

***Yarra Trams
Technical Specification for
Tram Super Stop Construction
On Collins Street, b/w Spencer & King
Streets, Melbourne.***

NOTE:

THIS SPECIFICATION IS TO BE READ IN CONJUNCTION
WITH CONNELL WAGNER PTY LTD ELECTRICAL AND
COMMUNICATION SPECIFICATION & DRAWINGS

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1. Scope of Works

1.1 General

The Yarra Trams network forms a major part of the tram system that has been an important means of public transport and major part of Melbourne's streetscape for many years. The tram network has a strong historical significance and forms an important part of the community's local identity.

Under agreement with the State Government of Victoria, Yarra Trams has a commitment to increase patronage on the Yarra Tram network. Yarra Trams' strategy for achieving its commitment is through improved service levels. The creation of Super stops is one of several commitments aimed at improving the tram service.

Super stops are to be located at route transfer stops, including inter-modal transfers, or stops with particularly high patronage. All super stops will include shelters and Disability Discrimination Act (DDA) compliant platforms to allow direct access for all wheelchair-bound, sight impaired and elderly passengers. Subject to site specific restrictions, these stops will also have some or all of the following public amenities: automatic public toilets, kiosks, payphones, real time passenger information, ticketing machines and vending machines.

This Contract involves the construction of a pair of tram platforms, associated infrastructure (a Super Stop) at the Western end of Collins Street between Spencer and King Streets. Similar Super Stops have been constructed on Collins Street near the intersections of Spring and Swanston Streets. The intent of the project is to produce a high quality, disabled access enabled (DDA compliant) tram Stop, which satisfies the requirements of Yarra Trams, the City of Melbourne, Vic Roads and the Department of Infrastructure. The DDA compliance of the tram Stop will be fully utilised with the phased introduction of the Yarra Trams Citadis low floor tram.

The New tram Super Stop will incorporate or make allowance for a number of features designed to improve passenger acceptance of tram travel, specifically; lit shelters with advertising panels, ticket machines, seats, bins, public telephones, passive and interactive real time information displays and recorded CCTV for safety and anti-vandal purposes.

It is Yarra Trams intention that the Super Stop be aesthetically pleasing, as well as providing for increased passenger comfort and volumes. For this reason the Contractor is required to undertake the Works to high levels of workmanship and quality.

The Contractor shall prepare temporary Works designs and supply all plant, equipment, labour, materials, supervision and incidentals required for the complete and proper construction of the Works to their full purpose and intent.

The Contractor shall undertake the Works in a manner so as to minimise inconvenience to the public, and to Yarra Trams operations.

1.2 Site

The extent of the site is the section of Collins Street, Melbourne, between Spencer and King Streets as shown on the drawings.

1.3 Mobilisation and Demobilisation

The Contractor shall mobilise and maintain plant, equipment and other accommodation amenities and ablution facilities for its work force.

All necessary permits for the location of site accommodation and facilities shall be obtained from Melbourne City Council.

At the completion of The Works, the Contractor shall remove all plant and equipment and accommodation from the site and restore the area to a condition acceptable to the Superintendent.

The Contractor shall exclude the public from his work area by constructing suitable barricades at each end of the limit of works as shown on the drawings and restore the area acceptable to the Superintendent for public use and tram operations.

The Contractor shall erect and maintain any promotional construction signage provided by Yarra Trams during the construction period.

1.4 Scope

The Contractor shall construct the Platforms, and carry out the associated Works as shown on the drawings and generally as follows. The Contractor shall submit a draft work method statement as part of the tender submission. The work method statement shall include any temporary work, impact on overhead wires, relocation of existing services, modifications to existing structures and traffic signal works. The successful Contractor shall submit a final work method statement to the Superintendent for approval within one week of winning the tender. Approval or otherwise shall be provided within one week. The Contractor shall also obtain and pay for approval from and meet all the requirements of Yarra Trams, as well as the City of Melbourne and all relevant service authorities. The Contractor shall submit approvals to the Superintendent before commencing work.

The Works shall include, but are not limited to:

- (a) Traffic Management; The Contractor shall provide to the Superintendent a Traffic Management Plan accompanied by a Road Safety Auditors report or assessment. The Contractor shall not begin Works until the Superintendent has reviewed the Traffic Management Plan. The approval period shall be no more than one week. The Contractor shall supply traffic management and safe access for all contractors working on the site, regardless of whether they are subcontracting to the Contractor, or are engaged directly by the Principal. The Contractor should ascertain the traffic management requirements of all involved parties and allow for this in its tender. The Contractor shall arrange necessary traffic management permits from MCC and Vic Roads for the construction period, including advertising and public consultation, at the Contractors expense. A copy of approvals must be submitted to the Superintendent prior to commencement of Works. A post implementation Audit report is to be submitted confirming the implementation of appropriate traffic management.
- (b) The Contractor shall provide traffic management and appropriate signage for the diversion of pedestrians, crossing adjacent to the works area. The intended layout shall be provided to the Principal for approval, prior to works commencing, and accompanied by an accredited Road Safety Auditors report. The contractor shall also arrange for approvals by Melbourne City Council, at the contractors expense. A similar report is to be submitted confirming the implementation of appropriate access.
- (c) Platform Construction; The Contractor shall construct the new Super Stop to the details provided on the drawings. The Contractor will also make allowance in the concrete slab for underground conduits and furniture footing details as shown on the drawings.
- (d) Platform Surface; The Contractor shall pave the platforms in the manner described by the specification and shown on the drawings.
- (e) As Built Drawings; The Contractor shall prepare and submit to the Superintendent, as built drawings for all platform construction, furniture placement, road marking and buried services carried out as part of this Contract. The Contractor shall supply these drawings in both A3 size paper and electronic (AutoCad V14), formats. Particular note will be made of the as built location of any conduits terminated under the paver surface for potential future facilities. A detailed survey of track to platform clearances and platform levels achieved shall also be prepared and submitted to the Superintendent upon request.
- (f) Tactile Ground Surface Indicators (TGSI's) Installation; The Contractor shall install all TGSI's on platforms and other areas as detailed on the drawings and to the requirements set out in this specification.

- (g) Road Marking and Road Signs; The Contractor shall perform all road marking placement and removal as shown on the drawings and to the standard described by this specification, or Vic Roads Standards as appropriate.
- (h) Platform Furniture Installation; The Contractor shall install rubbish bins, handrails, and electrical switchboard, in the locations shown on the drawings. The Contractor shall make allowance for other furniture, by providing footings and conduits as shown on the drawings and set out in this specification. The Contractor shall co-ordinate and provide safe access to others to supply and install their furniture item/s. The Contractor shall supply any cast in hold down bolts or assemblies as required.
- (i) Street Furniture Relocation; The Contractor shall relocate, make good and return all of the existing street furniture to the City of Melbourne, or owner of assets as required.
- (j) Underground conduits; The Contractor shall provide underground conduits complete with cable draw pits and draw wires for electrical power and communication reticulation as indicated on the drawings and to the requirements as set out in this specification, unless these works are sub let by Yarra Trams. The contractor is responsible in maintaining conduits clear of debris, and localised crushing of conduits as a result of construction.
- (k) Power and communication interfaces; The Contractor shall allow safe access to others for final connection and cabling interfaces to all platform equipment including but not necessary limited to light fittings, advertising panels, ticket machines, passive and interactive real time information displays, CCTV cameras and the like. The Contractor shall supply and install appropriate power cables for the J.C. DeCaux shelter conduits unless sublet by Yarra Trams. Final connection to the shelter shall be provided by J.C. DeCaux. The Contractor shall install final power sub-circuit cabling from the distribution pillar to the public pay phones and supply and install a protective earth cable from the main earth to each of the payphones. The Contractor shall coordinate fully with the telecommunications service provider during installation and pay all associated fees. (Refer to Electrical design plans drawings)
- (l) Network Connection for Electricity and Communications; The Contractor shall install conduits and pits, as shown on the drawings and set out in this specification, to allow for connection of the platforms to the Electricity and Telephone networks. The Contractor shall allow safe access to Electricity and Telephone network personnel to perform whatever Works are necessary to finalise the connections.

