



SPECIAL COUNCIL MEETING

08 April 2021

Attachment Booklet – SCM April 2021

ATTACHMENT: CEO01

**Request for Tender 3-2020/21 Moreton Terrace Upgrade – Civil
Construction**

Attachment 1
RFT 3-2020/21 Moreton Terrace Upgrade – Civil Construction

Attachment 2
RFT 3-2020/21 Evaluation Matrix



Request for Tender

Request for Tender:	<i>Moreton Terrace Upgrade - Civil Construction</i>
Deadline:	<i>5.00pm, Thursday 1 April 2021</i>
Address for Delivery:	<p><i>11 – 13 Waldeck Street DONGARA WA 6525</i> <i>(Please mark envelope RFT 3-2020/21)</i></p> <p>or</p> <p><i>PMB21 DONGARA WA 6525</i></p> <p>or</p> <p>tenders@irwin.wa.gov.au</p>
RFT Number:	<i>3-2020/21</i>

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1 Conditions of Tendering

1.1 Definitions

Below is a summary of some of the important defined terms used in this Request:

Attachments:	The documents you attach as part of your Tender.
Contractor:	Means the person or persons, corporation or corporations who's Tender is accepted by the Principal including the executors or administrators, successors and assigns of such person or persons, corporation or corporations.
Deadline:	The deadline for lodgement of your Tender as detailed on the front cover of this Request.
General Conditions of Contract:	Means the General Conditions of Contract for the Provision of Services relating to works nominated in Part B of Minor Works Contract Conditions.
Offer:	Your offer to supply the Requirements.
Principal:	Shire of Irwin
Request OR RTF OR Request for Tender	This document.
Requirement:	The Services, including works requested by the Principal.
Selection Criteria:	The Criteria used by the Principal in evaluating your Tender.
Special Conditions:	The additional contractual terms.
Specification:	The Statement of Requirements that the Principal requests you to deliver if selected.
Tender:	Completed Offer form, response to the Selection Criteria and Attachments.
Tenderer:	Someone who has or intends to submit an Offer to the Principal.

1.2 Tender Documents

This Request for Tender is comprised of the following parts:

Part 1 – Conditions of Tendering (*read and keep this part*).

Part 2 – Statement of Requirement includes Specification and any plans/drawings (*read and keep this part*).

Part 3 – General Conditions of Contract (*read and keep this part*).

Part 4 – Special Conditions of Contract (*read and keep this part*).

Part 5 – Tenderer's Offer (*complete and return this part*).

Part 6 - Appendix 1 – Minor Works Contract Conditions (*read and keep this part*).

Separate Documents

- a) Addenda 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.

1.3 How to Prepare Your Tender

Tenderers must:

- 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.

1.4 Contact Persons

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

Name:	<i>Silvio Brenzi, Supervisor Technical Services</i>
Telephone:	9927 0000
Email:	sbrenzi@irwin.wa.gov.au

1.5 Prequalification Requirements

To be eligible for selection, Tenderers must have been successfully short listed from the Expression of Interest stage of the Tendering process.

1.6 Tender Briefing/Site Inspection

Attendance at this meeting is not mandatory.

1.7 Customs Duty

The Tenderer shall allow for any customs duty and primeage applicable to all imported materials, plant and equipment required in connection with the works in its Tender.

1.8 Site Allowances

This contract is not subject to adjustment for Site allowances.

1.9 Lodgement of Tenders and Delivery Method

Physical Tender Box

The tender must be lodged by the Deadline.

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 11-13 Waldeck Street, Dongara (by the Tenderer or the Tenderer's private agent) or sent through the mail to the Chief Executive Officer PMB21 Dongara WA 6525.

Electronic mail Tenders will be accepted.

Tenderers must ensure that they have provided 2 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.

1.10 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.

No web links or hyperlinks will be considered as part of any submission.

1.11 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.

1.12 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.

1.13 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(s) or be advised that no Tender was accepted.

1.14 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.

1.15 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.

1.16 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 arising 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".

1.17 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.

1.18 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.

1.19 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 to otherwise 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.

1.20 Evaluation Process

This is a Request for Tender. 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.

1.21 Selection Criteria

The Contract may be awarded to a sole Tenderer 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.

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. A Tender demonstrating 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.

1.22 Compliance Criteria

These criteria are detailed within Part 5 of 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.

1.23 Qualitative Criteria

In determining the most advantageous Tender, the Evaluation Panel will score each Tenderer against the qualitative criteria as detailed within *Part 5* of 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.

1.24 Value Considerations

The Weighted Price method is used where price is considered to be crucial to the outcome of the contract. The price is then assessed with quality. Include any items that may affect any pricing outcomes (eg Regional Price Preference Policy).

Criteria	Weighting
Tendered Price	50%

1.25 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 of Irwin's Policy CP01 Localised Purchasing, adopted 27/08/2019.

The Policy stipulates that:

The following price preferences may be applied under this policy:

1. 10% for goods and services up to a maximum price reduction of \$50,000 (excluding GST).
2. 5% for Construction (building services) up to a maximum price reduction of \$50,000 (excluding GST).
3. 10% for goods and services – including construction (building services) up to a maximum price reduction of \$500,000 (excluding GST) if tenders/quotations are being sought for the first time for goods and services that are currently being undertaken by Council.

1.26 Price Basis

Fixed Price

All prices for services 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 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.

1.27 Ownership of Tenders

All documents, materials, articles and information submitted by the Tenderer as part of or in support of the Tender will 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.

1.28 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.

1.29 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 Part 5 and whose execution appears on the Offer Form in Part 5 of this Request. Upon acceptance of the Tender, the Tenderer will become the Contractor.

1.30 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.

1.31 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 the Shire Administration Office 11-13 Waldeck Street, Dongara.

1.32 Monetary Values

Monetary Values that appear in the Tender (such as provisional sums, prime cost amounts, value of Principal supplied items etc) are net values. They do not include Goods and Services Tax (GST).

1.33 In House Tenders

The Principal does not intend to submit an In-house Tender.

2 Statement of Requirements

Refer to the separate contract and specification documents provided as part of this RFT.

3 General Conditions of Contract

Refer to the separate contract and specification documents provided as part of this RFT.

4 Special Conditions of Contract

Refer to the separate contract and specification documents provided as part of this RFT.

5 Tenderer's Offer

5.1 Form of Tender

The Chief Executive Officer
Shire of Irwin
PMB 21, Dongara WA 6525

I/We (Registered Entity Name): _____
(BLOCK LETTERS)

of: _____
(REGISTERED STREET ADDRESS)

ABN _____ ACN (if any) _____

Telephone No: _____ Facsimile No: _____

E-mail: _____

In response to Request for Tender (RFT) 3-2020/21 Moreton Terrace Upgrade - Civil Construction:

I/We agree that I am/We are bound by, and will comply with this Request and its associated schedules, attachments, all in accordance with the Conditions of Tendering contained in this Request signed and completed.

The tendered price is valid up to ninety (90) calendar days from the date of the tender closing or forty-five (45) days from the Council's resolution for determining the Tender, whichever is the later unless extended on mutual agreement between the Principal and the Tenderer in writing.

I/We agree that there will be no cost payable by the Principal towards the preparation or submission of this Tender irrespective of its outcome.

The tendered consideration is as provided under the schedule of rates of prices in the prescribed format and submitted with this Tender.

Dated this _____ day of _____ 20

Signature of authorised signatory of Tenderer: _____

Name of authorised signatory (BLOCK LETTERS): _____

Position: _____

Telephone Number: _____

Authorised signatory Postal address: _____

Email Address: _____

5.2 Selection Criteria

5.2.1 Compliance Criteria

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

Description of Compliance Criteria	
a) 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
b) Compliance with the Specification contained in the Request.	Yes / No
c) Compliance with attendance at any mandatory tender briefing or site inspection.	Yes / No
d) Compliance with the Delivery Date. Delivery Date: 30/06/2021	Yes / No
e) The insurance requirements for this Request are stipulated in Part 25 of the Minor Works Contract Conditions. Tenderers are to supply evidence of their insurance coverage including, insurer, expiry date, value and type of insurance. If the Tenderer holds “umbrella Insurance” please ensure a breakdown of the required insurances are provided. A copy of the Certificate of Currency is to be provided to the Principal within fourteen (14) days of acceptance.	Yes / No

5.2.2 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.

<p>A. Relevant Experience</p> <p>Tenderers must address the following information in an attachment and label it “Relevant Experience”:</p> <p><i>(Below are some suggested criteria only. These should be reviewed for relevance to the Goods and/or Services being sought)</i></p>	<p>Weighting</p> <p>20%</p>	
<ul style="list-style-type: none"> a) <i>Provide details of similar work undertaken.</i> b) <i>Provide scope of the Tenderer’s involvement including details of outcomes.</i> c) <i>Demonstrate competency and proven track record of achieving outcomes.</i> d) <i>Project reference sheet.</i> 	<p>“Relevant Experience”</p>	<p>Tick if attached</p> <p><input type="checkbox"/></p>

<p>B. Tenderer’s Resources</p> <p>Tenderers must address the following information in an attachment and label it “Tenderer’s Resources”:</p> <p><i>(Below are some suggested criteria only. These should be reviewed for relevance to the Goods and/or Services being sought)</i></p>	<p>Weighting</p> <p>10%</p>	
<ul style="list-style-type: none"> a) <i>Plant, equipment and materials.</i> b) <i>Any contingency measures or backup of resources including</i> 	<p>“Tenderer’s Resources”</p>	<p>Tick if attached</p>

Part 5 COMPLETE AND RETURN THIS PART

<p><i>personnel (where applicable).</i></p> <p>c) <i>Resources Schedule.</i></p>		<input type="checkbox"/>
<p>As a minimum, Tenderers should provide a current commitment schedule and plant/equipment schedule in an attachment and label it “Tenderer’s Resources”.</p>		

<p>C. Demonstrated Understanding</p> <p>Tenderers must address the following information in an attachment and label it “Demonstrated Understanding”:</p> <p><i>(Below are some suggested criteria only. These should be reviewed for relevance to the Goods and/or Services being sought)</i></p>	<p>Weighting</p> <p>20%</p>	
<p>a) <i>A project schedule/timeline (where applicable).</i></p> <p>b) <i>The process for the delivery of the Goods/Services.</i></p> <p>c) <i>Demonstrated understanding of the Scope of Work.</i></p>	<p>“Demonstrated Understanding”</p>	<p>Tick if attached</p> <p><input type="checkbox"/></p>
<p>Supply details and provide an outline of your proposed methodology in an attachment labelled “Demonstrated Understanding”.</p>		

<p>D. Price</p> <p>Optional packages will be considered when evaluating price.</p>	<p>Weighting</p> <p>50%</p>
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5.3 Price Information

Tenderers must complete the following "Price Schedule". Before completing the Price Schedule, Tenderers should ensure they have read this entire Request.

5.3.1 Price Schedule

5.3.2 Schedule of Rates for Labour and Day Works

The Tenderer shall list below the hourly rates payable for various occupational groups which may be employed on the Site including any applicable Goods and Services Tax (GST).

Item	Rate Per Hour (inc GST)
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$
	\$

5.3.3 Schedule or Rates for Plant Hire

Tenderers shall list the hourly rates for the hire of all types of constructional equipment used on the site for clearing, earthworks, excavation, compaction, laying of pipes, construction of manholes, grading of surfaces and watering.

The rates shall include allowance for an experienced operator, fuel consumable stores, maintenance, overheads, GST and profit and are for the plant specified or equivalent, based on the Contractors standard working week.

[illegible]

5.3.4 Lump Sum

The Tenderer shall price all tasks in the Price Schedule. The prices entered shall fully cover all the obligations of the Contractor under the Contract.

Breakdown of Lump Sum

No	Item	Amount (inc GST)
2.5.1	Stage 1 – Moreton Tce SLK 0.37 to SLK 0.6	\$
	Stage 2 – Moreton Tce SLK 0.23 to SLK 0.37	\$
2.6	Medical Centre Car Park Connection	\$
2.7	Town Park Car Park Upgrade	\$
2.8	Street Lighting Upgrade	\$
Lump Sum Total		\$
Optional		
2.9.1	Option – Moreton Terrace Renewal – Stage 3	\$
2.9.2	Option – Hunt / Waldeck Roundabout	\$
2.9.3	Option – Moreton / Pt Leander Roundabout	\$
2.9.4	Option – Hosken Street and on-street Parking	\$
2.9.5	Option – Community Resource Centre Car Park	\$
2.9.6	Option – Dongara Hotel Precinct – Car Park Upgrade	\$

6 Appendix 1 – Minor Works Contract Conditions



RFT 3-2020/21

Moreton Terrace Upgrade
Civil Construction

MINOR WORKS CONTRACT CONDITIONS

Shire of Irwin of 11-13 Waldeck Street, Dongara ABN:96 734 531 282
(Principal)

and

[insert Contractor] of [insert address] [insert ABN]
(Contractor)

(together, the **Parties**)

Date of Contract:

MINOR WORKS CONTRACT CONDITIONS	1
1 DEFINITIONS AND INTERPRETATION	3
2 FORMATION OF CONTRACT AND TERM	7
3 EXECUTION OF THE WORKS	7
4 COMPLIANCE WITH LEGAL REQUIREMENTS, INDUSTRIAL AWARDS AND AGREEMENTS	8
5 SAFETY OBLIGATIONS	8
6 SUSTAINABLE PROCUREMENT	8
7 WORKS PROGRAM	9
8 SITE POSSESSION	10
9 COMMENCEMENT AND COMPLETION OF THE WORKS	10
10 LATENT CONDITIONS	11
11 LIQUIDATED DAMAGES	11
12 PLANT AND EQUIPMENT	11
13 MATERIALS	12
14 WORKS VARIATION	12
15 TESTING	12
16 DEFECTS LIABILITY PERIOD	12
17 PAYMENT	12
18 INTEREST ON OVERDUE PAYMENTS	13
19 RETENTION MONEYS AND SECURITY	13
20 DEFAULT, SUSPENSION AND TERMINATION FOR BREACH	14
21 TERMINATION	15
22 LIABILITY	16
23 SETTLEMENT OF DISPUTES	16
24 CONSTRUCTION CONTRACTS ACT	17
25 INSURANCE AND RISK MANAGEMENT	17
26 ASSIGNMENT AND SUB-CONTRACTING	20
27 CONFIDENTIALITY	20
28 INTELLECTUAL PROPERTY RIGHTS	21
29 GENERAL	21
30 EXECUTION	24
Schedule 1 - Minor Works Contract Specifics and Specification	25

DATE:

PARTIES:

BACKGROUND

- (a) The Principal has engaged the Contractor to perform the Works.
- (b) This Document sets out the terms and conditions upon which the Contractor shall perform the Works.

1 Definitions and interpretation

1.1 In this Document, except where the context indicates otherwise:

Affected Obligation has the meaning given in clause 29.1(a)(i).

Background Intellectual Property Rights means any Intellectual Property Rights owned by a Party prior to the commencement of the Contract or which did not come into existence by reason of the Contract, and which a Party is entitled to exercise and sub-license, which are embodied in, attached to or otherwise relate to the Contract.

Business Day means a day that is not a Saturday, Sunday, a public holiday in Western Australia or 27, 28, 29, 30 or 31 December.

Commencement Date means the date on which the Contract commences in accordance with clause 2.1 or 2.2, as applicable.

Completion means that stage of the execution of the Works where the Works are complete and meet the requirements of the Contract, except for Minor Defects, and all certificates, documents, warranties, guarantees and other information required for the use, operation and maintenance of the Works have been provided to the Principal.

Completion Certificate means a certificate issued by the Principal to the Contractor confirming that Completion has occurred.

Confidential Information means:

- (a) the Contract;
- (b) information relating to the Principal's past, existing or future business, strategic plans or operations, finances, or customers;
- (c) any other information provided by a Party to the other Party which is identified by the disclosing Party as confidential;
- (d) any report, opinion or advice prepared by the Contractor which the Principal advises is to be prepared on a confidential basis; and
- (e) any copies, extracts or summaries of the information described in paragraphs (a) to (d) (inclusive) above,

but excluding information which has entered the public domain other than through a breach of a confidentiality obligation owed by a Party to the other Party or by any other person.

Consequential Loss means any loss of production, revenue, profit, business reputation, opportunities or anticipated savings, and loss arising from wasted overheads or business interruptions.

Construction Contracts Act means the *Construction Contracts Act 2004* (WA).

Contract means the agreement between the Parties regarding the performance of the Works containing the terms and conditions set out in this Document.

Contractor means the party who is engaged by the other party to perform the Minor Works under the Contract and whose details may be set out on the front page of this Document.

Contractor's Vehicles and Equipment has the meaning given in clause 25.4.

Contract Price means:

- (a) the prices or rates specified in an Order as the amount to be paid by the Principal to the Contractor for executing the Works the subject of that Order in accordance with the Contract; or
- (b) the amount to be paid by the Principal to the Contractor for executing the Works, in accordance with the Contract, as otherwise set out in the Contract.

Date of Completion means the date specified in a Completion Certificate as the date upon which Completion occurred.

Date for Completion means the date for the completion of the Works specified in an Order or agreed by the Parties in writing. To avoid doubt, the Date for Completion may be set out in the Minor Works Contract Specifics.

Defect means any error, deficiency, omission, non-conformity, fault, failure, malfunction, irregularity or other defect in the Works, or any aspect of the Works, which is not in accordance with the requirements of the Contract.

Defects Liability Period means a period of 12 months from the Date of Completion, as extended as a result of any rectification works carried out during the Defects Liability Period.

Disbursement means reasonable out-of-pocket costs and expenses incurred by a Contractor in executing the Works which are:

- (a) charged to the Principal at cost; and
- (b) incidental to the execution of the Works.

Dispute means any dispute or difference between the Parties in connection with the Contract.

Dispute Notice has the meaning given in clause 23.1.

Document means this document called 'Minor Works Contract Conditions'.

Extension Request has the meaning given in clause 9.3.

Force Majeure Event means an event or cause beyond the reasonable control of the Party claiming force majeure comprising any of the following:

- (a) act of God, lightning, storm, flood, fire, earthquake, explosion, cyclone or wind and wave conditions associated with a cyclone, tidal wave, landslide or adverse weather conditions;
- (b) strike, lockout or other labour difficulty;
- (c) act of public enemy, war, sabotage, blockade, revolution, riot, insurrection, civil commotion, epidemic or terrorism; or
- (d) a change in any Law or any authority exercised by an authority or official by Law.

Force Majeure Event Termination Period means 120 consecutive days.

GST Law means *A New Tax System (Goods and Services Tax) Act 1999* (Cth) and any related Act imposing such tax.

Insolvency Event means:

- (a) in relation to a corporation, where that corporation:
 - (i) goes into liquidation, except for the purpose of reconstruction or amalgamation of which the affected Party has given the other Party 5 Business Days' prior written notice of such reconstruction or amalgamation;
 - (ii) is otherwise dissolved;
 - (iii) has had appointed to it a receiver or receiver/manager of the whole or any part of the assets and undertaking of the Party;

- (iv) enters into any composition or scheme of arrangement with its creditors;
 - (v) has had appointed to it an inspector or like official to examine the affairs of the Party or the Party enters into voluntary or other external administration; or
 - (vi) is otherwise unable to pay all its debts as and when they fall due; and
- (b) in relation to a natural person, where that natural person:
- (i) commits an act of bankruptcy;
 - (ii) becomes subject to an order for the sequestration in bankruptcy of the estate of the Party;
 - (iii) assigns its estate or enters into a scheme of arrangement or composition for the benefit of its creditors; or
 - (iv) is otherwise unable to pay all its debts as and when they fall due.

Insurances means the insurances that the Contractor is required to obtain under clause 25.

Intellectual Property Right means all intellectual and industrial property rights and interests throughout the world, whether registered or unregistered, including trademarks, designs, patents, inventions, semiconductor, circuit and other eligible layouts, copyright (including future copyright), database rights and analogous rights, trade secrets, know how, processes, concepts, plant breeder's rights, confidential information and all other intellectual property rights as defined in Article 2 of the Convention establishing the World Intellectual Property Organisation on 14 July 1967, as amended from time to time, including any application or right to apply for any of these rights.

Law means statute, equity, the common law and the legally enforceable requirements of Authorities, including any regulation or law of the Principal.

Legal Requirement means a requirement under any Law or approval including a requirement to pay any fees and charges in connection with any Law or approval.

Letter of Award means an Order or other form of document provided by the Principal to the Contractor advising that the Contractor's Request Response was accepted by the Principal.

Loss means any liability, loss, damage, cost (including litigation costs on a full indemnity basis), claim, suit, charge, diminution in value, action, demand, expense or proceeding whether present or future, actual, contingent or prospective and whether known or unknown, and howsoever arising.

Minor Defects means Defects which do not prevent the Works from being reasonably capable of being used for their intended purpose and which can be rectified by the Contractor without prejudicing the convenient or effective use of the Works by the Principal.

Minor Works Contract Specifics means the contract information contained in Schedule 1 under the heading 'Minor Works Contract Specifics'.

OSH Laws means all workplace, health and safety related Law, codes of practice, other compliance codes, directions on safety or notices issued by any relevant authority and standards, where any part of the Contractor's obligations under the Contract are being performed. This includes the *Occupational Health and Safety Act 1984* (WA), in addition to any other relevant legislation or regulations.

Order means a purchase order or other written direction from the Principal to the Contractor which requires the execution of specified Works.

Parties means the Principal and the Contractor.

Payment Claim means a written claim for payment made by the Contractor to the Principal in accordance with the Contract.

Personnel means the personnel engaged by the Principal, the Contractor or a related body corporate of the Contractor, including directors, officers, employees and agents, contractors and Sub-contractors and any director, officer, employee or agent of any contractor or Sub-

contractor, but when used in the context of the Principal's Personnel, does not include the Contractor or the Contractor's Personnel.

Principal means the party engaging the other Party to perform the Works under the Contract and whose details may be set out on the front page of this Document.

Principal's Documents means any documents, including drafts or working versions, whether in hard copy or electronic format, in the possession of, or otherwise under the control of, the Principal.

Principal Request means the written request provided by the Principal to the Contractor to submit an offer and price to perform the Works.

Representative means a representative of a Party as described in clause 29.3.

Request Response means the offer submitted by the Contractor to execute the Works made in response to a Principal Request.

Retention Moneys means moneys withheld by the Principal from amounts otherwise due to the Contractor in accordance with the Contract.

Retention Percentage (if relevant) has the meaning given in clause 19.2.

Retention Sum means the amount (if any) specified as such in any Minor Works Contract Specifics.

Site means the site at which the Works shall be executed.

Specification means a specification or scope of works for the Works:

- (a) provided by the Principal to the Contractor before the Contractor provides its Request Response; or
- (b) developed after the Contractor provided its Request Response or after the Contract came into effect and agreed to by the Parties; or
- (c) contained within Schedule 1.

Start Date means the date specified as such in the Principal Request, an Order, in any Minor Works Contract Specifics, or as otherwise agreed by the Parties in writing as the date upon which the Works shall commence.

Sub-contractor means any person or entity engaged by the Contractor in connection with the execution of the Works and includes consultants, subcontractors, suppliers and other contractors, but does not include the Contractor's employees.

Sustainability Objectives has the meaning given in clause 6.1.

Wilful Misconduct means any wrongful act or omission that was intentionally done or involved reckless disregard to the likely consequences, including an intentional breach of the Contract.

Works means the works to be executed by the Contractor as set out in an Order, any Specification or any Minor Works Contract Specifics.

Works Program means a written document setting out the Contractor's proposed activities and timeline for executing the Works.

Works Variation means a variation to the scope of the Works or the nature of the execution of the Works.

1.2 In this Document, unless the context suggests otherwise:

- (a) a reference to the Contract means the Contract as varied from time to time;
- (b) a reference to 'including' must be read as if it is followed by '(without limitation)';
- (c) where a word or an expression is defined, any other part of speech or grammatical form of that word or expression has a corresponding meaning;
- (d) words in the singular include the plural and vice-versa;

- (e) a reference to any legislation or legislative provision includes any statutory modification or re-enactment of, or legislative provision substituted for, and any subordinate legislation issued under, that legislation or legislative provision;
- (f) a reference to any Party includes that Party's executors, administrators, substitutes, successors and permitted assigns;
- (g) a reference to a clause is a reference to a clause of this Document;
- (h) a reference to a 'day' or 'month' is a reference to a calendar day or calendar month;
- (i) headings are for convenience only and do not affect interpretation of this Document; and
- (j) no rule of construction applies to the disadvantage of a Party on the basis that the Party put forward the Contract or any part of it.

2 Formation of contract and term

- 2.1 Where this Document is executed by the Parties, the Contract shall be formed, and shall commence, on the date that the last Party executes this Document. To avoid doubt, any failure by the Parties to complete the Minor Works Contract Specifics does not affect the formation of the Contract.
- 2.2 Where this Document is not executed by the Parties:
 - (a) the Contract shall be formed, and shall commence, on the date of the Letter of Award;
 - (b) the Parties agree that the terms and conditions in this Document are incorporated within the Contract and the failure of either Party to execute this Document does not affect the incorporation of those terms and conditions within the Contract or the Contract's existence; and
 - (c) any failure by the Parties to complete the Minor Works Contract Specifics does not affect the formation of the Contract.
- 2.3 The Contract shall terminate:
 - (a) by written agreement of the Parties;
 - (b) in accordance with clauses 20.6(b), 20.7 or 20.8(k); or
 - (c) upon the expiry of the Defects Liability Period.
- 2.4 Termination of the Contract shall not affect the rights and liabilities of a Party accrued prior to termination.
- 2.5 Clauses 0 (Definitions and interpretation), 2.4 (regarding accrued rights and liabilities), 2.5 (regarding survival), 8.3 (regarding re-possession of the Site and Works), 16 (Defects Liability Period), 19.6(b) (regarding return of Retention Sum or security), 21 (Termination), 22 (Liability), 23 (Settlement of Disputes), 27 (Confidentiality), 28 (Intellectual Property Rights), 29.4 (Notice) and 29.6 (Governing Law) shall survive termination of the Contract.

3 Execution of the works

- 3.1 The Contractor must execute the Works in accordance with the Contract, including any Specification, and in accordance with the approved Works Program, to the Principal's reasonable satisfaction.
- 3.2 The Contractor warrants that it has the skills, experience, expertise and resources necessary to competently execute the Works.

4 Compliance with legal requirements, industrial awards and agreements

- 4.1 The Contractor must comply with all Legal Requirements affecting or applicable to the execution of the Works and shall ensure that its Personnel and Sub-contractors also comply with the same.
- 4.2 Without limiting clause 4.1, the Contractor shall:
- (a) comply with all industrial awards or agreements affecting or applicable to the persons employed by the Contractor for the purposes of executing the Works;
 - (b) ensure that the remuneration and terms of employment of all of its employed Personnel are consistent with such remuneration and terms reflecting the industry standard as expressed in industrial awards, agreements and any code of practice applicable to the Contractor's industry;
 - (c) to the extent practicable, use reasonable endeavours to ensure that its Sub-contractors satisfy the requirements of clauses 4.2(a) and 4.2(b); and
 - (d) comply with the terms of any agreements with its Sub-contractors in relation to the Works.

5 Safety obligations

- 5.1 The Contractor must:
- (a) do all things reasonably necessary to ensure that the Works are executed in a manner that is safe and not likely to cause injury or illness to any person; and
 - (b) perform all relevant functions and fulfil all relevant duties under all relevant OSH Laws required of an employer or otherwise applicable to the role of the Contractor under the Contract including notification of incidents as may be required under OSH Laws.
- 5.2 Where any injury, property damage, accident or incident which is notifiable under any Legal Requirement occurs, the Contractor must:
- (a) as soon as practicable, but in any event within 24 hours, notify the Principal in writing of that injury, property damage, accident or incident; and
 - (b) provide the Principal with any further information requested by the Principal.
- 5.3 The Contractor acknowledges that if, in performing its obligations under the Contract, its Personnel enter premises under the control of the Principal they must comply with the Principal's occupational health and safety policies and procedures.
- 5.4 Without limiting clause 20, the Principal may suspend the whole or part of the performance of the Parties' obligations under the Contract following any breach by the Contractor of OSH Laws or this clause which gives rise to circumstances which:
- (a) present actual or potential risk of life or serious injury; or
 - (b) are otherwise required to be notified under OSH Laws.

6 SUSTAINABLE PROCUREMENT

- 6.1 The Contractor acknowledges that the Principal supports ethical and environmentally, socially and economically sustainable procurement practices, including the matters contemplated by clause 6.2 (**Sustainability Objectives**) and acknowledges that its support of the Sustainability Objectives assists the Member in meeting its own Sustainability Objectives.
- 6.2 The Contractor agrees to use reasonable endeavours to conduct its business and supply the Goods and/or Services in a manner which seeks to support the Sustainability Objectives, which endeavours may include:
- (a) preparing and implementing policies to seek to support the Sustainability Objectives, including providing training to its Personnel regarding such policies;

- (b) implementing practices which seek to reduce the environmental impact of the Contractor's activities, including:
 - (i) using recycled materials and products;
 - (ii) reducing emissions;
 - (iii) adopting greener energy solutions;
 - (iv) adopting environmentally sustainable design; and
 - (v) reducing wastage;
 - (c) providing employment or training opportunities to individuals with a disability or experiencing disadvantage, and using the services of agencies or other businesses which provide employment or training opportunities to such individuals (such as WA Disability Enterprises and/or Aboriginal Enterprises);
 - (d) sponsoring and supporting local community groups and local community development initiatives;
 - (e) promoting fair workplace practices;
 - (f) promoting workplace health;
 - (g) using services and purchasing products from Western Australian and Australian suppliers and small and medium-sized businesses; and
 - (h) using services and purchasing products that are efficient to operate and have low operating and maintenance costs.
- 6.3 The Contractor agrees to provide the Principal with any reasonably requested information relating to the measures adopted by the Contractor in pursuit of the Sustainability Objectives.
- 6.4 The Contractor agrees to undertake reasonable due diligence and monitoring of its supply chain on an ongoing basis to ensure that materials and services required for the supply of the Goods and/or Services to the Principal are supplied from sustainable sources.

7 Works program

- 7.1 Within 10 Business Days of the Commencement Date, the Contractor must prepare and submit to the Principal a draft Works Program for approval by the Principal.
- 7.2 Unless otherwise advised in writing by the Principal, the Works Program must:
- (a) be consistent with the Contract;
 - (b) show key dates and constraints;
 - (c) arrange activities and tasks on a week-by-week basis with each week starting on a Monday;
 - (d) arrange activities and tasks in sequential logical order and on a timeline accurately representing the Contractor's proposed timeline and method for executing the Works; and
 - (e) take into account any requirements and constraints set out in the Specification (if any).
- 7.3 If the Principal approves the Works Program without proposing any amendments, the Principal must give the Contractor written notice of such approval as soon as practicable.
- 7.4 If the Principal suggests amendments or provides other written comments on the draft Works Program, the Contractor must take such amendments or comments into account and, where applicable, provide a revised draft Works Program to the Principal for approval.
- 7.5 Following approval of the draft Works Program by the Principal, the Contractor must provide to the Principal:
- (a) a final version of the Works Program; and

- (b) a weekly written report regarding compliance with the Works Program.

8 Site possession

- 8.1 On and from the Start Date, the Principal shall give the Contractor sufficient possession of the Site for the commencement and execution of the Works. To avoid doubt, possession of the Site shall confer on the Contractor a right to use and control the Site only as necessary to enable the Contractor to carry out the Works and does not constitute a right of exclusive possession of the Site.
- 8.2 While the Contractor is in possession of the Site, the Contractor:
 - (a) is liable for the care of the Works, any temporary works, materials, plant and equipment on the Site until the Principal issues a Completion Certificate; and
 - (b) must promptly rectify any loss or damage to the Works, unless caused by the Wilful Misconduct or gross negligence of the Principal or the Principal's Personnel.
- 8.3 Upon issue of the Completion Certificate or termination of the Contract, whichever comes first, the Contractor shall give possession of the Site and the Works to the Principal, but the Principal is not liable for any items of Contractor's property or Sub-contractor's property remaining on the Site, and the Contractor must remove, or ensure the removal of, such items as soon as possible.

9 Commencement and completion of the works

- 9.1 Unless otherwise agreed in writing by the Parties, the Contractor must commence the Works on the Start Date and complete the Works before the Date for Completion.
- 9.2 The Contractor is entitled to an extension to the Start Date or Date for Completion if a delay in the commencement or execution of the Works is due to:
 - (a) a breach by the Principal of the Contract;
 - (b) delay or disruption caused by the Principal, except where such delay or disruption is caused by the Principal acting in accordance with the Contract;
 - (c) a Force Majeure Event occurring before the Start Date or Date for Completion, as applicable;
 - (d) suspension of the Contract under clause 20 where the suspension is the result of a breach by the Principal; or
 - (e) a Works Variation being agreed.
- 9.3 To obtain an extension to the Start Date or Date for Completion, the Contractor must make a written request to the Principal within 10 Business Days after the cause of delay has arisen, or within any other period agreed in writing by the Parties, setting out the facts on which the request is based (**Extension Request**).
- 9.4 The Principal, acting reasonably, must notify the Contractor in writing within 10 Business Days of receiving the Extension Request, or such other time agreed in writing by the Parties, whether the Extension Request is granted and any relevant period of extension.
- 9.5 The Contractor must give the Principal at least 15 Business Days' notice in writing of the date on which the Contractor anticipates that Completion shall occur.
- 9.6 When the Principal is satisfied that Completion has occurred, the Principal must issue a Completion Certificate to the Contractor.
- 9.7 As soon as possible after the Date of Completion, the Contractor must clear away and remove from the Site all plant, surplus material, rubbish and temporary works of any kind and fill and consolidate and level off all excavations (other than those forming part of the Works) made by the Contractor on the Site, and ensure that the Site is clean and tidy, to the Principal's satisfaction.

10 Latent conditions

- 10.1 The Contractor warrants that, before entering into the Contract, the Contractor had access to, and inspected, the Site, and has carried out its own enquiries to establish, understand and satisfy itself as to the state of the Site and all risks and contingencies associated with the Site existing as at the Commencement Date.
- 10.2 If the Contractor discovers physical conditions on the Site or its surroundings, excluding weather conditions, which could not reasonably have been anticipated at the time of entering the Contract even where the Contractor had:
- (a) examined all information made available in writing by the Principal to the Contractor for the purpose of preparing a Request Response in respect of the Works;
 - (b) examined all information relevant to the risks, contingencies and other circumstances having an effect on the Request Response and obtainable by the making of reasonable enquiries; and
 - (c) inspected the Site and its surroundings,
- the Contractor shall immediately notify the Principal in writing and may request that a Works Variation be directed and/or may make an Extension Request, and the Principal must not unreasonably withhold its agreement to a Works Variation and/or Extension Request.

11 Liquidated damages

- 11.1 This clause 11 applies if the Parties have executed this Document and have stated that this clause 11 applies in the Minor Works Contract Specifics.
- 11.2 If the Contractor fails to achieve Completion by the Date for Completion, the Contractor must pay the Principal liquidated damages calculated in accordance with the Minor Works Contract Specifics for such default for every day by which Completion of the Works is delayed beyond the Date for Completion. To avoid doubt, the Principal may recover liquidated damages from the Contractor either on demand from the Contractor or by deducting such amount from any amount owed by the Principal to the Contractor.
- 11.3 To claim liquidated damages, the Principal must provide written notice to the Contractor stating the date on which the Contractor's liability to pay liquidated damages commenced as soon as practicable after the Contractor's liability to pay liquidated damages arose.
- 11.4 The Contractor acknowledges and agrees that all sums payable by the Contractor to the Principal as liquidated damages represent the Principal's genuine pre-estimate of the damages likely to be suffered if Completion is not achieved by the Date for Completion and such sums shall not be construed as a penalty.
- 11.5 If an Extension Request in relation to the Date for Completion is granted after the Contractor has paid, or the Principal has set-off, the liquidated damages payable under clause 11.2, the Principal must repay to the Contractor the amount of such liquidated damages as represents the length of the extension to the Date for Completion.
- 11.6 To avoid doubt, the payment of liquidated damages under this clause 11 does not relieve the Contractor from any of its obligations or liabilities under the Contract.

12 Plant and equipment

The Contractor must:

- (a) provide all materials, labour, plant, equipment, tools and other resources necessary for executing the Works, unless otherwise agreed in writing by the Parties or set out in any Minor Works Contract Specifics; and
- (b) ensure that all such items used or supplied in connection with the Works comply with Legal Requirements and are fit for their usual and intended purpose.

13 Materials

- 13.1 All materials used in the execution of the Works must be consistent with the nature and character of the Works, be of a kind that is suitable for their purpose, and be in compliance with the Contract and any relevant Australian standards, unless otherwise agreed by the Principal.
- 13.2 The Contractor must give the Principal full particulars in writing of the mode, place of manufacture, source of supply and the performance capacities of materials, or other information, about the materials used in executing the Works, where the Principal makes a request in writing (acting reasonably) for such particulars or information.
- 13.3 At any time prior to the issue of the Completion Certificate, the Principal may reject any material that is not in compliance with clause 13.1 and may direct its replacement, correction or removal at the Contractor's cost.

14 Works variation

- 14.1 The Principal may direct a Works Variation by providing written notice of the Works Variation, including details of the Works Variation, to the Contractor and the Contractor must comply with such a direction.
- 14.2 Within 10 Business Days of receipt of the notice under clause 14.1, the Contractor must submit to the Principal in writing a detailed, itemised price for executing the Works Variation.
- 14.3 The Works Variation shall be valued by agreement of the Parties to be recorded in writing or, failing agreement within 10 Business Days (or such other time as is agreed in writing by the Parties) after receipt of the notice under clause 14.1, by the Principal, and the Contract Price shall be adjusted accordingly.

15 Testing

- 15.1 Prior to the Date of Completion, the materials and Works shall be subject to such tests as:
- (a) set out in any Minor Works Contract Specifics; or
 - (b) may be reasonably directed in writing by the Principal,
- to establish the compliance of materials, workmanship and the Works with the Contract.
- 15.2 Tests conducted under clause 15.1 shall be conducted at the Contractor's cost unless otherwise agreed in writing by the Parties.

16 Defects liability period

- 16.1 The Contractor must rectify any Defects notified to the Contractor by the Principal in writing during the Defects Liability Period within a reasonable time, but no later than 30 days from the date that notice of the Defect was given by the Principal, at the Contractor's expense.
- 16.2 If the Contractor fails to rectify a Defect in accordance with clause 16.1, the Principal may rectify the Defect and the costs of it doing so shall be a debt due from the Contractor to the Principal. To avoid doubt, the Principal may recover such amounts from the Contractor either on demand from the Contractor or by deducting such amount from any amount owed by the Principal to the Contractor.

17 Payment

- 17.1 As soon as reasonably practicable following the end of each month or at another time or frequency agreed in writing by the Parties, including as set out in any Minor Works Contract Specifics, the Contractor must give the Principal a detailed, itemised Payment Claim specifying:

- (a) the amount due to the Contractor for any part of the Works carried out up to the date of the Payment Claim, including a breakdown of such amounts and description of the Works carried out;
 - (b) any other amounts owed by the Principal to the Contractor at the date of the Payment Claim; and
 - (c) any other information reasonably required by any Minor Works Contract Specifics or directed in writing by the Principal.
- 17.2 Subject to the deduction of:
- (a) any Retention Moneys; or
 - (b) other amount which the Principal may be entitled to deduct or which is due and payable by the Contractor to the Principal,
- the Principal must pay the balance of a valid Payment Claim within 20 Business Days of the date of issue of the Payment Claim or the time for payment otherwise agreed in writing by the Parties, including as set out in any Minor Works Contract Specifics. To avoid doubt, nothing in the Contract obliges the Principal to pay for Works that are not in accordance with the Contract or for plant or materials not incorporated in the Works on Site.
- 17.3 If the moneys deducted by the Principal under clause 17.2(b) are insufficient to discharge the payment liability of the Contractor to the Principal, the Principal may have recourse to Retention Moneys or any security provided under the Contract.
- 17.4 The payment of moneys to the Contractor by the Principal shall not be evidence of the value of work done or an admission of liability or evidence that any Works have been executed satisfactorily but shall be a payment on account only. To avoid doubt, the Principal may correct an error in a previous payment in a later payment.
- 17.5 Unless otherwise agreed in writing by the Parties, the Contract Price shall not be subject to adjustment for rise and fall in costs.
- 17.6 The Contractor is not entitled to payment for any Disbursements not included in the Contract Price unless prior written notice of the Disbursement was provided to the Principal and the Principal approved the Disbursement in writing. To avoid doubt, the Principal must not unreasonably withhold its consent to any reasonable Disbursements.

18 Interest on overdue payments

- 18.1 This clause 18 applies if the Parties have executed this Document and have stated that this clause 18 applies in the Minor Works Contract Specifics.
- 18.2 Interest at the rate set out in the Minor Works Contract Specifics is payable on so much of an amount that is payable under the Contract by a Party to the other Party on or before a certain date but which is unpaid 20 Business Days after that date.
- 18.3 The interest is to be paid for the period beginning on the day after the date on which the amount is due and ending on and including the date on which the amount payable is paid.
- 18.4 To avoid doubt, if the Party who owes the other Party an amount under the Contract pays to the other Party that amount before the expiry of 20 Business Days from the date on which the amount fell due, no interest is payable.

19 Retention moneys and security

- 19.1 This clause 19 applies if the Parties have executed this Document and have stated that this clause 19 applies in the Minor Works Contract Specifics.
- 19.2 Subject to clause 19.3, the Principal may deduct as Retention Moneys a percentage set out in any Minor Works Contract Specifics of the balance of each Payment Claim (**Retention Percentage**) as security for the performance of the Contractor's obligations under the Contract.

- 19.3 The Principal may deduct Retention Moneys under clause 19.2 until the Principal has retained an amount equalling the Retention Sum.
- 19.4 If required by the Minor Works Contract Specifics, the Contractor must provide security equal to the value of the Contract Price or part thereof in lieu of Retention Moneys in the form of an unconditional and irrevocable bank undertaking in a form, and from a financial institution, approved by the Principal, or another form of security, as set out in the Minor Works Contract Specifics.
- 19.5 The Principal may have recourse to any Retention Moneys or security at any time it may be entitled to recover from, or be paid by, the Contractor an amount under the Contract or otherwise.
- 19.6 The Principal must return to the Contractor the Retention Sum or any security provided under clause 19.4 after deduction of any amounts the Principal is owed under the Contract or otherwise:
- (a) within the period of time specified in any Minor Works Contract Specifics following the Date of Completion; or
 - (b) where the Contract is terminated before the Date of Completion, within the period of time specified in any Minor Works Contract Specifics following termination.

20 Default, suspension and termination for breach

Default

- 20.1 Without limiting the Principal's rights under clause 20.8, if a Party breaches a provision of the Contract and that breach continues for a period of 5 Business Days, the other Party may provide a written notice to that Party:
- (a) identifying the nature of the alleged breach;
 - (b) requiring the Party to comply with the relevant provision of the Contract; and
 - (c) requiring the Party to remedy the breach in any manner and within a reasonable timeframe specified in the notice;
- 20.2 If a Party breaches or repudiates the Contract, nothing in the Contract prejudices the right of the other Party to recover damages or exercise any other right under the Contract or under any applicable Legal Requirement.

Suspension

- 20.3 Without limiting the Principal's rights under clause 20.8, if a Party breaches a provision of the Contract and fails to comply with a written notice issued under clause 20.1, the non-defaulting Party may suspend the performance of its obligations (or any of them) and the defaulting Party's obligations (or any of them) by written notice to the defaulting Party until such time that the breach is remedied to the non-defaulting Party's reasonable satisfaction or the non-defaulting Party otherwise directs that the performance of the Contract is no longer suspended (in each case the non-defaulting Party shall give written notice to the defaulting Party of the cessation of the suspension) at which point the Parties must promptly recommence the performance of their obligations.
- 20.4 The Contractor must bear any cost it incurs as a result of a suspension under clauses 20.3 or 5.4 and any costs incurred by the Principal as a result of the suspension and any amounts payable by the Contractor to the Principal under this clause become a debt due to the Principal by the Contractor.
- 20.5 To avoid doubt, if a Party suspends the Contract or any part of it in accordance with clauses 20.3 or 5.4, the Date for Completion shall not be extended by the period of that suspension, except as otherwise agreed in writing by the Parties.

Termination for breach

- 20.6 Subject to clause 20.7, without limiting the other circumstances in which the Contract may be terminated, if a Party breaches a provision of the Contract and fails to comply with a notice issued under clause 20.1, then the other Party:

- (a) may give a further notice to the defaulting Party of its intention to terminate the Contract if the breach is not remedied or rectified in accordance with any manner or timeframe specified in the notice; and
 - (b) by a further and final notice in writing to the defaulting Party, may immediately terminate the Contract if the breach is not remedied or rectified within the timeframe specified in the notice given under clause 20.6(a); and
- 20.7 If a Party breaches a material provision of the Contract and that default is incapable of remedy or rectification, the non-defaulting Party may immediately terminate the Contract by written notice to the defaulting Party.

‘Show cause’ procedure

- 20.8 At any time, irrespective of whether the Principal has followed the steps in clauses 20.1 to 20.7 (inclusive), the Principal may by written notice to the Contractor require the Contractor to show cause, by a date specified in the notice, why the Principal should not terminate the Contract or suspend payment and take the Works remaining to be completed wholly or partly out of the hands of the Contractor without prejudice to any rights of the Principal under the Contract or at Law if the Contractor:
- (a) fails to commence the Works by the Start Date;
 - (b) fails to proceed with the Works at a reasonable rate of progress;
 - (c) commits a material breach of the Contract;
 - (d) fails to comply with a Legal Requirement relating to the execution of the Works;
 - (e) fails to maintain the Insurances;
 - (f) assigns or sub-contracts the Contract or the Works or any part thereof without any prior written consent of the Principal required by the Contract; or
 - (g) commits an Insolvency Event,
- and if the Principal does so take all or part of the Works out of the hands of the Contractor because the Contractor has failed to show sufficient cause:
- (h) the Principal may complete the whole or any part of those Works itself or by means of other persons;
 - (i) the Principal may take possession of the Site, the Works and, except where the Contract is terminated, the plant and other things on or in the vicinity of the Site as are owned by the Contractor;
 - (j) if the costs incurred by the Principal in completing the Works is greater than the amount which would have been paid to the Contractor if the Contractor had completed the Works, the difference shall be a debt due from the Contractor to the Principal, otherwise any difference shall be a debt due from the Principal to the Contractor; and
 - (k) the Principal may terminate the Contract by written notice to the Contractor.

21 Termination

- 21.1 If the Contract is terminated, the Principal may engage or contract with any person other than the Contractor to execute all or part of the Works.
- 21.2 Where the Principal terminates the Contract under clauses 20.6(b), 20.7 or 20.8(k), the Principal shall ascertain the amount of all damages and expenses suffered or incurred by the Principal as a result of any of the matters referred to in those clauses and all such amounts may be deducted from amounts then owing to the Contractor or may be recovered by the Principal as a debt due by the Contractor to the Principal.
- 21.3 When the Contract is terminated, the Contractor must:
- (a) promptly return to the Principal any of the Principal's property or Principal's Documents; and

- (b) if requested by the Principal, co-operate with and assist the Principal to transition the execution of the Works to the Principal or to another person engaged by the Principal.

22 Liability

- 22.1 Subject to clause 22.2, the Contractor shall indemnify the Principal and the Principal's Personnel against any Loss suffered or incurred in connection with any act or omission of the Contractor or the Contractor's Personnel in connection with the execution of the Works and the performance of the Contract, except to the extent that the Loss is caused by the Wilful Misconduct or gross negligence of the Principal or the Principal's Personnel.
- 22.2 Notwithstanding any other clause of the Contract, neither Party will be liable to the other Party for any Consequential Loss unless:
 - (a) the Law provides otherwise;
 - (b) the Parties agree in writing that a Party will be liable for that Consequential Loss; or
 - (c) the Consequential Loss is specified in or otherwise covered by an Insurance.
- 22.3 Each Party agrees that Part 1F of the *Civil Liability Act 2002* (WA), to the extent that the same may be lawfully excluded, is excluded from operation with respect to any Dispute, claim or action brought by one Party against the other Party arising out of or in connection with the Contract and any of the Contractor's Sub-contractors or such Sub-contractors' personnel.

23 Settlement of disputes

- 23.1 In the event of a Dispute, a Party may provide a written notice to the other Party identifying the nature of the Dispute and containing enough information to enable the other Party to reasonably understand the facts relevant to the Dispute (**Dispute Notice**).
- 23.2 Within 15 Business Days of receipt of the Dispute Notice, the Parties shall meet to seek to negotiate, in good faith, a resolution to the Dispute.
- 23.3 In the event that the Dispute remains unresolved after the time period referred to in clause 23.2, either Party may, at any time after giving notice to the other Party of its intention to do so, refer the Dispute for mediation in accordance with clause 23.4.
- 23.4 A mediation under this clause 23 shall:
 - (a) be conducted by a single mediator to be appointed, in the absence of agreement by the Parties within 5 Business Days after the giving of a notice of intention under clause 23.3, by the Chairperson (or his or her nominee) for the time being of the dispute resolution organisation known as the Resolution Institute;
 - (b) be conducted according to the rules proposed by the appointed mediator; and
 - (c) be conducted during a period of 10 Business Days (or such longer period as the Parties may agree in writing) from the acceptance by the mediator of his or her appointment.
- 23.5 The Parties shall each pay their own costs of the mediation and will each pay half of the mediator's fees and costs.
- 23.6 If the Parties are unable to resolve the Dispute within the mediation period stipulated in, or agreed under, clause 23.4(c), either Party may take whatever other action is available to it under the Contract or the Law, including initiating proceedings in a court of competent jurisdiction.
- 23.7 Nothing in this clause 23 precludes a Party from seeking interlocutory relief relative to the subject matter of a Dispute from a court of competent jurisdiction, including the right to seek injunctive relief.
- 23.8 To avoid doubt, nothing in this clause 23 affects or limits a Party's right to apply for an adjudication under the Construction Contracts Act.

24 Construction contracts act

- 24.1 The Contractor must promptly and without delay give the Principal a copy of any notice, application or document filed or served on the Contractor or any of its Sub-contractors under the Construction Contracts Act relating to any sub-contract in respect of the Works.
- 24.2 If the Principal becomes aware that a Sub-contractor engaged by the Contractor is entitled to suspend or has suspended work pursuant to the Construction Contracts Act, the Principal may in its absolute discretion pay the Sub-contractor such money that may be owing to the Sub-contractor in respect of that work and any amount paid by the Principal will be a debt due from the Contractor to the Principal.
- 24.3 The Contractor must ensure that none of its sub-contracts contain terms prohibited by the Construction Contracts Act.

25 Insurance and risk management

- 25.1 The Contractor must:
- (i) procure and maintain the Insurances with the minimum level of cover set out in this Document, or otherwise specified by the Principal in the Principal Request, from insurers having a financial performance rating of at least A- by Standard and Poor's (Australia) Pty Limited, or an equivalent rating from another internationally recognised rating agency, approved by the Principal, which either:
 - (i) carries on business in Australia and is authorised by the Australian Prudential Regulation Authority; or
 - (ii) if an overseas insurer, covers claims lodged and determined in the jurisdiction of Australia, with any limitations regarding this requirement to have been notified to, and approved, by the Principal;
 - (j) ensure that its Sub-contractors have appropriate and reasonable insurance (including as to amounts of insurance and type of insurance) for the work or services they may conduct or provide under a sub-contract relating to the performance of the Works;
 - (k) upon the Principal's written request, provide to the Principal copies of current and updated certificates of insurance for all Insurances, including those of a Sub-contractor;
 - (l) inform the Principal in writing immediately if it becomes aware of any actual, threatened or likely claims in connection with the Contract under any of the Insurances, except claims which the Principal may have against the Contractor;
 - (m) disclose to the Principal in writing any limitations under an Insurance or other factors relevant to any Insurance which may adversely impact on the performance of the Works by the Contractor or a claim in connection with the Contract;
 - (n) pay all premiums and deductibles applicable to any of the Insurances when due;
 - (o) promptly reinstate any Insurance required if it lapses or cover is exhausted;
 - (p) give the Principal at least 20 Business Days' prior written notice of any cancellation or non-renewal of, or a material alteration to, any of the Insurances; and
 - (q) not do any act or omission that would be grounds for an insurer to refuse to pay a claim made under any of the Insurances.
- 25.2 To the extent possible, at the times of placement or renewal of any Insurances, each Insurance must:
- (a) state that it is governed by the laws of the Commonwealth of Australia and that courts of Australia shall have exclusive jurisdiction to deal with any dispute under the policy; and

- (b) where the Principal is entitled to cover under the Insurance:
 - (i) provide that the Insurance is primary with respect to the interests of the Principal and any other insurance maintained by the Principal is excess to and not contributory with the Insurance;
 - (ii) provide that a notice of claim given to the insurer by an insured under the Insurance must be accepted by the insurer as a notice of claim given by the Principal;
 - (iii) except for compulsory workers' compensation insurance, compulsory third party motor liability insurance and professional indemnity insurance, include a cross-liability provision extending the policy to operate in the same manner as if there was a separate policy of insurance covering each party insured (without increasing the deductibles or reducing the overall limit of indemnity);
 - (iv) provide that, where the Principal is not a named insured, the insurer must waive rights of subrogation against the Principal; and
 - (v) provide that any breach of the conditions of that Insurance by an insured other than a Principal must not in any way prejudice or diminish any rights which the Principal has under that Insurance.

25.3 The Contractor must procure and maintain **public liability insurance** and **product liability insurance** which:

- (a) is for an amount not less than **\$20 million**, or such other amount as specified in the Principal Request, in respect of any one claim, is unlimited in the amount of occurrences and not less than the amount set out in the Principal Request (if any is so specified) in the aggregate during any one 12 month period of insurance;
- (b) covers the liability of the Contractor, its Personnel and the Principal in respect of:
 - (i) loss of, damage to, or loss of use of, any real or personal property; and
 - (ii) the bodily injury of, disease or illness (including mental illness) to, or death of, any person (other than liability which is required by any Legal Requirement to be insured under a workers' compensation policy),

ARISING OUT OF OR IN CONNECTION WITH THE CONTRACTOR'S PERFORMANCE OF THE CONTRACT; AND

- (c) covers the use of unregistered motor vehicles or unregistered mobile plant and equipment used in connection with the Contract and sudden and accidental pollution.

25.4 Where the Contractor shall be using its own vehicles, plant and equipment in performing the Works, the Contractor must procure and maintain reasonable **vehicle and equipment insurance** for such vehicles, plant and equipment (Contractor's Vehicles and Equipment) (in addition to any compulsory third party motor vehicle insurance), which must:

- (a) cover all loss and/or damage to the Contractor's Vehicles and Equipment;
- (b) cover third party personal injury or death (to the extent not covered by any public and product liability insurance taken out by the Contractor and any compulsory third party motor vehicle insurance) and third party property damage liability involving the Contractor's Vehicles and Equipment;
- (c) be unlimited in the number of occurrences; and
- (d) to the extent available from the insurance market from time to time, contain a principal's indemnity extension in favour of the Principal.

25.5 Unless otherwise agreed in writing by the Principal, the Contractor must procure and maintain **workers' compensation insurance** as follows:

- (a) the Contractor must insure against liability for death of or injury to persons employed by or deemed by a Legal Requirement to be employed by the Contractor including liability under statute and at common law with a level of cover not less than **\$50 million** or such amount as is specified in a Principal Request in respect of any one event; or
 - (b) where the Contractor is a sole trader and has no workers' compensation policy in place, the Contractor must insure against the loss of income and illness by the purchase of an income protection or salary continuance policy.
- 25.6 Where specified in a Principal Request or otherwise reasonably requested by the Principal, the Contractor must procure and maintain **professional indemnity insurance**, which must:
 - (a) be for not less than **\$5 million** or such other amount as is specified in the Principal Request or otherwise reasonably requested by the Principal in respect of any one claim;
 - (b) be for an amount not less than the amount specified in the Principal Request in the aggregate for all claims arising in any one 12 month period of insurance (if any is so specified);
 - (c) include one full automatic reinstatement of the limit of liability;
 - (d) cover liability arising from any act or omission in connection with or arising out of the Contractor's professional activities and duties under the Contract; and
 - (e) cover claims under the *Competition and Consumer Act 2010* (Cth), the *Fair Trading Act 2010* (WA) and any similar legislation in any other state or territory, insofar as they relate to the provision of professional advice.
- 25.7 Notwithstanding any other provision of this clause 25, if agreed in writing by the Principal, the Contractor may self-insure in respect of any or all of the Insurances provided that:
 - (a) it is lawful for the Contractor to do so;
 - (b) the Contractor identifies in writing to the Principal which of the risks required to be insured are being self-insured; and
 - (c) if required by the Principal from time to time, the Contractor will provide to the Principal a copy of the Contractor's latest annual report and accounts and/or demonstrate to the Principal's reasonable satisfaction that the Contractor maintains sufficient financial reserves to discharge any liability accruing in respect of such insurance risks.
- 25.8 The Parties acknowledge and agree that:
 - (a) the effecting and maintaining of the Insurances by the Contractor does not, in any way, affect or limit the liabilities or obligations of the Contractor under the Contract;
 - (b) the Insurances are primary, and not secondary, to the indemnities referred to in this Document and the Principal is not obliged to make a claim or institute proceedings against any insurer under the Insurance before enforcing any of its rights or remedies under such indemnities;
 - (c) whenever a claim is made under any of the Insurances, the Contractor is liable for any excess or deductible payable as a consequence;
 - (d) the Contractor must not do or omit to do any act that would be grounds for an insurer to refuse to pay a claim made under any of the Insurance;
 - (e) nothing in this clause 25 fixes the Principal with notice of the contents of any Insurance policy and must not be raised as a defence to any claim by the Principal against the Contractor; and
 - (f) where relevant, the Contractor must provide reasonably requested assistance to the Principal in the preparation and negotiation of insurance claims.

- 25.9 The Contractor, at the discretion of the Principal, may be required to provide the Principal with a risk management plan relating to the Contract in accordance with AS/NZS 4360-2009 Risk Management.

26 Assignment and sub-contracting

- 26.1 The Contractor must not:
- (a) assign any of its rights and obligations under the Contract, or sub-contract any aspect of the Works, without the Principal's prior written approval; or
 - (b) allow a Sub-contractor to further sub-contract any aspect of sub-contracted Works without the Principal's prior written approval.
- 26.2 To avoid doubt, the Principal must not unreasonably withhold its approval under clause 26.1.

27 Confidentiality

- 27.1 In this clause 27, the following terms have the following meanings:
- (a) **'Disclosing Party'** means the Party which has disclosed Confidential Information that is confidential to that Party; and
 - (b) **'Receiving Party'** means the Party to whom Confidential Information is disclosed by the Disclosing Party.
- 27.2 Subject to clause 27.3, the Parties must not:
- (a) disclose Confidential Information to any other person; or
 - (b) use Confidential Information except to the extent necessary to fulfil their obligations under the Contract.
- 27.3 Subject to clause 27.4, a Party may disclose Confidential Information to a third party:
- (a) with the prior consent of the Disclosing Party;
 - (b) to the extent required by any Law or applicable securities regulation or rule;
 - (c) in connection with any dispute or litigation concerning the Contract or its subject matter;
 - (d) to the extent required by any authority having jurisdiction over the Receiving Party; or
 - (e) who is an employee, officer, financier, joint venture partner, related body corporate, contractor, financial adviser, legal adviser or insurer of the Receiving Party, where the disclosure is necessary for the purpose of the Receiving Party performing its obligations, or enforcing its rights, under the Contract.
- 27.4 Before making a disclosure to a person under clause 27.3, the Receiving Party must:
- (a) inform the entity or person to whom the Confidential Information is being disclosed of the Receiving Party's obligations under the Contract, except where clause 27.3(b) applies;
 - (b) notify the Disclosing Party and give the Disclosing Party a reasonable opportunity to take any steps that the Disclosing Party considers necessary to protect the confidentiality of that information; and
 - (c) where clause 27.3(e) applies, but with the exception of employees or officers of the Receiving Party, procure that the person or entity executes a deed in favour of the Disclosing Party in a form acceptable to the Disclosing Party, acting reasonably, imposing on the person or entity an undertaking of confidentiality having substantially similar effect as the Contract.

28 Intellectual property rights

- 28.1 The Contractor warrants that its execution of the Works and any designs, documents or methods of working provided by it to the Principal in doing so does not infringe any Intellectual Property Right.
- 28.2 The Contractor shall indemnify the Principal against any Loss resulting from any alleged or actual infringement of any Intellectual Property Right arising from or in connection with the execution of the Works or from any designs, documents or methods of working provided by it to the Principal.
- 28.3 Ownership of a Party's Background Intellectual Property Rights vests in and shall remain vested in that Party.
- 28.4 The Contractor grants to the Principal a royalty-free, perpetual, irrevocable, express, non-exclusive, world-wide licence to use, exercise and sub-license the Contractor's Background Intellectual Property Rights only for the intended purpose of the Contract.
- 28.5 The Principal grants the Contractor a revocable, royalty-free and non-transferable licence to use any Principal's Background Intellectual Property Rights to the extent necessary for the Contractor to execute the Works.
- 28.6 All Intellectual Property Rights (other than the Contractor's Background Intellectual Property Rights) in the designs, documents, materials, equipment or methods of working provided by the Contractor under the Contract will vest in the Principal. The Contractor must do everything necessary to perfect such vesting at the Contractor's cost or as otherwise agreed by the Parties.
- 28.7 The Contractor must ensure that:
- (a) copyright and any other ownership interests or rights in the designs, documents, materials, equipment or methods of working provided by the Contractor under the Contract do not vest in any Sub-contractor of the Contractor or any other third party; and
 - (b) no third party is in a position to successfully assert any moral rights or other proprietary interests in relation to the Works or the Contract contrary to the interests of the Principal.
- 28.8 A Party must not:
- (a) grant any third party access to the other Party's Intellectual Property Rights without that other Party's prior written consent, which may be given in that other Party's discretion; or
 - (b) do or allow to be done, or fail to do, any act that may infringe the other Party's Intellectual Property Rights.
- 28.9 All payments and royalties payable in respect of any Intellectual Property Rights required in respect of performance of the Contract shall be included in the Contract Price and shall be paid by the Contractor to the person, persons, or body to whom they may be due or payable.

29 General

29.1 Force Majeure Event

- (a) A Party must:
 - (i) immediately give notice to the other Party of any Force Majeure Event that precludes that Party from partially or wholly complying with any of its obligations under the Contract (**Affected Obligations**); and
 - (ii) if it gives such a notice, either:
 - (A) to the extent practicable, specify in the notice the length of delay that will result from the Force Majeure Event; or

- (B) where it is impracticable to specify the length of delay at the time the notice is delivered, provide the other Party with periodic supplementary notices during the period over which the Force Majeure Event continues.
- (b) The Party's obligation to perform the Affected Obligations is suspended for the duration of the actual delay arising out of the Force Majeure Event.
- (c) The Party whose performance is affected by the Force Majeure Event must use its reasonable endeavours to remove or relieve the Force Majeure Event and to minimise the delay so caused.
- (d) If a Force Majeure Event continues to affect the performance of the Works for the duration of the Force Majeure Event Termination Period, the Principal may terminate the Contract by serving written notice on the Contractor.

29.2 Relationship of the Parties

The Contractor acknowledges and agrees that it is an independent contractor and not an agent of the Principal and that it has no authority to bind the Principal by contract or otherwise. Nothing in the Contract creates a partnership, trust or agency between the Parties or imposes any fiduciary duties on either Party in relation to the other, unless expressly agreed otherwise.

29.3 Representatives

- (a) Each Party may appoint a Representative, and give them authority, to act on its behalf for the purpose of the Contract within delegation limits advised in writing to the other Party.
- (b) If the Parties execute this Document and specify the details of the Parties' Representatives in the Minor Works Contract Specifics, the Parties' Representatives are those persons set out in the Minor Works Contract Specifics as at the date of executing this Document.

29.4 Notice

- (a) Any notice under the Contract shall be in English, in legible writing and signed by hand or by electronic signature, and shall be given or served by:
 - (i) hand delivery or prepaid post to the address of the receiving Party specified in the Request Response, Letter of Award or the Minor Works Contract Specifics, or at such other address as may from time to time be notified in writing to the notifying Party by the receiving Party, but in any event to the last notified address; or
 - (ii) email to the email address of the receiving Party specified in the Request Response, Letter of Award or the Minor Works Contract Specifics, or at such other email address as may from time to time be notified in writing to the notifying Party by the receiving Party, but in any event to the last notified email address.
- (b) Any notice is regarded as being given by the notifying Party and received by the receiving Party:
 - (i) if by delivery in person, when delivered to the address of the recipient;
 - (ii) if by post, 5 Business Days from and including the date of postage; and
 - (iii) if sent by email, in accordance with section 14 of the *Electronic Transactions Act 2011* (WA),

but if the delivery or receipt is on a day which is not a Business Day or is after 5.00pm (recipient's time), it is regarded as received at 9.00am on the following Business Day.

29.5 **GST**

- (a) Words capitalised in this clause 29.5 and not otherwise defined have the meaning given in the GST Law.
- (b) Where an amount of Consideration is payable for a Taxable Supply made under the Contract (whether that amount is specified or can be calculated in accordance with the Contract), it does not include GST and must be increased by the GST Rate.
- (c) The Party making a Taxable Supply under the Contract must issue a Tax Invoice or Adjustment Note to the Recipient in accordance with the GST Law.
- (d) If any Party has a right to be reimbursed or indemnified for any cost or expense incurred under the Contract, that right does not include the right to be reimbursed or indemnified for that component of a cost or expense for which the indemnified Party can claim an Input Tax Credit.

29.6 **Governing law**

The Contract and any Dispute shall be governed by the Laws of the State of Western Australia and the Parties agree that the courts of that State shall have exclusive jurisdiction to deal with any Dispute.

29.7 **Waiver**

A Party may only waive a right or power it has under the Contract by written notice to the other Party. No forbearance, delay or indulgence by a Party in enforcing a provision of the Contract shall prejudice, restrict or limit the rights of, or the exercise of the powers of, that Party, nor shall any waiver of those rights operate as a waiver of any subsequent breach or of that right or power in the future.

29.8 **Variation**

Without limiting clause 14, the terms of the Contract shall not be varied except by the written agreement of the Parties.

29.9 **Entire agreement**

The Contract embodies the entire agreement between the Parties and supersedes all prior conduct, arrangements, agreements, understandings, quotation requests, representations, warranties, promises, statements or negotiations, express or implied, in respect of the subject matter of the Contract.

29.10 **Rights are cumulative**

Subject to any express provision in the Contract to the contrary, the rights of a Party under the Contract are cumulative and are in addition to any other rights of that Party.

29.11 **Severability**

Should any part of the Contract be invalid or unenforceable, that part shall be:

- (a) read down, if possible, so as to be valid and enforceable; and
- (b) if it cannot be read down, severed from the Contract to the extent of the invalidity or unenforceability,

and the remainder of the Contract shall not be affected by such invalidity of unenforceability.

30 EXECUTION

Principal – where executing in accordance with a Council resolution

Signed by an authorised person(s) on behalf of the Shire of Irwin in accordance with a resolution of the Council passed on [insert date]:

sign here ►

Chief Executive Officer

print name

Contractor – where the Contractor is a company

EXECUTED by [insert name] ACN [insert)
ACN] in accordance with section 127(1) of)
the *Corporations Act 2001* (Cth):)

Director/Secretary/Sole Director-Secretary
(signature)
(Delete whichever is not applicable)

←

Director/Secretary (signature)
(Delete whichever is not applicable)

←

Director/Secretary/Sole Director-Secretary
(print full name)
(Delete whichever is not applicable)

Director/Secretary (print full name)
(Delete whichever is not applicable)

Contractor – where the Contractor is an individual

SIGNED by [insert name] in the)
presence of:)
)

Signature of Contractor

Signature of Witness

Date

Full name of Witness (print)

Address of Witness

Schedule 1 - Minor Works Contract Specifics and Specification

Part A - Minor Works Contract Specifics

ITEM	CONTRACT SPECIFIC	DESCRIPTION
1.	Works (clause 1.1)	<i>As set out in the Specification</i>
2.	Start Date (clauses 1.1 and 9.1)	<i>05/04/2021</i>
3.	Date for Completion (clauses 1.1 and 9.1)	<i>30/06/2021</i>
4.	Application of clause 10 regarding liquidated damages (clause 11)	<i>To be confirmed</i>
5.	Liquidated damages formula or calculation (clause 11)	<i>To be confirmed</i>
6.	Payment Claim – frequency (clause 17.1)	<i>Monthly</i>
7.	Payment Claim – information required (clause 17.1(c))	<i>N/A</i>
8.	Payment Claim – time for payment (clause 17.2)	<i>N/A</i>
9.	Application of clause 18 regarding interest (clause 18.1)	<i>No</i>
10.	Interest rate on overdue payments (clause 18.2)	<i>N/A</i>
11.	Application of clause 19 regarding Retention Moneys and security (clause 19.1)	<i>To be confirmed</i>
12.	Retention Percentage (clauses 1.1 and 19.2)	<i>To be confirmed</i>
13.	Retention Sum (clauses 1.1 and 19.3)	<i>To be confirmed</i>
14.	Security requirements (clause 19.4)	<i>To be confirmed</i>
15.	Time for return of Retention Moneys or security following Date of Completion (clause 19.6(a))	<i>To be confirmed</i>

ITEM	CONTRACT SPECIFIC	DESCRIPTION
16.	Time for return of Retention Moneys or security following termination (clause 19.6(b))	<i>To be confirmed</i>
17.	Plant and equipment that the Contractor does not need to provide (clause 12(a))	N/A
18.	Tests (clause 15.1)	As set out in any Minor Works Contract Specifics
19.	Representatives – Contractor’s Representative (clause 29.3)	Name: Title: Postal address: Phone: Email:
20.	Representatives – Principal’s Representative (clause 29.3)	Name: Shane Ivers Title: Chief Executive Officer Postal address: PMB 21, Dongara WA 6525 Phone: 9927 0000 Email: ceo@irwin.wa.gov.au
21.	Notice – Principal (clause 29.4)	Postal address: PMB 21, Dongara WA 6525 Email: ceo@irwin.wa.gov.au Contact person: Shane Ivers, Chief Executive Officer
22.	Notice – Contractor (clause 29.4)	Postal address: Email: Contact person:

Part B – Contract Price

No	Item	Amount (inc GST)
2.5.1	Stage 1 – Moreton Tce SLK 0.37 to SLK 0.6	\$
	Stage 2 – Moreton Tce SLK 0.23 to SLK 0.37	\$
2.6	Medical Centre Car Park Connection	\$
2.7	Town Park Car Park Upgrade	\$
2.8	Street Lighting Upgrade	\$
Lump Sum Total		\$
Optional		
2.9.1	Option – Moreton Terrace Renewal – Stage 3	\$
2.9.2	Option – Hunt / Waldeck Roundabout	\$
2.9.3	Option – Moreton / Pt Leander Roundabout	\$
2.9.4	Option – Hosken Street and on-street Parking	\$
2.9.5	Option – Community Resource Centre Car Park	\$
2.9.6	Option – Dongara Hotel Precinct – Car Park Upgrade	\$
Approved Variations		
V0.1		\$
Final Contract Price		
	Price (ex GST)	\$
	Price (inc GST)	\$

Part C – Special Conditions of Contract

1.1 Advertisements and Promotions on Site

The Contractor may erect on the Site or permit to be erected on Site only those signs:

- a) required by law;
- b) specified in the Contract documents; and
- c) required to identify the Contractor's premises

The Contractor shall not erect on Site, or permit to be erected on site, any other sign, advertisement, promotion or other display without the written approval of the Superintendent.

1.2 Publicity

The Contractor shall not issue any information, publication, document or article for publication in any media which includes details of the work under the Contract without the written approval of the Principal.

1.3 Environmental Protection

1.3.1 Noise Control

The Contractor shall, at all times, take adequate measures to control noise on the Site.

The contractor shall comply with all statutory requirements relating to control of noise levels on the Site and take all necessary precautions to minimise nuisance from noise and vibration and ensure that all sub-contractors observe similar care.

The Contractor shall arrange the operations and shall provide silencing equipment to the plant, at its own expense, to whatever extent it necessary to satisfy the requirements of the Shire of Irwin in relation to the sound level arising from the Contractor's operations near the boundaries of existing occupied properties.

1.3.2 Site Control

The Contractor shall, at all times:

- a) Comply with the regulations and restrictions imposed by the Superintendent relating to the storage of materials, the routing of construction traffic, the interruption of existing services and facilities and any other regulations in force on the Site;
- b) Comply with all statutes, regulations and bylaws relating to the protection of the environment;
- c) Obtain written approval from the Superintendent for the formation of any temporary roads, the erection of temporary structures or any Site clearing not specifically documented;

- d) Ensure that no trees or shrubs shall be removed or destroyed without the written approval of the Superintendent;
- e) Ensure that no fire shall be lit without the written approval of the Superintendent; and
- f) Store flammable or explosive products in accordance with the relevant statutes and to the approval of the Superintendent.

1.3.3 Soil Erosion

The contractor shall take all proper precautions to prevent soil erosion from any land used or occupied by the Contractor in the execution of the work under the Contract.

1.3.4 Dust, Dirt, Water and Fumes

The contractor shall prevent any nuisance occurring through the discharge of dust, dirt, water, fumes and the like onto persons or property.

1.3.5 Vehicles

All debris, spoil, rubbish or materials shall be suitably contained and covered in vehicles during transportation to or from the Site to prevent spillage or contamination of adjoining and other areas or property.

The Contractor shall maintain vehicles, wheels and tracks in a suitable clean condition to prevent transfer of mud onto adjacent streets or other areas.

1.3.6 Refuse Disposal

All Site refuse (including foodstuffs) shall be handled and disposed of in accordance with the requirements of relevant statutes and to the approval of the Superintendent.

1.3.7 Smoking on Construction Sites

The Contractor shall at all times ensure that all workmen and visitors on the construction Site comply with the following Smoking Policy;

In respect of construction Sites, smoking is prohibited:

- a) in Site Offices, lunchrooms or enclosed toilet facilities; and
- b) inside existing premises that are designated as “no smoking” areas.

1.4 Contractor's Representative

The Contractor's Representative shall have sufficient command of the English language and of Australian construction and technical terminology, to be able to read, converse and receive instructions in English.

1.5 Existing Improvements

Where, within the Site there are a range of existing improvements, roads, drainage and other services, the Contractor shall protect and maintain the same throughout the Contract.

The Contractor shall allow for all traffic control measures to maintain the roads in a safe trafficable condition.

1.6 Temporary Safety Fence

The Contractor shall provide a temporary fence as required by the Occupational Safety and Health Act 1984 and the Occupational Safety and health Regulations 1996 and with any amendments that may be made to the Act and the Regulations.

1.7 Materials, Labour and Constructional Plan

1.7.1 Workmen's Amenities

The Contractor shall provide all statutory and necessary amenities and sanitary facilities for workmen and other persons lawfully upon the Site and remove them on practical completion of the works

Occupation of any part of the works and Site for the provision of Workmen's Amenities shall not be permitted without the prior written approval of the Superintendent.

1.8 Materials and Work

1.8.1 Regulations

The Contractor shall comply with the Occupational Safety and Health Act 1984 (the "Act") and the Occupational Safety and Health Regulations 1996 (the "Regulations") and with any amendments that may be made to the Act and Regulations from time to time.

The Contractor shall be solely responsible for ensuring that wherever practicable, its employees and those of the Sub-contractors and employees of Separate Contractors, the Principal, Superintendents, and visitors to the Site, are not exposed to hazards.

Attention is drawn to the requirement to supply manufacturers/suppliers "Material Safety Data Sheets". These sheets should be consistent with the "Work Safe" information and format.

A copy of all "Material Safety Data Sheets" shall be supplied to the Superintendent with another copy kept on Site by the Contractor.

1.8.2 Safety Management Plan

The Contractor shall, throughout the Works, implement and maintain a "Safety Management Plan".

The Contractor shall prepare the Safety Management Plan in conjunction with a person suitably experienced and qualified in safety matters.

Prior to the commencement of the Works, the Contractor shall supply to the Superintendent in writing, its Safety Management Plan.

1.8.3 Induction Training

Employees of the Contractor and its Subcontractors and Employees of Separate Contractors shall not commence work on the Site until they have been inducted.

Upon commencement of work on the Site, the Contractor shall further induct each employee with regard to all significant hazards associated with their particular activity and area of employment on the Site and where relevant shall include the use of powered plant, tools and equipment.

1.8.4 Pre-Job Planning

Where legislation or codes of practice identify particularly hazardous activities including but not limited to work in confined spaces, asbestos removal, demolition work, excavation work, working near power lines and live conductors and working at heights, the Contractor shall supply to the Superintendent a Safe Work Procedure prior to the commencing such activity or type of work on the Site.

The Contractor shall induct its employees and its Subcontractors and Separate Contractors with regard to Safe Work Procedures and shall prepare "Training Session Attendance" sheets signed by each attendee verifying that such induction has occurred.

1.8.5 Site and Public Security

Notwithstanding the Contractors' obligations to Site and public security as stated elsewhere in this Contract the Contractor shall monitor and control wherever practical, the access of all persons to the Site.

The Contractor shall ensure that no persons, including without limitation friends and relatives (particularly children) of employees and the representative of organisations unrelated to the Contractor, enter the Site without the express permission of the Contractor.

1.8.6 Occupied Sites

In the event of the Site being a partially occupied Site, the Contractor is to liaise with the occupier regarding Safety and Health requirements.

The Superintendent will arrange a safety co-ordination meeting between the occupiers and the Contractor. The occupiers will provide to the Contractor their occupation requirements on and/or adjacent to the Site to assist the Contractor in the development of a Site specific Safety

Management Plan addressing the Contractors and occupiers operational interface requirements.

The Safety Management Plan shall incorporate the Contractor's own operations and the interface with the occupiers operations.

The Contractor shall be responsible for the implementation of the Safety and Health standards on the occupied Site for the duration of the Contract and shall co-ordinate and integrate the Works.

1.8.7 Materials to be Supplied by the Principal

The materials stated in the specification to be supplied by the Principal will be supplied free of charge to the Contractor for use only in the execution of the work under the Contract. The Contractor shall take delivery of the materials under the Conditions set out in the Contract.

1.8.8 Services Installation

The mechanical, electrical, plumbing, and similar service installations, equipment and their associated services shall be installed in such order that will ensure they are located as shown on the drawings and that all essential components and parts are accessible for the purposes of maintenance and replacement.

The Contractor shall be responsible for co-ordination between the various service installers in attaining the required locations and tolerances.

1.8.9 Working Hours

The Work to be performed under the contract shall be subject to execution within certain restricted working hours and the Contractor shall observe the following requirements:

- a) *Monday to Saturday, between 7:00am and 6:00pm*

The Contractor shall be liable for any additional costs the Principal may incur as a result of work outside the normal hours programming of the works.

1.8.10 Completion of Work

All portions of the movement area which have been affected by construction and/or trafficked by construction vehicles shall be cleaned and swept so that they are free from loose stones and debris to the satisfaction of the Shire. The Contractor shall retain the necessary plant and personnel at the work site, until the required cleanliness is achieved.

Part D – Specification



RFT 3-2020/21

Moreton Terrace Upgrade
Civil Construction

SPECIFICATION FOR MINOR WORKS CONTRACT

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1 INTRODUCTION

The Shire of Irwin is resealing Moreton Terrace and renewing the kerbing and drainage as part of its asset management program funded by the Regional Road Group program. Due to some additional funding received, the Shire will also replace the existing street paving and lighting together with some improvements.



Figure 1 – Site Plan

2 SCOPE OF WORKS

The Scope of Works for this project is to upgrade existing street lighting, car parks, footpaths, drainage structures and road features at locations on Hosken Street, Town Park Car Park, Community Resources Centre Car Park, Dongara Hotel Precinct, Moreton terrace and Memorial Park.

Notwithstanding the details as shown on the Drawings provided with the tender package and described within the Specification and this Scope of Works, the Contractor shall carry out all the incidental works which are necessary or inferred, whether detailed or described or not, to achieve the intent of this Scope of Works. The Contractor shall provide all labour, supervision, materials, tools, equipment and plant necessary to undertake works mentioned above which are detailed under the sections below.

