of the sub-base level at that point as determined from the drawings.

b) Pavement Widening Sections

1. The level of the completed sub-base surface shall be deemed to be conforming when the levels of the sub-base at its junction with the existing pavement are within +5mm, -25mm of the levels as determined from the basecourse depth making due allowances for the effect of the existing cross fall of the pavement.

25.4.2 Basecourse

a) Construction or Reconstruction Sections

1. The level of the completed basecourse surface shall be judged to be acceptable when the level measured at any point on the surface is within the following tolerances for the basecourse level for that point as determined from the drawings:

i) where final surface is asphalt - 5mm, + 10mm

ii) elsewhere - 5mm, + 20mm.

2. Where the basecourse is stabilised, the depth of stabilisation shall be deemed to be acceptable when the actual depth of the stabilised material after compaction shall nowhere depart from the specified depth by more than - 0mm, + 25mm.

b) Pavement Widening Sections

1. The level of the completed basecourse surface shall be judged to be acceptable when the levels of the basecourse at its junction with the existing seal are within -0mm, +5mm of the top cut edge level of the existing seal.

25.5 Acceptance Surface Finish

1. Completed pavement layers shall be in a homogeneous, uniformly bonded condition with no evidence of layering, cracking, disintegration or surface tearing. The finished surface should appear as a stone mosaic interlocked with fine material and shall be dense, even textured and tightly bonded. The basecourse must retain those characteristics after rotary brooming and be suitable to receive bituminous surfacing. Prior to the application of a bituminous surfacing the surface of the basecourse shall be uniformly dry.

MAINTENANCE

26.0 SUBGRADE MAINTENANCE

1. Completed subgrade construction shall be maintained to the specified standards of surface shape, level, dryback and compaction up to the time of construction of the sub-base.

2. Watering shall be continued as necessary to prevent, dusting or loosening of the surface.

3. Completed subgrade construction shall also be maintained to the specified standard of dryback up to the time of application of the bituminous surfacing.

27.0 SUB-BASE MAINTENANCE

1. Completed sub-base construction shall be maintained to the specified standards of surface shape, level, dryback and compaction up to the time of construction of the basecourse.

2. Watering shall be continued as necessary to prevent shrinkage cracking, dusting or loosening of the surface.

3. Completed sub-base construction shall also be maintained to the specified standard of dryback up to the time of application of the bituminous surfacing.

28.0 BASECOURSE MAINTENANCE

1. Completed basecourse construction shall be maintained to the specified standards of surface shape, level, compaction, dryback and finish up to the time of application of the bituminous surfacing.

Watering shall be continued as necessary to prevent shrinkage cracking, dusting and loosening of the surface.

REGULATORY REQUIREMENTS

29.0 REGULATORY REQUIREMENTS

The Contractor shall conform to all statutory and regulatory requirements concerning the environment, aboriginal heritage, wildlife conservation, dangerous goods, occupational safety and health, rail safety, and road safety.

ANNEXURES

30.0 ANNEXURE A- EMBANKMENTS

A.1. IMPORTED MATERIAL FOR EMBANKMENTS

1.1 Imported material shall be certified as “Dieback-free” (free from the plant disease *phytophthera cinnamomi*), and shall conform to the requirements for Particle Size Distribution given in Table A.1.

1.2 The portion of the material passing the 0.425mm sieve for imported material shall have a linear shrinkage not exceeding 1.0 %.

Table A1: Particle Size Distribution (Imported Material)

AS Sieve Size (mm)	% Passing by Mass
37.5	90 - 100
2.36	30 - 100
0.075	1 - 10

A.2. DEPTH OF COMPACTION EMBANKMENT FOUNDATION

The depth (in millimetres) of compaction for Embankment Foundation shall be 150.

A.3. COMPACTION REQUIREMENTS (END PRODUCT SPECIFICATION)

The required densities for the various earthworks elements shall be as follows:

Table A2: End Product Compaction Requirements

Earthworks Element	Characteristic Dry Density Ratio (%)	
	Perth Sands	Other
Embankment Foundation	90	88
Embankment Construction	95	90
Subgrade	96	92

A4 WALGA MEMBER STOCKPILE LOCATIONS

Details of the locations of nominated stockpile locations are as follows:

Coordinates		Type	Treatment details
North	East		

A5 NOMINATED ONSITE LOCATIONS FOR SPOIL MATERIALS

Details of the onsite spoil sites nominated by the WALGA Member are as follows:

Coordinates		Type	Treatment details
North	East		

A6 NOMINATED OFF-SITE LOCATIONS FOR SPOIL MATERIALS

Details of the offsite locations for disposal of spoil materials nominated by the WALGA Member are as follows:

Spoil Site Name/Location	Comments

31.0 ANNEXURE B - TOPSOIL OPERATIONS

The depth of topsoil removal shall be as follows:

Table B1: Topsoil Removal

Location/Section		Depth of Topsoil Removal (mm)	Comment on Treatment
To	From		

The depth of topsoil respread shall be as follows:

Table B2: Topsoil Respread

Location/Section		Depth of Topsoil Respread (mm)	Comment on Treatment
To	From		

Nominated stockpile locations are as follows:

Table B3: Principal's Nominated Stockpile Locations

Co-ordinates		Type	Treatment details
North	East		

The depth of mulch respread shall be as follows:

Table B4: Mulch Respread

Location/Section		Depth of Mulch Respread (mm)	Treatment details
To	From		

The Contractor shall prepare and implement a Weed Control Program in accordance with Clause 6 CLEARING, prior to undertaking any other works.

The Weed Control Program shall include but not be limited to the listing below of known locations of nominated weed species for control and disposal.

Table B5: Weed Control Requirements

Co-ordinates		Weed species	Timing of Control	Treatment details
North	East			

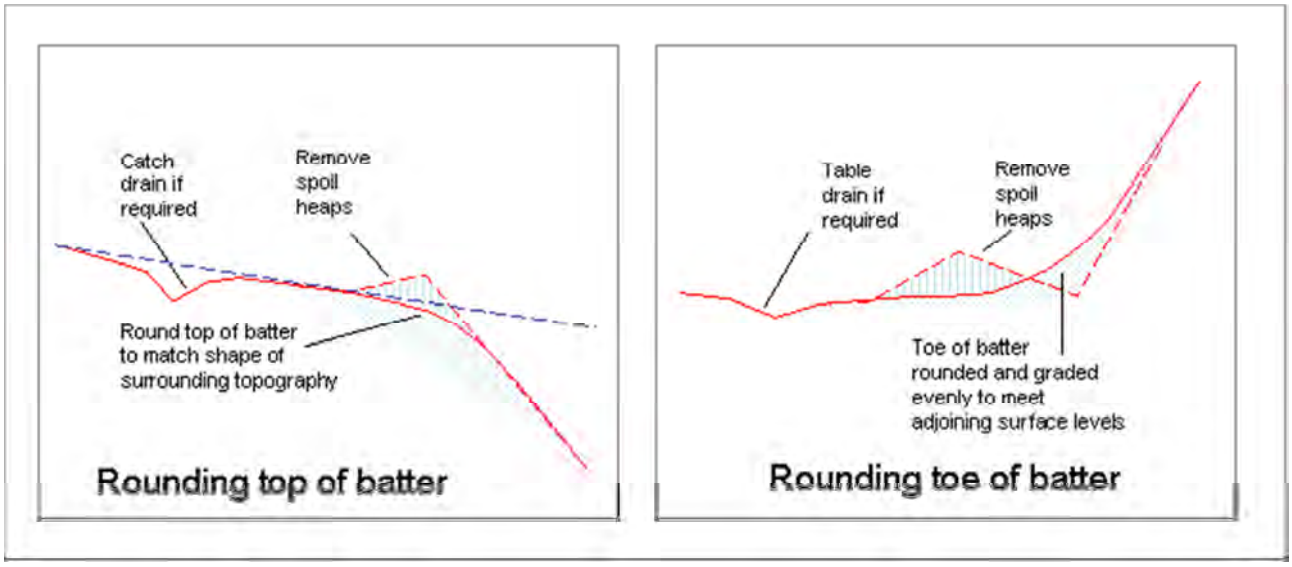

Figure B1: Typical Cross Section for Stockpiles of Topsoil

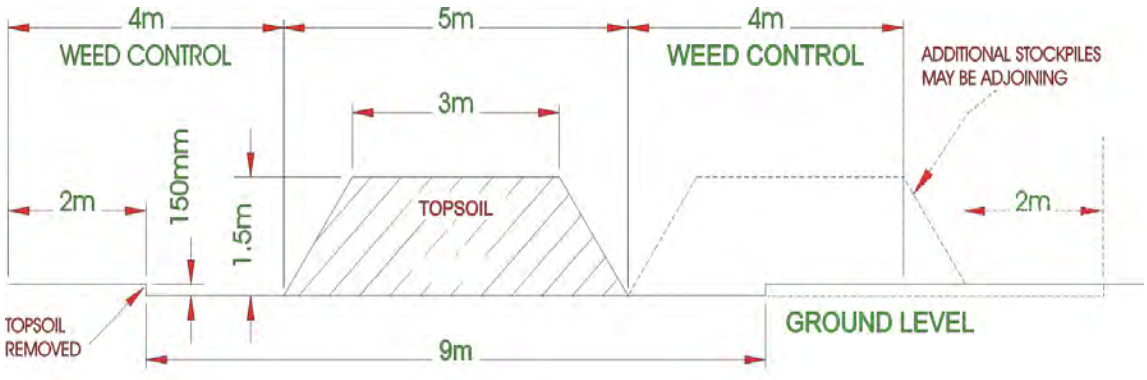

Figure B2: Typical Cross Section for Rounding of Top and Toe of Batter Slopes

32.0 ANNEXURE C - ROCK IN TABLE DRAIN

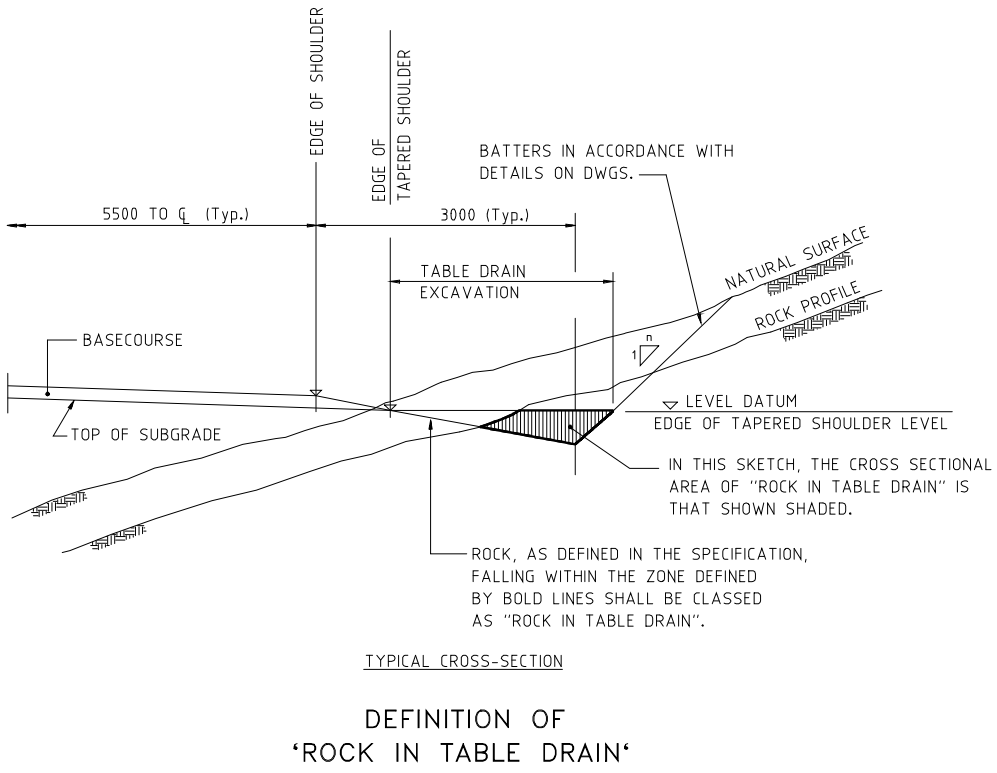

Figure C1: Definition of 'Rock In Table Drain'

33.0 ANNEXURE D - COMPACTION AND DRYBACK

D1. COMPACTION OF PAVEMENT LAYERS

Pavement layers shall be compacted to the densities shown in Table D1.

Table D1: Compaction Values

Pavement Layer	Minimum Characteristic Dry Density Ratio % (Rc)
Drainage Layer	94%
Sub-Base	94%
Cement Stabilised Sub-Base	94%
Lime Stabilised Sub-Base	94%
Crushed Recycled Concrete Sub-Base	94%
Gravel Basecourse (final surfacing - sprayed seal)	96%
Gravel Basecourse (final surfacing - asphalt)	98%
Cement Stabilised Basecourse	96%
Lime Stabilised Basecourse	96%
Bitumen Stabilised Limestone Basecourse	98%
Crushed Rock Base Basecourse	99%

D2. DRYBACK OF PAVEMENT LAYERS

Basecourse or other pavement layers shall be dried back to the requirements shown in Table D2 or Table D3 prior to the application of bituminous binder or the construction of the overlying layer.

Table D2: Dryback on Subgrade or Subbase Layers

Subgrade or Pavement Layers	Maximum Dryback Characteristic Moisture Content (DMc) as a proportion of Optimum Moisture Content
Layer 150mm below Subgrade surface	85%
Drainage Layer	85%
Sub-Base	85%

Table D3: Basecourse Dryback

Basecourse Material Type	Maximum Dryback Characteristic Moisture Content (DMc) as a proportion of Optimum Moisture Content
Basecourse (final surfacing - sprayed seal)	85%
Basecourse (final surfacing - asphalt)	70%
Crushed Rock Base (all surfacing types)	60%

D3. CEMENT STABILISED PAVEMENTS

Cement stabilised pavement layers shall be constructed at the locations and with the parameters as shown in Table D4:

Table D4: Cement Stabilised Pavements

Section		Depth of Stabilisation (mm)	Width of Stabilisation (m)	Cement Content (% by dry mass of Pavement Layer)
From	o			
Sub-Base Layers				
Basecourse Layers				

D4. LIME STABILISED PAVEMENTS

Lime stabilised pavement layers shall be constructed with the parameters as shown in Table D5:

Table D4: Lime Stabilised Pavements

Section		Depth of Stabilisation (mm)	Width of Stabilisation (m)	Equivalent Pure Hydrated Lime Content (% by dry mass of
From	To			Pavement Layer)
Sub-Base Layers				
Basecourse Layers				

D5. DRAINAGE LAYER

5.1 GEOTEXTILE

Geotextile shall comply with the properties given in Tables D5 and D6.