1.5 Work By Others

Some activities on the site will be undertaken by other contractors. Unless otherwise noted, the Contractor should not allow for undertaking the following Works in his tender price. However, the Contractor should allow for and undertake the coordination of all Works undertaken on the site, including those Works noted below and performed by contractors engaged directly by the Principal.

Works by others include:

(a) Tram Shelters

Supply and installation of tram shelters. (Contractor to supply and install hold down bolts, conduits and cabling as specified).

(b) Electrical Authority

- Supply and installation and connection of consumer's mains cabling from the Supply Authority Network to the new supply authority pit on the Tram Stop. (The Contractor is to supply conduits, trenching and conduit installation to the new supply authority pit and consumers mains cabling from this pit to the distribution pillar).

(c) Telecommunications Provider

- Supply and installation of conduit from the existing Telstra pit to the platform. (Trenching, conduit bedding and trench backfilling to be undertaken by the Contractor).
- Supply and installation of the communications cabling from the existing Telstra pit to the platform and connection to the Telstra network.
- Supply only of the new Telstra pit on the Tram platform. (Installation of the pit is to be by the Contractor).
- Supply and installation of the cable joint in the new Telstra pit.
- Supply and installation of communications cabling to the pay phones. (Conduit from the new Telstra pit to pay phones supplied and installed by the Contractor).
- Supply and installation of communications cabling to the RTI ground units. (Conduit from the new Telstra pit to RTI ground units supplied and installed by the Contractor).
- Supply only of power sub-circuit cabling to the pay phone. (Power sub-circuit cabling to be installed by the Contractor. Protective earth cable to be supplied and installed by the Contractor).
- Supply and installation of payphone.

(d) Fencing

Supply and installation of fence posts, fence post support assemblies and fence panels. (Contractor to supply and install fence hold down bolts as specified)

(e) Real Time Information System

Supply and installation of Real Time Information ground unit and associated cabling. Supply of overhead RTI pole or attached devices. (Contractor to supply and install hold down bolts and conduits as specified).

(f) Ticket Vending System

The supply and installation of the ticket vending machines, ticketing system cabinet and associated cabling. (Contractor to supply and install conduits and other minor items as specified).

(g) Quadguard Traffic Safety Device

The supply and installation of the Quadguard traffic safety device. (The Contractor shall supply and install the concrete footing as specified)

(h) Time Table Totem, Yarra Trams Signage, and Audio Bollard

The contractor is responsible for supply and install of conduits. The supply and installation of these items will be performed by others.

1.6 Approvals and Permits

The following approvals have either been obtained or are in the process of being obtained and need not be obtained by the Contractor:

- Construction approval from the Department of Infrastructure
- Building approval from Melbourne City Council
- Traffic treatment approval from MCC (For permanent traffic treatments, not traffic management during construction)

Other approvals have not been obtained and the Contractor should make allowance for obtaining these at his expense. These include but are not limited to:

- Road opening permits from MCC
- Site accommodation location permit from MCC
- Approval for works adjacent to tram tracks from Yarra Trams
- Approval to lower the High Voltage conduit/cable run as shown on the drawings
- Approval to connect to the electricity grid and associated works to enable final connection and power.
- Approval for isolation of Tram Power if Required.

Note that any alterations to the design intentions reflected in this Specification and on the Drawings made by the Contractor may require additional or revised approvals. These shall be obtained by the Contractor at his expense.

1.7 Drawings

The Works to be constructed are shown on the following Drawings:

[illegible]

2. General

2.1 Standards, Codes and Referenced Specifications

All work shall be performed in accordance with the Contract and the requirements of current Australian Standards and Codes including those listed below. In the event of any conflict, the requirements of the Contract shall apply:

AS1012 Method of Testing Concrete
AS1100 (all parts) Technical drawing
AS1101 Graphic symbols for general engineering
AS1110 ISO metric hexagon precision bolts and screws
AS1112 ISO metric hexagon nuts
AS1141 Methods of sampling and testing aggregates
AS1152 Test Sieves
AS1160 Bitumen emulsion for construction and maintenance of pavements
AS1214 Hot-dipped galvanised coatings on threaded fasteners
AS1237 Flat metal washers for general engineering purposes
AS1289 (all parts) Methods of testing soils for engineering purposes
AS1302 Steel reinforcing bars for concrete
AS1303 Steel reinforcing wire for concrete
AS1304 Welded wire reinforcing fabric for concrete
AS1379 The specification and manufacture of concrete
AS1428.1 Design for access and mobility Part I : General Requirements for Access - Buildings
AS1470 Health and safety at work - principles and practices
AS1478 Chemical admixtures for concrete
AS1646 Elastomeric seals for waterworks purposes
AS1650 Hot-dipped galvanised coatings on ferrous articles
AS2008 Residual Bitumen for Pavements
AS2150 Asphalt (hot mixed)
AS2157 Cutback bitumen
AS2193 Force measuring system and testing machines
AS2205 (all parts) Methods of destructive testing of welds in metal
AS2601 The demolition of structures
AS2758 (both parts) Aggregates and rock for engineering purposes
AS2990 Quality systems for engineering and construction projects
AS3000 Wiring Rules
AS3080 Telecommunications Installations
AS3500 National plumbing and drainage code
AS3500.3 Stormwater Drainage
AS3600 (& supplements) Concrete structures
AS3610 Formwork for concrete (all parts & supplements)
AS3799 Liquid membrane forming curing compounds for concrete
AS3901 Quality systems for design/development, production installation and servicing
AS3902 Quality systems for production and installation
AS3972 Portland and blended cements

2.2 Site Survey

The Contractor shall engage an experienced and qualified surveyor to set out the Works in strict conformity with the Specification and Drawings. This surveyor shall possess the experience and qualifications which would be acceptable to the Institution of Surveyors, Australia as satisfying the requirements for Corporate or Associate Membership or alternatively, possess the experience and qualifications which would be acceptable for Membership to the Institution of Engineering and Mining Surveyors, Australia.

The Works are set out to Australian Mapping Grid (AMG) and Australian Height Datum (AHD).

3. Quality Assurance

3.1 General

3.1.1 Scope

This section of the specification covers the Quality Assurance requirements for the civil and electrical Works component of the project.

The purpose of Quality Assurance in the context of this project is:

- (a) To provide the Principal with assurance that the quality of the product or service will be in accordance with the Contractual requirements; and
- (b) To place on the Contractor the responsibility for achieving the required quality and then demonstrating that it has been provided.

3.1.2 Referenced Documents

The following documents which are referenced in this Section, form part of this Specification only to the extent that they are referred to herein:

AS/NZS	ISO9001: 1994	Quality Systems - Model for quality assurance in design, development, production, installation and servicing.
AS/NZS	ISO9002: 1994	Quality Systems - Model for Quality Assurance in production, installation and servicing.
AS/NZS	ISO8402: 1994	Quality Management and quality assurance - vocabulary.