Referring to the drawings provided, the scope is broken into the following core packages which will form the main contract:

- Moreton Terrace Renewal:
 - Stage 1
 - Stage 2
- Memorial Park Upgrade
- Town Park Carpark Upgrade
- Street Lighting Upgrade

Budget estimates for the following optional packages are to be included in this tender submission where the estimate accuracies and assumptions are to be stated clearly. The Principal reserves the right to execute in part or in full the following packages subject to a formal variation process:

- Moreton Terrace Renewal:
 - Stage 3
- Hunt/Waldeck Roundabout
- Moreton/Pt Leander Roundabout
- Hosken Street
- CRC carpark
- Dongara Hotel carpark

2.1 Documentation

Drawing Number	Revision	Title
	1	Shire of Irwin Footpath Specification
		IPWEA Restoration Specification
10001-1	0	Plans Showing Drainage Upgrade Moreton Terrace Dongara
P6258 E-01	0	Moreton Terrace Dongara Street Scape Upgrade – Electrical Layouts
P6258 E-02	0	Moreton Terrace Dongara Street Scape Upgrade – Electrical Layouts
P6258 E-03	0	Moreton Terrace Dongara Street Scape Upgrade – Electrical Details
12533215-G001	B	Cover page and drawing list
12533215-G002	C	General notes
12533215-C001	E	Proposed works - Overall plan
12533215-C002	E	Proposed works - Detail plan
12533215-C003	E	Proposed works - Detail plan
12533215-C004	D	Proposed works - Detail plan
12533215-C005	F	Proposed works - Detail plan
12533215-C006	F	Proposed works - Detail plan
12533215-C007	E	Proposed works - Detail plan
12533215-C008	D	Proposed works - Detail plan
12533215-C009	D	Proposed works - Detail plan
12533215-C010	E	Proposed works - Detail plan
12533215-C011	E	Proposed works - Detail plan
12533215-C012	D	Proposed works - Detail plan
12533215-C013	E	Proposed works - Detail plan
12533215-C014	D	Proposed works - Detail plan
12533215-C015	D	Proposed works - Detail plan
12533215-C101	B	Plan and longitudinal section - Stage 1 Moreton Terrace
12533215-C102	B	Plan and longitudinal section - Stage 1 Hosken Street
12533215-C103	C	Plan and longitudinal section - Stage 2 Moreton Terrace
12533215-C104	C	Plan and longitudinal section - Stage 2 Community Resources Centre Carpark
12533215-C105	B	Plan and longitudinal section - Stage 3 - Moreton Terrace
12533215-C201	B	Typical cross section - Moreton Terrace
12533215-C202	B	Typical cross section - Hosken Street
12533215-C203	B	Typical cross section - Car park
12533215-C204	A	Typical cross section - Stage 2 Moreton Terrace
12533215-C205	B	Typical cross section - Hotel car park
12533215-C206	B	Typical cross section - Stage 3 - Moreton Terrace
12533215-C207	B	Typical cross section - Stage 3 - Moreton Terrace
12533215-C208	B	Roundabout cross sections
12533215-C301	B	Details - Kerbs and Pathways
12533215-S101	B	Ramp and retaining wall - Layout & details
12533215-S102	B	Ramp and retaining wall - General notes
12533215-BOQ	A	Sol Moreton Tce and Car Park Upgrade-Final Design Stage – Bill Of Qty

2.2 Works Site Details

The Works sites are located in the Dongara Town Centre, WA 6525. The specific location of the Works Sites are shown in the below:



Figure 1: Hosken Street



Figure 2: Town Park Car Park



Figure 3: Community Resources Centre Car Park



Figure 4: Dongara Hotel Car Park

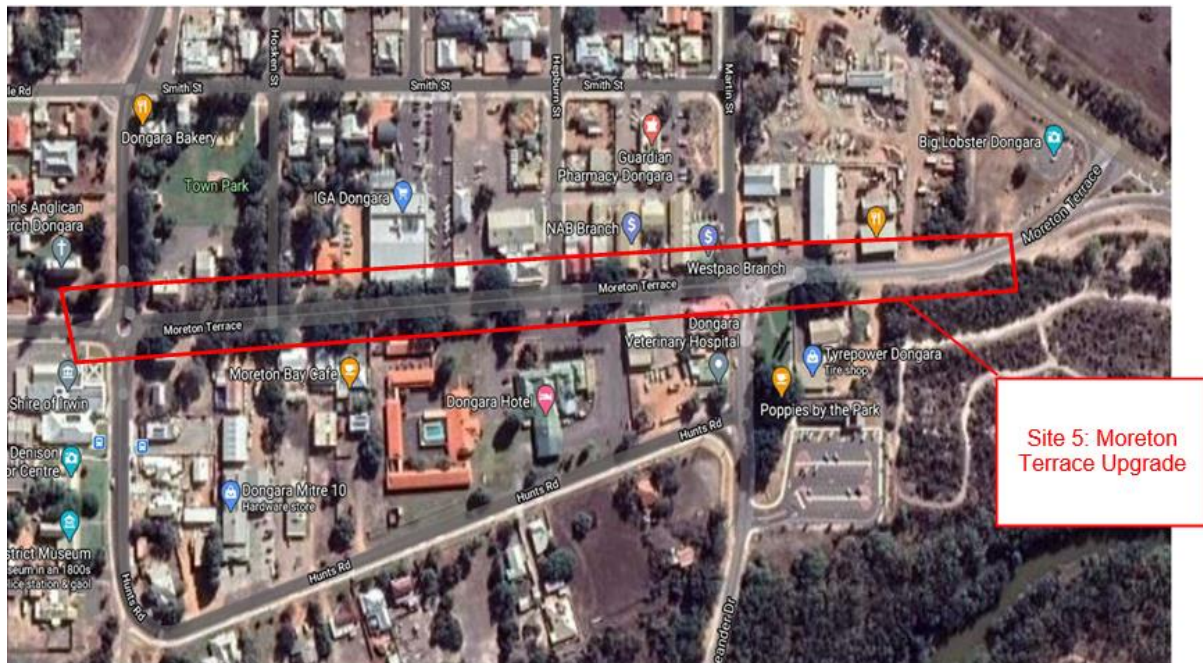


Figure 5: Moreton Terrace Upgrade

2.3 Work Excluded

- Supply of pavers
- Supply of light poles, light pole rag cages and lights
- Asphaltting and all kerbing except kerbing related to cross overs and pram ramps.
- Profiling and correcting
- Supply and installation of permanently installed road traffic signs
- Road and car park line marking
- Tree removal
- Supply of drainage materials
- Surveying works
- Car parking wheel stops
- Traffic Management plans including all traffic management, barricading, signage, warning lights, etc necessary to provide a safe working area for both the Contractor's workers and the public. The Traffic Management Plan will be provided upon Contract award.
- Service location including site survey and service location marking
- Transfer station fees associated with this project
- Closed off parking area between Town Park car park and Hosken Street including supply and placing of drainage, kerbing and turf (Drgs. 12533215-C009, C010)

2.4 General

2.4.1 General – Civil Works

The Works required under the Contract is for the supply of all materials, plant and labour, for the execution of the Works as specified and shown on the Drawings, and generally comprising the following, but not limited to:

- All job planning and risk assessments to include protection of the Heritage listed Moreton Bay Fig trees.
- Submit a Dial Before You Dig inquiry to cover the actual period of the Works.
- Prepare the documentation as required.
- Provide an As-Built red line mark-up of the Issued for Construction drawing(s) reflecting the final constructed arrangements, where they differ from design.
- Mobilisation of personnel, plant and equipment to site.
- Clear and prepare site prior to undertaking works.
- Construction in accordance with plans, this Specification and relevant standards.

2.4.2 General – Electrical Works

This scope in isolation shall not be interpreted as describing the whole of the works required by a trade or trades. The work described by this scope comprises the supply, delivery, installation, testing, commissioning, maintenance and defects fault rectifications of electrical services and associated equipment as indicated on the drawings and any incidental work which may become necessary, though not specifically mentioned herein to the true intent and meaning of this scope.

This scope indicates the required methods of installation of the various electrical services.

The Contractor shall be responsible for all works required for the Electrical Services section of the contract including provision of all equipment, sundries, materials, consumables, supervision, labour, insurance, transport, tools, plant and support items necessary to complete the scope of works to the satisfaction of the Principal in accordance with the specification and drawings.

The Contractor shall visit site to prior to providing a response to ensure a full understanding of the extent of the works required and state of the existing installation.

Whether or not the words "supply and install" appear in the instructions, drawing and schedules of this specification, understand that, unless clearly excluded, all materials and labour for the complete installation is required and must be supplied, delivered to site and installed.

This scope indicates the required methods of installation of the various electrical services. However, where full details are not given in this scope, include everything necessary for the convenient, safe, efficient and correct operation of such services.

Examine all project trades and services drawings so as to be fully informed of the intent, extent and nature of the works. This includes the connection and/or control, of various items of electrical equipment supplied and to be connected/controlled in accordance with other sections of the specification.

Coordinate and liaise with other trades to reduce any conflict between trade information shown on electrical services documentation and the associated trade without cost variation.

Materials and workmanship shall comply with all relevant current Australian Standards, Codes and Regulations and also reference codes and Standards listed in the prefaces to those

standards and codes. All electrical installations must comply with AS/NZS 3000 Wiring Rules. Where Australian Standards and Codes do not exist the appropriate International Standard or Codes shall apply.

The scope includes collecting the necessary information to assist compiling the 'As Constructed' drawings. 'As Constructed' drawings will show:

- the location of all equipment, circuit details, detection, single line diagrams, switchboard layouts, equipment rack layouts, system schematic diagrams and details of special items of equipment.
- the exact depth and location ($\pm 100\text{mm}$) of all inground services excluding final circuit conduits.

Test and commission the installation in accordance with Australian Standards and the recommendations contained within the Appendices of those Standards where applicable. Commissioning procedures and measurement methods, which are not approved or not in accordance with methods detailed in this specification, will not be accepted as evidence that the systems have been correctly commissioned. Any part of the installation found to be non-conforming shall be replaced with new materials and/or components or corrected to the satisfaction of the Principal. Street lighting circuits with an insulation resistance lower than 50 Megohms shall have the faulty cable sections replaced and re-tested to confirm that acceptable insulation resistance values have been attained. All systems/services shall be tested and operational to specification prior to commissioning tests being carried out in the presence of the Principal. Formats for test check sheets can be obtained from the Principal on request. The Principal will attend selected commissioning activities and provide a list of any rectification works required. These will be checked at a second commissioning if required, however, only after Subcontractor and Contractor certification. Provide signed test sheets to the Principle before confirmation of commissioning dates. Three copies of all test results and certifications shall be neatly bound in folders and submitted to the Principal for approval at least two weeks prior to Application for Practical Completion.

The Contractor is to supply:

- RCD test and operation certificates
- Continuity of the earthing system (earth resistance)
- Insulation resistance between all live conductors and earth
- Polarity
- Correct circuit connections
- Verification of earth fault-loop impedance
- Copy of Contractor's installation statement.

Completion Certifications shall follow the format "We certify that the Street Lighting System was installed in compliance with the design specification and drawings and all Australian Standards and statutory requirements". The certification is to be made on company letterhead stationery and is to include ACN/ABN and electrical workers licence numbers. Practical completion cannot be granted without Completion Certificates and As Built drawings.

2.5 Moreton Terrace Renewal

2.5.1 Scope Overview

Stage 1- Moreton Tce SLK 0.37 to 0.65

- Includes all traffic islands east of the Hunt/Waldeck Roundabout
- Includes all paving, pram ramps and drainage work as shown on the drawings on the north east and south east corners of the Hunt/Waldeck Roundabout
- Excludes Hunt/Waldeck Roundabout and the north, west & south roundabout traffic islands
- Excludes new footpath on the south west corner of the Hunt/Waldeck Roundabout
- Ref Drg's 12533215-C002, C003, C004, C005, C101, C201, C301 & S001

Stage 2 - Moreton Tce SLK 0.23 to 0.37

- Includes all traffic islands west of the Moreton/Pt Leander Roundabout
- Includes all paving, pram ramps and drainage work as shown on the drawings on the north west and south west corners of the Moreton/Pt Leander Roundabout including the left turn traffic island from Moreton Terrace to Martin Street
- Excludes Moreton/Pt Leander Roundabout and the north, south & east roundabout traffic islands
- Excludes new footpath on the north east and south east corners of the Moreton/Pt Leander Roundabout
- Ref Drg's 12533215-C005, C006, C103, C201, C204, C301 & S001
- **Note:** Stage 2 finishes at the Give Way line marking on the west side of the Moreton/Pt Leander Roundabout and **not as shown on the drawing**

2.5.2 Civil Construction Scope

2.5.2.1 Demolition

- Remove and dispose of all existing kerbing and install temporary fencing for the full length of the job and in accordance with the traffic management plan.
- Remove speed humps and dispose off site.
- Where applicable, remove existing median/traffic islands and crossovers
- Where applicable, remove existing bitumen/asphalt for deleted carparking bays
- Remove redundant structures and dispose off site.
- Remove existing boardwalk (near Uniting Church) and dispose off site.

2.5.2.2 Installation or reinstatement of subgrade

For areas requiring the installation of reinstatement of subgrade:

- Supply and install 200 mm subbase and compact to 95% MMDD for new widened pavement.
- Supply and install 200 mm basecourse and compact to 98% MMDD for new widened pavement.
- Supply and install primer seal immediately after compaction

Typical Locations
New Town Carpark entry
Altered kerb lines
New car parking bays
Altered traffic islands
Old street light islands

2.5.2.3 Paving

- Lift existing pavers onto pallets, including the supply of pallets where required, and transport to Shire Depot
- Install brick paved footpath, edge restraints and pram ramps and tie in with existing building floor levels, footpaths, accesses.
- Install brick pavers according to the Shire of Irwin Specification for Footpaths, but noting the additional requirement for 50mm of Cracker Dust or Blue Metal Dust as the top layer of the compacted subgrade.
- Brick paver laying pattern to be finalised on site and approved by the Shire
- Supply and construct brick paved cross-overs
- Approximate quantities, which already have an allowance for cutting and breakage:

Location	Area (m2)
Moreton Terrace Stage 1	1,750
Moreton Terrace Stage 2	1,450

2.5.2.4 Drainage

- Referring to drawing "10001-1 Plans Showing Drainage Upgrade Moreton Terrace Dongara", the table below is a guide:

Drain No.	Drain Type
1	Side Entry - install
2	Side Entry – install
3	Side Entry – install
4	Liner & Lid
5	Side Entry – install
6	Side Entry – install
7	Side Entry – install
8	Side Entry – install
9	Junction Pit - install
10	Junction Pit - install
11	Junction Pit - install
12	Side Entry – install
13	Pre-Cast Iron Lid - install
14	Pre-Cast Wave Grate - install
15	Pre-Cast Wave Grate - install

2.5.2.5 Services

- Raise service lids to suit new levels.
- Relocate existing services in consultation with the Utility Authorities and Shire

2.5.2.6 Concrete

- Supply and install concrete edge along tree beds.
- Install flush kerbing FK1 as shown on drawings at the specified locations
- Supply and construct cross-overs with flush/mountable kerbing. The below table is a guide only and exact details to be confirmed by the contractor from the drawings:

Crossover Type	Est. Quantity
Pram ramps	16
Vehicle crossovers	13

2.5.2.7 *Miscellaneous*

- Install approximately 2 metres of stainless handrail (near Ray White) as agreed with Principal
- Possible retaining wall for the footpaths at the Hunt/Waldeck Roundabout as shown on the drawing's
- Relocate Westpac Bank Moreton Terrace verandah entry

2.6 Medical Car Park Connection

- Scope Overview:
 - Construct wheelchair accessible ramp as indicated on the Drawings.
 - Tie in with existing buildings and footpaths in Memorial Park.
 - Ref Drg's 12533215-C006, C014, C301, S001 & S002
- Civil Construction Scope:
 - Remove existing footpath and tree **in consultation with the Shire**. Portions of the footpath are possibly **Heritage Listed**.
 - Brick pavers to be Installed according to the Shire of Irwin Specification for Footpaths, but noting the additional requirement for 50mm of Cracker Dust or Blue Metal Dust as the top layer of the compacted subgrade.
 - Place existing pavers onto pallets, including the supply of pallets where required, and transport to Shire Depot
 - Install brick paved footpath, edge restraints and pram ramps and tie in with existing building floor levels, footpaths, accesses.
 - Brick paver laying pattern to be finalised on site and approved by the Shire

2.7 Town Park Car Park Upgrade

- Remove and dispose off site all redundant structures and vegetation
- Relocate/adjust affected services.
- Ref Drg's 12533215-C002, C009, C301 & S001

2.8 Street Lighting Upgrade

- Street lighting Upgrade:
 - Prepare and submit all required notices/forms to all the legally constituted authorities and conform to all rules and regulations of such authorities;
 - Removal of 14 existing street light poles & light fittings
 - Removal of 1 existing in-ground up-light fitting
 - Provide new Site Main Site Switchboard (SMSB)
 - Provide 16 new street light poles
 - Provide 58 new LED light fittings;
 - Supply and installation of all associated Electrical services;
 - Provide all 'As Built' drawings and specified test documentation;
 - Testing, Commissioning and twelve months warranty on the installation.
 - Formal co-ordination with the Client and Head Contractor as required and necessary to successfully complete the contract works
 - Ref Drg's P6258-E01, E02 & E03

2.8.1 Electrical Specifications

The following specifications include:

- Switchboards
- Cabling
- Street Lighting Poles
- Street Lighting Luminaires
- Statutory compliance and relevant standards

2.8.1.1 Switchboards

2.8.1.1.1 General

All switchboards shall be complete with all necessary components to comply with AS/NZS 61439 and be designed and constructed in accordance with this specification and contract drawings. All switchboards shall have a minimum of 25% spare spaces for additional circuit protection and control devices. Spare spaces shall include busbars, mountings and individually blanked openings, i.e. spare poles on MCCB chassis shall have insert-type pole fillers. Switchboards shall be the front access type with escutcheons unless otherwise shown. Unless otherwise specified, the top of the switchboards shall be 2000mm above floor level. Miniature MCB's and fuses are to be mounted on proprietary brand mounting chassis complete with busbars unless approved otherwise. Cover spare busbar arrangements and tags for future MCCB's with either heat shrink sleeving or proprietary insulating shrouds. Split or cut chassis will not be accepted where separate chassis' have been identified on the drawings. Neutral links shall have at least as many terminals as to suit full incoming and outgoing active cable capacity (including spare spaces). The terminals shall be numbered and connected to correspond with the fuse or circuit breaker numbers. Plate all hardware to prevent corrosion.

Self-tapping screws shall not be used anywhere in the construction of switchboards. Unless otherwise specified use a single brand throughout for each type of equipment i.e. MCB's, contactors, fuses, switches etc. All switchboard protective devices and equipment shall be of a manufacturer with locally available spare parts / replacements and regional technical support.

2.8.1.1.2 Construction

Fill all visible welds and grind smooth. Remove all scale, rust and grease after fabrication, and treat as indicated below allowing ample time for thorough drying between coats. Ensure the finished paintwork is free of all blemishes and runs with a high gloss finish of automotive

quality. Alternatively, manufacturers standard treatments may be acceptable providing full details of the process are advised prior to manufacture.

- Colours/Finishes
 - Finish the interior of the switchboard in a white gloss.
 - External/Outside mounted - orbital sanded & treated with an Anti-Graffiti coating.
 - Exterior of switchboards shall be provided with an Anti-Graffiti treatment applied after surface finishing in accordance with system manufacturers application instructions, relevant clauses of AS/NZS 2311, and this specification.
 - Submit proposed "Anti-Graffiti System" for approval prior to application.
- Locks
 - Shall be keyed to Clients requirements and all fittings and fixtures of a similar nature shall be keyed alike. SMSB metering compartment doors to be fitted with Western/Horizon Power approved key.
- Identification
 - Mark all fuses and miniature MCB's with numbered phase markers secured to panels or escutcheon plates in line and centred directly adjacent the related items (e.g. red markers - 1, 2, 3 etc., blue markers - 1, 2, 3 etc.).
 - Multi-module devices on chassis shall be identified by a single marker only to ensure accurate identification and the chassis poles increased as required to achieve the nominated spare spaces required.
 - Identify Multiple Master Meters with numbered markers.
 - For all switchboards containing RCD units, either integral or within the field wiring, install a label to the chassis escutcheon plate to read 'Warning: RCD's installed on this switchboard and in the field, do not megger. Refer to circuit schedule'. Label to be green on white.
 - Clearly label all other devices on switchboards stating their function. Labels shall be of black anodised screw fixed aluminium having 5mm minimum size engraved lettering.
 - Clearly label all contactors, controls and the like installed behind escutcheon stating their functions using labels as specified above.
 - Clearly label all emergency service circuits with white on red lettering stating the service description, i.e., 'Automatic Fire Detection Equipment – Do Not Switch Off'.
- Switchboard Identification
 - Provide a label fixed to the front elevation of the switchboard to detail manufacturer, contact details, project reference, service conditions, diversity factor, IP rating, fault rating, form construction, submain cable type and size and source of supply.
- Legend and Drawing Holder
 - Provide a circuit schedule holder for each switchboard and secure it inside the switchboard doors. All circuit details shall be typewritten on a circuit schedule card and placed in the schedule holder. Circuit details shall include circuit number, circuit description, rating of protection device and size of cable for each circuit.
 - The card shall also show the customer's name for each multiple master meter, where such metering is fitted.
 - Provide a separate A3 drawing holder. Holder shall contain switchboard 'As Constructed' drawings and shall also contain site plans in accordance with AS/NZS 3000 - 3.11.4.6.
 - Provide in the circuit schedule holder a typed schedule of initial circuit breaker adjustable trip settings.

- Enclosures
 - Construct using sheet aluminium construction forming a rigid frame cubicle enclosure. Use commercial quality aluminium for panels and structural members.
 - Fit hinged doors with 'Emka' 316 stainless steel swing handles, doors over 900mm in height shall be fitted with three point securing.
 - Provide a flexible braided earth strap between all hinged doors and the switchboard body.
- Degree of Protection - *IP56 for external mounted*
 - All switchboards exposed to the weather shall be minimum IP56 rated to AS 60529 and fitted with weatherproof and insect proof ventilation. All fixings into aluminium shall be 316 stainless steel.
 - External switchboards shall be constructed with a sun shield to the top section of the board. The shield shall be welded to the panel roof, open at both ends and provide for sufficient slope to disperse any water to the rear of the panel. Provide details for comment with shop drawings. Ground mounted external enclosures shall be fixed to an inground concrete foundation suitably sized to retain the switchboard. Foundation to extend 150mm above ground level.
- Size
 - Select equipment and size enclosures to suit cupboards / ducts / spaces provided. Confirm exact dimensions of areas available and clear opening dimensions in the case of door frames with Architect prior to preparation of shop drawings to ensure boards can be installed and removed through final finished clear openings.
 - Switchboard enclosures shall be complete with suitable gland plates for bottom and/or top entry as required to suit cable entries. Gland plates design shall minimise circulating eddy currents.
 - Switchboard enclosures shall be complete with door(s) and escutcheons unless otherwise specified. Doors shall be hinged, lockable and secured shut in three locations, top, middle and bottom. Door locking devices shall be "EMKA" A/HSA stainless steel swing handles or equal approved, complete with padlocks keyed to approval.
 - During design of all switchboards, particular attention must be paid to the prevention of inadvertent contact with live parts during inspection of equipment, by use of insulation or barriers in accordance with AS/NZS 61439.
 - Doors shall open through 110 degrees and when installed externally be complete with captive stays to hold open against wind.
 - Doors shall be earthed by means of 4 sq. mm copper braid.
- Panels
 - Fit hinged doors and hinged escutcheon panels with dust proof neoprene gaskets held in perimeter channels. Ensure doors are a minimum 23mm deep all round. Provide hinges of the concealed lift-off type with staggered length hinge pins. Ensure hinged doors and escutcheon panels open a minimum of 110° with restraints at the fully open position.
- Installation
 - Install floor mounted switchboards on minimum 6mm thick hot dipped galvanised C channel bases of minimum height 75mm to form a kick rail. Construct the assembled switchboard to prevent the entry of vermin.
- Equipment
 - Mount equipment on the switchboard in readily accessible compartments.
- Cable zones
 - Provide cable zones with cable trays, ducts and supports to allow access to and removal of any cable without disturbing adjacent cables in complete safety

by a competent tradesperson whilst the remainder of the switchboard remains energised.

- Escutcheons
 - Provide hinged escutcheon panels to cover all live wiring and connections but exposing switch and circuit breaker handles, toggles, and fuse carriers. Escutcheon plates shall be no longer than 1.2m.
 - Provide separate cut-outs for individual mains and submains circuit breakers on escutcheon panels for large switchboards.
 - Secure hinged escutcheon plates by chrome plated large knurled captive head machine screws.
 - Ensure panels over spare spaces for future switchgear match the surrounding panels.
- Cable entry
 - Provide cable entries via removable gland plates, the full size in the bottom of each compartment.
- Vermin Proof
 - The switchboard shall be vermin proof and all vents, openings, etc. shall be covered with a suitably fine stainless steel mesh.

2.8.1.1.3 Busbars

Match the busbar configuration to incoming conductors and ensure phase rotation is uniform.

- Material
 - Construct busbars from high conductivity hard drawn copper with continuous current ratings as detailed. Consider ratings to be nett values after any applicable de-ratings have been applied relative to the mounting or assembly configuration. Ensure the design temperature rise of any busbar does not exceed 60°C, based upon a 40°C ambient.
- Ratings
 - Rate busbars to match the frame rating of the switchgear connected and size in accordance with either proven tested designs or to the recommendation of the switchgear supplier having regard both to the frame rating and the situation in which it is installed.
- Construction
 - Fit drilled busbars and supports for incoming and outgoing supplies, future switchgear and CT's where detailed. Ensure busbar sections for CT mounting are readily removable and provided to the dimensions required by Western Power. Provide busbar connections for all main interconnections and tee-offs in excess of 80Amp rating.
 - Machine bend and form all busbars. Smooth matching faces by draw filing or sanding before jointing. Use high tensile steel bolts with flat washers, nuts and locknuts, torque tensioned to the bolt manufacturers recommendations, for all busbar joints.
 - Provide rigid supports for busbar supports from approved insulating materials with secondary insulation through each support for uninsulated busbars to prevent direct tracking paths between phases and earth.
 - Extend neutral bars rated to the full current rating of the phase busbar for the full length of the supply section of the switchboard. Extend neutral and earth bars for the full length of switchboards over 900mm long.
 - Fit each supply section of switchboards with readily accessible and removable neutral and earth bar links permanently and legibly labelled. Ensure earth and neutral bars are adjacent to each other in the cabling zones.
- Identification

- Colour busbars in Form 3 and main busbars in Form 2 assemblies by means of two coats of enamel on etched and primed surfaces. Apply the colouring in 50mm bands on each busbar section in each compartment.
- Miniature Circuit Breaker Chassis
 - All miniature circuit breaker chassis shall incorporate individual pole isolation, similar to NHP Grizzbar or Schneider Isobar or equal.
- Escutcheons
 - Provide hinged escutcheon panels to cover all live wiring and connections but exposing switch and circuit breaker handles, toggles, and fuse carriers. Escutcheon plates shall be no longer than 1.2m.
 - Provide separate cut-outs for individual mains and submains circuit breakers on escutcheon panels for large switchboards.
 - Secure hinged escutcheon plates by chrome plated large knurled captive head machine screws. Ensure panels over spare spaces for future switchgear match the surrounding panels.
 - Lift off panels shall only be approved by the Electrical Consultant in writing.
 - All operating devices including reset buttons shall protrude through escutcheons.
 - All fixings for escutcheons shall be complete with internal star metal captive washers. Paint all escutcheons in approved colour.
 - All escutcheons shall be designed to prevent inadvertent contact of the escutcheon with live parts during removal and installation by means of insulation or barriers to AS/NZS 61439.
 -

2.8.1.1.4 Form of Segregation

Switchboards shall be constructed to meet the segregation requirements detailed in AS/NZS 3000, clause 2.5.5 or where a higher level is shown on the drawing. As a minimum switchboards shall be constructed to the following criteria:

- Heavy current site main switchboards and main distribution switchboards serviced by a protective device/s with frame ratings the summation of which exceeds that detailed in AS/NZS 3000 shall have a form 3b segregation as a minimum.
- Site main switchboards and main distribution boards serviced by circuit protective devices with a frame size less than that detailed in AS/NZS 3000 for heavy current switchboards shall have Form 2b segregation.
- Distribution boards shall have Form 1 segregation with additional insulation or barriers segregating the incoming functional unit from all outgoing functional units or where installed in restricted locations, as identified in AS/NZS 3000 clause 2.10.2.5.

2.8.1.1.5 Discrimination

Prior to submission of tenders and again prior to selection of switchgear supplier, the switchboard manufacturer must ensure discrimination can be achieved as follows. The switchboard manufacturer must obtain submain cable details from the design drawings to ensure discrimination and earth fault loop impedance requirements are met. Co-ordinate the protection equipment on all main and distribution switchboards such that in the event of any condition of over-current or short circuit occurring at the load side of terminals of any submain protective device or final sub circuit equipment isolator/connection device to the full prospective fault level of the installation;

- Submains protection effectively discriminates (enhanced selectivity);
- All lighting circuits continue to operate apart from any lighting which is supplied by the faulty circuiting;
- Short circuit calculations shall be for all faults up to and equal to the prospective fault current at each distribution switchboard. The manufacturer may use cascading if the

manufacturer can prove by test results that discrimination is ensured to the full prospective fault level of the system.

Switchgear manufacturer or Switchboard manufacturer must certify compliance with the above in writing to the Principal, including fault and discrimination test results/tables for switchgear used prior to submission of switchboard shop drawings for examination. Time current curves cannot be used to prove discrimination in the short circuit region of circuit breakers. Submission of equipment list and manufacturer's discrimination and enhanced selectivity charts are acceptable in lieu of individual test results, where these are available. Note that use of some brands of switchgear may require upgrading of circuit cabling, the cost of which shall be borne by the manufacturer.

2.8.1.1.6 Circuit Breakers

Generally, circuit breakers are to be utilised for all submains and subcircuit protection, unless otherwise shown on the drawings or specified herein. Circuit breakers shall be rated for the prospective fault current available at the point of installation, or the fault current nominated on the drawings, whichever is the greater. All trip units shall be suitable for continuous full load enclosed operation with such trip rating nominated on the drawings or as specified. Commission all trip units to meet Supply Authority requirements and discrimination co-ordination requirements specified.

Transformer isolating switches for Supply Authority transformers or for transformers of 500kVA rating and greater shall be Withdrawable Air Circuit Breakers (Withdrawable ACB's). For all adjustable circuit breakers, detail frame size and settings on the submitted shop drawings. In some instances electronic trip units must be used to ensure compliance with earth fault loop impedance. Obtain earth cable sizes prior to final selection of trip units. Miniature Circuit Breakers (MCB's) shall be utilised for the protection and control of all sub circuits rated at less than 100 Amps, unless otherwise specified.

- Withdrawable Air Circuit Breakers (Withdrawable ACB's)
 - Withdrawable air circuit breakers shall have full segregation of live parts and positive indication of open, closed, tripped and 'test' position of contacts. Adjustable overload pickup and time delay, adjustable short circuit pickup and time delay units shall be fitted to all withdrawable ACB's. All withdrawable ACB assemblies shall be Type Tested to Australian or IEC Standards.
 - Where used as transformer isolators, withdrawable circuit breaker trip units shall also be fitted with adjustable earth fault pickup and time delay. All withdrawable circuit breakers shall be equipped to immediately trip the ACB if draw-out is attempted whilst the ACB is closed. All ACB's shall be equipped with a "test position", allowing testing whilst the tripping and auxiliary functions are active and the contacts are disconnected.
- Moulded Case Circuit Breakers (MCCB's)
 - Moulded Case Circuit Breakers shall be constructed of a non-conducting low hydroscopic case that will not fail under the maximum electrical, thermal or mechanical conditions possible at the point of installation.
 - All moulded case circuit breakers of 160A trip rating or greater shall be fitted with adjustable electromagnetic and thermal trip units.
 - All moulded case circuit breakers shall be fitted with positive "flag" identification of open or closed positions, or shall otherwise be clearly labelled for rapid identification of switch position.
 - Where used as transformer isolating switches in accordance with this specification, MCCB's shall be fitted with fully adjustable short time and long time overcurrent and earth fault trip units as specified for "Withdrawable ACB's" herein.
- Miniature Circuit Breakers (MCB's)

- Miniature circuit breakers shall have a minimum fault interrupting capacity of 6,000 Amps at 240 VAC for single pole and 10,000 Amps at 415 VAC for multiple units. All MCB's shall have 'C' curve tripping characteristics unless otherwise specified. Where cascading is employed by an upstream device, ensuring prospective fault downstream cannot exceed 5.5kA. MCB's shall comply with AS/NZS 60898. It is the responsibility of the switchgear manufacturer to certify acceptability prior to submission of shop drawings.
- MCB's shall be installed on proprietary, fully insulated and colour coded switchable MCB chassis. MCB's shall be of a readily and locally available manufacture.
- Non-Auto MCB's shall not be used as isolators.
- MCB's shall not be utilised for submain protection unless otherwise approved or specified or on the drawings.
- Residual Current Devices (RCD's)
 - MCB/RCD devices shall be of 30 mA / Sensitivity and of a single module width unless otherwise approved.
 - Ensure RCD's are fitted to all required circuits to meet the requirements of AS/NZS3000 clause 2.6. It is the contractors responsibility to ensure correct equipment protection for selected circuits, additional protection maybe required to meet these requirements.
 - All RCD breakers shall be fitted with in the distribution board unless otherwise noted.
 - Single phase breakers shall be single pole, three phase circuits shall be fitted with matching RCD controls.

2.8.1.1.7 Fuses

Fuses shall only be used where shown on drawings or where prior written approval is given. The fuse fittings shall have fully shrouded bases and carriers. H.R.C. fuse cartridges shall be GEC or approved equal standard T type, Class Q1. All fuses shall be the HRC type unless otherwise shown. Provide one (1) set of three (3) spare HRC fuse cartridges for each rating and type of fuse incorporated on each switchboard. Mount these fuse cartridges neatly on racks located in a section of the switchboard front zone.

2.8.1.1.8 Contactors and Motor Starters

Contactors and motor starters shall be minimum Type 1 coordination, or to approved equal manufacture suitable for the required duty, AC3 for motor loads and AC5(a) for lighting loads. Coils, unless otherwise specified, shall be 250 Volt. Where extra low voltage coils are required, size control transformers for the maximum in-rush current of all coils plus 20% spare capacity. Starters shall have thermal overload in all three phases and single phasing protection. Size overloads to suit motor nameplate data and in accordance with manufacturer's recommendation. Install contactors and motor starters with adequate clearances from other equipment as recommended by the specific equipment manufacturers.

2.8.1.1.9 Fuse Combination Units (FCU)

Fuse combination units shall only be used where shown on the drawings and shall be of the double air break, quick make-and-break type in which the moving contacts are driven by springs ensuring that opening and closing is independent of the operating handle. All terminals shall have insulating shrouds to prevent accidental contact with live metal whilst fuses are being installed or replaced when the switchboard is energised. Fuse switches shall be rated for load make, load break, uninterrupted full load duty.

Incorporate on and off position indicators in the operating mechanism, driven from the moving contacts, mechanism or contact operating linkage. Dust proof and mechanically interlock the front door of each unit to prevent opening of door while the unit is energised, or closure of the unit whilst the door is open. All handles shall be pad lockable in the 'off' position.

2.8.1.1.10 Isolators and Switches

All isolators shall be complete with insulating shrouds over terminals. Override switches shall be push-button type complete with engraved plate indicating function i.e. - "OFF-ON", "MAN-AUTO", etc. All switch and isolator covers and escutcheon panels shall be able to be opened/removed without having to turn the switch or isolator to the 'off' position.

2.8.1.1.11 Time Switches

Time switches shall be equal in brand and quality to other switchboard equipment. Time settings to be set to approval. Obtain advice on required settings from the Superintendent.

2.8.1.1.12 Service Protection Device (SPD)

Provide Supply Authority with Service Protection Device/Main Switch protection settings including time current curves. The rated short circuit breaking capacity of the SPD circuit breaker shall be fault rated to Supply Authority requirements. Confirm fault level with Supply Authority. Where the SPD or Main Switch is a circuit breaker provide the Supply Authority Design Project Manager with the following information at least four (4) weeks prior to commissioning:

- Main circuit breaker type and rating;
- Protective device types and setting ranges;
- Current transformer class and tapping ratios;
- Proposed protection device settings;
- Time current curves showing protection grading with Supply Authorities upstream protection device to a fault level determined by the Supply Authority.
- SPD shall be a withdrawable ACB.

2.8.1.1.13 Metering

Where metering is shown on the drawings, submit meter applications and Supply Authority Certificates as required for completed portions of the installation and commission supplies for each plug in, CT or direct connected metered supply, in accordance with Electricity Retailer and Supply Authority guidelines. Obtain meters from the Electricity Retailer and install in accordance with authority requirements. Prepare documentation as required to obtain an account number for each metered installation. This account number shall be used on electrical tickets and requests for connection. Upon completion of testing, close or transfer accounts as required.

2.8.1.1.14 Wiring

Wiring shall be neatly run, generally contained in slotted PVC cable duct or harnessed in an approved manner such that any cable can be readily traced. Use compression type lugs to properly terminate all cables where suitable tunnel terminals are not provided. Label active, neutral, and earth conductors using numbered and phase coloured printed type coded ferrule type proprietary brand cable markers at protection device, earth bar and neutral bar. Neutral labels shall be black with white lettering R1, R2, etc. Tape markers are not acceptable. Each active, neutral, and earth cable is to be identified with its corresponding I.P.A. marked fuse/MCB/RCD. Mark control cables to correspond with terminal numbers on control diagrams.

2.8.1.1.15 Drawings

Submit shop drawings detailing the switchboard design as previously specified for all switchboards. Obtain Supply Authority approval for main switchboards and switchboards containing Supply Authority metering equipment, before drawings are submitted for Superintendents review. All switchboard designs shall be accompanied by a signed inspection test plan and endorsed by the switchboard manufacturer. Show all label wording, positions, details, and clearly indicate the fault ratings of all protective devices and busbar assemblies on shop drawings. Submit detailed control diagrams for all control circuits, complete with termination and cable schedules.

Shop drawings shall comprise of the following:

- Minimum A3 drawing sheet size;
- Produced using AutoCAD or equivalent electronic drafting package;
- Manufacturer's drawing sheet title block identifying the project name, project number, drawing number;
- Minimum scale of 1:10;
- Include equipment materials list with part numbers;
- Labelling schedule noting size and colour of lettering and background;
- Switchboard general arrangements; front elevations with escutcheons fitted and without escutcheons, minimum one section both vertically and horizontal;
- Confirm form construction;
- Confirm fault rating;
- Diagrams for all control equipment, (e.g., lighting controls, meters, relays, etc.) complete with terminal strip numbers;
- Schedule of construction details confirming as a minimum material type and sizes used, colour, handle types, locks and all hardware, etc.;
- Simplified single line diagram clearly showing all principle equipment, busbar and internal wiring, fault rating of equipment and protective devices. The diagram must identify proposed detailed design and construction and therefore shall not utilise Consultant's drawings.
- Where protective devices are fitted with adjustable settings, confirm settings on the drawings.
- Provide Manufacturers pamphlet details of any proprietary equipment used as part of the switchboard construction, i.e. meters, relays, contactors, time clocks, and push buttons.

All switchboard designs and shop drawings must be checked and endorsed by the Contractor for correctness prior to submission to Superintendent. The Superintendent will reject shop drawings that have not been so endorsed.

2.8.1.1.16 Switchboard Inspection Test Plan

For each switchboard that shop drawings are being submitted for, the checklist below shall be completed, signed and included in the drawing submission for review by the Consulting Engineer.

The omission of this sheet or any items on the below checklist will result in the automatic rejection of the shop drawings. The items below are extracted from switchboard section of this specification that clearly details the level of information expected to be present on the shop drawings.

They shall comprise of the following as a minimum:

Switchboard Checklist	Included
Name/Designation:___	
Minimum A3 drawing sheet size	
Produced using AutoCAD or equivalent electronic drafting package	
Manufacturer's drawing sheet title block identifying the project name, project number, drawing number	
Minimum scale of 1:10	
Include equipment materials list with part numbers for all equipment	
Labelling schedule noting size and colour of lettering and background	
Drawings - Switchboard general arrangements; front elevations with escutcheons fitted and without escutcheons, minimum one section both vertically and horizontal. Show main busbars and cabling distribution arrangements.	
Confirm exact dimensions of areas available and clear openings for doors, door frames and mullions to ensure compliance with clearance requirements of AS/NZS3000	
Confirm form construction	
Confirm IP rating	
Confirm fault rating	
Confirm colour or finishes	
Diagrams for all control equipment, (e.g., lighting controls, meters, relays, etc.) complete with terminal strip numbers	
Schedule of construction details confirming as a minimum material type and sizes used, colour, handle types, locks and all hardware, etc.	
Simplified single line diagram clearly showing all principle equipment, busbar and internal wiring, fault rating of equipment and protective devices. The Consultant's drawing must not be used.	
Where protective devices are fitted with adjustable settings, confirm settings on the drawings	
Provide Manufacturers pamphlet details of any proprietary equipment used as part of the switchboard construction, i.e. meters, relays, contactors, time clocks, and push buttons	
All switchboard designs and shop drawings must be checked and endorsed by the Contractor for correctness prior to submission to Superintendent. The Superintendent will reject shop drawings that have not been so endorsed.	

2.8.1.2 Cabling

All cables shall have copper conductors and double insulated PVC with an insulation rating of 0.6/1kV. Cables with elastomer insulation used in accordance with AS/NZS 3000 and AS/NZS 3008, with higher current ratings and volt drop performance than the specified cable, may be used in lieu of PVC insulated cables. All cables shall be new and delivered on site in unbroken reels with maker labels attached. Cable joints shall not be permitted unless otherwise indicated on the drawings, or where cable run length exceeds standard cable drum length. If in- line joints are required, they shall be carried out using proprietary jointing kits that are fit for purpose and acceptable to the cable manufacturer for the installation conditions proposed. Where in-line joints are required they shall be utilised in accessible locations only, joints within conduits will not be accepted. Obtain Superintendent's approval for proposed jointing kit, method of jointing and locations of joints prior to placing cable orders. Locations of joints shall be recorded on 'As Constructed' drawings.

All cabling shall be clearly identified to indicate their intended function as active, neutral, earthing or equipotential bonding conductors in accordance with AS/NZS 3000. The stripping of any portion of the outer sheathing from cables to enable them to fit into conduits will NOT

be permitted. When pulling cables through the conduits, extreme care must be exercised to ensure that the cable is not damaged by the bell-mouth at the ends of the conduits. Where there is evidence of excessive wear on the bell-mouth caused by the pulling of the cables into the conduit, the cables shall be removed, made available for inspection by the Superintendent, and replaced with new cable if the insulation is damaged, or otherwise replaced.

2.8.1.2.1 Colour Coding

- Active conductors - Red, white, blue as specified on the Drawings Neutral conductors - Black
- Earth conductors - Yellow/Green
- The colour of insulation tape shall match the colour of the cable insulation.
- All multi-strand conductors shall be terminated with crimp lugs.
- Joints with or without connectors shall not be accepted except within cable pits.

2.8.1.2.2 Cable Identification

All cables shall be clearly identified with permanent water resistant cable markers showing each outgoing cable in the switchboards, in each cable pit and in the base of each pole. The markers shall identify each circuit, for example L1, L2 etc. In the cable pits one marker for each circuit is acceptable providing the circuit cables are firmly tied together where the marker is attached.

2.8.1.2.3 Cable Route Markers & Danger Tape

The location of all underground cables shall be indicated by means of cable route markers set securely in the concrete surround to the cable pits. The markers shall be set flush in the concrete surround of the cable pits. The Contractor shall install 150mm wide orange danger tape in accordance with AS/NZS 2648.1 300mm above all installed cables and conduits.

2.8.1.2.4 Pole Conduits

Conduit shall finish a minimum of 100mm above final ground level.

2.8.1.2.5 Conduits & Underground Services

Care must be taken not to damage existing conduits that are to remain in service. Where necessary manual excavation shall be carried out to avoid damage. Conduit shall be circular rigid PVC generally.

Use galvanised steel or HFT UV stabilised conduit where exposed to mechanical damage or sunlight. Minimum size shall be 25mm. Conceal all conduits from view within or by building structure work including draw-in boxes. Completed conduit installations shall enable wiring to be drawn in or out at any time without damage to cable or the building. Keep conduits and boxes free of moisture and rubble. All conduit joins shall be glued using proprietary PVC jointing cement.

Provide all trenching, backfill, compaction (as required by the Superintendent). Before trenching, make thorough enquiries and take every reasonable precaution to locate and avoid damage to existing services. Replace all damage to existing services caused by failure to comply with this specification. On completion of contract works mark 'As Constructed' drawings indicating unused conduits and dimension location of spare conduits that do not terminate in a pit.

2.8.1.2.6 Underground Conduits

Provide all conduit access, cable pits, etc. for cable access as given on the drawings. Before trenching, make thorough enquiries and take every reasonable precaution to locate and avoid damage to existing services. Replace all damage to existing services caused by failure to comply with this specification. Lodge queries with 'Dial Before You Dig' www.1100.com.au for all projects. Generally all underground conduits shall be approved heavy duty Category C electric orange rigid P.V.C. conduit for low, medium and high voltage services and white PVC (ACMA approved) for Data/Communications services. Unless otherwise shown all conduits shall be installed in straight lines between pits, etc. Supply and install all conduits and pits as shown on the drawings. Use only large sweep bends. Conduits shall be installed in a neat orderly manner without unnecessary crossovers and shall be sealed immediately after installation to prevent the ingress of water and dirt, both prior to and after cables/draw wires, being installed.

2.8.1.2.7 Empty Conduits

Install all conduits as shown. Provide Jet Line draw wire in each empty conduit and in all underground conduits.

2.8.1.2.8 Bi-Directional Drilling

Conduits and cables shall be installed in accordance with the approved construction drawings. In general, the following principles shall apply:

- Each cable shall be installed in a single way conduit.
- Cable and conduit installations shall be installed between 900 mm minimum depth and 1500 mm maximum depth unless local site conditions apply.
- Cable spacing's shall meet the requirements of Drawing No. UDS-6-2 in the Underground Distribution Scheme (UDS) Manual or as designed for alternative installations.
- Conduits installed by directional drilling shall not require additional cable protection covers or cable marker tapes.

A maximum of two LV cables of 185mm², including streetlight cables can be installed in a common directional drilling bore if there will be no tee or service joints along the cables. Multiple high voltage feeder cables shall not be combined into a single directional drilling bore. Drilling/boring shall not be carried out within 500mm of asbestos cement water pipes to prevent damage. During construction, continuous monitoring and plotting of the pilot drill and back reamer progress shall be recorded to ensure compliance with the required alignment and installation depth. The monitoring may be accomplished either by manual plotting based on the location and depth readings provided by the tracking system or by computer-generated track logs fed by this information. The tracking system shall provide information on:

- Clock and pitch.
- Alignment and Depth.
- Position (x-y).
- Azimuth - is defined as the direction of cable where a walkover is not possible.

The bore logs shall show a depth and bore position from a known boundary every 3m along the bore line. These records shall be made available to Department of Transport electronically as a

permanent record. To prevent collapse of the borehole, drilling mud shall be used for both drilling and back reaming operations. Drilling, back-reaming speeds and fluid flow shall be set to ensure spoil is removed without putting unacceptable pressure on the surrounding soil (e.g. surface humping). During conduit and/or cable installation, pull-back tension shall be set so as to not exceed conduit/cable manufacturers' maximum pulling tensions. A drilling fluids

management plan shall be completed prior to the commencement of directional drilling work. The plan shall contain the following:

- Method of slurry containment.
- Method of recycling drilling fluids and spoil if applicable.
- Method of transporting drilling fluids and spoil off site.
- Drilling fluid pressures.
- Measures to contain and clean the affected area for inadvertent return of drilling or hydraulic fluids.
- Measures to adequately clean-up of surface seepage of drilling fluids and spoils.

2.8.1.2.9 Road and Driveway Crossings

All cables crossing roads and vehicle crossovers shall be directional drilled and installed in conduits. Road crossings shall be installed perpendicular to the property street boundaries. For service cables and streetlight cables, the conduits shall be installed to the edge of the cable alignment. For cables with a large bending radius, road-crossing conduits shall extend a minimum of 1000 mm beyond the kerb into the verge and as close as possible to the cable alignment. Conduit crossing locations shall be permanently identified on the road kerb-face. Typical identification methods could include a:

- 75 mm high letter “E” embedded or cut in,
- proprietary brass plate/letter “E” adhered to the face.

Where conduits are installed across roadways where no kerbs currently exist or will not be installed when the conduits are installed, conduit location as-built drawings shall show the conduit centreline end-point relative to surveyed property boundaries. All damage to roads and/or driveways will be repaired by the Contractor.

2.8.1.2.10 Excavation and Trenching

Provide all directional boring, trenching, footings, backfill, compaction. All excavation work shall be carried out in accordance with the requirements of the WorkSafe WA Code of Practice – Excavation. Trenches shall be excavated to a width sufficient for satisfactory and safe working conditions. Trenches and excavations must be shored or benched when:

- The excavation is deeper than 1.5m
- The soil is unstable and there is a risk of the excavation collapsing

Temporary barriers and covers are to be erected over trenches and holes that are to be left open and unattended. A temporary barrier with a minimum height of 900mm and a suitable cover that can withstand a minimum of 100kgs is to be erected around and over the trenches and holes to restrict access to the area. Temporary barriers or barricades must be erected around the excavation to restrict public access to the area. Temporary barriers must be placed at a distance that prevents plant, persons or other materials from falling into the excavated area. Pedestrian access routes, including directional signs must be established around or over excavations. Coordinate the underground installation with other trades to avoid clashes with footings, piling and other underground services installed. Advise Superintendent of any clashes and modify route as instructed by the Superintendent.

2.8.1.2.11 Piping Type and Identification

The Colour is orange and the service normally associated with the colour is heavy duty mains AC power.

2.8.1.2.12 Cable Pits

Each cable pit shall be located as shown on drawings. The cable pits shall be installed such that their lids are flush with the surrounding finished surface level. Where the conduits enter the cable pits a neat hole shall be cut in the pit using a hole cutter or similar tool. Pits with holes knocked in with a hammer or similar tool will be rejected. All cable pits shall have a preformed or drilled hole of minimum 12mm diameter in the bottom to facilitate drainage. The conduit shall be sealed at the point of entry through the cable pit wall with Silastic. Only one hole for each conduit entering the cable pit shall be cut. A bell-mouth shall be fitted to the end of each conduit within the cable pit except the conduit to the pole. All foreign material shall be removed and sand and dirt vacuumed from the pit after all electrical connections have been made. The pit gasket shall be installed directly under the lid and rest on the pit lip.

2.8.1.3 Street Lighting Poles

The street lighting poles to be supplied by others

2.8.1.3.1 Pole Assembly

The access door shall face away from the carriageway and shall face the carriageway for bridge mounted poles. Poles shall be erected in accordance with the manufacturer's published procedures. Poles shall be lifted using a sling or chain formed into a noose at approximately two thirds column height from the base. To prevent poles from falling and/or the dislodgement of pole segments, lift poles into position using a temporary attachment between the poles' lifting lug (located at the pole's base) and noose preventing the noose from slipping up the pole while also transferring the lifting force via the lifting lug back to the pole base. Care must be taken when handling the poles so that the galvanising is not damaged. Metal Slings, if used, shall have adequate protection so that metal to metal contact does not occur. The luminaire lamp holders shall be adjusted to the nominated distribution. The luminaire spigot clamp shall be set to the correct angle. The lamp bases shall be date coded.

2.8.1.3.2 Internal Pole Wiring

Generally a three (3) core, 2.5 mm² stranded copper/PVC insulated /PVC sheathed 0.6/1 kV (TPS) cable shall be provided from the base of the pole to the luminaire. However, cable selection shall suit the temperature rating required by the luminaire terminal temperature. At the top of the pole a loop shall be formed in the cable using a nylon cable tie. The cable shall then be attached to the pole cap using this loop. The control gear plate with drip shield and complete with all necessary equipment shall be installed at the base of the pole. The cables from the Tee connection shall be connected to the terminal strip and firmly clamped to the plate. Brass or stainless steel M6 earth studs shall be fitted to the control gear plate and on the support strap for bonding the plate and the pole to earth.

2.8.1.3.3 Terminals

Terminals shall be provided for the incoming conductors and the lamp connections. The terminals shall be of adequate size for wire sizes up to 10mm² and must be of the type which does not provide connection directly between the terminal screw and the conductor.

Features required:

- Voltage rating 600V 50Hz
- Current rating 30A
- Temperature rating 100°C
- Captive chromate plated steel screws acting on shielding plate to protect conductor.
- Tin-plated brass tunnel with 4mm² conductor capacity

- “Dead front” construction with both screws and tunnel contacts recessed in the housing.

2.8.1.3.4 Pole Connections

10mm sq stranded copper/PVC insulated/ PVC sheathed 0.6/1kV cables shall be run between the control gear in the base of the pole and the cable pit or the control gear within the next pole.

The incoming supply cables shall be securely clamped to the control equipment base (gear) plate and the earth firmly attached to earth studs on the plate and the support bar in the pole. Tee connections at pole base Tee connections shall be made in the cable pits and shall be made by carefully stripping sufficient insulation from the main cables to use a split bolt clamp or a rising main tee off connector. The joint shall then be completely covered with GEC-Henley yellow or green plastic compound, minimum thickness 5mm. The covered joint shall then be wrapped with Scotch 23 high voltage splicing tape taking care to eliminate air spaces. The tape shall be wrapped far enough to completely enclose the ends of the cable sheath. The outer layer of tape shall have the same colour as the cable insulation so as not to confuse with the cable sleeve colour. Finally the joint shall be wrapped with Scotch 33 insulation tape of the same colour as the cable. The cable joint shall then be securely fixed with a nylon cable tie to a conduit wedged into the top of the pit so as to be held above the level of any water that may accumulate in the pit.

2.8.1.3.5 Door

The pole access door opening shall be a minimum size of 4500mm by 150mm with one captive door fastening bolt located at the top of the door. Above the door and external to the pole, a weather strip shall be welded to reduce the possibility of water entering the pole at the door.

2.8.1.3.6 Pole Footing

The light pole footing shall be located as shown on the design drawings. Each pole base shall be within ± 50 mm of its location and ± 10 mm of its final level as shown on the design Drawings. The pole footing size shall be in accordance with the Structural Engineers requirements. It is the contractors responsibility to obtain Structural Engineering design and drawings prepared by a NPER Structural Engineer for all footings and submit to Superintendent for approval prior to installation.

Should the water table be such that the concrete cannot be placed in a dry hole, it shall be placed by tremie. Water shall not be allowed to flow through the space in which the concrete is to be cast. Should the walls of the hole be likely to collapse before pouring the concrete, a simple sheet metal, Spirolock or plastic sleeve shall be inserted to prevent the collapse. The tremie shall consist of a sheet metal hopper with a metal pipe leading out of the bottom that has a simple outlet valve at its lower end. It shall be water tight with a minimum diameter of 100mm. The tremie shall be kept filled with concrete at all times during placing. Should the concrete charge be lost, the tremie shall be withdrawn and refilled. The tremie shall be operated in such a manner as to discharge below the surface of the fresh concrete and to maintain as nearly as practicable uniform flow. Concrete shall not be dropped through water. No agitation or vibration of the concrete shall be permitted during placing. Compaction shall take place after concrete pouring has been completed and the water displaced.

2.8.1.3.7 Rag Bolt & Rag Cage Assembly

The holding down bolt assembly shall include the mesh cage and shall be complete with eight (8) nuts and eight (8) washers. All bolts shall be the same length with respect to the vertical axis of the assembly. The bolt arrangement shall be such that the pole may be mounted with the access door in any of four positions which are 90° apart. The bolts shall be 30mm threaded

rod and have a minimum $F_y = 300\text{MPa}$. All fittings shall be of a material which does not promote electrolytic corrosion.

2.8.1.3.8 Pole Numbers

Numbers shall be attached to each pole, refer Superintendent for details. The numbers shall be made up of 50mm black characters on a 50mm x 60mm background of adhesive class 2 yellow retro-reflective, material as per AS/NZS 1906 Part 1. The numbers shall be fixed vertically to the pole, be read from top to bottom and be at a height of approximately 3 metres from the ground. The numbers shall be placed in such a position that they can be readily seen from a vehicle travelling along the carriageway.

2.8.1.4 Street Lighting Luminaires

The street lighting luminaires to be supplied by others.

2.8.1.4.1 Construction & Finish

Paint finish shall be RAL9007 Grey aluminium. All light fittings shall be provided with a 12 metre pre-wired tail. The luminaire shall be provided with a positive long life seal between reflector-refractor and socket-reflector junctures to prevent the entry of moisture and foreign matter giving at least IP54 degree of protection. The housing and the refractor ring shall each be a one piece aluminium casting. The refractor holder assembly shall hinge open at least 90° to give easy access to the optical system. Access to the terminals shall be by a hinged one piece cast aluminium door. Any hinged parts shall be secured such that they will withstand high velocity wind in the open position. All catches, cotter pins, clamps, adjustment screws and accessories shall be made of corrosion resistant metals equal to stainless steel grade M316. The weight of the luminaire complete with lamp shall not exceed 25kg. The sail area shall not exceed 0.20m^2 . A bird guard shall be provided with each luminaire to prevent birds entering the housing when the luminaire is installed on the outreach arm.

2.8.1.4.2 Control Gear

All control gear components shall be suitable for operation on 240Volt (phase to neutral) 50Hz and conform to the requirements of AS/NZS 61347. The control gear shall be quiet in operation and suitable in every aspect for mounting in the base of the pole or the light fitting. The control gear shall be mounted on the base plate if external to the fitting. The control gear shall operate satisfactorily between the ambient temperatures of -10°C and $+50^\circ\text{C}$ when installed in the base of the pole with relative humidity up to 100%.

2.8.1.4.3 Cable Clamp

A suitable cable clamp shall be provided as part of the control gear mounting plate to securely clamp the 4mm^2 incoming cables to ensure that terminal connection are not duly stressed.

2.8.1.4.4 Circuit Diagrams

A schematic circuit diagram shall be firmly attached to each set of control gear and each item of equipment shall be clearly labelled as to its function. The circuit diagram and labelling shall be such that they do not deteriorate with age.

2.8.1.4.5 Focusing Luminaire

After the poles have been plumbed each luminaire shall be focused using a digital spirit level to the correct angle in accordance with the requirements of the Schedule. The top of the luminaire shall be horizontal.

2.8.1.5 Statutory Compliance and Standards:

All work shall comply with the current revisions of the following –

- AS/NZS HB167 Australian/New Zealand Standard – Security Risk Management;
- AS 1158.1.3 Vehicular Traffic (Category V) Lighting-Guide to design, installation, operation and maintenance
- AS/NZS 1158.6 Lighting for roads and public spaces - Luminaires
- AS/NZS 1170.2 Structural design actions – Wind actions
- AS 1906 Retroreflective Materials and Devices for Road Traffic Control Purposes – Retroreflective Materials
- AS 3137 Approval and test specification – Luminaires
- AS 3771 Road lighting luminaires with integral control gear
- AS/NZS 4676 Steel utility services poles
- AS/NZS 4680 Hot-dip galvanised (zinc) coatings on fabricated ferrous articles
- AS/NZS 1367 Coaxial Cabling Systems for Analogue TV & Sound Signals in Single & Multiple Units Installations;
- AS/NZS 1429 Electric cables - Polymeric insulated For working voltages 1.9/3.3 (3.6) kV up to and including 19/33 (36) kV
- AS/NZS 1768 Lightning Protection
- AS/NZS 1882 Earth and Bonding Clamps
- AS 1851 Routine service of fire protection systems and equipment;
- AS/NZS 3190 Approval and test specification - Residual current devices;
- AS/NZS 3008 Electrical Installations Selection of Cables;
- AS/NZS 3100 Approval and test specification – General requirements for electrical equipment;
- AS/NZS 3760 In-service safety inspection and testing of electrical equipment;
- AS/NZS 4671 Steel reinforcing materials
- AS/NZS ISO 31000 Risk Management – Principals and Guidelines
- AS/NZS 5000 Electric cables - Polymeric insulated - For working voltages up to and including 0.6/1 (1.2) kV;
- AS 60529 Classification of Degrees of Protection;
- AS/NZS 60598.1 Luminaires – General requirements and tests;
- AS/NZS 61000 Electromagnetic compatibility (EMC);
- AS/NZS 61439 Low-voltage switchgear and control gear assemblies series
- AS/NZS 2053 Non-Metallic Conduits and Fittings
- AS 61347.2.13 Lamp control gear Particular requirements for d.c. or a.c. supplied electronic control gear for LED modules
- AS/NZS 62560 Self-ballasted LED-lamps for general lighting services by voltage > 50 V - Safety specifications
- AS/NZS IEC 61347.2.13 Lamp control gear Particular requirements for d.c. or a.c. supplied electronic control gear for LED modules
- AS/NZS 3901 Quality Assurance Standards
- AS/NZS 4251.1 Electromagnetic Compatibility – Generic Emission Standards
- Office of Energy – Western Australian Electrical Requirements;
- Australian Telecommunications Media Authority (ACMA);
- Supply Authority requirements and guidelines,
- Local Building Authority,
- Worksafe WA
- Western Australia Electrical Requirements (WAER)

2.9 Optional Packages

The following optional packages may progress in part or in full where estimates are required and the estimate accuracy is to be stated clearly.

2.9.1 Option – Moreton Terrace Renewal – Stage 3

2.9.1.1 Scope Overview

Stage 3 - Moreton Tce SLK 0.06 to 0.19

- Excludes the proposed boardwalk though it or a similar option may be considered by the Principal as a variation during the project
- Ref Drg's 12533215-C006, C007, C008, C105, C201, C206, C207, C301 & S001
- **Note:** Stage 3 is as shown on the drawing

2.9.1.2 Civil Construction Scope

2.9.1.2.1 Demolition

- Remove and dispose of all existing kerbing and install temporary fencing for the full length of the job and in accordance with the traffic management plan.
- Where applicable, remove existing crossovers
- Where applicable, remove existing bitumen/asphalt for deleted carparking bays
- Remove redundant structures and dispose off site.

2.9.1.2.2 Installation or reinstatement of subgrade

For areas requiring the installation of reinstatement of subgrade:

- Supply and install 200 mm subbase and compact to 95% MMDD for new widened pavement.
- Supply and install 200 mm basecourse and compact to 98% MMDD for new widened pavement.
- Supply and install primer seal.

2.9.1.2.3 Paving

- Install brick paved footpath, edge restraints and pram ramps and tie in with existing building floor levels, footpaths, accesses.
- Install brick pavers according to the Shire of Irwin Specification for Footpaths, but noting the additional requirement for 50mm of Cracker Dust or Blue Metal Dust as the top layer of the compacted subgrade.
- Brick paver laying pattern to be finalised on site and approved by the Shire
- Supply and construct brick paved cross-overs
- Approximate quantities, which already have an allowance for cutting and breakage:

Location	Area (m2)
Moreton Terrace Stage 3	800

2.9.1.2.4 Drainage

- Referring to drawing "10001-1 Plans Showing Drainage Upgrade Moreton Terrace Dongara", the table below is a guide:

Drain No.	Drain Type
20	Open Swale

2.9.1.2.5 Services

- Raise service lids to suit new levels.
- Relocate existing services in consultation with the Utility Authorities and Shire

2.9.1.2.6 Concrete

- Supply and install concrete edge along tree beds.
- Supply and construct cross-overs with flush kerbing. The below table is a guide only and exact details to be confirmed by the contractor from the drawings:

Crossover Type	Est. Quantity
Pram ramps	3
Vehicle crossovers	3

2.9.2 Option - Hunt/Waldeck Roundabout

2.9.2.1 Scope Overview

- Includes Hunt/Waldeck Roundabout and the north, west & south roundabout traffic islands
- Includes new footpath on the south west corner of the Hunt/Waldeck Roundabout
- Excludes all traffic islands east of the Hunt/Waldeck Roundabout
- Excludes all paving, pram ramps and drainage work as shown on the drawings on the north east and south east corners of the Hunt/Waldeck Roundabout
- Ref Drg's 12533215-C002, C208, C301 & S001

2.9.2.2 Civil Construction Scope

2.9.2.2.1 Demolition

- Remove and dispose of existing roundabout
- Where applicable, remove existing median/traffic islands and crossovers
- Remove redundant structures and dispose off site.

2.9.2.2.2 Installation or reinstatement of subgrade

For areas requiring the installation of reinstatement of subgrade:

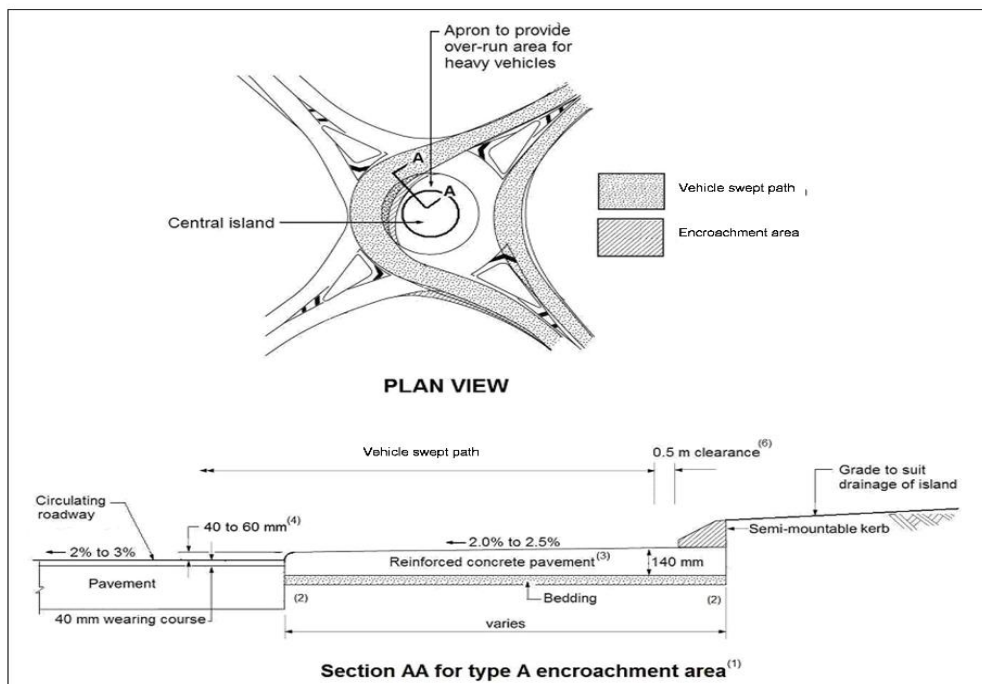
- Supply and install 200 mm subbase and compact to 95% MMDD for new widened pavement.
- Supply and install 200 mm basecourse and compact to 98% MMDD for new widened pavement.
- Supply and install primer seal.

2.9.2.2.3 Roundabout construction

- Drawing 12533215-C208 Roundabout cross sections references Austroads Part 4B Roundabouts Figure 4.11. MRWA Supplement to Austroads Guide to Road Design - Part 4B states:
 - *"4.6.3 Encroachment Areas*
 - *For confined locations where a smaller roundabout needs to accommodate heavy vehicles (trucks over 19 m long), raised encroachment areas may be used to maintain entry curvature to a kerb line. Refer to drawing 201731-0006.*
 - *Main Roads supports the use of raised encroachment areas for permit vehicles only.*
 - *Refer to Austroads Part 4B Fig 4.11 Sections AA for encroachment areas.*

- *Encroachment areas should be in a different colour to the road surface, either coloured asphalt, coloured concrete, or a long life coloured material with a skid resistance to match the adjacent road surface.*
- *Mountable kerb type A should be painted with a retro reflective paint.*
- *Raised aprons are not desirable on roundabouts where it is used by trucks carrying animals or fuel.”*
- The contractor to include cost for an appropriate reinforced concrete design (certified by an engineer) in their tender price for a Type A encroachment area (see Fig 4.11).
- Note that reinforced concrete pavement is required (Note 3, Fig 4.11)

Figure 4.11: Typical encroachment area detail at a roundabout



2.9.2.2.4 Concrete footpath

There is a requirement to install a concrete footpath on the south west corner of the roundabout intersection as specified in the drawing

2.9.2.2.5 Paving

- Traffic island kerbing to be done by others
- Installed brick pavers according to the Shire of Irwin Specification for Footpaths, but noting the additional requirement for 50mm of Cracker Dust or Blue Metal Dust as the top layer of the compacted subgrade.
- Brick paver laying pattern to be finalised on site and approved by the Shire

2.9.2.2.6 Services

- Raise service lids to suit new levels.
- Relocate existing services in consultation with the Utility Authorities and Shire

2.9.3 Option - Moreton/Pt Leander Roundabout

2.9.3.1 Scope Overview

- Includes Moreton/Pt Leander Roundabout and the north, south & east roundabout traffic islands
- Includes new footpath on the north east and south east corners of the Moreton/Pt Leander Roundabout
- Excludes all traffic islands west of the Moreton/Pt Leander Roundabout
- Excludes all paving, pram ramps and drainage work as shown on the drawings on the north west and south west corners of the Moreton/Pt Leander Roundabout including the left turn traffic island from Moreton Terrace to Martin Street
- Ref Drg's 12533215-C006, C208, C301 & S001
- **Note:** Stage 2 finishes at the Give Way line marking on the west side of the Moreton/Pt Leander Roundabout and **not as shown on the drawing**

2.9.3.2 Civil Construction Scope

2.9.3.2.1 Demolition

- Remove and dispose of existing roundabout
- Where applicable, remove existing median/traffic islands and crossovers
- Remove redundant structures and dispose off site.

2.9.3.2.2 Installation or reinstatement of subgrade

For areas requiring the installation or reinstatement of subgrade:

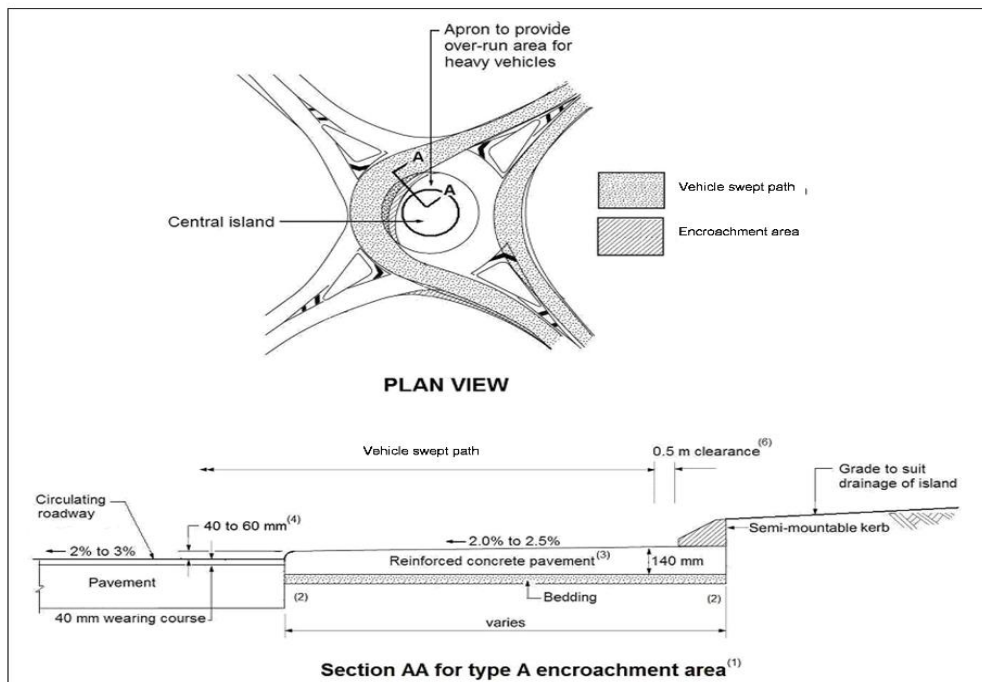
- Supply and install 200 mm subbase and compact to 95% MMDD for new widened pavement.
- Supply and install 200 mm basecourse and compact to 98% MMDD for new widened pavement.
- Supply and install primer seal.

2.9.3.2.3 Roundabout construction

- Drawing 12533215-C208 Roundabout cross sections references Austroads Part 4B Roundabouts Figure 4.11. MRWA Supplement to Austroads Guide to Road Design - Part 4B states:
 - *"4.6.3 Encroachment Areas*
 - *For confined locations where a smaller roundabout needs to accommodate heavy vehicles (trucks over 19 m long), raised encroachment areas may be used to maintain entry curvature to a kerb line. Refer to drawing 201731-0006.*
 - *Main Roads supports the use of raised encroachment areas for permit vehicles only.*
 - *Refer to Austroads Part 4B Fig 4.11 Sections AA for encroachment areas.*
 - *Encroachment areas should be in a different colour to the road surface, either coloured asphalt, coloured concrete, or a long life coloured material with a skid resistance to match the adjacent road surface.*
 - *Mountable kerb type A should be painted with a retro reflective paint.*
 - *Raised aprons are not desirable on roundabouts where it is used by trucks carrying animals or fuel."*
- The contractor to include cost for an appropriate reinforced concrete design (certified by an engineer) in their tender price for a Type A encroachment area (see Fig 4.11).

- Note that reinforced concrete pavement is required (Note 3, Fig 4.11)

Figure 4.11: Typical encroachment area detail at a roundabout



2.9.3.2.4 Concrete footpath

There is a requirement to install a concrete footpath on the south west corner of the roundabout intersection as specified in the drawing

2.9.3.2.5 Paving

- Traffic island kerbing to be done by others
- Install brick pavers according to the Shire of Irwin Specification for Footpaths, but noting the additional requirement for 50mm of Cracker Dust or Blue Metal Dust as the top layer of the compacted subgrade.
- Brick paver laying pattern to be finalised on site and approved by the Shire

2.9.3.2.6 Concrete

- Install flush kerbing FK1 as shown on drawings at the specified locations

2.9.3.2.7 Drainage

- Referring to drawing "10001-1 Plans Showing Drainage Upgrade Moreton Terrace Dongara", the table below is a guide:

Drain No.	Drain Type
16	Pre-Cast Wave Grate - install
17	Pre-Cast Wave Grate - install
18	Pre-Cast Wave Grate - install
19	Pre-Cast Wave Grate - install

2.9.3.2.8 Services

- Raise service lids to suit new levels.

- Relocate existing services in consultation with the Utility Authorities and Shire

2.9.4 Option - Hosken Street and on-street Parking

Referring to drawings 12533215-C003, C010, C011, C102, C202, C301 & S001:

- Remove and dispose off-site all redundant structures including existing asphalt surfacing and kerbing.
- Supply material and construct 2.0 m wide concrete footpath.
- Drainage works - remove existing stormwater drainage pit cover and replaced with Class D Wave Grate or approved equivalent.
- Tie in with existing footpaths and other infrastructure.
- Raise service lids to suit new levels where required.

2.9.5 Option - Community Resources Centre Car park

Referring to drawings 12533215-C003, C010, C104, C203, C301 & S001:

- Remove and dispose off site all redundant structures including existing drainage, brick paving, kerbing and existing tree.
- Rework existing basecourse:
 - Top up with gravel if required to reach design levels.
 - Trim and compact to 98% MMDD.
- Install brick paved footpath, edge restraints and pram ramps.
- Drainage work:
 - Remove existing stormwater drainage pit cover and replaced with Class D Wave Grate or approved equivalent Supply and install new grated gully pits.
 - Install soak wells and connect as indicated on the Drawings.
- Paving work:
 - Install brick paved footpath, edge restraints and pram ramps and tie in with existing building floor levels, footpaths, accesses.
 - Install brick pavers according to the Shire of Irwin Specification for Footpaths, but noting the additional requirement for 50mm of Cracker Dust or Blue Metal Dust as the top layer of the compacted subgrade.
 - Brick paver laying pattern to be finalised on site and approved by the Shire
 - Supply and construct brick paved cross-overs with mountable/flush kerbing.
 - Approximate quantities, which already have an allowance for cutting and breakage:

Location	Area (m2)
Community Resource Centre Car Park	170

2.9.6 Option - Dongara Hotel Precinct – Car Park Upgrade

Referring to drawings 12533215-C005, C013, C205, C301 & S001:

- Remove redundant structures and dispose off site.
- Install brick paved footpath, edge restraints and pram ramps.
- Miscellaneous - small traffic islands, finishing, infill with cracker dust etc.
- Paving work:
 - Lift existing pavers onto pallets, including the supply of pallets where required, and transport to Shire Depot
 - Install brick paved footpath, edge restraints and pram ramps and tie in with existing building floor levels, footpaths, accesses.
 - Install brick pavers according to the Shire of Irwin Specification for Footpaths, but noting the additional requirement for 50mm of Cracker Dust or Blue Metal Dust as the top layer of the compacted subgrade.

- Brick paver laying pattern to be finalised on site and approved by the Shire
- Supply and construct brick paved cross-overs with flush kerbing.
- Approximate quantities, which already have an allowance for cutting and breakage:

Location	Area (m2)
Hotel Carpark	230

2.10 Indicative Timetable of Works

The following Table outlines the indicative timing of works.

- | | |
|---------------------------|------------|
| • Formal Contract Award | 05/04/2021 |
| • Commence Site Works | 19/04/2021 |
| • Asphaltting (by others) | 10/05/2021 |
| • Complete Site Works | 30/06/2021 |

2.11 Programme of Work

The Contractor shall submit to the Principal's Representative for approval a diagrammatic or other approved form of time schedule for the carrying out of the various parts or stages of the works. The programme shall list starting and completion dates for each part or stage of the works.

The Works are located within the Shire of Irwin and the current technical standards for civil work issued by the local authority applies to this contract. Any discrepancy between the contract drawings and the current local authority standards shall be notified to the Principal's Representative as soon as is practicable.

The order of precedence of the Contract documentation shall be:

1. The Conditions of Contract;
2. The Contract Drawings;
3. The Technical Specification (this document);
4. State Government or Industry Standards/Guidelines relevant to work item being undertaken; and
5. Australian Standards relevant to the work item being undertaken.

Suggested program of works:

- Remove existing streetlights & islands
- Install new street light cabling & footings.
- Remove existing kerbing & install temp fencing
- Remove existing drainage
- Box out & install suitable subgrade & primer seal
- Survey - mark out street (by the Shire)
- Install new drainage pits
- Lay asphalt & kerb - profile & correct (by others 10/05/2021)
- Install footpath.

Part E - Technical Documentation



Shire of Irwin

Specification for Footpaths

Revision	A	0	1
Prepared By	Greenfield Technical Services (J. Kirk)	Greenfield Technical Services (J. Kirk)	Peter Traylen A/ Manager Infrastructure & Development
Approved By	Shire of Irwin	Shire of Irwin	Shire of Irwin
Revision Date	17 Feb 2017	23 Mar 2017	11 Jan 2021
Revision Purpose	Issued for Review	Issued for Use	Internal Review

SUMMARY OF DOCUMENT REVISIONS

Revision	Date	Section Revised	Description of Change
A	17 Feb 2017	All	Issued for Review
0	23 Mar 2017	Section 5.1 Reference drawings	Added details regarding separation of pedestrians from road ways Added typical footpath plan and sections drawings

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1.0 GENERAL

1.1 Scope

This specification covers the requirements for footpaths within the Shire of Irwin. **NOTE:** shared paths and separated paths are outside the scope of this document.

1.2 Applicable Documents and Industry Standards

The applicable Codes, Industry Standards and Government Regulations are referenced below. Unless specified and/or as indicated in specific Project documentation, current editions of these reference documents shall apply.

1.2.1 Codes & Standards

AGRD Part 6A	Australian Guide to Road Design – Pedestrian & Cyclists Paths
AS 1379	The Specification and Manufacture of Concrete
AS 1428.1	Design for Access and Mobility - General Requirements for Access - Buildings
AS 1428.4	Design for Access and Mobility - Tactile Ground Surface indicators for the Orientation of People with Vision Impairment
AS 1742.9	Manual of Uniform Traffic Control Devices - Bicycle Facilities
AS 1742.10	Manual of Uniform Traffic Control Devices - Pedestrian Control and Protection
AS 1743	Road Signs - Specifications
AS 3600	Concrete Structures
AS 3610	Formwork of Concrete

1.2.2 Guidelines

Guide to Residential Streets and Paths – Cement & Concrete Association of Australia

Public Transport Bus Stop Layout Guidelines (2010)

Traffic Management for Works on Roads – Code of Practice

1.2.3 Standard Drawings & Details

MRWA 200531-0008-2	Shared Path Typical Bollard & Pavement Marking Plan
MRWA 200931-0089-4	TGSI Ramp Type 'A' and 'B' Details
MRWA 200931-0090-4	TGSI Modified Cut Through Corner Treatment Detail
MRWA 200931-0091-3	TGSI Median Gap Details
MRWA 9331-0376-3	Kerb Types
MRWA 9331-0377-4	Kerbing Treatments
MRWA 9831-5649-1	Ramp & Grab Rail Details

2.0 DEFINITIONS AND ABBREVIATIONS

2.1 Definitions

Bicycle	A bicycle is defined as a vehicle with two or more wheels which is propelled by human power. The Road Traffic (Bicycles) Regulation 2002 includes power assisted bikes within the standard definition of 'bicycles' which can be used on shared paths. The Road Code was amended in August 2011 to allow adults to ride a compliant power assisted bike on shared paths as well as roads with the power engaged as they are frequently used by older people with health issues and not capable of riding a standard bicycle.
Footpath	Any pedestrian access-way with a gradient no steeper than 1:20.
Frontage Zone	The zone immediately adjacent the property boundary and is generally not used for pedestrian travel as it may contain retaining walls, fences, pedestrians emerging from properties or other hazards.
Pedestrian	Any person on foot, in a pram, or a person with disability in a un-motorised or motorised wheelchair, and includes a person pushing a perambulator or wheelchair, a person wheeling a bicycle or a wheeled toy, if the person is completely dismounted from the bicycle or wheeled toy, a person in or on a wheeled recreational device or a motorised scooter or a person under 12 years of age in or on a wheeled toy.
Ramp	A ramp is an inclined access-way that has a constant gradient anywhere between 1:14 and 1:20. They provide a continuous accessible path of travel for pedestrians with mobility impairments and for other wheeled pedestrians (prams, scooters etc).
Shire	Shire of Irwin or the Shire's nominated representative
Street Furniture	Soft landscaping, vegetation, light poles, traffic signal poles, seating etc
Street Furniture Zone	Zone on footpath between kerb and pedestrian through-route used for placement of street furniture.
Through-route	The area on a path used for pedestrian travel and must be kept free of obstructions

2.2 Abbreviations

TGSI	Tactile Ground Surface Indicators
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3.0 GENERAL REQUIREMENTS

3.1 General

All new footpaths shall be in accordance with this Specification and the referenced Australian Codes & Standards. Work within this Specification shall also comply with the requirements of Local, State and Federal Government bodies.