Table D5: Mechanical Properties

	Subsoil Drains	Drainage Blanket	Test Method
Minimum G Rating as defined in AUSTROADS Guide to Geotextiles #			AS 3706.4 and AS 3706.5

NOTE: 1. # Burst Strength (CBR Plunger Method) shall be the 5th percentile value determined in accordance with A S3706.1 & AS 3706.4 and Puncture Resistance (Drop Cone Method) shall be the 5th percentile value determined in accordance with AS 3706.1 & AS 3706.5.

Table D6: Hydraulic Properties

	Subsoil Drains	Drainage Blanket	Test Method
Maximum Equivalent Opening Size (EOS) (µm)			AS 3706.7#
Minimum Q_{100} (L/m²/sec)			AS 3706.9#

NOTES:

1. # Maximum Equivalent Opening Size (EOS) and Minimum Q100 are mean values.
2. Q100 = Flow rate under 100mm constant head determined using the Perpendicular Flow Test.

5.2 DRAINAGE LAYER SAND

Drainage Layer sand shall comply with the requirements shown in Table D7:

Table D7: Particle Size Distribution - WA 115.1

AAS Sieve Size (mm)	% Passing by Mass Minimum and Maximum Limits
37.5	90 - 100
2.36	30 - 100
0.075	0 - 3

34.0 ANNEXURE E - MINIMUM TESTING FREQUENCY

1. The minimum frequency of testing to determine the conformance of Works Processes with specified characteristics shall be as detailed in the Minimum Testing Frequency Table of the Specification or in the following Table:

PRODUCT/PROCESS	QUALITY VERIFICATION REQUIREMENT	MINIMUM TESTING FREQUENCY
Embankment Foundation	FOR CONTROL OF COMPACTION:	
	• End Product Specification:	
	Dry Density Ratio (WA 134.1)	As per Table 2
	Particle Size Distribution (WA115.2)	2 Per Lot
	• Contractor's Developed Method Spec:	
	Dry Density Ratio (WA 134.1)	As per Table 2 (**1 in 5 Lots tested**)
	Particle Size Distribution (WA115.2)	2 Per Lot
	FOR CONTROL OF CONSTRUCTION MOISTURE	
	Construction Characteristic Moisture Content (WA 110.1 or 110.2)	1 per test site as shown in Table 2 (**All Lots tested**)
	Optimum Moisture Content (OMC) (WA 133.1 or WA 133.2) (The mean value of these OMCs shall be taken to represent the Lot)	2 per lot
	• Principal's Method Spec:	
	Particle Size Distribution (WA 115.2)	2 per Lot
	FOR CONTROL OF CONSTRUCTION MOISTURE	
	Construction Characteristic Moisture Content (WA 110.1 or WA 110.2)	1 per test site as shown in Table 2 (**All Lots tested**)
	Optimum Moisture Content (OMC) (WA 133.1 or WA 133.2) (The mean value of these OMCs shall be taken to represent the Lot)	2 per Lot
Embankment Construction: Culvert Selected Bedding and Culvert Embankment Backfill, Select Fill	FOR CONTROL OF IMPORTED MATERIAL: SUPPLIED BY THE CONTRACTOR	
	PARTICLE SIZE DISTRIBUTION (WA 115.1)	1 per 2,500 m^3 bank in the ground
	LINEAR SHRINKAGE (WA 134.1)	1 per 2,500 m3 bank in the ground Lot
	FOR CONTROL OF COMPACTION:	
	• End Product Specification:	
	Dry Density Ratio (WA 134.1)	As per Table 2
	PARTICLE SIZE DISTRIBUTION (WA 115.2)	2 per Lot
	• Contractor's Developed Method Spec:	
	Dry Density Ratio (WA 134.1)	As per Table 2 (**1 in 5 Lots tested**)
	PARTICLE SIZE DISTRIBUTION (WA 115.2)	2 PER LOT
	FOR CONTROL OF CONSTRUCTION MOISTURE	

PRODUCT/PROCESS	QUALITY VERIFICATION REQUIREMENT	MINIMUM TESTING FREQUENCY
	Construction Characteristic Moisture Content (WA 110.1 or WA 110.2)	1 per test site as shown in Table 2 (**All Lots tested**)
	Optimum Moisture Content (OMC) (WA 133.1 or WA 133.2) (The mean value of these OMCs shall be taken to represent the Lot)	2 per Lot
	• Principal's Method Spec:	
	Particle Size Distribution (WA 115.2)	2 per Lot
	FOR CONTROL OF CONSTRUCTION MOISTURE	
	Construction Characteristic Moisture Content (WA 110.1 or WA 110.2)	1 per test site as shown in Table 2 (**All Lots tested**)
	Optimum Moisture Content (OMC) (WA 133.1 or WA 133.2) (The mean value of these OMCs shall be taken to represent the Lot)	2 per Lot
	FOR CONTROL OF DRYBACK MOISTURE	
	• DRYBACK CHARACTERISTIC MOISTURE CONTENT	As per Table 2
Subgrade Construction	for control of compaction: • End Product Specification:	
	Dry Density Ratio (WA 134.1)	As per Table 2
	Particle Size Distribution (WA 115.2)	2 per Lot
	FOR CONTROL OF CONSTRUCTION MOISTURE Construction Characteristic Moisture Content (WA 110.1 or WA 110.2)	
	• Principal's Method Spec:	
	Particle Size Distribution (WA 115.2)	2 per Lot
	FOR CONTROL OF CONSTRUCTION MOISTURE	
	Construction Characteristic Moisture Content (WA 110.1 or WA 110.2)	1 per test site as shown in Table 2 (**All Lots tested**)
	Optimum Moisture Content (OMC) (WA133.1 or WA133.2) (The mean value of these OMCs shall be taken to represent the Lot)	2 per Lot
	FOR CONTROL OF DRYBACK MOISTURE	
	DRYBACK CHARACTERISTIC MOISTURE CONTENT (WA 136.1)	As per Table 2
	GEOMETRICS:	
	• Rural/Freeway	As necessary to meet the specified tolerances in the Technical Specification
Sub-Base	for control of SUB-BASE SUPPLIED BY THE CONTRACTOR:	
	• PSD (WA 115.1)	1 per 1,000 m^3 of stockpile
	• LA Abrasion (WA 220.2)	1 per 5,000 m^3 of stockpile
	• $CaCO_3$ (WA 915.1)	1 per 5,000 m^3 of stockpile
	• MDCS (WA 140.1)	1 per 5,000 m^3 of stockpile
	Liquid Limit (WA 120.2)	1 per 1,000 m^3 of stockpile

PRODUCT/PROCESS	QUALITY VERIFICATION REQUIREMENT	MINIMUM TESTING FREQUENCY
	Plasticity Index (WA 122.1)	1 per 1,000 m^3 of stockpile
	Linear Shrinkage (WA 123.1)	1 per 1,000 m^3 of stockpile
	Soaked CBR (WA 141.1)	1 per 5,000 m^3 of stockpile
	FOR CONTROL OF COMPACTION	
	Dry Density Ratio (WA134.1)	As per Table 2
	Particle Size Distribution (WA 115.2)	3 per Lot
	FOR CONTROL OF CONSTRUCTION MOISTURE	
	CONSTRUCTION CHARACTERISTIC MOISTURE CONTENT (WA 110.1 OR WA 110.2)	As per Table 2
	FOR CONTROL OF dryback MOISTURE	
	• DRYBACK CHARACTERISTIC MOISTURE CONTENT (WA 136.1)	As per Table 2
	FOR CONTROL OF COMPACTED SUB-BASE MATERIAL SUPPLIED BY THE CONTRACTOR	
	PSD (WA 115.1)	1 per 3 Lots
	Linear Shrinkage (WA 123.1)	1 per 3 Lots
Additional Requirements for Cement or Lime Stabilised Sub-Base	FOR CONTROL OF STABILISATION	
	• Layer depth	9 sites per Lot
	• Cement or Lime content	6 sites per Lot
Basecourse	FOR CONTROL OF BASECOURSE SUPPLIED BY THE CONTRACTOR	
	• PSD (WA 115.1)	1 per 1,000m^3 of stockpile
	• LA Abrasion (WA 220.1)	1 per 5,000m^3 of stockpile
	• Flakiness Index (WA 216.1)	1 per 5,000m^3 of stockpile
	• $CaCO_3$ (WA 915.1)	1 per 5,000m^3 of stockpile
	• MDCS (WA 140.1)	1 per 5,000m^3 of stockpile
	• Liquid Limit (WA 120.2)	1 per 1,000m^3 of stockpile
	• Plasticity Index (WA 122.1)	1 per 1,000m^3 of stockpile
	• Linear Shrinkage (WA 123.1)	1 per 1,000m^3 of stockpile
	• Dust Ratio (Contract)	1 per 1,000m^3 of stockpile
	• Soaked CBR (WA 141.1)	1 per 5,000m^3 of stockpile
	• Wet/Dry Strength Variation (AS 1141.22)	1 per 5,000m^3 of stockpile
	• Secondary mineral content in basic igneous rock (AS 1141.26)	1 per 10,000m^3 of stockpile
	• Accelerated soundness index by reflux (AS 1141.29)	1 per 10,000m^3 of stockpile
	PSD & Bitumen Content (WA 730.1)	1 per 5,000m^3 of stockpile
	• LA Abrasion for bitumen stabilised limestone (WA 220.2)	1 per 5,000m^3 of stockpile
	• Bitumen Emulsion (AS 1160)	1 per 10,000m^3 of stockpile
	• Bitumen Dispersion (WA 717.1)	1 per 1,000m^3 of stockpile

PRODUCT/PROCESS	QUALITY VERIFICATION REQUIREMENT	MINIMUM TESTING FREQUENCY
	• Emulsifiers & Wetting Agents (as per Tech Spec)	Information to be provided by the Supplier
	FOR CONTROL OF COMPACTION	
	• Dry Density Ratio	As per Table 2
	Particle Size Distribution (WA 115.2)	3 per Lot
	FOR CONTROL OF CONSTRUCTION MOISTURE	
	• CONSTRUCTION CHARACTERISTIC MOISTURE CONTENT (WA 110.1 OR WA 110.2)	As per Table 2
	FOR CONTROL OF DRYBACK MOISTURE	
	DRYBACK CHARACTERISTIC MOISTURE CONTENT	As per Table 2
	FOR CONTROL OF COMPACTED BASECOURSE SUPPLIED BY THE CONTRACTOR	
	PSD (WA 115.1)	1 per 3 Lots
	Linear Shrinkage (WA 123.1)	1 per 3 Lots
Additional requirements for Cement or Lime Stabilised Basecourse	FOR CONTROL OF STABILISATION	
	• Layer depth	9 sites per Lot
	• Cement or Lime content	6 sites per Lot

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GOLDER ASSOCIATES PTY LTD

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August 2012

WALGA SPECIFICATIONS

WALGA Specification 8 - Aggregate and Cementitious Binders

Submitted to:
Mr Andrew Blitz
Western Australian Local Government Association
PO Box 1544
WEST PERTH WA 6872

SPECIFICATION

Report Number. 127642097-001-S-Rev1

Distribution:

1 electronic Copy - WALGA
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WALGA SPECIFICATION 8
AGGREGATE AND CEMENTITIOUS BINDER
REVISION REGISTER

Date	Clause Number	Description of Revision	Authorised By

Table of Contents

TABLES

1.0 SCOPE

This standard specifies the requirements of aggregates, including the source rock and the crushed screened product, for a range of nominal size aggregates used in sprayed sealing and concrete. It also includes a specification for cement and lime.

Quotations are to be supplied as set out in a Schedule of Rates included in Annexure A1 and in a Lump Sum Bill of Quantities included in Annexure A2.

Acknowledgment: The use of Main Roads WA specifications and guidelines and the Institute of Public Works Engineering Australia (WA Division) Local Government Guidelines for Subdivisional Development are gratefully acknowledged as the basis of these specifications.

2.0 REFERENCES

Australian Standards, MAIN ROADS Western Australia documents and Test Methods and ASTM test methods are referred to in abbreviated form (e.g. AS 1234, Main Roads 67-08-43 or WA 123).
For convenience, the full titles are given below:

Equivalent Australian Standard and Main Roads test methods may be substituted for one another.

Australian Standards

AS 1141	Methods for Sampling and Testing Aggregates
AS 2758.1	Aggregate and Rock for Engineering Purposes – Part 1 Concrete Aggregate
AS 3973	General Purpose and Blended Cement
AS 1672.1	Limes and Limestone – Part 1 Limes for Building
AS 1726	Geotechnical Site Investigations
AS 2350	Methods of Testing Portland and Blended Cements
AS 4489	Test Methods for Limes and Limestones

MAIN ROADS Test Methods

WA 200.1	Sampling Procedures for Aggregates
WA 210.1	Particle Size Distribution of Aggregate
WA 212.1	Aggregate Moisture Content: Convection Oven Method
WA 212.2	Aggregate Moisture Content: Microwave Oven Method
WA 215.1	Average Least Dimension
WA 216.1	Flakiness Index
WA 220.1	Los Angeles Abrasion Value
WA 223.1	Crushing Test Value
WA 624.1	Potential Alkali – Silica Reaction by Accelerated Mortar Bar

Acts and Regulations

Environmental Protection Act 1986
Environmental Protection Regulations 1987
Aboriginal Heritage Act 1972
Wildlife Conservation Act 1950
Environmental Protection (Clearing of Native Vegetation) Regs 2004
Health Pesticide Regulations 1956
Dangerous Goods Safety (Road and Rail Transport of Non-explosives) Regulations 2007
Occupational Safety and Health Act 1984
Occupational Safety and Health Regulations 1996
Rail Safety Act
Road Traffic Code 2000
Main Roads Act 1930

3.0 ONE SIZED SEALING AGGREGATES

3.1 General

Crushed aggregate, including its source rock, shall meet the requirements of this specification.

3.2 Source Rock

Source rock shall be selected from an approved quarry site such that the feed to the primary crusher is fresh, hard and durable rock, free from clay, organic matter, weathered (except as allowed below) or friable material, and is consistent in appearance. A classification system for rock material weathering is defined in Table A9 of AS 1726. The proportions of weathered rock material in the source rock shall not exceed the following limits by mass:

Table 1: Proportions of Weathered Rock

Slightly Weathered Rock	10% Maximum
Distinctly weathered rock	0.1% maximum
Extremely weathered rock	0.1% maximum
Residual soil	0% maximum

Selection of source rock shall be such that the requirements shown in Table 2 are satisfied and sealing aggregate conforming to the following specifications is able to be produced.