3.1.3 Definitions

The definitions contained in AS/NZS ISO 9002 and ISO 8402 shall generally apply, however, the following definitions shall be used for this project.

Lot

For the purpose of this Contract, a lot is an essentially homogeneous section of the Works, the limits of which will be chosen by the Contractor, but subject to the approval of the Superintendent (see also Clause 3.3.7).

Hold Point

AS/NZS ISO 8402 defines a hold point as a point, defined in an appropriate document, beyond which an activity shall not proceed without the approval of a designated organisation or authority. The approval to proceed beyond a hold point is given usually in written form, but it may be given by any other agreed system of authorisation.

For the purposes of this Contract, hold points will apply at the points defined in the approved Project Quality Plan, and also at any point at which a non-conformance is detected.

Witness Point

A witness point is a point at which the Superintendent may review, inspect or test the Works.

3.2 Quality System

3.2.1 General

The Contractor shall plan, establish, implement and maintain a Quality System for the Works to meet the requirements of AS/NZS ISO 9002, and in accordance with the requirements of this Section of the Specification.

The Contractor shall undertake and bear all costs of all independent and internal inspections and testing, surveillance of all manufacturing, construction and commissioning processes, and quality system audits.

The Principal may, at his discretion, carry out audits and surveillance as deemed necessary.

3.2.2 Project Quality Plan

The Contractor shall prepare a Project Quality Plan for the Works and submit it to the Superintendent for approval within seven calendar days from the date of award of the Contract. The Project Quality Plan shall cover all of the Works under the Contract (both on-site and off-site) and shall include:

- (a) A statement of the Contractor's Quality Policy
- (b) System application
- (c) Management responsibilities
- (d) organisation requirements
- (e) Quality system element procedures
- (f) Project procedures
- (g) Technical procedures
- (h) Inspection and Test Plans (ITP's)
- (i) Hold Points and Witness Points
- (j) planned audits
- (k) a schedule and program of all quality documentation to be prepared during the progress of Works.

Parts of the Project Quality Plan (notably items (f), (g), (h) and (i) above) may be submitted progressively for each different phase of the Works, subject to the agreement of the Superintendent. However, all relevant parts of the overall Plan shall have been submitted and approved before the particular phase of the Works (to which that part of the Project Quality Plan applies) is commenced.

Within 3 days of approval of any part of the Project Quality Plan by the Superintendent, the Contractor shall submit 3 controlled copies to the Superintendent for his retention.

Changes to the Project Quality Plan

Changes to the Project Quality Plan for the Work may be made by the Contractor at any time. However, where the change affects the Work either directly or indirectly, the proposed change shall be subject to the prior written approval of the Superintendent.

The Contractor shall immediately implement changes to the Quality System upon receipt or issue of a Non-conformance Report or Corrective Action Request against any aspect of the Work, or if the Contractor determines that the existing Project Quality Plan:

- (i) is causing nonconformance;
- (ii) has to be changed as a result of an audit;
- (iii) no longer represents the Contractor's current or appropriate practice; or
- (iv) does not address the needs of the Contract.

Any change to the Project Quality Plan shall be subject to the change complying with the following requirements:

- (i) the change does not cause the Works to be constructed to a lower standard than specified in the Contract;
- (ii) the change does not include any increase in payment by the Principal to the Contractor or others;
- (iii) Approval of the change does not incur any liability for the Superintendent or the Principal for any consequences of the change; and
- (iv) the change can be implemented without any disruption to the Work under the Contract.

The Contractor shall remove all superseded documents and modify all relevant procedures and the ITP's and shall replace them with the new documents and procedures.

Sub-Contractors' Quality Plans

The Contractor shall specify on all purchasing documents, subcontracts or Contract-related documents the relevant Quality System standard and audit provisions for all subcontract Works (which for the purposes of this clause is deemed to include the supply of materials, material testing and all other services).

Subcontractors undertaking construction Works or material fabrication shall prepare ITPs for the work concerned. Should the Subcontractors not be able to provide satisfactory ITPs and the appropriate procedures, the Contractor shall ensure that the Contractor's ITPs incorporate the necessary Hold Points to ensure that the specified requirements are met.

3.2.3 Quality Records

General

Quality records shall include the results of any system and product audits, tests, observations or measurements, including any relevant calculations or analyses.

Forms

All compliance tests/measurements/observations, test results, calculations and analyses shall be reported on forms prepared by the Contractor as part of his Project Quality Plan to include at least the following:

- (a) The date (including the date of sampling),
- (b) the lot number,
- (c) lot description,
- (d) Type of test,
- (e) The three dimensional location of the test,
- (f) A clear and logical tabulation of results, calculations and analyses,
- (g) A comparison of actual test results with the specified values,
- (h) An indication of compliance or non-compliance, and
- (i) The signature of an authorised representative of the Contractor.

Retention of Records

The Contractor shall retain all primary records in accordance with the Contractor's Project Quality Plan, statutory requirements, and the Contract. These documents shall be handed over the Superintendent in an agreed format at the completion of the Works. The records shall be retained and made available to the Contractor for updating as necessary as a result of any work performed by the Contractor during the Defects Liability Period.

The handing over of these documents shall be a condition precedent to the issue of a Certificate of Practical Completion. For the purpose of the Contract, primary records shall include at least:

- (a) All conformance and non-conformance reports;
- (b) All monitoring and testing results, analyses, reports, measurements and observations; and
- (c) The original Project Quality Plan and any changes made to it.

Progress and Summary Charts

The Contractor shall maintain progress and summary charts of tests, measurements and observations during the Project. Copies of all charts shall be progressively supplied to the Superintendent during the course of the Contract.

National Association of Testing Authorities, Australia (NATA) Tests

Conformance tests undertaken by the Contractor shall be performed by laboratories registered with NATA, wherever applicable.

All such tests shall be covered by the terms of registration of NATA and all test reports shall be issued on a NATA report signed by a NATA authorised signatory for the test concerned.

Conformance Reports

Conformance data shall be entered in the record system daily as soon as possible after compliance testing has been completed.

Conformance reports shall be prepared and recorded prior to any Progress Claim. Each conformance report shall be signed by the Contractor's Quality Representative and shall include a statement in the following form:

"On behalf of (Contractor), we certify that the Works represented by the items of work listed have been tested in accordance with the Project Quality Plan and conform in all respects with the requirements of the Contract."

Where work is to be covered up after conformance has been actioned, preparation of the conformance report prior to covering up shall constitute a Hold Point.

Non-Conformance Reports

All non-conformance reports and records shall be submitted to the Superintendent as soon as practicable and within one (1) working day of the nonconformity being recognised.

3.2.4 Quality Audits

Contractors Quality Audits

The Contractor (and Sub-Contractors and Suppliers) shall undertake quality audits in accordance with the approved Project Quality Plan.

Principal's Quality Audits

In addition to the Contractor's Quality System audits, the Superintendent and/or any other authorised representative of the Principal shall at any time and from time to time be entitled to conduct such audits of the Contractor's Works and Quality System including the Works and quality systems of Subcontractors as are considered necessary. The Contractor shall provide every assistance to the Principal's Representative in the conduct of such audits. The cost of additional testing associated with audits conducted by the Principal's Representative shall be borne by the Principal.

Where appropriate NATA tests exist, comparative testing by the Principal's Representative shall be conducted by a laboratory with NATA accreditation for the test methods specified, with nominated proficient testing operators and shall be reported on NATA endorsed test reports.

Both scheduled and unscheduled audits may be conducted as follows:

(a) Scheduled Audits

Audits may be conducted on a scheduled basis on all aspects of the Works and the Quality System and shall be performed in accordance with recognised quality audit procedures.