Any discrepancies between Codes and Standards, and this Specification shall be referred to the Shire for resolution at the earliest opportunity.

All footpaths and related activities shall be constructed to the design lines, elevations and details shown on the relevant drawings. Design lines and elevations not specified on the drawings shall be interpolated or extrapolated from those specified in a linear manner.

3.2 Guiding Principals

3.2.1 Principals of Pedestrian Network Planning

Pedestrian facilities have significant roles in the transport network for trips made entirely by walking and the first or last links in a trip made by other types of transport. Inadequate provision of pedestrian networks and crossing facilities can have a large impact on overall 'connectivity' and therefore 'walkability' of a route.

Walkability is how friendly the environment is and the ease in which pedestrians can travel through this space. It includes factors such as connectivity, legibility, safety and pedestrian Level of Service.

There are five general principles for planning pedestrian networks:

1. Connected - do walking networks provide good access to key destinations?
2. Comfortable - does the path width, surface, landscaping and adjacent scale of development provide an attractive walking environment?
3. Convenient - can streets be crossed easily, safely and without delay by all pedestrians?
4. Convivial - are routes interesting, clean and free from threat?
5. Conspicuous - are walking routes set out in a coherent network, clearly signposted and are they published in local maps?

3.2.2 Pedestrian Accessibility

Pedestrian networks should be planned in combination with land uses to provide residential access to mixed use centres and bus routes within a 400m walk of strategic and secondary activity centres.

3.2.3 Pedestrian Safety

Pedestrian networks should be designed with passive surveillance and good lighting to provide an attractive and safe walking environment

3.2.4 Universal Design

Pedestrian facilities are often designed to cater for the 'average' pedestrian. In reality all pedestrians will fall into one of the categories below for some time within their lifespan. It is often people who do not fall within this 'normal' range, who are unable to drive cars and are highly dependent on pedestrian facilities. For this reason, pedestrian facilities must be constructed to accommodate users of all ages and abilities.

Designers and users of this specification should consider the concept of Universal Design to effectively remove barriers and allow inclusion of people of all ages and abilities. Universal Design is defined as 'the design of products and environments to be usable by all people to the greatest extent possible, without the need for adaptation or specialised design'.

4.0 TYPES OF PATHS

There are three types of paths used by pedestrians:

1. Footpath
2. Shared Path
3. Separated Footpath

NOTE: shared paths and separated paths are outside the scope of this document.

4.1 Footpath

A footpath is for the use of all pedestrians and cyclists under the age of 12 years.

4.2 Shared Path

A shared path is for the use of all pedestrians and cyclists and is designated by signs or pavement markings.



Figure 1: Shared path sign

4.3 Separated Footpath

A separated path is divided by some physical means into two parts; one for pedestrians and the other for cyclists. Signs or pavement markings may be used to indicate the delineation.



Figure 2: Separated path sign

5.0 KEY DESIGN ELEMENTS

5.1 Location / Placement of Paths

Paths can be located:

- Through road and street reserves
- Along river and coastal frontages
- On foreshores
- Through parkland
- Along railway reservations
- Abutting bridges or across exclusive bridge facilities

Within a road reserve a path can be located:

- Adjacent to a property boundary
- Adjacent to the kerb
- At an intermediate point

In deciding where a path should be located, the following aspects should be considered:

- There should adequate clearance between the road traffic and path users to give a sense of distance from fast moving traffic. An extra 0.5 m width allows for a narrow 'street furniture' zone to separate the pedestrian through-route from traffic lanes.
- There should be adequate clearance from the property line to achieve sufficient sight distance for vehicles exiting driveways (3 m clearance for shared paths).
- The path should not be too far from the adjacent carriageway such that path users are outside the peripheral vision of turning drivers.

The overriding consideration should be the safety of the path users. For this reason, it is recommended that where practicable paths adjacent urban arterial roads are located with adequate clearance from both road traffic and the property line so that adequate sight distance is achieved for vehicles and pedestrians leaving driveways. A related consideration is that a path too far from the adjacent carriageway may decrease the likelihood of path users being seen because they are outside the peripheral vision of turning drivers. Wider clearances or physical barriers (including low profile landscaping) may be appropriate where the kerbside lane is heavily trafficked and/or the adjacent road has a high speed limit (>60km/hr).

It is necessary for the Shire to approval the final design alignment and route of the footpath prior to construction commencing.

5.2 Path Width

Paths should conform to minimum dimensional requirements to provide for the safe passage of pedestrians and other eligible road users. The minimum required path width varies from case to case. Footpaths can accommodate functions other than providing a clear access route for pedestrians, such as providing space for street furniture, alfresco dining, signs and lighting poles. These temporary or permanent features reduce the effective width for pedestrians. The total footpath width must be wide enough to accommodate these other elements alongside the minimum pedestrian through-route width.

The minimum and desired width for pedestrian through-route zones in various situations are summarised below:

- 1.2 m is the minimum through-route width allowing passage for a single wheelchair (this minimum width should only be used for a short distance in constrained environments).
- 1.8 m is the desired minimum path width to allow for two wheelchairs to comfortably pass, widened to 2m near schools and small local shops.
- 1.54 m wide clearance should be maintained between a bus shelter and the kerb, as specified in the Public Transport Bus Stop Layout Guidelines. Where insufficient space is available the absolute minimum through-route width is 1.2 m.
- 2.4 m is the desirable minimum through-route width for commercial or shopping environments
- In busy alfresco dining areas, a minimum through-route of 3 – 4 m should be provided reduced to 2.5 m in areas with less pedestrian traffic.

To maintain an acceptable footpath width, objects such as poles, bollards or chicanes, bus shelters and accompanying signage should be located within either the Street Furniture Zone or the Frontage Zone, so as to keep the Through-route Zone free for pedestrians, particularly those using wheelchairs and those with low vision. Refer Figure 3.

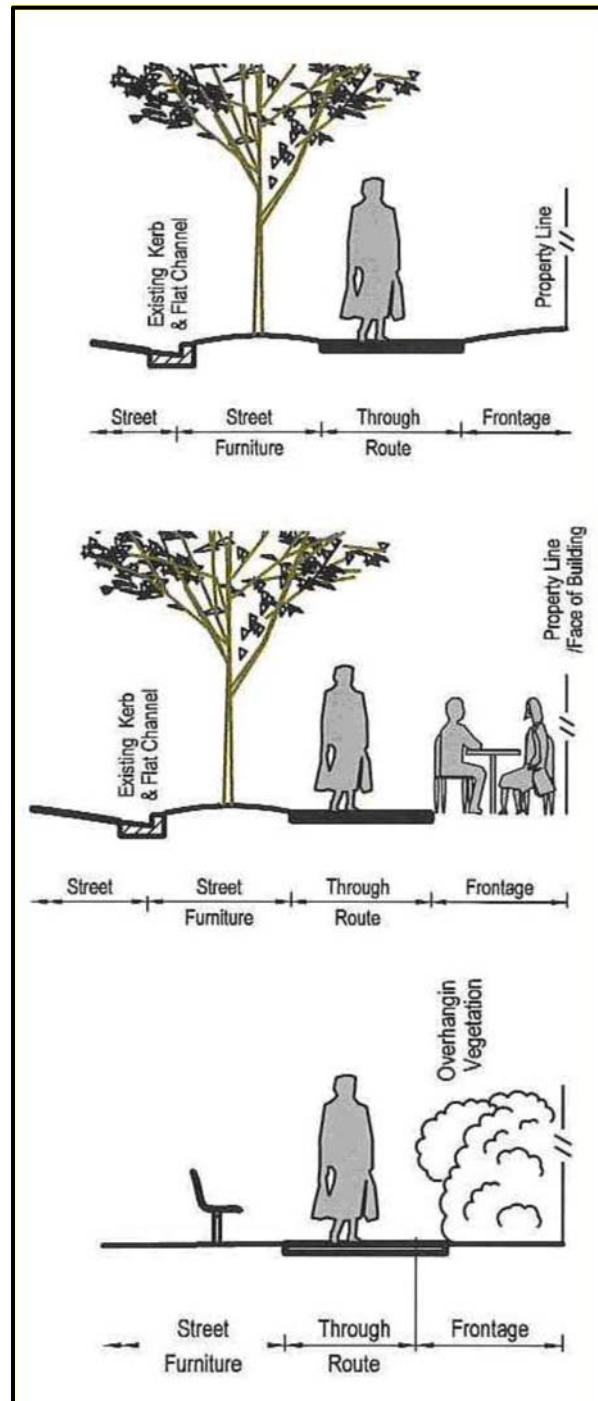


Figure 3: Footpath zones (AGRD Part 6A 2009)

5.3 Gradients and Ramps

5.3.1 Gradients

Permitted ramp gradient is between 1:14 - 1:20. Due to natural topography some footpaths are located on steep hills with gradients greater than 1:14. Efforts must be made to decrease these gradients especially in higher pedestrian areas. If it is technically not possible, building in landings at close intervals that act as resting points, providing handrails for support and/or some form of overhead protection against inclement weather may assist.

Long straight ramps should be avoided. If this is not possible, then regular landings and/or changes in direction should be considered.

The minimum width of a footpath ramp is 1.5 m.

5.3.2 Landings

Ramp landing intervals shall be as below:

- A ramp with a gradient of 1:14 requires landings at least every 9 m.
- A ramp with a gradient of 1:20 requires landings at least every 15 m.
- Gradients in-between require calculation of intervals by linear interpolation.

Footpath landing intervals shall be as below:

- Footpaths with a gradient of 1:20 require landings every 15 m.
- Footpaths with a gradient of 1:33 require landings every 25 m.
- Footpaths that are flatter than 1:33 do not require landings.
- Gradients in-between require calculation of intervals by linear interpolation.

The minimum dimensions that will enable wheelchairs users to rest or change direction are:

- 1200 mm long for a straight ramp,
- 1500 mm long for a 90 degree turn,
- 1540 mm wide by 2070 mm long, assuming two 1000 mm wide parallel paths with a 70 mm gap in between, for a 180 degree turn.

5.3.3 Handrails

Ramps require handrails on both sides. These are to be positioned at 865 - 1000 mm above the surface of the ramp, are not to encroach into required circulation spaces and shall be extended 300 mm past the end of the ramp. For areas where there are expected to be a high percentage of children, a second rail should be positioned at 700 mm above the surface of the ramp.

5.3.4 Handrail Details

These should be circular or elliptical (with the horizontal dimension larger than the vertical dimension) with a diameter of 30 - 50 mm to allow a reasonable grasp by most hands.

The top of the handrail is to be free for the hand to slide along the top 270 degrees without being hindered. This means that wall fittings will generally need to be attached to the underside of the rail.

Clearance between the handrail and any adjacent wall is to be at least 50 mm and this clearance is to extend above the top of the handrail by not less than 600 mm.

Ends of the handrails should ideally continue in the horizontal plane of the ramp for 300 mm without encroaching in the circulation space at either the top or bottom of the ramp. This allows a person to steady themselves through the changes of level and provides a cue for vision impaired persons

The ends of the handrail shall be turned under for 180 degrees or returned to the wall.

Handrails shall be of a colour that is contrasting against the background surface.

5.3.5 Edge Treatments

If there is no wall or balustrade, or the ground on either side of the ramp or footpath does not continue for at least 600 mm (i.e. ground drops away), then kerbs must be installed for the safety of all pedestrians. These are required to be flush with the inside of the handrail and a minimum height of 65 mm with the top edge not terminating between 75 - 150 mm high, or have gaps within this region to prevent wheelchair footplates becoming jammed.

5.3.6 Warning Tactile Ground Surface Indicators (TGSi)

In general, warning TGSi are required at the top and bottom of all ramps.

However, where the ramp handrail continues on through a landing it is not required to install warning TGSi.

5.4 Crossfall & Camber

Crossfall (or camber) is the slope of the footpath at right angles to the direction of travel. Some crossfall is required for drainage however excessive crossfall results in difficult conditions for pedestrians.

Crossfall in the through-route zone should not exceed 1:40 (2.5%). Where possible a flatter crossfall (1%) is preferable providing that the surface is adequately drained to avoid any ponding of water within the path. If necessary, steeper crossfalls can be created in the Street Furniture and/or Frontage Zone allowing good rainfall drainage.

For footpaths with asphalt bitumen surfaces, the maximum crossfall is 1:33 (3%).

Crossfalls are not required for footpaths (and ramps) with a gradient steeper than 1:33 (3%).

5.5 Cross-Overs & Driveways

Generally paths should continue through crossovers providing a clear visual cue of pedestrian priority across driveways. The crossover should be as flat as possible throughout the width of the footpath. Crossfall must not be greater than 1:40.

If the full width of the footpath cannot be constructed to footpath design details, then a minimum of 1.2 m must be flat, preferably adjacent to the building line.

Truncation at the building line is required to provide adequate visibility between pedestrians and drivers.

5.6 Steps & Stairs

Stairs are not to be the only means of vertical access.

Where stairs are required, the geometry is to be even and constant throughout the stairway. Risers must be closed and spiral staircases are not permitted.

Treads shall be 275 – 300 mm wide and the tread should not overhang the riser more than 25 mm.

Risers shall be 150 – 165 mm high.

Handrails are required on both sides and must be positioned at 860 – 1000 mm above the tread of each step. For areas where there are expected to be a high percentage of children, a second rail should be positioned at 700 mm above the surface of the tread.

Slip resistant colour contrasting nosings are to be applied to the tread on every step.

Warning TGSi are to be located at the top and bottom of a stairway.

5.7 Drainage

Footpath surfaces must be designed to ensure adequate drainage as ponding or pooling of water can cause issues for people walking.

Adequate drainage may be achieved by the use of effective camber and crossfall design and drainage gates if necessary.

5.8 Surfaces

Surfaces must be slip resistant, flat and even.

Materials such as brushed concrete or asphalt are considered suitable. The texture of the surface shall be traversable by people who use a wheelchair and those with an ambulant or sensory disability.

Abutment of surfaces shall have a smooth transition. Design transition shall be 0 mm. Construction tolerances shall be as follows:

- 0 - 3 mm vertical, or
- 0 - 5 mm, provided the edges have a bevelled or rounded edge to reduce the likelihood of tripping.

Any gaps, lips, joins or changes in height cannot exceed 5 mm as these can create trip hazards.

5.8.1 Asphalt Surfaces

Asphalt surfacing can present the most suitable surfaces for all users as it eliminates joins where problems can occur.

5.8.2 Paved Surfaces

Paved, textured surfaces should be slip resistance and designed to minimise tripping hazards and vibration for pedestrians. For continuous paving units, the maximum design height variation between pavers should be 2 mm. Construction tolerance allows for an occasional maximum height difference between pavers up to 5 mm.

The use of older style cobblestones should be avoided where possible, as these present particular hazards due to the uneven surface.

5.9 Grates / Covers

Grates and covers should be flush with the adjacent path. Tolerances should not exceed +/- 5 mm.

When grates are placed along a path of travel to provide drainage they must be flush with the adjacent ground surface and have gaps no greater than 150 mm long and 13 mm wide to prevent wheelchair castors and canes from becoming trapped. The longer gap is to run perpendicular to the direction of travel.

Where slotted openings are less than 8 mm, the length of the slots may continue across the width of paths of travel.

5.10 Vertical Clearances

A minimum clearance of 2 m is required over a footpath (2.5 m for a shared path).

A minimum clearance of 2.5 m is required under traffic signs that overhand a shared path or footpath.

5.11 Barricades

The use of barricades on footpaths requires careful consideration to ensure appropriate access is maintained for wheel chair, vision impaired and other disabled person access.

5.11.1 General

Walls, weld-mesh fences and landscaping are suitable edges for footpaths.

All pedestrian bridges and elevated ramps require balustrades. Balustrades should not interfere with sight lines on winding ramps. On coming pedestrians or cyclists should be visible.

Hedges or plantings must be well maintained and kept at a height that does not impinge on lines of sight.

5.11.2 Chicanes and Mazes

These present particular hazards to pedestrians who have visual impairment as a high rail will not be detected by a cane and as they are oriented across the path of travel may be difficult to see.

To enable a chicane or maze to be detected by a cane, the rail should be no higher than 0.25 m. The path of travel through the maze must be of sufficient width to allow access by a wheelchair. A width of at least 1.5 m in the direction of approach and through the rails is recommended.

5.12 Kerbs

Kerbs adjacent footpaths which generally have medium to heavy pedestrian traffic shall generally be Type 'B' or Type 'BX' (MRWA 9331-0376-3). Where pedestrian traffic is light, a kerb Type 'SB' may be considered subject to Shire approval.

Kerb transitions (where applicable) shall be as per MRWA 9331-0377-4.

5.12.1 Kerb Ramp Alignment

Kerb ramps link footpaths across roadways. Ramps on either side of a crossing must be aligned and located perpendicular to the direction of travel. Kerb ramps should be constructed of brushed concrete.

5.12.2 Kerb Ramp Gradient

The maximum kerb ramp gradient is 1:10. Where a kerb ramp may exceed this gradient, the absolute maximum is 1:8 across a maximum length of 1.52 m. Refer MRWA 9831-5649-1.

The cross-slope on kerb ramps shall be kept at a minimum.

5.12.3 Kerb Ramp Landings

Kerb ramp landings must be installed at the top and base of ramps with a maximum gradient of 1:40. The preferred minimum width is 1.5 m with an absolute minimum width of 1.33 m. This can be further reduced to 1.2 m where wheelchair users are not required to change direction. Refer MRWA 9831-5649-1.

5.12.4 Kerb Ramp Type 'A'

MRWA Kerb Ramp Type 'A' is the typical kerb ramp used for paths located on a road verge. Refer MRWA 9831-5649-1.

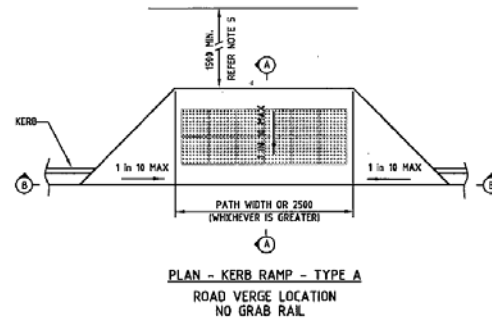


Figure 4: Kerb Ramp Type 'A'

5.12.5 Kerb Ramp Type 'B'

Kerb Ramp Type 'B' shall be used for kerb ramps at medians or median island locations. Refer MRWA 9831-5649-1.

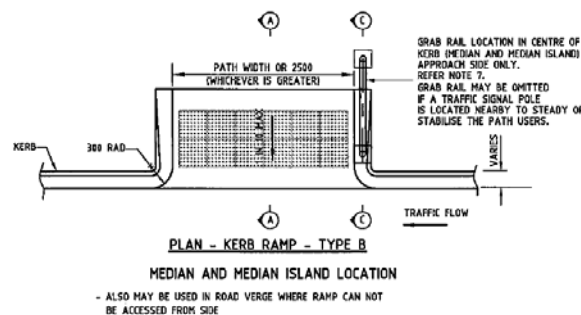


Figure 5: Kerb Ramp Type 'B'

5.12.6 Kerb Cross-Overs

Kerb cross-overs shall be flush with the road surface as per MRWA 9831-5649-1. Care should be taken to ensure that there is provision of a minimum of 1.5 m level section of pathway behind the ramp. Where possible, the kerb ramp shall be aligned to reflect the direction of travel required by the user when commencing to cross the street.

5.13 Grab Rails

A grab rail is an upside down U-shaped rail to provide support to pedestrians and cyclists at kerb ramps. Refer MRWA 9831-5649-1 for typical details.

The top of the grab rail shall be 0.865 – 1.0 m above the ground and is intended for stability.

In order to detect grab rails and to assist in location of kerb ramps, grab rails shall be painted such that they contrast against the surrounding environment. MRWA 9831-5649-1 provides details on the paint and reflective tape colours and requirements.

Where median crossings or median islands exist, grab rails shall be installed providing the median or median island is >1.2 m in depth.

The preferred grab rail length varies between 0.6 – 1.5 m depending on depth of crossing. Refer MRWA 9831-5649-1.

5.14 Tactile Paving

TGSI are designed to give warning of hazards and directional information to pedestrians who are blind or have impaired vision.

TGSI should be implemented at selected intersections on the basis of need. Typically, these are limited to kerb ramps at frequently used intersection or mid-block crossings in high traffic areas.

MRWA 200931-0089-4 provides out dimensions to be used for warning surface indicators on pedestrian ramps. MRWA 200931-0090-4 and MRWA 200931-0091-3 show the particular layout requirements where TGSI are used within median cut throughs and verge corner cut throughs respectively.

Users of this specification should also refer to AS 1428.4 Appendix C (Design for Access and Mobility - Tactile Ground Surface indicators for the Orientation of People with Vision Impairment) for details of numerous configurations of warning surface indicators used in conjunction with directional surface indicators.

5.14.1 Warning TGSI

Warning TGSI shall be positioned 0.3 m from the edge of the hazard, perpendicular to the direction of travel and across the entire ramp width. The preferred depth shall be 0.8 m with a minimum depth of 0.6 m.

For warning TGSI requirements at bus stops, refer Public Transport Bus Stop Layout Guidelines (PTA).

5.14.2 Directional TGSI

Directional TGSI shall be used where a person has to deviate from their path of travel to access a facility, at a minimum width of 0.8 m. Directional TGSI shall also be used to guide pedestrians through complicated area at a minimum width of 0.3 m.

5.15 Sight Lines

All crossing points must provide adequate sight distance for pedestrians and approaching vehicles. Consideration should be given to the design speed and design vehicle used in the design of the specific road in order to determine a safe sight distance.

Pedestrian crossing facilities should be located where:

- Motorists can see a pedestrian move from the footpath or median onto the road in sufficient time to stop, and
- Pedestrians can see a vehicle far enough away to safely cross the road before the vehicle arrives.

Table 1 provides a guide as to the minimum approach sight distance for various speeds:

Speed (km/hr)	Approach Sight Distance (m)
40	35
50	50
60	65
70	85

Table 1: Approach Sight Distance

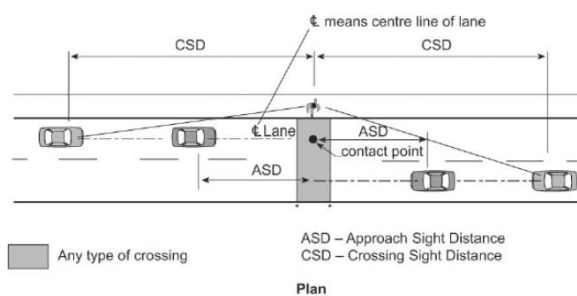


Figure 6: Approach Crossing Distance and Crossing Sight Distance

Table 2 provides a guide as to the minimum crossing sight distance for various speeds:

Speed (km/hr)	Crossing Sight Distance (m)
40	65
50	85
60	100
70	115

Table 2: Crossing Sight Distance (assuming 6 seconds to cross a 2-lane carriageway)

6.0 MATERIALS

Footpaths shall be cast in-situ concrete, concrete brick/block paving or as specified otherwise on the drawings.

6.1 Concrete Footpaths

Concrete footpaths shall typically be constructed from un-reinforced concrete with at least a 28-day cylinder compressive strength of 32 MPA, maximum aggregate size of 14 mm and a slump of 50 - 80 mm. Any deviation from this must be approved by the Shire before pouring concrete.

All ready mixed concrete shall be produced in accordance with AS 1379.

6.1.1 Concrete Pavement Thickness

Thickness of concrete footpaths shall be a minimum of 100mm thick for poor subgrade materials.

6.1.2 Concrete Footpath Jointing

Expansion and contraction joints shall be allowed for in the design and construction of all concrete footpaths.

Contraction joints shall be provided at 3.0m centres and shall be neatly defined using a jointing tool and smooth trowel finish for 80 mm either side of the joint.

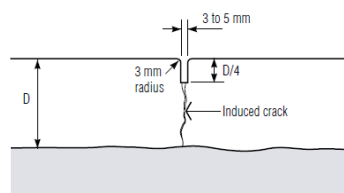


Figure 7: Typical contraction joint

Expansion joints shall be constructed at 6.0 m intervals and shall provide a 12 mm gap between adjacent sections of the concrete for the full depth of the footpath. A 12 mm thick bitumen impregnated filler board, the full depth of the concrete, shall be inserted in the joint to finish flush with the surface of the path. Expansion joints must also be installed where the pathway abuts service covers and other free-standing structures.

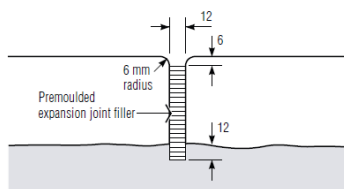


Figure 8: Typical expansion joint

Following a minimum of 7 days curing period for the concrete, expansion joints must be thoroughly cleaned and sealed with an approved concrete “caulking” material.

The top of the joint filler shall be cut back to allow a minimum depth of 10 mm caulking agent to be applied to the joint. The finished joint shall be tooled off in a professional manner to produce a smooth finish slightly concave of the finished concrete surface.

The following joint materials are approved:

- Lock Joint Australia – Lock Joint or equal and approved
- Danley Systems - Expanda Joint or equal and approved
- Dimet - Jointex (58 degrees - 62 degrees Celsius softening point)
- Expandite - Flexcell or equal and approved

Where an expansion joint and a contraction joint would coincide, the expansion joint should be provided. The next contraction and expansion joints shall be located from that joint according to the requirements above.

6.1.3 Reinforcement

A layer of SL62 reinforcement mesh is required to be placed on plastic chains. A minimum of 40mm concrete must be maintained over reinforced mesh.

6.2 Brick and Block Paving

Where designated on the drawings, footpaths shall be paved with either brick or concrete block pavers suitable for the purpose.

7.0 CONSTRUCTION

Prior to commencing construction works, the Contractor shall submit a method proposal detailing the works for Shire approval. Works shall not commence until Shire approval is received.

7.1 Utilities

The Contractor shall submit an application to ***'Dial Before You Dig'*** to acquire all services information for the works site. The Contractor shall locate and depth all services within the works site and take all measures required to protect the services in direct liaison with the service owner.

7.2 Dimensions and Profile

Footpaths shall be constructed to the widths, lines and levels shown on the drawings.

Where the path is constructed in the road reserve, the longitudinal profile of the path shall be the same as the longitudinal profile of the adjacent kerbing. Elsewhere, the existing surface should be cut/filled to ensure the finished pathway levels are an average of 75mm above the existing surrounds and generally follow the contours of the existing surrounds but gradients shall not exceed 3%.

7.3 Earthworks for Footpaths

Concrete, brick and block paved footpaths shall be constructed directly on the compacted subgrade, unless stated otherwise on the drawings. Prior to concrete placement, the subgrade shall be thoroughly moistened.

In the event that imported fill material is required, it is to be compacted to 95% of maximum density as determined by 10 blows/300 mm with a Perth sand penetrometer. Special attention should be given to service authority trenches.

Where possible, footpaths shall not be constructed until all drainage, sewerage and other services, and kerbing have been completed.

7.4 Formwork

Formwork shall be in accordance with AS 3610. It shall have adequate strength to carry all applied loads, including the pressure of fresh concrete, vibration loads, weight of workers and equipment, without loss of shape. Forms shall be mortar tight and designed to allow removal without risk or damage to the completed structure. Joints in the formwork shall be perpendicular to the main axis of the shape of the concrete.

Formwork shall be maintained in good condition at all times – clean and straight without kinks or bends. Formwork finished and ready to receive concrete shall be straight and adequately pegged along the outside to maintain support for the placed concrete.

7.5 Placement of Concrete

Handling and placing of concrete shall comply with the requirements of AS 3600. Concrete shall be placed so as to avoid segregation of the materials and the displacement of the reinforcement, anchor bolts or other case-in items.

The concrete mix temperature, when tested at the point of discharge from the chute within 30 minutes of batching, shall at no time exceed 30°C. The Subcontractor shall nominate methods and shall demonstrate the capacity to execute such methods by which this requirement will be achieved to the Shire before commencing works.

Note - Prior to any concrete path, pram ramp or crossover being poured, inspection by a Shire of Irwin representative is required.

The concrete is to be bull-floated, trowelled and broom finished right up to the joints and edges of the pathway. A hair broom finish shall provide a non-slip, dense surface free of any depressions, float marks, jointing marks, honey comb sections, or accumulation of fine dusty accretions liable to cause excessive surface wear.

Control of the curing of the concrete shall be carried out in a manner to ensure that shrinkage cracking does not occur. This may require the use of waterproof paper, polythene sheeting or a liquid membrane compound.

7.6 Concrete Testing

All testing shall be undertaken by a NATA approved testing laboratory.

The contractor shall take 4 test cylinders on site for every 10m³ of concrete poured. Of these 4 cylinders, the contractor shall hand over 2 cylinders to the Shire immediately. The contractor shall test the remaining 2 cylinders to provide compressive strength results progressively as the works proceed. The first cylinder shall be tested to report 7-day strength and the second sample shall be tested to report 28 day strength.

7.7 Placement of Brick and Block Paving Footpaths

Brick and Block pavers shall be laid in accordance with the manufacturer's recommendations. Details of shape, thickness, laying patterns and colour for the Brick or Block pavers shall be specified on the contact drawings.

7.8 Reinstatement of Road Verge

The edges and area around all path works is to be reinstated with suitable local material. In cases where the fill slope exceeds 1/20, approved gravel, compacted to 94% maximum density shall be used for reinstatement.

8.0 FOOTPATHS THROUGH ROAD CONSTRUCTION SITES

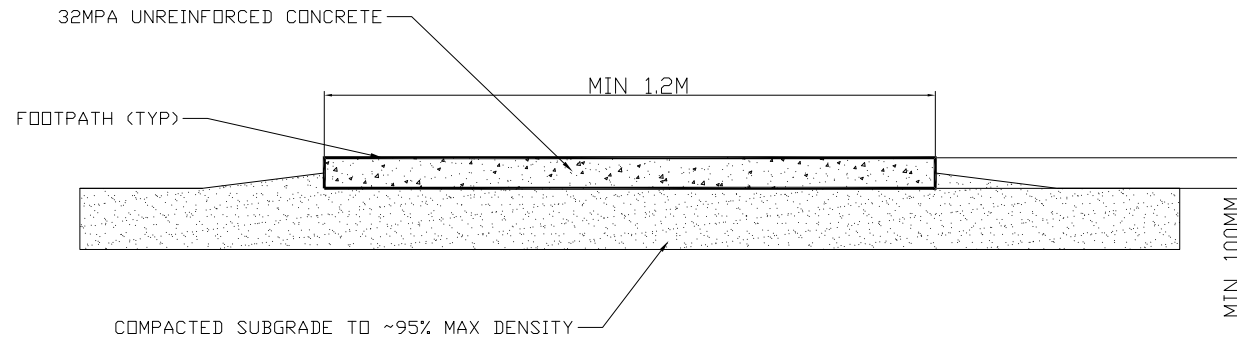
The access requirements for pedestrians and cyclists passing through road construction sites need to be reinforced. The Traffic Management Requirements for Works on Roads (Main Roads WA) stipulates the need to protect all road users including "pedestrians, such as school children, people with disabilities, cyclists and emergency vehicles."

Where there are existing pedestrian or cycling facilities, the contractor shall provide temporary facilities (at slow speed as necessary) to enable pathway users to traverse the site. Plastic mesh fencing shall be used to keep pedestrians and cyclists from straying into work areas. Temporary pathways through the worksite shall be lit or otherwise delineated for use at night.

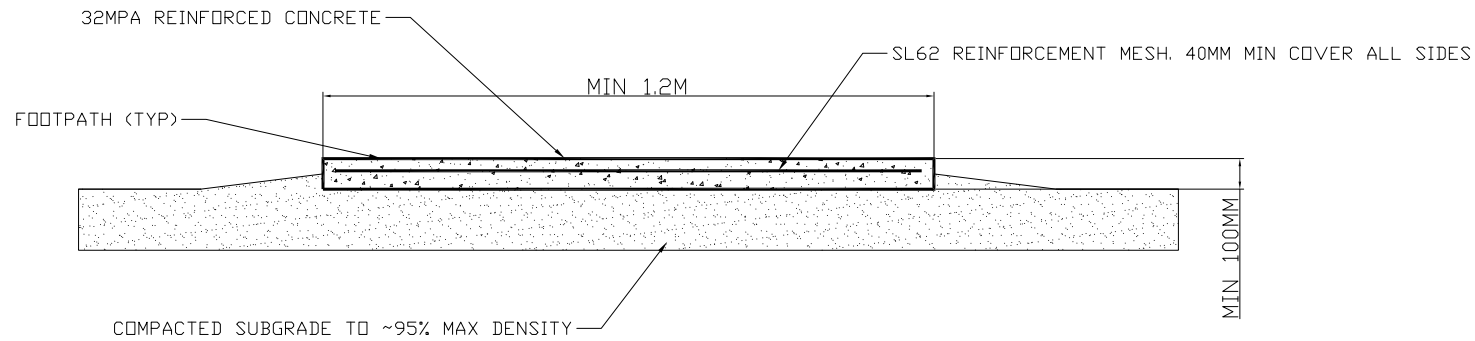
Temporary safety barriers should be utilised where necessary to protect pathway users from hazards like bridge piers or deep excavations. Only in exceptional circumstances, where it would be too dangerous to allow pedestrians or cyclists to traverse a worksite, shall access be denied. In such cases alternative routes shall be nominated by clear on-site signage.

Care shall be taken that the location of signs does not impair cyclist, wheelchair or pram accessibility.

9.0 APPENDIX 1 – REFERENCE DRAWINGS



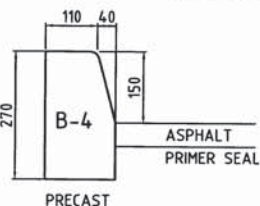
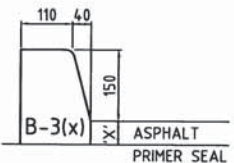
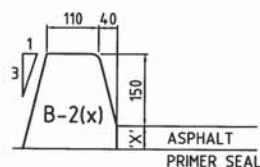
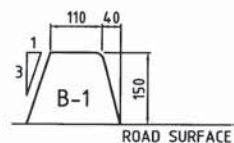
TYPICAL CROSS SECTION - UNREINFORCED FOOTPATH



TYPICAL CROSS SECTION - REINFORCED FOOTPATH

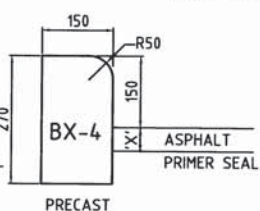
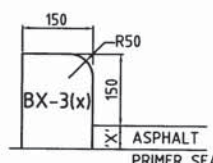
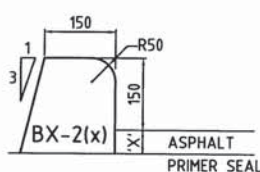
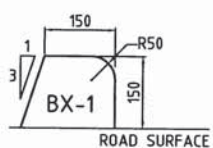
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No. A B	DESCRIPTION	APPROVED & DATE
NOTES		
METADATA		
GROUND SURVEY STANDARD:		
DATE OF CAPTURE:		
MAPPING SURVEY STANDARD:		
DATE OF CAPTURE:		
MAIN ROADS PROJECT ZONE:		
HEIGHT DATUM:		
Greenfield Technical Services 1/81 Forrest St, Geraldton WA 6530 Ph (08) 9921 5547 Fax (08) 9965 4116		
DRAWING NUMBER/DOCUMENT ID		
DESIGNED / DRAWN		NG/NG
VERIFIED		
DIRECTOR		
MRWA FILE NUMBER		FILE_NUMBER
APPROVED		
Typical Cross Section Details		
LOCAL AUTHORITY Shire of IRWIN		

1:100 0 1m 2 3 4 5 6 7 8 9 10 11 12 13 14 15
1:1000 0 10m 20 30 40 50 60 70 80 90 100 110 120 130 140 150
Scales A 1



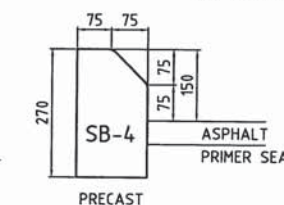
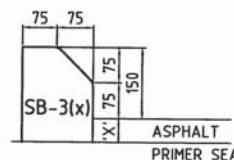
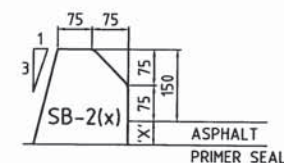
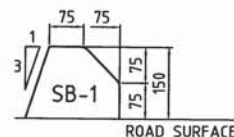
BARRIER - TYPE B

USED IN BUILT-UP AREAS ADJACENT TO FOOTPATHS WITH CONSIDERABLE PEDESTRIAN TRAFFIC OR TO MATCH EXISTING KERBS



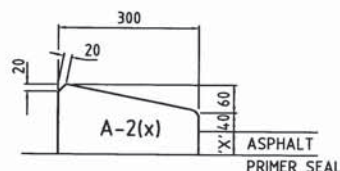
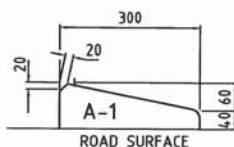
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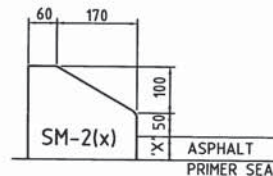
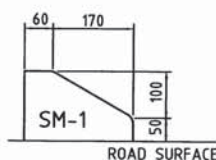
SEMI-BARRIER - TYPE SB

USED WHERE PEDESTRIAN TRAFFIC IS LIGHT AND A BARRIER TYPE KERB COULD TEND TO REDUCE TRAFFIC CAPACITY



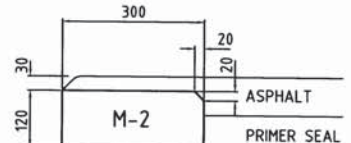
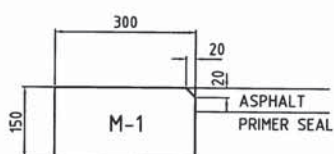
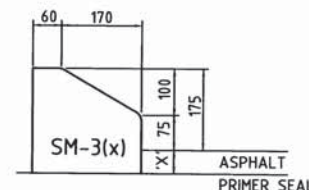
MOUNTABLE - TYPE A

USED TO MATCH LOCAL AUTHORITY KERBING ALSO RAISED PAVEMENT AT INTERSECTION AND ROUNDABOUTS



SEMI-MOUNTABLE - TYPE SM

USED ON ALL MEDIANS AND ISLANDS



USE 20m EITHER SIDE OF LOW POINT WHERE OPEN GRADED BITUMINOUS CONCRETE IS USED

MOUNTABLE - TYPE M

USED TO DEFINE A PAVEMENT EDGE
eg. LOCAL AREA TRAFFIC MANAGEMENT SCHEMES

NOTES

1. SEMI-MOUNTABLE TYPE SM SHOULD GENERALLY BE USED EXCEPT WHEN ANOTHER TYPE IS SPECIFIED FOR A PARTICULAR SITUATION.
2. 'X' DENOTES THICKNESS OF ASPHALT
3. ALL RADII ARE 20mm UNLESS OTHERWISE NOTED
4. CONCRETE CLASS TO BE N20

NOTE: ALL DRAWINGS ARE CONSIDERED UNCONTROLLED UNLESS STAMPED 'CONTROLLED COPY' IN RED

AMENDMENTS

No.	DATE	DESCRIPTION	APPROVED
1.	20.10.98	NEW TITLE BLOCK NOTES AMENDED	R. GROVE
2.	6.10.99	KERB TYPE SM-5 AMENDED	R. GROVE
3.	18.05.05	KERB TYPE SM-4(x) & SM-5(x) REMOVED	R. GROVE

NOT TO SCALE

ALL UNITS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED

STANDARDS AND AUDIT
ROAD AND TRAFFIC STANDARDS
Waterloo Creek
Telephone: (08) 9323 4111 East Perth WA 6002
Fax: (08) 9323 4430

FILE No.	JOB No.	DATE
DESIGNED/DRAWN	ROAD AND TRAFFIC STANDARDS	DATE
VERIFIED	R. BROWN	10.5.94
APPROVED	V. JOHNSTON	17.5.94



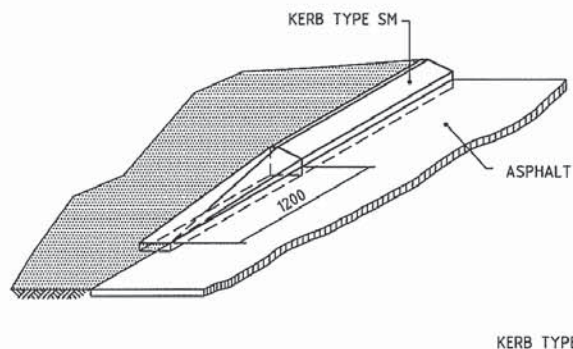
MAIN ROADS
Western Australia

STANDARD DRAWING

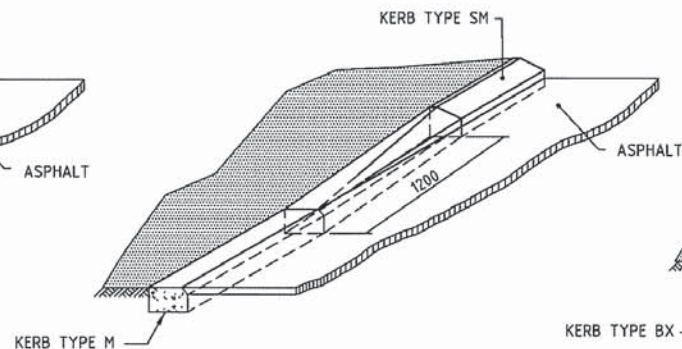
KERB TYPES

LOCAL AUTHORITY	DRAWING NUMBER	AMEND.
99.00	9331-0376-3	

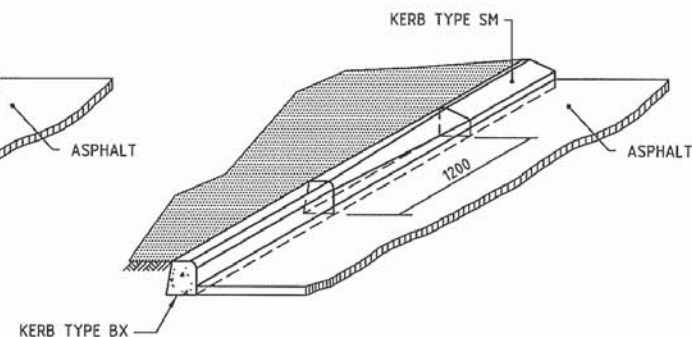
No.	DATE	DESCRIPTION	APPROVED
1.	20.10.98	NEW TITLE BLOCK. REFERENCE TO DATE OF STANDARD REMOVED.	R. GROVE
2.	18.05.05	RAISED PAVEMENT KERB DETAIL REMOVED.	R. GROVE
3.	5.05.10	NOTE 2 SPELLING CORRECTED.	D. LANDHARK
4.	15.06.16	KERBING DETAIL ADDED. TITLE BLOCK UPDATED.	<i>Among</i>



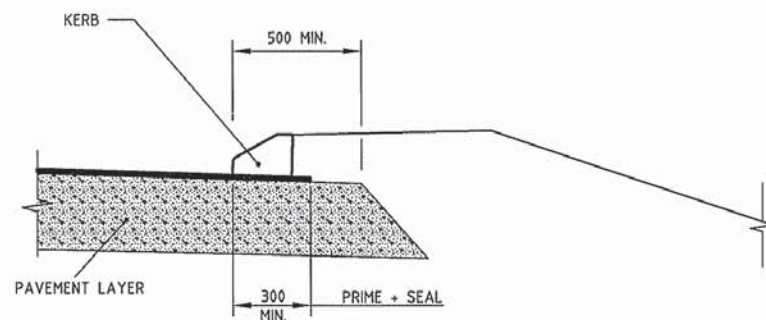
NO KERBING TO TYPE SM TRANSITION



KERB TYPE M TO KERB TYPE SM TRANSITION



KERB TYPE BX TO KERB TYPE SM TRANSITION



KERBING DETAIL



REFERENCE DRAWINGS

KERB TYPES	9331-0376
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NOTES

1. CONCRETE CLASS SHALL BE N20 IN ACCORDANCE WITH AS1379.
2. KERB TRANSITION SHALL BE TROWELLED SMOOTH TO MATCH SURFACE ON ADJACENT KERBING.



PLANNING AND TECHNICAL SERVICES DIRECTORATE
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FILE NUMBER	
DESIGNED / DRAWN	ROAD & TRAFFIC ENGINEERING
VERIFIED	R. BROWN
APPROVED	V. JOHNSTON

STANDARD DRAWING
KERBING TREATMENTS

LOCAL AUTHORITY	
MIRWA DRAWING NUMBER	
AMENDMENT	
9331-0377-4	

AMENDMENTS

AMENDMENTS																			
No.	DATE	DESCRIPTION	APPROVED																
1	8.2.12	GRAB RAIL AND SLEEVE DETAILS ALTERED. TGD'S ADDED. NOTE 4 AMENDED, NOTE 8 REMOVED. NOTES AND DETAILS REARRANGED.	<i>K. Turner</i> 7/4/12																
<div style="display: flex; justify-content: space-between;"> <div> <p>STANDARDS AND AUDIT ROAD AND TRAFFIC STANDARDS</p> <p>Victoria Creek Telephone (08) 9323 4155</p> </div> <div> <p>East Perth Fax (08) 9323 6430</p> </div> </div> <table border="1" style="width: 100%; margin-top: 10px;"> <tr> <td colspan="2">FILE No. G-31-561</td> <td colspan="2">JOB No.</td> </tr> <tr> <td>DESIGNED/DRAWN</td> <td>ROAD AND TRAFFIC STANDARDS</td> <td colspan="2">DATE SEPT. 1998</td> </tr> <tr> <td>VERIFIED</td> <td>K. TURNER</td> <td colspan="2">15.9.98</td> </tr> <tr> <td>APPROVED</td> <td>GRAEME McLEAN</td> <td colspan="2">15.9.98</td> </tr> </table>				FILE No. G-31-561		JOB No.		DESIGNED/DRAWN	ROAD AND TRAFFIC STANDARDS	DATE SEPT. 1998		VERIFIED	K. TURNER	15.9.98		APPROVED	GRAEME McLEAN	15.9.98	
FILE No. G-31-561		JOB No.																	
DESIGNED/DRAWN	ROAD AND TRAFFIC STANDARDS	DATE SEPT. 1998																	
VERIFIED	K. TURNER	15.9.98																	
APPROVED	GRAEME McLEAN	15.9.98																	

MAIN ROADS

Western Australia

STANDARD DRAWING

RAMP & GRAB RAIL DETAILS

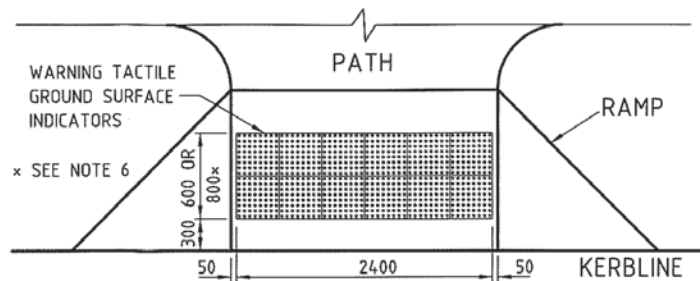
LOCAL AUTHORITY

DRAWING TYPE

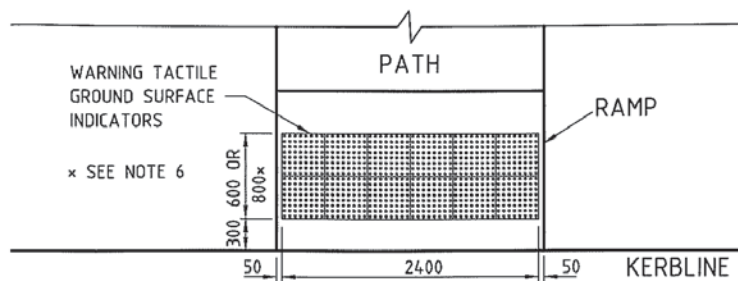
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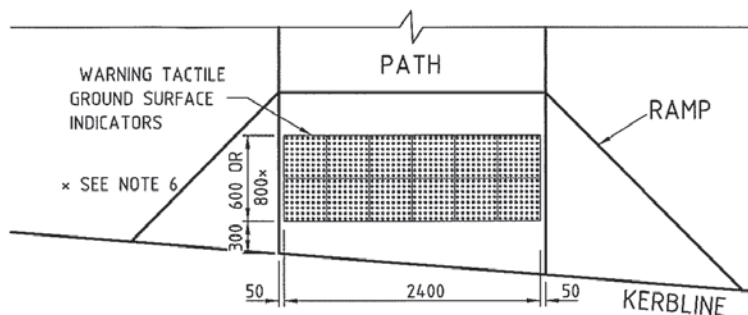
99.00



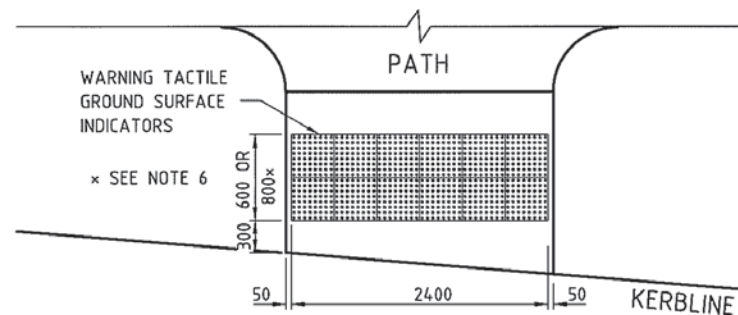
RAMP TYPE 'A' DETAIL
ROAD VERGE LOCATION



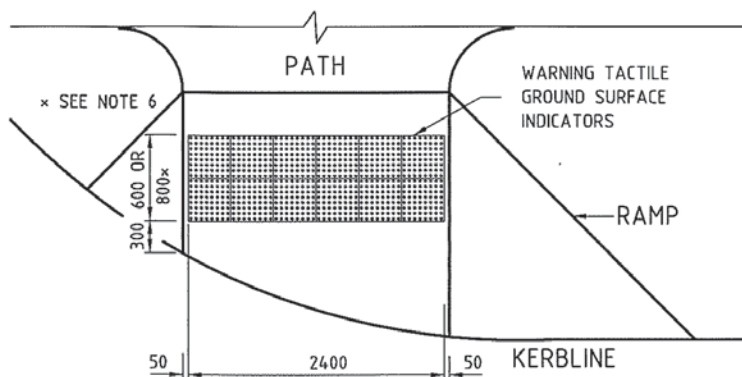
RAMP TYPE 'B' DETAIL
MEDIAN AND MEDIAN ISLAND LOCATION



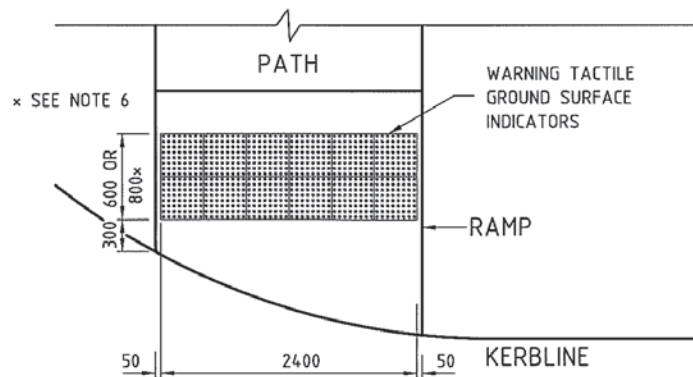
RAMP TYPE 'A' SKEWED KERBLINE DETAIL
ROAD VERGE LOCATION



RAMP TYPE 'B' SKEWED KERBLINE DETAIL
MEDIAN AND MEDIAN ISLAND LOCATION



RAMP TYPE 'A' CURVED KERBLINE DETAIL
ROAD VERGE LOCATION



RAMP TYPE 'B' CURVED KERBLINE DETAIL
MEDIAN AND MEDIAN ISLAND LOCATION

AMENDMENTS	
No.	DESCRIPTION
1.	TGSI'S ALIGNED TO BE PARALLEL TO FACE OF KERB.
2.	TGSI'S ALIGNED TO BE PERPENDICULAR TO THE DIRECTION OF TRAVEL.
3.	'DIRECTIONAL' REMOVED FROM TITLE.
4.	ADDITIONAL TGSi SIZE AND NOTE 4 ADDED.

NOTES

1. A MINIMUM 30% LUMINANCE CONTRAST BETWEEN THE COLOUR OF THE PATH AND THE COLOUR OF THE TGSi MUST BE ACHIEVED SHOULD RED ASPHALT NOT BE ABLE TO BE USED AS THE PATH SURFACE.

2. IF RAMP PROTRUDES INTO PATH ALIGNMENT USE CUT THROUGH TREATMENTS. REFER TO DRAWING 200931-0090 FOR DETAILS.

3. IF RAMP PLACES PEDESTRIAN SIGNAL POST >2.0m FROM THE KERB USE DROP DOWN PATHS & CUT THROUGH TREATMENTS. REFER TO DRAWING 200931-0090 FOR DETAILS.

4. RAMP TYPE 'A' USED WHEN RAMP CAN BE ACCESSED FROM SIDE (I.E. WINGS ARE ACCESSIBLE FOR PEOPLE WITH DISABILITIES), OR WHEN RAMP CAN BE ACCESSED FROM ONE SIDE ONLY. IT IS ACCEPTABLE TO USE THE TYPE 'A' "WING" ON ONE SIDE AND THE TYPE 'B' "KERB RETURN" ON THE OTHER.

5. RAMP TYPE 'B' USED IN ROAD VERGE WHERE RAMP CAN NOT BE ACCESSED FROM SIDE.

6. TGSi's CAN BE EITHER 300 x 300mm OR 400 x 400mm IN SIZE. (400 x 400mm TILES SHOWN).





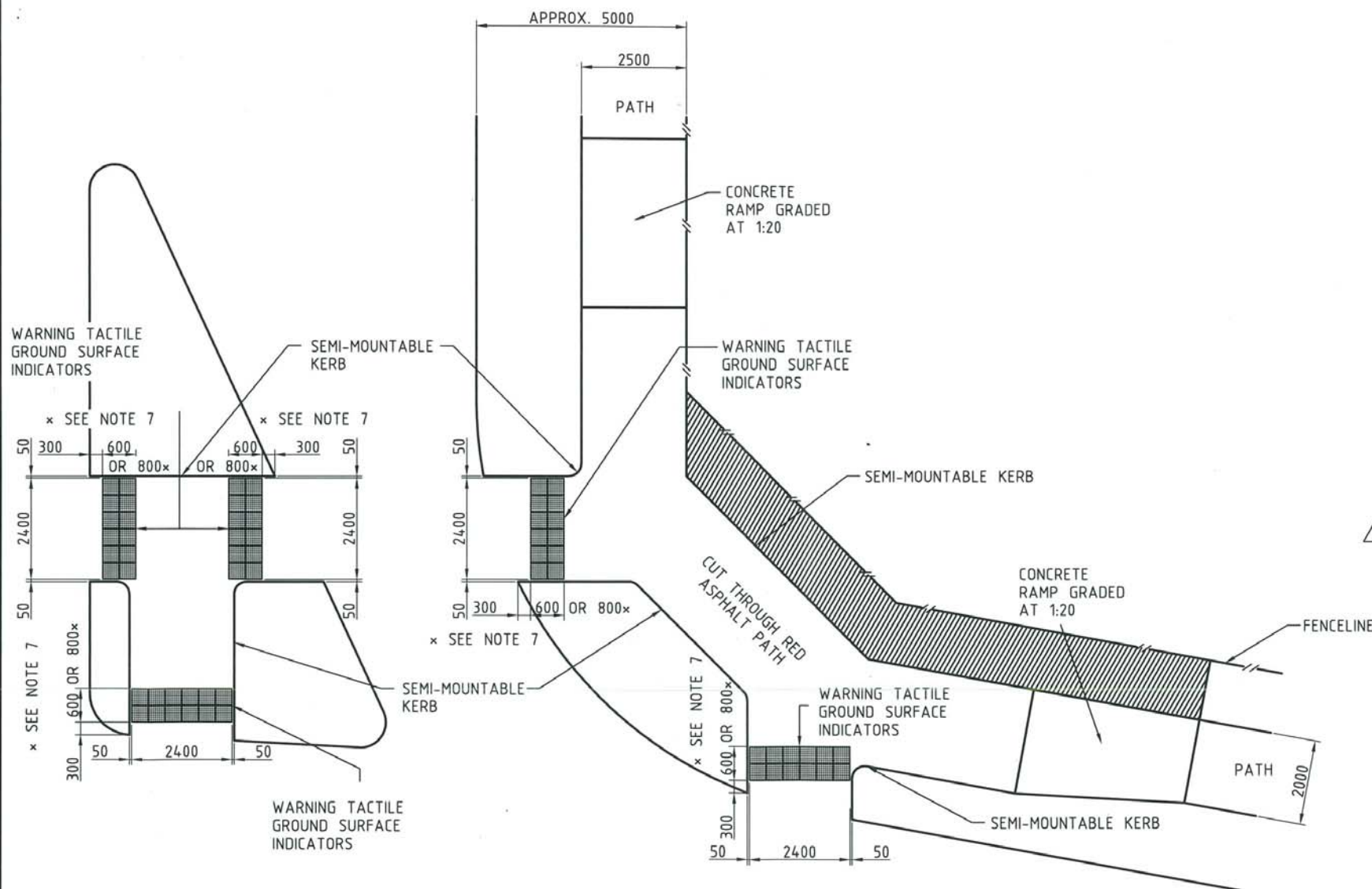

 PLANNING AND TECHNICAL SERVICES DIRECTORATE
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FILE NUMBER	06/7882
DESIGNED / DRAWN	C. MAGRIPLIS
VERIFIED	C. MAGRIPLIS
APPROVED	R. GROVE

STANDARD DRAWING
TACTILE GROUND SURFACE INDICATORS
RAMP TYPE 'A' AND 'B' DETAILS

LOCAL AUTHORITY
DRAWING NUMBER
AMENDMENT

200931-0089-4



TYPICAL CUT THROUGH DETAIL

AMENDMENTS

NO.	DESCRIPTION	APPROVED & DATE
1.	TGSI'S ALIGNED TO BE PARALLEL TO FACE OF KERB.	C.M. 24/03/10
2.	TGSI'S ALIGNED TO BE PERPENDICULAR TO THE DIRECTION OF TRAVEL.	C.M. 25/09/12
3.	'DIRECTIONAL' REMOVED FROM TITLE.	C.M. 16/08/13
4.	ADDITIONAL TGSI SIZE AND NOTE 7 ADDED.	C.M. 8/12/15

NOTES

1. THE DROP DOWN CUT THROUGH TREATMENT SHOULD ALLOW FOR SIGNAL POLES TO BE SET BACK DESIRABLY 1.4m FROM THE KERB LINE. THE 1.4m ALLOWS FOR 300mm SET BACK TO THE TGSI, 800mm OF TGSI AND THE SIGNAL POLE BEING 300mm FURTHER BACK FROM THE TGSI.
2. WHEN DEVELOPING THE TREATMENTS PLEASE CAREFULLY CONSIDER THE DRAINAGE REQUIREMENTS. THERE ARE A VARIETY OF PEDESTRIAN FRIENDLY SYSTEMS THAT CAN BE INSTALLED WITHIN THE CUT THROUGH AREA AND IN EXTREME CASES ADDITIONAL SIDE ENTRY PITS MAY BE REQUIRED ON ROAD.
3. A MINIMUM 30% LUMINANCE CONTRAST BETWEEN THE COLOUR OF THE PATH AND THE COLOUR OF THE TGSI MUST BE ACHIEVED SHOULD RED ASPHALT NOT BE ABLE TO BE USED AS THE PATH SURFACE.
4. ALL PITS TO BE LOWERED AND MADE FLUSH WITH NEW PATH LEVEL.
5. THIS TREATMENT IS TO BE USED IN RESTRICTED LOCATIONS WHERE TYPE 'A' AND 'B' RAMP ARE NOT FEASIBLE.
6. THE TACTILE INDICATORS SHOULD BE ALIGNED TO BE AT RIGHT ANGLES TO THE INTENDED DIRECTION OF PEDESTRIAN TRAVEL.
7. TGSIS CAN BE EITHER 300 x 300mm OR 400 x 400mm IN SIZE. (400 x 400mm TILES SHOWN).



AREA TO BE INFILLED WITH PAVING AND/OR CONCRETE

mainroads
 WESTERN AUSTRALIA
 PLANNING AND TECHNICAL SERVICES DIRECTORATE
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FILE NUMBER 06/7882

DESIGNED / DRAWN C. MAGRIPLIS APRIL 09

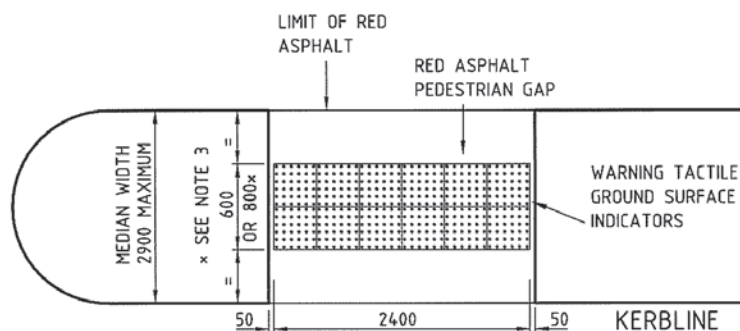
VERIFIED C. MAGRIPLIS 07/01/10

APPROVED R. GROVE 07/01/10

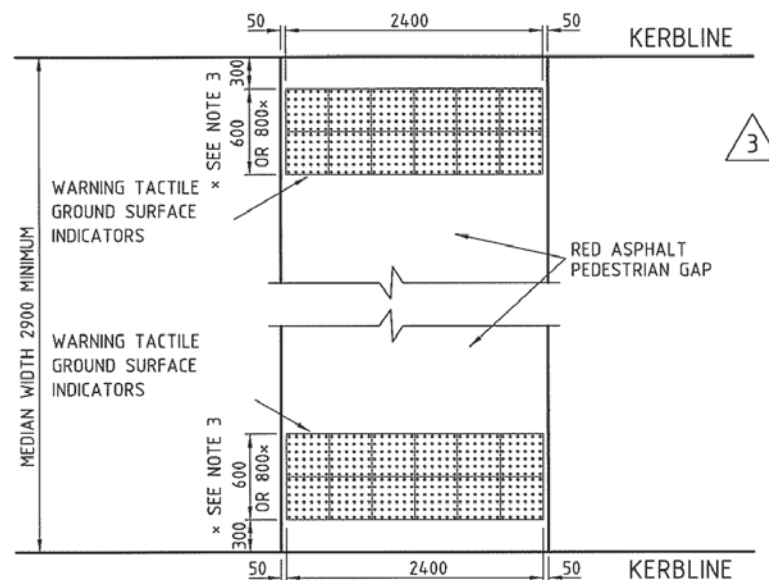
STANDARD DRAWING
 TACTILE GROUND SURFACE INDICATORS
 MODIFIED CUT THROUGH CORNER
 TREATMENT DETAIL

DRAWING NUMBER AMENDMENT

200931-0090-4



NARROW MEDIAN GAP DETAIL
 MEDIAN WIDTH \leq 2900
 REFER TO NOTE 2



WIDE MEDIAN GAP DETAIL
 MEDIAN WIDTH $>$ 2900

AMENDMENTS		
No.	DESCRIPTION	APPROVED & DATE
1.	MEDIAN WIDTH CLARIFIED	C.H. 25/09/12
2.	'DIRECTIONAL' REMOVED FROM TITLE. NOTE ADDED.	R.G. 29/07/13
3.	ADDITIONAL TGSi SIZE AND NOTE 3 ADDED.	CM 8/12/15

NOTES

1. A MINIMUM 30% LUMINANCE CONTRAST BETWEEN THE COLOUR OF THE PATH AND THE COLOUR OF THE TGSi MUST BE ACHIEVED SHOULD RED ASPHALT NOT BE ABLE TO BE USED AS THE PATH SURFACE.
2. THE NARROW MEDIAN GAP DETAIL SHOULD NOT BE USED AT SIGNALISED INTERSECTIONS (AT LEAST WHERE A PARALLEL WALK PHASE EXISTS).
3. TGSi's CAN BE EITHER 300 x 300mm OR 400 x 400mm IN SIZE. (400 x 400mm TILES SHOWN).




PLANNING AND TECHNICAL SERVICES DIRECTORATE
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FILE NUMBER	06/7882
DESIGNED / DRAWN	C. MAGRIPLIS APRIL 09
VERIFIED	C. MAGRIPLIS 07/01/10
APPROVED	R. GROVE 07/01/10

STANDARD DRAWING
 TACTILE GROUND SURFACE INDICATORS

MEDIAN GAP DETAILS

LOCAL AUTHORITY	AMENDMENT
DRAWING NUMBER	

200931-0091-3

2010

Public Transport Bus Stop Site Layout Guidelines



Public Transport Authority of WA

INTRODUCTION

The Public Transport Authority of Western Australia (PTA) is responsible for ensuring that its facilities and services comply with the requirements of the Disability Discrimination Act and the associated Disability Standards for Accessible Public Transport 2002 (Disability Standards). For Transperth and regional town bus services, this generally means the provision of a compliant bus stop sign, the establishment of a level hard-stand area (at correct height) and Tactile Ground Surface Indicators (TGSIs) at all new and existing bus stop locations.

Under the Disability Standards the following levels of compliance are to be achieved over time:

- 25% of that infrastructure complying by 31 December 2007;
- 55% of that infrastructure complying by 31 December 2012;
- 90% of that infrastructure complying by 31 December 2017; and
- 100% of that infrastructure complying by 31 December 2022.

Note: delays in the commencement of the required works has resulted in the early compliance targets not being met.

This Public Transport Bus Stop Layout Guideline document is to be read in conjunction with the PTA's Accessibility Policy and Disability Access and Inclusion Plan 2007 - 2012.

The objective of these guidelines is to improve bus to bus stop accessibility by making the general bus stop area free of impediments that can act as mobility barriers to people using bus services.

The PTA's Public Transport Bus Stop Layout Guideline has been revised (February 2010) following detailed consultation with representatives of the disability community, access consultants and other transport agencies across Australia. This consultation process has resulted in a significant change to the bus stop layout designs previously adopted by the PTA. Furthermore all bus stop layouts have been developed to comply with the Disability Standards.

Part of this review process also involved provision of a copy of the revised bus stop layouts to the Human Rights and Equal Opportunity Commission (HREOC) in response to draft bus stop guidelines issued by HREOC in 2009. Initial indications are that the proposed layouts will meet or exceed the minimum requirements of the HREOC draft guidelines.

Separate to the change in PTA bus stop layout designs, one of the most significant amendments to this guideline document is the change to Agency responsibilities with regard to this matter. Following extensive negotiations between the PTA and the Western Australia Local Government Association (WALGA), representing the needs of all Local Governments in Western Australia, the PTA has accepted limited responsibility for ensuring compliance of the immediate bus stop area to the Disability Standards. It is intended that under this arrangement, the PTA will be responsible for upgrading the immediate boarding area and up to one metre of connecting pathway to an existing footpath. The PTA is not responsible for items that improve the amenity of the area for local residents; this typically includes the provision of

discretionary infrastructure such as bus shelters, seating and rubbish bins which have traditionally been provided by Local Government.

GUIDELINE STATEMENT

The PTA's Accessibility Policy promotes that it should as far as reasonably practicable provide services that are accessible to all passengers. Further endorsement and a general plan of how these matters are to be addressed by the PTA are included in the Disability Access and Inclusion Plan 2007 – 2012. The Government has acknowledged the obligations of the PTA to comply with the Disability Standards and has provided funding for this purpose under the Bus Stop Accessibility Works Program (BSAWP).

In further promoting this guideline document the PTA:

- endorses the following design portfolio of accessible bus stop layouts which will be used as a standard design for all public transport bus stop locations;
- will utilise funding for the BSAWP such that the new layout designs will be installed at all new bus stops and progressively retrofitted to existing bus stop sites; and
- will progressively review each bus stop location used throughout its operations and undertake required works in such a manner to maximise the effectiveness of the BSAWP and to minimise disruption and inconvenience to bus operators, residents, public transport users and the general public wherever possible.

PROCEDURES FOR LOCAL GOVERNMENT AND OTHER ENTITIES

In accepting general responsibility for the immediate bus stop area (with an exception for discretionary items such as shelters, bins, lights etc), the PTA stresses the importance of other entities utilising the Road Reserve, like Local Government and Main Roads WA, that they must not undertake any works in the bus stop area which may make the area non-compliant to the Disability Standards.

Whenever consideration is being given to installing a bus shelter, seat, rubbish bin or any other item of discretionary infrastructure at a bus stop, the resultant works must comply with the bus stop layouts detailed in this document. For example, the simple installation of a rubbish bin in an incorrect location can render the entire bus stop site non-compliant. In such circumstances, the entity responsible for undertaking the unauthorised works will be responsible for the cost of reinstituting the site to its original condition.

Any entity intending to undertake works within a bus stop area must abide by the procedures for Local Government set out within this document, as detailed below:

- Identify the bus stop location and the infrastructure intended to be installed;
- Provide a detailed drawing to the PTA showing the proposed bus stop layout including the new infrastructure. These drawings should use the measurements and criteria listed within this document and also consult the bus stop design portfolio shown in Figures 1-10;
- The PTA will review the drawings, mark any relevant changes and return to the relevant Local Government;
- The PTA requires five working days notice prior to the commencement of works and an expected completion date so that the PTA may to install a temporary bus stop and provide information to passengers;
- Local Government shall commission the works and then inform the PTA once works have been completed;
- The PTA will then visit the location and perform a Bus Stop Accessibility Audit to ensure that the entire bus stop location complies with the Disability Standards; and
- Once the PTA is satisfied that the bus stop location is compliant with the Disability Standards then the Local Government shall be informed and this bus stop location shall be marked as compliant in PTA information management systems.

DESIGN PHILOSOPHY

The recommended bus stop layout designs in this document (Figures 1 – 10) were developed following a detailed consultative process with representative user groups and access consultants. The PTA is confident that these designs deliver the best possible outcome for the various user groups which often have conflicting requirements or desires.

The resultant design portfolio contained in this document should cover most situations encountered and should be followed at all bus stop locations. If this is not the case, PTA will adopt alternative solutions on a case by case basis noting that the same general principles will be applied wherever possible.

The designs have been developed to comply with the requirements of the Disability Standards for Accessible Public Transport 2002 and the Australian Standard AS 1428.2 and AS 1428.4. It is intended that the development of new and existing bus stop locations should have limited impact on all users of public transport, the general public and residents in close proximity to a bus stop location.

The development of this design considers the needs of all public transport bus users, especially those groups with enhanced requirements, including:

- Seniors-using a frame, walking stick or motorised chair;
- People with ambulant disabilities;
- People using wheelchairs or scooters;
- People with vision impairment;
- Parents with prams, and
- Other (e.g. Travellers with luggage, etc).

DESIGN CRITERIA

It is intended that the bus stop layout designs in this document will provide a consistent approach to all bus stop locations in metropolitan Perth and regional towns.

The following factors are considered by the PTA to be best practice and must be applied to all bus stops under the control of the PTA:

Bus Stop Sign

At present there are approximately 13,000 bus stop locations in the Perth metropolitan area and about 3,000 bus stops in regional towns with the only common factor at each site being the bus stop sign, which may be a 75mm x 50mm x 1300mm (above ground level) orange post or a rectangular 'infounit' type bus stop sign 236mm x 45mm x 2450mm (above ground level).

Where an infounit type bus stop sign is in place and timetable information is displayed on both sides, access to both sides is required in accordance with Disability Standards.

Typically timetable information should be displayed on the approach side of an infounit type sign and a stopping pattern displayed on the downstream side. In this situation there is no requirement under this legislation for the hardstand area to be extended to cover this area. Similarly if the bus stop sign is a standard orange post there is no requirement for the downstream side to have a hardstand area. However, it is preferred for bus stop signs to be installed into a concrete surface as opposed to only soil and it is recommended that the hardstand area is extended by 300mm to enable the bus stop sign to be installed within the hardstand area.

At each bus stop location the bus stop sign is to be placed exactly 600mm from the kerb face (road edge).

The bus stop sign must be placed 550mm from the edge of the warning TGSIs.

Kerb Height

The required height for the kerb is a minimum of 150mm above the road surface.

Tactile Ground Surface Indicator (TGSIs)

All TGSIs must be either terracotta or yellow in colour and made of polyurethane material that is 5mm thick, unless specified by the PTA. The surface of the TGSIs must have 30% luminance contrast to the adjacent boarding point surfaces.

When TGSIs cross an uninterrupted pathway, a dual row of colour contrasting 400mm x 400mm x 5mm directional tiles is required leading up to the bus stop from the boundary wall as applicable. The dual row will lead into a single centred row of colour contrasting 300mm x 300mm x 5mm TGSIs which are to be positioned 300mm from the end the kerb inset (back of kerb) and start of the hardstand.

When using polyurethane TGSIs the concrete surface must be left for 28 days to cure and then the tiles are to be laid after this time has lapsed. A space of 1mm is required between each tile. All tiles are to be laid correctly using a surface primer and then the bond is attached to the polyurethane tile itself.

Hardstand Boarding Area

The boarding area must be a minimum of 2m x 2.75m with a maximum of 8m x 3m. The boarding area must not have a gradient greater than 1 in 40 and the connecting pathway between the boarding area and an existing pathway must not have a gradient greater than 1 in 14.

Bus Door Stopping Position

The bus stopping position is determined by the position of the bus stop sign. Bus drivers are instructed to stop adjacent to the bus stop sign. Where a bus stop is situated within a bus embayment the bus stop sign is to be placed 4 – 6 metres from the end of the bus embayment.

Bus Embayment

A bus embayment may be recommended at bus stops with high dwell times; for instance timed/high patronage bus stops or stops on high speed roads (80 Kilometres per hour or above).

The desired minimum width of a bus embayment is 3.0 metres. Refer to the Main Roads WA website for standard designs (Figure 11).

Discretionary Infrastructure

Bus shelters, seating and rubbish bins are discretionary infrastructure and are the responsibility of Local Government. Where provided, compliance with the PTA's Bus Stop Layout Guideline is mandatory.

Rubbish bins should be positioned either at the approach side of a bus shelter or in a location that leaves all TGSIs, circulation areas, and access ways clear of obstacles. Warning TGSIs should be located in front of the rubbish bin.

Bus Shelter Design

As the PTA has responsibility for the overall compliance of the bus stop boarding area if replacement or new bus shelters are being installed through the Bus Shelter Grant Scheme or otherwise, the PTA requires a detailed drawing of each location showing the proposed work for approval. This will also apply for new or replacement rubbish bins, bench seating or 'street furniture' being installed at new or existing bus stop locations. Some bus stop sites may have a seat and a bus shelter; others may only have a seat. This infrastructure remains the property of the entity providing the infrastructure (usually Local Government) but must comply with the legislation.

Following installation of a bus shelter the PTA is still only liable for maintenance of the minimum boarding area and the TGSIs (not the greater bus shelter area).

Where a rear facing bus shelter is placed adjacent to the road a minimum distance of 700 mm must be maintained from the road edge to avoid conflict with buses.

Seating

Where a seat is provided either as part of a bus shelter or separately the design must comply with AS 1428.2 Clause 27.2. Seats generally should be 450mm high and hand rests where possible.

Wheelchair bay

At least one wheel chair bay is required at a bus shelter should a bus shelter be provided. The wheel chair bay must have a minimum width of 1000mm by 1300mm in length.

Wheelchair Turning Circle

The space required for a wheelchair to make a 60° to 90° turn shall have a gradient no steeper than 1 in 40 and shall be no less than 1500mm wide and 1500mm long in the direction of travel.

Pram Ramp

The minimum allowable width of a pram ramp is 800mm with a gradient of no greater than 1 in 14 as stated in AS1428.2 Clause 8. It is preferable for pram ramps to be positioned at the rear of the bus stop boarding area. Where located downstream of a bus stop it must be located a minimum of 20 metres from the bus stop sign.

Kerb Ramp

An inclined surface on a continuous accessible path of travel with a maximum rise of 190 mm, a length not greater than 1520 mm and a gradient not steeper than 1 in 8, located within or attached to a kerb.

Concrete Specification

Premix concrete shall comply with the requirements of Australian Standard AS1379 1997. All concrete used in the works shall develop a minimum compressive strength of 25MPa at 28 days and shall be composed of a mixture of screenings, sand and cement to give strength specified with a maximum slump of 90mm.

All concrete shall have an approved high early strength additive to give rapid hardening.

SERVICE DISRUPTIONS

Work being undertaken by Local Government, Main Roads WA or other Government agencies will often have an effect on PTA bus services.

Where the existing boarding area at a bus stop is affected by such works compliance with the PTA's Bus Stop Layout Guideline must be included as part of the works. The PTA will require a detailed drawing of each bus stop affected for approval. When work is completed the PTA will undertake an access audit to determine whether the bus stop location is compliant.

Whilst undertaking these works a temporary bus stop will often be required. In such circumstances, liaison with the Transperth section of the PTA will be required to facilitate this requirement (noting the operational requirements of the SmartRider Ticketing system detailed below). Where the physical location of a bus stop is to be changed the PTA will be required to undertake a site visit to approve any new locations. When planning these works the Local Government should contact this specific email address which will then be allocated to the particular person to deal with the disruption. Email: transperthservicedisruptions@pta.wa.gov.au

SMARTRIDER TICKETING SYSTEM

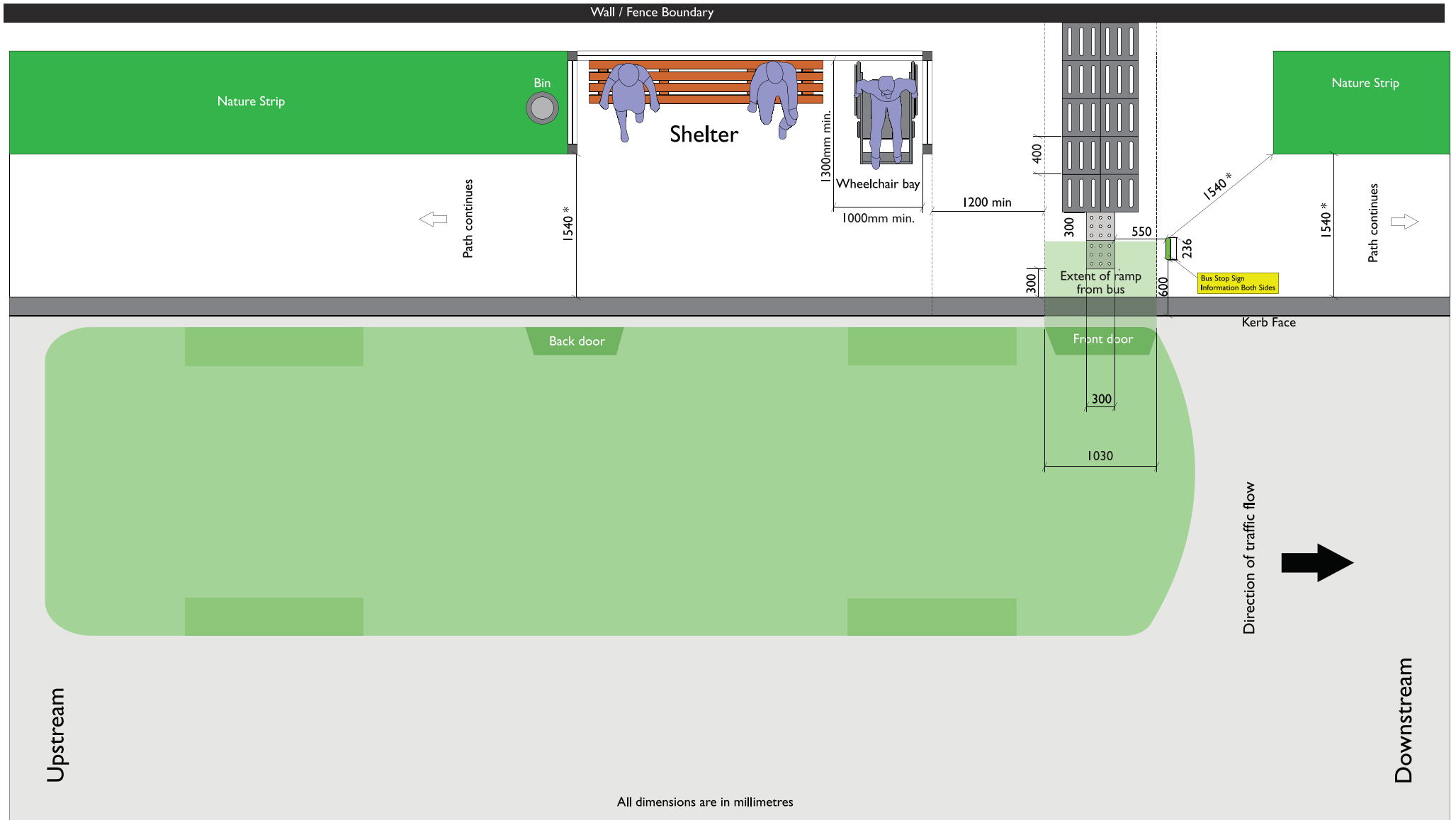
The SmartRider ticketing system utilises the Transperth bus stop data to calculate passenger fares. Accordingly, the "XY" co-ordinates of each bus stop have been captured and are rigorously maintained by the PTA in its information systems.