Table 2: Source Rock Properties

Property	Limit	Method of Test
Pendulum Friction Test (PAFV)	45 min	AS 1141.42

3.3 Crushed Aggregate for Sprayed Sealing Works

Source rock shall be processed to produce crushed and/or screened aggregate suitable for sprayed sealing works which shall conform to the requirements shown in Table 3 and Table 4. The aggregate shall be of uniform quality, clean, hard and durable and shall be free from clay, organic matter and elongated particles. The aggregate shall be of a uniform colour and appearance for the whole of the application.

Table 3: Crushed Aggregate Properties

Property	Requirement	Test Method
Los Angeles Abrasion Value (Note 2)		
Granite and other rock types	35% maximum	WA 220.1
Basalt	25% maximum	WA 220.1
Flakiness Index (Note 2)	35% maximum	WA 216.1
Average Least Dimension (Note 2)	Report	AS 1141.20.1 or WA 215.1
Water Absorption of Fine and Coarse Aggregate	2% maximum	AS 1141 6.1 AS 1141.5
Wet Strength	100kN minimum	AS 1141.22
Wet/Dry Strength Variation	35% maximum	AS 1141.22
Stripping Test Value (Note 1)	10% maximum	AS 1141.50
Degradation Factor	50 minimum	AS 1141.25.2
Secondary Mineral Content	25% maximum	AS 1141.26
Petrographic Examination	Statement of suitability for use as a sealing aggregate	

Notes: 1. The aggregate shall be tested with 0.5% of adhesion agent in the binder using one of the following approved adhesion agents: Bitumite Concentrate, Redicote BE, Diamin TO-L, Fentamine BA422 and Bitumite Concentrate.
2. Not applicable for crusher dust, sand, 7 mm and 5 mm aggregate.

Table 4: Sprayed Sealing Aggregate Particle Size Distribution Limits

AS Sieve Size (mm)	Percentage by Mass Passing Each Sieve for Each Nominal Size of Aggregate						
	20 mm	16 mm	14 mm	10 mm	7 mm	5 mm	3 mm
26.50	100						
19.00	80-100	100					
16.00	0-20	80-100	100				
13.20	0-2	0-20	80-100	100			
9.50		0-2	0-20	80-100	100		
6.70			0-2	0-20	80-100	100	
4.75				0-2	0-25	80-100	100
2.36					0-2	0-30	80-100
1.18	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-1.0	0-30
0.60							0-5

4.0 FINE AGGREGATES - CRUSHER DUST/SAND

Crusher dust/sand shall be suitable for use for primer-sealing and shall be clean coarse material that should not contain more than 4% by mass of material passing the 0.075 mm sieve and should be relatively free of clay and silt. The particles should be tough, durable, sound and free of deleterious material.

Unless otherwise approved by the Local Government Authority Representative, the material shall have the following properties:

Material shall be coarse, with a $D_{80} > 0.60$mm and $C_u(Coefficient\ of\ Uniformity) > 4$, where D_{80} is the particle size in millimetres at which 80%, by mass of the sample, is smaller in size and

$$C_u = \frac{D_{60}}{D_{10}},$$

where D_{60} and D_{10} are respectively equal to the particle size in millimetres at which 60% and 10%, by mass of the sample, is smaller in size.

The maximum particle size shall be 4.75 mm. Oversize material shall be removed by screening.

5.0 CONCRETE AGGREGATE

5.1 General

Aggregate for use in concrete shall conform to AS 2758.1 and this specification. The Local Government Authority may approve use of aggregates that do not comply in all respects to this specification provided evidence acceptable to the Local Government Authority is provided that the performance of concrete made with the aggregate is satisfactory for the type of use intended. Unless otherwise agreed by the Local Government Representative, aggregate supplied under this specification shall have a particle density limited to between 2.1 and 3.2 t/m³.

5.2 Durability

Unless otherwise agreed by the Local Government Authority, all aggregate shall suitable for use in exposure classification C as specified in AS 2758.1.

5.3 Fine Aggregate

Fine aggregate for concrete shall be defined as aggregate having a nominal size of less than 5 mm. Fine aggregates shall be natural sand unless otherwise agreed by the Local Government Authority and shall comply with the requirements of AS 2758.1.

The grading of the fine aggregate shall comply with the requirements of AS 2758.1 as specified in Table 5.

Table 5: Fine Aggregate - Grading Requirements and Limits of Deviation

Sieve Size	Uncrushed fine aggregate		Crushed fine aggregate	
	Size Limits, mass of sample passing (%)	Maximum deviation from submitted sample grading (%)	Size Limits, mass of sample passing (%)	Maximum deviation from submitted sample grading (%)
9.50	100		100	
4.75	90 to 100	± 5	90 to 100	± 5
2.36	60 to 100	± 5	60 to 100	± 10
1.18	30 to 100	± 10	30 to 100	± 15
0.600	16 to 100	± 15	15 to 80	± 15
0.300	5 to 50	± 10	5 to 40	± 10
0.150	0 to 20	± 5	0 to 25	± 5
0.075	0 to 5		0 to 20	± 5

The maximum amount of water absorption for fine aggregates shall not exceed 1.5 percent when tested in accordance with AS 1141.5, AS 1141.6.1 or AS 1141.6.2.

The maximum weighted average loss when determined in accordance with AS 1141.24 (Aggregate Soundness – Evaluation by exposure to sulphate solution) shall not be greater than 12 percent.

5.4 Coarse Aggregate

Course aggregate for concrete shall be defined as aggregate having a nominal site equal to or greater than 5 mm. Coarse aggregates shall be crushed igneous rock or crushed or screened river gravel conforming to the requirements of AS2758.1. All coarse aggregates shall be single-sized. Graded coarse aggregates shall not be used unless otherwise approved by the Local Government Authority. The maximum amount of water absorption for coarse aggregates shall not exceed 2.5 percent.

All aggregates proposed for use in the Works shall comply with the requirements of the "Alkali-Reactive Materials" clause of AS 2758.1. Aggregates shall be classified by Main Roads WA Test Method WA 624.1 and those aggregates having potential for substantial AAR shall not be used.

The Wet strength and wet/dry strength variation when determined in accordance with AS 1141.22 shall be not less than 100 kN and 25% respectively.

The Los Angeles Value when tested in accordance with AS 1141.23 or Main Roads WA 220.1 shall be not more than 30%.

The Sodium Sulphate Soundness weighted average loss shall be not more than 6% when tested in accordance with AS 1141.24.

The Flakiness Index shall not exceed 35 % when tested in accordance with AS 1141.15 or Main Roads WA 216.1.

The grading of the one sized coarse aggregate shall comply with the requirements of AS 2758.1 as specified in Table 6.

Table 6: Coarse Aggregate Grading Requirements

Sieve size	Mass of sample passing %				
	Nominal size of single sized aggregates (mm)				
	28	20	14	10	7
37.5	100				
26.5	85 to 100	100			
19.0	-	85 to 100	100		
13.2	0 to 20	-	85 to 100	100	
9.5	-	0 to 20	-	85 to 100	100
6.7	-	-	0 to 20	-	85 to 100
4.75	0 to 5	0 to 5	-	0 to 20	-
2.36	-	-	0 to 5	0 to 5	0 to 20
0.075	0 to 2	0 to 2	0 to 2	0 to 2	0 to 2

The limits of deviation from the submitted sample grading shall be as specified in AS 2758.1. Sampling for the purposes of carrying out tests shall be in accordance with AS 1141 or Main Roads WA 200.1.

6.0 GENERAL PURPOSE AND BLENDED CEMENTS

Cement shall comply with the requirements of AS 3972 for the type and blend specified. Sampling and testing of cement shall be in accordance with AS 2350. The cement shall be sufficiently dry to flow freely during application.

Unless otherwise specified by the Local Government Authority, cement shall also comply with the requirements of Australian Technical Infrastructure Committee (ATIC) Specification SP43. The Cementitious Material Registration Scheme (CMRS) shall be used to confirm that the cement complies to ATIC - SP43.

Prior to supply of cement the Contractor shall confirm that the cement complies with ATIC – SP43 and shall provide the CMRS registration number for the cement to the Local Government Representative for approval of the cement.

7.0 LIME

Quicklime and hydrated lime shall comply with the requirements of AS 1672.1. Sampling and testing of lime shall be in accordance with AS 4489. Hydrated lime shall be sufficiently dry to flow freely during application.

Prior to supply of lime the Contractor shall confirm that the material complies with AS 1762.1 and shall provide a NATA endorsed quality report for all relevant test properties for the material to be supplied to the Local Government Authority Representative for approval of the cement.

8.0 MATERIAL QUALITY

The Contractor shall implement a quality control system to ensure material supplied under this contract complies in all respects to the specified requirements for the type of material purchased.

The quality control system shall include the minimum testing requirements detailed in Table 7.

Table 7: Minimum Quality Control Testing Requirements

Property	Minimum Number of Tests
Aggregate	
PSD (WA 210.1 or AS 1141.11)	3 tests per quarry production lot
Flakiness Index (WA 216.1 or AS 1141.15)	3 tests per quarry production lot
LA Abrasion (WA 220.1 or AS 1141.23)	1 test per 12 months
Water Absorption (AS 1141.5/6)	1 test per 12 months
Degradation Factor (AS 1141.25.2)	1 test per 12 months (excluding acid igneous rock)
Wet Strength and Wet/Dry Strength Variation (AS 1141.22)	1 test per 12 months
Petrographic Examination (AS 1141.22)	1 test per 12 months per material type
Secondary Mineral Content (AS 1141.26)	1 test per 12 months (excluding acid igneous rock)
Resistance to Stripping (AS 1141.50)	1 test per 12 months (sealing aggregate only)
ALD (AS 1141.20.1)	Minimum 3 tests per lot per aggregate size (sealing aggregate only).
Water Absorption (AS 1141.5, AS 1141.6.1 or AS 1141.6.2)	1 test per 12 months
Aggregate Soundness (AS 1141.24)	1 test per 12 months
Potential Alkali-Silica Reaction (WA 624.1)	1 test per 12 months
Cement	
Suite of tests for properties specified in AS 3972	1 certificate per supply lot
Lime	
Suite of tests for properties specified in AS 1672.1	1 certificate per supply lot

Notes: Aggregates

1) A lot shall be no more than one (1) days production or 1000 m^3 whichever is the lesser and shall be homogeneous in terms of quality.
2) The quality control system shall include separate stockpiling of each aggregate type and size on well prepared stockpile sites at the quarry or pit.
3) Prior to the supply of any material the Contractor shall certify that material supplied by the Contractor complies in all respects with the specified requirements and shall provide test certificates that demonstrate compliance.
4) The Contractor shall provide ready access of Local Government Authority Representative to inspect the quarry, pit or production and or manufacturing site and to take samples.
5) The Contractor shall provide ready access of Local Government Authority Representative to inspect the quarry, pit or production and or manufacturing site and to take samples.
6) Conformance of the aggregate at its source shall be construed only as authorising the Contractor to deliver the material. Contamination of the aggregate during cartage, or failure to cart and stockpile the aggregate as specified shall render the material non-conforming. The Contractor shall not be paid for non-conforming material or its cartage.

9.0 SUPPLY

9.1 Aggregate

The source of aggregate supplied by the Contractor shall be nominated with the Tender.

Where specified, the Contractor shall supply the aggregate into nominated stockpile sites at the time specified by the Local Government Authority and shall make all necessary arrangements with the Local Government Authority Representative concerning load size, rate for supply, timing of the delivery and documentation. Different aggregate sizes and types shall be placed in clearly identified and separate stockpiles.

Any contamination of aggregate during delivery or stockpiling that is due in any way to the Contractor's activities shall be corrected at no cost to the Local Government Authority.

Where specified, the Contractor shall provide for the Local Government Authority to have ready access to the quarry or pit and shall load the Local Government Authority trucks with the specified aggregate size and type.

9.2 Cement

The Contractor shall arrange cement delivery. The Contractor shall be responsible for all arrangements in regard to the transfer of cement between delivery vehicles, on site bulk storage facilities and cement spreaders.

Transportation units and storage bins for bulk cement shall be weatherproof and shall be constructed so that there is no dead storage. The Contractor shall demonstrate that the transport units and storage bins for bulk cement do not have any dead storage. If dead storage exists the bins shall be emptied completely at least once every three months. Cement delivered in bags shall be stored in weatherproof structures having floors raised above the ground. Cement that is more than three months old shall not be supplied.

Any contamination, wetting up or other problem during delivery and supply that is due in any way to the Contractor's activities shall be corrected at no cost to the Local Government Authority.

9.3 Lime

The Contractor shall arrange lime delivery. The Contractor shall be responsible for all arrangements in regard to the transfer of lime between delivery vehicles, on site bulk storage facilities and lime spreaders.

Transportation units and storage bins for bulk lime shall be weatherproof and shall be constructed so that there is no dead storage. The Contractor shall demonstrate that the transport units and storage bins for bulk cement do not have any dead storage. If dead storage exists the bins shall be emptied completely at least once every three months. Lime delivered in bags shall be stored in weatherproof structures having floors raised above the ground. Lime that is more than three months old shall not be supplied.

Any contamination, wetting up or other problem during delivery and supply that is due in any way to the Contractor's activities shall be corrected at no cost to the Local Government Authority.

10.0 REGULATORY REQUIREMENTS

The Contractor shall conform to all statutory and regulatory requirements concerning the environment, aboriginal heritage, wildlife conservation, dangerous goods, occupational safety and health, rail safety, and road safety.

11.0 ANNEXURE A1

Schedule of Rates

The quantities in this Schedule of Rates are the estimated quantities of the Works and are not to be taken as the actual or correct quantities. The Contractor shall be paid for the measured quantity of each section or item of work described below and executed under the contract at the rates and amounts entered applicable thereto.

Item	Description	Unit	Qty	Rate (i)	Amount	
					$	¢
Sealing Aggregate						
1	14 mm sealing aggregate	m^3				
2	10 mm sealing aggregate	m^3				
3	7 mm sealing aggregate	m^3				
4	5 mm sealing aggregate	m^3				
5	Sand/crusher dust	m^3				
6	Cartage	m^3/km				
Concrete Aggregate						
7	Fine aggregate	m^3				
8	28 mm aggregate	m^3				
9	20 mm aggregate	m^3				
10	14 mm aggregate	m^3				
11	10 mm aggregate	m^3				
12	7 mm aggregate	m^3				
13	Cartage	m^3/km				
Cement						
14	GP and blends	tonne				
15	Cartage	tonne/km				
Lime						
15	Quicklime	tonne				
16	Hydrated Lime	tonne				
17	Cartage	Tonne/km				
GST Exclusive Total						
GST Amount						
Total Amount of Tender						

Note (i): Rate to include all overheads, incidentals, mobilisation and demobilisations, testing and aggregate loading.