The Principal's Representative shall give the Contractor at least five (5) days' notice that a scheduled audit is to be conducted.

(b) Unscheduled Audits

Audits additional to scheduled audits may be conducted at any time on products, service, processes and technical procedures.

If an unscheduled audit indicates a significant non-conformance of a product or service, the Principal's Representative shall be entitled to conduct a Quality System Element Audit with twenty-four (24) hours' notice to the Contractor.

During any audit, the Contractor shall provide the Principal's Representative with all documentation, access and assistance necessary for its completion.

Auditing may take one or a combination of the following forms:

- (a) A check on whether the Contractor is complying with the requirements of the Quality System;
- (b) A check on the Contractor's individual procedures, records and/or calculations;
- (c) A continuous check on the Contractor's processes; or
- (d) A program of independent compliance inspections of any number of lots in accordance with the procedures in the Specification.

The Principal's Representative shall immediately advise the Contractor, in writing, of any deficiency or deviation in the Contractor's Quality System.

If any deficiency or deviation in the Contractor's Quality System is detected, the Contractor shall immediately rectify the Quality System in compliance with the requirements of Clause 3.2.2.

If the deficiency or deviation has caused a non-conformance, the Contractor shall immediately submit a non-conformance report and comply with the requirements of Clause 3.3.9.

Where an audit detects any errors, deficiencies or deviations in any procedure, record, test, calculation, analysis or report, the procedure, record, test calculation, analysis or report shall be immediately corrected. If the correction of an error, deficiency or deviation generates a non-conformance, the Contractor shall immediately submit a non-conformance report and comply with the requirements of Clause 3.3.9.

If, in the opinion of the Superintendent, any process, procedure, test method, calculation, analysis or report has resulted or will result in a serious non-conformance, then the Superintendent may direct the Contractor, in writing, to stop the work or operation concerned and the Contractor shall immediately carry out any corrective or remedial action.

3.2.5 Conforming and Non-conforming Materials and Work

Progress Payment for Conforming Work

Progress payments under the provision of the General Conditions of Contract will only be made for those lots of the Works for which a Conformance Report has been prepared and recorded under the provisions of Clause 3.2.3.

Each lot subject to payment shall include a Conformance Report that verifies that all survey checks have been completed and as built records documented in accordance with the Contractor's Quality Plan.

Nonconforming Materials and Work

Unless express approval has been otherwise granted by the Superintendent, nonconforming materials or work shall be repaired, or shall be removed and replaced with conforming materials or work.

3.3 Quality System Elements

3.3.1 General

In considering the requirements of the Quality System, the Contractor shall, among other matters, take into account the requirements of Section 4 of AS/NZS ISO 9002:1994.

Quality Plans, Procedures and Work Instructions shall be prepared by the Contractor to meet the objectives of Clause 4.2 of AS/NZS ISO 9002:1994.

Quality Plans and Procedures shall be prepared to be preventive of defective materials being incorporated into the Works and preventive of performance of defective Contract Works.

Procedures shall be prepared for all on-site Works and off-site Works carried out at sites or new factories prepared for this Contract or off-site Works involving unique manufacture/ construction.

Procedures shall also be prepared for off-site material production or manufacture / construction involving output from established factories.

3.3.2 Contract Reviews

The Contractor shall carry out the reviews required under Clause 4.3 of AS/NZS ISO 9002:1994, and any exceptions or nonconformances shall be reported to the Superintendent.

3.3.3 Design

The Contractor shall provide Design Assurance and Design Verification to comply with Clause 4.4 of AS/NZS ISO 9001:1994 only, for the following:

- (a) Temporary Works for construction purposes
- (b) Any alternative designs proposed by the Contractor and accepted by the Superintendent for the permanent Works.

3.3.4 Documentation

In addition to the requirements of Clause 4.5 of AS/NZS ISO 9002:1994, the Contractor shall keep on site copies or originals of all project documentation. Such documentation shall include all relevant codes of Practice and Standards referred to in the Specification or required to carry out and test any part of the Works.

3.3.5 Purchasing

The Contractor's Quality Plan shall provide for the requirements of Clause 4.6 of AS/NZS ISO 9002:1994 in respect of Subcontractors and Suppliers.

The selection of the appropriate quality system standard, if any, shall be subject to the approval of the Superintendent.

If work under the Contract to be undertaken by a Subcontractor is to be further subcontracted, the Contractor shall ensure that the Subcontractor complies with Clause 4.6 of AS/NZS ISO 9002:1994 in relation to that Subcontractor's subcontractor(s).

The Contractor shall establish and maintain a register of subcontracts and all significant material suppliers describing details of the subcontract including the scope of Works of each subcontract or supply agreement, the quality system specified and the Subcontractor's Quality Representative.

A copy of the register is to be submitted to the Superintendent as updates occur.

The Contractor shall establish and maintain a procurement program for subcontractors and significant material suppliers to include at least dates for award, commencement, submission quality system documents, shop drawings, samples, prototypes and delivery.

3.3.6 Product Supplied by the Principal

All design, drawings and documentation supplied by the Principal are supplied to the Contractor under the provisions of the General Conditions of Contract. The requirements of Clause 4.7 of AS/NZS ISO9002:1994 shall apply.

The Contractor shall coordinate the receipt of all construction materials supplied by the Principal and formally acknowledge acceptance of delivery, state and quality of each batch of material. Upon receipt of the material, the Contractor shall be held responsible for the material. Damage caused by the Contractor to supplied materials shall be made good or the damaged materials replaced at the Contractor's expense.

3.3.7 Identification and Traceability

Identification by Lot

Earthworks and pavement Works shall be identified by lots. All other items of work shall be identified by the most appropriate method. Unless specified otherwise, a "Lot" also includes any "item of work" not divided into lots.

The Contractor shall identify all samples and test results with accurate field locations and lots to which they relate.

If, prior to commencement or during construction of a lot, discrete portions of the lot are identified which are visually non-homogeneous and/or non-representative of the lot, the portions concerned shall be excluded by the Contractor from the lot and each excluded portion treated as a separate lot.

The Superintendent shall have the right at any time to determine if any lot is essentially homogeneous, non-homogeneous or non-representative and/or direct that discrete portions of a lot be treated as a separate lot, without additional cost to the Principal.

For the purposes of this Contract, essentially homogeneous shall be taken to mean a lot or a section of the work where there is no variation due to assignable causes.

Where the term "homogeneous lot" or "homogeneous section of the work" appears elsewhere in the Contract it shall be taken to mean "essentially homogeneous lot" or "an essentially homogeneous section of work".

Lot numbers shall be used as identifiers on all Quality System data.

The Contractor shall determine the proposed bounds of each lot before construction commences and shall include the proposals in the Contractor's Inspection and Test Plan(s).

Unless otherwise approved by the Superintendent, the depth of lots for earthworks and pavements shall be limited to the depth of a single layer placed for compaction purposes.

Sample identification shall uniquely define the lot which is represented by the sample.

Lot Numbering

Each lot shall be given a lot number. The allocation of lot numbers shall be carried out by the Contractor to suit the circumstances of construction provided the lot numbering system complies with the following requirements:

- (a) The Contractor shall establish a system which immediately relates the schedule item number and program activity number for the work to the lot number; and
- (b) The lot number shall be entered into a register which provides at least the following information:
 - Three dimensional surveyed location of the lot (chainage of the start and finish points, lateral location and layer location) and/or the particular structure (eg. pier or abutment number, pour number);
 - Indication of conformance or non-conformance;
 - The replacement lot numbers for non-conforming lot;

- Summary of test results (eg. characteristic value);
- Location of detailed test results (form number, file number);
- Relevant schedule item number and program activity number.