The removal or relocation of a bus stop without PTA approval may result in passengers being overcharged. The PTA reserves the right to seek reimbursement of any over charges from any party responsible for this occurring.

Additionally, the duty of care with regard to passenger safety will be transferred to the party responsible for removing or relocating a bus stop in a situation where a passenger is injured boarding or alighting at an unauthorised bus stop location.

Approved Bus Stop Layout Designs

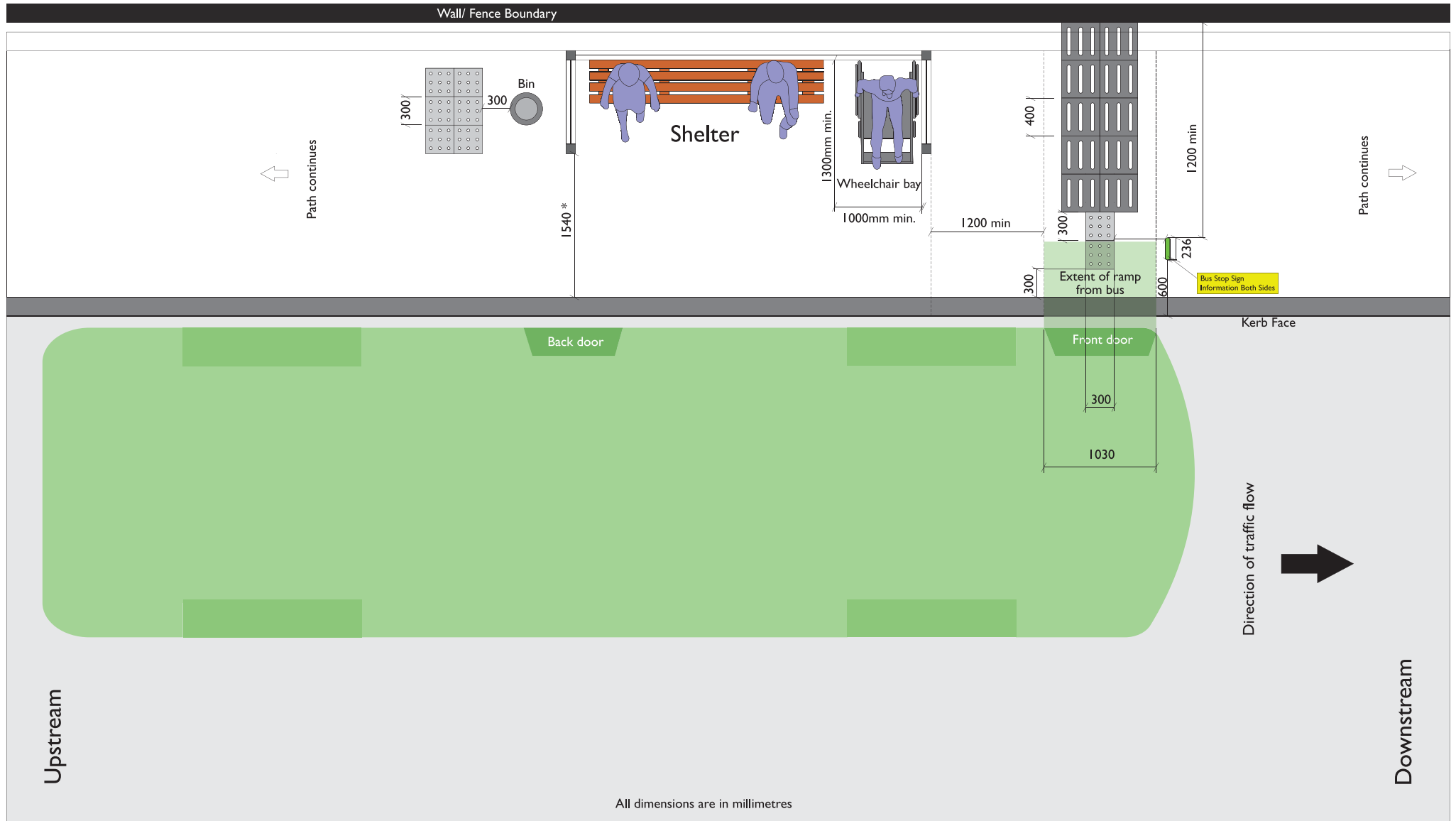
Figures 1 – 10



- Legend:
- Directional TGSIs 400 x 400mm
 - Directional TGSIs 300 x 300mm
 - Warning TGSIs 300 x 300mm
- TGSIs to cover extent of footpath
- For kerb profile and dimensioning, refer page 16 and 17
- * 1540mm width where space is available.
If space is an issue minimum width is 1200mm.

Single sided shelter facing the street, backing on to property boundary.
Located within nature strip on concrete pad.

Figure I



Legend:



Directional TGSIs
400 x 400mm



Directional TGSIs
300 x 300mm



Warning TGSIs
300 x 300mm

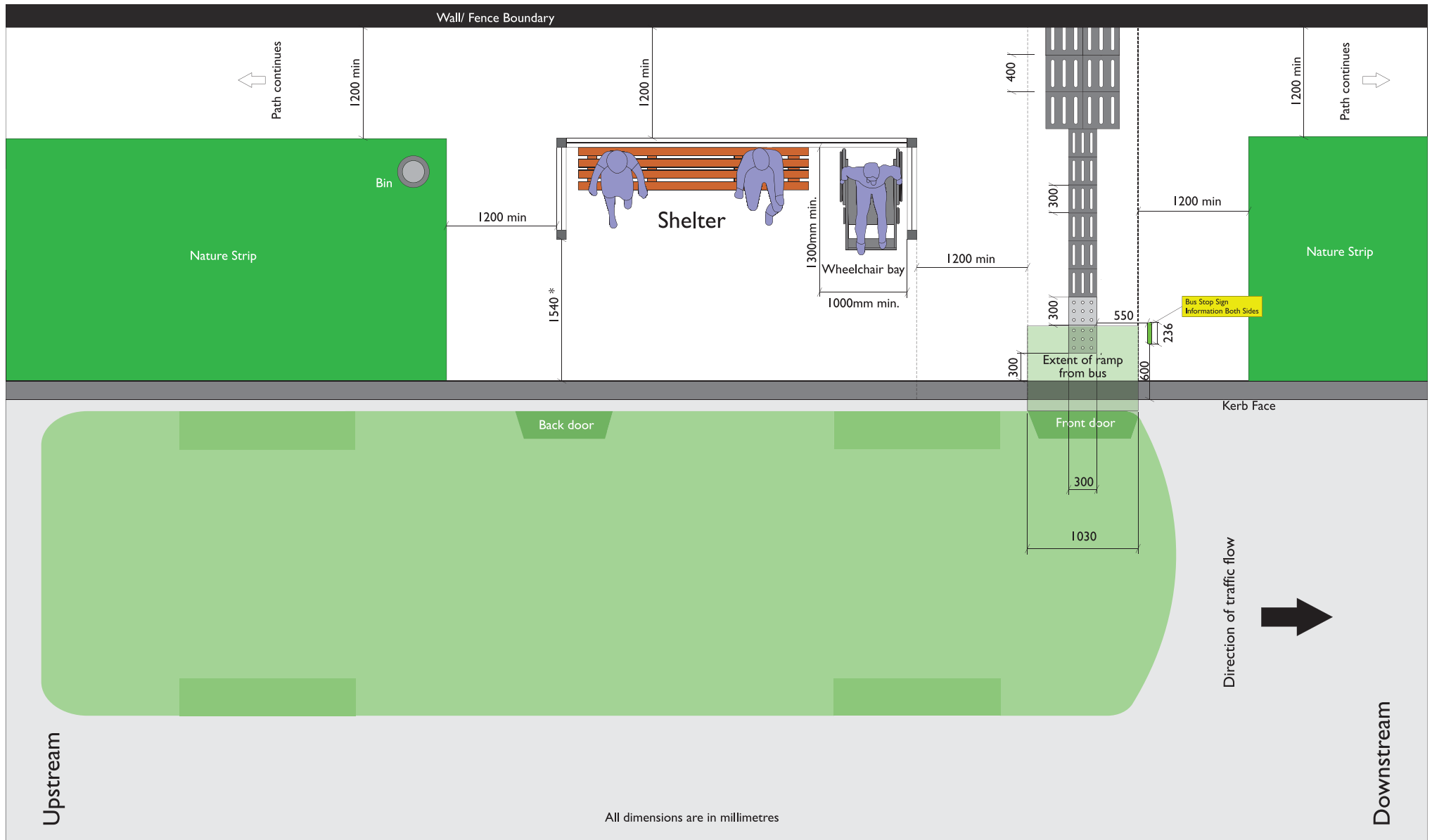
For kerb profile and dimensioning, refer page 16 and 17

* 1540mm width where space is available.
If space is an issue minimum width is 1200mm.

NOTE: TGSIs to cover extent of footpath.

Single sided shelter facing the street and backing on to property boundary.
Located within footpath.

Figure 2



Legend:

Directional TGSIs
400 x 400mmDirectional TGSIs
300 x 300mmWarning TGSIs
300 x 300mm

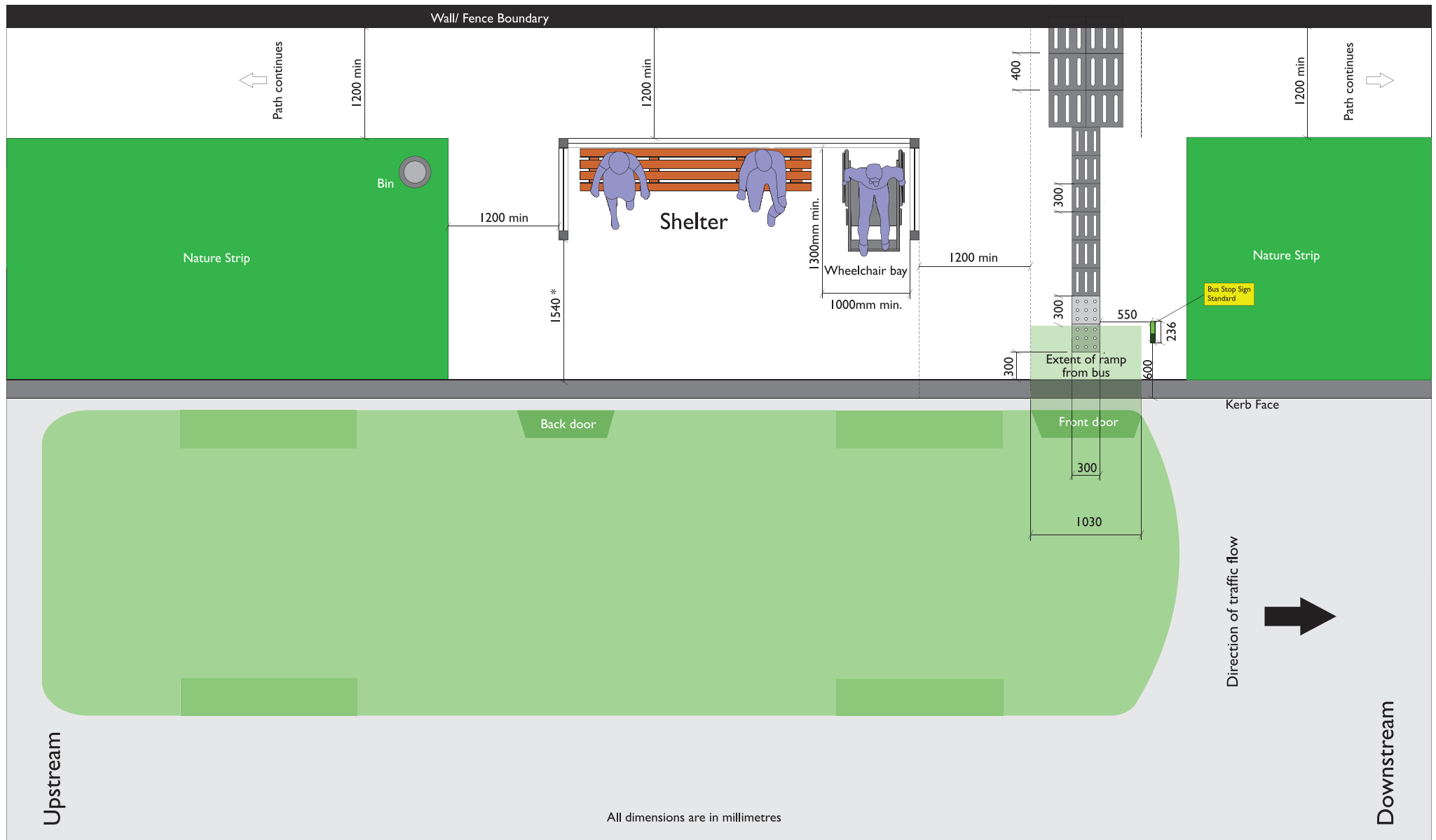
For kerb profile and dimensioning, refer page 16 and 17

* 1540mm width where space is available.
If space is an issue minimum width is 1200mm.

NOTE: TGSIs to cover extent of footpath.

Single sided shelter facing the street and backing on to footpath.
Located within nature strip on concrete pad.

Figure 3A



Legend:



Directional TGSIs
400 x 400mm



Directional TGSIs
300 x 300mm



Warning TGSIs
300 x 300mm

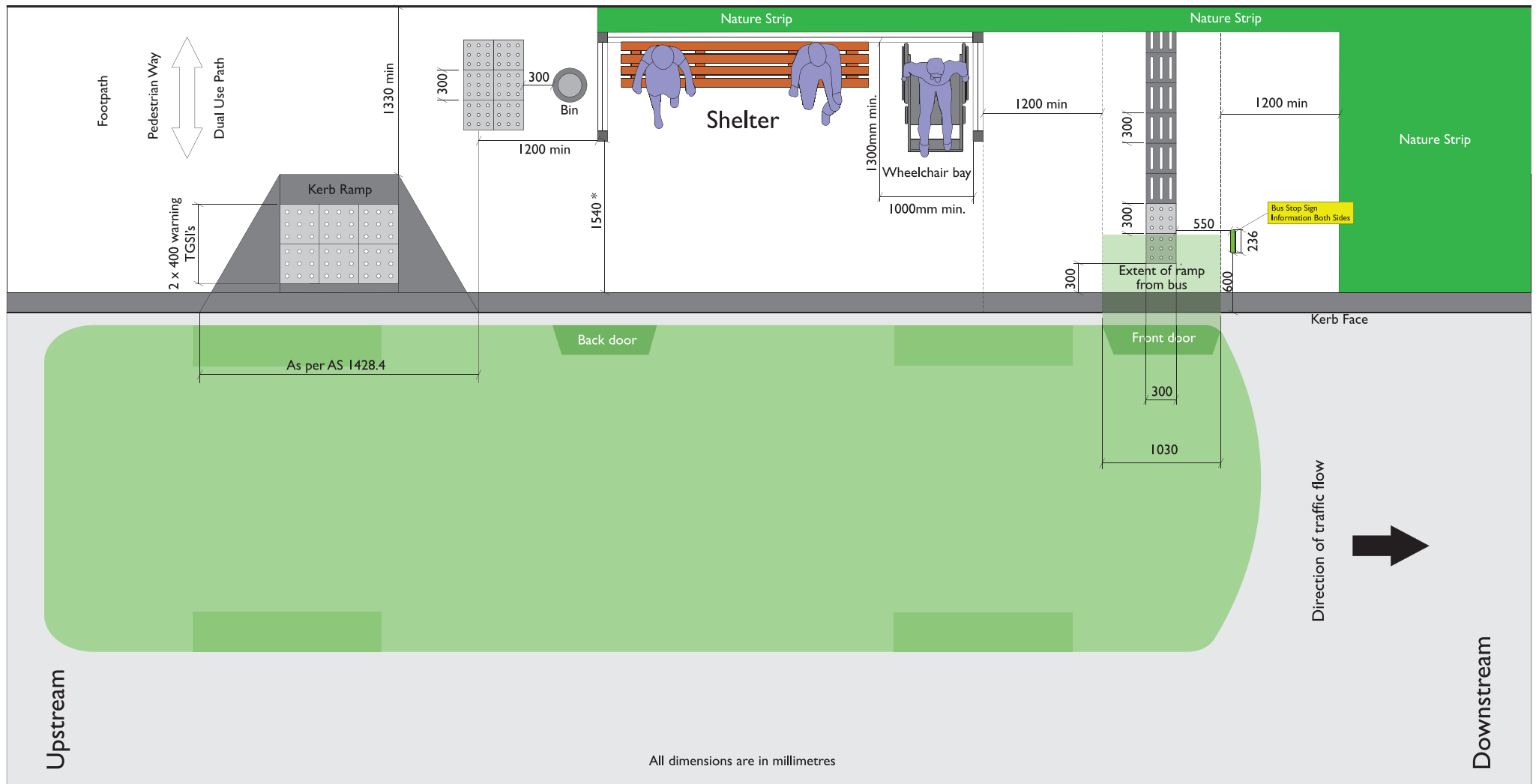
For kerb profile and dimensioning, refer page 16 and 17

* 1540mm width where space is available.
If space is an issue minimum width is 1200mm.

NOTE: TGSIs to cover extent of footpath.

Single sided shelter facing the street and backing on to footpath.
Located within nature strip on concrete pad.

Figure 3B



Legend:



Directional TGSIs
300 x 300mm



Warning TGSIs
300 x 300mm



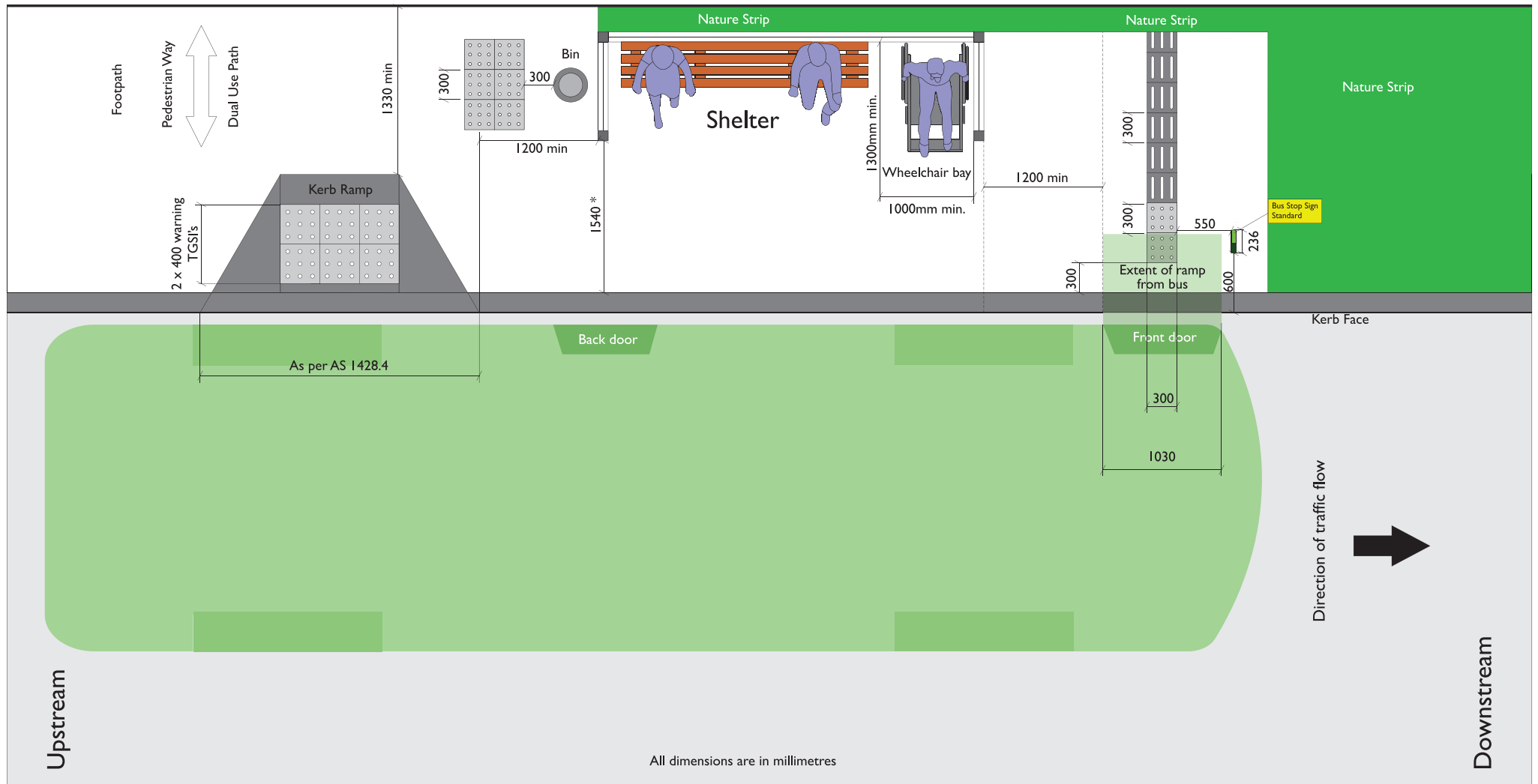
Warning TGSIs
400 x 400mm

For kerb profile and dimensioning, refer page 16 and 17

* 1540mm width where space is available.
If space is an issue minimum width is 1200mm.

Single sided shelter facing the street, with access from one side of the shelter only.

Figure 4A



Legend:

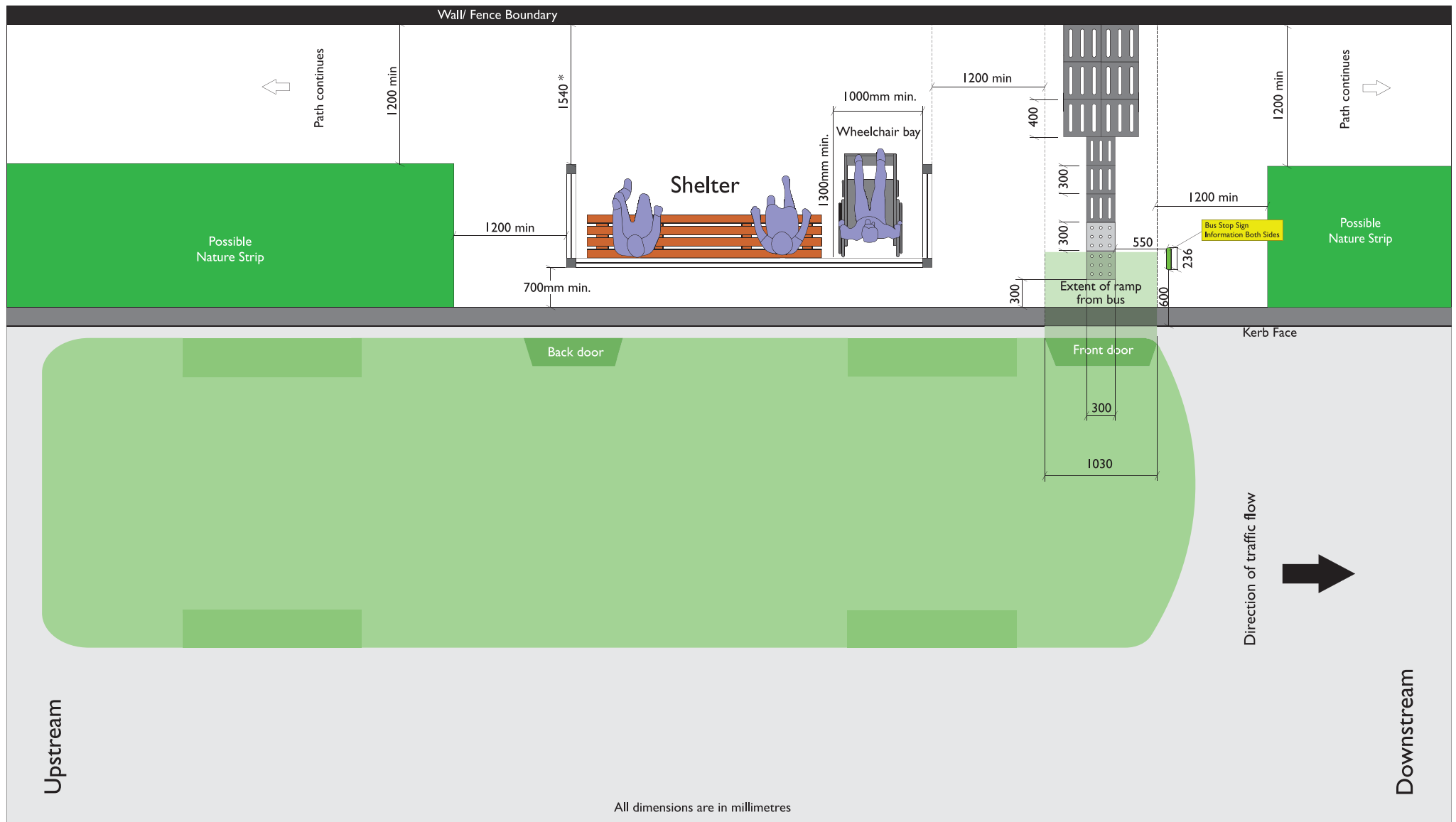
Directional TGSIs
300 x 300mmWarning TGSIs
300 x 300mmWarning TGSIs
400 x 400mm

For kerb profile and dimensioning, refer page 16 and 17

* 1540mm width where space is available.
If space is an issue minimum width is 1200mm.

Single sided shelter facing the street, with access
from one side of the shelter only.

Figure 4B



Legend:



Directional TGSIs
400 x 400mm



Directional TGSIs
300 x 300mm



Warning TGSIs
300 x 300mm

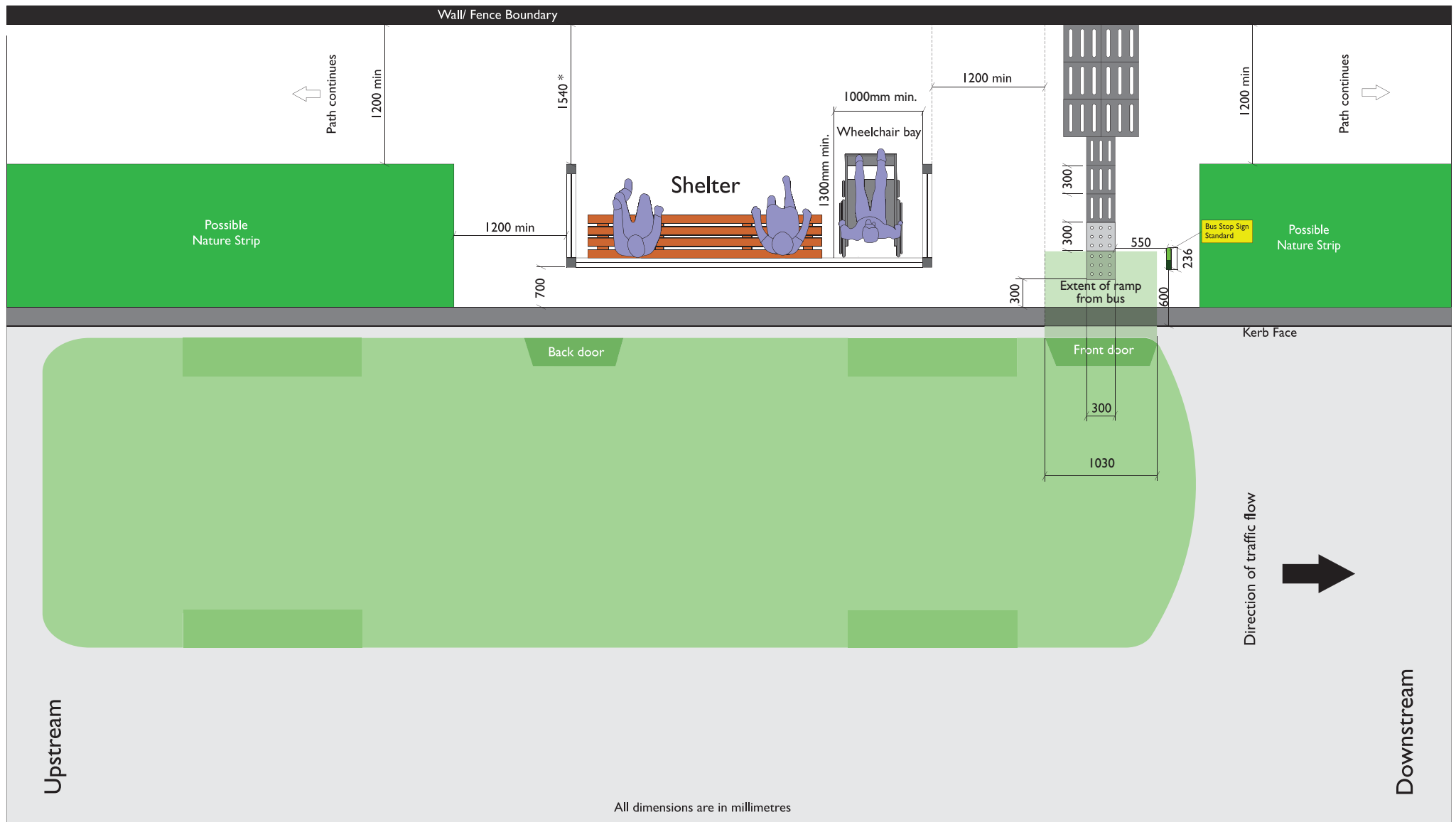
For kerb profile and dimensioning, refer page 16 and 17

* 1540mm width where space is available.
If space is an issue minimum width is 1200mm.

NOTE: TGSIs to cover extent of footpath.

Single sided shelter backing the street and facing on to footpath.
Located within nature strip on concrete pad.

Figure 5A



Legend:



Directional TGSIs
400 x 400mm



Directional TGSIs
300 x 300mm



Warning TGSIs
300 x 300mm

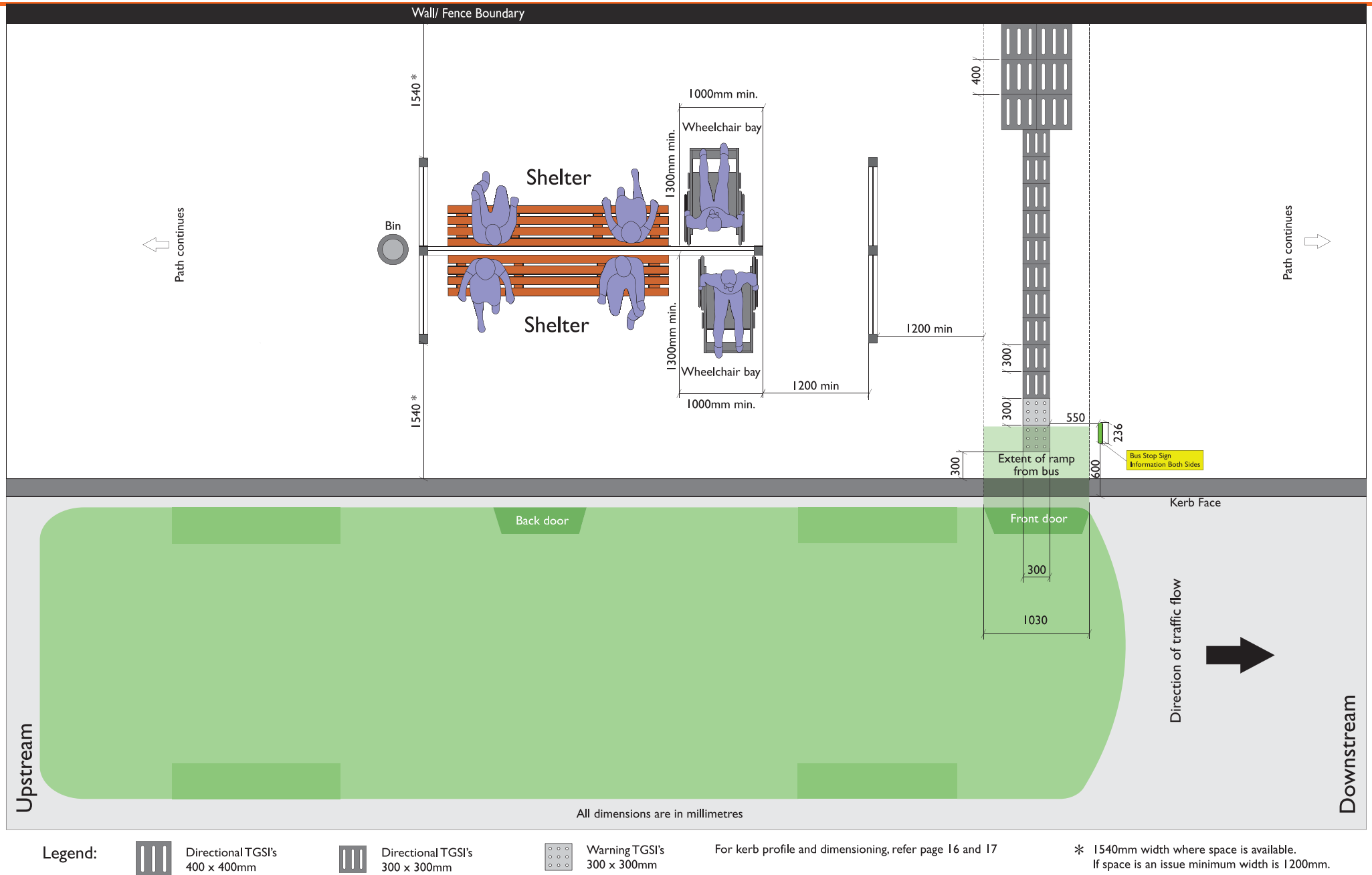
For kerb profile and dimensioning, refer page 16 and 17

* 1540mm width where space is available.
If space is an issue minimum width is 1200mm.

NOTE: TGSIs to cover extent of footpath.

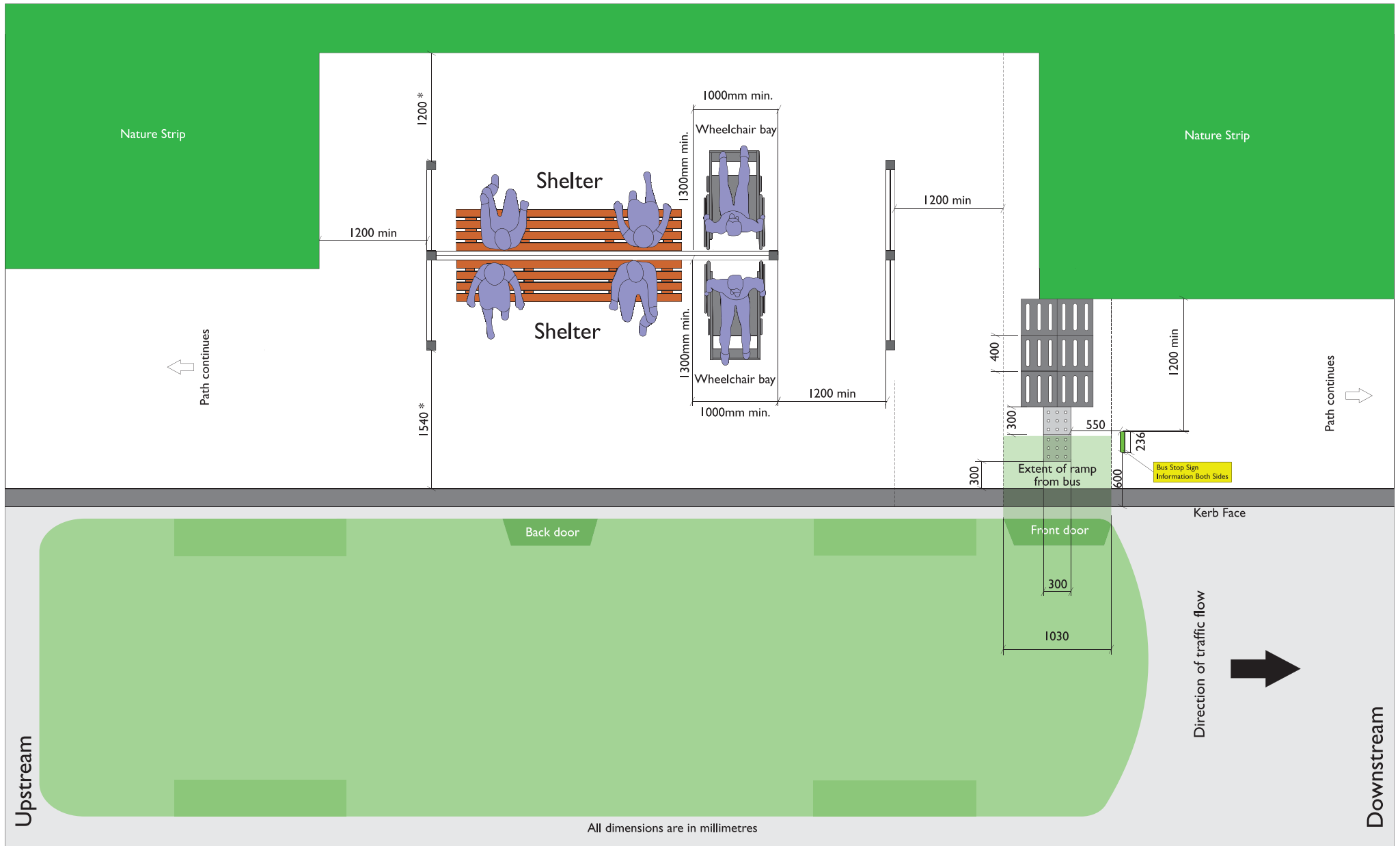
Single sided shelter backing the street and facing on to footpath.
Located within nature strip on concrete pad.

Figure 5B



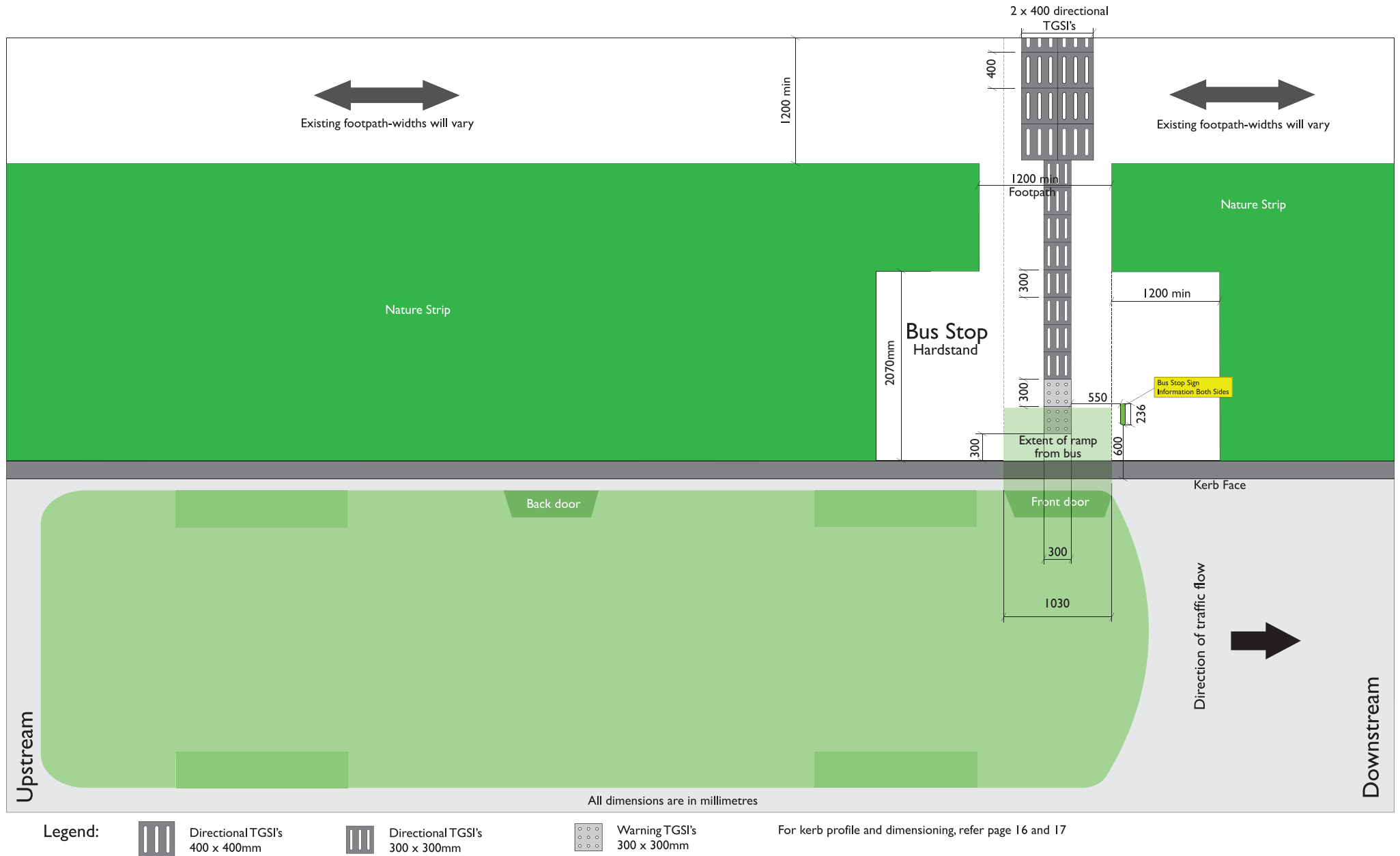
Double sided shelter located within the footpath.

Figure 6



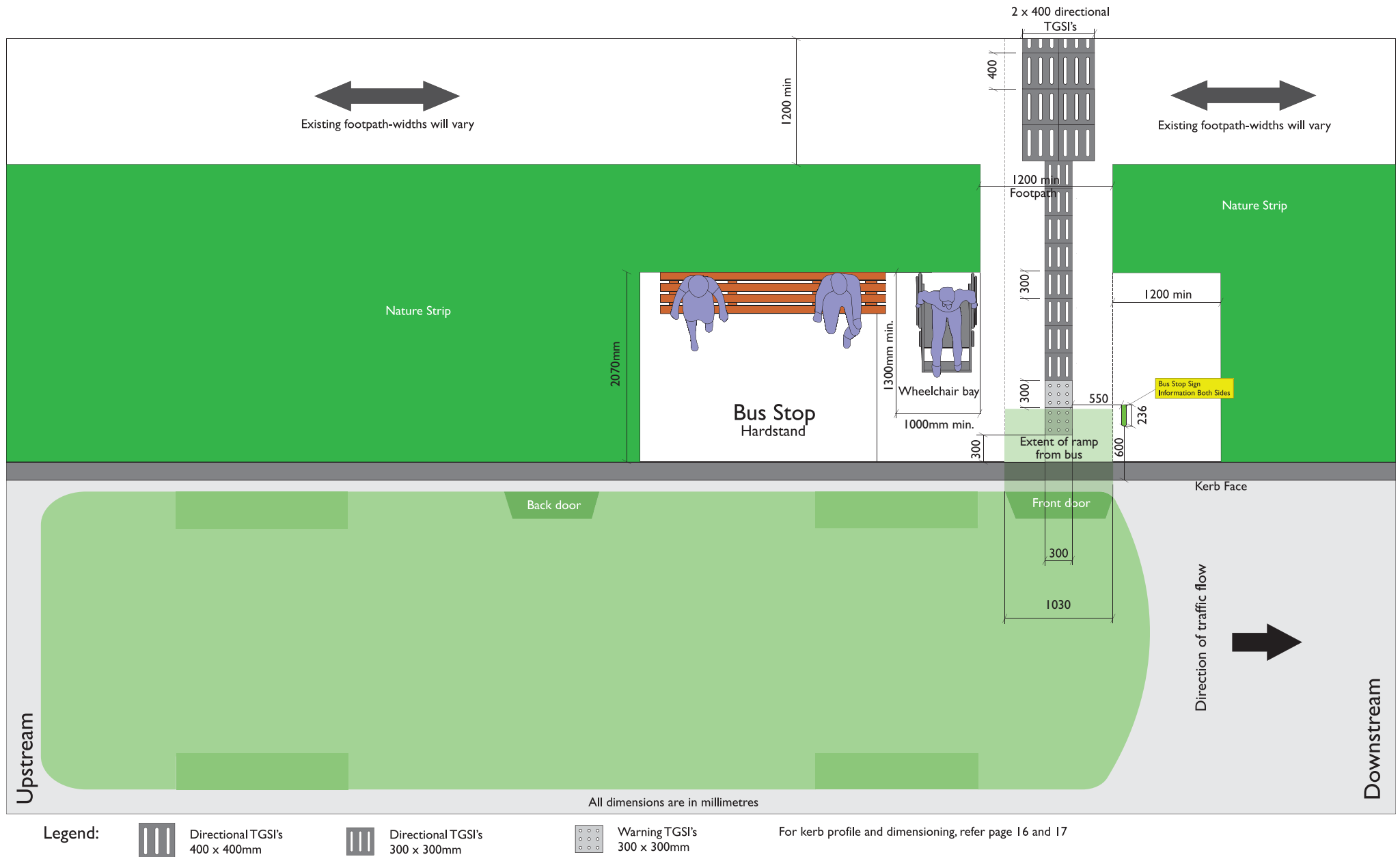
Double sided shelter with concrete pad located within footpath and nature strip.

Figure 7



Located within nature strip on concrete pad with access to nearby footpath.
No shelter or seat provided.

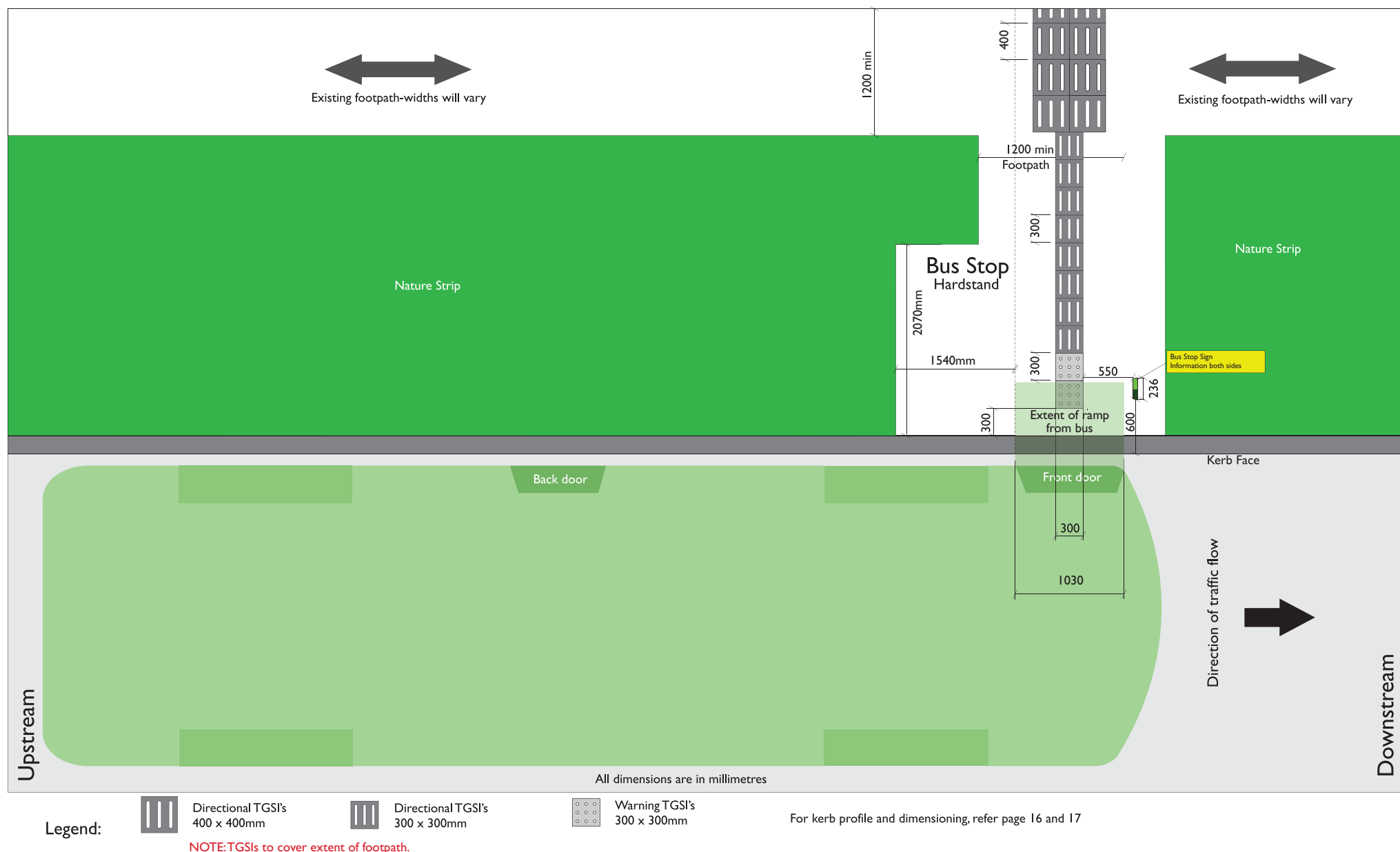
Figure 8A



NOTE: TGSIs to cover extent of footpath.

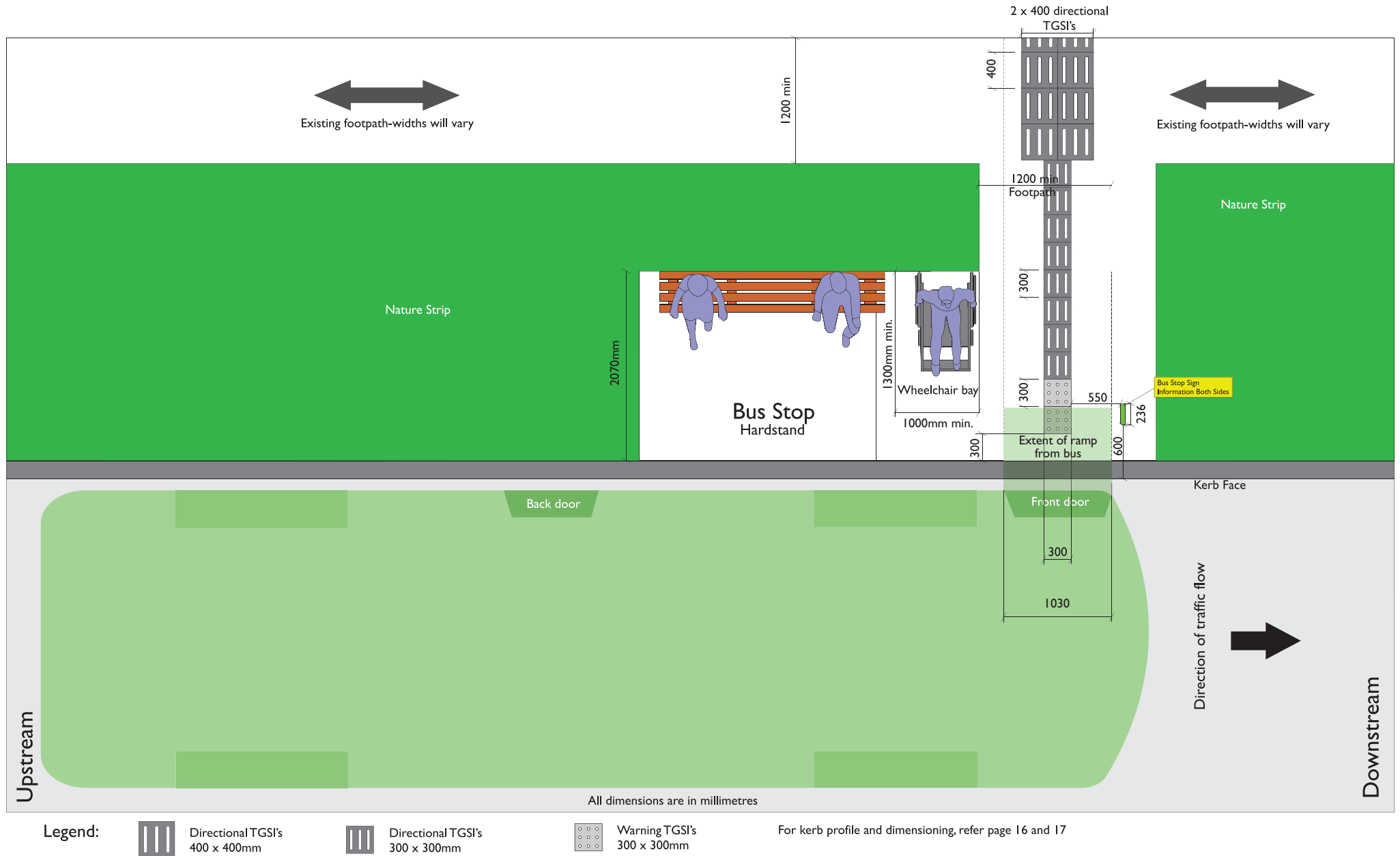
Located within nature strip on concrete pad with access to nearby footpath.
No shelter provided.

Figure 8AA



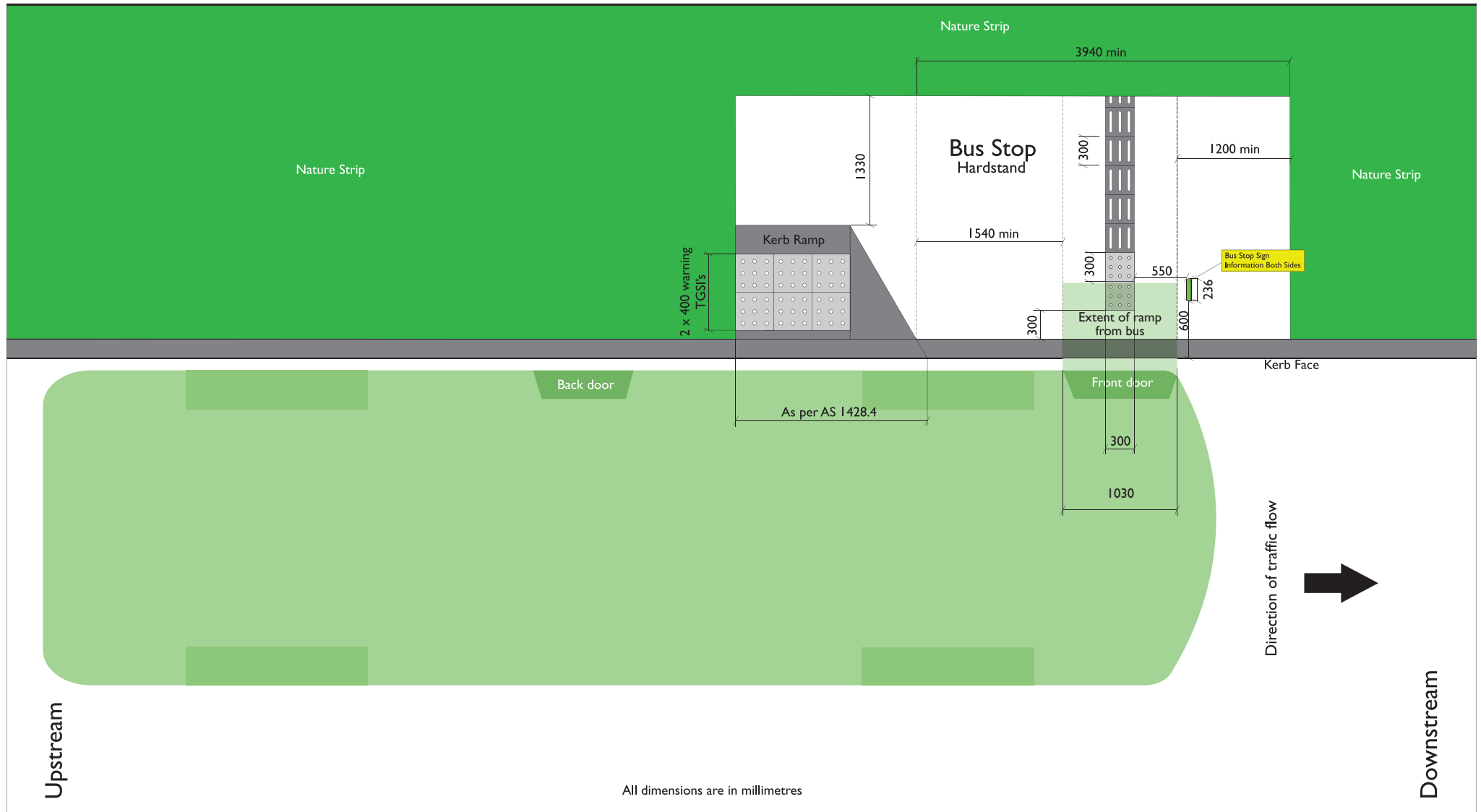
Located within nature strip on concrete pad with access to nearby footpath.
No shelter or seat provided.

Figure 8B



Located within nature strip on concrete pad with access to nearby footpath.
No shelter provided.

Figure 8BB



Legend:



Directional TGSi's
300 x 300mm



Warning TGSi's
300 x 300mm

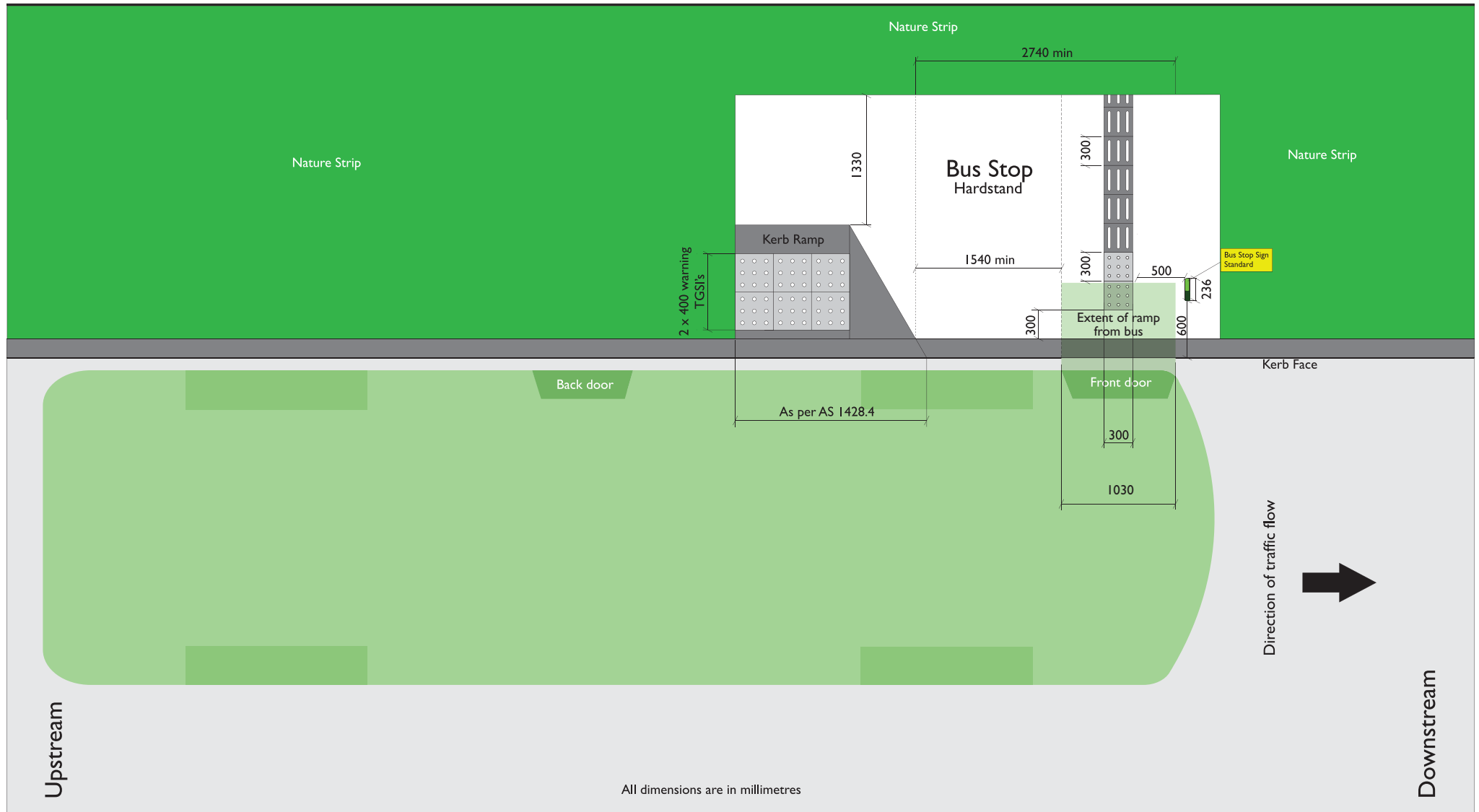


Warning TGSi's
400 x 400mm

For kerb profile and dimensioning, refer page 16 and 17

Bus Stop within nature strip with no nearby footpath.
No shelter or seat provided.

Figure 9A



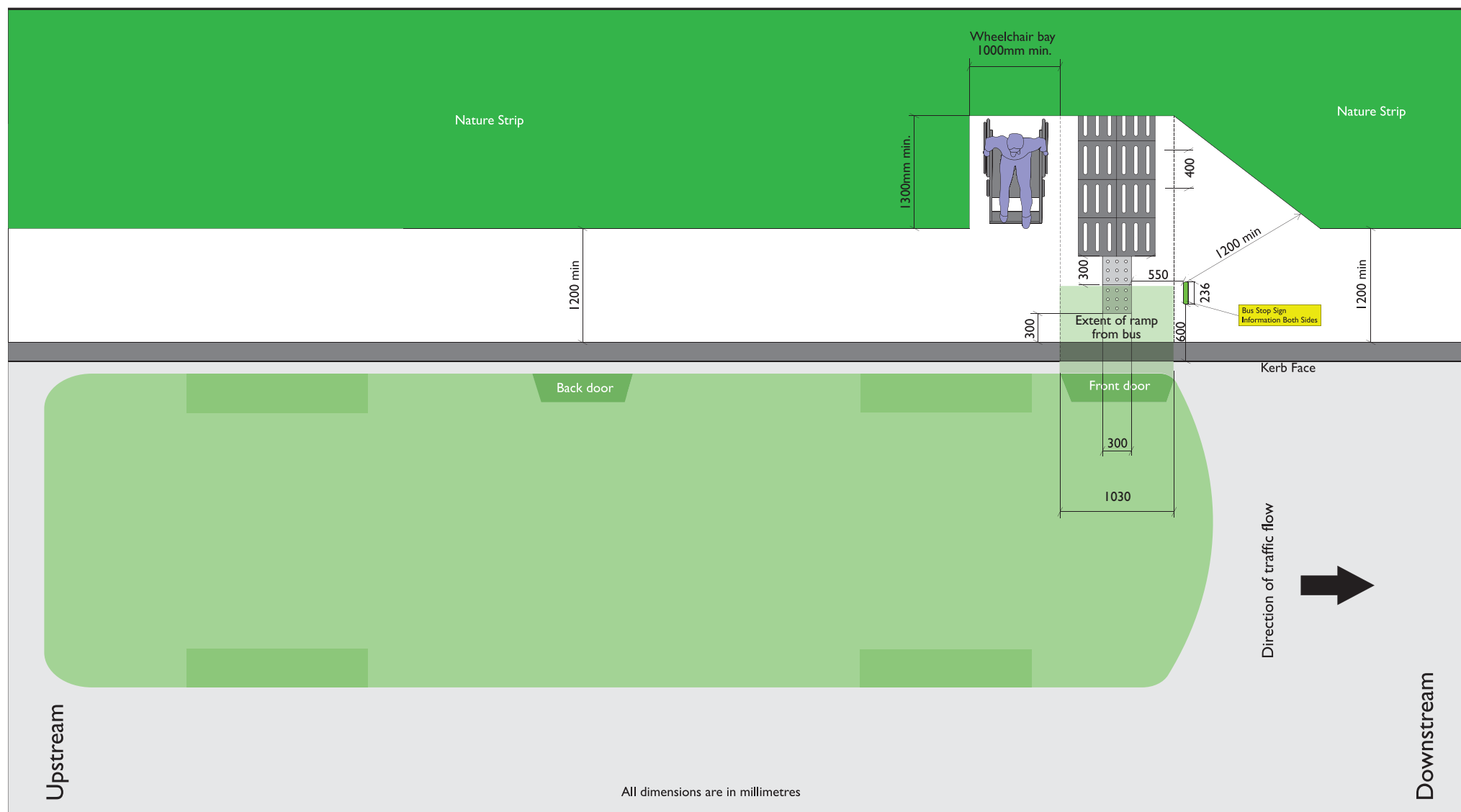
Legend:

Directional TGSIs
300 x 300mmWarning TGSIs
300 x 300mmWarning TGSIs
400 x 400mm

For kerb profile and dimensioning, refer page 16 and 17

Bus Stop within nature strip with no nearby footpath.
No shelter or seat provided.

Figure 9B



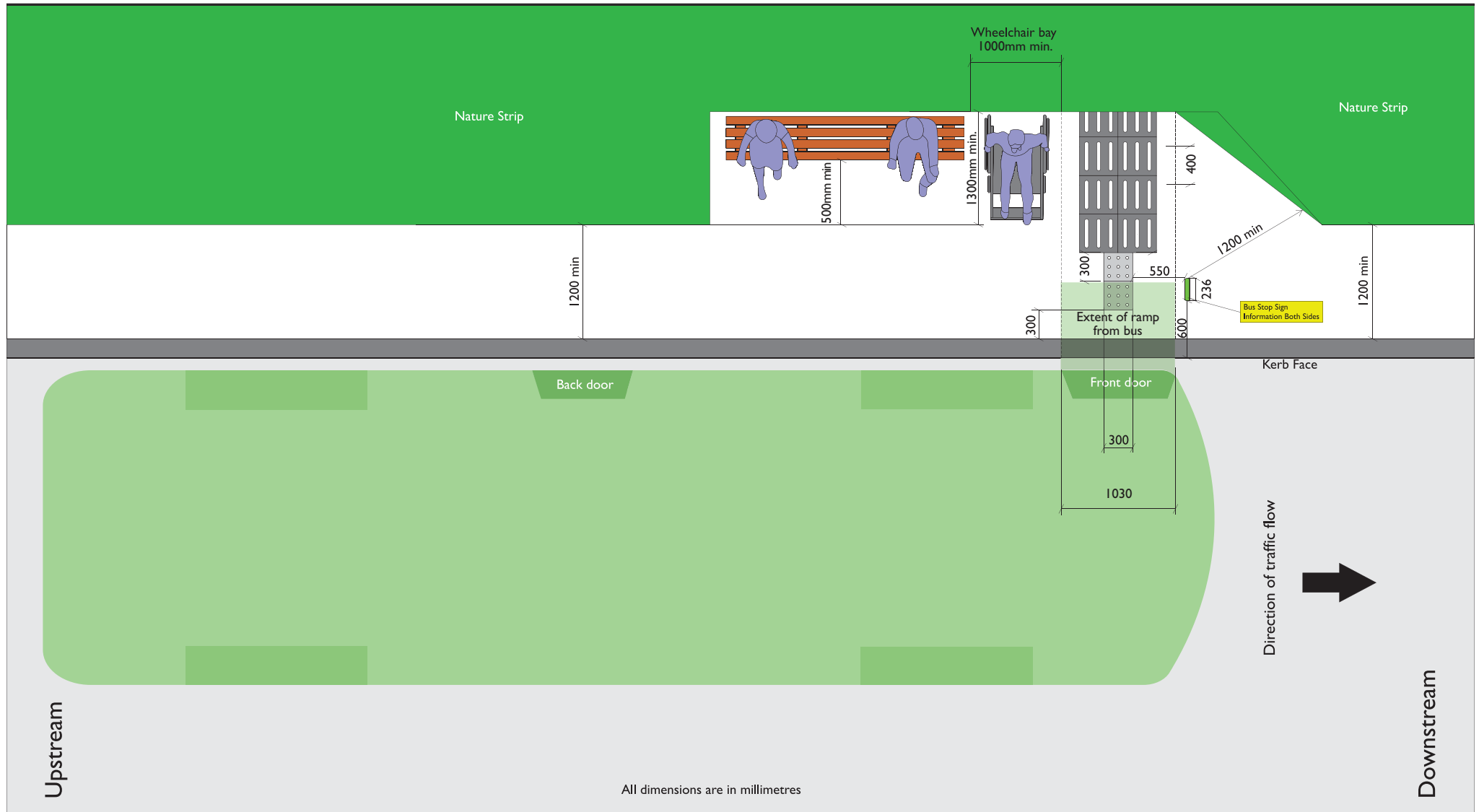
Legend:

Directional TGSIs
300 x 300mmWarning TGSIs
300 x 300mm

For kerb profile and dimensioning, refer page 16 and 17

Bus Stop within footpath and nature strip on concrete pad.
No shelter or seat provided.

Figure 10



Legend:



Directional TGSIs
300 x 300mm

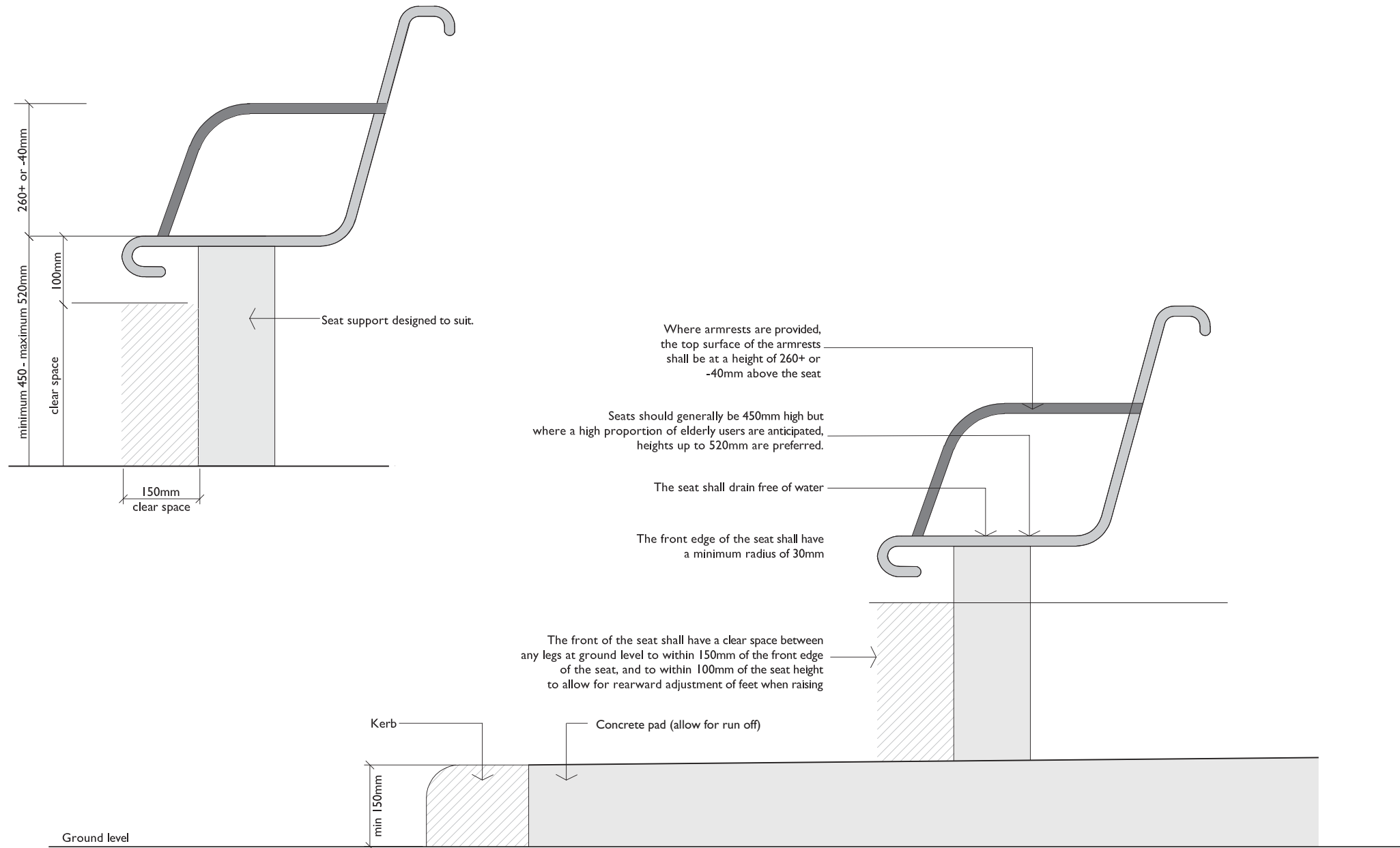


Warning TGSIs
300 x 300mm

For kerb profile and dimensioning, refer page 16 and 17

Bus Stop within footpath and nature strip on concrete pad.
No shelter provided.

Figure 10A



Bus Stop seats, with or without shelter are to comply with AS 1428.2 Clause 27.2.

Kerb and Seat with Armrest Profile

Bus Embayment

Figure 11

Indented Bus Bays

Document No: D09#54467

Revision: 2A

Date amended: 26-Feb-2009

The information below is intended to reflect the preferred practice of Main Roads Western Australia ("Main Roads"). Main Roads reserves the right to update this information at any time without notice. If you have any questions or comments please contact [Eric Findlater](#) by e-mail or on (08) 9323 4146.

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Revision Register

Ed/Version Number	Clause Number	Description of Revision	Date
1	All	Guideline Developed and Approved.	10-Sep-2002
1A	3.5.2	Drawing 9931-0198 amended.	26-Sep-2006
1B	3.5.2	Drawing 9931-0198 amended.	15-Nov-2006
1C	3.5.2	Drawing 9931-0198 amended.	21-Aug-2008
1D	3.5.2	Drawing 9931-0198 amended.	08-Nov-2008
1E	Header	Document No. 67-08-64 replaced with TRIM No. D08#223895	05-Dec-2008
2	All	Guideline Reviewed and updated.	25-Feb-2009
2A	All	Re-publish reviewed Guideline for Public Subscription Service.	26-Feb-2009

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 - 3.4. INDENTED BUS BAY FACILITIES
 - 3.4.1. PAVING
 - 3.4.2. BUS SHELTERS
 - 3.5. SIGNS AND PAVEMENT MARKING
 - 3.5.1. TRAFFIC SIGNS
 - 3.5.2. PAVEMENT MARKING

▲ 1.POLICY

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▲ 3.1.LOCATION

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▲ 3.3.DRAINAGE

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▲ 3.4.2.Bus Shelters

▲ 3.5.SIGNS AND PAVEMENT MARKING

▲ 3.5.1.Traffic Signs

▲ 3.5.2.Pavement Marking

This guideline assists the designer in respect to location, geometric design and facilities of indented bus bays. The primary objective should be to produce an indented bus bay design that provides easy and safe entry/exit travel paths along with the bus storage capacity required for the location. Indented bus bays shall be designed to comply with the access and mobility requirements in AS 1428 'Design for Access and Mobility', and the Public Transport Authority "Public Transport Bus Stop Site Layout Policy" For Universal Accessibility including Tactile Ground Surface Indicators and Wheelchair Access which can be found on their website at [www.pta.wa.gov.au/publications/PTA guidelines for public transport infrastructure](http://www.pta.wa.gov.au/publications/PTA_guidelines_for_public_transport_infrastructure).

Bus stops located within through lanes create a disruption to through traffic and may lead to driver frustration, particularly when following a frequently stopping service. As a consequence risk taking by way of overtaking a stationary bus, may increase. The use of indented bus bays permits a bus to pull clear of through traffic thereby significantly reducing the potential for rear end and side swipe type crashes.

The design of indented bus bays shall generally be in accordance with Figure 4. In situations where constraints, (such as services, availability of land) prevent the use of the preferred layout, a reduced length of exit geometry may be permitted (Figures 5 to 8). The designer should not automatically revert to the minimum geometry when restrictions occur, but strive for the maximum practical length taking into account the operating speed of the road and the road hierarchy. Any constraints requiring the bus bay to be less than the standard length should be documented by the designer. The parallel length of the bus bay shall be determined by the number and type of buses likely to stop simultaneously and should be discussed with MRWA and PTA.

The minimum width of the indented bus bay shall be 3 metres. This width shall be in addition to the existing/proposed adjacent shoulder width where provisions have been made for on road cycling. Where the demand for on road cycling is low then the 3m indented bus bay width may include the available shoulder width.. For information on pavement marking in both cases refer to Section 3.5 [Signs and Pavement Marking](#).

Normally, the crossfall within an indented bus bay should be 2% towards the adjacent traffic lane, as shown in Figure 9 and Figure 10. Where the indented bus bay is located on a right curved superelevated road alignment, the indented bus bay crossfall shall be the same as the traffic lanes, as shown in Figure 11.

For drainage spread widths applicable to indented bus bays refer to [the Design of Piped Systems](#), Table 1.2.

Figure 9

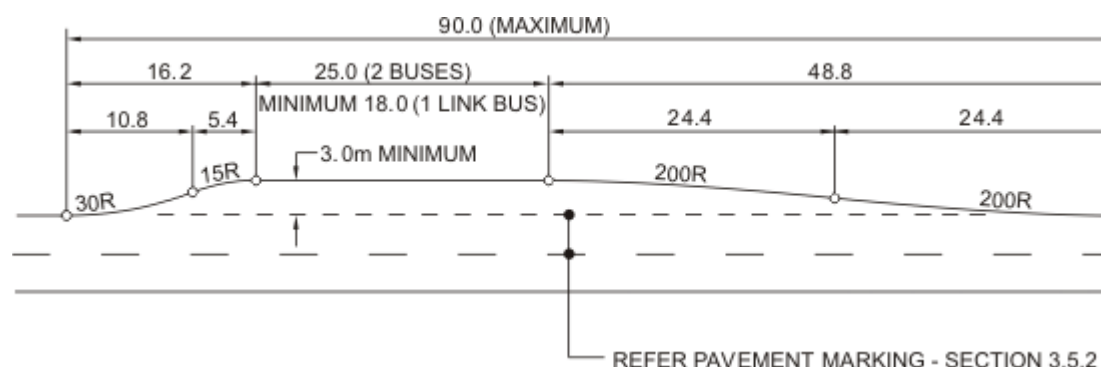
Figure 10

A paved hard standing area should be provided adjacent to the bus bay (if a footpath/shared path is not required or is not placed against the kerb) for pedestrians entering and alighting from the bus.

For further information on kerbing refer to 'Guide to the Design of Kerbing'.

Bus shelters, where provided, shall be located in accordance with the following:

- Refer to PTA's 'Public Transport Bus Stop Site Layout Policy' and to Austroads Part 5 'Intersections at Grade', 2005 Chapter 6, Table 6.3 for Entering Sight Distance.



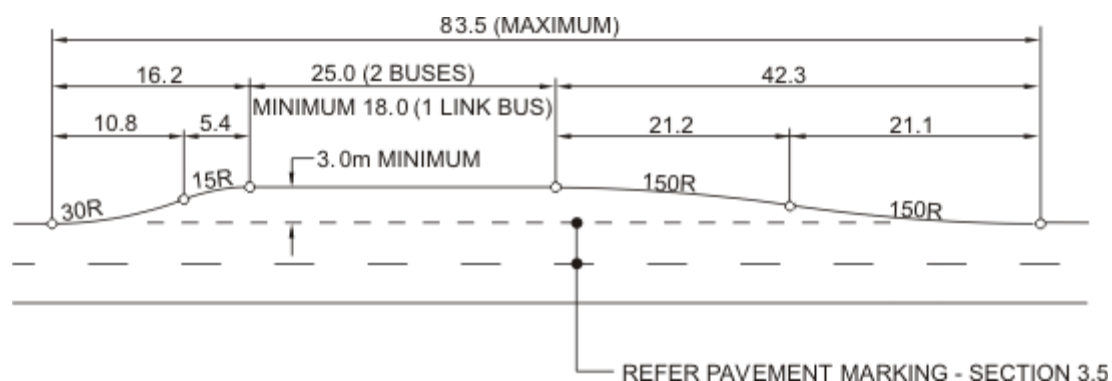


Figure 6 Restricted indented bus bay length, 83.5 m maximum

Guidelines for the placement of bus stops and indented bus bays are provided in Austroads Part 11 'Parking'. Prior to design, confirmation from PTA is required in relation to the proposed location, size and other requirements for new or relocated indented bus bays. Consultation should also take place with the local government authority (LGA) regarding all aspects of bus shelters that may be located at the indented bus bay site.

It is generally safer to locate indented bus bays well away from intersections, but where this is unavoidable, it is preferable that the indented bus bay is located on the departure side of the intersection, as shown in Figure 1 and at the offset shown in Table 1. In the event that it is unavoidable that an indented bus bay be placed in advance of the intersection, it must be located in accordance with Figure 2 and Table 1 below.

As a general rule indented bus bays should not be combined with acceleration or deceleration lanes.

The location of indented bus bays should be integrated with the street lighting layout where possible to illuminate the area for pedestrians waiting for or exiting and alighting the bus. Desirably, lighting poles should be within 5m to 10m of the pedestrian waiting area.