12.0 ANNEXURE A2

Price Schedule (Lump Sum Bill of Quantities)

All items in this Bill of Quantities shall be priced and extended by the Tenderer and the lump sum accepted by the Local Government Authority shall equal the TOTAL AMOUNT GST INCLUSIVE. Any errors in the rates or prices entered in this Schedule shall be corrected by agreement between the Tenderer and the Local Government Authority. Where no agreement can be reached, any errors shall be corrected as determined by the Local Government Authority so that the total amount of tender for all items in this Schedule continues to equal the lump sum accepted by the Local Government Authority.

Item	Description	Unit	Qty	Rate (i)	Amount	
					$	¢
Sealing Aggregate						
1	14 mm sealing aggregate	m^3				
2	10 mm sealing aggregate	m^3				
3	7 mm sealing aggregate	m^3				
4	5 mm sealing aggregate	m^3				
5	Sand/crusher dust	m^3				
6	Cartage	m^3/km				
Concrete Aggregate						
7	Fine aggregate	m^3				
8	28 mm aggregate	m^3				
9	20 mm aggregate	m^3				
10	14 mm aggregate	m^3				
11	10 mm aggregate	m^3				
12	7 mm aggregate	m^3				
13	Cartage	m^3/km				
Cement						
14	GP and blends	tonne				
15	Cartage	tonne/km				
Lime						
15	Quicklime	tonne				
16	Hydrated Lime	tonne				
17	Cartage	Tonne/km				
GST Exclusive Total						
GST Amount						
Total Amount of Tender						

Note (i): Rate to include all overheads, incidentals, mobilisation and demobilisations, testing and aggregate loading.

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solutions@golder.com
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West Perth, Western Australia 6005
Australia
T: +61 8 9213 7600

Golder Associates

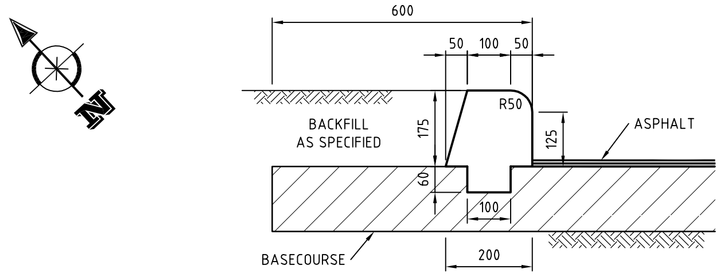
Part 5	COMPLETE AND RETURN THIS PART

Part 6 - DRAWINGS

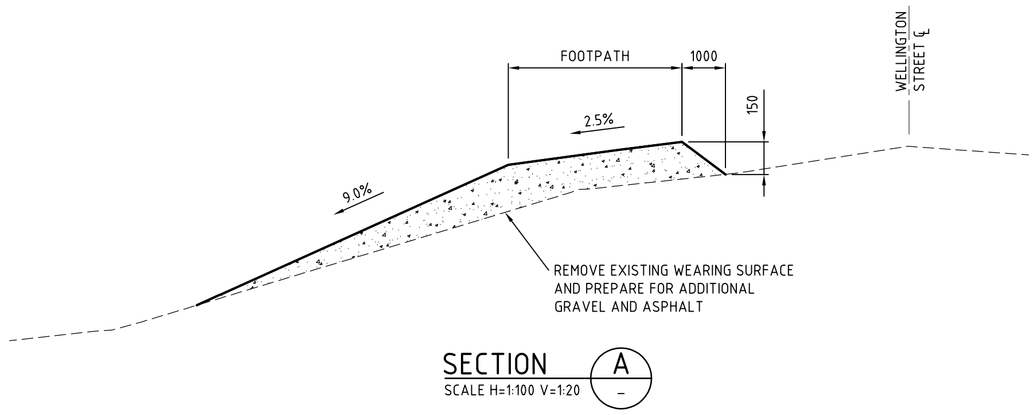
The Northam Town Drainage improvements include the following works:-

- 13647-01 Rev C - Overall Layout Plan
- 13647-02 Rev C - Atkinson and Chidlow Street
- 13647-03 Rev C - Atkinson and Chidlow Street Details
- 13647-04 Rev D - Wellington Street Car park - Cross Over A & B only
- 13647-04A Rev B - Wellington Street Car park - Cross Over A & B only
- 13647-05 Rev D - Target Car park Sheet 1 - Enlargement 2, 3 & 5 only
- 13647-05A Rev B - Target Car park Sheet 2 - Enlargement 2 only

These works shall be constructed in accordance with the specification package provided forming part of this Contract.



BARRIER KERB DETAIL
SCALE 1:10



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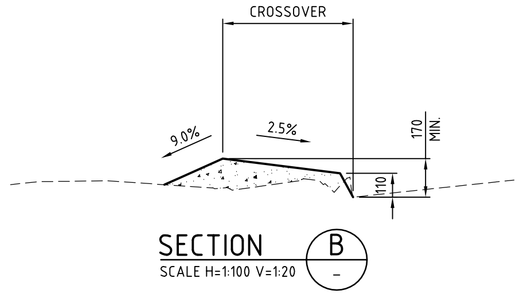

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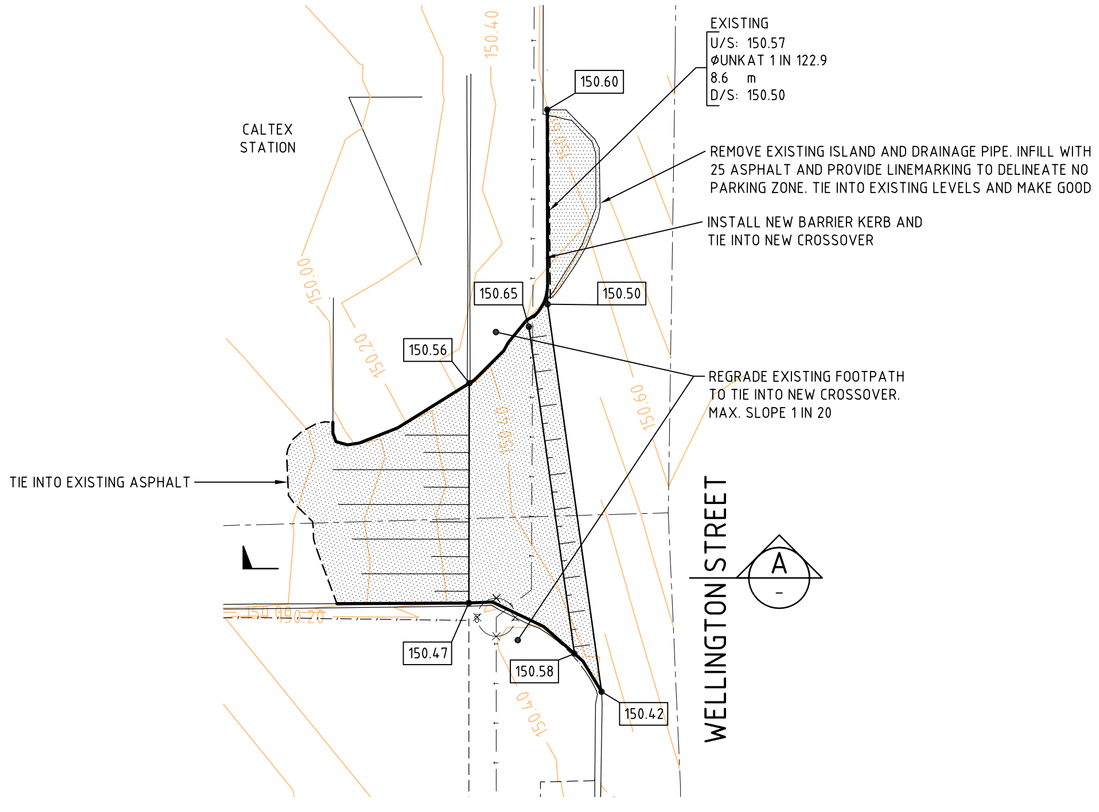

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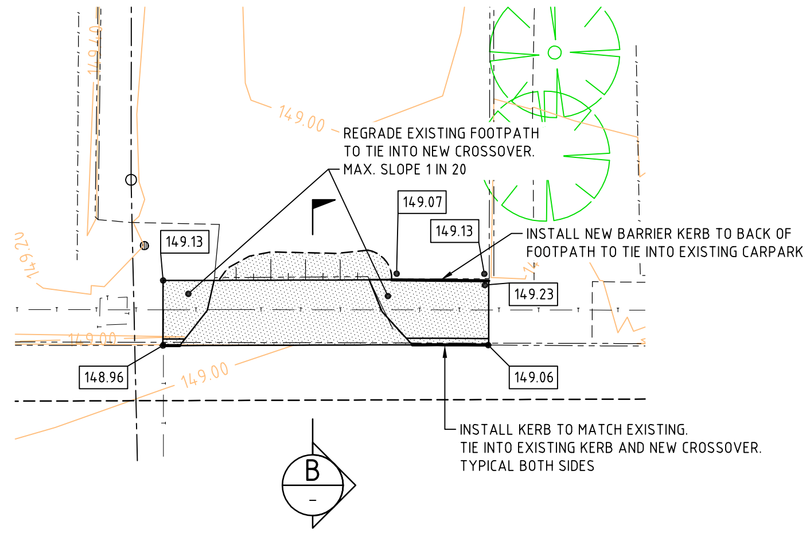

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LEGEND

(EXISTING)

- KERB/EDGE OF SEAL
- WATER
- POWER
- SEWER
- TELSTRA
- CONTOURS (99.99)
- DRAINAGE LINE
- DRAINAGE PIT
- TREES

(PROPOSED)

- EXTENT OF WORKS
- CONTOURS (99.99)
- SEMI-MOUNTABLE KERB
- ø1200 GULLY GRATE
- DESIGN LEVEL (160.00)
- FOOTPATH / ASPHALT
- RE-CONSTRUCTED CROSSOVER

CAUTIONARY NOTE:
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B	ISSUED FOR COMMENTS	RS	AH	MF	19.05.2014
A	ISSUED FOR COMMENTS	RS	AH	MF	14.05.14

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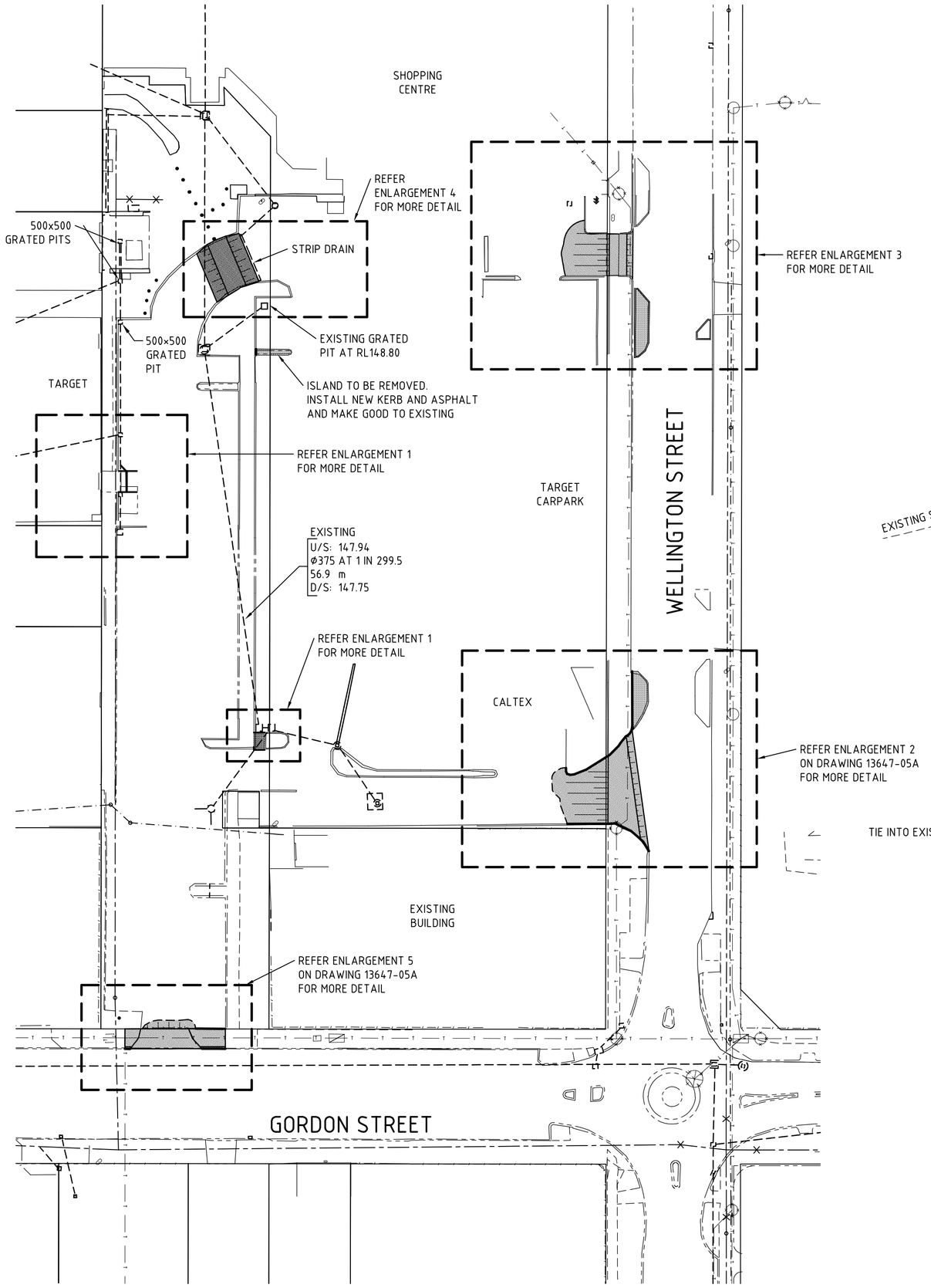
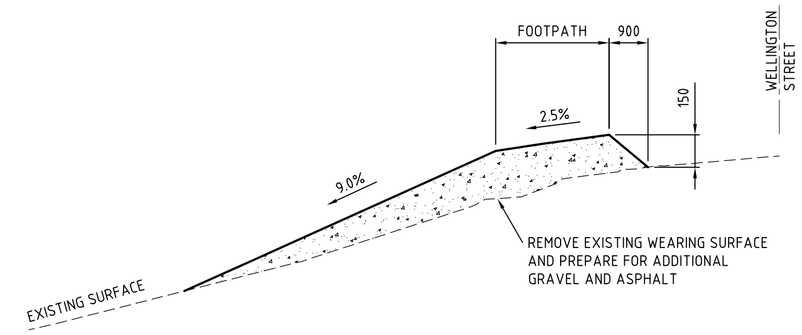
SCALE: 1:500 | SHEET SIZE: A1
DATUM: -
ALL DIMENSIONS IN MILLIMETRES DO NOT SCALE