A non-conforming lot which is reworked and resubmitted for compliance testing or which has been subject to a fresh compliance testing program or which has been subdivided into smaller lots for rework and/or a fresh compliance testing program shall retain its original lot identification number. A new number, or numbers, shall be allocated to the reworked/resubmitted/subdivided lot(s).

Details of the lot numbering system shall be included in the Contractor's Inspection and Test Plan(s).

Similar records shall be maintained for all items of work not divided into lots.

Field Identification

To ensure all site personnel can readily identify where the particular lots are in the field, the Contractor shall implement a field identification system which shall clearly identify the bounds of each lot and the lot number.

This identification system is to be detailed in the Project Quality Plan and shall be maintained during all phases of construction of the lot and until the Contractor has ensured that the lot has achieved specified quality.

Work on a lot shall not commence until the field identification has been established.

The boundaries of a lot may be changed if subsequent events cause the original lot to be no longer essentially homogeneous. Where the Contractor initiates such a change, the prior approval of the Superintendent shall be obtained.

Daily Lot Number Notification

As part of the Quality System, the Contractor shall arrange to supply the Superintendent by 9.30am each day on which work is being performed, a list of all lots on which work commenced and was completed on the preceding working day, with the lot numbers and general descriptions.

3.3.8 Process Control

The sequence of operations required as part of each process procedure shall be in the form of a flow chart or checklist and shall reflect the requirements of the Specification. They shall include relevant inspection and test points, survey control points, Hold Points and Witness Points and indicate where these points occur in the sequence.

3.3.9 Inspection and Testing

Inspection and Test Plans

The Contractor shall set up an appropriate regime of inspection and testing of the Works as well as the Works of Subcontractors.

The Contractor shall develop ITPs to cover all activities and components that are necessary to complete the Works. ITPs shall include for the documentation and recording of sufficient test and inspections to ensure that the Works comply with the Contract.

ITPs shall include the following information:

- (a) who carries out the inspection or test;
- (b) the method of inspection or test;
- (c) the specified acceptance criteria;
- (d) the form of record of results;
- (e) the frequency and timing of the tests;
- (f) details of what is to be inspected;
- (g) details of Witness Points;
- (h) details of Hold Points; and
- (i) details of audits to be carried out by the Contractor's quality assurance team.

Testing

All conformance testing shall be based on lots.

The frequency of testing for conformance shall be approved by the Superintendent.

(a) Control Testing

Control testing shall be carried out by the Contractor to verify that the process is proceeding as planned. The frequency and extent of control testing shall be at the discretion of the Contractor which shall take into account previous performance and the impact of non-conformance on progress of the Works.

The results of control tests shall be documented and reported to the Superintendent.

(b) Conformance Testing

Conformance testing shall be performed on a lot at the time when the Contractor considers that the lot has been processed sufficiently to comply with the requirements of the Contract.

Prior to commencement of conformance testing, the limits of the lot shall have been clearly identified and an identification number shall have been allocated to the lot.

Once conformance testing of the lot has commenced, the conformance testing procedures shall be completed and a result reported.

(c) *Reinstatement*

The Contractor shall reinstate all core holes, test holes, excavations and any other disturbance resulting from control and/or conformance testing.

The reinstatement shall be to a standard which is at least equal to the specified requirements for the particular work.

Sampling

Inspection and Test Procedures shall detail sampling methods and/or plans.

Unless specified otherwise random sampling procedures shall be used.

The term "sampling" shall be taken to also include testing, inspection and any other term used for the checking of sections of the work for conformance.

Inspections

The Contractor's Project Quality Plan shall set out procedures for incoming inspections, in-process inspections, final inspections and inspection status in accordance with Clauses 4.10, 4.11 and 4.12 of AS/NZS ISO 9002:1994.

In addition, the Contractor shall conduct Procedural and Compliance inspections as set out in the following:

(a) *Procedural Inspection*

Procedural Inspections shall be completed by the nominated person for each section of the work and this person shall signify that correct construction procedures have been followed.

Inspection records shall be held by the nominated person in charge of the Works during all phases of the Works covered by the appropriate inspections and made available to the Superintendent upon request.

(b) *Conformance Inspections*

Conformance Inspections shall be completed and certified by the Contractor's Quality Representative or his nominee.

Conformance inspection records of completed lots shall be compiled daily into a register or computer database. The data shall be kept up to date with records compiled within 24 hours of execution or completion of work.

The Contractor shall prepare Conformance Reports setting out completed lots in accordance with the provisions of Clause 2.2.3 of this Section.

Witness Points

The Contractor's Project Quality Plan shall nominate Witness Points. The Contractor shall establish notification procedures acceptable to the Superintendent to allow inspection of the work at each Witness Point.

The Contractor shall not proceed beyond a Witness Point without the written concurrence of the Superintendent.

The Contractor shall have available at each Witness Point evidence of compliance of work completed. Concurrence of the Superintendent shall generally be in the format of signature on a suitable form provided by the Contractor.

Signature of the Superintendent shall not constitute verification, acceptance or approval of the Works completed at the Witness Point. The quality of the Works shall remain the responsibility of the Contractor as provided elsewhere in the Contract.

The nomination of Witness Points shall be subject to approval by the Superintendent.

Witness Points shall include, but not be limited to, those detailed in other Sections of the Specification.

Hold Points

The Contractor's Project Quality Plan shall nominate Hold Points. The Contractor shall establish notification procedures acceptable to the Superintendent to allow inspection of the work at each Hold Point.

The Contractor shall not proceed beyond a Hold Point unless compliance with the following conditions is certified by the Contractor or his Quality Representative.

- (a) all underlying lot(s) and any adjacent lot(s) affected by the lot in question are conforming;
- (b) all conformance reports for any underlying lot(s) or any adjacent lot(s) affected by the lot in question have been submitted.
- (c) the proposed dispositions and corrective actions related to all non conformances for any underlying lot(s) or any adjacent lot(s) affected by the lot in question have been approved by the Superintendent.

Additionally, the Contractor shall not proceed beyond a Hold Point without the written concurrence of the Superintendent in the format of signature on a suitable form provided by the Contractor.

Signature of the Superintendent shall not constitute verification, acceptance or approval of the Works completed at the Hold Point. The quality of the Works shall remain the responsibility of the Contractor as provided elsewhere in the Contract.

The nomination of Hold Points shall be subject to approval by the Superintendent.

Hold Points shall include, but not be limited to, those detailed in other Sections of the Specification.

Control of Nonconforming Product and Corrective Action

The Contractor's Project Quality Plan shall provide for two levels of nonconformance reporting:

(a) *Internal Quality System Monitoring*

This level shall provide for the reporting of actual and potential Quality System nonconformances of all the Contractor's processes of management, administration and construction. Such non-conformances shall be subject to reporting through Non-conformance Reports by all of the Contractor's personnel and Subcontractors with the view to improving productivity.

The Contractor's Project Quality Plan shall identify the commitment, objectives, quality assurance procedures, organisation and structure and induction/training to ensure this level of Project monitoring.

(b) *Works Monitoring*

In respect of any lot or item of work, the treatment of all non-conformances shall comply with AS/NZS ISO 9002:1994 Clauses 4.13 and 4.14.

The Contractor shall obtain acceptance by the Superintendent of all dispositions affecting the Works proposing repair or use-as-is.