ROAD LOCATION TYPE	PREFERRED (after intersection)		ALTERNATIVE (approach to intersection)	
	Desirable distance from T.P.	Minimum distance from T.P.	Desirable distance from T.P.	Minimum distance from T.P.
roads under Main roads control	30m	10m	100m	40m
other roads	Location is the responsibility of local government and PTA , refer to the agencies.			

Table 1 Indented bus bay proximity to intersection depending on road type.

Longitudinal yellow continuity lines as shown on Drawing 200331-092 shall be marked across the length of the indented bus bay, including tapers, in line with the kerb face or adjacent edge lines as shown in Figures 13 and 14. Pavement marking shall be long life material in accordance with Main Roads Specification 604, "Pavements Markings".

Where practical indented bus bays shall be designed into all new and upgraded road projects that are on bus routes and under Main Roads control in locations acceptable to both Main Roads and the Public Transport Authority (PTA).

Figure 1 Proximity to departure side of intersection.

Figure 2 Proximity to approach side of intersection.

The indented bus bay should be located so that the Stopping Sight Distance for passing motorists is not compromised. It should be noted that drivers of buses departing from bus bays located on left hand curves have problems sighting vehicles approaching from the rear due to the curvature of the alignment. It is therefore not recommended to locate indented bus bays on left curve alignments unless it can be demonstrated that this problem has been overcome with modified bus bay geometry, refer Figure 3.

Figure 3 Modified geometry - Indented bus bay on a left hand curve.

Refer to Guide to Traffic Engineering Practice "Intersections at Grade" Part 5 2005, Chapter 6, Table 6.3 for Entering Sight Distance.

Figure 7 Restricted indented bus bay length, 75.7 m maximum.

Figure 8 Restricted indented bus bay length, 67.7 m maximum.

Figure 11

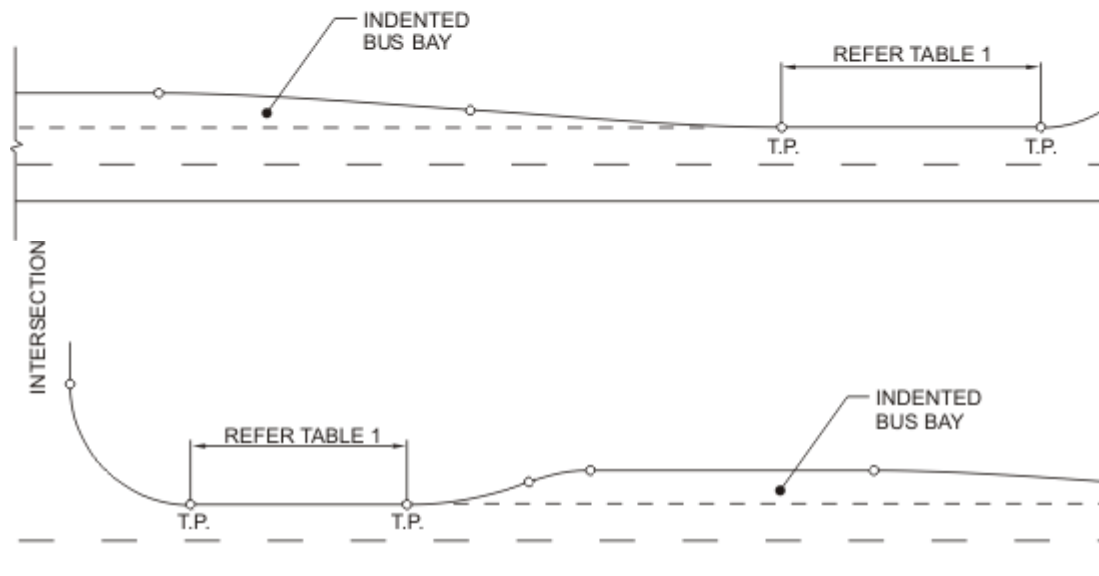
Where possible, drainage gully pits should not be placed within the length of the indented bus bay, refer Figure 12.

Figure 12 Preferred gully location.

Signs MR-RPK-6 (L or R)(equivalent to R5-20 (L or R) in accordance with AS 1742.1) are to be used at extremities of the indented bus bay. For stand-alone signs, size "A" should be used. If the "Bus Zone" sign is used in conjunction with other parking series signs, then the size will depend on the required sign layout. All other signs advising bus routes and times or associated with other facilities at the bus stop, are not traffic signs and are the responsibility of PTA.

**Figure 13 Signs and Pavement Marking.
(No cycle lane/shoulder)**

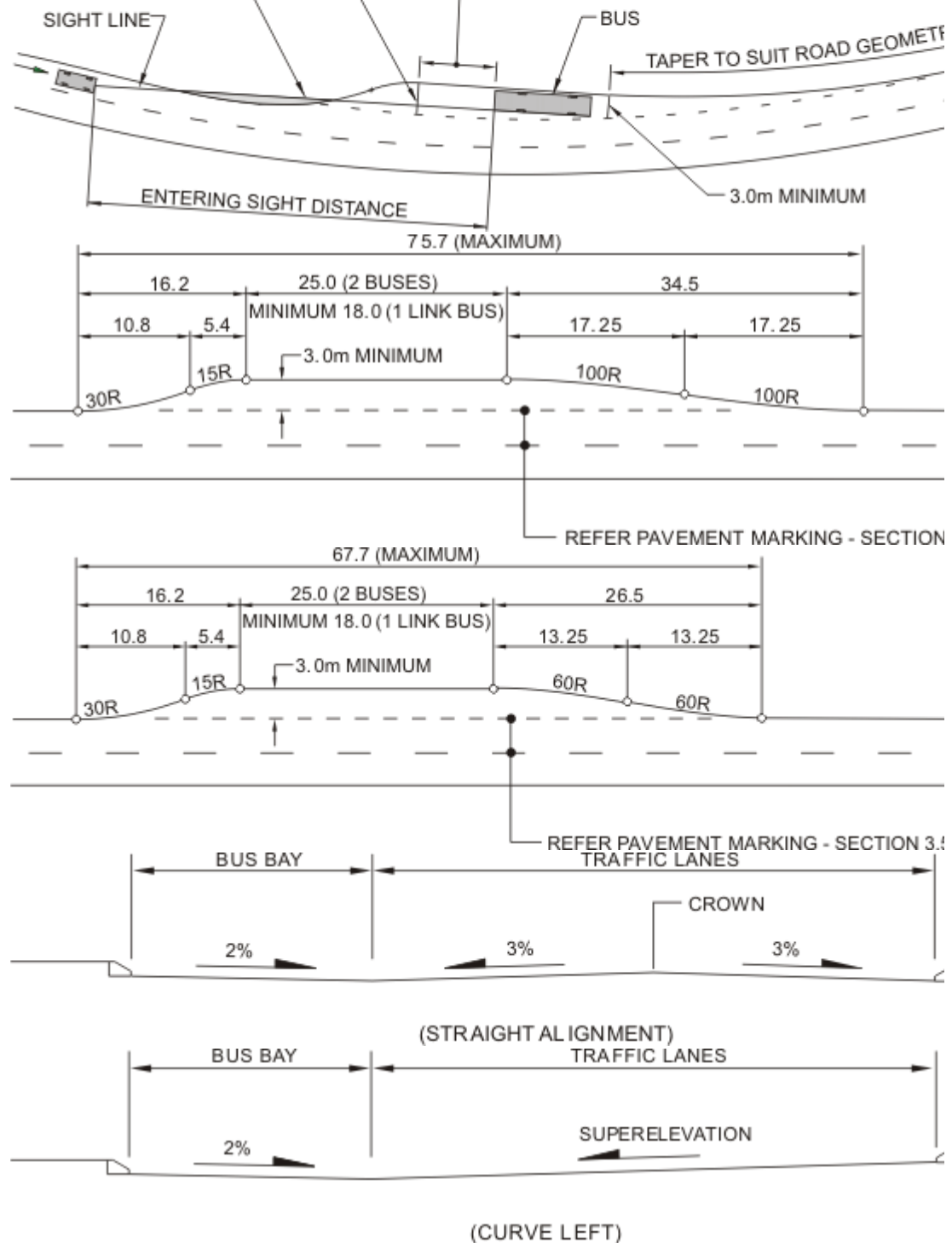
**Figure 14 Signs and Pavement Marking.
(Including cycle lane/shoulder)**

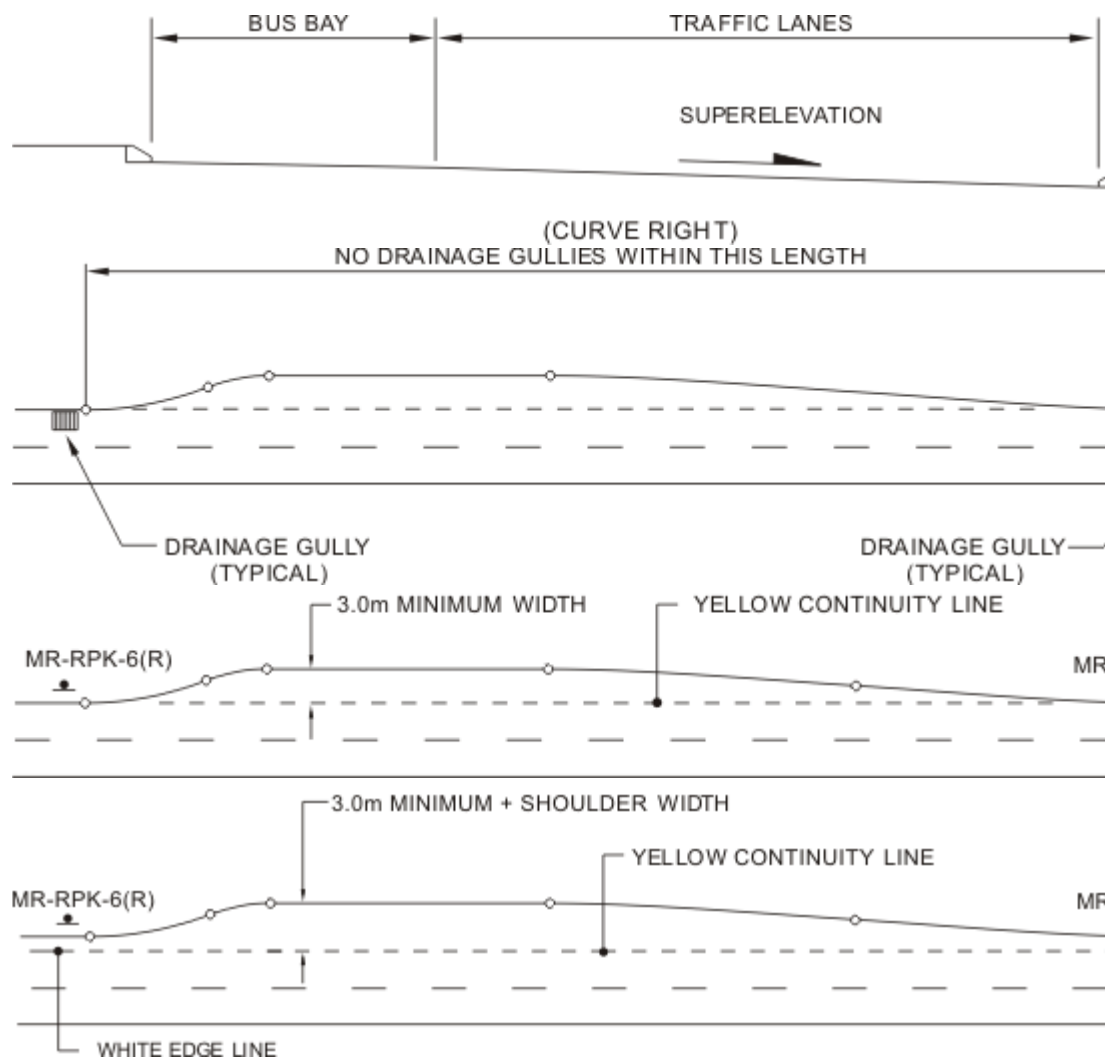


DIMENSION GREATER THAN 3.0m TO PRODUCE ANGLE TO GIVE ENTERING SIGHT DISTANCE.

NO OBSTRUCTIONS IN THIS AREA

LENGTH TO ALLOW BUS TO BE CORRECTLY POSITIONED PARALLEL TO KERB.





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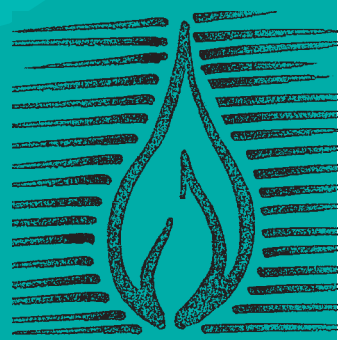
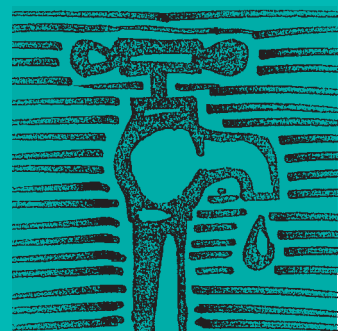
RESTORATION AND REINSTATEMENT

RESTORATION AND REINSTATEMENT SPECIFICATION

FOR LOCAL GOVERNMENTS
IN WESTERN AUSTRALIA



Institute of Public Works
Engineering Australia
WA Division Inc.



RESTORATION AND REINSTATEMENT SPECIFICATION FOR LOCAL GOVERNMENTS

This Specification has been endorsed by the Utility Providers
Services Committee (Western Australia)



**Institute of Public Works
Engineering Australia
WA Division Inc.**

**Produced by the Institute of Public Works
Engineering, Australia (WA Division)**

Applicable from October 2002

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1. RESTORATION OF NON-TRAFFICABLE AREAS (PRIVATE PROPERTIES, ROAD VERGES AND PUBLIC OPEN SPACES)

1.1 GENERAL REQUIREMENTS

The Contractor shall engage the services of a qualified horticulturist in an advisory capacity for the duration of the Contract.

The Contractor shall obtain onsite guidance regarding restoration from the horticulturist both as necessary and to the satisfaction of the Superintendent.

Sheds, lawns gardens, street trees, street furniture, fences, walls, pavements and other property improvements which have been affected by construction work shall be restored to the pre-construction condition and/or as specified herein using new materials, plants and turf as necessary.

All trenches left open shall be securely barricaded, sign posted and illuminated in accordance with statutory and regulatory requirements.

Restoration work shall be managed so as to comply with specific conditions including the sequence and completion time constraints for various work components as specified in the respective Sections of the Specification or as detailed on Drawings.

1.2 DEFINITIONS

“Restoration” in this section is the work undertaken to reinstate a disturbed non-trafficable area of the road reserve, private property or public open space.

1.3 DETAILED RESTORATION REQUIREMENTS

1.3.1

Structures and Paving (Private Properties)

In private properties all structures (eg. fences, walls, sheds, garden beds) paving (eg. brick, concrete) concrete slabs and footpaths shall be restored at least to previous condition and dimensions by competent and experienced specialist tradesmen (and/or subcontractors), using compacted bedding new imported materials as necessary and work practices to recognised manufacturer’s requirements and Australian Standards for these works.

1.3.2

Footpaths

The trench backfill shall be as specified to within 200mm of the surface over the width of the footpath crossing (and 0.1m beyond each edge) and then sand bedding of minimum 95% MOD 100mm compacted thickness shall be provided.

Sawcuts shall be made at existing panel joints each side of the damaged section. The panel shall be replaced with a 100mm thick concrete slab (poured insitu) with broomed finish and isolation expansion joints of suitable full depth bitumen impregnated fibre board (or equivalent) at both ends of the restored footpath section. Transverse contraction joints of minimum depth of 20mm shall be spread at intervals not exceeding 2.0m along the path and expansion joints shall be spaced at a maximum of 6.0 metre. Concrete shall be a suitable mix of 25MPa compressive strength at 28 days as specified for kerbing in Clause 2.6.3. Curing shall be carried out as specified in Clause 2.6.6.

1.3.3

Shrubs, Trees, Plants and Garden Beds

Advice from the Local Government and Superintendent shall be sought by the Contractor

regarding trees and shrubs requiring removal or trimming prior to this work commencing on site.

Trees, shrubs, plants and garden beds that are damaged or removed shall be replaced using advanced trees (of the same species as those removed) matured to at least three years and shrubs and plants to the property owner's satisfaction. The surface is to be restored using the stockpiled topsoil for the top 200mm compacted to a density of the surrounding soil. The areas shall be mulched as necessary to match surroundings or previous condition.

All damaged borders/walls surrounding garden beds shall be fully restored using new materials as necessary.

1.3.4

Ungrassed/Sparsely Grassed Surfaces

The surface of ungrassed/sparsely grassed surfaces shall be reinstated using the stockpiled topsoil raked to a smooth level finish. The areas shall be top dressed lightly with suitable sand and raked as necessary to remove all ruts and depressions.

1.3.5

Grassed/Lawn Areas (unable to be turfed)

The stockpiled topsoil of grassed/lawn areas (unable to be turfed) shall be re-spread, raked smooth and watered. If necessary, it shall be rotary hoed to break up lumps and lightly top dressed with a suitable sand to create a surface equal in appearance to the surrounding area. Shredded lawn or grass runners shall be planted and established. The planting shall be suitably fertilised and watered in.

1.3.6

Established Lawns (able to be turfed)

The underlying layers of topsoil previously stockpiled shall be replaced and raked smooth. If necessary, the area shall be rotary hoed to break up lumps.

The previously stripped and stacked turf shall then be re-laid and lightly compacted. A light top dressing of suitable sand shall then be applied, the surface raked to a smooth, neat appearance and the area watered.

In the event of the turf dying or deteriorating before the formal acceptance of this work, as specified in Clause 1.3, the Contractor shall replace the turf using new turf of the same species obtained from a reputable commercial nursery. The turf shall be suitably fertilised before watering in.

1.3.7

Contaminated Topsoil

If the stockpiled topsoil has been contaminated during construction, the Contractor shall provide clean loam fill for the top 200mm compacted to the density of the surrounding top soil.

1.3.8

Sprinklers and Reticulation Systems

Sprinkler and Reticulation systems shall be restored, using new parts as necessary, to achieve a standard of working order as previously agreed with the property owner by the Contractor.

Failure to agree any reduced standard in writing with the property owners/occupier previous to the disturbance of reticulation shall render the Contractor liable to return the system to full working order, despite it's previous condition.

1.4 ACCEPTANCE REQUIREMENTS

1.4.1

Maintenance until Acceptance

The Contractor shall be responsible for, and maintain restoration, for each property and adjacent verge until it has been formally accepted.

Alternative arrangements by the Contractor with any of the respective owners/occupier shall not diminish the responsibility of the Contractor in this regard.

1.4.2*Final Acceptance of Restoration Works
(Non-Trafficable Areas)*

Acceptance of restoration work will include acceptance of restoration of private properties as confirmed in writing by the respective property owners. The acceptance of the verges by the local authority must be endorsed by the Superintendent, after inspection by the local authority, in order for the Contractor to have reached full compliance under this Clause.

Acceptance of restoration work standards by the owners of properties affected by the work shall be in the format of a signing off of the previously issued Notice of Entry by the property owner.

In the event of disagreement between the Contractor and an owner regarding disturbed services, plant or property, the standard of restoration work for the purpose of acceptance shall be determined by the Superintendent. In the further event of the owner not being available, the Contractor should obtain the signature of bonafide agent of the owner on the acceptance form.

The above notwithstanding, any subsidence of an area of restoration shall be remedied by the Contractor within two (2) working days of the occurrence and/or notification of such defect. These repairs shall be carried out by the Contractor as necessary to maintain the safety of the Site to the satisfaction of the Superintendent otherwise the Local Government will be authorised to carry out the remedial work at the Contractor's cost.

2.**RESTORATION OF
TRAFFICABLE AREAS
(ROAD PAVEMENTS)****2.1 SCOPE AND DEFINITIONS****2.1.1***General*

This section of the Specification shall apply to the reinstatement of pavements, (including driveway crossovers) kerbing and stormwater drainage works disturbed during the construction of utility infrastructure.

2.1.2*Workmanship*

The Contractor shall ensure that all works are completed to the minimum requirements as specified. The works are to be carried out using skilled employees and/or sub-contractors with proven expertise and experience in this field of work; to the satisfaction of the Superintendent.

2.1.3*Definitions*

“Local Government” shall mean the Local Government in whom the affected roads, right of ways, public access ways and reserves are vested, and shall include any duly authorised officer of that Local Government.

“Pavement” shall include any road, footpath or driveway pavement: with spray sealed flexible pavements, asphaltic concrete paving, brick paving, concrete slabs or other.

“Restoration” in this section is the work undertaken to reinstate a disturbed trafficable area (or road pavement) of the road reserve.

2.1.4

Authority to Inspect Works by Others

The Contractor shall permit the Local Government's Inspector to enter upon the Works at any time for the purpose of inspecting and assessing the reinstatement of trenches and pavements and verges.

2.1.5

Authority to Give Instructions

All instructions to the Contractor shall be given by the **Superintendent** or its representative.

2.2 PLANNING REQUIREMENTS

The Contractor shall within 14 days of being awarded the Contract submit proposals for approval by the Superintendent (and the Local Government) for:

- discharge of dewatering into the existing stormwater drainage;
- location for storage/spoil sites/site compounds;
- sub-base and basecourse materials - tests of bulk samples;
- spray sealing, including spray rates and aggregate applications for bituminous seals;
- job mixes for asphaltic concrete (if applicable).

For any **traffic diversion** the Contractor shall refer to the traffic management requirements of the Utility Providers Code of Practice (2002).

The Contractor shall present a traffic management plan to the Local Government, advertise road closures in the local community newspaper and implement traffic management requirements of the Utility Providers Code of Practice (2002).

The Contractor shall also:

- a) obtain and conform with Local Government standard stormwater drainage pit drawings, drainage pit reconstruction requirements, kerb-type requirements and stormwater construction specification; and
- b) advertise commencement of the Works to the Local Government's requirements in the local community newspaper;
- c) give a minimum of ten working days notice prior to commencement of excavation work on Site and:
 - arrange an initial condition inspection of the Local Government's improvements/roadways with the Local Government and the Superintendent.
 - record the level of the deterioration of the Local Government's improvements and agree such recording with the Superintendent before any disturbance of the roadways occurs on Site. (Photographs and video recordings shall be included as necessary);
 - provide the Superintendent for approval the intended program of road restoration works including the elected pavement restoration proposals in accordance with the specification (pavement layer/wearing surface thickness and materials) for each street \roadway, to the Superintendent for approval. The Contractor shall hand excavate the existing pavements sufficiently to confirm the existing pavement material types and thicknesses in determining the restoration requirements for each street/test lot.
 - complete an As Constructed survey (and submit the 1:10 natural scale drawings) of the existing sealed roads with cross-sections at 10m intervals and levels of low points along the entire extent of the roadways to be affected by the utility infrastructure works, unless otherwise approved by the Superintendent.
 - report all unauthorised disturbance/damage to the Local Government's improvements to the Superintendent within one (1) day of occurrence of the event.

2.3 PAVEMENT CONSTRUCTION

2.3.1

Pavement Layers

The pavement shall consist of:

- a) subgrade;
- b) flexible pavement including
 - sub-base;
 - base course;
 - sub-base and combined base course; and
 - thick lift asphalt basecourse
- c) wearing course including
 - prime (or Primer seal) and Bituminous Spray Seal;
 - prime (or Primer seal) and Asphaltic concrete;
 - two Coat Seal; and
 - concrete.

2.3.2

Subgrade

Materials used for backfilling of trenches shall be clean sand free of clay and compacted in layers with a maximum depth of 300mm.

The Contractor shall allow to reinstate the pavement to pre-existing As-Constructed levels as surveyed previously. Notwithstanding this requirement, the Contractor shall adjust the finished pavement levels locally to ensure the road is free draining and there are no undrained areas isolated from main drainage points.

The subgrade shall be compacted to a minimum of 95% Modified Dry Density Ratio in accordance with either AS 1289.5.4.1 or AS 1289.5.4.2. Where assigned values are used under AS 1289.5.4.2, the validity of the assigned Maximum Dry Density and Optimum Moisture Content shall be verified for conformance with the standard on a continual

basis. Where the materials tested are too variable to produce an assigned value complying with the limits specified in AS 1289.5.4.2, testing shall be carried out to AS 1289.5.4.1 This standard requires the laboratory Dry Density/Moisture Content Relationship to be determined at each site tested for field density determination.

The laboratory Dry Density/Moisture Content Relationship shall be determined in accordance with AS 1289.5.2.1 with the value adjusted for the presence of any oversize materials as required by AS 1289.5.4.1.

The subgrade shall be graded smooth, free of any loose foreign materials across its width and level, and uniformly compacted.

The Contractor shall ensure that the completed subgrade is free of contaminants prior to and during the placement of pavement materials.

2.3.3

Flexible Pavement (sub-base, basecourse)

a) General

- The flexible pavement restoration shall be constructed of crushed limestone, lateritic gravel or crushed rock to match the types of materials in the existing pavement layers.
- The **classification** of the various roads on the Works shall be as determined by the relevant local authority.
- In all cases, the compacted thickness of the restored flexible pavements (sub-base and/or base course) over the sewer trench/excavation shall not be less than that of the existing pavement.
- where the existing basecourse is emulsion or cement stabilised material the Contractor shall restore the pavement using such stabilised material in lieu of crushed limestone in accordance with the local authority's specification for stabilisation.

b) Flexible Pavement Structure

The requirements of Clause 2.3.3(a) above, notwithstanding, where the trench is excavated in an existing roadway the Contractor shall choose between the following alternatives unless pavement structures have been specified by the Local Government.

i) For Main Roads/Industrial Roads/District Distributor Roads

- 330mm minimum thickness lateritic gravel (or granite road base); or
- 200mm minimum thickness limestone sub-base and 130mm minimum thickness lateritic gravel (or crushed granite) base course.

ii) For Local Distributor Roads

- 300mm minimum thickness lateritic granite or gravel road base; or
- 200mm minimum thickness limestone sub-base and 100mm minimum thickness lateritic crushed granite or gravel base course; or
- 175mm + 75mm asphalt.

iii) For Access Roads

- 200mm minimum thickness limestone; or
- 150mm minimum thickness limestone sub-base plus 100mm minimum thickness base course. (Lateritic gravel or crushed granite); or
- 175mm + 75mm asphalt

iv) For All Existing Unsealed Gravel Pavements

The restoration shall consist of a gravel pavement to match the existing material type (with a minimum thickness of 200mm) compacted to 98% modified dry density ratio in accordance with AS 1289.5.4.1.

c) Pavement Material Placement and Finishing

Before placement of any pavement material and as part of the subgrade preparation works, the sides of the remaining trench prepared for receiving the pavement material shall be cut clean to achieve a uniform plane surface, free of any loose or foreign material (including pavement materials, such as sand.)

Flexible pavement shall be made up of sub-base and base course. The base course shall be constructed of crushed rock (road base) or natural gravel. The sub-base shall be limestone, natural gravel or crushed rock according to the existing pavement.

The flexible pavement material shall be laid in layers not greater than 150mm (200mm for limestone) or less than 100mm compacted thickness, with light scarification between layers to ensure bonding.

Appropriate construction mixing methods shall be applied to ensure uniformity of the material qualities when laid and without segregation along the trench length.

The pavement shall be compacted using mechanical compactors. Hand operation to be used in confined areas, however, self propelled driven mechanical plant shall be used where trench area allows.

Sub-base pavements shall be compacted to a minimum of 95% Modified Dry Density Ratio and basecourse pavements to a minimum of 98% Dry Density Ratio in accordance with either AS 1289.5.4.1 or AS 1289.5.4.2. Where assigned values are used under AS 1289.5.4.2, the validity of the assigned Maximum Dry Density and Optimum Moisture Content shall be verified for conformance with the standard on a continual basis. Where the materials are tested are too variable to produce an assigned value complying with the limits specified

in AS 1289.5.4.2, testing shall be carried out to AS 1289.5.4.1. This standard requires the laboratory Dry Density/Moisture Content Relationship to be determined at each site tested for field density determination.

The laboratory Dry Density/Moisture Content Relationship shall be determined in accordance with AS 1289.5.2.1 with the value adjusted for the presence of any oversize materials as required by AS 1289.5.4.1.

The surface shall be in a tight and uniformly bound condition with no evidence of layering, cracking or disintegrating, and free of loose, dusty, stony or slurried areas with texture like a mosaic tile finish.

The surface shall be true to level and at any point shall not deviate by more than 10mm from a 3m straight edge.

d) Materials

i) Crushed Rock (Road Base)

Crushed rock shall be manufactured from hard, durable stone free of clay lumps, organic matter and other deleterious substances. The material may be crusher run or screened and recombined and be freshly blended prior to delivery.

When tested in accordance with AS 1289 C6.1 the particle size distribution shall comply with the limits prescribed in the following table:

AS SIEVE SIZE (MM)	PERCENTAGE PASSING BY MASS
26.5	100
19.0	95-100
13.2	70-90
9.5	60-80
4.75	40-60
2.36	30-45
1.18	20-35
0.60	13-27
0.425	11-23
0.075	5-11

The ratio of the portion passing 0.075mm sieve to the portion passing 0.425mm sieve shall fall within the range of 40-60%.

Crushed rock passing the 0.425mm sieve shall have the following properties:

• Liquid limit shall not exceed	25%
• Plasticity index shall not exceed	3
• Linear shrinkage shall not exceed	2%
• If non-plastic, the material shall have a maximum dry compressive strength of not less than	1700 kPa
• The Los Angeles abrasion loss shall not exceed	35
• The wet/dry strength variation shall not exceed	40%
• Flakiness index shall not exceed	35
• The soluble sulphate salt content, expressed as percentage sulphate by mass of crushed rock shall not exceed	0.1%

ii) Laterite Gravel Base Course

Laterite gravel shall consist of durable laterite pebble in soil mortar. The material shall be quarried from sources approved by the Superintendent, shall not contain any roots, organic matter or other deleterious material, and shall conform to the following requirements.

a) Particle size distribution

The grading of the portion passing a 37.5mm AS sieve shall conform to the following.

AS SIEVE SIZE (MM)	PERCENTAGE PASSING BY MASS
37.5	100
19.0	71-100
9.5	50-81
4.75	36-66
2.36	25-53
1.18	18-43
0.425	11-32
0.075	4-19

b) Soil constraints

The portion of the sample passing the 0.425mm sieve shall conform to the following:

- i) Liquid Limit - not greater than 25%;
- ii) Plasticity Index shall not exceed 3;
- iii) Linear Shrinkage - not greater than 3%;
- iv) Maximum Dry Compressive Strength (MDCS) - not less than 1700 kPa; and
- v) California Bearing Ratio (CBR) - not less than 80%

Where required by the Superintendent, the material shall have a 4 day soaked CBR

value of not less than 80% for a specimen compacted to 98% modified dry density ratio in accordance with AS 1289.5.4.1 at or near its optimum moisture content.

iii) Crushed Limestone Rubble Sub-base Material

The crushed limestone rubble shall be obtained from an approved source, and shall be free from sand, roots and other foreign material, and shall not contain either oversize spalls or capstone or an excessive proportion of fine grained material.

The percentage of wear of the crushed limestone, determined by the Los Angeles test, shall not exceed 60% or be less than 20%.

The calcium carbonate content of the crushed limestone shall not be less than 70% nor in excess of 85% by mass when chemically tested with hydrochloric acid.

The maximum dry compression strength of the limestone shall not be less than 1700 kPa.

The crushed limestone for sub-base shall comply with the following grading requirements when tested in accordance with AS 1289 C6.1:

SIEVE SIZE (SQUARE OPENING AS SIEVE)	PERCENTAGE PASSING BY MASS
75mm	100%
19mm	60-80%
2.36mm and less	20-40%

Sampling and testing of crushed limestone rubble shall be in accordance with AS 1141.

A sample shall be taken and tested by the Contractor for calcium carbonate content, percentage of wear, grading and determination of the maximum dry density of the material.

If the material varies in quality or is obtained from various quarries, each variation in quality, or, material from each quarry used shall have this test performed by an approved NATA Testing Authority and a record shall be maintained by the Contractor as to where the various materials have been placed.

e) Sampling and Testing Sub-Base and Base Course Material

At the commencement of production or supply of sub-base and base course material the Contractor shall take two representative bulk-samples from the first 50 tonne of each material. During placement, the Contractor shall take at least one representative bulk-sample of the material from each successive 200 tonne of material from each source and intended for delivery to the Site.

The bulk-samples shall be taken in accordance with the requirements of AS 1141.3.

For the material in each bulk-sample of material obtained in accordance with the requirements specified, the Contractor shall determine each of the properties detailed in the preceding paragraphs for the sub-base and base course material. Test results shall be submitted to the Superintendent for approval.

Any material which would break down with ageing or weathering to such an extent that it would then fall outside the limits of the Specification, shall be rejected.

2.4 WEARING COURSE

2.4.1

General

All priming and binder application operations shall be undertaken by use of approved truck mounted spray equipment.

The application of primer and binder by hand lance will be limited to areas considered impracticable to be treated by truck mounted sprayers.

All works adjacent to the spraying operations (including concrete kerbs, brick paving etc). shall be protected by appropriate covers. All entries to drainage structures shall be blocked to prevent entry of bitumen. Drip trays shall be placed under spray bars when sprayer is stationary.

Records of all spray application rates shall be forwarded to the Superintendent within seven (7) days of application.

2.4.2

Wearing Course Structure

The surface wearing course shall be one of the following alternatives:

- gravel (for gravel pavement);
- prime (or primer seal) and bituminous spray seal;
- prime (or primer seal) and asphaltic concrete seal;
- emulsion tack coat and thicklift asphaltic concrete;
- two coat seal; or
- concrete.

a) Existing Wearing Course - Gravel

The restored gravel surface shall match the existing surface material.

b) Existing Wearing Course - Spray Seal

The new surface-spray seal shall match the pre-existing seal type for each road.

c) Existing Wearing Course - Asphaltic Concrete

Where the existing surface is asphaltic concrete seal, the minimum wearing course for restoration shall be as follows:

i) **For Main Roads/Industrial Roads/District Distributor Roads**

- Straights;
Prime plus 30mm minimum thickness, 10G, 75 blow asphaltic concrete.
- Major Intersections;
Prime plus 40mm minimum thickness, 14G, 75 blow asphaltic concrete.

ii) **For Local Distributor Roads**

- Prime plus 30mm minimum thickness, 10G, 50 blow asphaltic concrete.

iii) **For Access Roads**

- On limestone pavement -
50mm minimum compacted thickness 14G, 50 blow asphaltic concrete.
- On roadbase base course -
Prime plus 25mm compacted thickness 7G, 50 blow asphaltic concrete.

Road surface remedial works, shall be carried out by the Contractor in addition to the wearing courses specified above, in accordance with the technical specification as published by the IPWEA and AAPA.

Driveway crossings damaged by the excavation works shall be reinstated to Clause 2.7 requirements.

2.4.3

Priming

a) Authority to commence priming

Priming shall not be undertaken until the pavement has been inspected by the Superintendent (in the company of the Local Government inspector).

b) Application

Priming shall not be carried out during inclement weather conditions and the prepared base course shall be sufficiently dry.

Before priming, the edges of the existing wearing course shall be uniformly and vertically cut (sawn) on both sides over the entire length of the trench. Wherever practical the sawn cut shall be parallel to the trench being prepared for pavement restoration. The asphaltic concrete edges shall be profiled. All areas of intrusion/overlap into the adjoining pavement shall be cut to a rectangular shape.

The sections of undamaged existing road-way surface, between the areas of trench intrusion into the existing surface, which are less than 2.0m in length, shall be removed to allow continuous rectangular sections of primed surfaces.

The edges of existing sprayed seal shall be prepared in accordance with the requirements for the sprayed seal specification. The resultant edges shall adhere properly and uniformly with the underlying pavement and be uniform in line, with deviations along a 3m straight edge of no more than 40mm.

The pavement and adjacent existing seal to 500mm width shall be broomed free of all loose material and dust, and any defects are to be made good. The prime shall be applied to a slightly dampened flexible pavement.

The primer shall be applied at a rate of 1.2 litres/m² to the approved surface course for its full width with an overlap to the adjacent existing seals of 25mm.

The primer shall be a cutback primer consisting of 50% residual bitumen and 50% power kerosene or, should weather conditions preclude the use of cutback primer, the Superintendent may approve a 60/40 cationic bitumen emulsion applied at a rate of 1.5 litres per square metre, measured at a temperature of 15 degrees Celsius. The cutback primer shall be applied at a temperature of 60 degrees Celsius. Emulsion primer may be heated to a maximum temperature of 50 degrees Celsius if conditions warrant.

c) Blinding

For cutback primer apply sand or 1.5mm aggregate after penetration of the primer but while sufficient bitumen is on the surface to allow adhesion. Sand or aggregate shall be applied at a sufficient rate to prevent lifting of the primed surface by vehicles.

For emulsion primer the blinding shall be a nominal 7mm aggregate applied immediately after spraying at a rate not less than 1 cubic metre per 150 square metres and sufficient to prevent lifting of the primed surface by vehicles.

The surface is to be multi-tyre rolled until the aggregate is firmly embedded in the primer.

The surplus aggregate shall be swept up and removed from Site not less than seven days after the completion of the rolling.

d) Protection of primed surface

The Contractor shall suitably protect the primed surface from excessive wear prior to the application of the surface seal. All damaged areas of prime shall be repaired without loss of integrity of the surrounding prime.

2.4.4

Bituminous Spray Seal (Single Coat)

The sprayed seal shall be a single coat hot bitumen seal Binder class 170 bitumen with the following properties:

PROPERTY	14MM AGGREGATE SEAL	10MM AGGREGATE SEAL
Binder Mix (Bitumen: Cutter)	98:2	98:2
Anti-Stripping Agent	0.2%	0.2%
Bitumen Minimum Application rate hot	1.6 litres/L/m ²	1.4 litres/m ²
Aggregate Size	14mm	10mm

The aggregate size shall match that of the existing road surface seal (as closely as possible).

The bitumen application rate and properties shown above are a guide only. The actual spray rates are subject to the average least dimension characteristics of the aggregate, the type of surface to be sprayed and traffic volumes for the street section. Details of the physical properties of aggregate to be used shall be submitted by the Contractor at least 10 days prior to spraying.

Spraying shall not take place during rain or when rain appears imminent. Bitumen shall be applied by spray bar or hand lance by a skilled experienced operator only when it is impractical to utilise a spray bar.

Precoated cover aggregate shall be applied uniformly immediately following spraying, and one pass with steel roller first and then rolled with rubber rollers to ensure full embedment and adhesion. Any stripping, flushing etc shall be remedied by the Contractor, at the discretion of the Superintendent in consultation with the local authority.

Care shall be taken to ensure a smooth, neat finish.

The new sprayed seal shall overlap the existing seal by 300mm.

All excess aggregate shall be swept up and removed from Site not less than seven days after the completion of the rolling.

2.4.5

Two Coat Seal

The seal shall consist of a two coat emulsion seal, as specified below. The bitumen application rate and properties shown above are a guide only. The actual spray rates are subject to the average least dimension characteristics of the aggregate, the type of surface to be sprayed and traffic volumes for the street section.

Details of the physical properties of aggregate to be used shall be submitted by the Contractor to the Superintendent at least 10 days prior to spraying.

a) Materials

i) Binder

Binder shall consist of cationic bitumen emulsion conforming with the relevant Australian Standard.

ii) Aggregate

14mm and 7mm aggregates shall be crushed granite free of dust, clay, excessive moisture and other deleterious substances.

Aggregate shall be crushed from hard, sound durable rock. The percentage loss as measured by the Los Angeles Abrasion Test shall not exceed 30.

Particle size distribution shall be within the limits prescribed in the following table for the nominal size specified.

AS SIEVE SIZE (MM)	PERCENTAGE PASSING BY MASS	
	14MM	7MM
19.0	100	-
13.2	95-100	-
9.5	0-30	100
6.7	0-5	85-100
4.75	-	0-40
2.36	-	0-10
0.600	0-2	0-2

Average least dimension of aggregates shall comply with the requirements of the following table for the nominal size specified.

SEAL - COAT	NOMINAL SIZE (MM)	ALD (MIN) (MM)
First Coat	14	6.4
Second Coat	7	3.5

All aggregates shall be free of excess dust, and the Superintendent may order the washing and/or precoating of dusty aggregate.

b) Plant

i) Spraying equipment

Spraying equipment shall comply with the requirements of the AUSTROADS 'Specification for Performance Requirements for Mechanical Sprayers of Bituminous Materials'.

Unless otherwise permitted, the sprayer shall have a minimum tank capacity of 2000 litres.

When requested by the Superintendent, provide a current certificate and calibration chart issued by the Main Roads, Western Australia before commencing spraying operations.

ii) Rollers

A self-propelled static pneumatic rubber tyred roller of approximately 15 tonnes mass shall be used.

Steel rollers, vibrating rollers and drawn rollers of any type shall not be used for sealing work.

iii) Trucks

The tipper trucks shall be fitted with approved tail-gate mounted metal spreaders.

c) First Coat

The emulsion application rate shall be confirmed by the Contractor 7 days prior to commencement.

Unless otherwise directed by the Superintendent an application rate of 1.4 litres/m² (measured at 15 degrees Celsius) and 80m²/m³ of 14mm nominal size aggregate shall be adopted by the

Contractor. The Contractor shall confirm the application rate with the Superintendent a minimum of seven (7) days before proceeding with this work.

When the flexible pavement has been compacted, trimmed and approved, the Contractor shall sweep the surface with a suitable rotary broom to remove dust and debris and until a mosaic of well embedded stone is showing on the surface. Areas inaccessible to the mechanical broom shall be swept by hand.

No traffic shall be allowed on the broomed surface.

The Contractor shall notify the Superintendent at least 24 hours in advance of intention to spray.

Before work commences weather conditions shall be dry and reasonably calm. The pavement temperature shall be not less than 15 degrees Celsius.

The pavement shall be lightly watered so that the surface is damp, but not wet. In the event of excess water being applied, bitumen spraying shall not proceed until the surface has dried and been recompacted to the satisfaction of the Superintendent.

The Contractor shall protect all works in the vicinity of spraying operations. Concrete kerbs, brick paving, etc, shall be covered with sand, building paper or bags. The Contractor shall place drip trays under spray bars when sprayer is stationary.

Immediately after the emulsion has 'broken', the Contractor shall spread 14mm aggregate on the binder. The aggregate shall be adequately rolled with a rubber tyred roller. Any areas of binder not covered with aggregate from the metal spreaders shall immediately be covered manually. During the rolling process, the drag broom shall be used to ensure an even spread of aggregate.

d) Second Coat

The second coat may, unless specified otherwise, be placed immediately after the first.

Emulsion application rates shall be confirmed by the Contractor prior to commencement. Unless otherwise directed by the Superintendent an application rate of 2.0 L/m² (measured at 15 degrees Celsius) and 120 m²/m³ of 7mm nominal size aggregate shall be adopted by the Contractor. The Contractor shall confirm such application rate with the Superintendent a minimum of seven (7) days before proceeding with this work.

Prepare the surface by sweeping with the drag broom to ensure an even spread of the aggregate placed in the first coat.

Protect all works in the vicinity of spraying operations. Concrete kerbs, etc, shall be covered with sand, building paper or bags. The entries to drains and sumps shall be closed.. Drip trays shall be placed under spray bars when sprayer is stationary. (Kraft paper shall be used to ensure that all joins are neat and straight.)

The Contractor shall not commence sealing until the road surface temperature has reached 15 degrees Celsius.

Immediately after the emulsion has 'broken' the Contractor shall cover the binder with 7mm aggregate. Binder which is not covered by aggregate from the metal spreader shall be covered manually.

The area shall be rolled with pneumatic tyred roller with tyre pressures adjustable in the range 550 kPa to 700 kPa.

The minimum amount of rolling shall be at a rate of 4 roller hours per 4,500 litres of bitumen sprayed and the following conditions shall apply:

- i) the whole of the area shall have received at least one roller pass within 2 minutes of covering;
- ii) after the initial slow pass by the pneumatic tyred roller the speed of rolling shall be increased to the minimum practicable for the area being sealed;
- iii) at least 25% of the rolling shall be applied within 2 hours of covering;

- iv) at least 50% of the rolling shall be applied within 4 hours of covering;
- v) the whole of the rolling shall be completed within 3 days of covering;
- vi) the rolling shall be carried out between the hours of sunrise and sunset; and
- vii) at the time of rolling, excess aggregate shall be removed and/or additional aggregate applied as required. The surface shall be drag broomed until it is uniformly covered with aggregate thoroughly embedded in the binder.

When the aggregate has been evenly spread and embedded in the binder, any remaining loose particles from the pavement shall be removed.

e) Acceptance

i) General

Acceptance of sealed surfaces shall be subject to the availability of certified test results and quality certificates for the work carried out.

ii) Tolerances

Actual rate of application of binder shall be in the range of 95% to 105% of the ordered rate.

iii) Defective Work

If the actual rate of application of binder is less than 95% or more than 105% of that ordered, the surface shall be resealed as directed by Superintendent (after removal of the previously sprayed seal as necessary, at the discretion of the Superintendent).

In any case, all unravelled, stripped slick or fatty surfaces shall be repaired as directed by the Superintendent.

2.4.6

Asphaltic Concrete

Asphaltic concrete works are to be carried out as per Technical Specification "Tender Form and Schedule

for Supply and Laying of Asphalt Road Surfacing" published by the Institute of Public Works Engineering, Australia.

2.4.7

Concrete

Unless otherwise specified, concrete pavements shall be reinstated using class N25 concrete to minimum 100mm thickness, or the original concrete pavement thickness, whichever is the greater, on approved subgrade.

The surface finish of the concrete shall be as close as practical to the existing, in both colour and texture.

Additional concrete beyond the damaged area shall be removed and replaced back to the nearest existing joint even if undisturbed by the sewer trench works.

Concrete shall be cured for 72 hours using PVC sheeting weighted with wet sand. All sand and plastic shall be removed from Site on completion of curing.

2.4.8

Remedial Works for Damaged Road Surfaces

a) When Existing Wearing Course is less than Ten Years Old

i) 75% Lane Disturbance

If the width of the trench and trench intrusions into existing pavements (including the adjacent seal overlaps) is greater than 75% of road lane width then the whole of the road lane width shall be resurfaced to match the existing road surface. A road lane refers to half of unmarked roadways or the width of marked lanes.

ii) Greater than 50% Roadway Disturbance

Where the trench disturbance is greater than half the total road width then the whole road shall be seal/resealed in accordance with

Clause 2.4.4 after the appropriate wearing course restoration over the trench.

**b) All Existing Road Surfaces
(irrespective of age)**

i) Reseal of Undamaged Seal Against Kerbs

In the case of trenching in the roadway, where an existing section of roadway of maximum 1.0m width remains undamaged against kerbs, resealing shall occur over both the trench and this undamaged section of roadway using a spray seal in accordance with Clause 2.4.4, after the appropriate wearing course restoration over the trench.

ii) Damage To Existing Adjacent Road and Driveway Crossing Surfaces

The adjacent road surfaces shall be appropriately protected from damage from the likes of construction vehicles, placement of manhole sections, excavated rock indentations etc.

Where damage occurs to the existing road/driveway surface, ie. gouges, scrapes or potholes; the contractor shall repair the surface to previous condition.

The repair may involve the spraying of a reseal (in accordance with sealing requirements of Clause 2.4) of the entire road pavement (lane) or resurfacing of the entire driveway crossing area as appropriate and at the discretion of the Superintendent in consultation with the Local Government.

Only Asphalt Hotmix (minimum compacted thickness of 25mm) will be accepted as a suitable patching material, (where a pre-patching material and sprayed reseal and sprayed reseal is required).

iii) Parallel Cracking

Where parallel cracking of the existing road surface occurs along the edge of a trench then the reinstatement shall be widened both to a line 200mm beyond the extremity of the cracking and so as to produce a consistent width of restoration.

c) Finished Pavement Grades

Unless otherwise approved by the Superintendent, the Contractor shall complete an As Constructed survey of the existing wearing surface at 10m intervals and low points along the entire extent of road affected by the utility infrastructure trenching. This shall be forwarded to the Superintendent for information. The Contractor shall reinstate to the As Constructed levels. Notwithstanding this requirement the Contractor shall adjust finished pavement levels locally to ensure the road is free draining as there may be locations in flat roads where previous consolidation has created undrained areas isolated from the main drainage points.

d) Damaged Concrete Pavements

If excavation damages existing concrete pavements including paths and crossovers the damaged concrete shall be removed back to the nearest control joint and replaced to match the existing pavement in accordance with Clause 2.4.7 of the specification.

2.4.9

Reinstatement of Road Markings and Signs

a) When a Stop/Holding line is removed the Contractor shall immediately inform the Main Roads WA Faultline on 1800 800 009 in the Metropolitan or South West Regions of the details and location of the lines removed. The Contractor shall inform the Main Roads Regional Office if the works are in other Regional areas (refer to the Utility Providers

Code of Practice (2002) Appendix A for contact details). Stop signs shall not be removed unless approved by the Superintendent.

- b) Immediately upon completion of road pavement restoration the Contractor shall install temporary Stop and Holding lines in the location of the lines they have removed. 3M temporary tape (or similar) is to be used for the lines. The width of the temporary line is to be a minimum of 150mm wide, and it is to be placed in accordance with Main Roads WA standard.
- c) Immediately upon restoration of the road pavement wearing course the Contractor shall reinstate all road line markings that have been removed by the works under the Contract, by arrangement with Main Roads WA. Any signs damaged or removed in carrying out the works shall be replaced immediately by the Contractor.

2.5 PAVEMENT TESTING AND INSPECTIONS

2.5.1

General

The Contractor shall supply copies of all test certificates to the Superintendent and the Local Government within seven (7) days of testing on Site.

All testing for subgrade, sub-base, basecourse and wearing course layers shall be carried out by a NATA registered testing laboratory as approved by the Superintendent.

The Contractor's NATA registered testing authority shall be a completely independent firm and/or entity to that of the firm involved in the laying of the pavement and/or wearing course layers.

Payment for NATA registered testing of pavements and wearing courses as specified (not including penetrometer testing) shall be made only for the successful tests in the accepted final group of tests certifying a completed Test Lot of works.

The Contractor shall advise the Superintendent and the Local Government that a section of reinstatement work area is ready for inspection with a minimum of one (1) working days notice at the following key times:

- on completion of trench backfill, (prepared subgrade) prior to placing pavement;
- on completion of pavement prior to primer application and;
- on completion of primer application, and prior to application of seal/wearing course.

2.5.2

Compaction Testing Equipment

The Perth Sand Penetrometer calibrated to correlate with the required density shall be used for testing subgrade compaction.

For flexible pavement layers, nuclear density meters shall be used for compaction testing, with a maximum modified dry density test completed for each test point. For gravel basecourse material an assigned value for the Modified Dry Density Ratio may be used provided the material is uniform in a nature and complies with AS 1289 Clause 5.4.2.

a) Trench/Excavation Backfill Compaction

Compaction of backfill in trenches/excavations and around new and existing structures:

Compaction testing of backfill material shall be done along the length of the trench or excavation for a maximum of 15m. Compaction testing around junction pits and access chambers shall be done at least one on each side.

b) Subgrade Compaction

Subgrade shall be compaction tested at a minimum rate of one test per 30 linear metres and one test for each section between structures less than 30m apart under pavements. Particular emphasis on testing will be made to ensure that adequate compaction has been achieved around structures.

The above notwithstanding, a minimum number of 3 tests shall be carried out for each Test Lot.

**c) Base Course/Sub-base Course
Compaction**

The base course and sub-base shall be compaction tested at the minimum rate of one test per 50 linear metres and one test for each section between structures less than 50m apart.

The above notwithstanding, a minimum number of 3 tests shall be carried out for each Test Lot.

d) Asphaltic Concrete

Audit core tests of the asphaltic concrete wearing course may be undertaken by the Superintendent to determine Marshall density/stability, thickness of asphalt course, bitumen content and percentage air voids.

Samples may be taken as required and tests carried out by a NATA registered laboratory, on behalf of the Superintendent.

2.5.4

Reporting of Test Results

Copies of test result certificates (both failed and successful) for each appropriate test lot, shall be submitted to both the Superintendent and the Road Authority by the Contractor within seven (7) days of testing of each Test Lot. Satisfactory completed submissions in this regard shall be pre-requisites to the works being deemed complete and due for payment. Test results for each penetrometer testing shall include the number of blows per 300mm penetration in that specific material equivalent to the relevant specified modified maximum density ratio compaction requirement in each case.

2.5.5

Acceptance of Pavements - Remedial Works

Should any Contractor's testing and re-testing or Superintendent's audit testing of pavement Test Lots

reveal a single test that fails then further working (including scarifying, remixing and/or compaction as necessary) shall be carried over of the entire Test Lot and retests carried out, all at the Contractor's cost. Re-testing shall be carried out at the same frequency as the original testing.

2.5.6

Acceptance of Asphaltic Concrete Wearing Course – As per specification of IPWEA/AAPA

Areas of asphaltic concrete assessed as defective with respect to the requirements specified herein for mix quality, density, percentage voids, surface finish, surface smoothness, or thickness, shall be removed and replaced by the Contractor, at the discretion of the Superintendent.

The Contractor shall remove and replace areas of asphaltic concrete which show signs of either ravelling, fretting, cracking, deflection, subsidence, scabbing or instability, for any reason, at the discretion of the Superintendent.

Any bituminous mix that has become damaged or contaminated with foreign material shall be removed and replaced.

The extent of the defective area shall include all the asphaltic concrete works in that Test Lot containing the failed test(s) unless defective areas can be suitably isolated to the Superintendent's satisfaction by additional testing (where necessary) by the Contractor.

Any subsidence of restored areas shall be repaired by the Contractor within two (2) days of the occurrence and/or notification of the defect. Immediate repairs shall be carried by the Contractor out as necessary to maintain the safety of the Site to the satisfaction of the Superintendent otherwise the Local Government shall be authorised to carry out remedial works at the Contractor's cost.

Skin patching of an area that has been rolled shall not be permitted.

Defective areas shall be removed and replaced with fresh materials. Patches shall be prepared by cutting and removing the defective asphaltic concrete to the full depth of the course such that the sides of the area are at right angles or parallel to the direction of traffic and the edges are vertical. The internal edges and surfaces of the area to be patched shall be cleaned of all cutting residue by flushing with water, and all free water removed. The surfaces shall be tack coated with bituminous emulsion prior to placing of fresh material which shall be spread, compacted and finished in accordance with the Specification. Surface reseal (sprayed seal) shall also be carried out as necessary to match the existing surface.

2.6 EXTRUDED KERBING

2.6.1

Scope

Where existing kerbing is demolished or damaged during the course of the work under the Contract, the supply and laying of replacement extruded concrete kerbing shall be carried out using a kerb section to the Local Government's standards.

2.6.2

Experienced Personnel

All works under this Section shall be carried out by personnel experienced in the laying of extruded concrete kerbing.

2.6.3

Concrete

Concrete for use in extruded kerbing shall be ready mixed concrete complying with all requirements of AS 1379.

The aggregate size shall be 10mm nominal. The concrete cylinder compressive strength at 28 days shall be not less than 25MPa.

A kerbing machine shall be used. Concrete shall have a maximum slump of 50mm.

2.6.4

Line and Level of Work

The kerbing shall be relayed to match pre-existing alignment level and grades.

The construction tolerance shall be such that when a 3 metre long straight edge is laid on the top or face of the kerb, the surface shall not vary more than 3mm from the edge of the straight edge, except at grade changes or curves. Kerbs shall be equal distance from the road centreline ($\pm 10\text{mm}$).

2.6.5

Construction Details

The surface to receive the kerb shall be a fully compacted and sealed base course.

The Contractor shall prepare the surface by removing all loose material to the satisfaction of the Superintendent immediately prior to the placing of the kerb.

The Contractor shall give the Superintendent 24 hours prior notice of the start of the kerb laying operations in order that the Superintendent may have the opportunity of inspecting the work.

The extruded kerb shall be finished with the use of an overall steel trowel whilst the concrete is still comparatively wet to give a smooth finish free of surface pits and depressions.

Expansion joints shall be provided at every second contraction joint and shall be sawn vertically at right angles to the longitudinal line of the kerb, to give a 12mm to 10mm wide cut for the full section of the kerb, after the concrete has cured.

Expansion joints shall be provided at all tangent points adjacent to inlet structures and when abutting new works to existing kerb.

The expansion joints shall be spaced at maximum 6.0m intervals, sealed with a closed cell polymer backing rod to a depth of 25mm to act as a backing and elastomeric silicon sealant. The seal shall finish 3mm below the face of the kerb.

Contraction joints shall be inserted immediately after the final finishing and shall be located at 1.5m intervals and shall be formed with a grooving tool, not fully fitted through the section of the kerb. Alternatively, the joint may be formed by cutting a 5mm gap at least $\frac{2}{3}$ the depth of the kerb section.

All joints where cutting is required, shall be cut not less than 24 hours following the laying of that section of kerb.

2.6.6

Curing

Curing compounds shall meet ASTM C309 requirements.

Kerbing shall be treated with a sprayed application of "Calcure D" membrane curing compound applied at a minimum rate of one litre per 6 square metres, within two hours of surface finishing of the concrete. The compound shall be applied by means of a low pressure mechanical spray. An approved equivalent curing compound may be used.

In hot weather, after the application of the curing compound, the kerb shall be covered with an approved Polythene membrane for a minimum period of 4 days prior to any road materials being placed adjacent to the kerb.

The membrane shall be replaced on completion of cutting and jointing operations.

2.6.7

Continuation of Roadworks

No further work shall be done on the roadworks or backfilling adjacent to kerb laid until a minimum of four (4) days following laying of kerb. Any

damage to the kerb by the Contractor shall be made good by complete replacement of the damaged section between joints.

2.6.8

Protection of Works

The Contractor shall be held solely responsible for the replacement as necessary of any defective or damaged kerbing during the course of the works and for the maintenance period as specified.

2.6.9

Buttressing of Kerb

Fill shall be placed not sooner than four (4) days after kerbing construction and thoroughly compacted by a plate compactor for the full length of the kerb and for a width of 600mm from back of kerb to give final verge level to the top of the kerb.

2.7 DRIVEWAY CROSSINGS AND CONCRETE/BRICK PAVING

2.7.1

Asphaltic Concrete/Sprayed Seal/Gravel Surfaces

The driveway crossings shall be restored as for road pavement restoration (classification: Access Ways) in the case of existing asphaltic concrete, sprayed seal and gravel surfaces. When the excavation damages any part of the existing driveway crossover the full width of the damaged section parallel to the roadway shall be reconstructed in the accordance with Clause 2.7 of the Specification. Where the damage is greater than 50% of the driveway area then the whole driveway shall be resurfaced to match the existing driveway surface levels and material type. (The existing wearing course shall be removed as necessary). Sprayed seal shall be a two (2) coat seal in accordance with Clause 2.4.5.

Where a strip of undisturbed driveway remains which has a width of less than 700mm at any position along its length then the wearing course

strip shall removed and the area incorporated in the new wearing course restoration works.

2.7.2

In situ Concrete Surface

Refer to the requirements of Clause 2.4.7 of the Specification.

2.7.3

Clay Brick/Concrete Block Paving on Roadways and Driveway Crossings

For paved driveway crossings and roadways the pavement layers should be adjusted to provide a 200mm compacted thickness of base course below a 30mm (+5mm) thick compacted sand bedding layer plus the pavers (as per existing) to match the levels of the existing undamaged surrounding surfaces.

The base course layer shall be compacted to 98% modified dry density ratio in accordance with AS 1289.5.4.1.

The bedding sand shall be a well-graded sand passing a 4.75mm sieve and suited to concrete manufacture.

The grading limits are:

AS SIEVE SIZE	PERCENTAGE PASSING
9.52mm	100
4.75mm	90-100
2.36mm	75-100
1.18mm	55-90
600um	35-59
300um	8-30
150um	0-10

The bedding shall be free of deleterious soluble salts or other contaminants likely to cause efflorescence or lead to reduced skid resistance. Bricklayers sand and single sized dune sands are not suitable.

The paving units shall be compacted after laying to achieve consolidation of the sand bedding and brought to appropriate finished levels and profiles by not less than three (3) passes of a suitable plate compactor.

Compaction should proceed as closely as possible following laying and prior to use by traffic. Paving work shall be carried out by proven specialised and skilled tradesman in this field of work.

2.8 STORMWATER DAMAGE

2.8.1

General

Should disturbance or demolition of existing drainage lines and structures occur due to the trench works they shall be reinstated in accordance with the specification to be obtained by the Contractor from the Local Government.

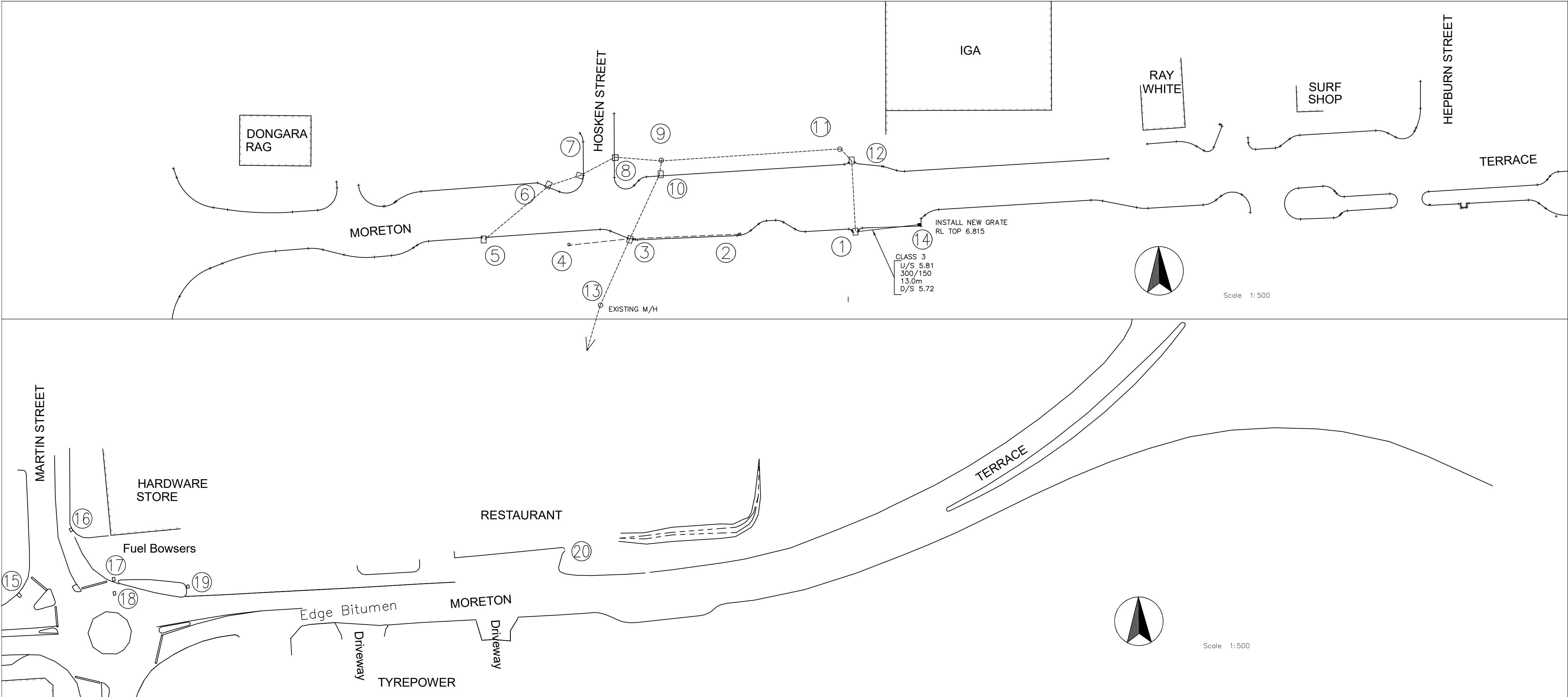
The Contractor shall also comply with construction drawings for precast concrete pits obtained from the Local Government.

Where existing grated pit concrete surrounds are cracked prior to commencement of work and further damage results to the pit surround as a result of the Contractor's work, the Contractor shall replace the entire concrete surround.

2.8.2

Pipes and Precast Components



All pipes and precast components incorporated in the restoration works shall be in first class condition and free of cracks, chips and deformities. Any items damaged by the Contractor shall be rejected, removed from the Site and replaced with new materials.

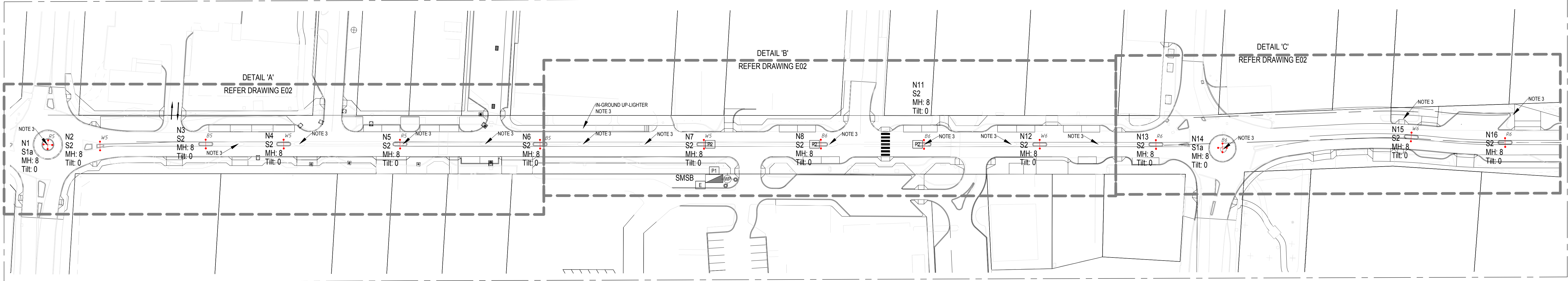


- LEGEND:**
- EXISTING STORMWATER DRAINAGE
 - KERBLINE
- NOTES:**
1. All tanks and pipe joints are to be grounded and patched to prevent any leakage, to industry standards to the satisfaction of the Principle
 2. Final Levels will be provided by the principle prior to installation. All lids, grates and finished surfaces to level to surrounding asphalt, kerbs and paving including driveways or paths.
 3. All materials will be supplied by the Principle for install, excluding machinery required

- Drain 1 – Side Entry**
Remove existing gully grate and in-ground concrete pit
Remove existing deflection slab outside entry from cover
Connect existing pipe and haunch
Install 1 x side entry frame and cover
Install 1 x deflection slab
Hand form kerbing to tie in drainage
- Drain 2 – Side Entry**
Remove existing drainage infrastructure
Install 1 x base plate and weep hole
Install 1 x 1200 x 1200 liner
Install 1 x deflection slab
Install 1 x side entry frame and cover
Hand form kerbing to tie in drainage
- Drain 3 – Side Entry**
Remove concrete from around deflection slab
Remove side entry frame and cover
Remove deflection slab
Install 1 x deflection slab
Install 1 x side entry frame and cover
Hand form kerbing to tie in drainage
- Drain 4 –**
Remove existing drainage infrastructure
Install 1 x base plate and weep hole
Install 1 x 1050 x 1200 concrete liner
Install 1 x 1200 x 1200 x 100 raised pre-cast GATIC lid
Replace drainage haunch and connect to side entry
- Drain 5 –**
Remove existing drainage infrastructure
Install 1 x base plate and weep hole
Install 1 x 1200 x 1200 concrete liner
Install 1 x deflection slab
Install 1 x side entry frame and cover
Hand form kerbing to tie in drainage
- Drain 6 – Side Entry**
Remove existing drainage infrastructure
Install 1 x deflection slab
Install 1 x side entry frame and cover
Hand form kerbing to tie in drainage
- Drain 7 – Side Entry**
Remove existing drainage infrastructure
Install 1 x deflection slab
Install 1 x side entry frame and cover
Hand form kerbing to tie in drainage
- Drain 8 – Side Entry**
Remove existing drainage infrastructure
Install 1 x deflection slab
Install 1 x side entry frame and cover
Hand form kerbing to tie in drainage
- Drain 9 – Junction Pit**
Remove existing JP cover
Install 1 x pre-cast GATIC lid (1200 x 1200 x 100 raised for paving)
This will require significant pit modification and lid will need to be flush with new brick paving levels.
This will need to be set when paving is re-laid
- Drain 10 – Junction Pit**
Remove existing metal cover
Install 1 x pre-cast GATIC lid (1700 x 1300 x 150 x 100) raised to have centre cast iron lid with lift lugs on the sides only.
This will require significant pit modification and lid will need to be flush with new brick paving levels.
Ensure all existing pipes are re-grouted in the existing drainage pit
- Drain 11 – Junction Pit**
Remove existing JP cover
Install 1 x pre-cast GATIC lid (1200 x 1200 x 150 x 100 raised for paving)
This will require significant pit modification and lid will need to be flush with new brick paving levels.
This will need to be set when paving is re-laid
- Drain 12 – Side Entry/Gully Grate**
Remove gully grate and pit
Replace drainage pipe and concrete haunch to tap into new drainage pit
Install 1 x base plate and weep hole
Install 1 x 1200 x 1200 concrete liner
Install 1 x deflection slab & side entry
Connect into junction pit 11
- Drain 13 – Pre-Cast Iron Lid**
Modify existing brick/concrete box
Install 1 x 1500 x 1240 x 150 pre-cast cover (concrete flush)
- Drain 14**
Install 1 x base plate and weep hole
Install 1 x 1050 x 1200 concrete liner
Install 1 x pre-cast wave grate
Connect drain 14 with 300 Stormpro drainage pipe to drain 1
- Drain 15 – Wave Grate**
Remove existing drainage infrastructure
Install 1 x base plate and weep hole
Install 1 x 1050 x 600 concrete liner
Install 1 x pre-cast wave grate
- Drain 16 – Wave Grate**
Remove existing drainage infrastructure
Install 1 x base plate and weep hole
Install 1 x 1050 x 600 concrete liner
Install 1 x pre-cast wave grate
- Drain 17 – Wave Grate**
Remove existing drainage infrastructure
Install 1 x base plate and weep hole
Install 1 x 1050 x 600 concrete liner
Install 1 x pre-cast wave grate
- Drain 18 – Wave Grate**
Remove existing drainage infrastructure
Install 1 x pre-cast wave grate
- Drain 19– Wave Grate**
Remove existing drainage infrastructure
Install 1 x base plate and weep hole
Install 1 x 1050 x 600 concrete liner
Install 1 x pre-cast wave grate
- Drain 20 – Open Swale**
Clean entry to box culvert inlet at kerb line to open swale drain
Clean and adjust levels to swale to allow for discharge to entry statement via earthwork adjustments and batter sides

Note: All drainage modification/works are to be confirmed on site with the Principal prior to execution. This applies to all drainage works under the contract.