CLIENT: SHIRE OF NORTHAM
PROJECT: PROPOSED UPGRADING NORTHAM TOWN SITE
TITLE: TARGET CARPARK SHEET 2
DRAWING NUMBER: 13647-05A
REVISION: B



SITE PLAN
SCALE 1:500



SECTION A
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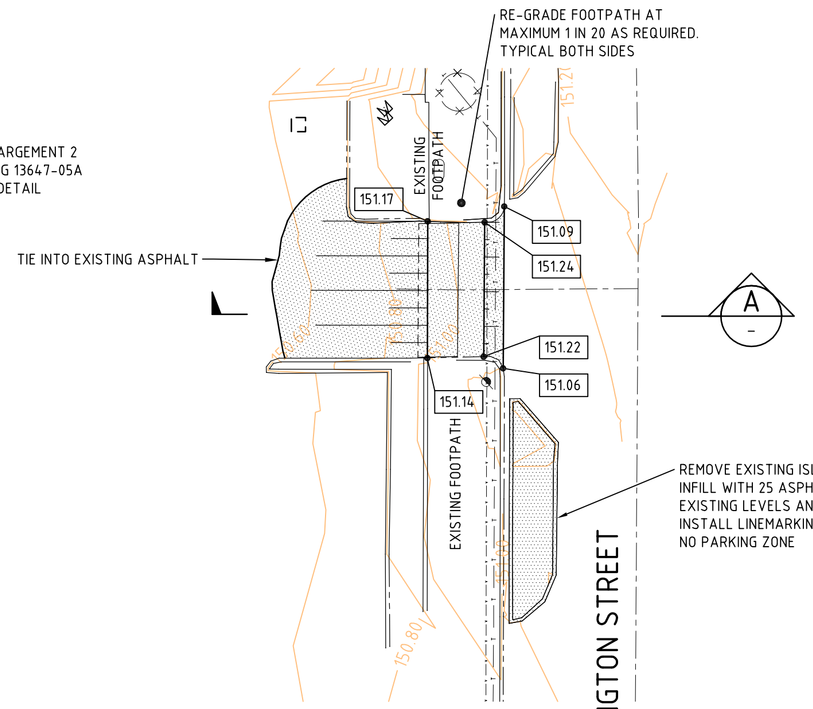

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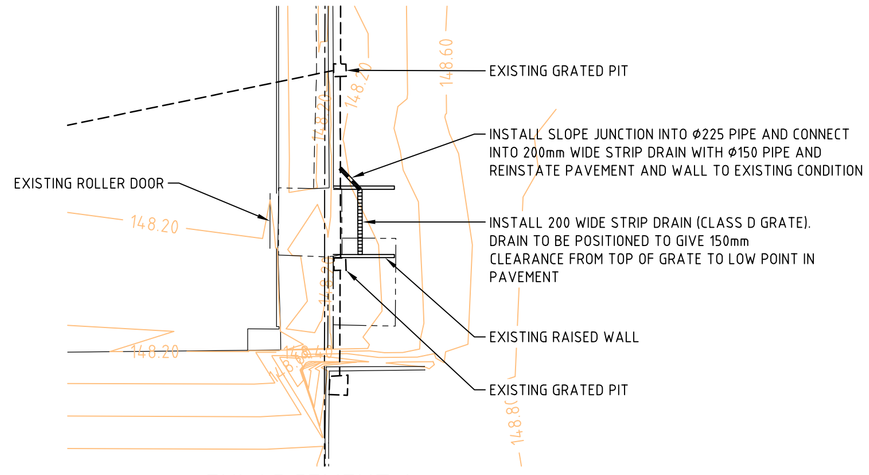
SCALE 1:200



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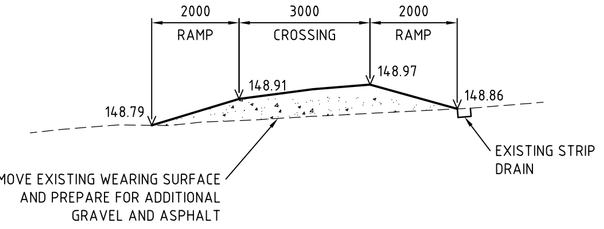
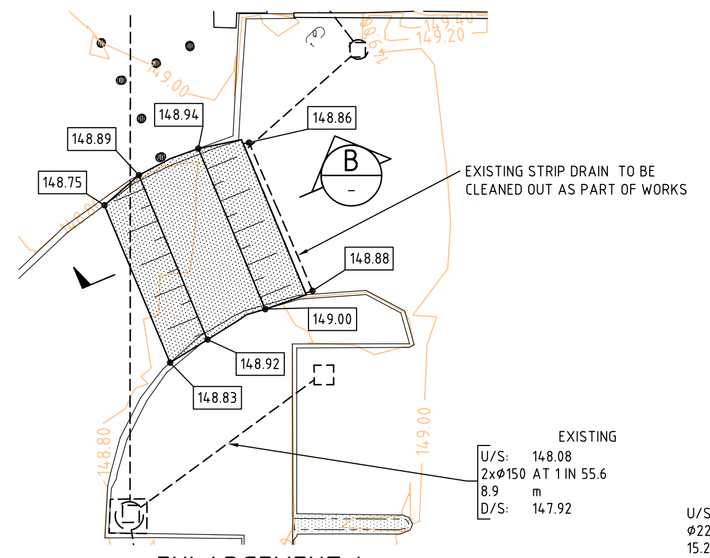
SCALE 1:200



SECTION B
SCALE H=1:100 V=1:20



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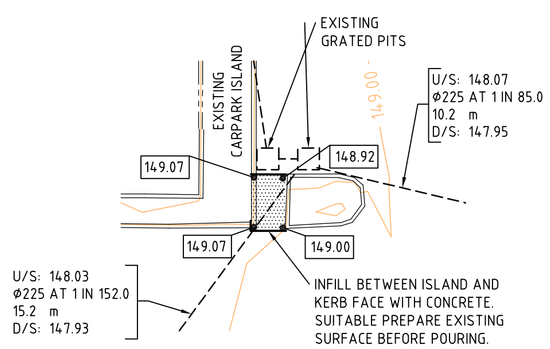
SCALE 1:200



ENLARGEMENT 1
SCALE 1:200

LEGEND

(EXISTING)

- KERB/EDGE OF SEAL
- WATER
- POWER
- SEWER
- TELSTRA
- CONTOURS (99.99)
- DRAINAGE LINE
- DRAINAGE PIT
- TREES

(PROPOSED)

- EXTENT OF WORKS
- CONTOURS (99.99)
- SEMI-MOUNTABLE KERB
- ϕ1200 GULLY GRATE
- DESIGN LEVEL (160.00)
- FOOTPATH / ASPHALT

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D	ISSUED FOR COMMENTS	RS	AH	MF	19.05.2014
C	ISSUED FOR COMMENTS	RS	AH	MF	14.05.2014
B	WALKWAY ADDED	RS	EA	MF	31.01.2014
A	INITIAL DRAWING	RS	EA	MF	18.11.2013

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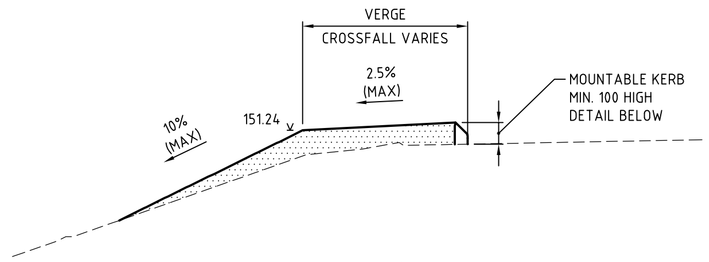
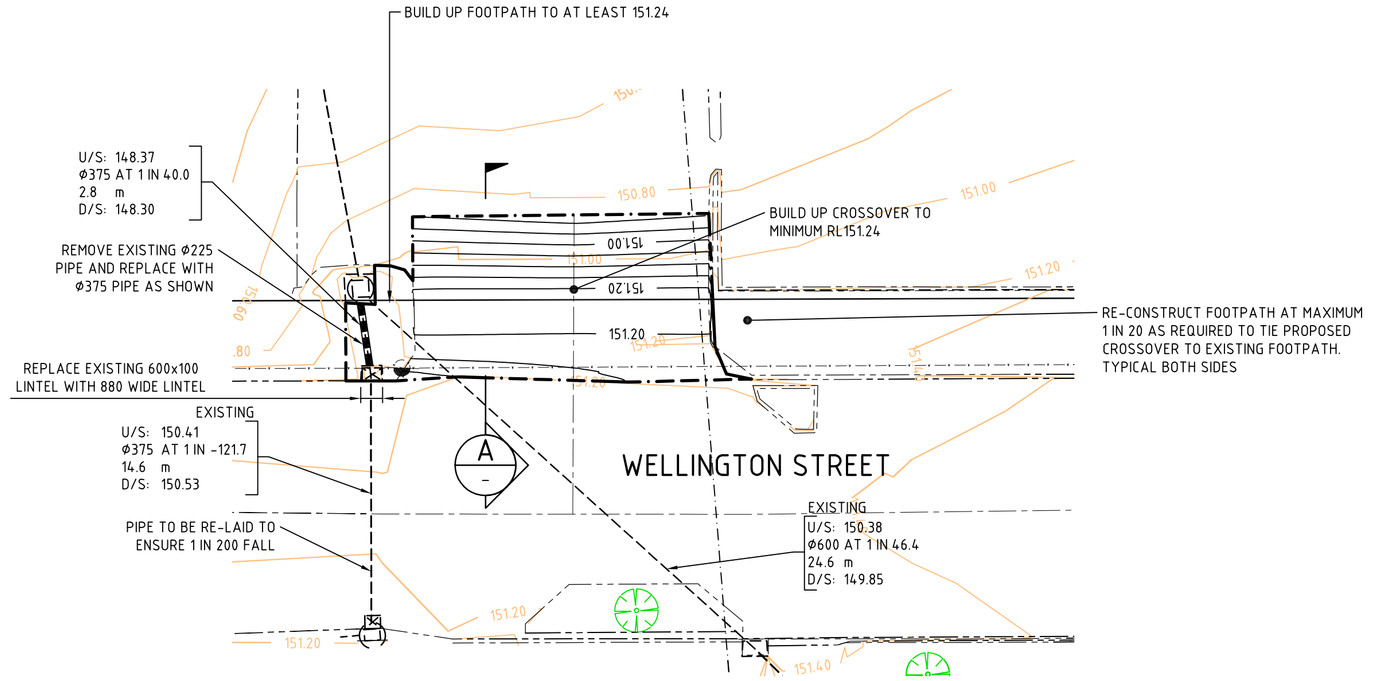
SCALE: 1:500 | SHEET SIZE: A1
DATUM: -
ALL DIMENSIONS IN MILLIMETRES DO NOT SCALE

CLIENT: SHIRE OF NORTHAM
PROJECT: PROPOSED UPGRADING NORTHAM TOWN SITE
TITLE: TARGET CARPARK SHEET 1
DRAWING NUMBER: 13647-05
REVISION: D



SECTION A
SCALE H=1:100 V=1:20



CROSSOVER ENLARGEMENT B
SCALE 1:200

LEGEND

(EXISTING)

- KERB/EDGE OF SEAL
- WATER
- POWER
- SEWER
- TELSTRA
- CONTOURS (99.99)
- BUILDINGS
- DRAINAGE LINE
- DRAINAGE PIT
- TREES
- SURFACE LEVEL (160.00)

(PROPOSED)

- EXTENT OF WORKS
- CONTOURS (99.99)
- MOUNTABLE KERB
- DRAINAGE
- DESIGN LEVEL (160.00)
- FOOTPATH / WALKWAY
- RE-CONSTRUCTED CROSSOVER
- BATTER

NOTE:

1. BANKWEST WALKWAY WILL TRANSFER 651l\s WITH NO FREEBOARD. IN 5 YEAR STORM 774l/s WILL FLOW THROUGH WALKWAY FROM UPSTREAM CATCHMENT

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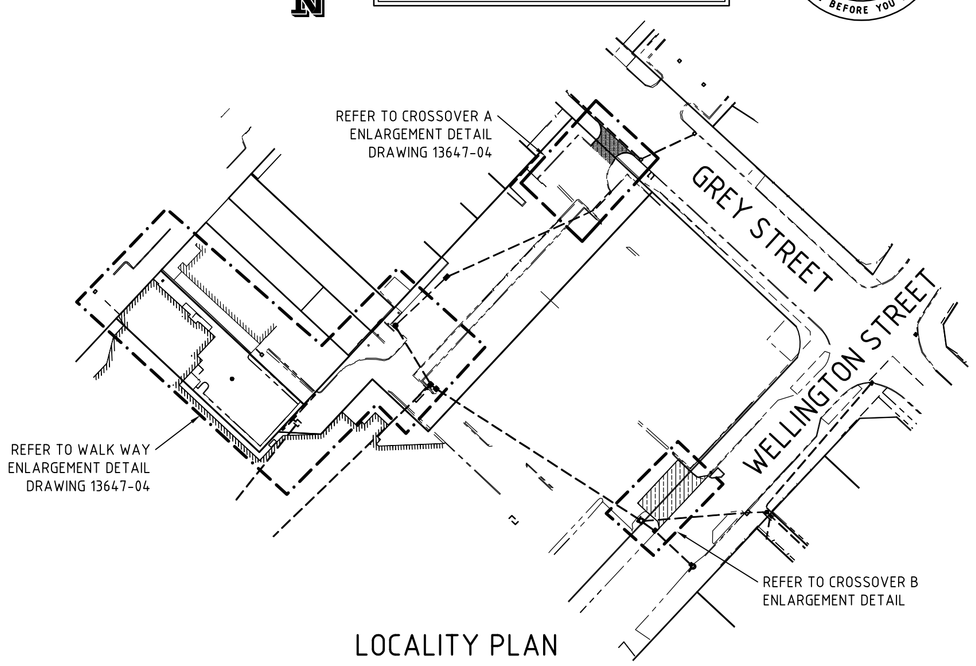