The Contractor shall maintain two registers of non-conformances, one for active non-conformances and one for resolved conformances. The register of active non-conformances shall show the following status of each non-conformance:

- (i) initial report raised and copied to the Superintendent;
- (ii) with Contractor for dispositioning;
- (iii) subsequent Corrective Action Requests raised;
- (iv) corrective action proposal with Superintendent or Contractor's Quality Representative (CQR) for acceptance;
- (v) corrective action proposal accepted but not implemented;
- (vi) Contractor doing corrective action;
- (vii) with CQR for verification of corrective action, copy to Superintendent; and
- (viii) non-conformance released, no further action.

The Contractor shall each week review the non-conformance register and submit an updated copy to the Superintendent.

Any nonconforming Works detected by personnel of either the Contractor or the Superintendent shall be reported to the Contractors Quality Representative, through a Non-conformance Report or a Corrective Action Request.

All nonconforming Works detected by the Contractor's Quality System shall be reported to the Superintendent as soon as practicable and within one (1) working day of the non-conformance being recognised using a Non-conformance Report. Non-conformance Reports and Corrective Action Requests shall be submitted with all records which indicate a departure from the requirements of the Contract.

The Contractor shall also immediately submit a Non-conformance Report if the Superintendent advises the Contractor, in writing, of non-conformance with a process or a specification requirement.

The submission of a non-conformance report shall constitute a Hold Point.

A Witness Point shall apply prior to covering up rectification work.

The Contractor shall advise the Superintendent in each Non-conformance Report the proposed disposition of the non-conformity and the corrective action to prevent the recurrence of the non-conformance. The proposed disposition shall include one of the following:

- (a) proposed additional Works to bring the lot up to the specified standard; or
- (b) replacement of all and/or part of the lot to bring it up to the specified standard; or
- (d) request for the utilisation of the non-conforming work when it is demonstrated to the satisfaction of the Superintendent that the work is satisfactory for its intended use.

All of the above options shall be subject to approval by the Superintendent. In options (a) and (b) after approval by the Superintendent of the proposed disposition, the reworked/replaced lot shall be subject to verification in the Project Quality Plan.

3.3.10 Preventive Action

The Contractor shall advise the Superintendent of any potential courses of non-conformity through a Corrective Action Request. Preventive actions are to be monitored as per disposition and corrective actions as specified in Clause 3.3.9.

The procedures for preventive action shall comply with the requirements of Clause 4.14.3 of AS/NZS ISO9002:1994.

3.3.11 Records of Contractor's Quality System

General

All records shall be stored and maintained such that they are retrievable in facilities that provide a suitable environment to prevent deterioration or damage, and to prevent loss.

The Contractor's records procedures shall ensure that all Contract records are duplicated and second copies are stored separately from the first copy for fire protection and loss prevention purposes. One set of records may be held by the Superintendent or Subcontractors provided such records are notified and recorded as such.

All records shall be properly and clearly indexed and filed. Updated copies of the Contractor's file index shall be copied to the Superintendent.

The record system shall contain at least the following:

- (a) records of ITPs;
- (b) records of non-conformances;
- (c) records of corrective and preventive actions;
- (d) records of audits;
- (e) original records of certification and approvals by statutory authorities;
- (f) certificates and warranties of manufacturers and suppliers;
- (g) material quality records and analyses; and
- (h) records of surveys.

The Contractor shall make all records available to the Superintendent at all reasonable times. Where requested by the Superintendent, the Contractor shall permit the Superintendent to copy all records.

As-Built Records

The Contractor shall establish procedures to progressively record and document the as-built construction details of the Works.

Such procedures shall include identification and traceability of all drawing amendments during the source of the Works including changes to shop drawings and all drawings issued for construction, cross referenced to relevant survey and records.

Each lot or groups of lots of the Works shall be subject to assessment for compilation onto as-built records.

3.3.12 Contractor's Quality Audits

The Contractor's Project Quality Plan shall include an internal audit plan in accordance with the requirements of Clause 4.17 of AS/NZS ISO9002:1994.

4. Environmental Protection

4.1 Environmental Management Plan

The Contractor is deemed responsible for the management of the environmental effects of the work and shall prepare, prior to commencement of work, an Environmental Management Plan (EMP) for approval by the Superintendent. The plan is to be a written report/table identifying environmental risks associated with the Works and shall address possible environmental impacts and detail procedures to prevent or mitigate such impacts as far as possible.

The EMP shall comply with the requirements of the Environmental Protection Authority's "Catchment and Land Protection Act 1994", the "Environmental Protection Act 1970", The Melbourne City Council Environment Local Law 1999, other Acts of Parliament, Regulations and State Environmental Protection Policies. In addition the Contractor will abide by all Ordinances, By-laws and any specific requirements of the responsible authorities for the administration of these Acts, Regulations, Ordinances and By-Laws. All environmental measures must take into account affected surrounding infrastructure.

The Environmental Protection Authority's Publication No. 480, "Environmental Guidelines for Major Construction Sites" can be used as a guide in the preparation of the Environmental Management Plan. Sections 4, 5, 6, 7 and 8 are recommended as a guide.

4.2 Scope of the Environmental Management Plan

4.2.1 Storage on Site

The Contractor shall store materials and equipment on Site so as to prevent damage to the Site and minimise hazards to persons, materials and equipment. The Contractor must keep storage areas in a neat and tidy manner.

All materials are to be stored only on the land of which the Contractor has possession for the execution of the Contract.

The Contractor must not use driveways, paths, lawns and garden beds, and the like for access or storage unless prior written approval by the Superintendent has been given.

At the completion of the Works, storage facilities shall be removed, or disposed of, and the area rehabilitated to not less than the pre-existing condition by the Contractor.

4.2.2 Noise and Vibration

The Contractor shall comply with the Environment Protection Authority's Noise Control Guidelines for Construction and Demolition Site Noise and ensure that noise from operations does not cause a nuisance as defined under the Health Act 1958. In particular, the EPA Guidelines require that the noise level at any

residential premises not exceed background noise by 10dB(A) after Contract commencement during the hours of:

- 6:00pm to 10:00pm Monday to Friday
- 1:00pm to 10:00pm Saturdays
- 7:00am to 10:00pm Sundays and public holidays

and that noise is inaudible within a habitable room of any residential premise between the hours of 10:00pm and 7:00am, Monday to Sunday.

To comply with these guidelines all plant and equipment supplied by the Contractor for use on the Works must be effectively 'sound-reduced' by means of silencers, mufflers, acoustic linings, shields, acoustic sheds or screens.

Noisy work shall not be undertaken in the vicinity of places of worship (eg churches, mosques etc) during worship services without the approval of the Superintendent.

When working in the vicinity of eating establishments or other businesses dependent on lunchtime trade, the Contractor shall cease, between the hours 12.00pm and 2.00pm every day, any excavation, demolition, saw cutting, jack hammering and other work generating noise and dust considered unacceptable by the Superintendent.

The Contractor shall take all reasonable and necessary precautions to protect services, structures and other property susceptible to damage from vibration.

4.2.3 Suppression of Dust

The Contractor shall take measures necessary to keep airborne dust to a minimum and to meet Victorian EPA Standards. No separate payment will be made for the suppression of dust.

If the Contractor fails to achieve adequate dust control, particularly where the safety and convenience of the public are affected, the Superintendent may take any action necessary and deduct the cost of such action from moneys due or becoming due to the Contractor.