NO.	DATE	REVISION	BY	CHKD	APPR	DATE	C.A.D.D. File Nos.		NOT TO BE USED FOR CONSTRUCTION UNTIL SIGNED APPROVED.	DESIGNER TO COMPLETE			TECHNICAL SERVICES DIRECTORATE		PLAN SHOWING DRAINAGE UPGRADE MORETON TERRACE, DONGARA			
							CAD FILES S:\SURVEY WORKS MORETON TCE\10047.dwg	DESIGN FILES S:\SURVEY WORKS\MORETON TCE\New Kerblines	APPROVED	DESIGNED J CLIFFORD	DATE 19/03/20							
									POSITION	DRAWN J CLIFFORD	19/03/20							
							SURVEYED BY: J CLIFFORD	H DATUM: JURIE V DATUM: AHD 71	DATE	DRAFT CHECK								
0		ISSUED FOR COMMENT	JC			19/3/20	DATE SEPT 2019			DESIGN CHECK			JOB NO. CJ22		SCALE: AS SHOWN	A1	DWG NO. 10001-1	REV NO. 0



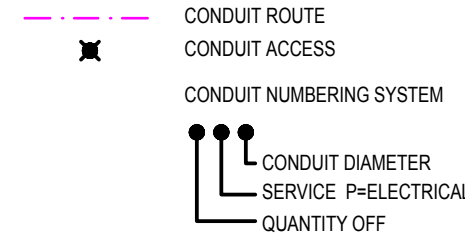
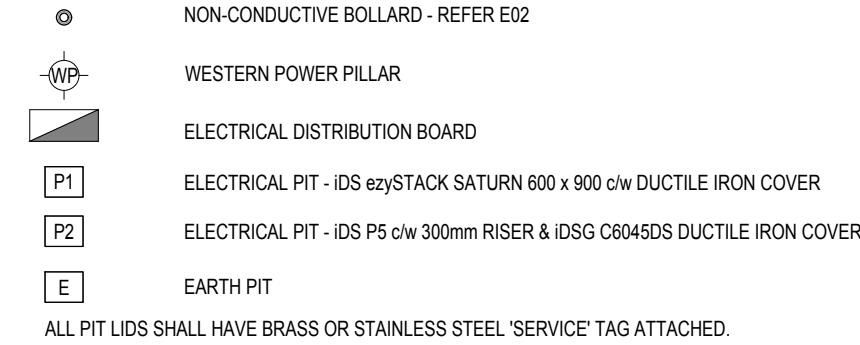
MORETON TERRACE LIGHTING EQUIPMENT LOCATIONS
NOT TO SCALE

Moreton Tce Street Scene Lighting					
Fixture Number	Location	Pole Type	Pole Height / mount	Proposed Light Source	Comments
N1	Roundabout Moreton Tce / Waldeck St	A.D Coote & Co, Meadow Springs	8m/Quad arm, 1500mm outreach	4 x 48w LED, S60 beam, side entry, 40mm spigot - WE-EF ASP530	Provide all proprietary mountings, adapters, fixings, drivers & surge protective devices as required to complete the project. All light fittings shall be supplied with a minimum 12m cable tail pre-fitted. Remote drivers and surge protective devices shall be accessible from the pole equipment hatch.
N2	Moreton Tce	A.D Coote & Co, Meadow Springs	8m/Twin arm, 1500mm outreach & banner arms	2 x 28w LED, S70 beam, 3000K, side entry, 40mm spigot - WE-EF ASP530 & 2 x 24W LED flood light, symmetrical medium beam, 3000K, column fitter mounted - WE-EF FLC131	
N3	Moreton Tce	A.D Coote & Co, Meadow Springs	8m/Twin arm, 1500mm outreach & banner arms	2 x 28w LED, S70 beam, 3000K, side entry, 40mm spigot - WE-EF ASP530 & 2 x 24W LED flood light, symmetrical medium beam, 3000K, column fitter mounted - WE-EF FLC131	
N4	Moreton Tce	A.D Coote & Co, Meadow Springs	8m/Twin arm, 1500mm outreach & banner arms	2 x 28w LED, S70 beam, 3000K, side entry, 40mm spigot - WE-EF ASP530 & 2 x 24W LED flood light, symmetrical medium beam, 3000K, column fitter mounted - WE-EF FLC131	
N5	Moreton Tce	A.D Coote & Co, Meadow Springs	8m/Twin arm, 1500mm outreach & banner arms	2 x 28w LED, S70 beam, 3000K, side entry, 40mm spigot - WE-EF ASP530 & 2 x 24W LED flood light, symmetrical medium beam, 3000K, column fitter mounted - WE-EF FLC131	
N6	Moreton Tce	A.D Coote & Co, Meadow Springs	8m/Twin arm, 1500mm outreach & banner arms	2 x 28w LED, S70 beam, 3000K, side entry, 40mm spigot - WE-EF ASP530 & 2 x 24W LED flood light, symmetrical medium beam, 3000K, column fitter mounted - WE-EF FLC131	
N7	Moreton Tce	A.D Coote & Co, Meadow Springs	8m/Twin arm, 1500mm outreach & banner arms	2 x 28w LED, S70 beam, 3000K, side entry, 40mm spigot - WE-EF ASP530 & 2 x 24W LED flood light, symmetrical medium beam, 3000K, column fitter mounted - WE-EF FLC131	
N8	Moreton Tce	A.D Coote & Co, Meadow Springs	8m/Twin arm, 1500mm outreach & banner arms	2 x 28w LED, S70 beam, 3000K, side entry, 40mm spigot - WE-EF ASP530 & 2 x 24W LED flood light, symmetrical medium beam, 3000K, column fitter mounted - WE-EF FLC131	
N9	Spare				
N10	Spare				
N11	Moreton Tce	A.D Coote & Co, Meadow Springs	8m/Twin arm, 1500mm outreach & banner arms	2 x 28w LED, S70 beam, 3000K, side entry, 40mm spigot - WE-EF ASP530 & 2 x 24W LED flood light, symmetrical medium beam, 3000K, column fitter mounted - WE-EF FLC131	
N12	Moreton Tce	A.D Coote & Co, Meadow Springs	8m/Twin arm, 1500mm outreach & banner arms	2 x 28w LED, S70 beam, 3000K, side entry, 40mm spigot - WE-EF ASP530 & 2 x 24W LED flood light, symmetrical medium beam, 3000K, column fitter mounted - WE-EF FLC131	
N13	Moreton Tce	A.D Coote & Co, Meadow Springs	8m/Twin arm, 1500mm outreach & banner arms	2 x 28w LED, S70 beam, 3000K, side entry, 40mm spigot - WE-EF ASP530 & 2 x 24W LED flood light, symmetrical medium beam, 3000K, column fitter mounted - WE-EF FLC131	
N14	Moreton Tce / Point Leander	A.D Coote & Co, Meadow Springs	8m/Quad arm	4 x 48w LED, S60 beam, side entry, 40mm spigot - WE-EF ASP530	
N15	Moreton Tce	A.D Coote & Co, Meadow Springs	8m/Twin arm, 1500mm outreach & banner arms	2 x 28w LED, S70 beam, 3000K, side entry, 40mm spigot - WE-EF ASP530 & 2 x 24W LED flood light, symmetrical medium beam, 3000K, column fitter mounted - WE-EF FLC131	
N16	Moreton Tce	A.D Coote & Co, Meadow Springs	8m/Twin arm, 1500mm outreach & banner arms	2 x 28w LED, S70 beam, 3000K, side entry, 40mm spigot - WE-EF ASP530 & 2 x 24W LED flood light, symmetrical medium beam, 3000K, column fitter mounted - WE-EF FLC131	

PROJECT NOTES

- ALL EQUIPMENT SHOWN SHALL BE NEW UNLESS OTHERWISE NOTED.
- CONTRACTOR SHALL LIAISE WITH WESTERN POWER AND SUPERINTENDENT TO ENSURE ALL EXISTING LIGHTING FOR REMOVAL SHALL BE DISCONNECTED AND MADE SAFE BY WESTERN POWER.
- EXISTING STREET LIGHT POLES & IN-GROUND UP-LIGHTER TO BE REMOVED IN ENTIRETY, REMOVE ALL CABLING MADE REDUNDANT BY THESE WORKS. HAND BACK ALL EXISTING EQUIPMENT TO OWNER

SITE, CONDUITS, PITS



LIGHT

- CONTRACTOR TO CONFIRM ALL PART NUMBERS WITH LIGHTING MANUFACTURERS
- ALL PRODUCTS LISTED SHALL BE OF EQUAL OR A SIMILAR PRODUCT EQUIVALENT IN FUNCTION, QUALITY, ETC TO THE APPROVAL OF THE SUPERINTENDENT

TWIN ARM POLE c/w 2 x 28w LED STREETLIGHT, 2 x 24W LED FLOOD LIGHT - REFER LIGHTING SCHEDULE ON THIS DRAWING FOR DETAILS

QUAD ARM POLE c/w 4 x 28w LED STREETLIGHT - REFER LIGHTING SCHEDULE ON THIS DRAWING FOR DETAILS

GENERAL NOTES

- ALL WORKS SHALL BE COMPLETED IN CONJUNCTION WITH THE PROJECT SPECIFICATION AND CONTRACT DRAWINGS.
- ALL WORK TO BE OF TRADESMAN QUALITY. NEW AND SHALL BE IN COMPLIANCE WITH THE LATEST REVISIONS OF AS3000, AS3008, AS2053.8, SUPPLY AUTHORITY: W.A.E.R., NCC, A.C.M.A. AND TELSTRANBN REQUIREMENTS.
- CONTRACTOR SHALL SUPPLY AND INSTALL ALL EQUIPMENT INCLUDING SWITCHBOARDS, ALL CABLING AND ALL LIGHT AND POWER DISTRIBUTION & CONTROL EQUIPMENT. FITTINGS AND FIXINGS TO ELECTRICALLY COMPLETE THE PROJECT.
- REMOVE ALL ELECTRICAL CABLING & EQUIPMENT MADE REDUNDANT BY THE WORKS. ALL GENERAL AND LIGHTING CIRCUITS SHOWN ON DRAWING(S) SHALL BE NEW.
- ALL EXTERNAL FIXINGS SHALL BE GRADE 316 STAINLESS STEEL.
- CONTRACTOR TO COLLECT AND INSTALL METERS AND ASSOCIATED EQUIPMENT.
- S.M.S.B. TO BE MANUFACTURED FROM 2.5mm ALUMINIUM AND RATED IP65. ALL CABLE/CONDUIT ENTRIES SHALL BE SEALED TO MAINTAIN IP RATING. PROVIDE SEPARATE DOOR & WESTERN POWER SECTION FITTED WITH EMKA 316SS PADLOCKABLE SWING HANDLE & WESTERN POWER APPROVED PADLOCK. PROVIDE SEPARATE DOOR & DISTRIBUTION SECTION FITTED WITH EMKA 316SS PADLOCKABLE SWING HANDLE. CLIENT TO PROVIDE PADLOCK TO SUIT.
- P.E. CELL SHALL BE LOCATED ON TOP OF M.S.B. ENCLOSED IN AN ALUMINIUM ENCLOSURE SUCH THAT IT IS ABLE TO OPERATE PROTECTED FROM VANDALS. REMOVAL OF PROTECTIVE ENCLOSURE SHALL ONLY BE EFFECTED FROM INSIDE OF S.M.S.B.
- USE ONLY RIGID CONDUITS WITH LARGE RADIUS BENDS. INSTALL 2.5mm sq DRAW WIRE IN SPARE CONDUITS. NO FLEXIBLE CONDUIT UNLESS OTHERWISE SHOWN.
- LABEL ALL CABLES AT BOTH ENDS WITH CRITICALLY "Z" TYPE CABLE MARKERS.
- FINAL LOCATION OF ALL EQUIPMENT AND UNDERGROUND SERVICES TO BE DETERMINED ON SITE WITH SUPERINTENDENT.
- PROVIDE ALL TRENCHING, BACKFILL AND COMPACTION, MAKING GOOD OF ALL ROADWAY & PAVING SURFACES SHALL BE BY OTHERS.
- ALL PITS SHALL BE SUITABLE FOR VEHICLE WEIGHTS - CLASS D, FLUSH TO SURROUNDING SURFACES WITH LID MARKED 'ELECTRICAL'. INSTALL AS PER MANUFACTURERS SPECIFICATION.
- ALL CONDUIT ENTRIES INTO PITS TO BE SEALED TO PREVENT INGRESS OF DEBRIS.
- CONTRACTOR TO LIAISE WITH WESTERN POWER TO ESTABLISH A NEW POWER SUPPLY FOR SITE.
- ALL CABLE SIZES SHOWN ON THESE DRAWINGS SHOULD BE CONSIDERED AS MINIMUM SIZES. INSTALLATION TYPE, METHOD, GROUPING AND OTHER DE-RATING FACTORS MAY NEED TO BE CONSIDERED DEPENDANT UPON INSTALLATION METHODOLOGY.
- FINAL SUB-CIRCUIT CABLING IN CONDUITS SHALL BE ORANGE CIRCULAR TYPE.
- GENERAL EQUIPMENT LAYOUT ONLY SHOWN ON ALL DRAWINGS.
- CONTRACTOR SHALL VISIT SITE TO DETERMINE ALL EXISTING EQUIPMENT TYPES AND LOCATIONS.
- ALL PRODUCTS LISTED SHALL BE OF EQUAL OR A SIMILAR PRODUCT EQUIVALENT IN FUNCTION, QUALITY, ETC TO THE APPROVAL OF THE SUPERINTENDENT



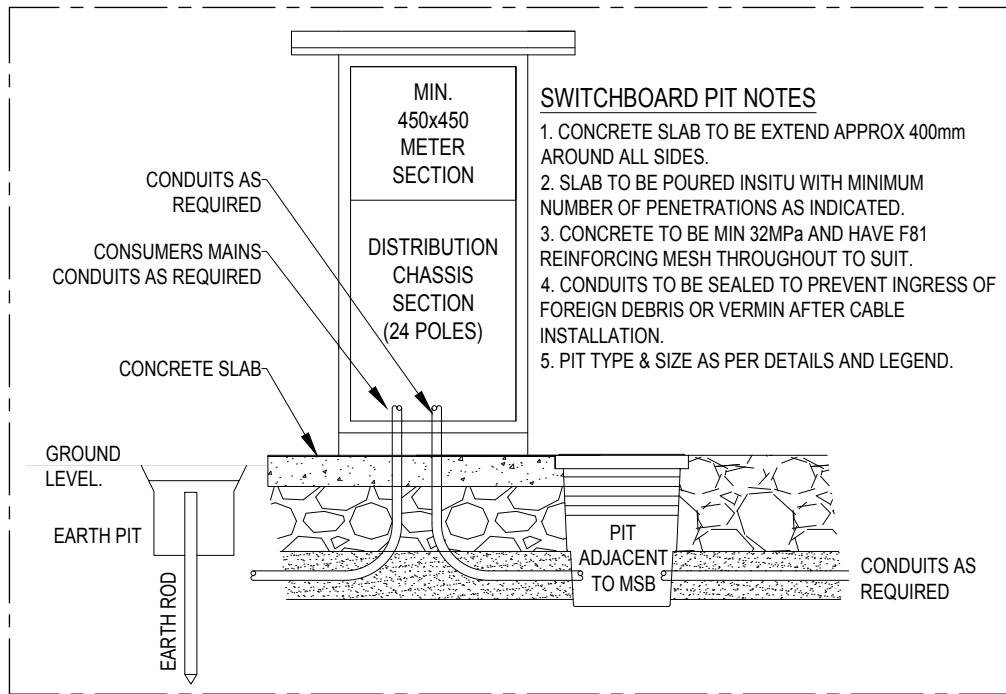
EXISTING QUAD OUTREACH FOR REMOVAL



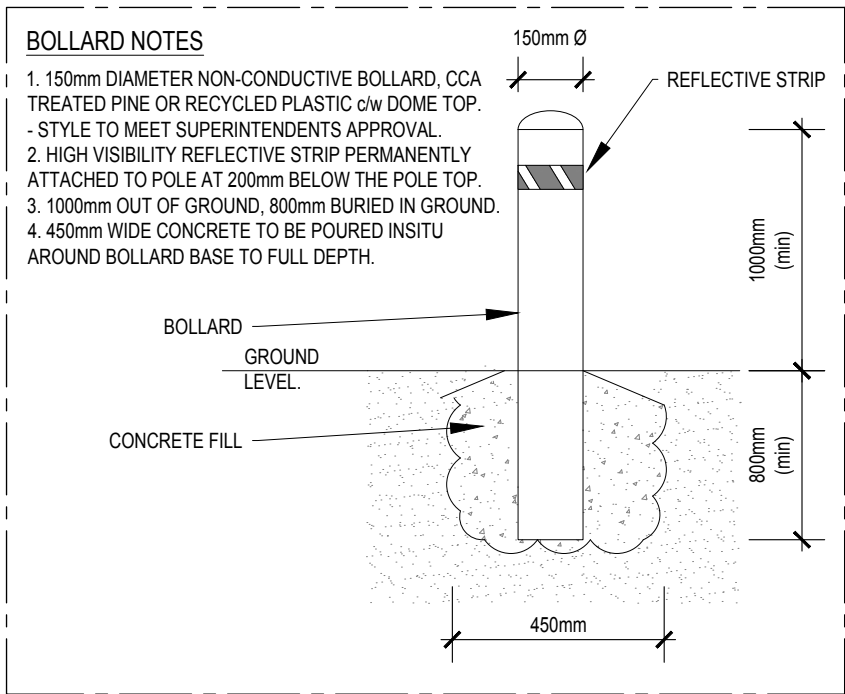
EXISTING CENTRAL STREET LIGHTS FOR REMOVAL



EXISTING IN-GROUND UP LIGHTER FOR REMOVAL



MSB AND PIT UNDER (TYPICAL) ELEVATIONS



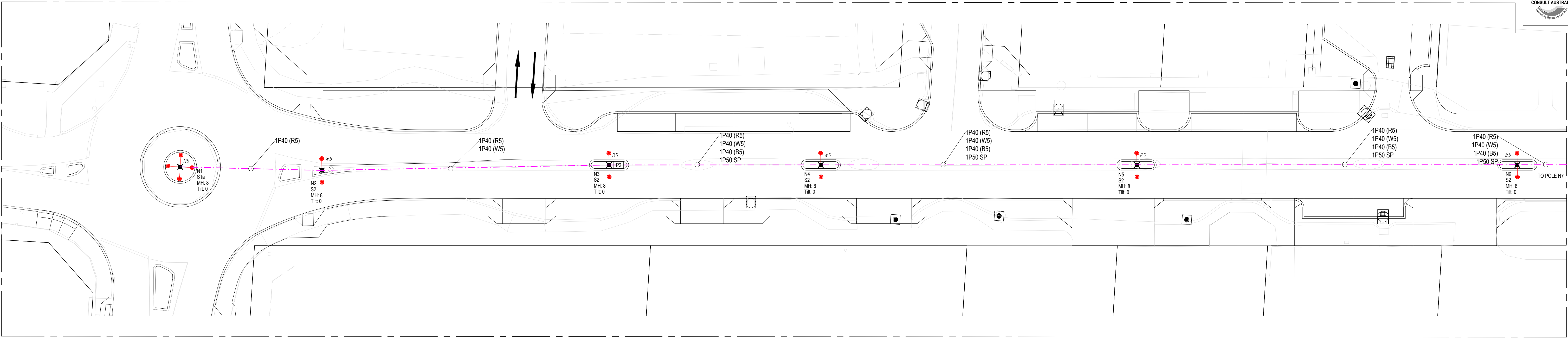
NON-CONDUCTIVE PROTECTION BOLLARD DETAIL



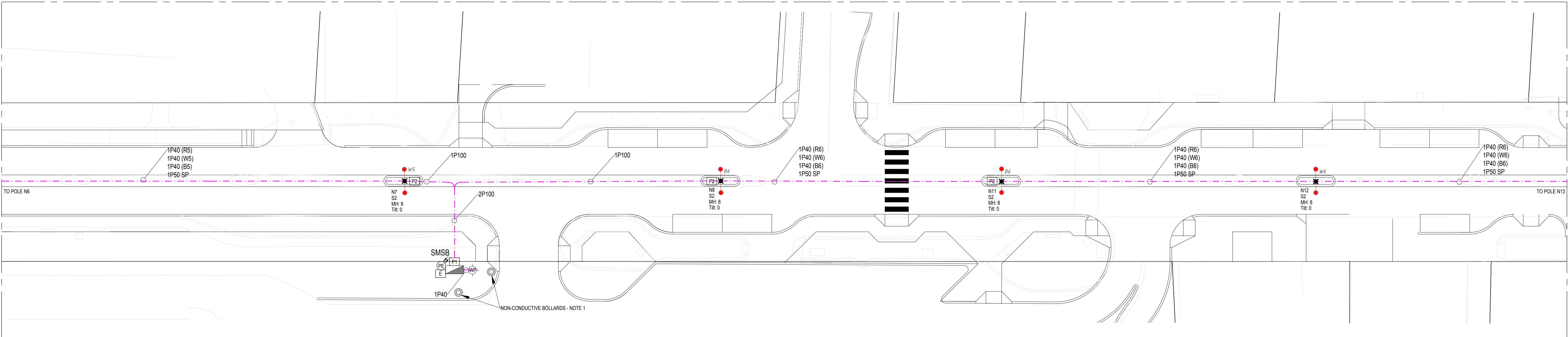
WARNING
BEWARE OF
UNDERGROUND
SERVICES

- The location of underground cables are approximate and their exact position should be checked on site. No guarantee is given that all existing cables and services are shown. Locate all underground cables and services before commencement of work.
- Refer to Worksafe Regulation 3.21.
- If working in the vicinity of existing overhead distribution or transmission lines, contractor to comply with worksafe clearances during construction.

ELECTRICAL CONTRACTOR TO LIAISE WITH WESTERN POWER FOR THE COORDINATION & INSTALLATION OF ALL REQUIRED WESTERN POWER SERVICES, PITS, CONDUITS & OTHER EQUIPMENT REQUIRED.		WESTERN POWER REF #:		NP030406	
PHONE: 13 10 87 - EMAIL: works.admin.general@westernpower.com.au		Rev No.		0	
		Date		14/11/2021	
		Revision		ISSUED FOR TENDER	



MORETON TERRACE WEST NEW STREET LIGHT ARRANGEMENT - DETAIL 'A'
SCALE: 1:250



MORETON TERRACE CENTRAL NEW STREET LIGHT ARRANGEMENT - DETAIL 'B'
SCALE: 1:250



MORETON TERRACE EAST NEW STREET LIGHT ARRANGEMENT - DETAIL 'C'
SCALE: 1:250

PROJECT NOTES

1. PROVIDE NON-CONDUCTIVE BOLLARDS TO SATISFY CUSTOMER SCOPE OF WORKS ITEM 'G' IN WESTERN POWER DESIGN NP030406 & W.A.D.C.M. CLAUSE 12.5.3. REFER DETAIL ON DRAWING E01.

LIGHT

- CONTRACTOR TO CONFIRM ALL PART NUMBERS WITH LIGHTING MANUFACTURERS
- ALL PRODUCTS LISTED SHALL BE OF EQUAL OR A SIMILAR PRODUCT EQUIVALENT IN FUNCTION, QUALITY, ETC TO THE SUPERINTENDENT

TWIN ARM POLE c/w 2 x 28W LED STREETLIGHT, 2 x 24W LED FLOOD LIGHT - REFER LIGHTING SCHEDULE ON E01 FOR DETAILS

QUAD ARM POLE c/w 4 x 28W LED STREETLIGHT - REFER LIGHTING SCHEDULE ON E01 FOR DETAILS

SINGLE ARM POLE c/w 1 x 108W LED STREETLIGHT - REFER LIGHTING SCHEDULE ON E01 FOR DETAILS

PHOTO ELECTRIC CELL FOR LIGHTING CONTROL

SITE, CONDUITS, PITS

WESTERN POWER PILLAR

NON-CONDUCTIVE BOLLARD - NOTE 1

ELECTRICAL DISTRIBUTION BOARD

ELECTRICAL PIT - DS ezySTACK SATURN 600 x 900 c/w DUCTILE IRON COVER

ELECTRICAL PIT - DS P5 c/w 300mm RISER & DSG C6045DS DUCTILE IRON COVER

EARTH PIT

ALL PIT LIDS SHALL HAVE BRASS OR STAINLESS STEEL 'SERVICE' TAG ATTACHED.

CONDUIT ROUTE

CONDUIT ACCESS

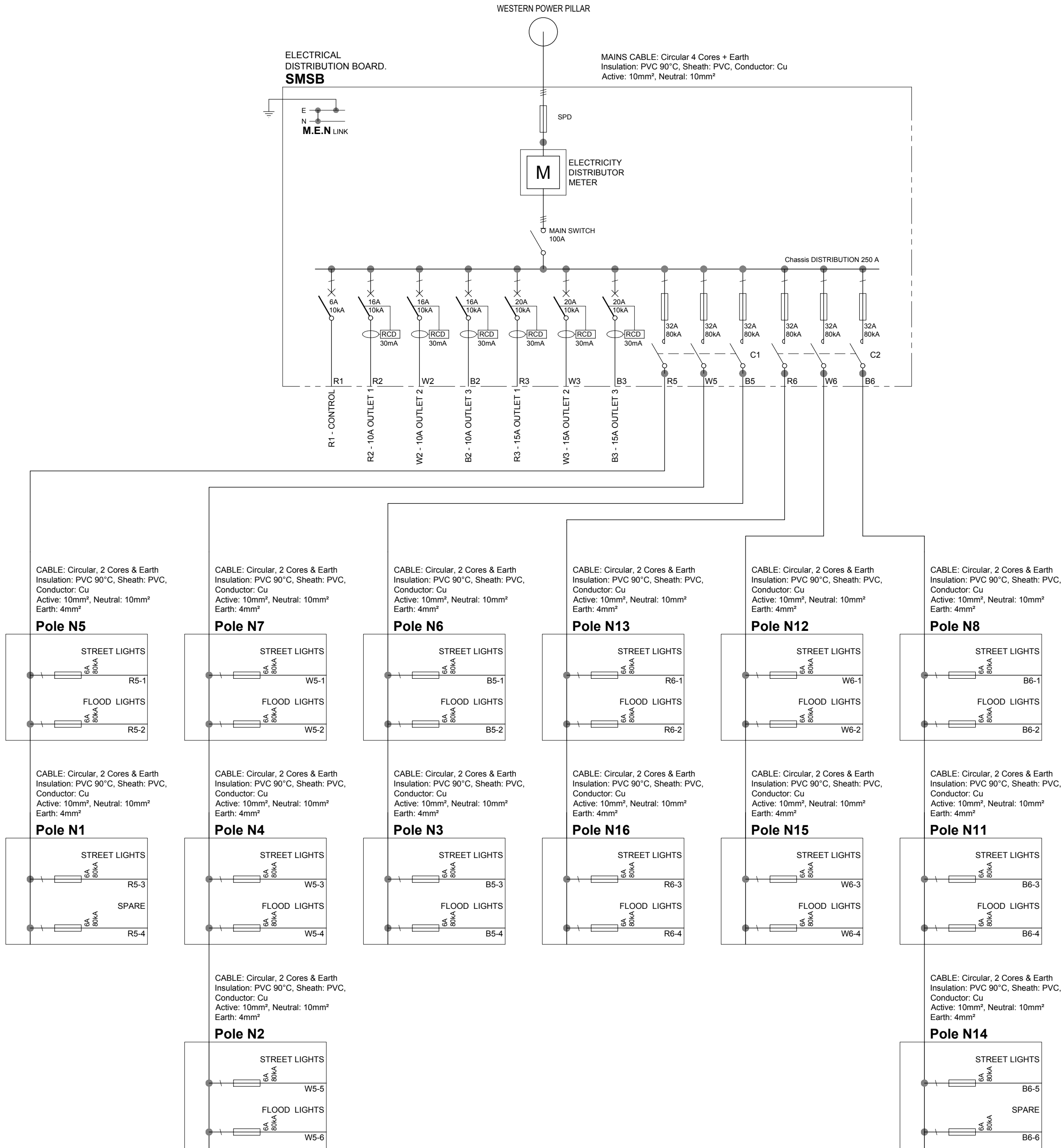
CONDUIT NUMBERING SYSTEM

CONDUIT DIAMETER

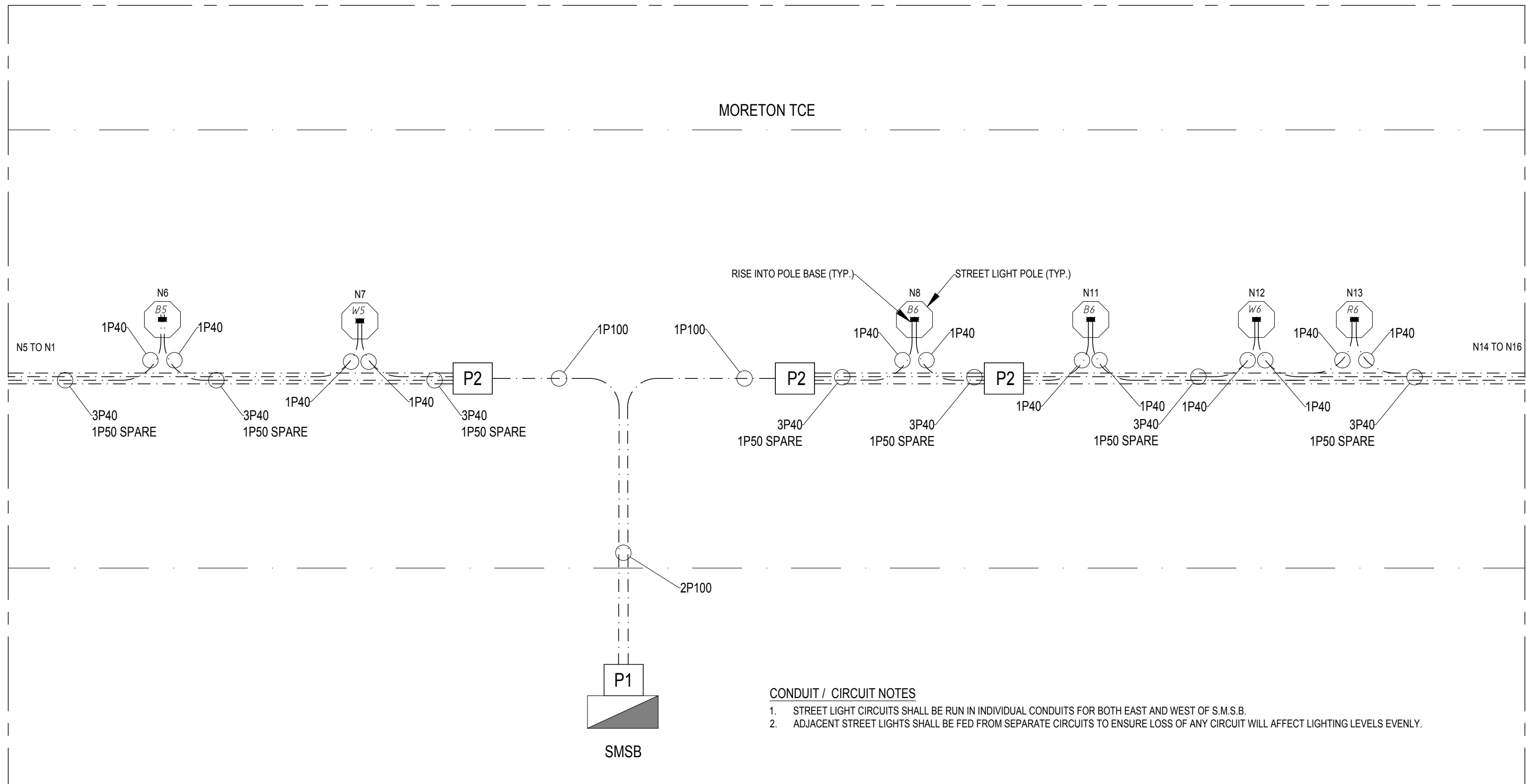
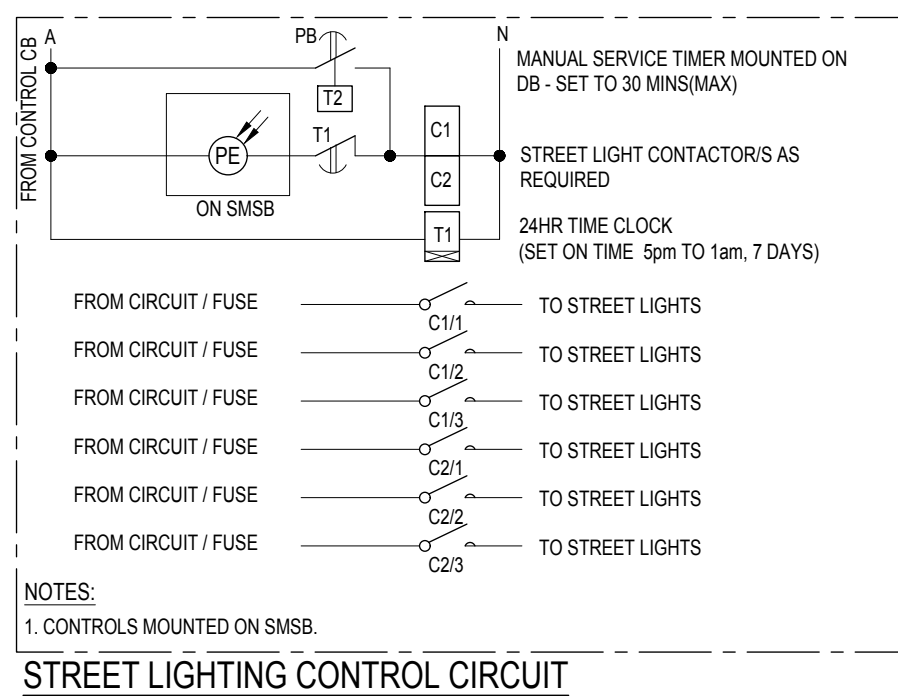
SERVICE P-ELECTRICAL

SP-SPARE

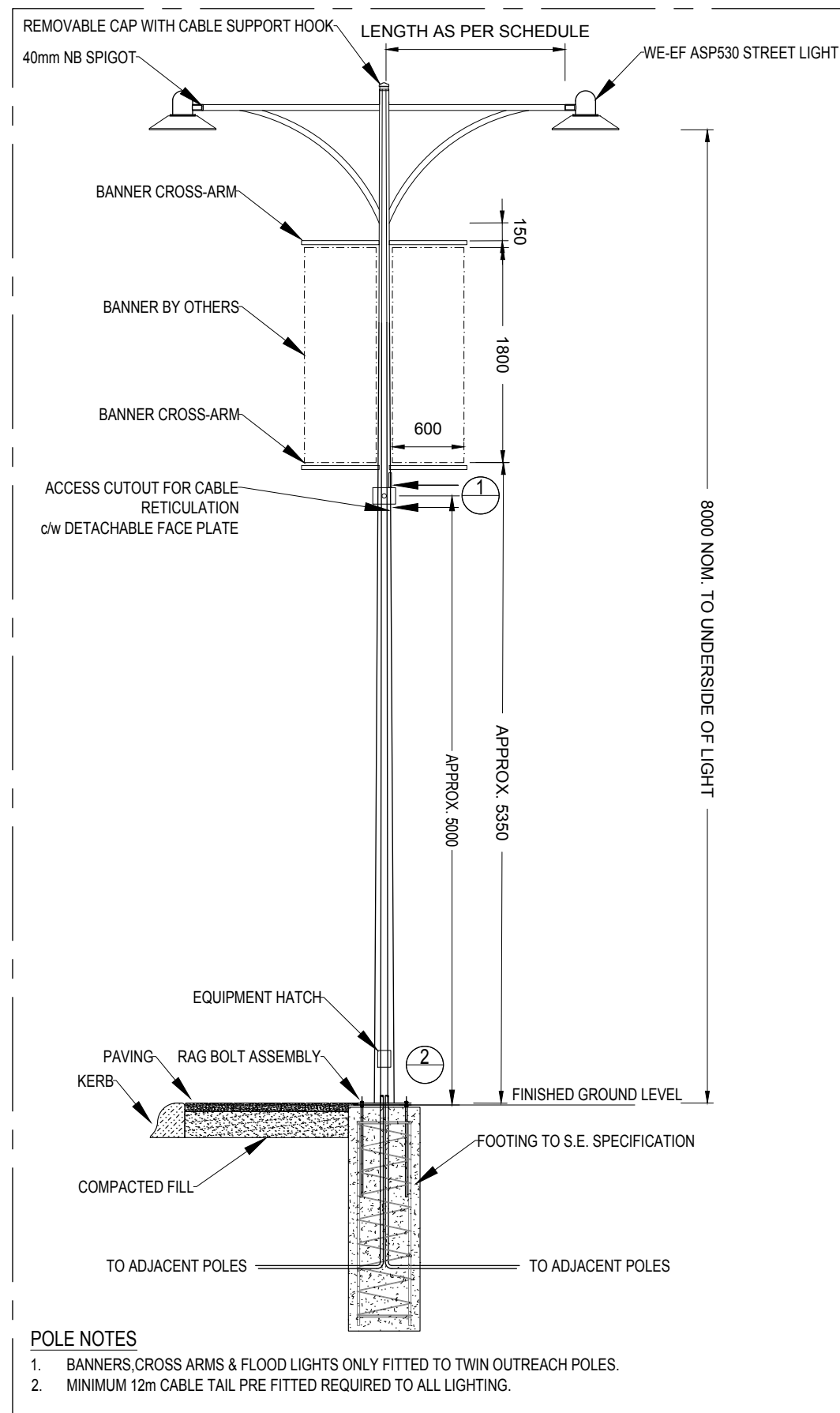
QUANTITY OFF



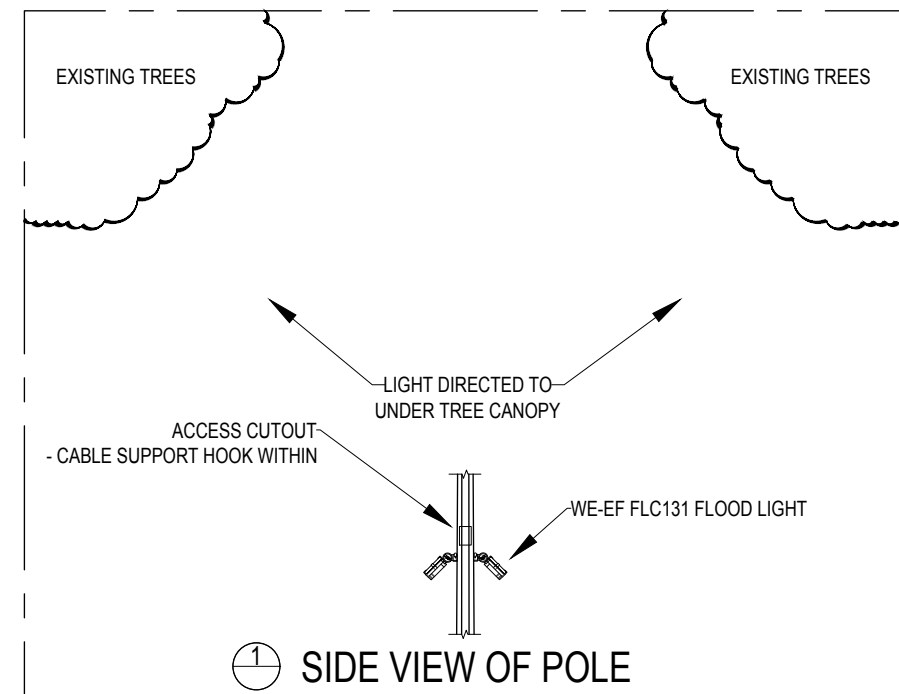
BOARD REF: SMSB											
CIRCUIT No.	PHASE	LOAD DESCRIPTION	PROTECTIVE DEVICE			CABLE					
			TYPE	MODEL	RATING	SIZE	INSUL	SHEATH	CONDUCTOR	TYPE	COMMENTS
BUS: DISTRIBUTION											
R1	R	R1 - CONTROL	MCB	IC60N	6A	10KA	2.5mm ²	PVC 90°C	PVC	Cu	S.D.I
W	W	SPARE									
B	B	SPARE									
R2	R	R2 - 10A OUTLET 1	RCD	IC60N RCBO Type A	16A	10KA	30mA	2.5mm ²	PVC 90°C	PVC	Cu
W2	W	W2 - 10A OUTLET 2	RCD	IC60N RCBO Type A	16A	10KA	30mA	2.5mm ²	PVC 90°C	PVC	Cu
B2	B	B2 - 10A OUTLET 3	RCD	IC60N RCBO Type A	16A	10KA	30mA	2.5mm ²	PVC 90°C	PVC	Cu
R3	R	R3 - 15A OUTLET 1	RCD	IC60N RCBO Type A	20A	10KA	30mA	2.5mm ²	PVC 90°C	PVC	Cu
W3	W	W3 - 15A OUTLET 2	RCD	IC60N RCBO Type A	20A	10KA	30mA	2.5mm ²	PVC 90°C	PVC	Cu
B3	B	B3 - 15A OUTLET 3	RCD	IC60N RCBO Type A	20A	10KA	30mA	2.5mm ²	PVC 90°C	PVC	Cu
R	R	SPARE									
W	W	SPARE									
B	B	SPARE									
R5	R	R5 - STREET LIGHTS 1	FUSE	FUSE	32A	80KA	10mm ²	PVC 90°C	PVC	Cu	Circ. 2C&E Earth: 4mm ²
W5	W	W5 - STREET LIGHTS 2	FUSE	FUSE	32A	80KA	10mm ²	PVC 90°C	PVC	Cu	Circ. 2C&E Earth: 4mm ²
B5	B	B5 - STREET LIGHTS 3	FUSE	FUSE	32A	80KA	10mm ²	PVC 90°C	PVC	Cu	Circ. 2C&E Earth: 4mm ²
R6	R	R6 - STREET LIGHTS 4	FUSE	FUSE	32A	80KA	10mm ²	PVC 90°C	PVC	Cu	Circ. 2C&E Earth: 4mm ²
W6	W	W6 - STREET LIGHTS 5	FUSE	FUSE	32A	80KA	10mm ²	PVC 90°C	PVC	Cu	Circ. 2C&E Earth: 4mm ²
B6	B	B6 - STREET LIGHTS 6	FUSE	FUSE	32A	80KA	10mm ²	PVC 90°C	PVC	Cu	Circ. 2C&E Earth: 4mm ²
BOARD REF: ALL POLES - LOOP THROUGH AT FUSE PROTECTION UNIT (TYPICAL)											
CIRCUIT No.	PHASE	LOAD DESCRIPTION	PROTECTIVE DEVICE			CABLE					
			TYPE	RATING	BREAKING CAPACITY	SIZE	INSUL	SHEATH	CONDUCTOR	TYPE	COMMENTS
1	R	STREET LIGHTS	FUSE	6A	80KA	2.5mm ²	PVC 90°C	PVC	Cu	Circ. 2C&E	-
2	R	PROJECTOR LIGHTS (SPARE IN POLES N1 & N14)	FUSE	6A	80KA	2.5mm ²	PVC 90°C	PVC	Cu	Circ. 2C&E	-



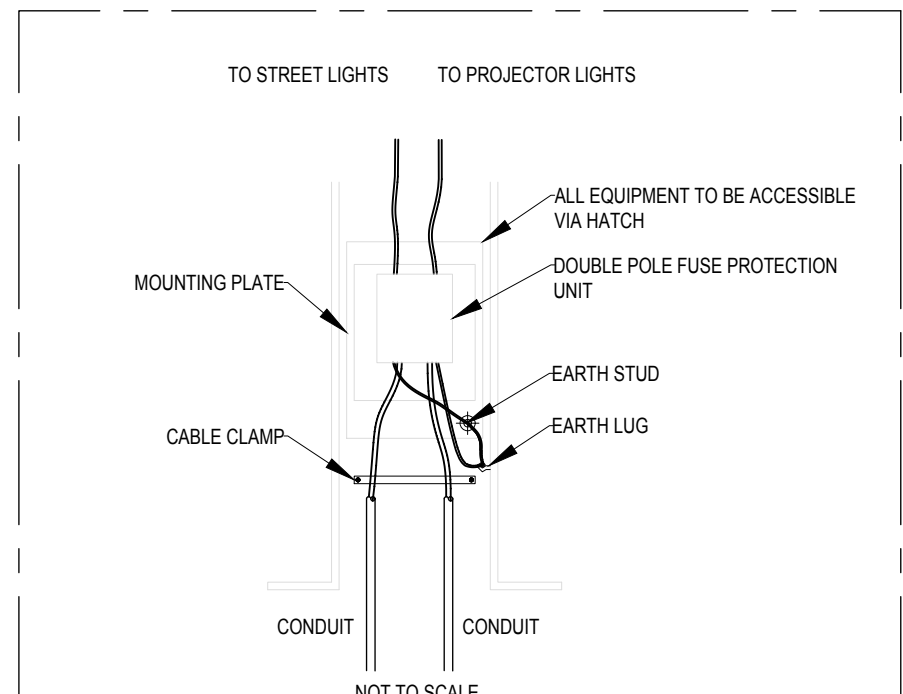
CONDUIT LAYOUT DIAGRAM
NOT TO SCALE:



LIGHT POLE DETAIL
SCALE 1:50



PROJECTOR LIGHT DETAIL
SCALE: 1:50



② **EQUIPMENT HATCH**

EQUIPMENT HATCH DETAIL
SCALE: 1:50

0	14/01/2021	ISSUED FOR TENDER
Rev No.	Date	Revision

A.B.N. 696611035
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ELECTRICAL - COMMUNICATIONS - ENERGY EFFICIENCY
BUILDING & MECHANICAL SERVICES - PROJECT MANAGERS

PROJECT
SHIRE OF IRWIN
MORETON Tce DONGARA
STREET SCPE UPGRADE
ELECTRICAL DETAILS

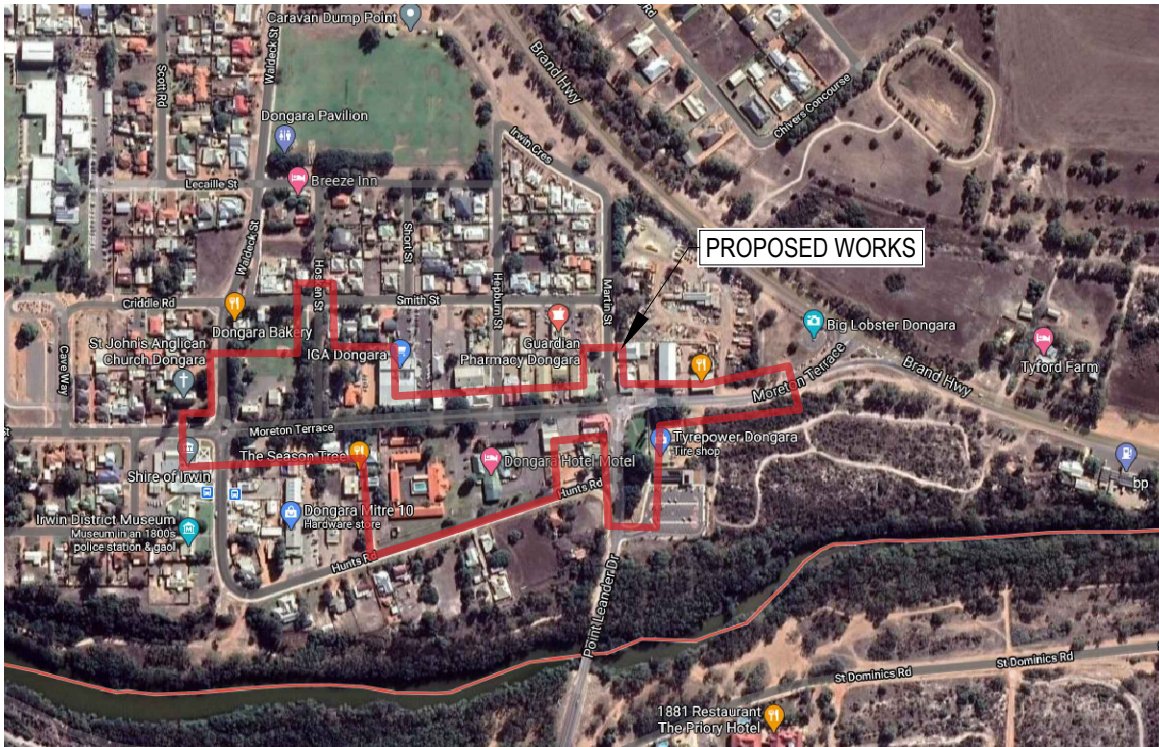
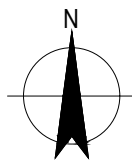
DRAWING STREET LIGHTING	JOB No. P6258
DRAFT. HS	APPRV. MR
DATE MARCH 2020	SCALE 1:1000@A1
DWG No.	REV. 0
E-03	

SHIRE OF IRWIN

MORETON TERRACE

DONGARA TOWN CENTRE UPGRADE

PROJECT NUMBER 12533215



LOCALITY PLAN
NOT TO SCALE

DRAWING LIST		DRAWING LIST	
DRG No.	DRAWING TITLE	DRG No.	DRAWING TITLE
12533215-G001	COVER PAGE AND DRAWING LIST	12533215-C201	TYPICAL CROSS SECTION - MORETON TERRACE
12533215-G002	GENERAL NOTES	12533215-C202	TYPICAL CROSS SECTION - HOSKEN STREET
12533215-C001	PROPOSED WORKS - OVERALL PLAN	12533215-C203	TYPICAL CROSS SECTION - CAR PARK
12533215-C002	PROPOSED WORKS - DETAIL PLAN	12533215-C204	TYPICAL CROSS SECTION - STAGE 2 - MORETON TERRACE
12533215-C003	PROPOSED WORKS - DETAIL PLAN	12533215-C205	TYPICAL CROSS SECTION - HOTEL CAR PARK
12533215-C004	PROPOSED WORKS - DETAIL PLAN	12533215-C206	TYPICAL CROSS SECTION - STAGE 3 - MORETON TERRACE
12533215-C005	PROPOSED WORKS - DETAIL PLAN	12533215-C207	TYPICAL CROSS SECTION - STAGE 3 - MORETON TERRACE
12533215-C006	PROPOSED WORKS - DETAIL PLAN	12533215-C208	ROUNDAABOUT CROSS SECTIONS
12533215-C007	PROPOSED WORKS - DETAIL PLAN	12533215-C301	DETAILS - KERBS AND PATHWAYS
12533215-C008	PROPOSED WORKS - DETAIL PLAN	12533215-S101	RAMP AND RETAINING WALL - LAYOUT & DETAILS
12533215-C009	PROPOSED WORKS - DETAIL PLAN	12533215-S102	RAMP AND RETAINING WALL - GENERAL NOTES
12533215-C010	PROPOSED WORKS - DETAIL PLAN		
12533215-C011	PROPOSED WORKS - DETAIL PLAN		
12533215-C012	PROPOSED WORKS - DETAIL PLAN		
12533215-C013	PROPOSED WORKS - DETAIL PLAN		
12533215-C014	PROPOSED WORKS - DETAIL PLAN		
12533215-C015	PROPOSED WORKS - DETAIL PLAN		
12533215-C101	PLAN AND LONGITUDINAL SECTION - STAGE 1 - MORETON TERRACE		
12533215-C102	PLAN AND LONGITUDINAL SECTION - STAGE 1 - HOSKEN STREET		
12533215-C103	PLAN AND LONGITUDINAL SECTION - STAGE 2 - MORETON TERRACE		
12533215-C104	PLAN AND LONGITUDINAL SECTION - STAGE 2 - COMMUNITY RESOURCES CENTRE CAR PARK		
12533215-C105	PLAN AND LONGITUDINAL SECTION - STAGE 3 - MORETON TERRACE		

FINAL DESIGN

						 SHIRE OF IRWIN DONGARA-PORT DENISON A BRILLIANT BLEND	 Level 1, 209 Foreshore Drive Geraldton WA 6530 Australia PO Box 164 Geraldton WA 6531 T 61 8 9964 3677 F 61 8 9921 7997 E permail@ghd.com.au W www.ghd.com.au	DO NOT SCALE	Drawn A. SUBBA	Designer S. DAVIES	Client	SHIRE OF IRWIN MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE COVER PAGE		
								Conditions of Use. This document may only be used by GHD's client (and any other person who GHD has agreed can use this document) for the purpose for which it was prepared and must not be used by any other person or for any other purpose.	Drafting Check A. KRAUSE	Design Check A. KRAUSE	Project			
B	FINAL DESIGN - ISSUED FOR REVIEW	AS	EA	AK	14.12.20			Approved (Project Director)			Title			
A	PRELIMINARY - ISSUED FOR REVIEW	AS			13.11.20			Date						
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing			Drawn			Job Manager	Project Director	Date	Scale		NTS	This Drawing must not be used for Construction unless signed as Approved

- G1. ALL LEVELS SHOWN ON THE DRAWING ARE REFERRED TO AHD (AUSTRALIAN HEIGHTS DATUM DERIVED)
- G2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE
- G3. SURVEY SUPPLIED BY SHIRE OF IRWIN
- G4. WARNING - THE POSITION OF ALL UTILITIES (WATER, SANITATION, STORMWATER, ELECTRICITY, GAS, TELECOMMUNICATIONS, ETC.) SHOWN ON THIS DRAWING ARE APPROXIMATE AND MUST BE VERIFIED ON SITE, CONTRACTOR TO ALSO OBTAIN ALL RELATED INFORMATION FROM "DIAL BEFORE YOU DIG" AND ANY DISCREPANCIES FROM INFORMATION SHOWN SHALL BE BROUGHT TO THE ATTENTION OF THE DESIGNER PRIOR TO COMMENCEMENT OF ANY WORK.
- G5. WARNING - ALL PROPERTY SERVICES ARE NOT SHOWN ON THE DBYD INFORMATION AND THESE PLANS. A SUITABLE QUALIFIED AND EXPERIENCED SERVICE LOCATOR SHALL BE ENGAGED TO LOCATE ALL SERVICES BEFORE COMMENCING WORKS.
- G6. ALL SET OUT FOR THE CIVIL WORKS AND ASSOCIATED LINE MARKING IS TO BE IN ACCORDANCE WITH THESE DRAWINGS.
- G7. DO NOT SCALE OR MAKE AMENDMENTS TO THE DRAWING - IF IN DOUBT OR CHANGES ARE REQUIRE CONTACT INFRASTRUCTURE SERVICES - ENGINEERING SERVICES DESIGN TEAM.
- G8. ALL WORK TO COMPLY WITH SHIRE OF IRWIN GUIDELINES, STANDARDS AND STANDARD DRAWINGS AND DETAILS UNLESS OTHERWISE SHOWN.
- G9. CONTRACTOR TO LOCATE ALL LEVELS FROM ESTABLISHED BENCH MARKS
- G10. THE CONTRACTOR SHALL CHECK, CONFIRM AND SATISFY THEMSELVES THAT ALL DIMENSIONS AND LEVELS ALONG WITH EXISTING SERVICE LOCATIONS ARE CORRECT PRIOR TO CONSTRUCTION WORKS COMMENCING ON SITE.
- G11. THE CONTRACTOR SHALL NOTIFY THE SUPERINTENDENT IMMEDIATELY OF ANY DISCREPANCIES OR ERRORS THAT MAY BE PRESENT WITHIN THESE PLANS.
- G12. THE CONTRACTOR SHALL MAINTAIN ACCURATE RECORDS OF LEVELS AND LOCATIONS OF SERVICES TO FULLY COMPLY WITH LOCAL AUTHORITY 'AS CONSTRUCTED' INFORMATION REQUIREMENTS
- G13. A MINIMUM OF 24 HRS NOTICE MUST BE PROVIDED TO THE LOCAL AUTHORITY OR THE SUPERINTENDENT WHEN ARRANGING FOR INSPECTIONS.
- G14. THE CONTRACTOR SHALL ARRANGE FOR A PRE-START MEETING TO BE HELD ON SITE BETWEEN ALL NECESSARY PARTIES PRIOR TO CONSTRUCTION COMMENCING ON SITE.

SID1. THE SAFETY RISK MITIGATION ITEMS BELOW ARE BASED ON GHD'S DESIGN OFFICE EXPERIENCE AND DO NOT NECESSARILY ACCOUNT FOR ALL CONSTRUCTION, OPERATION, MAINTENANCE AND DEMOLITION SAFETY RISKS. BASED ON INFORMATION AVAILABLE WHEN THIS DRAWING WAS MADE, IN ITS CAPACITY AS DESIGNER ONLY, GHD HAS TRIED TO IDENTIFY SAFETY RISKS PERTAINING TO CONSTRUCTION, OPERATION, MAINTENANCE AND DEMOLITION PHASES OF THE ASSET. INCLUSION (OR NOT) OF ANY ITEM DOES NOT REDUCE OR LIMIT OBLIGATIONS OF CONSTRUCTOR, USER, MAINTAINER AND DEMOLISHER TO UNDERTAKE APPROPRIATE RISK MANAGEMENT ACTIVITIES TO REDUCE RISK AND IS NOT AN ADMISSION BY GHD THAT INCLUSION OF ANY ITEM IS DESIGNER'S RESPONSIBILITY.

SID2 REFER SAFETY IN DESIGN RISK REGISTER

PD1. THESE PLANS SHALL BE READ IN CONJUNCTION WITH ALL OTHER DOCUMENTATION RELEVANT TO THIS PROJECT INCLUDING (BUT NOT LIMITED TO) THE FOLLOWING:

- ALL RELEVANT ROADWORKS LAYOUT PLANS, LONGITUDINAL SECTIONS AND CROSS SECTIONS ALONG WITH SETOUT PLANS.
- ALL RELEVANT STORMWATER DRAINAGE PLANS AND SPECIFICATIONS.
- TECHNICAL SPECIFICATION
- SAFETY IN DESIGN

- EC1. IN THE EVENT OF ROOT DAMAGE TO MATURE TREES TO REMAIN, MAKE A CLEAN CUT ABOVE THE SEVERED ROOT AND TREAT THE ROOT WITH A SUITABLE FUNGICIDE.
- EC2. LIMIT CONSTRUCTION ACTIVITY OVER AREAS WHICH ARE NOT TO BE DISTURBED BY FENCING OF WITH REGULARLY SPACED POSTS AND COLOURED PLASTIC TAPE.
- EC3. CARE FOR STOCKPILES SO AS TO PREVENT EROSION AND SOIL LOSS. AVOID ENTRY OF SEDIMENTS INTO STORMWATER SYSTEM.
- EC4. TOPSOIL AND SEED DISTURBED AREAS ON COMPLETION, ENSURE DISTURBED AREAS REMAIN STABLE THROUGHOUT THE ESTABLISHMENT. TURF AREAS SO DESIGNATED.
- EC5. SEDIMENT AND EROSION CONTROL MEASURES TO BE PLACE PRIOR TO BEGINNING OF EARTHWORKS OPERATIONS.
- EC6. OBTAIN APPROVAL FROM SUPERINTENDENT TO PROCEED WITH CLEARING OPERATIONS.

TM1. TRAFFIC MANAGEMENT PLAN TO BE PREPARED AND CHECKED BY SHIRE OF IRWIN COMPLIANCE/TRAFFIC CONTROL OFFICER IN ADVANCE OF WORKS BEING CONDUCTED.

TM2. PEDESTRIAN MANAGEMENT PLAN TO BE PREPARED AND CHECKED BY SHIRE OF IRWIN COMPLIANCE/TRAFFIC CONTROL OFFICER IN ADVANCE OF WORKS BEING CONDUCTED.

- D1. ANY ITEMS OR ADJACENT PAVEMENT AREAS DAMAGED AS A RESULT OF DEMOLITION ACTIVITIES SHALL BE REPAIRED OR REPLACED, AS REQUIRED, AT THE CONTRACTORS SOLE EXPENSE.
- D2. ANY SERVICE WHICH IS DISRUPTED BY THE DEMOLITION WORKS SHALL BE REINSTALLED BY THE CONTRACTOR IMMEDIATELY AND AT HIS EXPENSE.
- D3. ON COMPLETION OF DEMOLITION WORKS, DISTURBED AREAS ARE TO BE BACKFILLED AND COMPACTED TO NATURAL SURFACE LEVEL AS PER SPECIFICATION.
- D4. PRIOR TO CLEARING AND DEMOLITION OPERATIONS, REMOVE WITHOUT MANAGING ALL EXISTING INFRASTRUCTURE TO BE REUSED OR STORED, AS NOTED AND DIRECTED BY THE SUPERINTENDENT.
- D5. CLEARING AND DEMOLITION OPERATIONS SHALL BE CARRIED OUT ONLY WITHIN THOSE AREAS AFFECTED BY THE PROPOSED WORKS UNLESS NOTED OTHERWISE.
- D6. DEMOLISH EXISTING REDUNDANT INFRASTRUCTURE SUCH AS KERBS, PAVEMENT SEALS, CONCRETE FOOTPATHS, ABANDONED SERVICE STRUCTURES ETC. DISPOSE OF ALL SUCH MATERIAL OFF SITE.

- E1. ALL EARTHWORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH AS3798.
- E2. IT IS THE CONTRACTORS RESPONSIBILITY TO PROTECT THE SITE AND SURROUNDING AREAS FROM DAMAGE RESULTING FROM STORMWATER RUNOFF. TEMPORARY DIVERSION DRAINS AND OR OTHER DAMAGE CONTROL DEVICES ARE TO BE IMPLEMENTED BY THE CONTRACTOR DURING CONSTRUCTION TO MINIMISE THE EFFECTS OF WEATHER.
- E3. EXCESS SPOIL MATERIAL GENERATED DURING CONSTRUCTION IS TO BE REMOVED FROM THE SITE BY THE CONTRACTOR OR SPREAD ON SITE AS DIRECTED BY THE SUPERINTENDENT.
- E4. ALL FILL MATERIAL PLACE ON THE SITE SHALL COMPRISE ONLY OF NATURAL EARTH AND ROCK IS TO BE FREE OF CONTAMINANTS (AS DEFINED BY SECTION 11 OF THE ENVIRONMENTAL PROTECTION ACT 1994), NOXIOUS, HAZARDOUS, DELETERIOUS AND ORGANIC MATERIALS. SUITABLE FILL MATERIAL IS DEEMED TO COMPLY WITH THE REQUIREMENTS OF CLAUSE 4.3, AS3798.
- E5. ALL EARTHWORKS BELOW RL5.0M AHD MUST BE CARRIED OUT IN ACCORDANCE WITH AN ACID SULPHATE SOILS MANAGEMENT PLAN UNLESS NOTED OTHERWISE ON PLANS WHICH IS TO BE PREPARED BY THE CONTRACTOR IN ACCORDANCE WITH LOCAL AUTHORITIES GUIDELINES.

RD1. ALL SETOUT AND LEVEL INFORMATION PROVIDED IN THE 3D MODEL
RD2. REFER TYPICAL CROSS SECTIONS, INTERSECTION DETAIL PLANS, ROAD LAYOUT PLANS, LONGITUDINAL SECTIONS FOR SETOUT DETAILS
RD3. NEW ROAD SURFACE, PAVEMENT FORMATION AND KERB TO MATCH SMOOTHLY AND NEATLY TO EXISTING SURFACES, LEVELS AND ALIGNMENT MAY BE VARIED WHERE NECESSARY TO GET A SMOOTH FINISH AS DIRECTED BY THE SUPERINTENDENT.
RD4. PAVEMENT DESIGN AND MATERIALS TO BE CONFIRMED WITH THE SUPERINTENDENT PRIOR TO CONSTRUCTION.
RD5. TESTING TO BE UNDERTAKEN IN ACCORDANCE WITH LOCAL AUTHORITY REQUIREMENTS.

SD1. FOR CONNECTIONS TO EXISTING STORMWATER DRAINAGE NETWORKS, LEVELS AND GRADIENTS OF STORMWATER DRAINAGE PIPES MAY BE VARIED TO ACHIEVE A SATISFACTORY CONNECTION. WRITTEN APPROVAL FROM THE SUPERINTENDENT AND LOCAL AUTHORITY SHALL BE OBTAINED PRIOR TO COMMENCEMENT OF WORKS

SD2. ALL NEW AND EXISTING STORMWATER DRAINAGE NETWORKS INCLUDING CREEKS SHALL BE KEPT FREE OF SEDIMENT AND DEBRIS. ALL NEW STORMWATER LINES SHALL BE CLEANED OF ALL SEDIMENT AND DEBRIS PRIOR TO 'ON-MAINTENANCE' INSPECTION

SD3. STORMWATER LAYOUT PLANS TO BE READ IN CONJUNCTION WITH THE STORMWATER DRAINAGE LONGITUDINAL SECTIONS AND STRUCTURE DETAILS.

SD4. ALL STORMWATER DRAINAGE PIPES SHALL BE CLASS 2 RCP UNLESS NOTED OTHERWISE ON PLANS OR LONGITUDINAL SECTIONS.

SD5. ALL PIPES <600mm DIAMETER SHALL BE RUBBER RING JOINTED AND ALL PIPES >600mm DIAMETER SHALL BE FLUSH JOINTED UNLESS NOTED OTHERWISE ON PLANS OR LONGITUDINAL SECTIONS

SD6. ALL STORMWATER PIPE LENGTHS SHOWN ON LONGITUDINAL SECTIONS ARE FROM CENTRE OF STRUCTURE TO CENTRE OF STRUCTURE UNLESS NOTED OTHERWISE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CALCULATING THE ACTUAL PIPE LENGTHS REQUIRED.

SD7. STORMWATER DRAINAGE PIPES, MANHOLES, INLETS AND SOAK WELLS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION.

SD8. THICK STEEL PLATES SHALL BE PLACED OVER ALL MANHOLES DURING THE CONSTRUCTION PROCESS UNTIL FRAMES AND LIDS ARE PUT IN PLACE TO TAKE EXPECTED TRAFFIC.

SD9. ALL GULLY INLET SHAFTS SHALL BE CLASS 3 UNLESS NOTED OTHERWISE ON STRUCTURE DETAILS SHEETS.

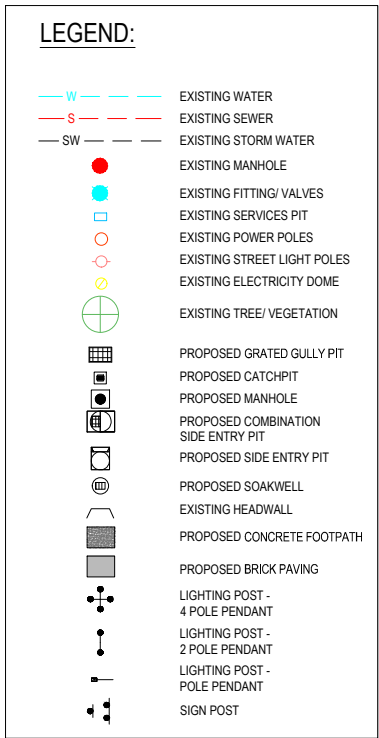
SD10. ENSURE JOINTS BETWEEN FLUSH JOINTED PIPES ARE FULLY SEALED USING AN APPROVED JOINT SEALANT TO MANUFACTURERS REQUIREMENTS AND SPECIFICATIONS.

SD11. PIPE OPENINGS ARE TO BE LOCATED WITHIN A SINGLE WALL OF SQUARE/RECTANGULAR PITS (IE. PIPES SHALL NOT BE PERMITTED TO ENTER THROUGH THE CORNER OF THE PIT STRUCTURE).

SD12. PROVIDE MIN. 1m LONG CONCRETE KERB TRANSITIONS EITHER SIDE OF GULLY PITS LOCATED IN KERB AND CHANNEL. END PROFILES OF TRANSITION TO MATCH KERB AND CHANNEL AND GULLY INLET PROFILES.

- F1. ALL CONCRETE TO BE 100mm THICK REINFORCED AS PER THE DESIGN DOCUMENTATION AND TECHNICAL SPECIFICATION, UNLESS SHOWN OTHERWISE.
- F2. CONCRETE TO HAVE A NON-SLIP SURFACE THAT MEETS AS1428 MINIMUM SPECIFICATIONS.
- F3. PRAM RAMP TO BE IN ACCORDANCE WITH AS 1428.1.
- F4. CONTROL JOINTS SHOWN AT CRITICAL LOCATIONS ONLY. ALL OTHER JOINTS TO BE SPACED AS PER THE STANDARD JOINT DETAILS.
- F5. CROSSFALL HAS BEEN DESIGNED TO BE PEDESTRIAN AND WHEELCHAIR USER FRIENDLY AS PER AS1428.
- F6. PATHWAY LONGITUDINAL GRADES SHOULD MEET AS1428 MINIMUM SPECIFICATIONS.
- F7. PRAM RAMPS TO BE FLUSH TO ROAD SURFACE WITH A SLOPE OF 1 IN 8 MAXIMUM, MAKING THEM ACCESSIBLE FOR PEDESTRIANS AND WHEELCHAIRS USERS AS PER AS1428.
- F8. SMOOTH TRANSITIONS FROM CROSSOVERS, INTERSECTIONS AND EXISTING PATHWAY TO NEW PATHWAY TO ELIMINATE TRIP HAZARDS.
- F9. ALL BRICK PAVING WORKS TO BE AS PER AS4455.

SF1. BATTER SLOPES ARE TO BE GRADED / VARIED UNIFORMLY BETWEEN CROSS SECTIONS.
 SF2. LOCALISED EARTHWORKS SHALL BE UNDERTAKEN AS REQUIRED TO ENSURE SITE IS FREE DRAINING
 SF3. FOLLOWING COMPLETION OF WORKS, BATTERS AND DISTURBED AREAS ARE TO BE COVERED WITH 50mm OF TOPSOIL AND GRASS ESTABLISHED ON THE SURFACE. ORGANIC FERTILISER SHALL BE SPREAD UNDER THE TOPSOIL.
 SF4. ALL PAVEMENT SURFACING AND CONCRETE WORKS SHALL BE HANDED OVER IN A CLEAN AND TIDY STATE



CAUTION

SERVICES SHOWN ARE TO BE USED AS A GUIDE ONLY. SERVICES SHALL BE MANUALLY LOCATED BY HAND PRIOR TO MECHANICAL EXCAVATION. RELEVANT PERMITS SHALL BE OBTAINED PRIOR TO SITE WORKS AND A DBYD ENQUIRY SHALL BE UNDERTAKEN NO EARLIER THAN 30 DAYS BEFORE CONSTRUCTION. A FULL SET OF THE DBYD DOCUMENTS ARE TO BE KEPT ON SITE AT ALL TIMES. CONFLICTING SERVICES ARE TO BE RELOCATED/PROTECTED TO THE SATISFACTION OF THE SERVICE AUTHORITY PRIOR TO WORKS.

FINAL DESIGN

[illegible]

Plot Date: 16 February 2021 - 9:59 AM Plotted by: Abhishek Subba Cad File No: N:\AU\Perth\Projects\61\12533215\CADD\Drawings\12533215-G002.dwg

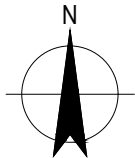
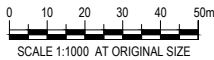


GENERAL ARRANGEMENT PLAN

SCALE 1:1000

FINAL DESIGN

E	FINAL DESIGN - ISSUED FOR REVIEW		SD	EA	AK	14.12.20
D	UPDATED GENERAL ARRANGEMENT		SD			01.12.20
C	PRELIMINARY DESIGN - ISSUED FOR REVIEW		SD			12.11.20
B	ISSUED FOR COMMENT		SD			24.09.20
A	ISSUED FOR PRELIMINARY		RP			
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date



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Drawn R. PASTORIN

Designer S. DAVIES

Drafting Check A. KRAUSE

Design Check A. KRAUSE

Approved
(Project Director)
Date

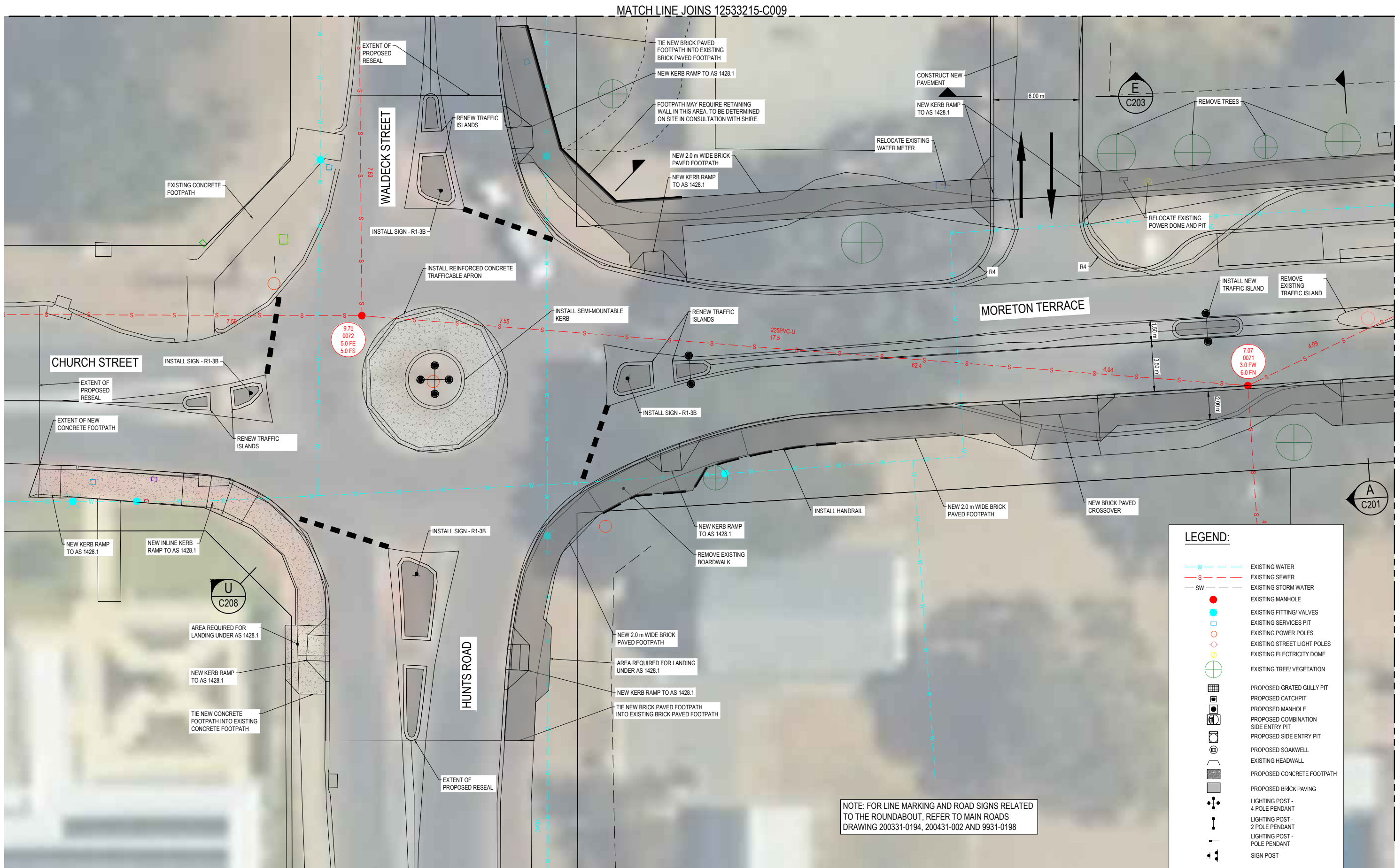
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Client **SHIRE OF IRWIN**
Project **MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE**
Title **GENERAL ARRANGEMENT PLAN**

Original Size
A1 Drawing No: **12533215-C001**

Rev: E

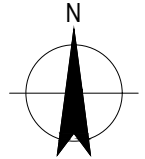
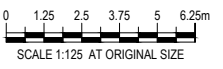


MATCH LINE JOINS 12533215-C003

E	ROUNDBOUT HATCH AND LEADER EDITED		SD	EA	AK	15.02.21
D	FINAL DESIGN - ISSUED FOR REVIEW		SD	EA	AK	14.12.20
C	PRELIMINARY DESIGN - ISSUED FOR REVIEW		SD			12.11.20
B	ISSUED FOR COMMENT		SD			24.09.20
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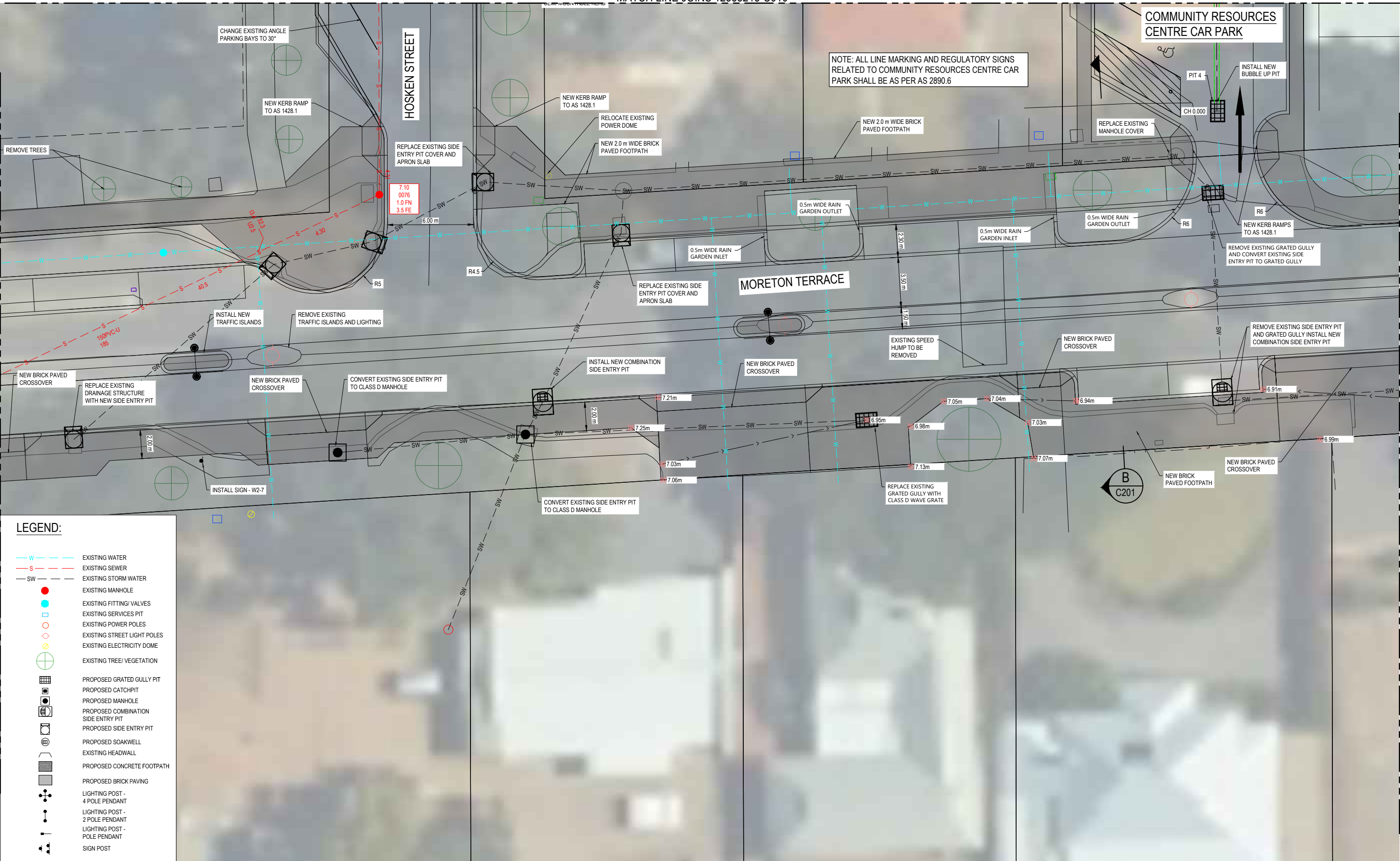
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	Approved (Project Director) Date			
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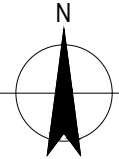
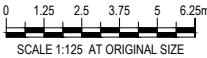
FINAL DESIGN



DETAIL PLAN
SCALE 1:125

FINAL DESIGN

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C	PRELIMINARY DESIGN - ISSUED FOR REVIEW	SD			12.11.20	
B	ISSUED FOR COMMENT	SD			24.09.20	
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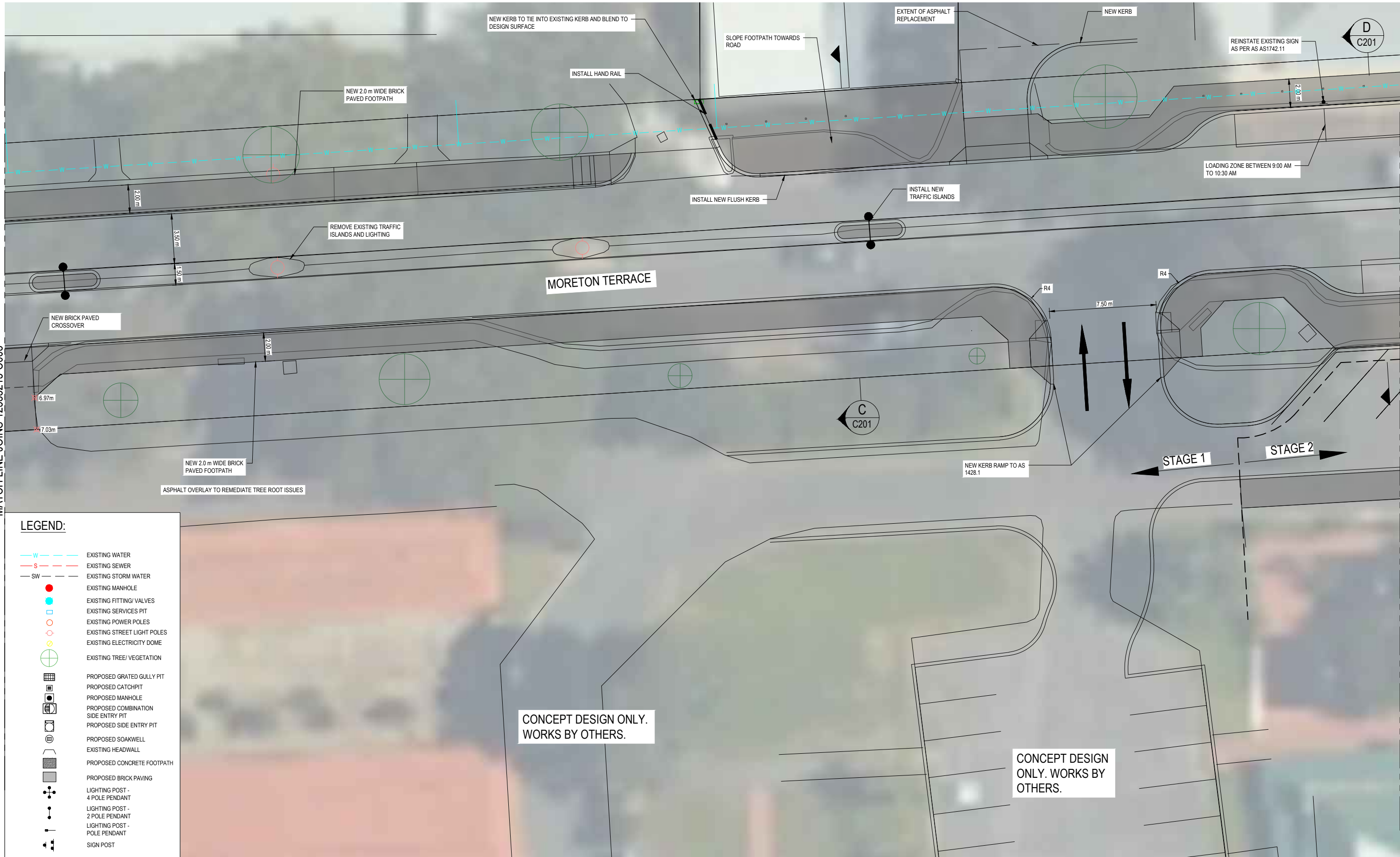
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Client Project	SHIRE OF IRWIN MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title	DETAIL PLAN
Original Size	A1
Drawing No:	12533215-C003
Rev:	E

MATCH LINE JOINS 12533215-C003



MATCH LINE JOINS 12533215-C005

LEGEND:

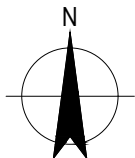
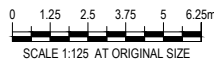
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- S EXISTING SEWER
- SW EXISTING STORM WATER
- EXISTING MANHOLE
- EXISTING FITTING/ VALVES
- EXISTING SERVICES PIT
- EXISTING POWER POLES
- EXISTING STREET LIGHT POLES
- EXISTING ELECTRICITY DOME
- ⊕ EXISTING TREE/ VEGETATION
- PROPOSED GRATED GULLY PIT
- PROPOSED CATCHPIT
- PROPOSED MANHOLE
- PROPOSED COMBINATION SIDE ENTRY PIT
- PROPOSED SIDE ENTRY PIT
- ⊙ PROPOSED SOAKWELL
- EXISTING HEADWALL
- PROPOSED CONCRETE FOOTPATH
- PROPOSED BRICK PAVING
- LIGHTING POST - 4 POLE PENDANT
- LIGHTING POST - 2 POLE PENDANT
- LIGHTING POST - POLE PENDANT
- SIGN POST

DETAIL PLAN
SCALE 1:125

MATCH LINE JOINS 12533215-C012

FINAL DESIGN

D	FINAL DESIGN - ISSUED FOR REVIEW		SD	EA	AK	14.12.20
C	PRELIMINARY DESIGN - ISSUED FOR REVIEW		SD			12.11.20
B	ISSUED FOR COMMENT		SD			24.09.20
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Designer S. DAVIES

Drafting Check A. KRAUSE

Design Check A. KRAUSE

Approved (Project Director)
Date

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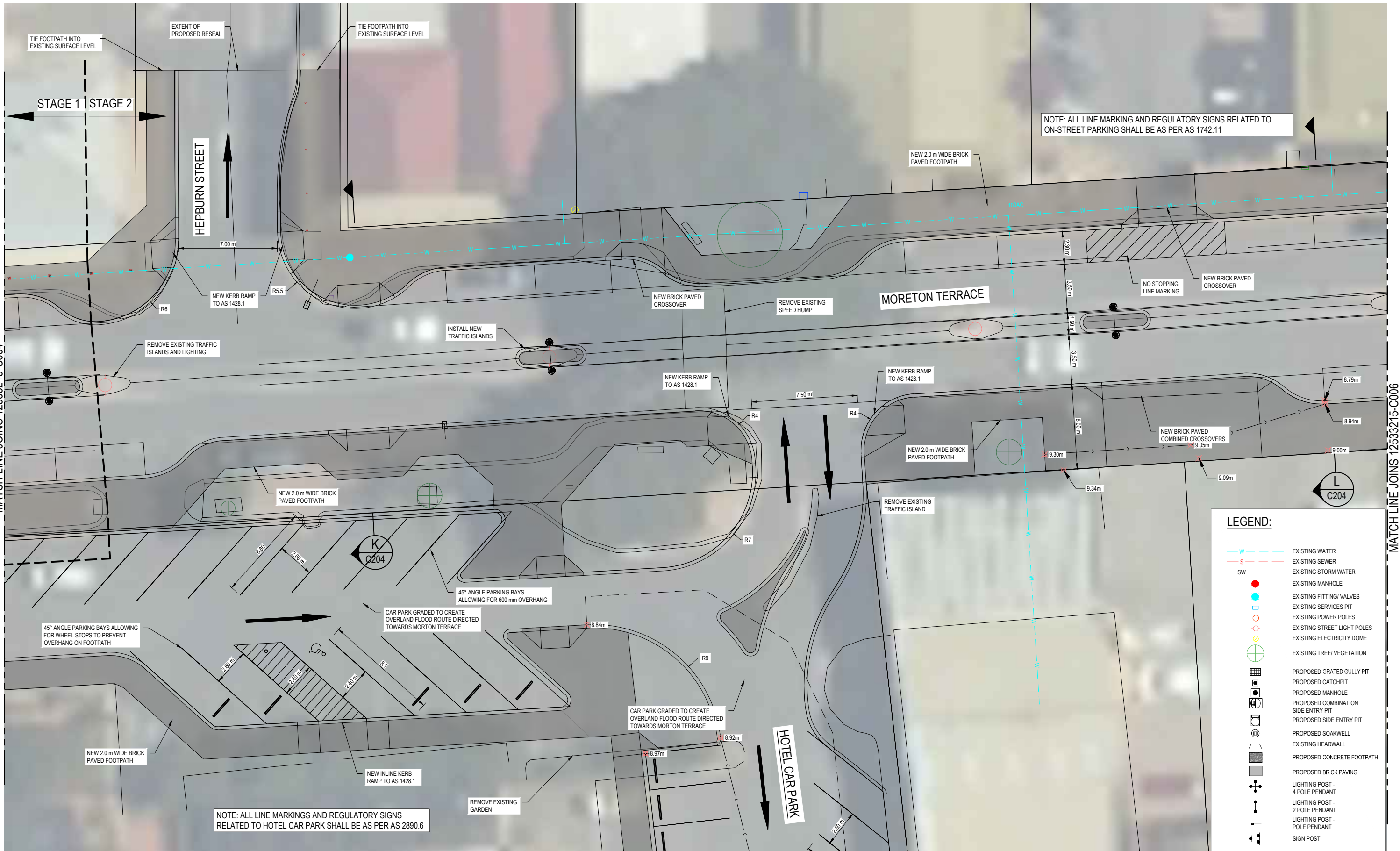
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Client SHIRE OF IRWIN
Project MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title DETAIL PLAN