LOCALITY PLAN
SCALE 1:1000

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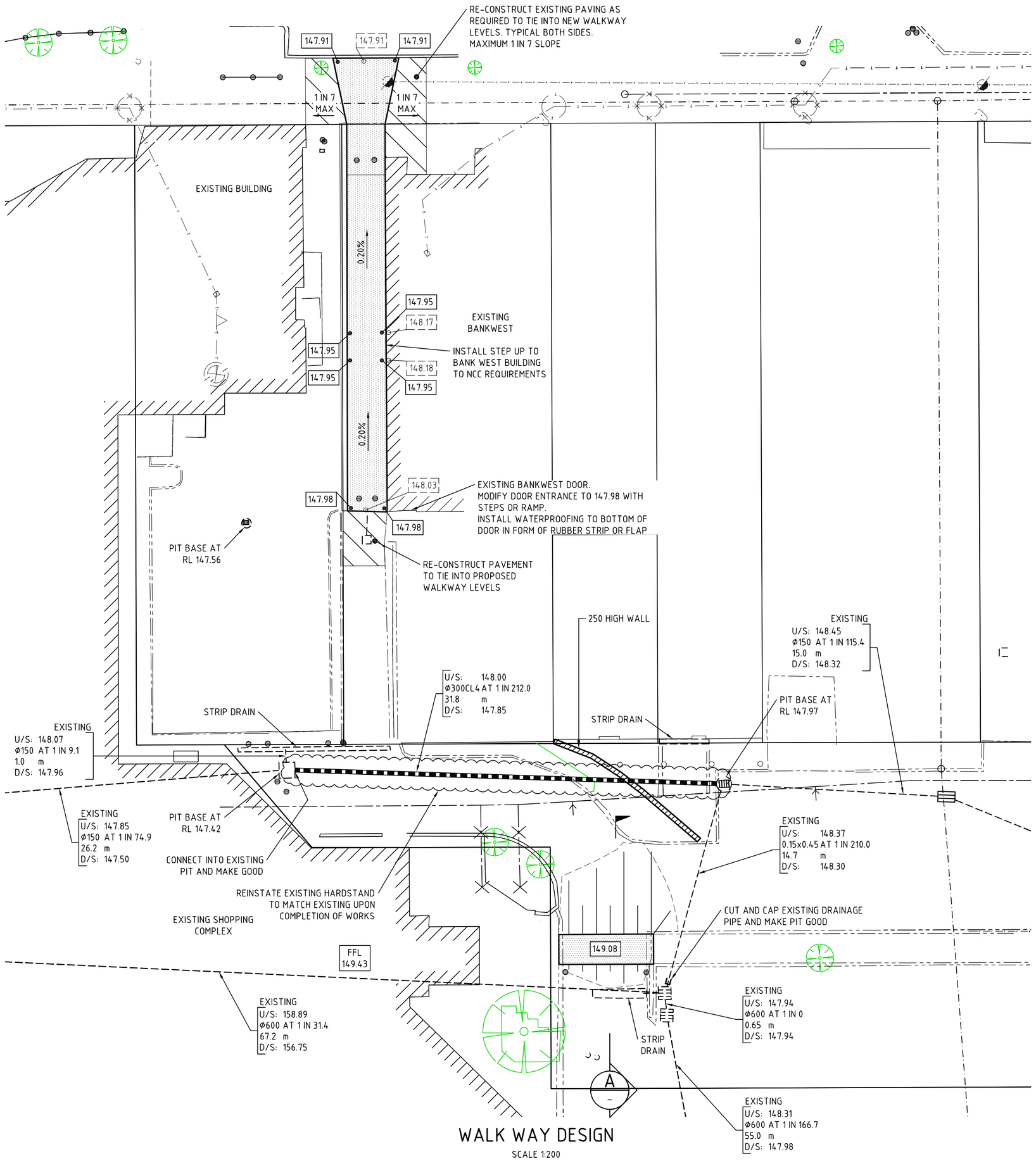
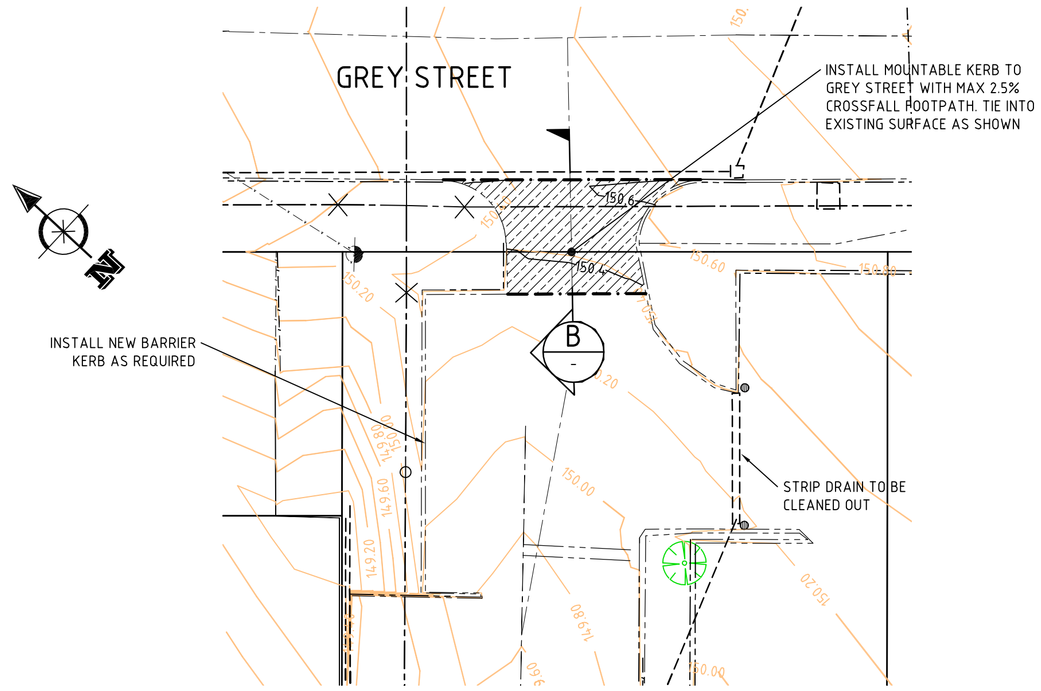
DATUM: -
ALL DIMENSIONS IN MILLIMETRES DO NOT SCALE

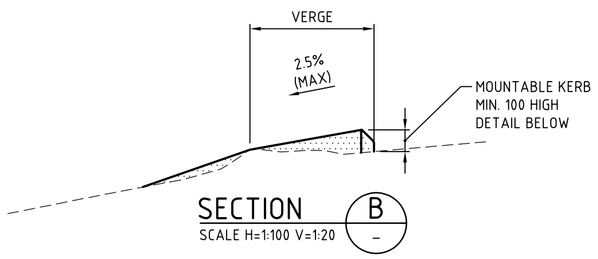
CLIENT: SHIRE OF NORTHAM
PROJECT: PROPOSED UPGRADING NORTHAM TOWN SITE
TITLE: WELLINGTON STREET (SHOPPING CENTRE CARPARK) SHEET 2
DRAWING NUMBER: 13647-04A
REVISION: B



WALK WAY DESIGN
SCALE 1:200



CROSSOVER ENLARGEMENT A
SCALE 1:200



SECTION B
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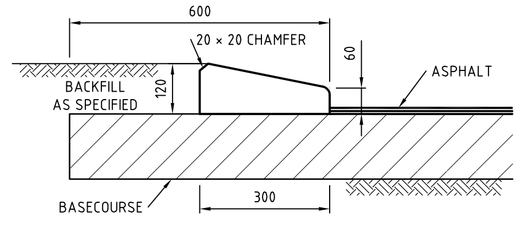
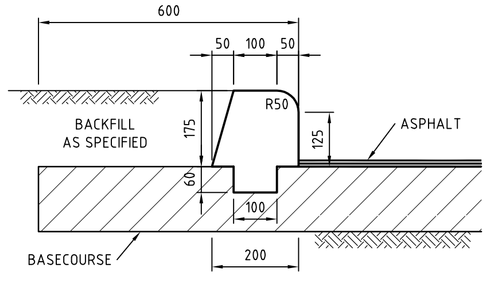
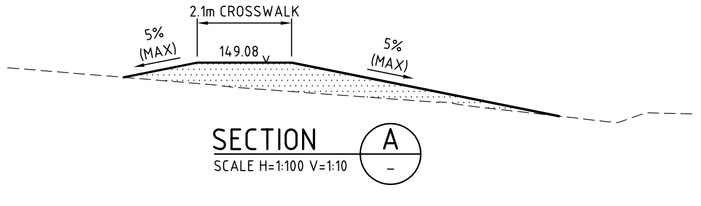


MOUNTABLE KERB DETAIL
SCALE 1:10



BARRIER KERB DETAIL
SCALE 1:10



SECTION A
SCALE H=1:100 V=1:10

LEGEND

(EXISTING)

- KERB/EDGE OF SEAL
- WATER
- POWER
- SEWER
- TELSTRA
- CONTOURS
- BUILDINGS
- DRAINAGE LINE
- DRAINAGE PIT
- TREES
- SURFACE LEVEL

(PROPOSED)

- EXTENT OF WORKS
- CONTOURS
- MOUNTABLE KERB
- WALL
- DRAINAGE
- DESIGN LEVEL
- FOOTPATH / WALKWAY
- RE-CONSTRUCTED CROSSOVER
- BATTER

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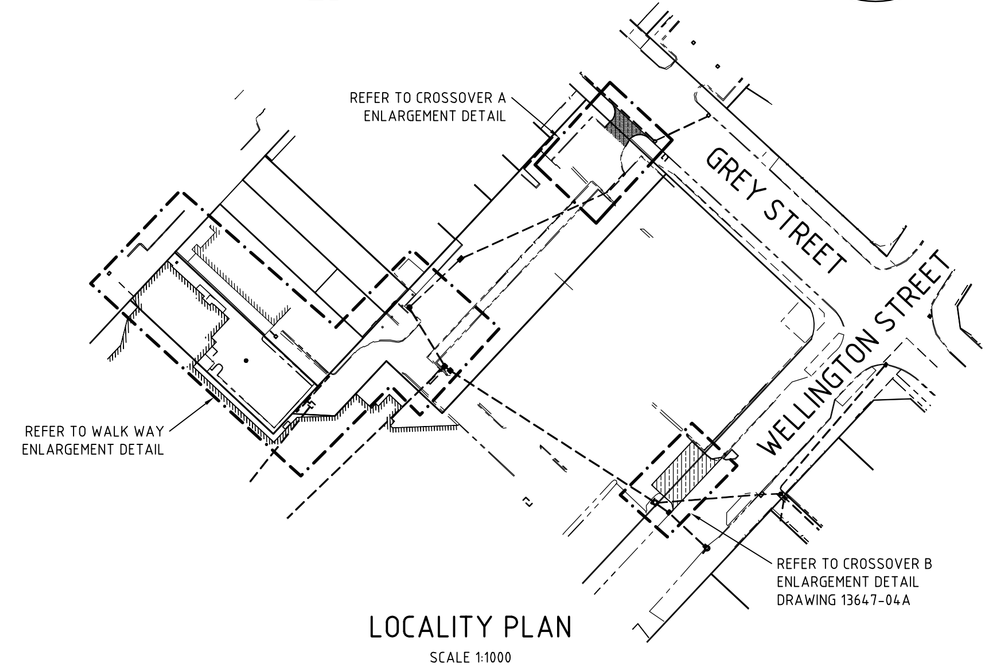

LOCALITY PLAN
SCALE 1:1000

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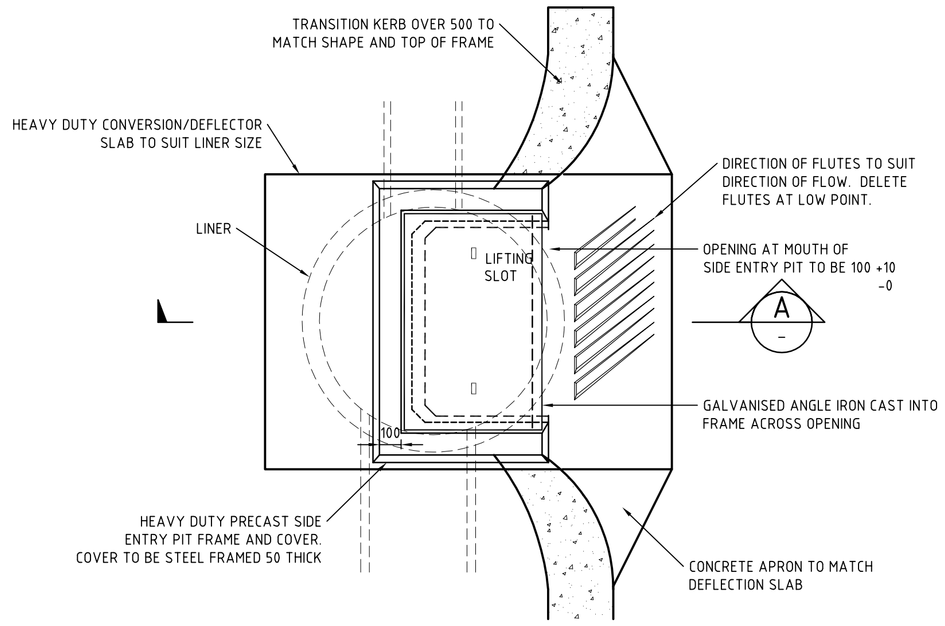
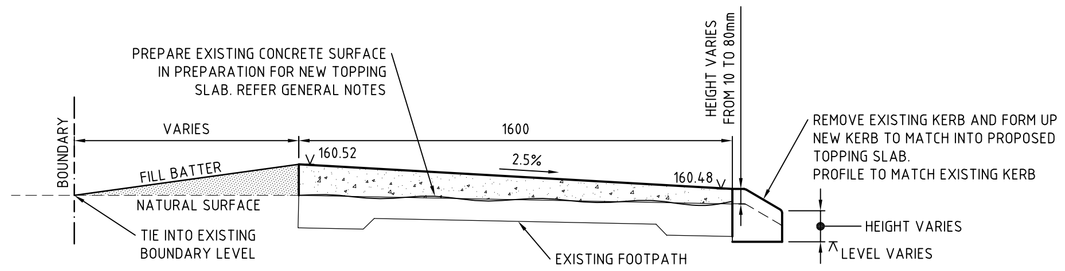
CLIENT: SHIRE OF NORTHAM
PROJECT: PROPOSED UPGRADING NORTHAM TOWN SITE
TITLE: WELLINGTON STREET (SHOPPING CENTRE CARPARK) SHEET 1
DRAWING NUMBER: 13647-04
REVISION: D



SIDE ENTRY PIT DETAIL

SCALE 1:20



TYPICAL FOOTPATH RE-CONSTRUCTION DETAIL

SCALE 1:20

NOTES

1. FOUNDATION TO BE COMPACTED TO 95% MAXIMUM DRY DENSITY IN ACCORDANCE WITH THE SPECIFICATION.
2. ALL CONCRETE FOR FOOTPATH CONSTRUCTION TO BE A MINIMUM OF 25MPa, 14 AGGREGATE ABD A MAXIMUM SLUMP OF 80-100.
3. BEDDING - SAND (100 MINIMUM).
4. EXPANSION JOINT EVERY 5.0m.
5. CONTRACTION JOINT EVERY 2.5m.
6. FINISH - BROOMED TO NON SKID FINISH.