The Superintendent may direct the suspension of work at any time where that work creates a dust hazard or nuisance to the public, personnel working on the site or property in the vicinity of the work. Where the Superintendent has directed a suspension of work and considers that the Contractor could not have been expected to have adequately controlled the dust, the Superintendent may consider an extension of time pursuant to the General Conditions of Contract. No claim for increased costs due to such suspension will be considered.

4.2.4 Site Cleanliness and Disposal of Refuse

The Contractor shall maintain a high standard of housekeeping and site cleanliness during the course of the Works. The Contractor shall, on a regular and frequent basis, remove from the site all refuse resulting from work under the Contract. Materials lost overboard from the Contractor's transit vehicles

shall be cleaned up to the satisfaction of the Superintendent and any local authorities.

For dropping refuse, the Contractor shall use hoppers and shutters, chutes or refuse buckets that are covered or of such a design as to confine the material completely and prevent dust emission.

All spoil from earthworks shall be removed by the Contractor from the Site.

4.2.5 Disposal of Contaminants

In the event that contaminated soil or other contaminants are encountered during the course of the Works the Contractor shall properly dispose of contaminants in accordance with all statutory and contractual requirements and from Site to approved locations or as otherwise directed by the Superintendent.

4.2.6 Installed Equipment

The Contractor shall protect installed equipment against damage by dust, dirt, shock or other causes.

4.2.7 The preservation of flora

The Contractor shall adequately protect from damage all trees, other plants and garden beds within or surrounding the Site. The Contractor is responsible for rectification of any damage to existing flora, including grassed areas and garden beds.

During the course of the Works all existing trees shall be protected in their entirety including roots, stems, trunks, bark, branches and foliage at all times such that:

- no damage is caused by lack of watering. The Contractor shall ensure that trees within the Site are adequately irrigated and not placed under undue stress. Existing irrigation systems servicing these trees shall be protected from damage. Prior to excavation, the Contractor shall contact the Superintendent to ascertain the location of any existing irrigation service.
- no damage is caused through chemical means including spraying of toxic materials or emission of fumes or by contamination of the soil.
- no damage is caused by deprivation of light, air or moisture as a result of covering, enclosing or coating any part of a tree or the soil surface within the drip lines of the tree.
- no damage is caused through physical means including cutting, breaking, bruising, heating or burning of plant parts or by compaction or removal of soil around the roots. The following minimum measures shall be taken to protect trees from physical damage:

The following minimum measures shall be taken to protect trees from physical damage:

- Excavation and trenching Works within 4.5m radius of a tree, as measured from the face of the tree, shall only be carried out with hand held equipment unless specifically approved by Council's Parks and Recreation or the Superintendent. No tree roots located within a 4.5m radius, measured from the face of the tree, shall be cut.
- The cutting of tree roots larger than 25mm diameter located outside a 4.5m radius, measured from the face of the tree, shall be carried out only when specifically approved by Superintendent and Council's Parks and Recreation.
- If tree roots are exposed within the 4.5 metre protection zone, they must be protected from drying out, especially during hot weather conditions. If the root system is to be exposed for more than one working day, the roots should be protected with wet hessian, burlap, mulch, woodchip or coarse sand. This mulch should be dampened prior to the heat of the day until the excavation is refilled with soil. Stockpiling, loading of building materials, disposal of waste and vehicular traffic should not occur within this protective zone.

4.2.8 Construction Drainage

The Contractor shall provide and construct such drains and take such other precautions as are necessary to protect the Works from damage due to the flow or collection of water and to prevent the ponding of water on or in any of the Works to be done under the Contract.

In locations where the disposal of water by gravity is not possible, the Contractor shall dispose of the water using adequate pumping equipment.

Such disposal of water shall take account of, and not adversely affect the adjacent flora and fauna reserve and the Principal's existing operations on the Site.

The contractor shall ensure that sediment laden runoff is prevented from entering the existing drainage system.

4.2.9 Storage and treatment of hazardous chemicals

Where chemicals or fuel are stored on site, the storage area shall be protected by bunds of sufficient size to retain any potential spillage. A contingency plan shall also be included as part of the Environmental Management Plan to contain, treat and dispose of, any spill

4.2.10 Site induction and training plan

The Contractor shall ensure that all site personnel including sub contractors are aware of how the EMP is to be implemented in relation to the Works, including emergency response procedures. The plan shall include personnel to be trained, training objectives and induction procedures.

4.2.11 Compliance

The Superintendent will inspect the Works and/or conduct periodic audits to measure the Contractor's compliance with the approved Environmental Management Plan. During the course of Works, the Superintendent may identify further environmental issues that need to be addressed by the Contractor for inclusion in the EMP.

The Contractor shall record and advise the Superintendent of all environmental complaints received in regard to the Works.

The costs of compliance with the requirements of this clause shall be included in the Contract lump sum.

5. Underground Services

5.1 General

The Contractor shall conduct a Melbourne One Call Survey (MOCS) or similar survey of all underground assets and services prior to commencing work on the site. The Contractor has a "Duty of Care" with respect to all services. For underground services the Contractor shall conduct a careful 'proving excavation' around all services in accordance with the service Authority's or Company's requirements prior to major work to ensure the safety of personnel and to maintain the integrity of the existing underground assets and services.

The Contractor shall inform the Superintendent as soon as he becomes aware of the possible need to encase, alter or relocate services. The Contractor shall advise the Superintendent and the responsible Authority or Company of the details and proposed actions. The Contractor shall be responsible for the costs to obtain the necessary approvals, or permits from the responsible Authority or Company.

The time of any such additional advice shall be the Contractor's responsibility and the Contractor is to organise his work program accordingly. The Contractor shall have no claim against the Principal for any loss or delay associated with work on or around any services.

The Contractor shall be responsible for any damage, which in the opinion of the Superintendent and the City Of Melbourne, has been caused to stormwater drains; other street furniture; council and private property; or utility services by any work or operations under the Contractor's control.

Where any damage is caused to work under the Contract by any fault that may develop in any stormwater drain or other utility service, the Contractor shall make arrangements with the appropriate Authority, Council or Company for any repairs to the service which may be necessary. The Contractor shall also make good the damage to the Works. The Contractor shall have no claim against the Principal for any loss or delay due to such damage.

5.2 Telstra Services

The Contractor shall arrange to have all managers or supervisors attend the Telstra Cable Awareness Presentation prior to commencing Works in the vicinity of Telstra infrastructure. This free 45 minute presentation can be arranged by contacting either:

Terry Prentice Team Leader Telstra Network Integrity Group Mobile: 0419 331 810	Con Andronis Manager Telstra Network Integrity Group Mobile: 0417 302 674
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6. Demolition

6.1 Scope

The Contractor shall demolish, remove, relocate, and reinstate items in accordance with the drawings and this Specification.

Where items are required to be demolished and removed from site, the Contractor shall:

- a) disconnect and cap all services connected to the item, in accordance with the requirements of the relevant statutory authority, and to the satisfaction of the Superintendent.
- b) dismantle, demolish and remove from site, all materials, components, rubbish and debris.

6.2 Standards, Codes and Referenced Specifications

6.2.1 Australian Standards

The following Australian Standards are referenced in this section of the Specification:

AS 2601 The Demolition of Structures

6.3 General Demolition Requirements

The Contractor shall carry out the Works as detailed on the drawings and Specification in a safe and satisfactory manner and in particular shall:

- Strictly conform to the requirements of any Act of Parliament and all regulations, by-laws or other orders made there under relating to the safety of persons on or about the site, or the conduct of the Works.
- Perform the Works in accordance with AS 2601-1991, The Demolition of Structures, excluding Clauses 2.3 and 3.7.1.3.
- Ensure that plant, all tackle, gear, staging, scaffolding, ladders, winding arrangements and other equipment used in connection with the Works shall not only conform to the requirements of any Statutory regulation in relation thereto but also to prudent practice and to the requirements of the Superintendent.
- Immediately discontinue any practice or remove any equipment considered likely to constitute a danger, notwithstanding that the Superintendent or other authorities may have previously approved such practice or equipment.
- Remove from the Works promptly any representative of a person, employed by the Contractor or any sub-contractor who shall create any danger on or about the Works, or misconduct himself, or be incompetent or negligent.