Original Size
A1 Drawing No: 12533215-C004

Rev: D

MATCH LINE JOINS 12533215-C004



MATCH LINE JOINS 12533215-C006

DETAIL PLAN
SCALE 1:125

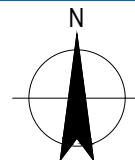
MATCH LINE JOINS 12533215-C013

E	FINAL DESIGN - ISSUED FOR REVIEW		SD	EA	AK	14.12.20
D	PRELIMINARY DESIGN - ISSUED FOR REVIEW - STAGE 2		SD			24.11.20
C	PRELIMINARY DESIGN - ISSUED FOR REVIEW - STAGE 1		SD			12.11.20
B	ISSUED FOR COMMENT		SD			24.09.20
F	PEDESTRIAN CROSSWALK REMOVED		SD	EA	AK	15.02.21
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0 1.25 2.5 3.75 5 6.25m
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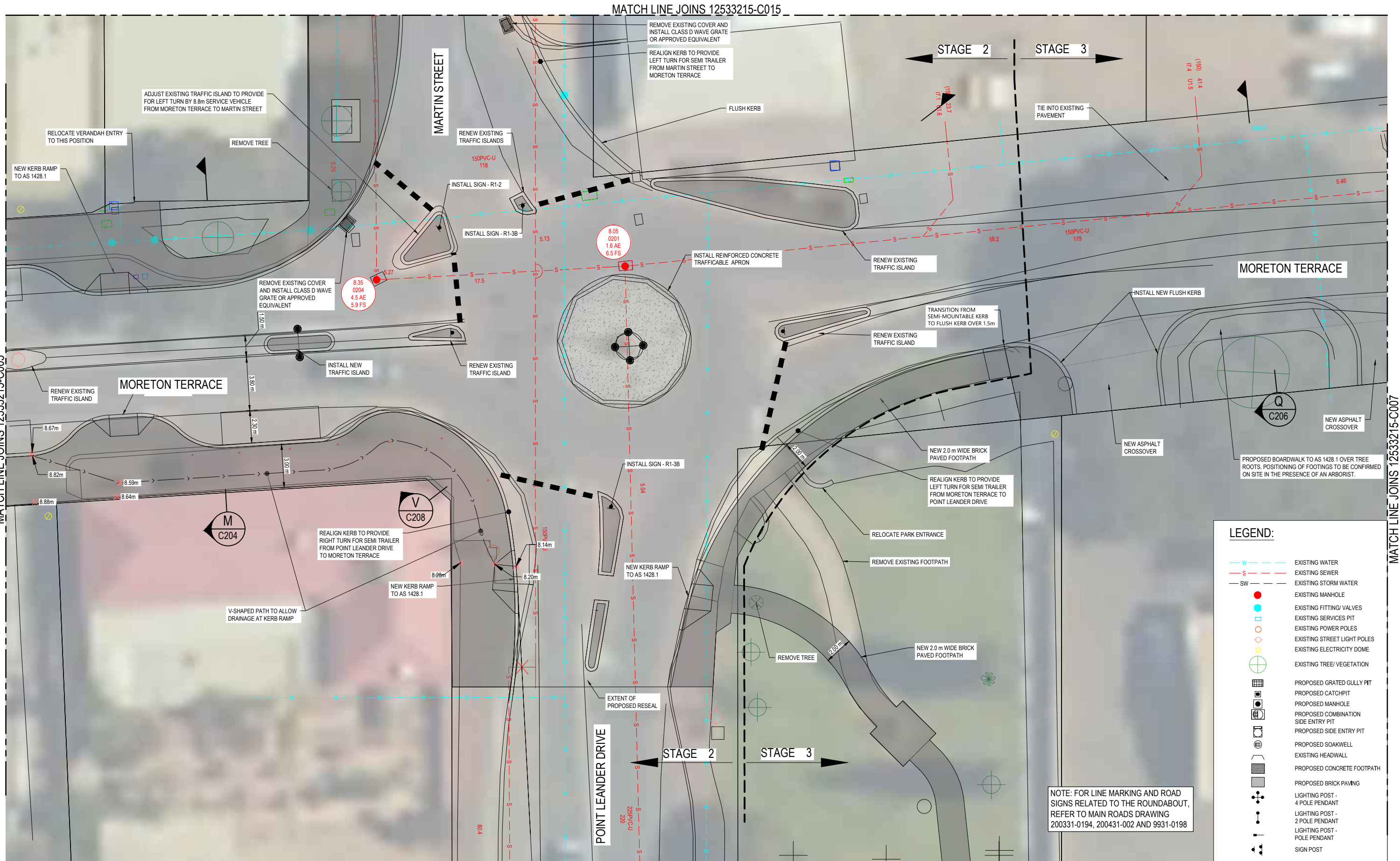
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Client **SHIRE OF IRWIN**
Project **MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE**
Title **DETAIL PLAN**

Original Size **A1** Drawing No: **12533215-C005** Rev: **F**

FINAL DESIGN

MATCH LINE JOINS 12533215-C005



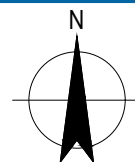
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D	PRELIMINARY DESIGN - ISSUED FOR REVIEW - STAGE 3	SD			26.11.20
C	KERB RAMPS RELOCATED, ROUNDABOUT KERBS REALIGNED	SD			24.11.20
B	ISSUED FOR COMMENT	SD			24.09.20
F	ROUNDABOUT HATCH AND LEADER EDITED	SD	EA	AK	15.02.21
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		Drawn	Job Manager	Project Director	Date

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Client	SHIRE OF IRWIN
Project	MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title	DETAIL PLAN
Original Size	A1
Drawing No:	12533215-C006
Rev:	F

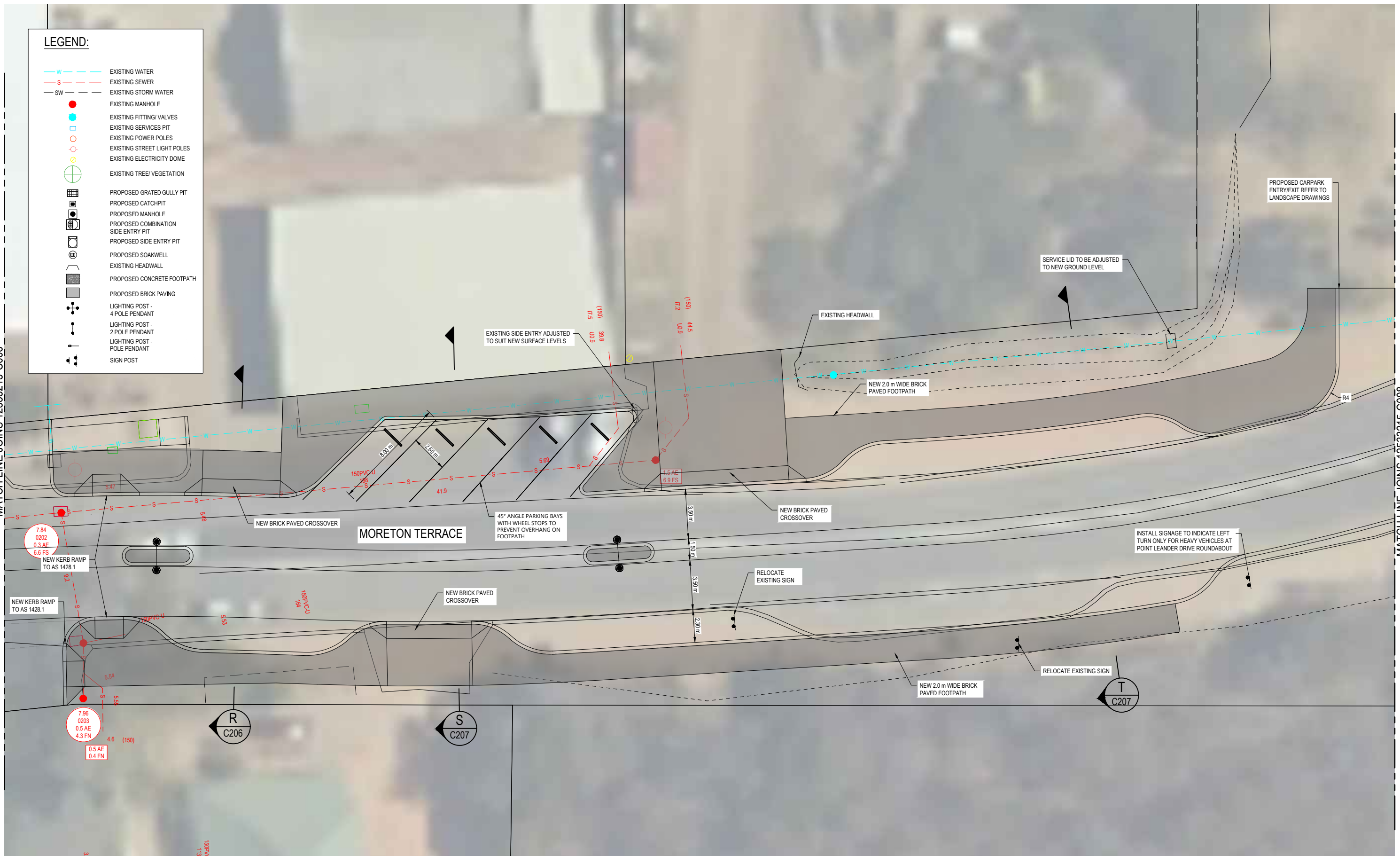
FINAL DESIGN

MATCH LINE JOINS 12533215-C006

MATCH LINE JOINS 12533215-C008

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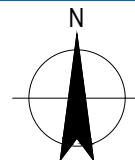
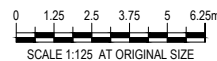
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- EXISTING SEWER
- EXISTING STORM WATER
- EXISTING MANHOLE
- EXISTING FITTING/ VALVES
- EXISTING SERVICES PIT
- EXISTING POWER POLES
- EXISTING STREET LIGHT POLES
- EXISTING ELECTRICITY DOME
- EXISTING TREE/ VEGETATION
- PROPOSED GRATED GULLY PIT
- PROPOSED CATCHPIT
- PROPOSED MANHOLE
- PROPOSED COMBINATION SIDE ENTRY PIT
- PROPOSED SIDE ENTRY PIT
- PROPOSED SOAKWELL
- EXISTING HEADWALL
- PROPOSED CONCRETE FOOTPATH
- PROPOSED BRICK PAVING
- LIGHTING POST - 4 POLE PENDANT
- LIGHTING POST - 2 POLE PENDANT
- LIGHTING POST - POLE PENDANT
- SIGN POST



DETAIL PLAN
SCALE 1:125

FINAL DESIGN

E	ADDED WHEEL STOP AND LEADER		SD	EA	AK	16.02.21
D	FINAL DESIGN - ISSUED FOR REVIEW		SD	EA	AK	14.12.20
C	CARPARK ENTRANCE ADDED		SD			26.11.20
B	ISSUED FOR COMMENT		SD			24.09.20
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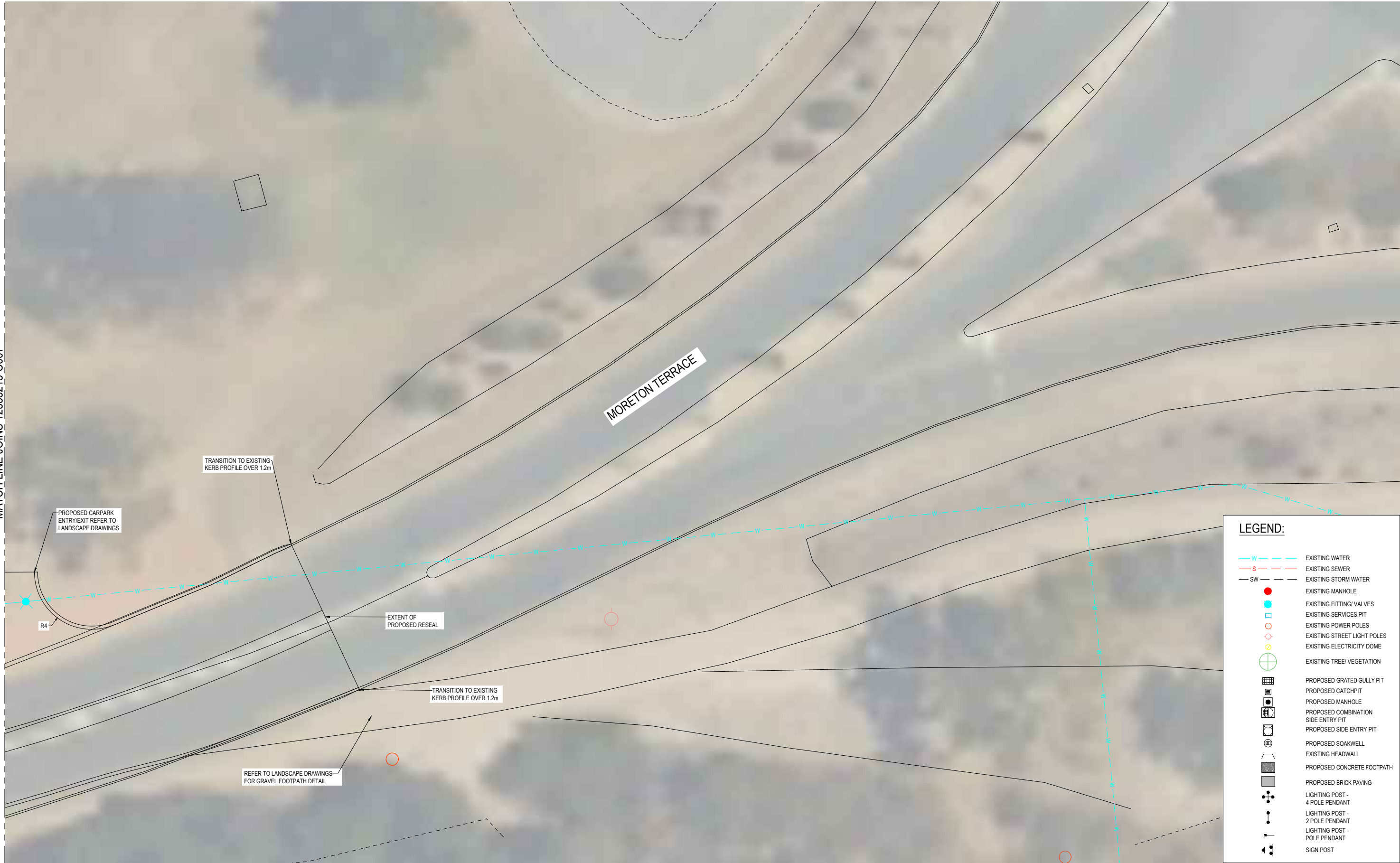
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Client	SHIRE OF IRWIN
Project	MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title	DETAIL PLAN
Original Size	A1
Drawing No:	12533215-C007
Rev:	E

MATCH LINE JOINS 12533215-C007

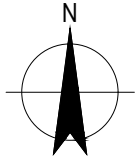
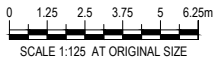


LEGEND:	
— W —	EXISTING WATER
— S —	EXISTING SEWER
— SW —	EXISTING STORM WATER
●	EXISTING MANHOLE
●	EXISTING FITTING/ VALVES
□	EXISTING SERVICES PIT
○	EXISTING POWER POLES
○	EXISTING STREET LIGHT POLES
○	EXISTING ELECTRICITY DOME
○	EXISTING TREE/ VEGETATION
■	PROPOSED GRATED GULLY PIT
■	PROPOSED CATCHPIT
■	PROPOSED MANHOLE
■	PROPOSED COMBINATION SIDE ENTRY PIT
■	PROPOSED SIDE ENTRY PIT
■	PROPOSED SOAKWELL
■	EXISTING HEADWALL
■	PROPOSED CONCRETE FOOTPATH
■	PROPOSED BRICK PAVING
■	LIGHTING POST - 4 POLE PENDANT
■	LIGHTING POST - 2 POLE PENDANT
■	LIGHTING POST - POLE PENDANT
■	SIGN POST

DETAIL PLAN
SCALE 1:125

FINAL DESIGN

D	FINAL DESIGN - ISSUED FOR REVIEW	SD	EA	AK	14.12.20		
C	CARPARK ENTRANCE ADDED	SD			26.11.20		
B	ISSUED FOR COMMENT	SD			24.09.20		
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No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing		Drawn	Job Manager	Project Director	Date



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Drawn R. PASTORIN

Designer S. DAVIES

Drafting Check A. KRAUSE

Design Check A. KRASUE

Approved (Project Director)
Date

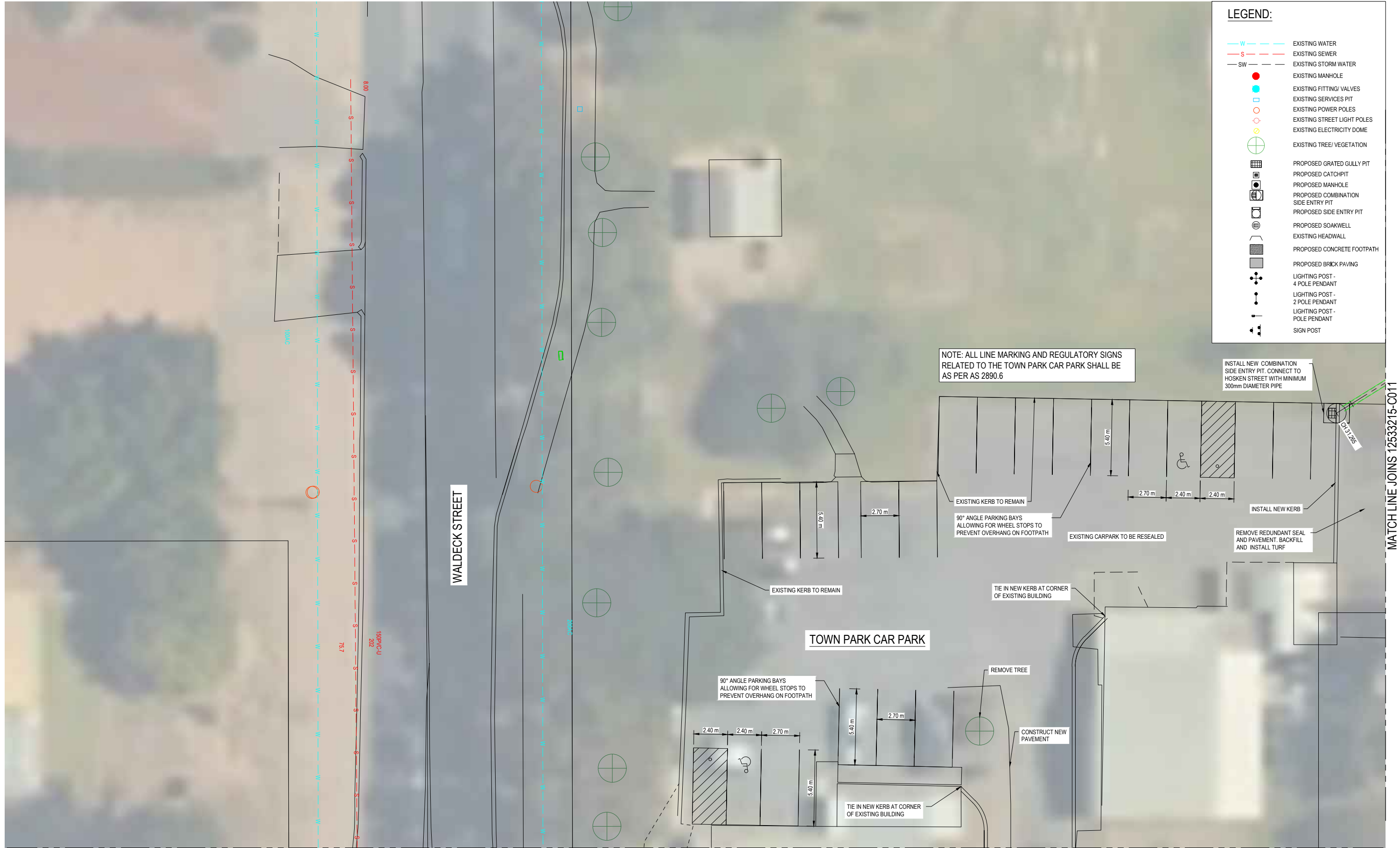
Scale 1:125

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Client SHIRE OF IRWIN
Project MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title DETAIL PLAN

Original Size A1 Drawing No: 12533215-C008

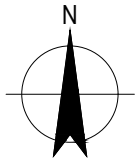
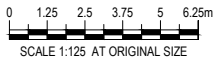
Rev: D



DETAIL PLAN MATCH LINE JOINS 12533215-C002

FINAL DESIGN

D	FINAL DESIGN - ISSUED FOR REVIEW	SD	EA	AK	14.12.20
C	PRELIMINARY DESIGN - ISSUED FOR REVIEW	SD			12.11.20
B	ISSUED FOR COMMENT	SD			24.09.20
A	ISSUED FOR PRELIMINARY	RP			
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing			
		Drawn	Job Manager	Project Director	Date



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Designer S. DAVIES

Drafting Check A. KRAUSE

Design Check A. KRAUSE

Approved (Project Director)
Date

Scale 1:125

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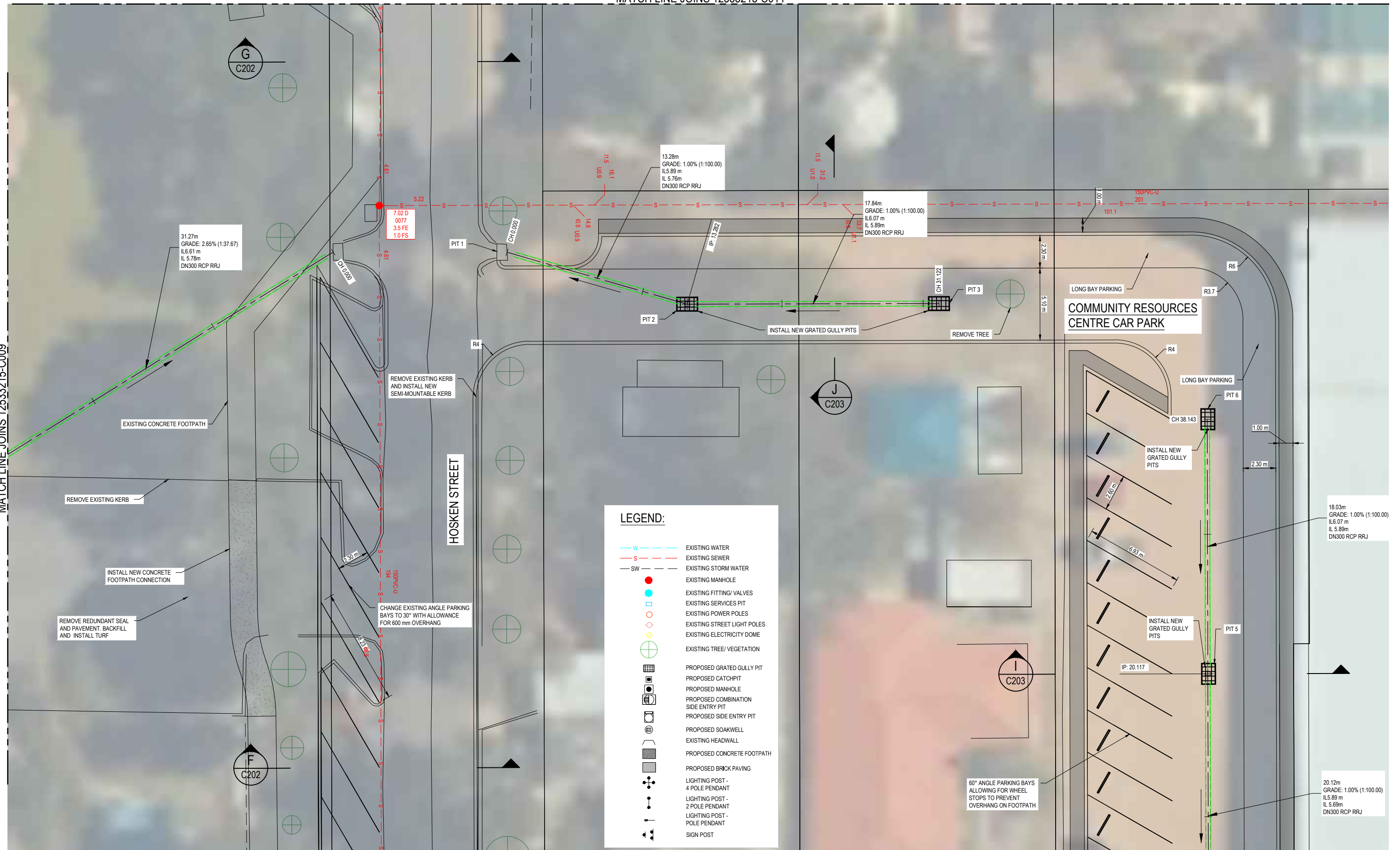
Client SHIRE OF IRWIN
Project MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title DETAIL PLAN

Original Size A1 Drawing No: 12533215-C009

Rev: D

MATCH LINE JOINS 12533215-C009

MATCH LINE JOINS 12533215-C011



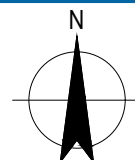
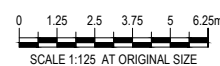
DETAIL PLAN MATCH LINE JOINS 12533215-C003
SCALE 1:125

FINAL DESIGN

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D	FINAL DESIGN - ISSUED FOR REVIEW		SD	EA	AK	14.12.20
C	PRELIMINARY DESIGN - ISSUED FOR REVIEW		SD			12.11.20
B	ISSUED FOR COMMENT		SD			24.09.20
A	ISSUED FOR PRELIMINARY		RP			
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

Plot Date: 16 February 2021 - 2:13 PM Plotted by: Abhishek Subba

Cad File No: N:\AU\Perth\Projects\611\2533215\CAD\Drawings\12533215-C010.dwg



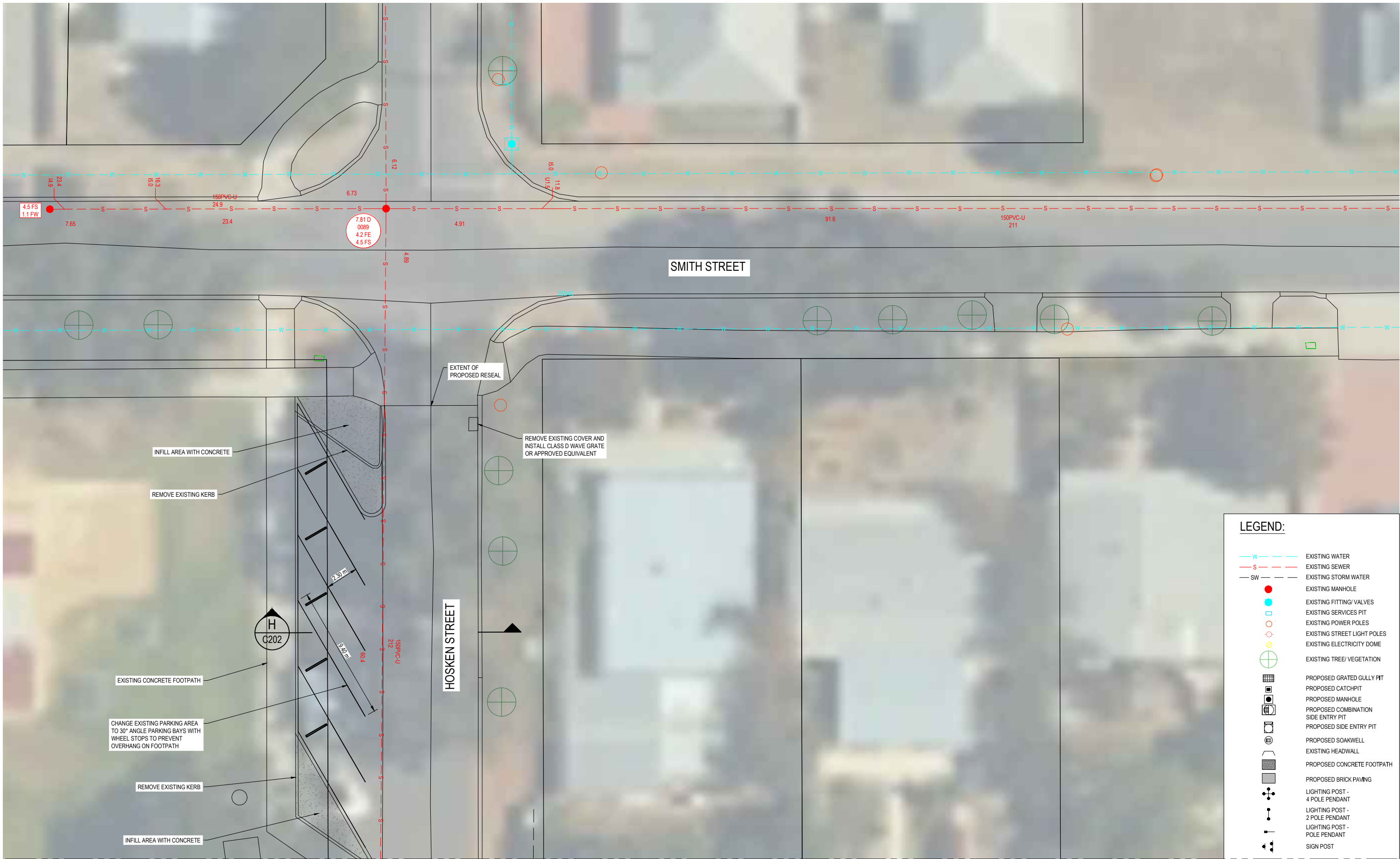
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Drafting Check	A. KRAUSE	Design Check	A. KRAUSE
Approved (Project Director)		Date	
Scale	1:125	This Drawing must not be used for Construction unless signed as Approved	

Client	SHIRE OF IRWIN
Project	MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title	DETAIL PLAN
Original Size	A1
Drawing No:	12533215-C010
Rev:	E



LEGEND:

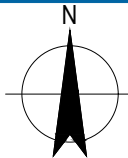
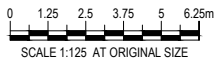
- W — — — — — EXISTING WATER
- S — — — — — EXISTING SEWER
- SW — — — — — EXISTING STORM WATER
- EXISTING MANHOLE
- EXISTING FITTING/ VALVES
- EXISTING SERVICES PIT
- EXISTING POWER POLES
- EXISTING STREET LIGHT POLES
- EXISTING ELECTRICITY DOME
- ⊕ EXISTING TREE/ VEGETATION
- ▤ PROPOSED GRATED GULLY PIT
- PROPOSED CATCHPIT
- PROPOSED MANHOLE
- PROPOSED COMBINATION SIDE ENTRY PIT
- PROPOSED SIDE ENTRY PIT
- PROPOSED SOAKWELL
- EXISTING HEADWALL
- PROPOSED CONCRETE FOOTPATH
- PROPOSED BRICK PAVING
- ⋄ LIGHTING POST - 4 POLE PENDANT
- ⋄ LIGHTING POST - 2 POLE PENDANT
- ⋄ LIGHTING POST - POLE PENDANT
- ⋄ SIGN POST

DETAIL PLAN MATCH LINE JOINS 12533215-C010
SCALE 1:125

E	SPELL CORRECTION		SD	EA	AK	16.02.21
D	FINAL DESIGN - ISSUED FOR REVIEW		SD	EA	AK	14.12.20
C	PRELIMINARY DESIGN - ISSUED FOR REVIEW		SD			12.11.20
B	ISSUED FOR COMMENT		SD			24.09.20
A	ISSUED FOR PRELIMINARY		RP			
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

Plot Date: 16 February 2021 - 1:31 PM Plotted by: Abhishek Subba

Cad File No: N:\AU\Perth\Projects\611\12533215\CADD\Drawings\12533215-C011.dwg



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Drafting Check	A. KRAUSE	Design Check	A. KRAUSE
Approved (Project Director)	Date		
Scale	1:125	This Drawing must not be used for Construction unless signed as Approved	

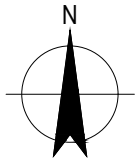
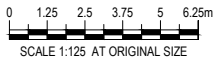
Client	SHIRE OF IRWIN		
Project	MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE		
Title	DETAIL PLAN		
Original Size	A1	Drawing No:	12533215-C011
Rev:	E		



DETAIL PLAN
SCALE 1:125

MATCH LINE JOINS 12533215-C013

D	FINAL DESIGN - ISSUED FOR REVIEW		SD	EA	AK	14.12.20
C	PRELIMINARY DESIGN - ISSUED FOR REVIEW		SD			24.11.20
B	ISSUED FOR COMMENT		SD			24.09.20
A	ISSUED FOR PRELIMINARY		RP			
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date



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Designer S. DAVIES

Drafting Check A. KRAUSE

Design Check A. KRAUSE

Approved (Project Director)
Date

Scale 1:125

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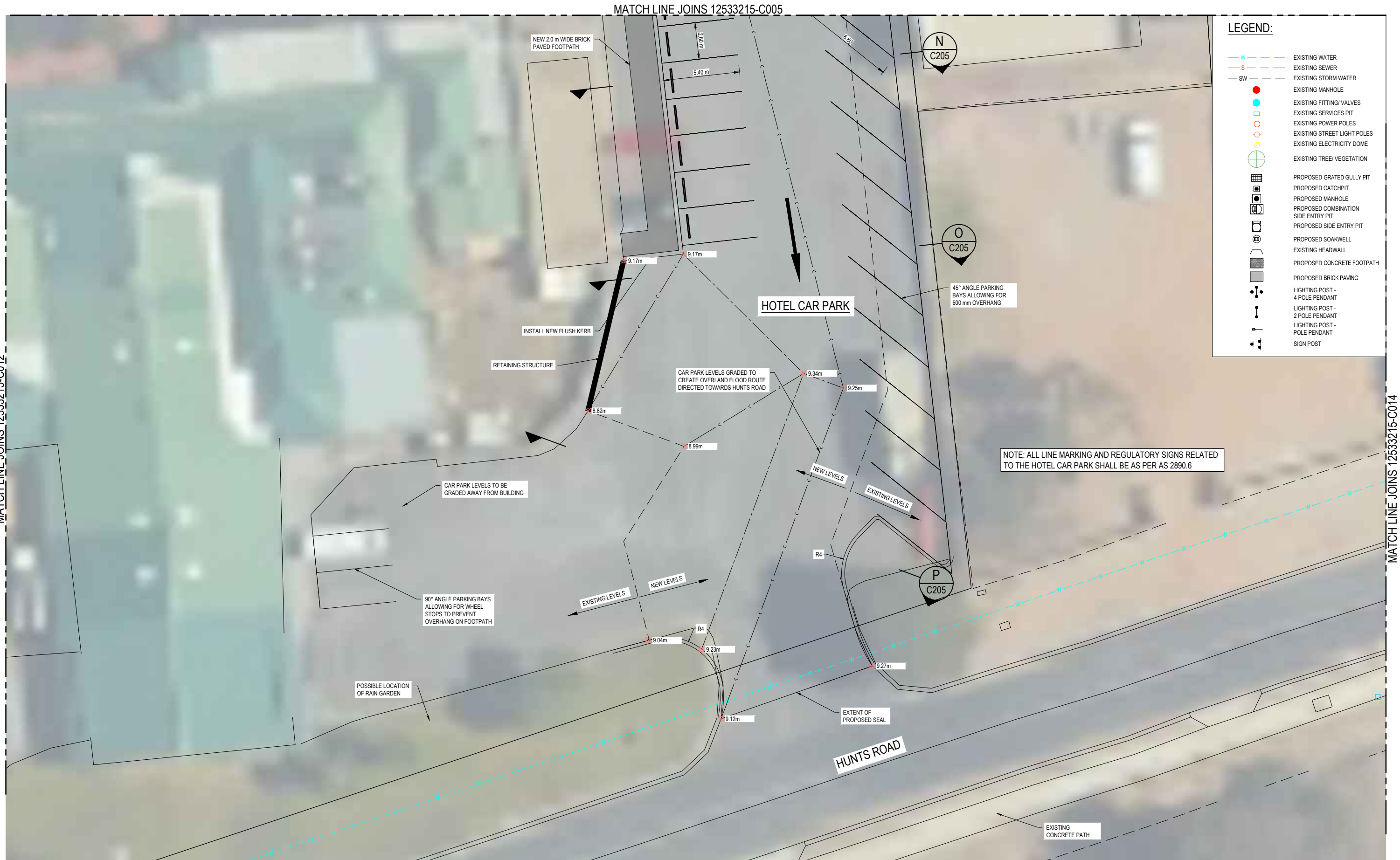
Client **SHIRE OF IRWIN**
Project **MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE**
Title **DETAIL PLAN**

Original Size
A1 Drawing No: **12533215-C012**

Rev: D

MATCH LINE JOINS 12533215-C012

MATCH LINE JOINS 12533215-C014



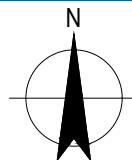
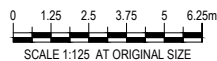
LEGEND:	
--- W	EXISTING WATER
--- S	EXISTING SEWER
--- SW	EXISTING STORM WATER
●	EXISTING MANHOLE
●	EXISTING FITTING/ VALVES
□	EXISTING SERVICES PIT
○	EXISTING POWER POLES
○	EXISTING STREET LIGHT POLES
○	EXISTING ELECTRICITY DOME
○	EXISTING TREE/ VEGETATION
	PROPOSED GRATED GULLY PIT
	PROPOSED CATCHPIT
	PROPOSED MANHOLE
	PROPOSED COMBINATION SIDE ENTRY PIT
	PROPOSED SIDE ENTRY PIT
	PROPOSED SOAKWELL
	EXISTING HEADWALL
	PROPOSED CONCRETE FOOTPATH
	PROPOSED BRICK PAVING
	LIGHTING POST - 4 POLE PENDANT
	LIGHTING POST - 2 POLE PENDANT
	LIGHTING POST - POLE PENDANT
	SIGN POST

NOTE: ALL LINE MARKING AND REGULATORY SIGNS RELATED TO THE HOTEL CAR PARK SHALL BE AS PER AS 2890.6

DETAIL PLAN
SCALE 1:125

FINAL DESIGN

E	ADDITIONAL COMMENT		SD	EA	AK	16.02.21
D	FINAL DESIGN - ISSUED FOR REVIEW		SD	EA	AK	14.12.20
C	PRELIMINARY DESIGN - ISSUED FOR REVIEW		SD			24.11.20
B	ISSUED FOR COMMENT		SD			24.09.20
A	ISSUED FOR PRELIMINARY		RP			
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date



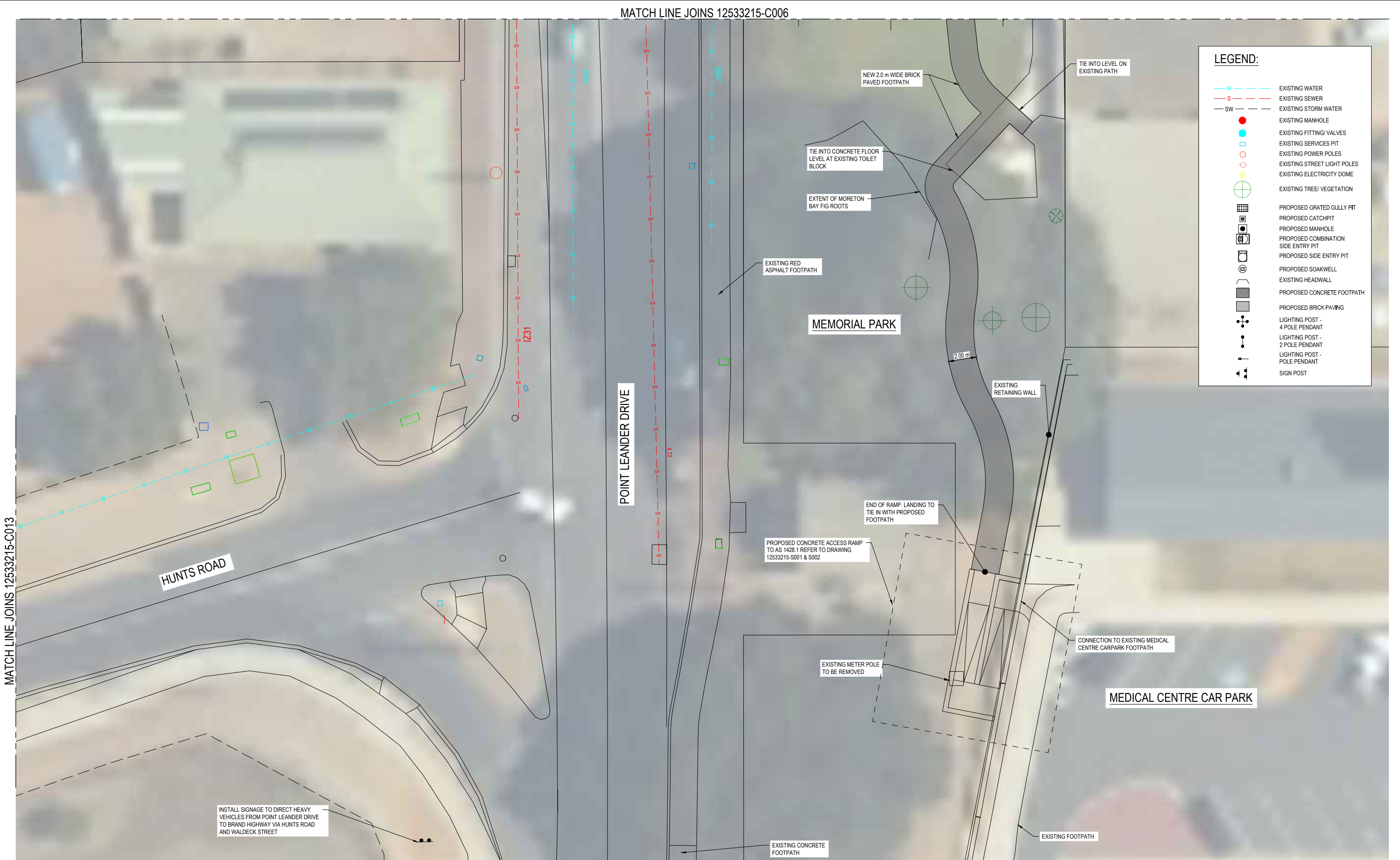
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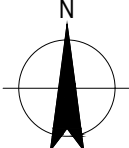
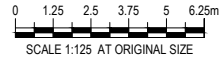
Drawn	R. PASTORIN	Designer	S. DAVIES
Drafting Check	A. KRAUSE	Design Check	A. KRAUSE
Approved (Project Director)			
Date			
Scale	1:125	This Drawing must not be used for Construction unless signed as Approved	

Client	SHIRE OF IRWIN		
Project	MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE		
Title	DETAIL PLAN		
Original Size	A1	Drawing No:	12533215-C013
Rev:	E		



FINAL DESIGN

D	FINAL DESIGN - ISSUED FOR REVIEW	SD	EA	AK	14.12.20	
C	PRELIMINARY DESIGN - ISSUED FOR REVIEW	SD			26.11.20	
B	ISSUED FOR COMMENT	SD			24.09.20	
A	ISSUED FOR PRELIMINARY	RP				
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date



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Drafting Check	A. KRAUSE	Design Check	A. KRAUSE
Approved (Project Director)	Date		
Scale	1:125	This Drawing must not be used for Construction unless signed as Approved	

Client	SHIRE OF IRWIN
Project	MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title	DETAIL PLAN
Original Size	A1
Drawing No:	12533215-C014
Rev:	D



NOTE: ALL LINE MARKING AND REGULATORY SIGNS RELATED TO THE WESTPAC CAR PARK SHALL BE AS PER AS 2890.6

LINE MARKING FOR UP TO 10 PARKING BAYS

WESTPAC BANK
CAR PARK

MARTIN STREET

EXTENT OF
PROPOSED RESEAL

NEW KERB RAMP
TO AS 1428.1

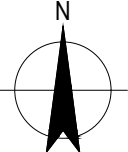
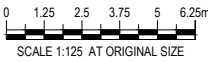
NEW BRICK
PAVED FOOTPATH

7.00 m

REALIGN KERB TO PROVIDE
LEFT TURN FOR SEMI TRAILER
FROM MARTIN STREET TO
MORETON TERRACE

DETAIL PLAN MATCH LINE JOINS 12533215-C006

SCALE 1:125



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Drawn R. PASTORIN

Designer S. DAVIES

Drafting A. KRAUSE

Design A. KRAUSE

Approved
(Project Director)
Date

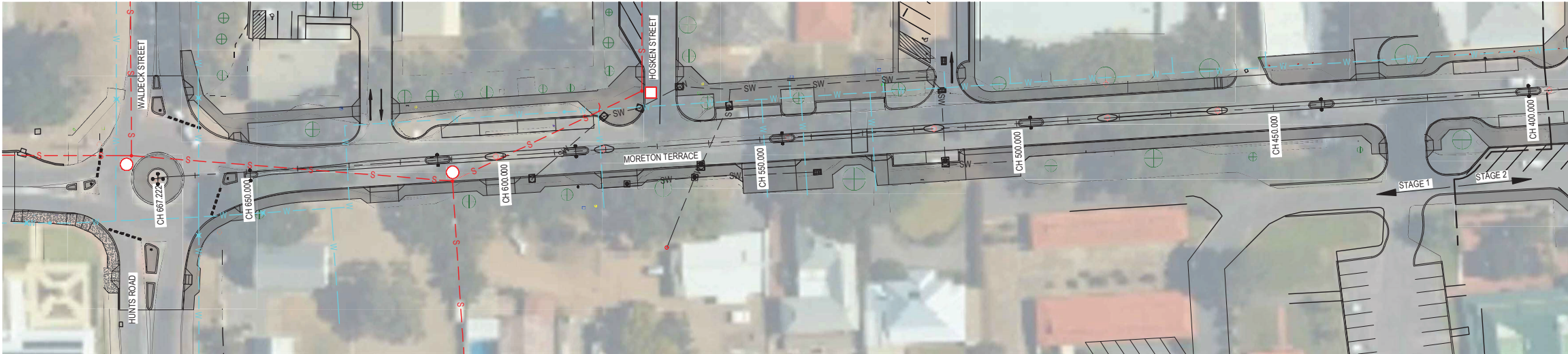
Scale 1:125

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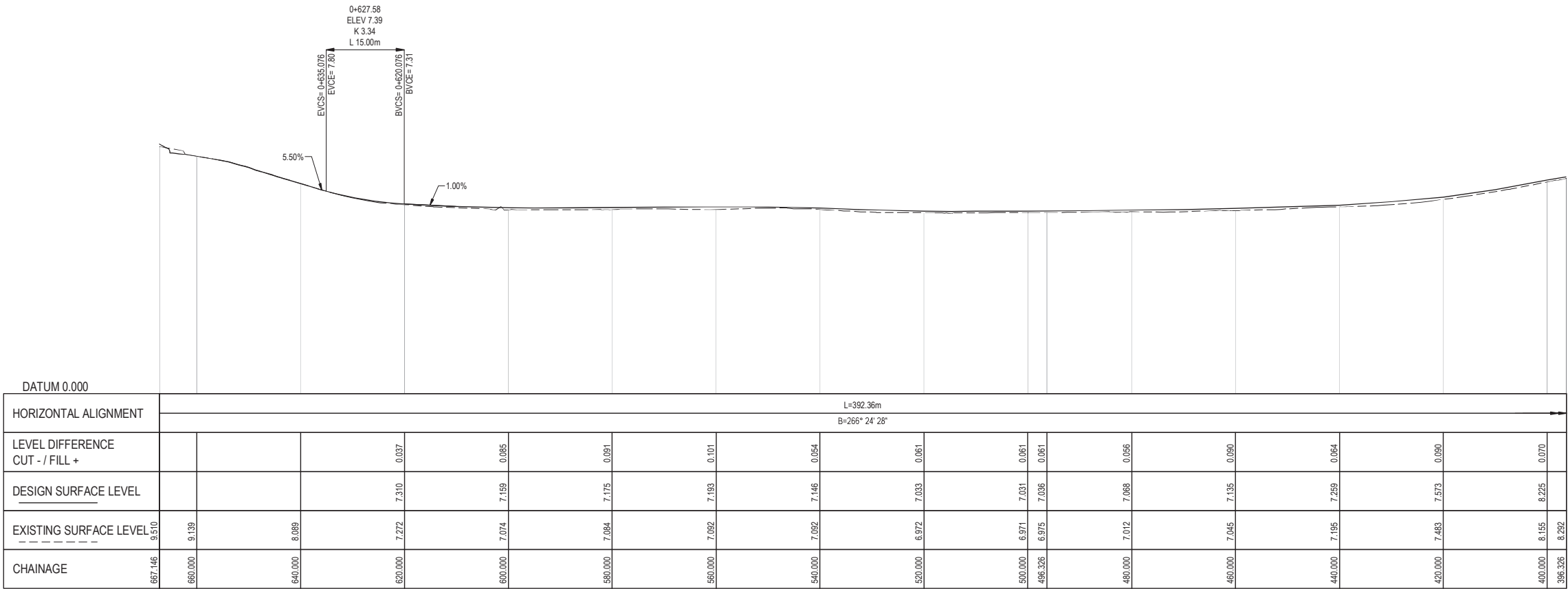
Client SHIRE OF IRWIN
Project MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title DETAIL PLAN

Original Size
A1 Drawing No: 12533215-C015

Rev: D



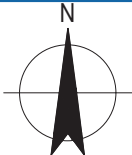
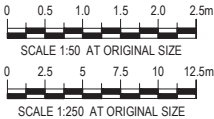
PLAN
SCALE 1:500



LONGITUDINAL SECTION
SCALE: HORIZONTAL 1:500 VERTICAL 1:100

FINAL DESIGN

B	FINAL DESIGN - ISSUED FOR REVIEW	SD	EA	AK	14.12.20	
A	PRELIMINARY DESIGN - ISSUED FOR REVIEW	SM			13.11.20	
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date



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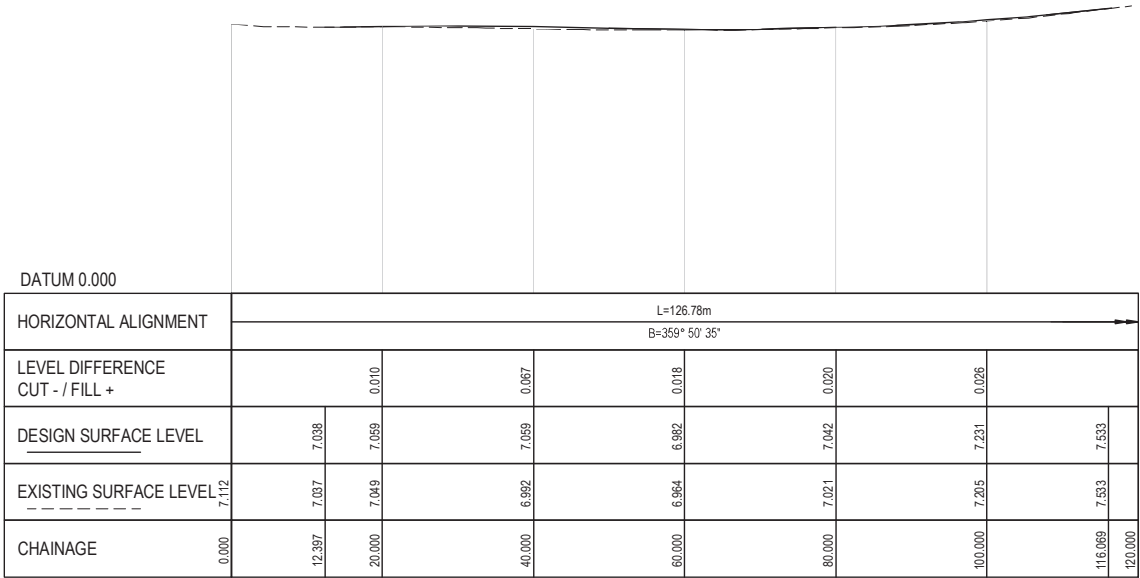
DO NOT SCALE	Drawn S.MOWBRAY	Designer S. DAVIES
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	Approved (Project Director) Date	
	Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved

Client	SHIRE OF IRWIN
Project	MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title	PLAN AND LONGITUDINAL SECTION STAGE 1 - MORETON TERRACE
Original Size	A1
Drawing No:	12533215-C101
Rev:	B



PLAN

SCALE 1:500

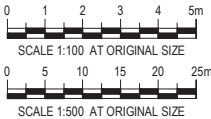


LONGITUDINAL SECTION

SCALE: HORIZONTAL 1:500 VERTICAL 1:100

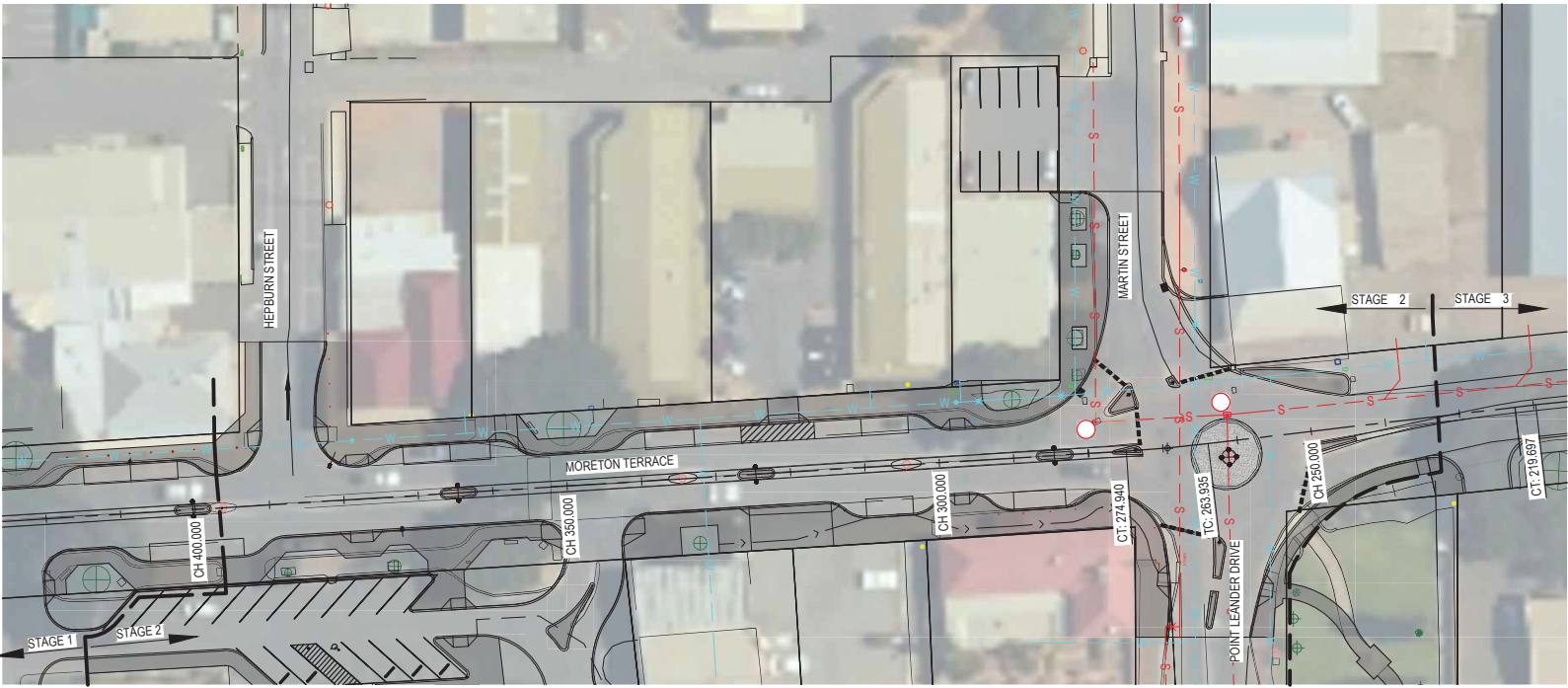
FINAL DESIGN

B	FINAL DESIGN - ISSUED FOR REVIEW	SD	EA	AK	14.12.20
A	PRELIMINARY DESIGN - ISSUED FOR REVIEW	SM			13.11.20
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director
					Date

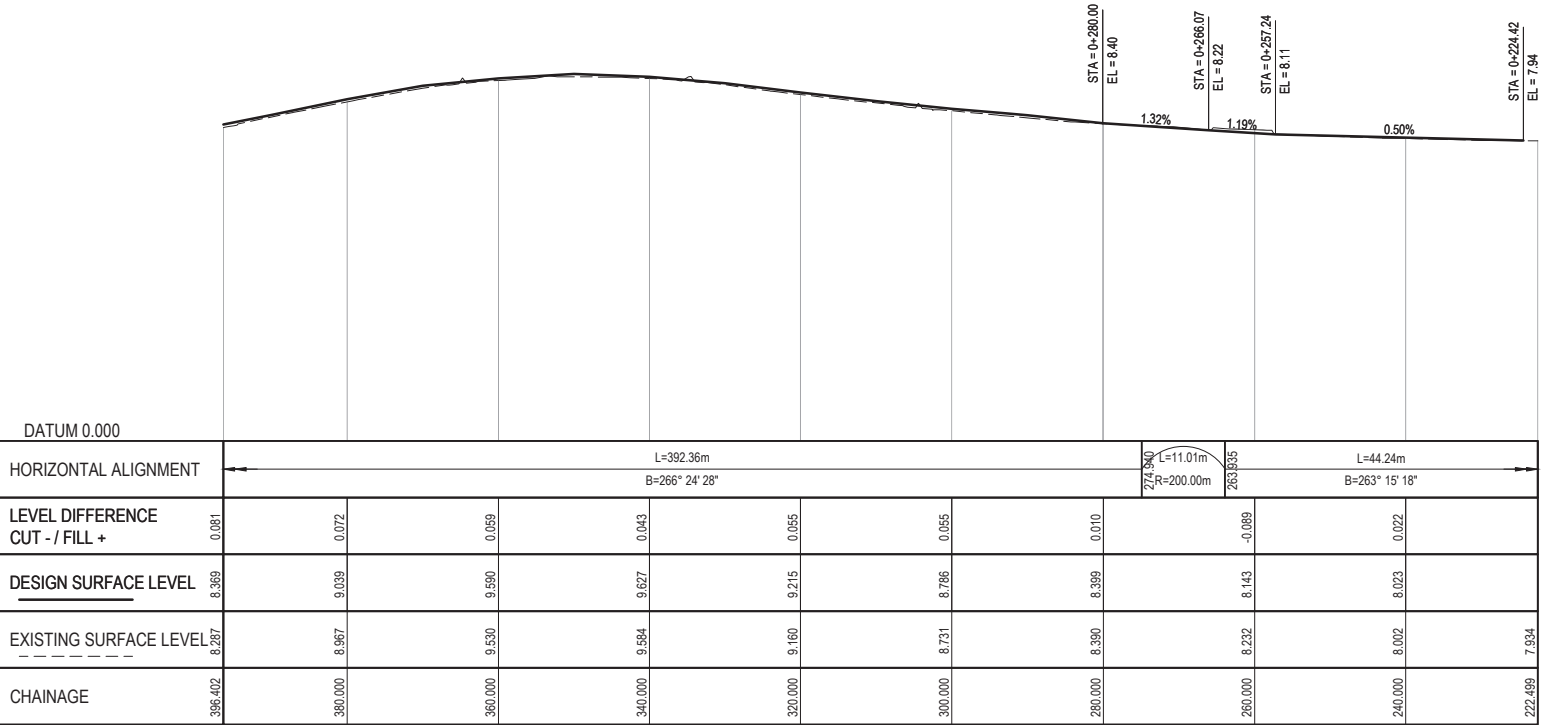


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	Approved (Project Director) Date	
	Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved

Client	SHIRE OF IRWIN
Project	MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title	PLAN AND LONGITUDINAL SECTION
	STAGE 1 - HOSKEN STREET
Original Size	Drawing No: 12533215-C102
Rev: B	



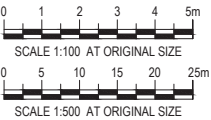
PLAN
SCALE 1:500



LONGITUDINAL SECTION
SCALE: HORIZONTAL 1:500 VERTICAL 1:100

FINAL DESIGN

C	REMOVED PEDESTRIAN CROSSING	AS	EA	AK	16.02.21	
B	FINAL DESIGN - ISSUED FOR REVIEW	AS	EA	AK	14.12.20	
A	PRELIMINARY DESIGN - ISSUED FOR REVIEW	SD			24.11.20	
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date



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Drawn A. SUBBA

Designer S. DAVIES

Drafting Check A. KRAUSE

Design Check A. KRAUSE

Approved (Project Director)

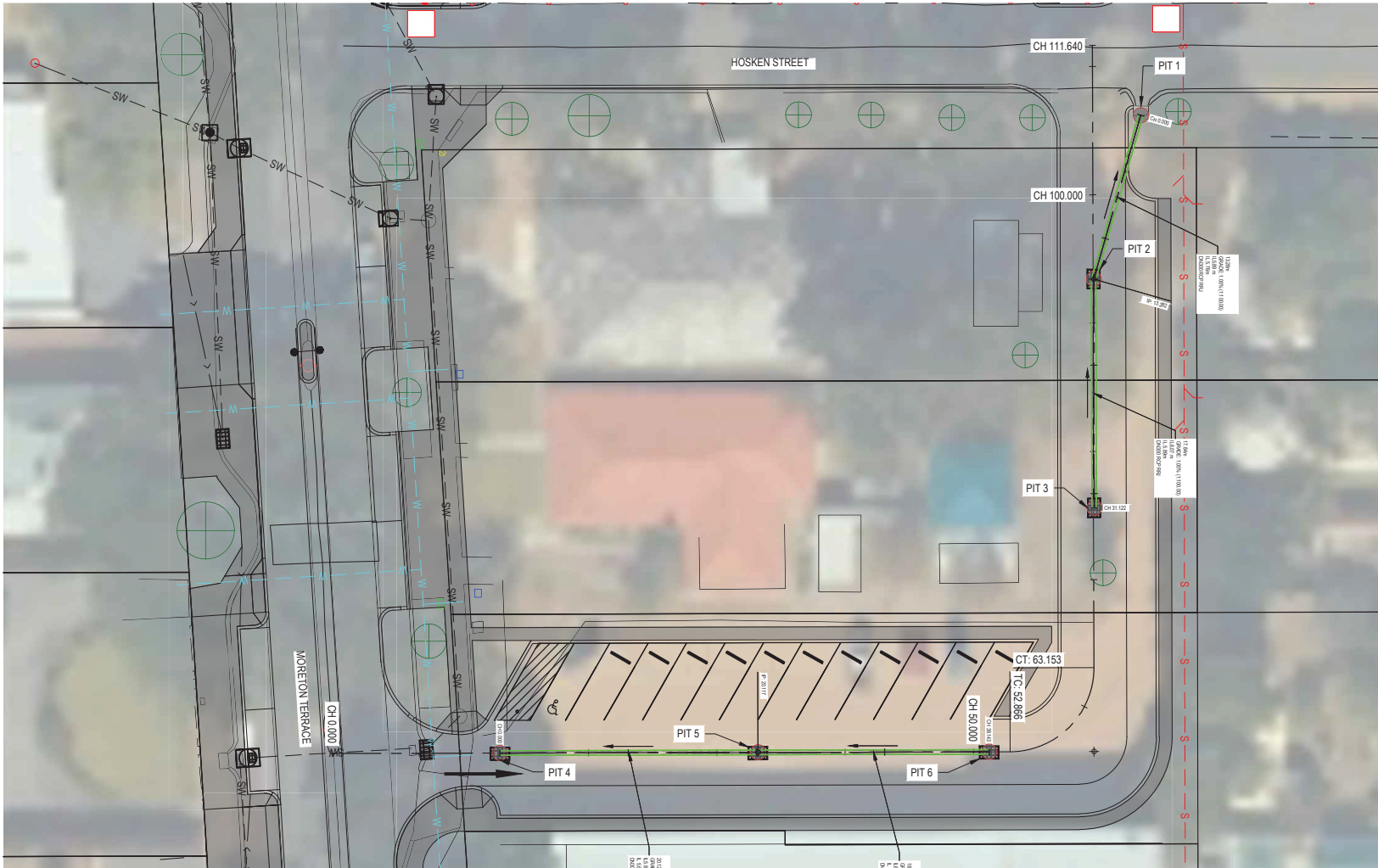
Date

Scale AS SHOWN

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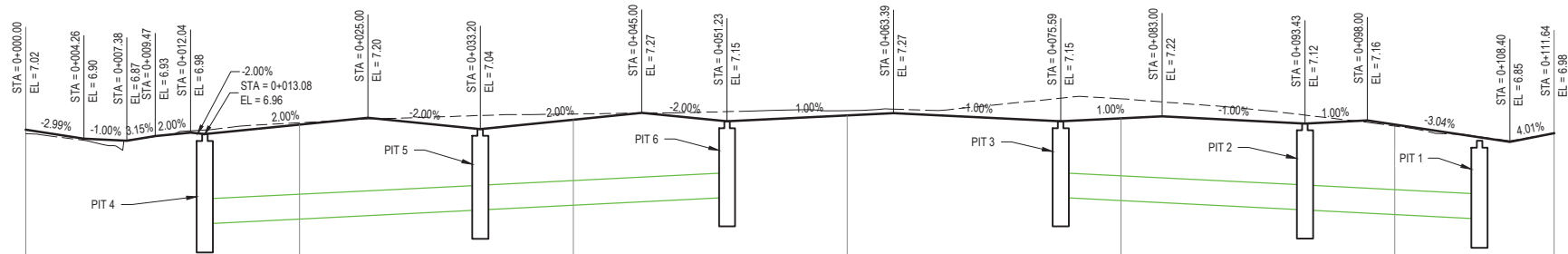
Client SHIRE OF IRWIN
Project MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title PLAN AND LONGITUDINAL SECTION
STAGE 2 - MORETON TERRACE

Original Size A1 Drawing No: 12533215-C103 Rev: C



PLAN

SCALE 1:500



DATUM 5.000

HORIZONTAL ALIGNMENT	L=52.87m B=359° 51' 14"				
LEVEL DIFFERENCE CUT - / FILL +	0.057	-0.028	-0.083	-0.067	-0.286
DESIGN SURFACE LEVEL	7.024	7.100	7.172	7.235	7.191
EXISTING SURFACE LEVEL	6.967	7.128	7.255	7.302	7.477
CHAINAGE	0.000	20.000	40.000	60.000	80.000

LONGITUDINAL SECTION

SCALE: HORIZONTAL 1:500 VERTICAL 1:100

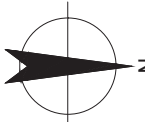
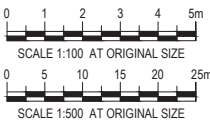
PIT SCHEDULE FOR: COMMUNITY RESOURCES CENTRE CAR PARK DRAINAGE			
PIT NUMBER	PIT TYPE	SETOUT COORDS	PIT TOP RL (m)
1	EXISTING SIDE ENTRY PIT	E: 45009.706 N: 312918.970	6.863
2	18000 x 1800 DEEP GRATED SOAK WELL	E: 45022.469 N: 312915.297	7.118
3	18000 x 1800 DEEP GRATED SOAK WELL	E: 45040.309 N: 312915.339	7.148
4	18000 x 1800 DEEP GRATED SOAK WELL	E: 45059.417 N: 312869.001	6.962
5	18000 x 1800 DEEP GRATED SOAK WELL	E: 45059.366 N: 312869.118	7.036
6	18000 x 1800 DEEP GRATED SOAK WELL	E: 45059.320 N: 312907.145	7.148
7	EXISTING SIDE ENTRY PIT	E: 44997.386 N: 312918.989	6.956
8	10500 COMBINATION SIDE ENTRY PIT	E: 44970.831 N: 312902.486	7.692

FINAL DESIGN

C	ADDED PIT SCHEDULE AND PIT NUMBERS	SD	EA	AK	16.02.21
B	FINAL DESIGN - ISSUED FOR REVIEW	AS	EA	AK	14.12.20
A	PRELIMINARY DESIGN - ISSUED FOR REVIEW	SD			24.11.20
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director
					Date

Plot Date: 16 February 2021 - 2:34 PM Plotted by: Abhishek Subba

Cad File No: N:\AU\Perth\Projects\6112533215\CADD\Drawings\12533215-C104.dwg



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Drafting Check A. KRAUSE

Approved (Project Director)

Date

Scale AS SHOWN

Designer S. DAVIES

Design Check A. KRAUSE

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signed as Approved

Client

Project

Title

Original Size

SHIRE OF IRWIN
MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
PLAN AND LONGITUDINAL SECTION
COMMUNITY RESOURCES CENTRE CAR PARK

A1

Drawing No: 12533215-C104

Rev: C

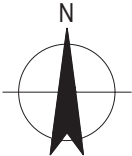
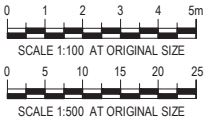


PLAN
SCALE 1:500



LONGITUDINAL SECTION
SCALE: HORIZONTAL 1:500 VERTICAL 1:100

B	FINAL DESIGN - ISSUED FOR REVIEW	AS	EA	AK	14.12.20
A	PRELIMINARY DESIGN - ISSUED FOR REVIEW	SD			26.11.20
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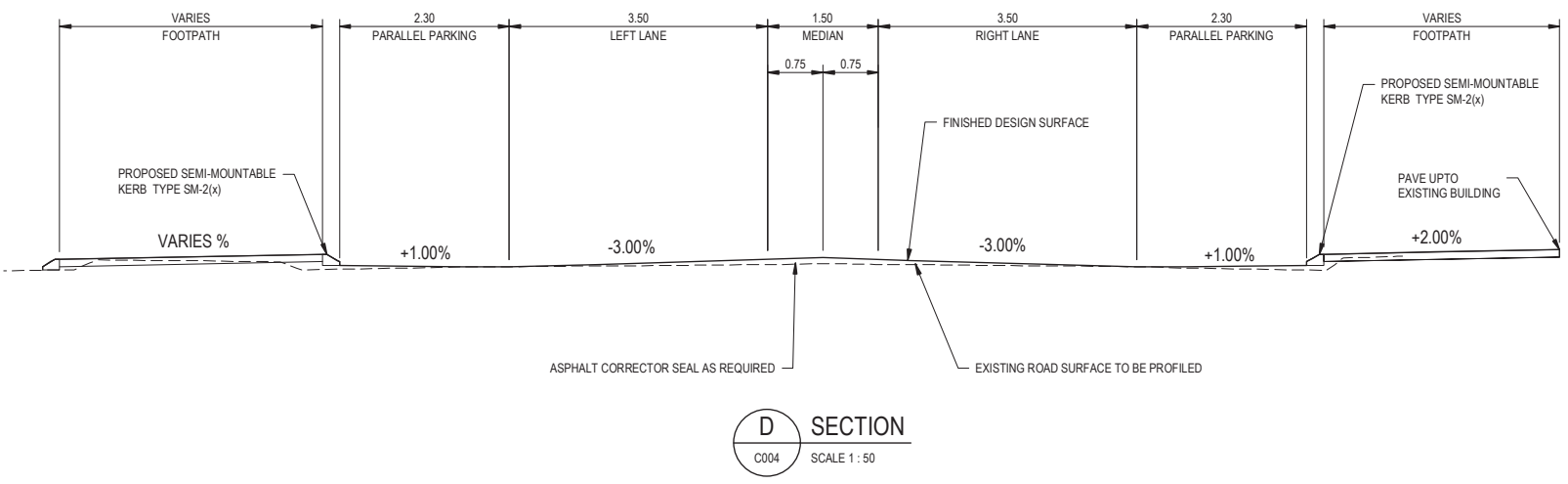
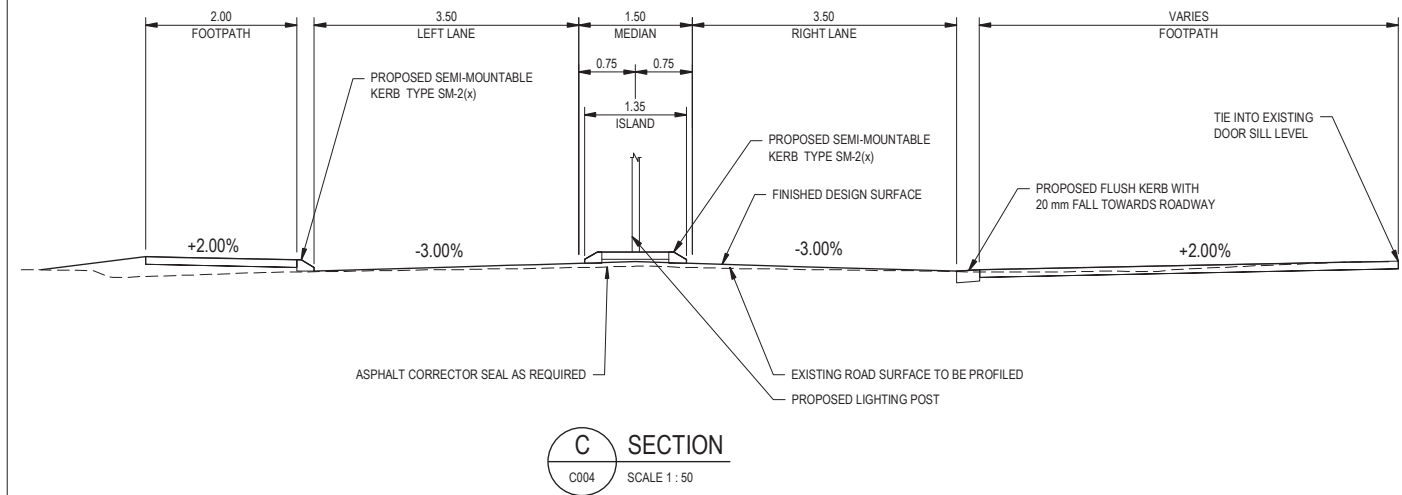
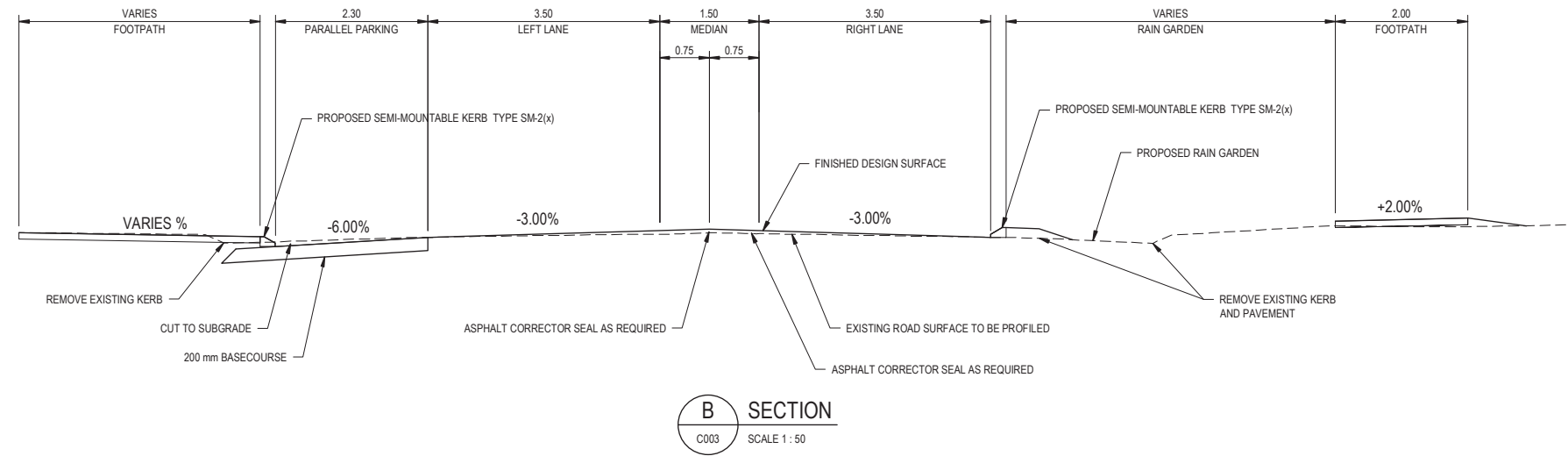
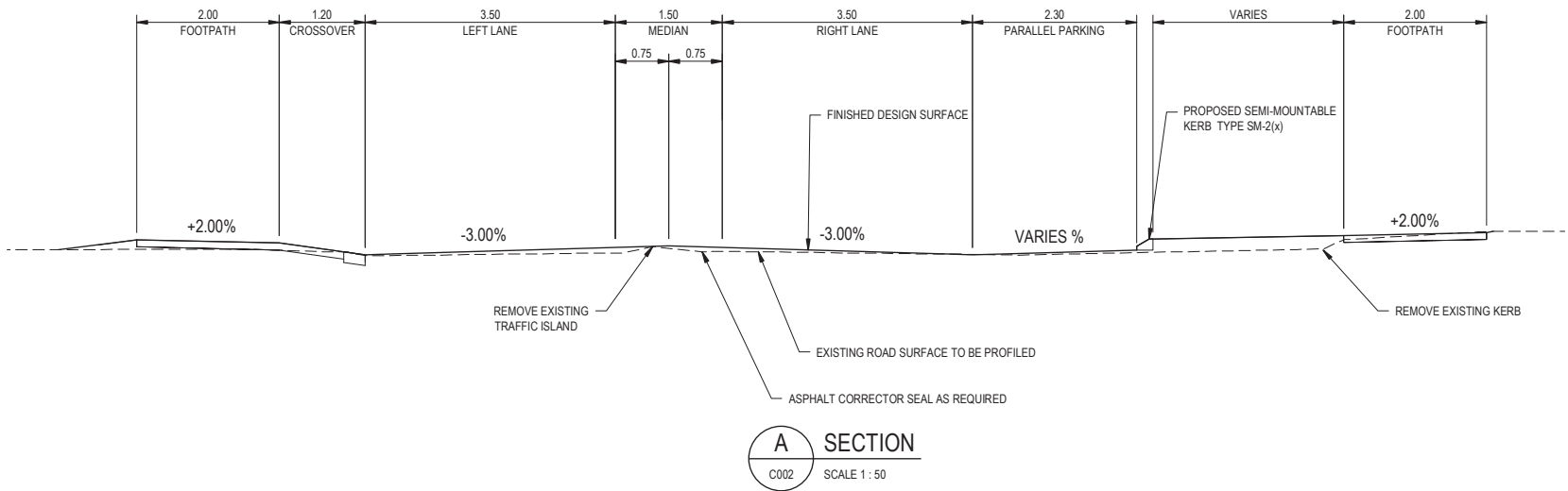
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Approved (Project Director)			
Date			
Scale	AS SHOWN		

Client	SHIRE OF IRWIN
Project	MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title	PLAN AND LONGITUDINAL SECTION STAGE 3 - MORETON TERRACE
Original Size	A1
Drawing No:	12533215-C105
Rev:	B

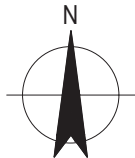
MORETON TERRACE SURFACING NOTES:

- ROAD - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC10 ASPHALT (BLACK) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.
- ON-STREET PARKING - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC7 ASPHALT (RED) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.
- MEDIAN - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC7 ASPHALT (RED) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.



FINAL DESIGN

B	FINAL DESIGN - ISSUED FOR REVIEW				14.12.20
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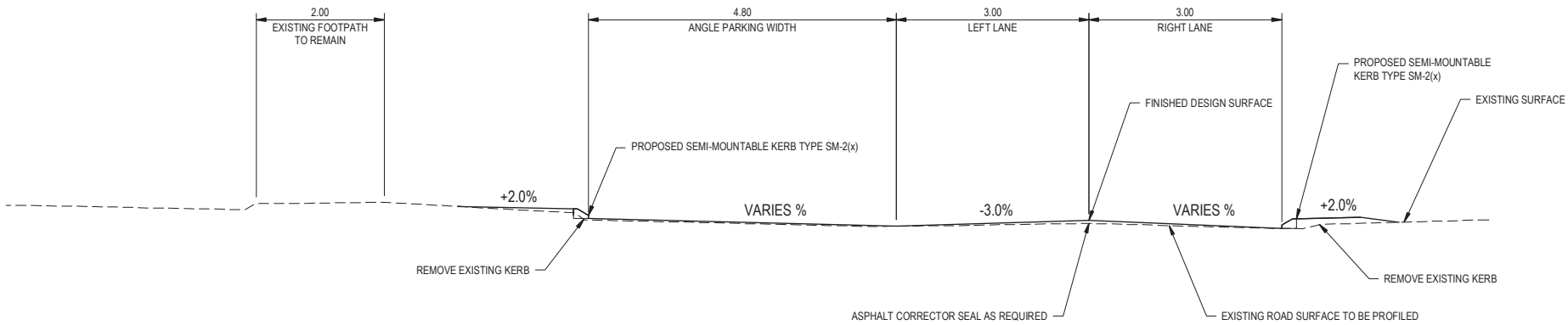
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Approved (Project Director)	Date		
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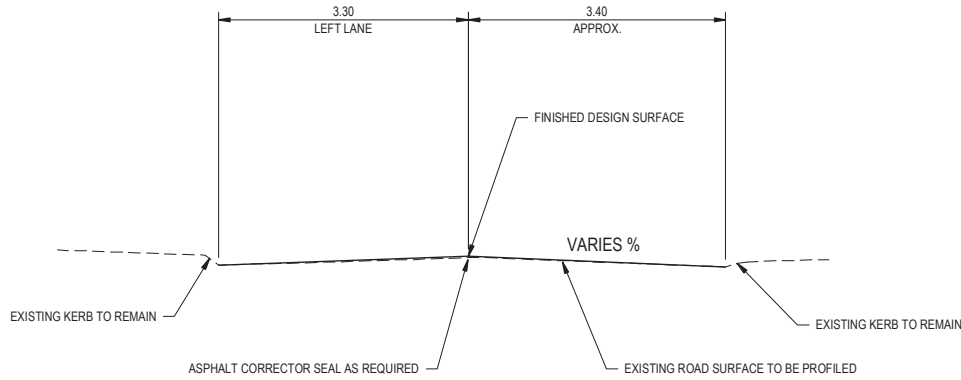
Client	SHIRE OF IRWIN		
Project	MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE		
Title	PLAN AND LONGITUDINAL SECTION TYPICAL CROSS SECTION - MORETON TERRACE		
Original Size	A1	Drawing No:	12533215-C201
Rev:	B		

HOSKEN STREET SURFACING NOTES:

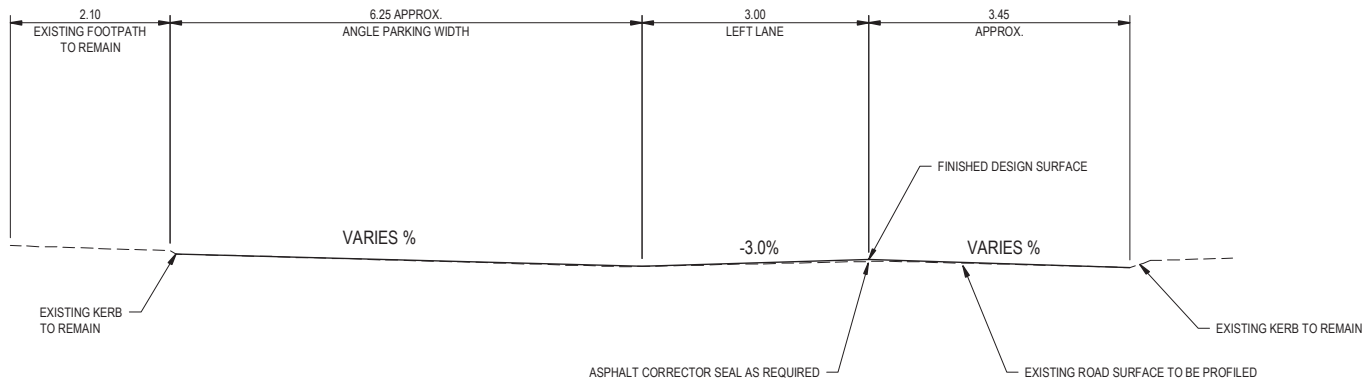
- ROAD - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC10 ASPHALT (BLACK) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.
- ON-STREET PARKING - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC7 ASPHALT (RED) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.