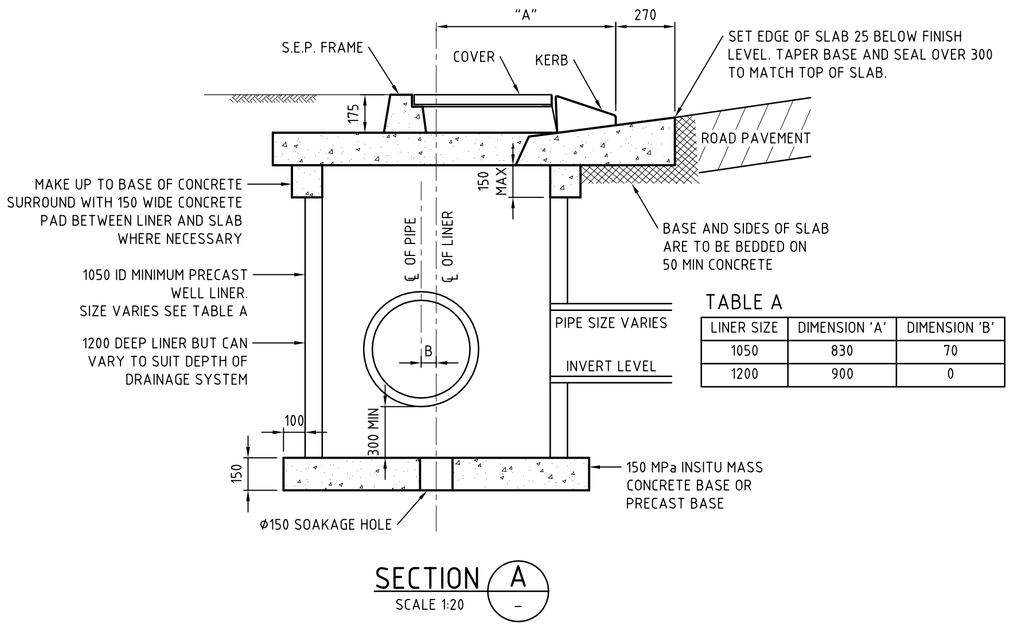
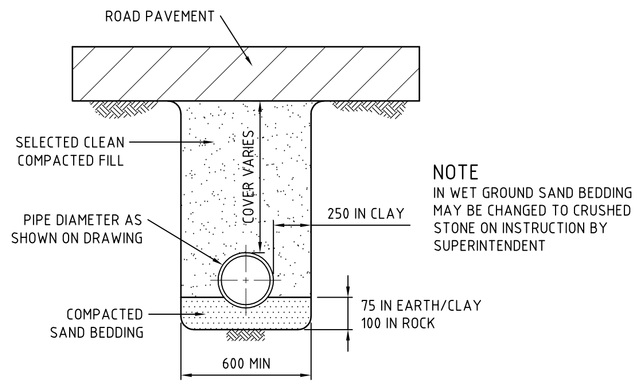


TABLE A

LINER SIZE	DIMENSION 'A'	DIMENSION 'B'
1050	830	70
1200	900	0

SECTION A

SCALE 1:20



NOTE
IN WET GROUND SAND BEDDING MAY BE CHANGED TO CRUSHED STONE ON INSTRUCTION BY SUPERINTENDENT

PIPE UNDER PAVEMENT LOCATION

SCALE 1:20

PREPARATION NOTES FOR TOPPING SLAB:

TOPPING SLAB IS TO BE PLACED ON A ROUGH SURFACE WHICH IS CLEAN AND SOUND. OLD CONCRETE SURFACES, WHICH ARE DUSTING OR SPALLING, SHOULD HAVE ALL LOOSE MATERIAL REMOVED UNTIL A SOUND SURFACE IS OBTAINED. SMOOTH CONCRETE SHOULD HAVE THE SURFACE ROUGHENED IN PREPARATION FOR THE NEW TOPPING. WATER BLASTING OR CAPTIVE SHOT BLASTING IS PREFERABLE.

ON A PREPARED SURFACE THE COARSE AGGREGATE SHOULD BE VISIBLE. NOTE THAT ANY PAINT ON THE SURFACE SHOULD ALSO BE REMOVED AS THIS COULD AFFECT THE BOND. THE SURFACE SHOULD BE HOSED AND SCRUBBED WITH A STIFF BROOM TO REMOVE ALL DUST AND FOREIGN MATTER (E.G. GREASE, OIL) BEFORE PLACING THE NEW CONCRETE.

A SUITABLE BONDING MATERIAL SHOULD BE USED. THESE RANGE FROM CEMENT SLURRIES, ACRYLIC LATEX PRODUCTS, STYRENE-BUTADIENE PRODUCTS TO EPOXY BONDING AGENTS. COMMON PVA OR WATER BASED BONDING PRODUCTS SHOULD NOT BE USED EXTERNALLY AS THEY MAY BREAK DOWN OVER TIME WITH EXPOSURE TO MOISTURE.

BASIC DESIGN NOTES AND INFORMATION

CONCRETE

1. THE PROVISIONS OF AS3600 SHALL APPLY.
2. ALL CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS SHALL BE 25MPa THE CONTRACTOR IS TO SUPPLY EVIDENCE THAT CONCRETE IS OF THE STRENGTH SPECIFIED.
3. ALL CONCRETE PLACED SHALL HAVE A SLUMP OF BETWEEN 50 AND 80. THE NOMINAL AGGREGATE SIZE SHALL BE 20.
4. ALL CONCRETE TO BE PLACED WITH AN APPROVED MECHANICAL VIBRATOR.
5. ALL CONCRETE MUST BE CURED BY KEEPING EXPOSED SURFACES CONTINUALLY WET FOR 7 DAYS AFTER POURING, OR EQUIVALENT CURING METHODS
6. IN HOT (ABOVE 30°C) AND WINDY CONDITIONS CONCRETE MUST BE CURED BY COVERING WITH PLASTIC SHEETING, SPRAYING WITH A LIQUID MEMBRANE CURING COMPOUND OR PONDING OF WATER ON THE TOP SURFACE.
7. ALL DUCTS AND PIPES SHALL BE TAKEN BELOW FOOTING UNLESS FOOTINGS ARE STEPPED AROUND DUCTS (OR AS DIRECTED BY ENGINEER).
8. CONDUITS AND PIPES SHALL HAVE 25 MINIMUM COVER AND BE LOCATED ABOVE BOTTOM REINFORCEMENT AND BELOW TOP REINFORCEMENT
9. MINIMUM STRIPPING TIME SHALL BE 14 DAYS FOR SLABS AND BEAM SOFFITS
10. SLAB THICKNESS DOES NOT INCLUDE FINISH.
11. CONCRETE SLABS ABUTTING MASONRY OR CONCRETE WALLS TO HAVE 10mm ZIPPED ABELFLEX BETWEEN THE SURFACE AND SEALED WITH SIKAFLEX PRO OR SIMILAR APPROVED PRODUCT APPLIED IN STRICT ACCORDANCE WITH MANUFACTURERS DETAILS.
12. ALL JOINTS AND EDGES FINISHED WITH A JOINTING AND EDGING TOOL

REINFORCEMENT

1. THE PROVISIONS OF AS4671 SHALL APPLY.
2. ALL REINFORCING TO BE DEFORMED BARS GRADE 500, WITH DUCTILITY CLASS L FOR MESH AND N FOR BARS
3. ALL REINFORCEMENT SHALL BE CLEAN AND FREE FROM RUST, SCALE OR OIL AND OTHER MATTER.
4. MESH SHALL HAVE MIN. SIDE AND ENDLAPS OF 2 CROSS WIRES FROM BOTH FABRICS PLUS 25.
5. ALL REINFORCEMENT TO BE ACCURATELY POSITIONED AS DIRECTED ON DRAWINGS AND SUPPORTED ON APPROVED CHAIRS AND WIRED AT INTERSECTIONS.
6. TWO STRIPS OF 3-L8TM OR ONE STRIP OF 3-L11TM OR 3-N12 BARS SHALL BE PLACED DIAGONALLY ACROSS A POTENTIAL CRACK AT RE-ENTRANT CORNERS OF ALL SLABS. ALL REINFORCEMENT SHALL HAVE A MINIMUM LENGTH OF 2000
7. MESH REINFORCEMENT MUST BE UNDAMAGED FLAT SHEETS (NOT ROLLS)
8. BARS TO HAVE MINIMUM LAPS OF 40 x DIAMETER

SHRINKAGE CONTROL

WHERE BRITTLE FLOOR COVERINGS ARE TO BE USED, EXTRA MEASURES ARE REQUIRED TO CONTROL THE EFFECT OF SHRINKAGE CRACKING. SUCH MEASURES INCLUDE ONE OR MORE OF THE FOLLOWING:

A) THE AMOUNT OF SHRINKAGE REINFORCEMENT SHALL BE INCREASED TO SL92 OR EQUIVALENT IN GROUND SLABS.
B) THE BEDDING SYSTEM SHALL BE SELECTED ON THE BASIS OF THE EXPECTED SLAB MOVEMENT AND THE CHARACTERISTICS OF THE FLOOR COVERINGS.
C) THE PLACEMENT OF FLOOR COVERINGS SHALL BE DELAYED BY MINIMUM 3 MONTHS

THIS PLAN IS A CONCEPT ONLY. ONCE APPROVAL OBTAINED FROM SHIRE OF NORTHAM CONSTRUCTION PLANS WILL BE ISSUED.

REVISION	DESCRIPTION	DESIGN	DRAWN	CHECKED	DATE
C	ISSUED FOR COMMENTS	RS	AH	MF	19.05.2014
B	ISSUED FOR COMMENTS	RS	AH	MF	14.05.2014
A	INITIAL DRAWING	RS	EA	MF	18.11.2013

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DO NOT USE FOR ANY PURPOSE OTHER THAN THAT INDICATED

SCALE: 1:200 | SHEET SIZE: A1

DATUM: -

ALL DIMENSIONS IN MILLIMETRES DO NOT SCALE

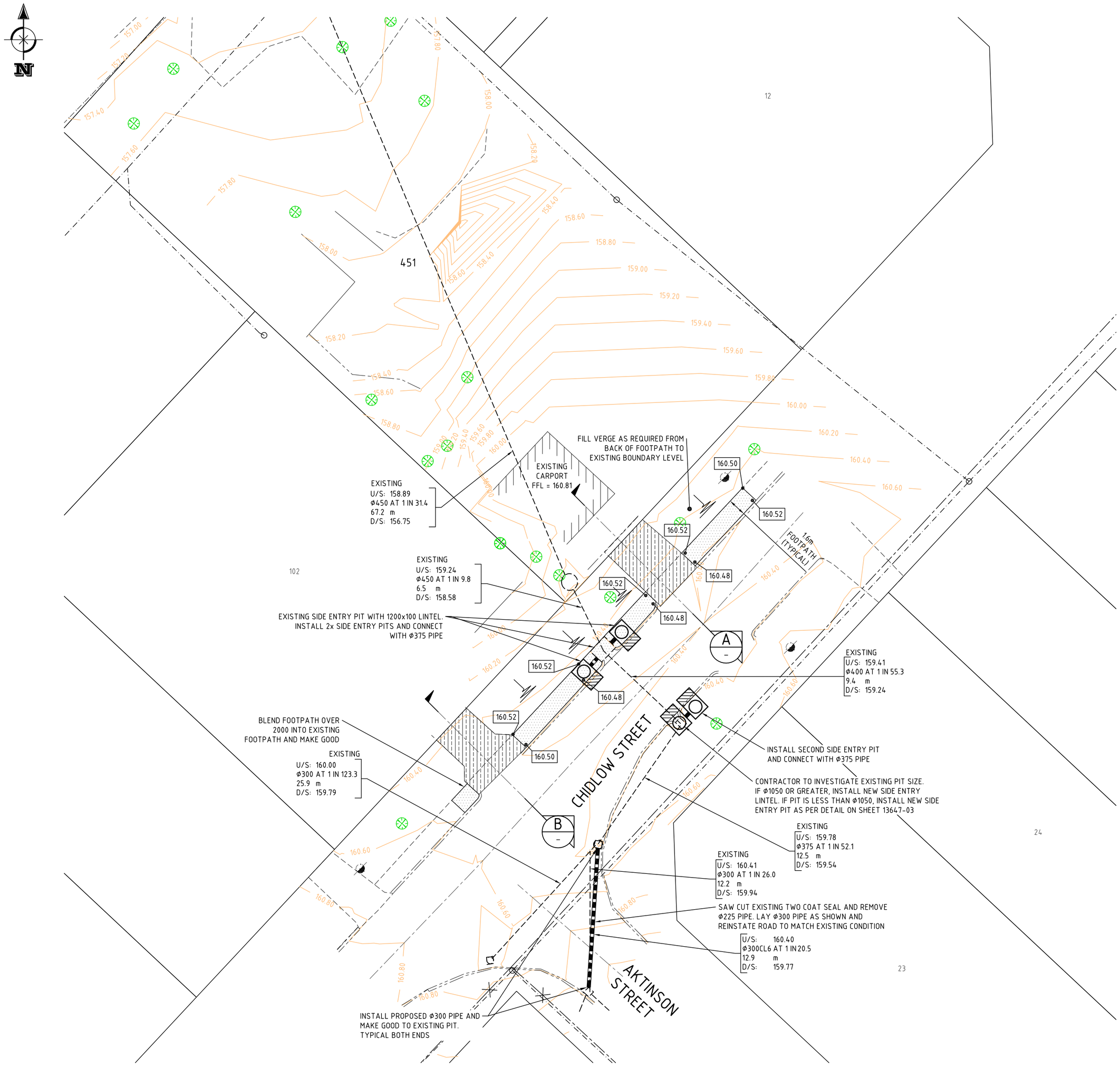
CLIENT: SHIRE OF NORTHAM

PROJECT: PROPOSED UPGRADING NORTHAM TOWN SITE

TITLE: ATKINSON AND CHIDLOW STREET DETAILS

DRAWING NUMBER: 13647-03

REVISION: C



SITE PLAN
SCALE 1:200

THIS PLAN IS A CONCEPT ONLY. ONCE APPROVAL OBTAINED FROM SHIRE OF NORTHAM CONSTRUCTION PLANS WILL BE ISSUED.

LEGEND

(EXISTING)

- KERB/EDGE OF SEAL
- WATER
- POWER
- CONTOURS (99.99)
- BUILDINGS
- DRAINAGE LINE
- DRAINAGE PIT
- TREES

(PROPOSED)

- EXTENT OF SITE
- DRAINAGE (ALL PIPES TO BE REINFORCED CONCRETE CLASS 3 UNO)
- SIDE ENTRY PIT
- DESIGN LEVEL (160.00)
- CONCRETE TOPPING SLAB OVER EXISTING FOOTPATH (REFER DRG. 13647-03 FOR MORE DETAILS)
- RE-CONSTRUCTED CONCRETE CROSSOVER (REFER DRG. 13647-03 FOR MORE DETAILS)

CAUTIONARY NOTE:

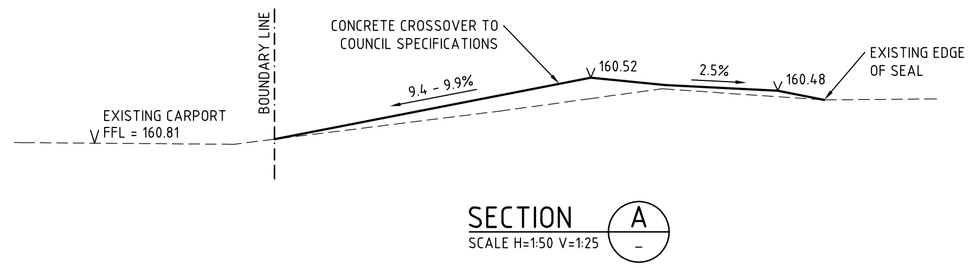
CONSTRUCTION OF SERVICES IN ESTABLISHED ROAD RESERVE WILL NECESSITATE CROSSING EXISTING SERVICES. THE CONTRACTOR SHALL LOCATE AND EXPOSE THE SERVICES AT ALL POINTS OF CONFLICT AND TAKE LEVELS PRIOR TO COMMENCING WORKS. IN THE EVENT OF A CLASH, SEEK DIRECTION FROM ENGINEER.

SERVICES AND RESTORATION:

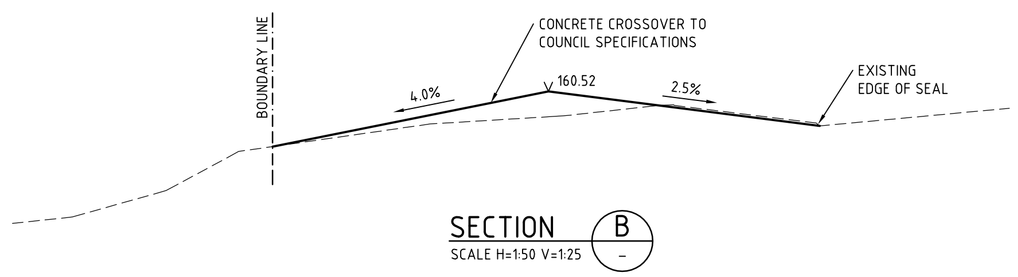
1. EXISTING SERVICES MARKED ON THIS DRAWING ARE APPROXIMATE AND ARE UNCONFIRMED.
2. THE CONTRACTOR SHALL BE SOLELY AND ENTIRELY RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING SERVICES AND STRUCTURES WITHIN AND ADJOINING THE SITE WHICH ARE OR MAY BE INTERFERED WITH DURING THE PROPOSED WORKS.
3. THE CONTRACTOR SHALL TAKE WHATEVER MEANS NECESSARY TO DETERMINE AND CONFIRM THE LOCATIONS AND LEVEL OF ANY AND ALL UNDERGROUND SERVICES PRIOR TO COMMENCEMENT OF CONSTRUCTION IN ORDER TO DETERMINE IF CLASHES WITH THE PROPOSED WORKS WILL OCCUR. DIAL 1100.
4. THE INVESTIGATION OF THE EXISTING SERVICES SHALL BE COMPLETED IN A TIMELY MANNER SUCH THAT THE PROGRAM OF THE WORKS IS NOT DELAYED SHOULD A CLASH OCCUR.
5. IF THERE ARE CLASHES WITH PROPOSED SERVICES THEN THE SUPERINTENDENT SHALL BE IMMEDIATELY NOTIFIED SO THAT A COURSE OF ACTION CAN BE DETERMINED WITH THE CONTRACTOR AND THE RELEVANT SERVICE AUTHORITIES.
6. IF THE CONTRACTOR DOES NOT FOLLOW THIS PROCESS THEN NO EXTENSION OF TIMES WILL BE GRANTED FOR ANY DELAYS RISING OUT OF THE CLASH.

CONSTRUCTION NOTES:

1. ALL PROPOSED PIPES TO BE REINFORCED CONCRETE RRJ CLASS 3 UNO



SECTION A
SCALE H=1:50 V=1:25



SECTION B
SCALE H=1:50 V=1:25

4 0 4 8 12 Metres

SCALE 1 : 200

REVISION	DESCRIPTION	DESIGN	DRAWN	CHECKED	DATE
C	ISSUED FOR COMMENTS	RS	AH	MF	19.05.2014
B	ISSUED FOR COMMENTS	RS	AH	MF	14.05.2014
A	INITIAL DRAWING	RS	EA	MF	18.11.2013

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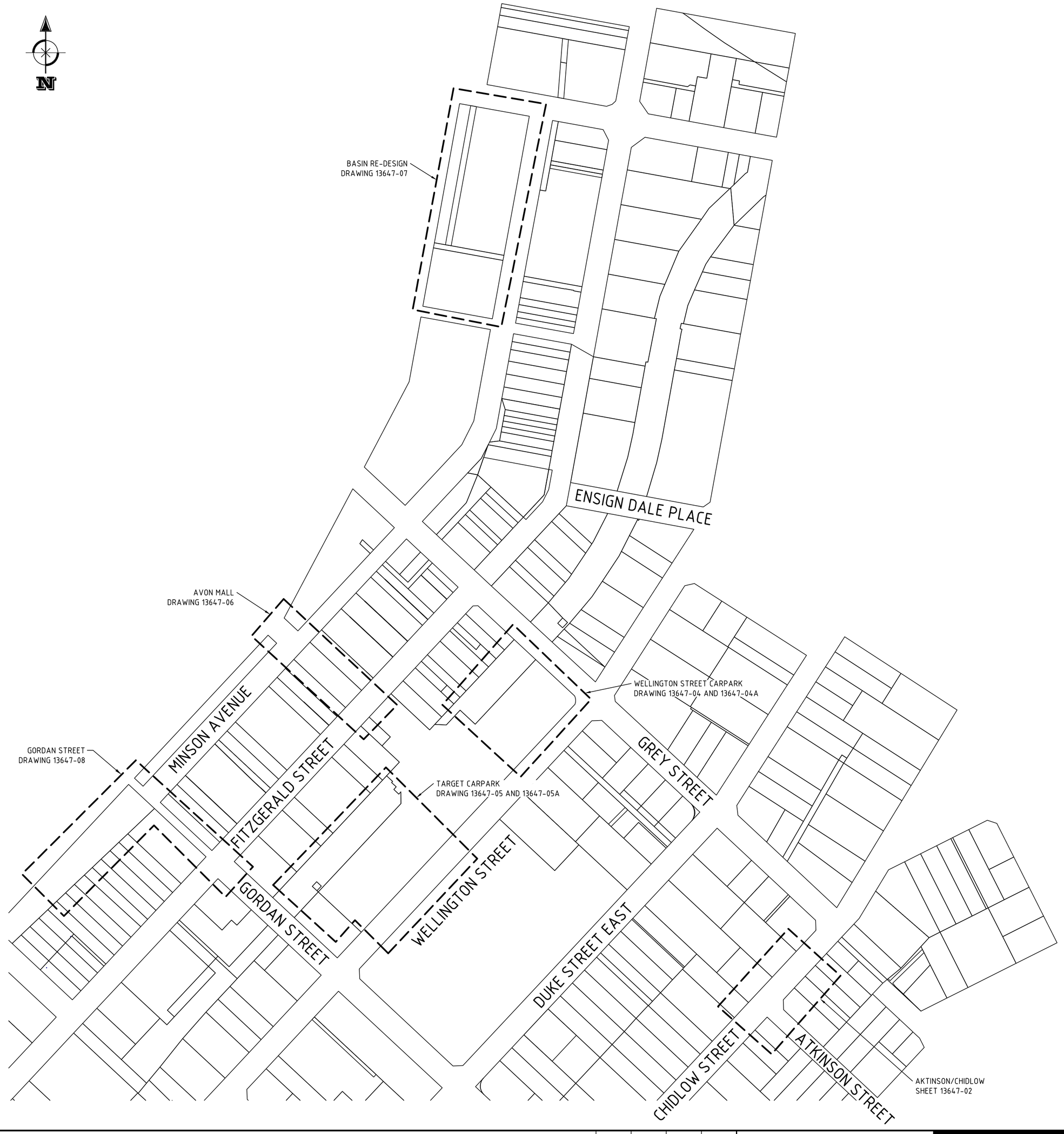
SCALE: 1:200 SHEET SIZE: A1
DATUM: -
ALL DIMENSIONS IN MILLIMETRES DO NOT SCALE

CLIENT: SHIRE OF NORTHAM
PROJECT: PROPOSED UPGRADING NORTHAM TOWN SITE
TITLE: AKTINSON AND CHIDLOW STREET
DRAWING NUMBER: 13647-02
REVISION: C



LEGEND

(EXISTING)

- KERB/EDGE OF SEAL
- WATER
- TELSTRA
- POWER
- CONTOURS 99.99
- BUILDINGS
- DRAINAGE LINE
- DRAINAGE PIT
- SPOT HEIGHT 99.99
- TREES

(PROPOSED)

- EXTENT OF SITE
- MOUNTABLE KERB U.N.O
- DRAINAGE (ALL PIPES TO BE REINFORCED CONCRETE CLASS 3 UNO)
- SIDE ENTRY PIT
- MANHOLE
- DESIGN LEVEL 160.00
- ASPHALT OVERLAY
- FOOTPATH AND PRAM RAMP
- CONTOURS 99.99
- FENCE
- BOLLARD

CAUTIONARY NOTE:

CONSTRUCTION OF SERVICES IN ESTABLISHED ROAD RESERVE WILL NECESSITATE CROSSING EXISTING SERVICES. THE CONTRACTOR SHALL LOCATE AND EXPOSE THE SERVICES AT ALL POINTS OF CONFLICT AND TAKE LEVELS PRIOR TO COMMENCING WORKS. IN THE EVENT OF A CLASH, SEEK DIRECTION FROM ENGINEER.

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6. IF THE CONTRACTOR DOES NOT FOLLOW THIS PROCESS THEN NO EXTENSION OF TIMES WILL BE GRANTED FOR ANY DELAYS RISING OUT OF THE CLASH.

LIST OF DRAWINGS

PERTH ONE CALL SYSTEM 1100 DIAL BEFORE YOU DIG

40 0 40 80 120 Metres

SCALE 1:2000

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C	ISSUED FOR COMMENTS	RS	AH	MF	19.05.2014
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A	INITIAL DRAWING	RS	EA	MF	18.11.2013

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SCALE: 15000 SHEET SIZE: A1

DATUM: -

ALL DIMENSIONS IN MILLIMETRES DO NOT SCALE

CLIENT: SHIRE OF NORTHAM

PROJECT: PROPOSED UPGRADING NORTHAM TOWN SITE

TITLE: OVERALL LAYOUT PLAN

DRAWING NUMBER: 13647-01

REVISION: C

Part 5	COMPLETE AND RETURN THIS PART

Part 7 - PRICING SCHEDULES

The amounts listed here under shall be used in the preparation and processing of the claims for payment referred to in the General Conditions.

The Contract Sum shown below shall include for all of the Works described in the WUC, Specifications, Drawings and other Contract Documents regardless of whether or not there is a separate cost quoted for a particular scope item in the following schedule of prices.

The Contract LUMP SUM

SUMMARY

SCHEDULE	DESCRIPTION	PRICE $
1	Mobilisation and Demobilisation	
2	Management & Supervision	
3	Work Under Contract (WUC)	
	TOTAL	

Part 5	COMPLETE AND RETURN THIS PART

SCHEDULE 1

MOBILSATION AND DEMOBILISATION

ITEM	DESCRIPTION	UNIT	QTY	RATE $	PRICE $
1	**Mobilisation**				
	Mobilisation of personnel, plant, equipment and materials to site				
2	**Demobilisation**				
	Demobilisation of personnel, plant, equipment, clearing up				
	TOTAL CARRIED TO SUMMARY				

SCHEDULE 2

MANAGEMENT & SUPERVISION

ITEM	DESCRIPTION	UNIT	QTY	RATE $	PRICE $
1	**Administration**				
	Supervision				
	Compile OSH Manuals,				
	Inspection and Testing Programme and supporting documentation				
	Compile As Built Documentation				
	Traffic Management				
	TOTAL CARRIED TO SUMMARY				

Part 5	COMPLETE AND RETURN THIS PART

SCHEDULE 3

WUC – Work Under Contract

ITEM	DESCRIPTION	UNIT	QTY	RATE $	PRICE $
	Chidlow & Atkinson Street Works				
1	Earthworks				
2	Drainage				
3	Surfacing				
4	Site Clean Up				
	Wellington Street Carpark				
1	Earthworks				
2	Drainage				
3	Surfacing				
4	Site Clean Up				
	Target Carpark				
1	Earthworks				
2	Drainage				
3	Surfacing				
4	Site Clean Up				
	TOTAL CARRIED TO SUMMARY				

Part 5	COMPLETE AND RETURN THIS PART

SCHEDULE 4

Daywork Rates

The rates listed below shall be used for the determination of any day works carried out by the Contractor as a result of Contract variations or works requested by the Principal.

The unit rates shall be firm and not subject to variation for rise and fall in the costs of labour, materials or any other items. All work shall be carried out at the unit rates specified regardless of the difficulty.

Unless otherwise stated, the unit rates shall include the cost of all wages, overtime, special allowances and living expenses, materials, facilities, professional and technical services, royalties, insurance, taxes, transport (excluding airfares), equipment, special tools for alignment etc., Contractor's profit and overheads and all other charges necessary to perform the work. The Contractor shall not be entitled to on-costs of any further nature whatsoever.

Item	Description	Unit	Qty	Rate $	Amount $

Part 5	**COMPLETE AND RETURN THIS PART**

SCHEDULE 5

Cash Flow Forecast

Contractor to provide his forecast progress claim amounts during the Contract to assist in overall project control.

PROGRESS CLAIM FOR PERIOD ENDING	**PROGRESS CLAIM AMOUNT**
January	$
February	$
March	$
April	$
May	$
June	$
July	$
August	$
September	$
October	$
November	$
December	$
TOTAL	**$**