F SECTION
C010 SCALE 1 : 50



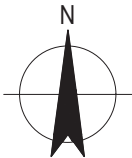
G SECTION
C010 SCALE 1 : 50



H SECTION
C011 SCALE 1 : 50

FINAL DESIGN

B	FINAL DESIGN - ISSUED FOR REVIEW	SM	EA	AK	14.12.20
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No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director
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Designer S. DAVIES

Drafting A. KRAUSE

Design A. KRAUSE

Approved (Project Director)
Date

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Client

Project

Title

Original Size

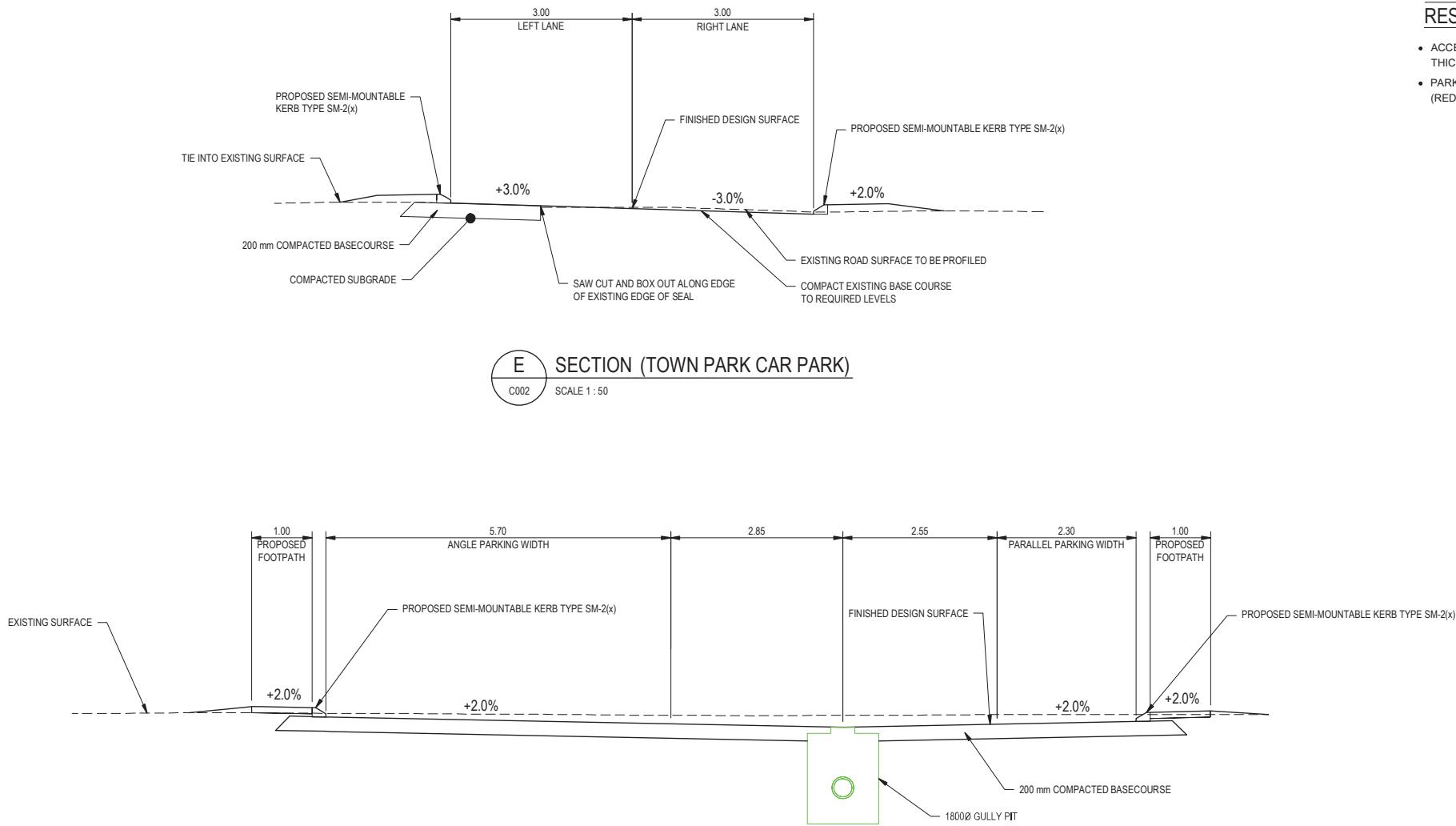
SHIRE OF IRWIN
MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
PLAN AND LONGITUDINAL SECTION
TYPICAL CROSS SECTION - HOSKEN STREET

A1 Drawing No: 12533215-C202

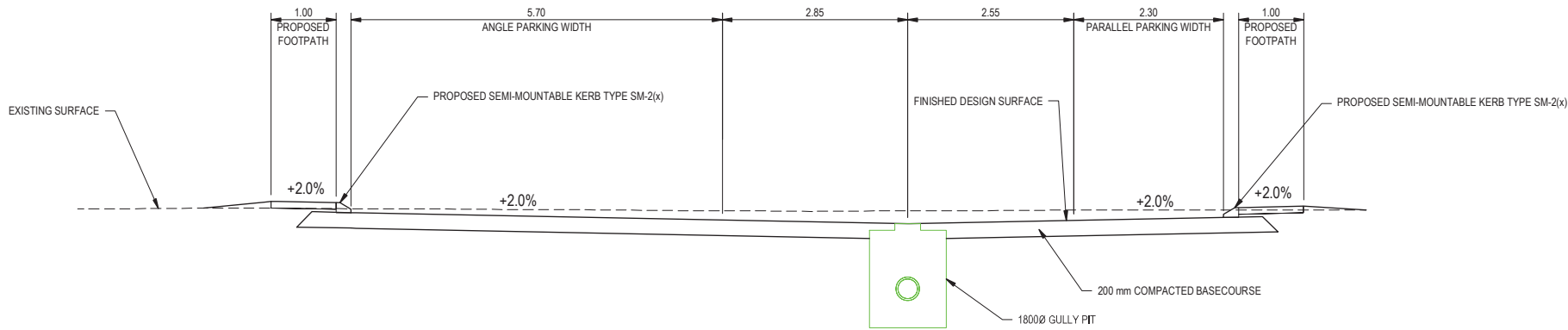
Rev: B

TOWN PARK CAR PARK AND COMMUNITY
RESOURCES CENTRE CAR PARK SURFACING NOTES:

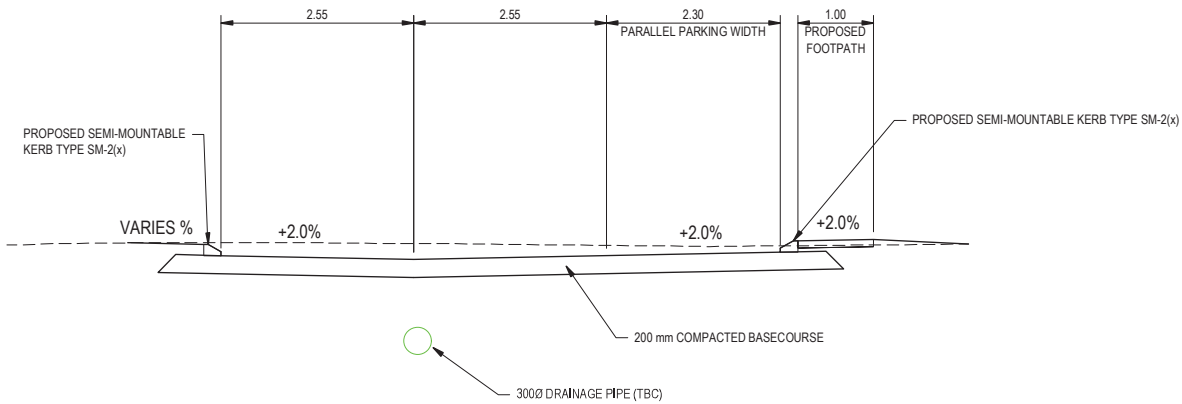
- ACCESS ROAD FROM MORETON TERRACE - SUPPLY AND LAY PRIMER SEAL, 30 MM MINIMUM THICKNESS AC10 ASPHALT (BLACK) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.
- PARKING AREAS - SUPPLY AND LAY PRIMER SEAL, 30 MM MINIMUM THICKNESS AC7 ASPHALT (RED) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.



E SECTION (TOWN PARK CAR PARK)
C002 SCALE 1 : 50



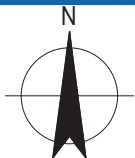
I SECTION (COMMUNITY RESOURCES CENTRE CAR PARK)
C010 SCALE 1 : 50



J SECTION (COMMUNITY RESOURCES CENTRE CAR PARK)
C010 SCALE 1 : 50

FINAL DESIGN

B	FINAL DESIGN - ISSUED FOR REVIEW	SM	EA	AK	14.12.20
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No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director



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Designer S. DAVIES

Drafting Check A. KRAUSE

Design Check A. KRAUSE

Approved (Project Director)
Date

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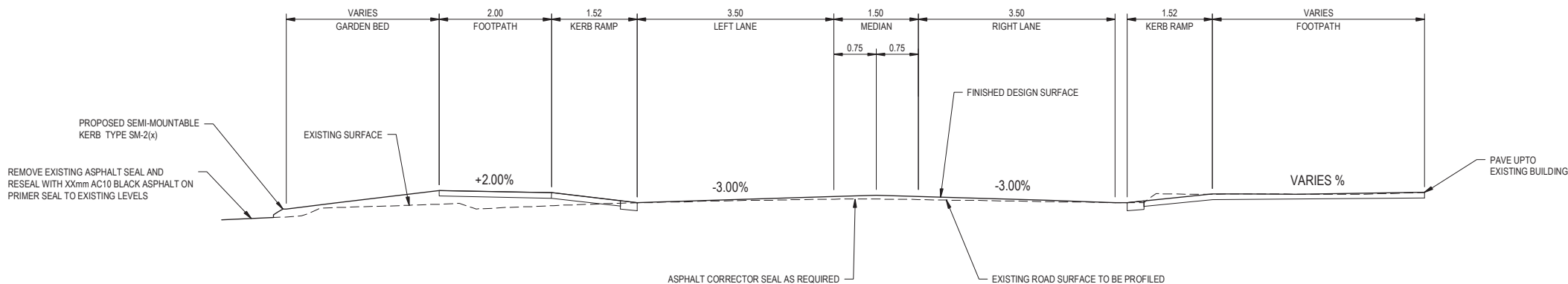
Client SHIRE OF IRWIN
Project MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title PLAN AND LONGITUDINAL SECTION
TYPICAL CROSS SECTIONS - COMMUNITY RESOURCES CENTRE CAR PARK

Original Size A1 Drawing No: 12533215-C203

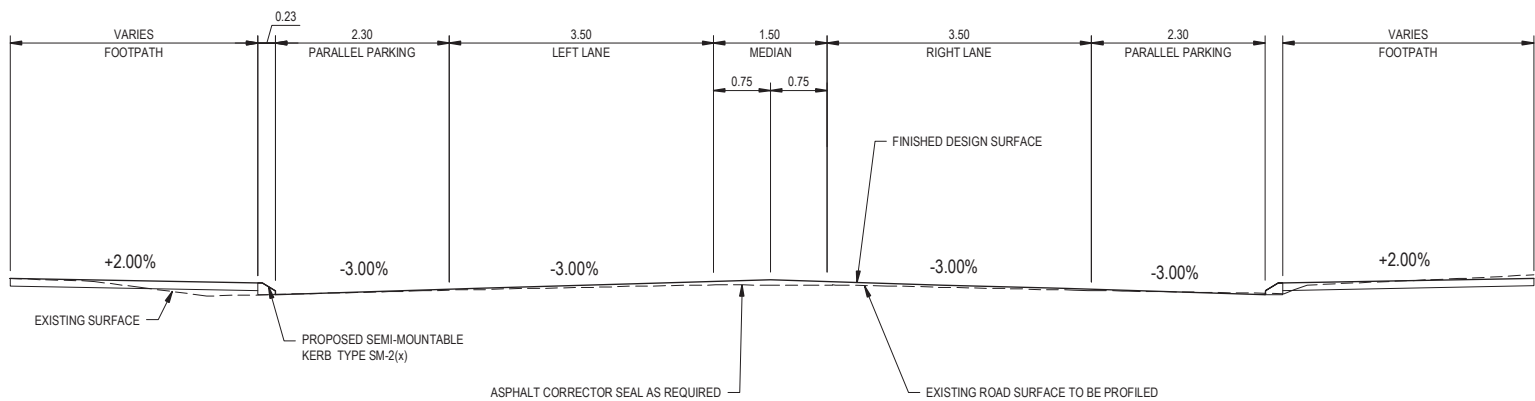
Rev: B

MORETON TERRACE SURFACING NOTES:

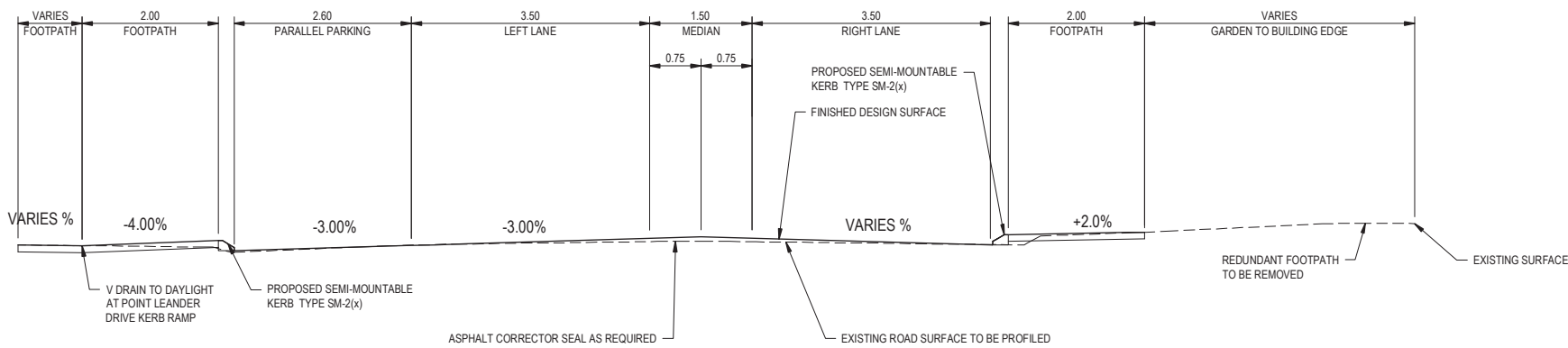
- ROAD - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC10 ASPHALT (BLACK) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.
- ON-STREET PARKING - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC7 ASPHALT (RED) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.
- MEDIAN - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC7 ASPHALT (RED) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.



K SECTION PEDESTRIAN CROSSING
C005 SCALE 1 : 50



L SECTION
C005 SCALE 1 : 50



M SECTION
C006 SCALE 1 : 50

FINAL DESIGN

B	FINAL DESIGN - ISSUED FOR REVIEW	AS	EA	AK	14.12.20
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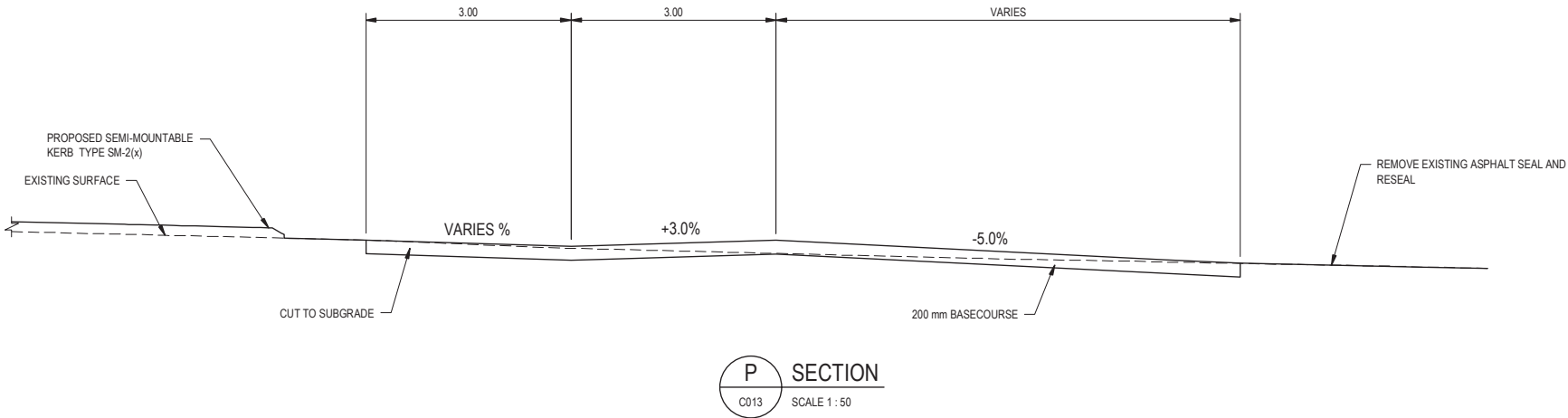
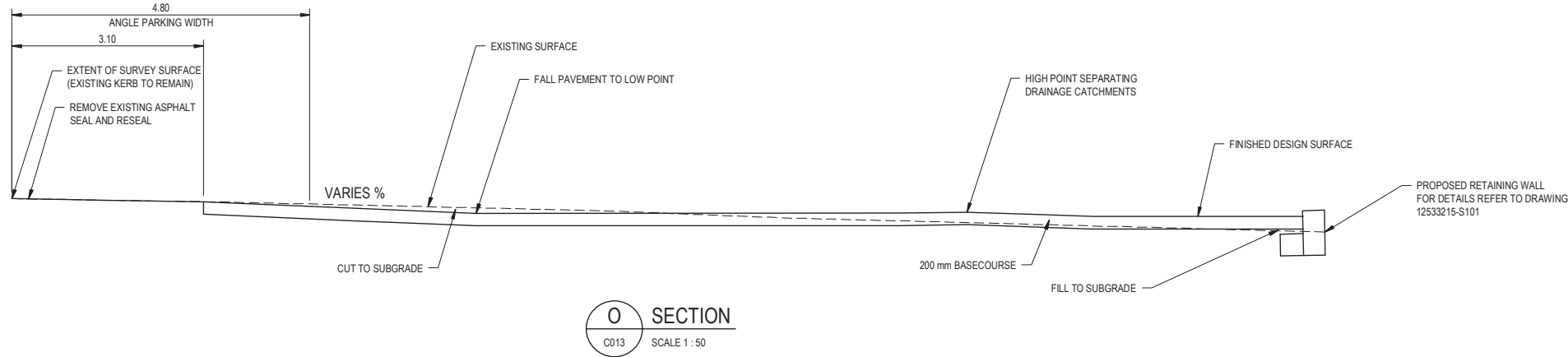
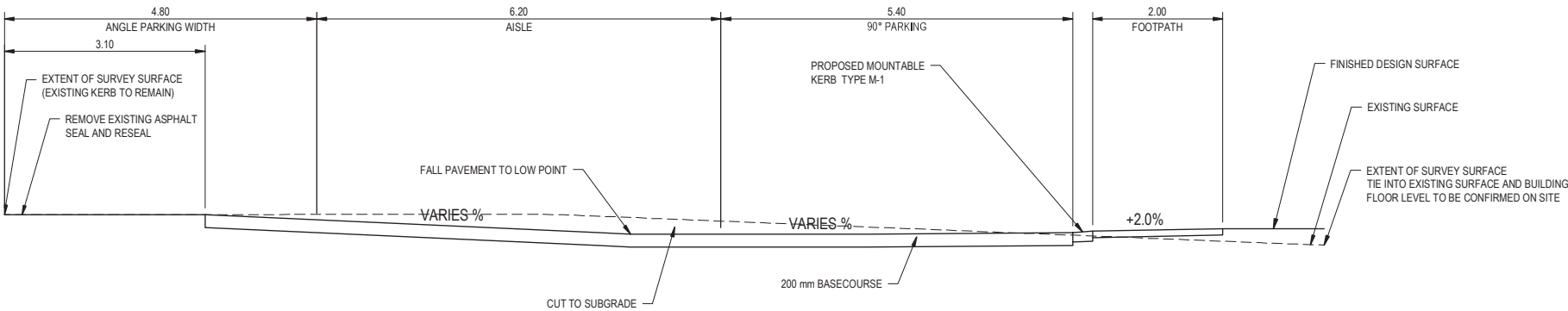
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Approved (Project Director)	Date		
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Project	MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title	PLAN AND LONGITUDINAL SECTION TYPICAL CROSS SECTIONS - STAGE 2 - MORETON TERRACE
Original Size	A1
Drawing No:	12533215-C204
Rev:	A

HOTEL CAR PARK SURFACING NOTES:

- ROADWAYS - SUPPLY AND LAY PRIMER SEAL, 30 MM MINIMUM THICKNESS AC10 ASPHALT (BLACK) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.
- PARKING AREAS - SUPPLY AND LAY PRIMER SEAL, 30 MM MINIMUM THICKNESS AC7 ASPHALT (RED) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.



FINAL DESIGN

B	FINAL DESIGN - ISSUED FOR REVIEW	AS	EA	AK	14.12.20
A	PRELIMINARY DESIGN - ISSUED FOR REVIEW	SD			24.11.20
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director



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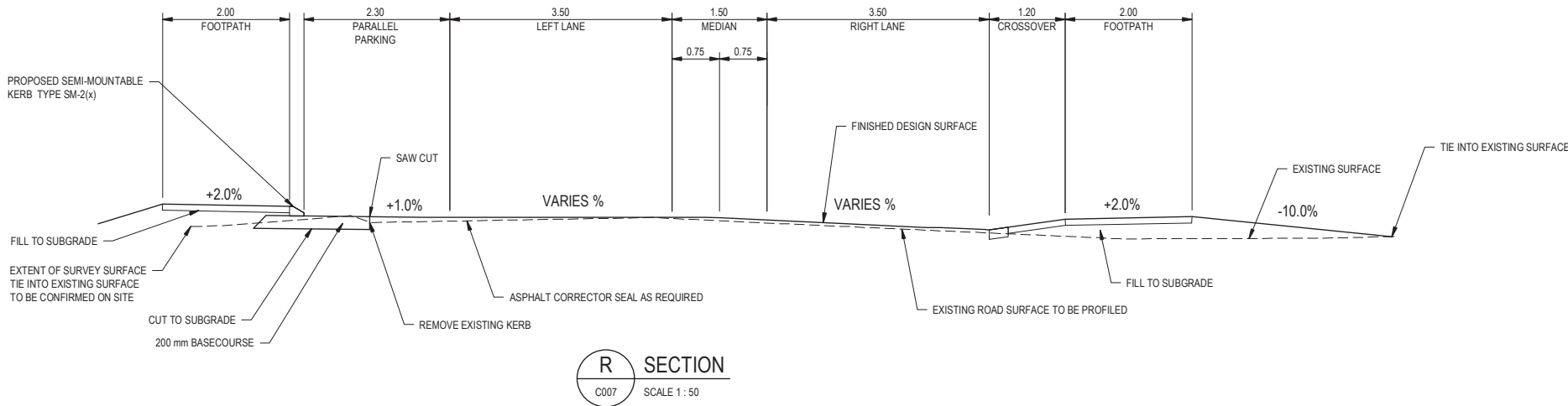
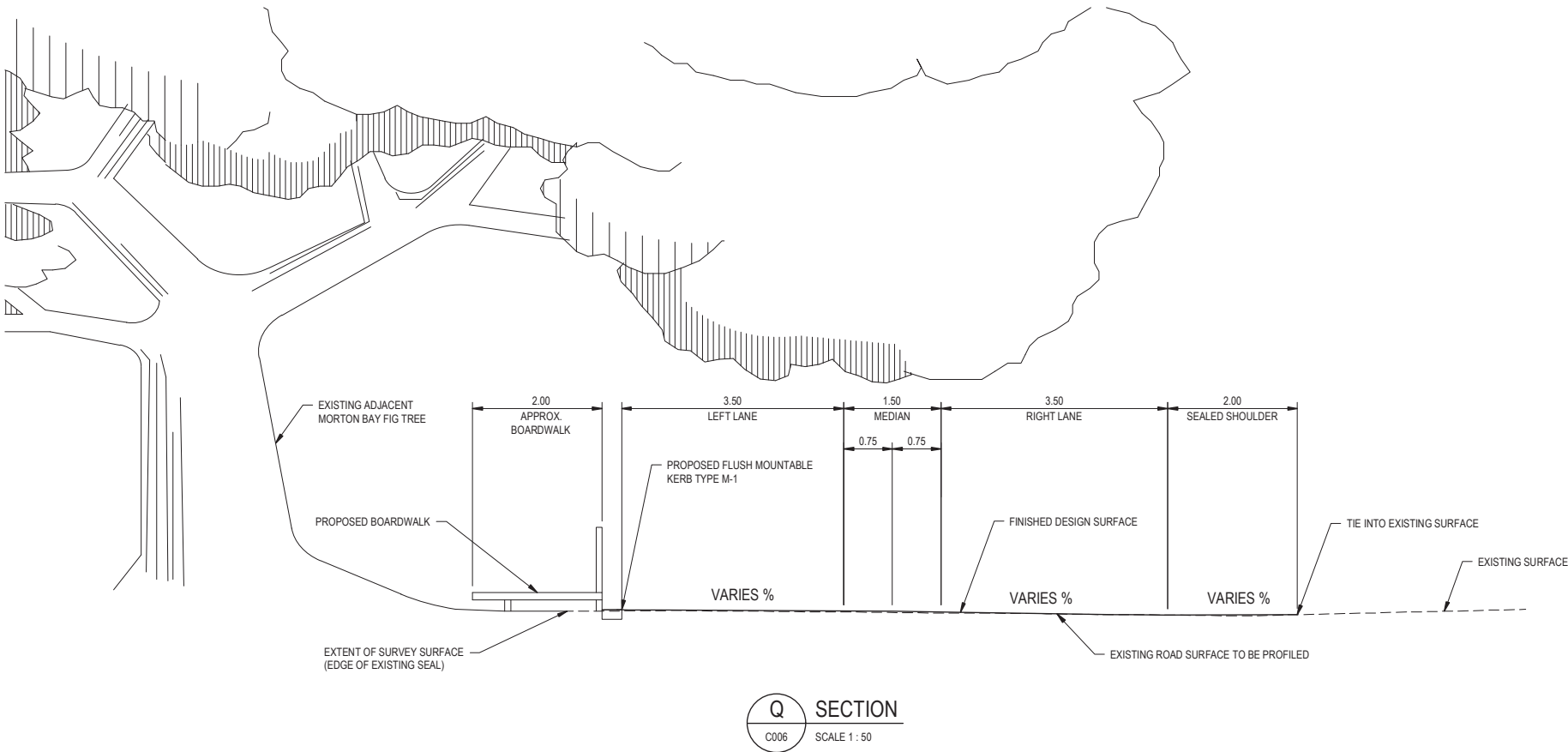
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Approved (Project Director)	Date		
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Client	SHIRE OF IRWIN
Project	MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title	PLAN AND LONGITUDINAL SECTION TYPICAL CROSS SECTIONS - HOTEL CAR PARK
Original Size	A1
Drawing No:	12533215-C205
Rev:	B

MORETON TERRACE SURFACING NOTES:

- ROAD - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC10 ASPHALT (BLACK) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.
- ON-STREET PARKING - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC7 ASPHALT (RED) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.
- MEDIAN - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC7 ASPHALT (RED) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.



FINAL DESIGN

B	FINAL DESIGN - ISSUED FOR REVIEW	AS	EA	AK	14.12.20
A	PRELIMINARY DESIGN - ISSUED FOR REVIEW	SD			26.11.20
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director Date



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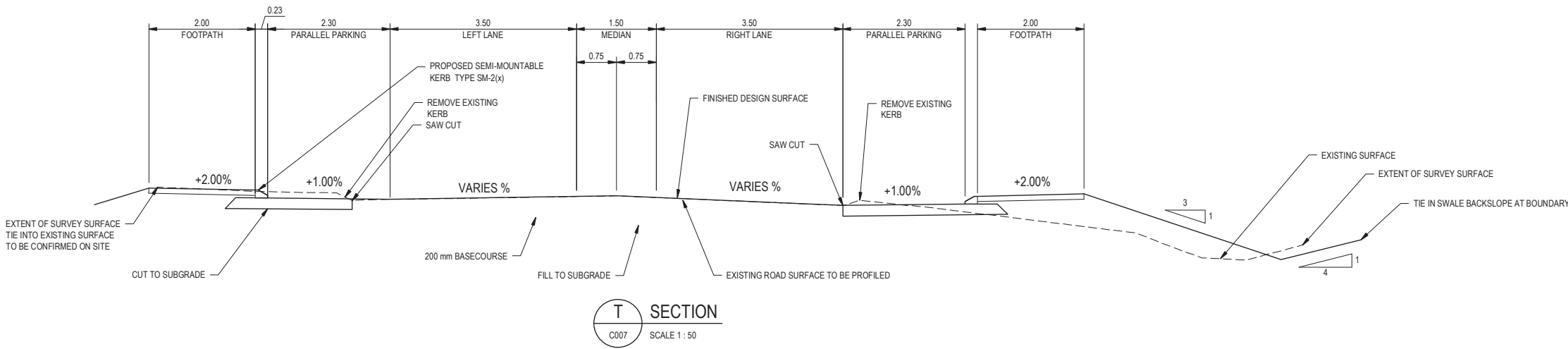
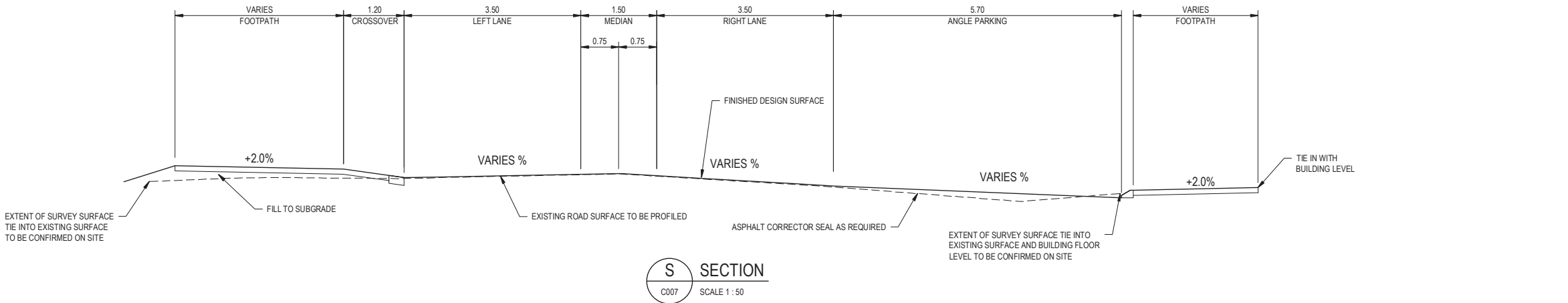
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Drafting Check	A. KRAUSE	Design Check	A. KRAUSE
Approved (Project Director)	Date		
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Client	SHIRE OF IRWIN
Project	MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title	PLAN AND LONGITUDINAL SECTION TYPICAL CROSS SECTIONS - STAGE 3 - MORETON TERRACE
Original Size	A1
Drawing No:	12533215-C206
Rev:	B

MORETON TERRACE SURFACING NOTES:

- ROAD - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC10 ASPHALT (BLACK) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.
- ON-STREET PARKING - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC7 ASPHALT (RED) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.
- MEDIAN - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC7 ASPHALT (RED) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.



FINAL DESIGN

B	FINAL DESIGN - ISSUED FOR REVIEW	AS	EA	AK	14.12.20
A	PRELIMINARY DESIGN - ISSUED FOR REVIEW	SD			26.11.20
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Drafting Check	A. KRAUSE	Design Check	A. KRAUSE
Approved (Project Director)			
Date			
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Client	SHIRE OF IRWIN
Project	MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
Title	PLAN AND LONGITUDINAL SECTION TYPICAL CROSS SECTIONS - STAGE 3 - MORETON TERRACE
Original Size	A1
Drawing No:	12533215-C207
Rev:	B

- ROAD - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC10 ASPHALT (BLACK) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.
- ON-STREET PARKING - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC ASPHALT (RED) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.
- MEDIAN - SUPPLY AND LAY PRIMER SEAL, 40 MM MINIMUM THICKNESS AC7 ASPHALT (RED) PLUS AN ASPHALT CORRECTOR LAYER AS REQUIRED.
- FOR CONCRETE APRON DETAILS, REFER TO AUSTRORDS GUIDE TO ROAD DESIGN PART 4B: ROUNDABOUTS, FIGURE 4.11 TYPICAL ENCROACHMENT AREA DETAIL.



B	AMENDED ROUNDABOUT DETAILS	AS	EA	AK	16.02.21
A	FINAL DESIGN - ISSUED FOR REVIEW	AS	EA	AK	14.12.20
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing			
		Drawn	Job Manager	Project Director	Date



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Original Size	A1
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Original Size
s **A1** Drawing No: **12533215-C208**

Rev: B

1. READ THESE NOTES IN CONJUNCTION WITH OTHER WRITTEN INSTRUCTIONS ISSUED. IN CASE OF DISCREPANCY, PRECEDENCE IS GIVEN TO DRAWINGS, THEN NOTES, THEN OTHER.
2. CARRY OUT WORK IN A SAFE MANNER IN ACCORDANCE WITH APPLICABLE LEGISLATION, STATUTORY REGULATIONS, BY-LAWS OR RULES. CONTRACTOR IS RESPONSIBLE FOR OCCUPATIONAL HEALTH AND SAFETY OF SITE PERSONNEL AND GENERAL PUBLIC IN ACCORDANCE WITH ALL CURRENT WORK HEALTH AND SAFETY ACTS, LEGISLATIVE REQUIREMENTS, ASSOCIATED REGULATIONS AND CODES OF PRACTICE, INDUSTRIAL AGREEMENTS AND ACCEPTED INDUSTRY PRACTICE.

1. SLAB PANELS TO BE FOUND ON NATURAL SOIL WITH A CALIFORNIA BEARING RATIO (CBR) OF NOT LESS THAN 10%. REMOVE SOFT SPOTS AND REPLACE WITH COMPACTED GRANULAR FILL. WHERE SLAB PANELS AND INTERNAL BEAMS FOUND ON CONTROLLED FILL, CONTROLLED FILL MUST CONTINUE AT LEAST ONE METRE PAST BUILDING.
PROVIDE 0.2 MM HIGH IMPERMEANT VIRGIN POLYETHYLENE FILM DAMP PROOF MEMBRANE TO AS2870 ON 50 MM SAND BED UNDER DRAINAGE CHANNELS. LAP 200 MM AND SEAL DAMP PROOF MEMBRANES. TIPS AT PENETRATIONS, ETC. TO ENSURE A COMPLETE VAPOUR BARRIER IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS2870. PREVENT PUNCTURING OR DAMAGE BY PLACING A PLASTIC PLATE UNDER REINFORCEMENT SUPPORTS.
3. SLOPE SLAB SO THAT WATER WILL FLOW INTO THE DRAINAGE POINT.

1. WORKMANSHIP AND MATERIALS TO COMPLY WITH AS3600, AS3100, AS3170, AS3178, AS3182, AS3592, AS3799, AS2758-1, AND AS3972. FOR LIQUID REPAIRING STRUCTURES ALSO COMPLY WITH AS3370.
2. WET CONCRETE TO BE PLACED AND FINISHED TO A FINISH SURFACE AND CURVED AND/OR CHAMFERED TO FOLLOW THE SHAPES OF CORNERS AND REINFORCEMENT. CONCRETE COMPLETELY FILLING FORMWORK WITHOUT SEGREGATION OF AGGREGATES AND / OR FIBRES, EXCESS FINE WATER ON SURFACE, LOSS OF MATERIAL, CONTAMINATION OR OTHER VISIBLE DEFECTS.
3. CONCRETE TO HAVE GOOD DIMENSIONAL STABILITY AND BE ABLE TO RESIST PLATE SETTLEMENT CRACKING, THERMAL CRACKING, SPLITTING AND DISINTEGRATION.
4. FINISHED CONCRETE TO BE A DURABLE, HOMOGENEOUS MASS COMPLETELY FILLING FORMWORK, EMBEDDING FIBRES, REINFORCEMENT AND TENDONS, AND FREE OF STONE POCKETS OR HONEYCOMBS, OF UNIFORM COLOR AND TEXTURE, WITH LOW PERMEABILITY AND ADEQUATE BUT NOT EXCESSIVE STRENGTH FOR GRADE.
5. CONCRETE BLEED TO BE LESS THAN 5% FOR FLOOR SLABS.
6. AIR ENTRAINMENT IS NOT PERMITTED.
7. THE LOCATION OF EMBEDDED ITEMS TO MINIMIZE POSSIBLE ZONES OF POOR COMPACTION THAT MAY COMPROMISE STRUCTURAL INTEGRITY.
8. QUALITY OF CONCRETE ELEMENTS TO BE M40, MAX 100MM SLUMP, MAX 20MM AGGREGATE.
9. SUPPLEMENTARY CEMENTITIOUS MATERIALS TO INCLUDE AMORPHOUS SILICA FUME, PL. ASH, CHAND GRANULATED BLAST FURNACE SLAG (GGBFS OR SLAG) COMPLYING WITH AS5862.
10. REINFORCEMENT WORKABILITY AND SURFACE TO BE AS REQUIRED FOR THE INTENDED EG PLACING, CHUTE, SPRAYING ETC.
11. CONCRETE CURING AND FINISHING, USE SUPER-ADJUSTERS AND HIGH RANGE WATER REDUCERS TO AS1478 TO ACHIEVE ADEQUATE WORKABILITY. DO NOT ADD WATER.
12. MAXIMUM ACID SOLUBLE CHLORIDE ION CONTENT OF CONCRETE IS 4 KGMS. DO NOT USE STRONGLY IONIZED SALTS.
13. MAXIMUM SULPHATE CONTENT OF CONCRETE TO BE LESS THAN 5% BY MASS OF ACID SOLUBLE SOLIDS AS A PERCENTAGE OF

1. THESE DRAWINGS DO NOT DETAIL TEMPORARY WORKS. CONSTRUCTION METHODS AND TEMPORARY WORKS ARE RESPONSIBILITY OF THE CONTRACTOR.
2. PROVIDE SCAFFOLDING, BARRIERS, FALL RESTRAINT, HAND-MID RAILS AND TOE BOARDS FOR WORK AT HEIGHT. ERECT ACCESS STAIRS AT EARLIEST OPPORTUNITY TO REDUCE OPEN SHAF HAZARDS AND FACILITATE ACCESS. MAINTAIN SAFETY MESH AND BARRIERS TO ALL OPENINGS AND ELEVATED EDGES.
3. PROVIDE TEMPORARY BRACING WHERE REQUIRED FOR STRUCTURAL ELEMENTS OR FRAMES STABILIZED BY MASONRY, PRECAST CONCRETE OR OTHER ELEMENTS CONSTRUCTED AFTER ERECTION OF THE STRUCTURAL ELEMENT OR FRAME, AND SHOW ON SHOP DRAWINGS.

1. STRUCTURAL WORK HAS BEEN DESIGNED FOR FOLLOWING LOADS:
 - PERMANENT DEAD LOAD OF STRUCTURE AS SHOWN ON DRAWINGS
 - SURFACE LIVE LOADS = 5 KPA
 - COMPACTION LOADS (LATERAL PRESSURE): 20 KPA 18 KN/M3
 - SOIL DENSITY: 18 KN/M3
 - ACTIVE LATERAL EARTH PRESSURE COEFFICIENT $K_a = 0.3$
 - AT REST LATERAL EARTH PRESSURE COEFFICIENT $K_p = 0.5$
 - HYDROSTATIC PRESSURE: GROUND WATER TO BE AT LEAST 500mm BELOW BASE OF WALL
 - BUILDING DESIGN WIND SPEED 50 YEARS
 - BUILDING OCCUPANCY LEVEL 2

1. EARTHWORKS TO BE TO A3378R AND A32870.
2. REMOVE TOPSOIL, MATERIAL CONTAINING GRASS ROOTS OR OTHER ORGANIC MATERIAL, RUBBLE AND / OR DEBRIS AND ALL UNSUITABLE MATERIAL FROM FOUNDATIONS AND WAHRE SHOWING ON DRAWING.
3. DO NOT STUOPIKE MATERIAL AGAINST RETAINING WALLS, BUILDINGS, FENCES OR TREES ETC. DO NOT OBSTRUCT THE FREE FLOW OF WATER.
4. DESIGN IS BASED ON DATA FROM DISCRETE LOCATIONS AS RECORDED IN INVESTIGATION REPORT. SUBSURFACE CONDITIONS SHOWN ON DRAWINGS IS INFERRED FROM DATA IN INVESTIGATION REPORT AND IS GIVEN AS A GUIDE ONLY. ACTUAL GROUND CONDITIONS MAY VARY FROM THIS.
5. PROVIDE TEMPORARY SUPPORT TO FACES OF EXCAVATIONS AS REQUIRED.
6. HAVE SAFETY OF PROPOSED EXCAVATIONS INCLUDING ANY TEMPORARY WORKS ASSESSED BY SUITABLY QUALIFIED GEOTECHNICAL / STRUCTURAL ENGINEER.
7. GENERAL FILL TO BE WELL GRADED MATERIAL, INORGANIC, LESS THAN 0.5% SULPHUR, MAXIMUM PARTICLE SIZE 75 MM.

- MAXIMUM PARTICLE SIZE 75 MM
- PROPORTION PASSING 0.075 MM SIEVE: 25% MAXIMUM
- PLASTICITY INDEX: >2%, <15%
- PROPORTION EXCEEDING PARTICLE SIZE OF 50 MM: 75% MINIMUM
9. PLACE FILL MATERIAL UNDER BUILDINGS AND OTHER FOOTINGS IN LAYERS NOT EXCEEDING 150 MM THICK AND COMPACT TO AT LEAST 95% MAXIMUM DRY DENSITY (STANDARD COMPACTION) TO AS1289
10. ADJUST MOISTURE CONTENT OF FILL AT TIME OF COMPACTION WITHIN THE RANGE OF 85-115% OF OPTIMUM MOISTURE CONTENT DETERMINED BY AS1289 TO ACHIEVE REQUIRED DENSITY
11. SAMPLE AND TEST COMPACTION TO MINIMUM 95% MMD.

1. INTERLOCKING BLOCK COURSING TO BE STAGGERED AS PER TYPICAL DETAIL.
2. ALL BLOCKS TO BE MINIMUM DENSITY OF 1800KG/CM³ (DRI).
3. COMPLETED BLOCKWORK OF WALL TO BE OF THICKNESS NO LESS THAN MINIMUM PROFILE INDICATED.
4. GROUND FOR WALL FOOTING TO BE COMPACTED TO A MINIMUM OF 95% MODIFIED M.D.D. OR TO A MINIMUM OF 10 BLOWS PER 300MM WITH A STANDARD PETHR SAND PENETROMETER OR EQUIVALENT.
5. ALL BLOCK JOINTS TO BE VERTICAL OR HORIZONTAL (NOT SLOPED) 30MM (MAX) ROLLED JOINTS. MORTAR TO BE 1:1:6 FACE JOINTS TO BE MATCHING MORTAR.

1. CONSTRUCTION TOLERANCES TO BE TO AS3610.
2. FORMWORK, REINFORCEMENT AND COVER, DOWELS, WATERSTOP, CAST-IN ITEMS ETC TO BE INSPECTED AND APPROVED BY SUITABLY QUALIFIED GEOTECHNICAL ENGINEER / SUPERINTENDENT / BUILDING SURVEYOR BEFORE PLACING CONCRETE IS PLACED.
3. REMOVE FREE WATER, DUST AND DEBRIS, STAINS ETC FROM FORMS, EXCAVATIONS ETC BEFORE PLACING CONCRETE. IN HOT CONDITIONS DAMPEN FORMWORK AND / OR SUB-GRADE BEFORE PLACING CONCRETE
4. INSTALL 1.2MM HIGH IMPACT RESISTANT VIRGIN POLYETHYLENE FLM DAMP PROOF MEMBRANE TO AS2870 TO BASE TO RETAIN WATER IN FRESH CONCRETE
5. PLACE CONCRETE IN LAYERS LESS THAN 300 MM THICK FOR FIRST LAYER AND 75% OF IMMERSION VIBRATOR LENGTH FOR SUBSEQUENT LAYERS, AND VIBRATE EACH LAYER BEFORE PLACING NEXT.
6. ELAPSED TIME BETWEEN WETTING OF MIX AND DISCHARGE OF CONCRETE AT SITE MUST BE AS SHORT AS POSSIBLE, AND MUST NOT EXCEED LIMITS GIVEN WITHOUT SUPERINTENDENT'S PRIOR WRITTEN CONSENT.

7. ELAPSED TIME LIMITS MAY BE VARY IF TRIALS DEMONSTRATE USE OF SET RETARDERS (TYPE RE OR WRRE TO AS1478) PROVIDED ADEQUATE RETENTION OF WORKABILITY FOR LONGER PERIODS AT REQUIRED TEMPERATURE. SLUMP LIMITS MAY BE EXCEEDED BY 1 INCH PER TEMPERATURE BEYOND MAXIMUM ALLOWED DISCHARGE TIME USING WATER OR ADMIXTURES IS NOT ALLOWED.
8. USE PLACEMENT METHODS THAT WILL MINIMIZE PLASTIC SETTLEMENT AND SHRINKAGE CRACKING. LIMIT VERTICAL FREE FALL BY USE OF CHUTES, ETC. KEEP CHUTES VERTICAL, FULL AND IMMERSED IN CONCRETE. PLACE CONCRETE IN LAYERS AND BLEND SUCCEEDING LAYERS BY COMPACTION. MAINTAIN CONCRETE EDGE IN A PLASTIC STATE, ESPECIALLY AT CORNERS AND JOINTS. USE MANUAL VIBRATION TO REMOVE AIR BUBBLES AND REPAIR CRACKS AND SURFACES BY SUPERINTENDENT TO AVOID CRACK AIR BUBBLES AND GIVE MAXIMUM COMPACTION WITHOUT SEGREGATION OF CONCRETE. TAKE CARE TO REMOVE CONTACT BETWEEN VIBRATORS AND PARTIALLY HARDENED CONCRETE, FORMWORK OR REINFORCEMENT. DO NOT USE VIBRATORS TO MOVE CONCRETE TO LONG FORMS.
9. DO NOT DISTURB CONCRETE UNTIL INITIAL SET HAS OCCURRED.
10. KEEP ON SITE A LOG BOOK RECORDING EACH PLACEMENT OF CONCRETE INCLUDING DATE, CLIMATIC CONDITIONS, PORTION OF WORK, SPECIFIED GRADE AND SOURCE OF CONCRETE, DELIVERY DOCKET DATA, METHODS OF PLACEMENT AND COMPACTION, PROJECT ASSESSMENT CARRIED OUT, SLUMP MEASUREMENTS, VOLUME AND OTHER NOTABLE INFORMATION THAT MAY AFFECT PERFORMANCE OF CONCRETE.
11. IN COLD WEATHER MAINTAIN TEMPERATURE OF FRESHLY MIXED CONCRETE WITHIN LIMITS SHOWN BELOW. "OUTDOOR" AIR TEMPERATURE IS AIR TEMPERATURE AT TIME OF MIXING, OR PREDICTED OR LIKELY AIR TEMPERATURE DURING NEXT 48 HOURS. BEFORE AND WHILE PLACING CONCRETE MAINTAIN TEMPERATURE OF FORMWORK AND REINFORCEMENT AT -5°C . DO NOT USE CALCIUM CHLORIDE TO ACCELERATE SETTING TIME. DO NOT USE SALT OR ICE OR SALT OR ICE MIXTURES IN MIXING OR PLACING CONCRETE. DO NOT ADD SALT OR FROZEN MATERIALS TO ENTER MIXER. EVALUATE THE NEED FOR INSULATION OF CONCRETE AND APPROVED BY NOT USE HIGH ALUMINA CEMENT.
12. IN HOT WEATHER PREVENT PREMATURE STIFFENING OF FRESH CONCRETE. REDUCE WATER ABSORPTION AND EVAPORATION BY TRANSPORT, PLACING AND COMPACTION OF CONCRETE AS QUICKLY AS POSSIBLE. DURING PLACEMENT TEMPERATURE OF CONCRETE MUST NOT EXCEED TEMPERATURES BELOW.

- DO NOT MIX CONCRETE WHEN SURROUNDING OUTDOOR SHADE TEMPERATURE 38C. MAINTAIN TEMPERATURE OF FORMWORK AND REINFORCEMENT AT 32C BEFORE AND DURING PLACING. COOL REINFORCEMENT AND FORMWORK AS REQUIRED. MAINTAIN SPECIFIED TEMPERATURE OF PLACED CONCRETE BY:
 - PLACING CONCRETE WHEN AMBIENT TEMPERATURE IS LOW (AT NIGHT)
 - COOL CONCRETE USING LIQUID NITROGEN INJECTION BEFORE PLACING, OR
 - COVER CONTAINER IN WHICH CONCRETE IS TRANSPORTED TO FORMS, OR
 - SHADING AND SPRAYING COARSE AGGREGATE USING COLD WATER, OR
 - USE CHILLED MIXING WATER.

PROTECT FRESH CONCRETE FROM PREMATURE DRYING - PARTICULARLY IN HOT, WINDY OR DRY (LOW HUMIDITY) CONDITIONS, EXCESSIVELY HOT OR COLD TEMPERATURES, RAIN, ETC. PROVIDE WIND BREAKS. MAINTAIN CONCRETE AT A REASONABLY CONSTANT TEMPERATURE WITH MINIMUM MOISTURE LOSS FOR CURING PERIOD

OR CONCRETE WITH WATER-CEMENT RATIO LESS THAN 0.5, IN HOT, WINDY OR DRY (LOW HUMIDITY) CONDITIONS SPRAY EXPOSED SURFACES OF FRESH CONCRETE WITH FOG SPRAY APPLICATION OF ALIPHATIC ALCOHOL RETARDANT IMMEDIATELY AFTER PLACEMENT TO REDUCE RISK OF PLASTIC SHRINKAGE CRACKING. IN SEVERE CLIMATIC CONDITIONS CONSIDER RE-IRRIGATING CONCRETE BEFORE IT REACHES INITIAL SET

COMMENCE CURING OF CONCRETE TO A33600 AS SOON AS POSSIBLE AFTER PLACING AND FINISHING OR STRIPPING, AND WITHIN ONE HOUR. ENSURE EXPOSED SURFACES ARE NOT STAINED. ACCEPTABLE METHODS OF CURING INCLUDE:

- RETENTION OF FORMWORK
- PONDING OR CONTINUOUS SPRINKLING WITH WATER (MOIST CURING)

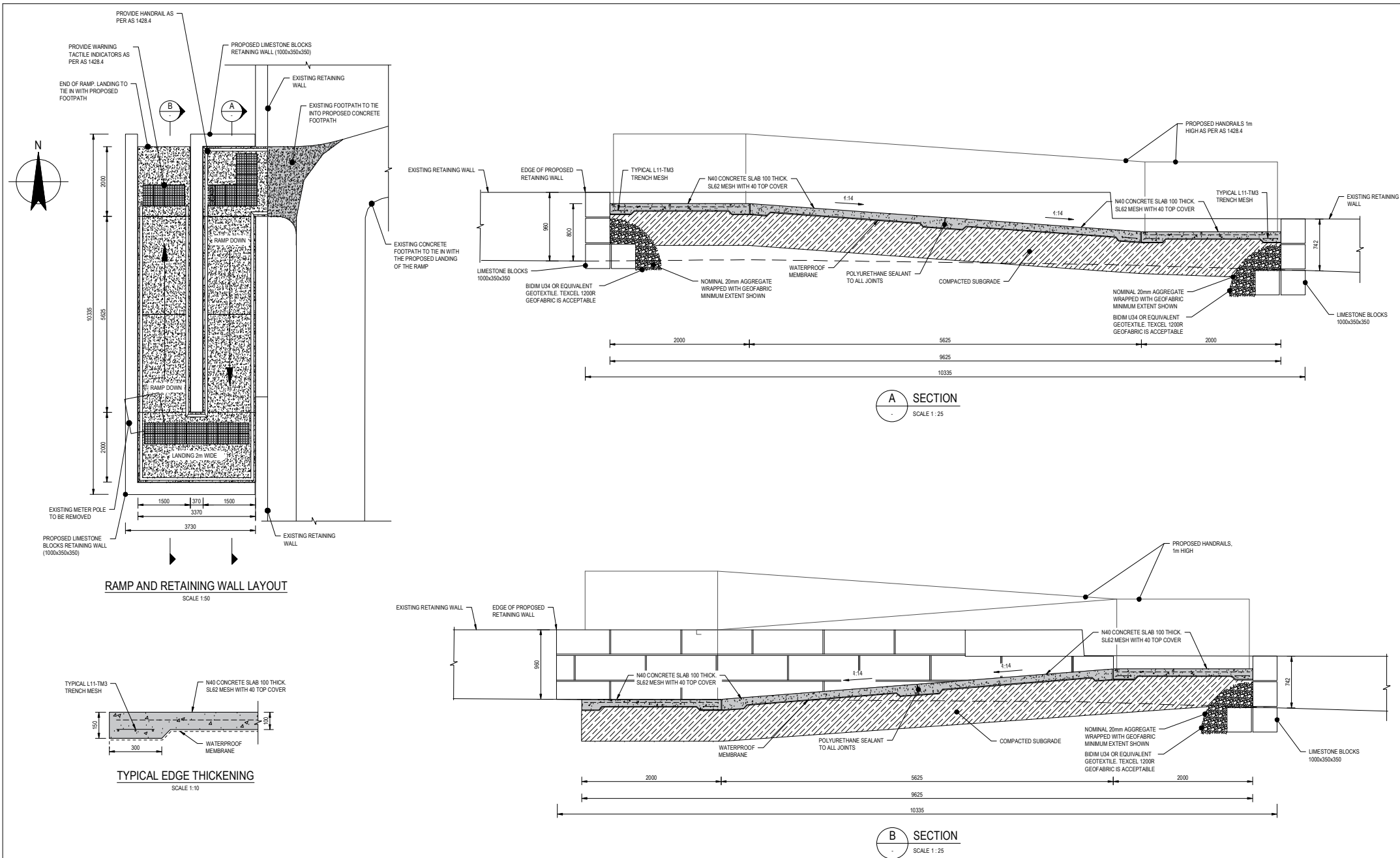
1. RESPONSIBILITY FOR DESIGN, CERTIFICATION, CONSTRUCTION AND PERFORMANCE OF FORMWORK AND FALSEWORK LIES WITH CONTRACTOR
2. DO NOT SUPPORT OR RESTRAIN FORMWORK ON PERMANENT WORKS WITHOUT SUPERINTENDENT'S WRITTEN APPROVAL.
3. CONSTRUCT FORMWORK TO COMPLY WITH ASS8601 AND CLAUSE 11.6 OF ASS600 WHERE THIS IS MORE STRINGENT SO AS TO PROVIDE DIMENSIONS, SHAPES, LOCATIONS AND FINISHES.
4. PROVIDE OPENINGS OR REMOVABLE PANELS IN FORMWORK FOR INSPECTION AND CLEANING.
5. APPLY RELEASE AGENT COMPATIBLE WITH CONTACT SURFACES TO INTERIOR OF FORMWORK (EXCEPT WHERE CONCRETE IS TO RECEIVE AN APPLIED FINISH OR COATING FOR WHICH THERE IS NO COMPATIBLE RELEASE AGENT), WHERE NECESSARY CLAMP REINFORCEMENT TO REMOVE TRACES OF RELEASE AGENT.
6. SEAL JOINTS BETWEEN FORMWORK PANELS, AND TO HARDENED CONCRETE WITH A FLEXIBLE RUBBER STRIP. SET OUT FORMWORK TO GIVE A REGULAR ARRANGEMENT OF JOINTS, BOLT HOLES AND SIMILAR VISIBLE ELEMENTS IN FORMED SURFACE.
7. PROVIDE HOLES IN REBATE FORMS, ETC, AS REQUIRED TO PREVENT AIR ENTRAPMENT.
8. DO NOT STRIP FORMWORK UNTIL CONCRETE IS HARDENED SUFFICIENTLY TO WITHSTAND MOVEMENT AND FORM REMOVAL WITHOUT DAMAGE. MINIMUM STRIPPING TIMES TO BE AS PER ASS1030 TABLE 5.4.1.
9. STRIP FORMWORK TO ASS3600 CLAUSE 17.6. REMOVE FORM THE BOLTS WITHOUT DAMAGING CONCRETE. PARTS OF BOLTS LEFT IN CONCRETE MUST NOT INTRUDE INTO COVER CONCRETE. FLUSH FILL HOLES USING PRE-MIXED NON-SHRINK CONCRETE. APPROVED REPAIR METHOD MATCHING CONCRETE SURFACE COLOUR, STRENGTH AND DURABILITY.
10. SUBMIT DETAILS OF PROPOSED REPAIR METHODS TO SUPERINTENDENT FOR APPROVAL.

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	Approved (Project Director)	Approved by
	Date	Date
	Scale AS SHOWN	Scale

Client	SHIRE OF IRWIN		
Project	MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE		
Title	RAMP AND RETAINING WALL GENERAL NOTES		
Original Size			
A1	Drawing No:	12533215-S001	Rev: B

**SHIRE OF IRWIN
MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE
RAMP AND RETAINING WALL GENERAL NOTES**

Rev: B



FINAL DESIGN

									DO NOT SCALE		Drawn A. SUBBA	Designer B. BARTON	Client SHIRE OF IRWIN Project MORETON TERRACE - DONGARA TOWN CENTRE UPGRADE Title RAMP AND RETAINING WALL LAYOUT & DETAILS								
									Conditions of Use: This document may only be used by GHD's client (and any other person who GHD has agreed can use this document) for the purpose for which it was prepared and must not be used by any other person or for any other purpose.		Drafting Check B. BARTON	Design Check B. BARTON									
											Approved (Project Director) Date										
											Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved									
B	FINAL DESIGN - ISSUED FOR REVIEW				AS	EA			AK	14.12.20	Level 1, 209 Foreshore Drive Geraldton WA 6530 Australia PO Box 164 Geraldton WA 6531 T 61 8 9964 3677 F 61 8 9921 7997 E permal@ghd.com.au W www.ghd.com.au				Original Size	Drawing No: 12533215-S002	Rev: B				
A	ISSUED FOR CLIENT REVIEW				AS				04.11.20					A1							
No	Revision				* indicates signatures on original issue of drawing or last revision of drawing																
Drawn		Job Manager	Project Director	Date																	

FINAL

Client: Shire of Irwin
Project Title: Moreton Tce and Car Park Upgrade
BOQ - Final Design Stage - DRAFT
Revision: A
Date: 08/02/2021
Prepared: Steven Davies
Checked: Antoinette Krause



ACTIVITY / DESCRIPTION			QTY	UOM	UNIT RATE	TOTAL
1		PRELIMINARIES				
	1.1	Project management, site management and administration, reviews and approvals. Health, safety and environment compliance, engineering supports and management.	1	Item		\$0.00
						\$0
2		SITE ESTABLISHMENT/GENERAL				
	2.1	Site establishment including mobilisation of plant and personnel	1	Item		\$0.00
	2.2	Contractor's site facilities	1	Item		\$0.00
	2.3	Water/electricity supply during construction (12 month period)	1	Item		\$0.00
	2.4	Setting out survey and as con survey	1	Item		\$0.00
	2.5	Geotechnical testing	1	Item		\$0.00
	2.6	Traffic Management for standard work hours (12 months)	264	Days		\$0.00
		SUB TOTAL				\$0
3		EARTHWORKS				
	3.1	Clearing and grubbing/site preparation/removal of unwanted site furniture, including disposal	1	Item		\$0.00
		SUB TOTAL				\$0
4		HOSKEN STREET AND CAR PARKS				
	4.1	Hosken Street and On-street Parking				
	4.1.1	Removal of existng asphalt surfacing on Hosken Street	990	sq.m		\$0.00
	4.1.2	Removal and disposal of kerbing	140	m		\$0.00
	4.1.3	Trim, prepare and compact existing basecourse to 98% MMDD	950	sq.m		\$0.00
	4.1.4	Boxing out and compation of subgrade level for new pavement areas	45	sq.m		
	4.1.5	Supply and install 200 mm basecourse and compact to 98% MMDD for new widened pavement	45	sq.m		\$0.00
	4.1.6	Supply and lay asphalt corrector layer as directed on site by superintendent (assume 50% of surfacing area)	425	sq.m		\$0.00
	4.1.7	Supply and install primer seal	1,075	sq.m		\$0.00
	4.1.8	Supply and lay - 40mm thickness AC10 asphalt (black) - road	710	sq.m		\$0.00
	4.1.9	Supply and lay - 40mm thickness AC7 asphalt (red) - on street parking	140	sq.m		\$0.00
	4.1.10	Install semi-Mountable kerb (Type 1): 250mm wide kerb, 180mm long slope, face off vertical	140	m		\$0.00
	4.1.11	Line marking (white 100mm wide) - on street parking	105	m		\$0.00
	4.1.12	Drainage: Remove existing cover and install class D Wave Grate or approved equivalent	1	Item		\$0.00
	4.1.13	Install concrete footpath(2.0m wide): Concrete paving N32 - 100mm thick (footpath) laid on 25mm sand base, compacted subgrade.	16	m		\$0.00
	4.1.14	Install concrete infill areas: Concrete paving N32 - 100mm thick laid on 25mm sand base, compacted subgrade.	45	sq.m		\$0.00
	4.1.15	Install concrete wheel stops	5	Item		\$0.00
		SUB TOTAL - ITEM 4.1				\$0
	4.2	Town Park Car Park				
	4.2.1	Removal of existing asphalt surfacing	975	sq.m		\$0.00
	4.2.2	Removal and disposal of brick paving	4	sq.m		\$0.00
	4.2.3	Removal and disposal of kerbing	65	m		\$0.00
	4.2.4	Removal and disposal of existng tree	1	Item		\$0.00
	4.2.5	Removal and disposal of existing car park pavement (405 sq.m) (area to be rehabilitated for grassing)	1	Item		\$0.00
	4.2.6	Trim, prepare and compact existing basecourse to 98% MMDD	975	sq.m		\$0.00
	4.2.7	Boxing out and compation of subgrade level for new pavement areas	85	sq.m		\$0.00
	4.2.8	Supply and install 200 mm basecourse and compact to 98% MMDD for new widened pavement	85	sq.m		\$0.00
	4.2.9	Supply and lay asphalt corrector layer as directed on site by superintendent (assume 50% of surfacing area)	503	sq.m		\$0.00
	4.2.10	Supply and install primer seal	1,040	sq.m		\$0.00
	4.2.11	Supply and lay 30 mm minimum thickness AC10 asphalt (black) – road way (access road from Moreton Terrace)	95	sq.m		\$0.00
	4.2.12	Supply and lay 30 mm minimum thickness AC7 asphalt (red) – parking areas	910	sq.m		\$0.00
	4.2.13	Install semi-mountable kerb (Type 1): 250mm wide kerb, 180mm long slope, face off vertical	65	m		\$0.00
	4.2.14	Line marking (100mm width white) - car park	105	m		\$0.00
	4.2.15	Line marking (100mm width yellow) - disabled bays	42	m		\$0.00
	4.2.16	Line marking (150mm width yellow) - shared area	26	sq.m		\$0.00
	4.2.17	Disabled parking bay pavement symbol	2	Item		\$0.00
	4.2.18	Shared area bollard	2	Item		\$0.00
	4.2.19	Relocation / adjustment of services	1	PS	\$2,500.00	\$2,500.00
	4.2.20	Supply and install new combination side entry pit with class D Wave Grate or approved equivalent	1	Item		\$0.00
	4.2.21	Drainage: Connect new combination side entry pit to the existng pit in Hosken Street (31m DN300 RCP RRJ pipe length, 1 no. Pits and 1 no. Break in the Exisitng Pit reinstate concrete footpath and lawn)	1	Item		\$0.00

ACTIVITY / DESCRIPTION			QTY	UOM	UNIT RATE	TOTAL
	4.2.22	Backfill and import top soil (100mm min.) and grass the former parking area (370 sq.m)	1	Item		\$0.00
	4.2.23	Miscellaneous (infill with cracker dust, signage, incidentals, finishing)	1	PS	\$7,500.00	\$7,500.00
		SUB TOTAL - ITEM 4.2				\$10,000
	4.3	Community Resources Centre Carpark				
	4.3.1	Removal & disposal of existitng tree	1	Item		\$0.00
	4.3.2	Rework the existitng basecourse, top up with gravel if required, trim, compact to 98% MMDD	600	sq.m		\$0.00
	4.3.3	Boxing out and compation of subgrade level for new pavement areas (access to Hosken Street)	495	sq.m		\$0.00
	4.3.4	Supply and install 200 mm basecourse and compact to 98% MMDD for new pavement (access to Hosken Street)	495	sq.m		\$0.00
	4.3.5	Supply and install primer seal	1,100	sq.m		\$0.00
	4.3.6	Supply and lay 30 mm minimum thickness AC10 asphalt (black) – road way	520	sq.m		\$0.00
	4.3.7	Supply and lay 30 mm minimum thickness AC7 asphalt (red) – parking areas	455	sq.m		\$0.00
	4.3.8	Install semi-mountable kerb (Type 1): 250mm wide kerb, 180mm long slope, face off vertical	220	m		\$0.00
	4.3.9	Supply and install concrete wheel stops	11	Item		\$0.00
	4.3.10	Line marking (100mm wide white) - car park	170	m		\$0.00
	4.3.11	Line marking (100mm width yellow) - disabled bays	20	m		\$0.00
	4.3.12	Line marking (150mm width yellow) - shared area	17	sq.m		\$0.00
	4.3.13	Disabled parking bay pavement symbol	1	Item		\$0.00
	4.3.14	Shared area bollard, adjacent to disabled parking bay	1	Item		\$0.00
	4.3.15	Install new grated gully pits with class D Wave Grate of approved equivalent	5	Item		\$0.00
	4.3.16	Connect new pit to the existitng pit in Hosken Street (70m DN300 RCP RRJ pipe length, 5 no. Pits with grated gully and 1 no. break in the existitng pit on Hosken Street)	1	Item		\$0.00
	4.3.17	Supply and construct 1m wide brick paved footpath	150	sq.m		\$0.00
	4.3.18	Miscellaneous (infill with cracker dust, signage, incidentals, finishing)	1	PS	\$7,500.00	\$7,500.00
		SUB TOTAL - ITEM 4.3				\$7,500
		SUB TOTAL				\$17,500
5		DONGARA HOTEL PRECINCT - CAR PARKS UPGRADE				
	5.1	Remove existing seal	2,300	sq.m		\$0.00
	5.2	Removal and disposal of kerbing	260	m		\$0.00
	5.3	Removal and disposal of existing car park pavement (200 sq.m) - proposed for landscaped areas	1	Item		\$0.00
	5.4	Trim, prepare and compact existing basecourse to 98% MMDD (section in front of hotel)	970	sq.m		\$0.00
	5.5	Removal and disposal of existing pavement and boxing out and compation of subgrade level for new pavement areas (985 sq.m) (section on side of hotel)	1	Item		\$0.00
	5.6	Construct retaining wall	1	Item		\$0.00
	5.7	Supply and install 200 mm basecourse and compact to 98% MMDD	985	sq.m		\$0.00
	5.8	Supply and install primer seal	1,950	sq.m		\$0.00
	5.9	Supply and lay 30 mm minimum thickness AC10 asphalt (black) – road way	1,115	sq.m		\$0.00
	5.10	Supply and lay 30 mm minimum thickness AC7 asphalt (red) – parking areas	680	sq.m		\$0.00
	5.11	Install semi-mountable kerb (Type 1): 250mm wide kerb, 180mm long slope, face off vertical	280	m		\$0.00
	5.12	Install mountable kerb (Type M-1): 300mm wide flush kerb	30	m		\$0.00
	5.13	Line marking (100mm wide white) - car park	215	m		\$0.00
	5.14	Line marking (100mm width yellow) - disabled bays	31	m		\$0.00
	5.15	Line marking (150mm width yellow) - shared area	20	sq.m		\$0.00
	5.16	Disabled parking bay pavement symbol	1	Item		\$0.00
	5.17	Shared area bollard, adjacent to disabled parking bay	1	Item		\$0.00
	5.18	Supply and construct 2m wide brick paved footpath	210	sq.m		\$0.00
	5.19	Supply and install pram ramps with tactiles	2	Item		\$0.00
	5.20	Supply and install in line kerb ramp to AS1428.1	1	Item		\$0.00
	5.21	Install concrete wheel stops	14	Item		\$0.00
	5.22	Backfill and import top soil (100mm min.) to former parking area (up to 200 sq.m)	1	Item		\$0.00
	5.23	Small traffic islands, signs, finishing, infill with cracker dust etc	1	PS	\$10,000.00	\$10,000.00
		SUB TOTAL				\$10,000
6		MORETON TERRACE UPGRADE				
	6.1	STAGE 1				
	6.1.1	Remove existing seal and dispose off site	3,450	sq.m		\$0.00
	6.1.2	Removal and disposal of existing grated gully	2	Item		\$0.00
	6.1.3	Removal and disposal of existing side entry pit	1	Item		\$0.00
	6.1.4	Removal and disposal of existing pavement for rain garden and landscaping (110 sq.m)	1	Item		\$0.00
	6.1.5	Backfill and Import Top Soil (100mm min.) to rain garden and landscaping area (110 sq.m)	1	Item		\$0.00
	6.1.6	Removal and disposal of existing pavement and boxing out and compation of subgrade level for new pavement areas (40 sq.m) (2x parking bays opposite CRC car park entrance)	1	Item		\$0.00
	6.1.7	Supply and install 200 mm basecourse and compact to 98% MMDD (parking bays mentioned in 6.1.5)	40	sq.m		\$0.00
	6.1.8	Trim, prepare and compact existing basecourse to 98% MMDD.	3,960	sq.m		\$0.00
	6.1.9	Supply and lay asphalt corrector layer as directed by the superintendent (assume 50% of surfacing area)	1,420	sq.m		\$0.00
	6.1.10	Supply and install primer seal for road	4,000	sq.m		\$0.00
	6.1.11	Supply and lay - 40mm thickness AC10 asphalt (black) for road	2,330	sq.m		\$0.00
	6.1.12	Supply and lay - 40mm thickness AC7 asphalt (red) for on-street parking and median	510	sq.m		\$0.00
	6.1.13	Removal and disposal of brick paving	1,080	sq.m		\$0.00

ACTIVITY / DESCRIPTION			QTY	UOM	UNIT RATE	TOTAL
	6.1.14	Remove existing kerb and dispose off site	570	m		\$0.00
	6.1.15	Removal and disposal of existing concrete footpath	60	sq.m		\$0.00
	6.1.16	Install semi-mountable kerb (Type 1): 250mm wide kerb, face off vertical	735	m		\$0.00
	6.1.17	Install mountable kerb (Type M-1): 300mm wide flush kerb	60	m		\$0.00
	6.1.18	Supply and install roundabout linemarking and signage	1	Item		\$0.00
	6.1.19	Line marking (120mm wide white) - median outline	430	m		\$0.00
	6.1.20	Line marking (100mm wide white) - onstreet parking	155	m		\$0.00
	6.1.21	Isolation and removal or existing light poles	8	Item		\$0.00
	6.1.22	Removal and disposal of existing traffic, roundabout and median islands with concrete infill (including kerb)	170	sq.m		\$0.00
	6.1.23	Remove speed hump and dispose off site	1	Item		\$0.00
	6.1.24	Replace existing side entry pit cover and apron slab and dispose of old cover and apron	4	Item		\$0.00
	6.1.25	Convert existing manhole to class D Wave Grate or approved equivalent and dispose of old cover	1	Item		\$0.00
	6.1.26	Convert existing side entry pit to manhole with class D cover and dispose of side entry pit cover and apron	2	Item		\$0.00
	6.1.27	Convert existing side entry pit to grated gully with class D Wave Grate or approved equivalent and dispose of side entry pit cover and apron	2	Item		\$0.00
	6.1.28	Supply and construct 2m wide brick paved footpath and tie in to existing brick paved footpath, including edge restraints	1,585	sq.m		\$0.00
	6.1.29	Supply and install pram ramps with tactiles	13	Item		\$0.00
	6.1.30	Supply and install in-line kerb ramp to AS1428.1	1	Item		\$0.00
	6.1.31	Install concrete footpath(2.0m wide): Concrete paving N32 - 100mm thick (footpath) laid on 25mm sand base, compacted subgrade.	65	m		\$0.00
	6.1.32	Supply and construct brick paved cross-overs with flush kerbing	65	m		\$0.00
	6.1.33	Remove existing boardwalk and dispose off site	1	Item		\$0.00
	6.1.34	Relocate existing water meter, including liaison with Utility Authority	1	Item		\$0.00
	6.1.35	Relocate existing power dome/pit, including liaison with Utility Authority	2	Item		\$0.00
	6.1.36	Remove trees (3 no.) and dispose off site	3	Item		\$0.00
	6.1.37	Replace existing non standard drainage structure with new side entry pit	1	Item		\$0.00
	6.1.38	Supply and install new combination side entry pit with class D Wave Grate or approved equivalent	1	Item		\$0.00
	6.1.39	Miscellaneous (infill with cracker dust or other fill material, handrails and any other miscellaneous items, finishing)	1	PS	\$10,000.00	\$10,000.00
		SUB TOTAL - ITEM 6.1				\$10,000
	6.2	STAGE 2				
	6.2.1	Remove existing seal and dispose off site	2,820	sq.m		\$0.00
	6.2.2	Remove existing kerb and dispose off site	330	m		\$0.00
	6.2.3	Removal and disposal of brick paving	730	sq.m		\$0.00
	6.2.4	Removal and disposal of concrete footpath	25	sq.m		\$0.00
	6.2.5	Removal and disposal of asphalt footpath	85	sq.m		\$0.00
	6.2.6	Boxing out and compaction of subgrade level for new pavement areas (at south side of roundabout)	30	sq.m		\$0.00
	6.2.7	Supply and install 200 mm basecourse and compact to 98% MMDD for new widened pavement	30	sq.m		\$0.00
	6.2.8	Trim, prepare and compact existing basecourse to 98% MMDD.	2,760	sq.m		\$0.00
	6.2.9	Supply and lay asphalt corrector layer as directed by the superintendent (assume 50% of surfacing area)	1,230	sq.m		\$0.00
	6.2.10	Supply and install primer seal for road	2,800	sq.m		\$0.00
	6.2.11	Supply and lay - 40mm thickness AC10 asphalt (black) for road	2,120	sq.m		\$0.00
	6.2.12	Supply and lay - 40mm thickness AC7 asphalt (red) for on-street parking and median	340	sq.m		\$0.00
	6.2.13	Roundabout linemarking and signage	1	Item		\$0.00
	6.2.14	Supply and install pedestrian crossing linemarking and signage	1	Item		\$0.00
	6.2.15	Line marking (120mm wide white) - median outline	210	m		\$0.00
	6.2.16	Line marking (100mm wide white) - on street parking	125	m		\$0.00
	6.2.17	Line marking (100mm wide white) - Westpac parking	55	m		
	6.2.18	Isolation, removal and disposal of existing light poles	4	Item		\$0.00
	6.2.19	Removal and disposal of existing traffic, roundabout and median islands with concrete infill, including kerbing	115	sq.m		\$0.00
	6.2.20	Remove speed hump and dispose off site	1	Item		\$0.00
	6.2.21	Supply and install kerb ramps	10	Item		\$0.00
	6.2.22	Supply and construct brick paved cross-overs with flush kerbing	30	m		\$0.00
	6.2.23	Supply and construct 2m wide brick paved footpath and tie in to existing brick paved footpath, including edge restraints	1,315	sq.m		\$0.00
	6.2.24	Remove tree and dispose off site	1	Item		\$0.00
	6.2.25	Drainage: Removal and disposal of existing cover and install Class D Wave Grate or approved equivalent	1	item		\$0.00
	6.2.26	Install semi-mountable kerb (Type 1): 250mm wide kerb, face off vertical	515	m		\$0.00
	6.2.27	Install mountable kerb (Type M-1): 300mm wide flush kerb	45	m		\$0.00
	6.2.28	Miscellaneous (infill with cracker dust or other fill material, handrails and any other miscellaneous items, finishing)	1	PS	\$7,500.00	\$7,500.00
		SUB TOTAL - ITEM 6.2				\$7,500
	6.3	STAGE 3				
	6.3.1	Remove existing seal and dispose off site	1,720	sq.m		\$0.00
	6.3.2	Remove existing kerb and dispose off site	235	m		\$0.00
	6.3.3	Removal and disposal of brick paving	125	sq.m		\$0.00
	6.3.4	Removal and disposal of timber railing in road rerserve	15	m		\$0.00
	6.3.5	Trim, prepare and compact existing basecourse to 98% MMDD.	1,730	sq.m		\$0.00

ACTIVITY / DESCRIPTION			QTY	UOM	UNIT RATE	TOTAL
	6.3.6	Boxing out and compaction of subgrade level for new pavement areas	210	sq.m		\$0.00
	6.3.7	Supply and install 200 mm basecourse and compact to 98% MMDD for new widened pavement	210	sq.m		\$0.00
	6.3.8	Supply and lay asphalt corrector layer as directed by the superintendent (assume 50% of surfacing area)	783	sq.m		\$0.00
	6.3.9	Supply and install primer seal for road	1,940	sq.m		\$0.00
	6.3.10	Install mountable kerb (Type M-1): 300mm wide flush kerb	35	m		\$0.00
	6.3.11	Install semi-mountable kerb (Type 1): 250mm wide kerb, face off vertical	290	m		\$0.00
	6.3.12	Supply and lay - 40mm thickness AC10 asphalt (black) for road	1,260	sq.m		\$0.00
	6.3.13	Supply and lay - 40mm thickness AC7 asphalt (red) for on-street parking and median	305	sq.m		\$0.00
	6.3.14	MRWA road reserve - Pavement markings and regulatory signs including any payment and coordination with Main Roads WA	1	PS	\$20,000.00	\$20,000.00
	6.3.15	Relocate existing signs	2	Item		\$0.00
	6.3.16	Supply and install Heavy Vehicles Must Turn Left ar Point Leander Drive sign	1	Item		\$0.00
	6.3.17	Line Marking (120mm wide white) - median outline	290	m		\$0.00
	6.3.18	Line Marking (100mm wide white) - on street bays	140	m		\$0.00
	6.3.19	Isolation and removal or existing light poles	2	Item		\$0.00
	6.3.20	Supply and install kerb ramps	3	Item		\$0.00
	6.3.21	Supply and construct brick paved cross-overs with flush kerbing	30	m		\$0.00
	6.3.22	Boxing out filling and compaction of subgrade level for new footpath sections (connection to medical car park and footpath to the new entry statement development)	1	PS		\$0.00
	6.3.23	Supply and construct 2m wide brick paved footpath and tie in to existing brick paved footpath, including edge restraints	725	sq.m		\$0.00
	6.3.24	Construct retaining wall and concrete ramp (medical centre car park tie in)	1	Item		\$0.00
	6.3.25	Install concrete wheel stops to angle parking bays	5	Item		\$0.00
	6.3.26	Supply and install boardwalk and handrail at Moreton Bay Fig Tree in the presence of an arborist (if approved by Shire of Irwin)	1	PS	\$5,000.00	\$5,000.00
	6.3.27	Miscellaneous (infill with cracker dust or other fill material, handrails and any other miscellaneous items, finishing)	1	PS	\$7,500.00	\$7,500.00
		SUB TOTAL - ITEM 6.3				\$32,500
		SUB TOTAL				\$50,000
7		SITE CLEAN-UP AND DEMOBILISATION				
	7.1	Site clean-up and demobilisation	1	Item		\$0.00
		SUB TOTAL				\$0
8		PROVISIONAL ITEMS				
	8.1					
	8.2					
		SUB TOTAL				\$0
		TOTAL DIRECT COSTS (ex GST)			\$0	\$77,500
		TOTAL INDIRECT COSTS (ex GST)				
		TOTAL COSTS (ex GST)			\$0	\$77,500

Title of RFQ: **RFT 3-2020/21 Moreton Terrace Upgrade - Civil Construction**

COMPLIANCE CRITERIA

QUALITATIVE CRITERIA

			COMPLIANCE CRITERIA					QUALITATIVE CRITERIA									
			NON-WEIGHTED					A. Relevant Experience		B. Tenderer's Resources		C. Demonstrated Understanding		E. Price			
			Item a	Item b	Item c	Item d	Item e	20%		10%		20%		50%			
	Tenderer	Quoted Lump sum price (inc. GST)	Y/N	Y/N	Y/N	Y/N	Y/N	Score 0-5	Weighted Score	Score 0-5	Weighted Score	Score 0-5	Weighted Score	Score 0-5	Weighted Score	TOTAL weighted score	RANKING
A																58	2
B																86	1