- Bind sub-contractors to accept and comply with all requirements of this Specification.

The use of explosives is forbidden in this Contract.

6.4 Environmental Protection

The Contractor shall observe and comply with all environmental requirements that apply to the area in which work under the Contract is to be carried out. The Contractor shall submit an Environmental Management Plan prior to receiving Works approval.

6.5 Safety

The Contractor shall be responsible for keeping the site safe at all times and shall comply in all respects with all statutory and other safety requirements. The Contractor shall be held liable for any accident caused as a result of appropriate safety precautions not being provided.

6.6 Removal of Rubbish

The Contractor shall remove all rubbish and debris from the site progressively as necessary or as directed by the Superintendent.

Areas where work is carried out are to be kept clean and tidy at all times, and the work shall be carried out in a safe and secure manner.

On completion, the Contractor shall ensure that the Works area is cleaned and surplus material, debris and the like have been removed, to the satisfaction of the Superintendent.

6.7 Protection of Services

The Contractor shall familiarise himself with all existing services prior to commencing work. The Contractor shall immediately notify the Superintendent in the event of damage to any water, gas, steam, compressed air, electric, drainage, sewerage, telephone, fire alarm or other services in the area. Costs of repairs to damaged services shall be the responsibility of the Contractor.

6.8 Bluestone Coping Stones

The Contractor shall replace at his own expense all bluestone coping stones damaged while undertaking the Works. Replaced stones are to match the existing.

7. Site Preparation & Earthworks

7.1 General

7.1.1 Scope

This section sets down requirements for Site Preparation and supply of all materials and construction of Earthworks associated with all pavements, stormwater and subsoil drainage and bulk earthworks.

7.1.2 Standards, Codes & Referenced Specifications

Australian Standards: The following Australian Standards are referenced in this section of the Specification:

AS 1152 Test Sieves
AS 1289 Methods of testing soils for engineering purposes
AS 3500 National Plumbing and Drainage Code.
AS 3500.3 Stormwater Drainage

7.1.3 Definitions

Standard Relative Compaction: "Standard Relative Compaction" is defined as the ratio, expressed as a percentage, of the dry density of the material in its in-situ condition to the dry density of the same material when compacted at optimum moisture content as determined by the laboratory compaction test described and defined by AS 1289 5.1.1 (Standard Maximum Dry Density).

Modified Relative Compaction: "Modified Relative Compaction" is defined as for standard relative compaction except that the laboratory compaction test shall be that described and defined by AS 1289 5.2.1 (Modified Maximum Dry Density).

Optimum Moisture Content: "Optimum Moisture Content" is the moisture content of a soil which a specified amount and type of compactive effort will produce the maximum dry density.

Pavement Subgrade Level: "Pavement Subgrade Level" shall mean the level of completed earthwork including excavation, filling, compaction, trimming, and the like required to bring the proposed pavements and topsoiled areas to the level, line and profile of the pavements or topsoil shown or directed by the Superintendent.

Earthworks Formation Level: "Earthworks Formation Level" shall mean the level required to bring the completed earthworks, including excavation, filling, compaction, trimming, and the like, to the finished design levels, lines and profiles of the upper surface of the construction as shown or as directed by the Superintendent.

Approved: Shall in all cases mean approval by the Superintendent.

7.2 Materials

No earthworks materials are defined in this specification.

7.3 Construction

7.3.1 General

The Contractor shall perform the work in such manner as not to harm the undisturbed condition of the underlaying or adjacent soils or damage filling or prevent the proper placement of fill. Should any existing soil structures be damaged or disturbed due to lack of precaution on the part of the Contractor and such damage or disturbance may, in the opinion of the Superintendent, preclude the utilisation of the site as planned, the Contractor shall make good such damage or disturbance. The cost of any consequent repairs or modifications will be deemed to be included in the Contract Sum or Rates.

7.3.2 Diverting Water & De-Watering

Further to the general requirements of this Specification, the Contractor shall carry out all work necessary to divert surface water and to keep trenches and other excavations free of water. If so directed by the Superintendent the Contractor shall carry out diversion Works before commencing excavation.

Any work or material damaged by water shall be made good by the Contractor at his sole expense.

7.3.3 Demolition & Grubbing

Unrequired materials or structures shall be demolished and cleared from the site to a depth of 150mm below either the existing ground surface, or earthworks foundation level, whichever is the lower.

Holes remaining after the demolition and clearing shall be backfilled to the level of the existing ground surface or the earthworks formation level whichever is the lower with Engineered Fill compacted in layers not greater than 150mm loose thickness to not less than 95 percent Standard Relative Compaction.

7.3.4 Disposal of Materials

Excavated material not required in the Works shall not be disposed of off-site unless otherwise directed by the Superintendent. The cost of this work shall be deemed to be included in the Contract Sum or Rates.

7.3.5 Excavation

The Contractor shall excavate to depths and widths as necessary to construct all Works under the Contract to the lines and levels as specified or shown.

Where the undisturbed condition of the natural material forming the excavation bottom is inadequate for the support of the planned structure or Works, the Contractor shall over-excavate to expose adequate support material and shall

backfill the excavated space to the proper level as specified in the following sub-clause.

Over-excavation shall be backfilled with Engineered Fill as directed by the Superintendent and in accordance with the relevant sections of this Specification.

Should excavation be required below the lines and levels because of the Contractor's operations, the Contractor shall carry out the additional excavation and refill required, and the cost of this work will be deemed to be included in the Contract Sum or Rates.

The Contractor shall leave a minimum clear distance of 3.0m or as directed between the edge of any excavation and the inner toe of an adjacent spoil bank. No fine or coarse aggregate, cement or other material shall not be stacked within one metre of the edge of any excavation.

7.3.6 Shoring & Stability

The work shall proceed in a careful, secure and safe manner with due precaution against accidents. The Contractor shall carry out shoring of trenches and other excavations in accordance with all relevant requirements of Authorities having jurisdiction. The work shall be carried out in accordance with the requirements for safety as stipulated in AS 3500.3.

The Superintendent may order the provision of additional support at the Contractor's expense. Compliance with such order or the omission of the Superintendent to make such an order shall not relieve the Contractor of his sole responsibility for the adequacy of such support.

7.3.7 Fill Locations

Engineered Fill: Engineered Fill shall be used under pavements.

7.3.8 Fill Construction

Each fill or zone of fill shall be raised uniformly over its full length and breadth in approximately horizontal layers and each layer thoroughly compacted to the specified density.

Compaction shall be achieved by the use of approved mechanical equipment suitable for the type of material being placed, the degree of compaction required and the location of the material being compacted.

During compaction, the moisture content of the materials shall be maintained within the range minus 2 percent to plus 1 percent of optimum moisture content.

If any in-situ or filled surface is too dry for compaction as specified it shall be worked and carefully wetted as necessary to achieve a homogenous material with uniform moisture content within the specified range prior to compaction.

If any in-situ or filled surface is too wet for compaction as specified it shall be worked as necessary to dry the material sufficiently to achieve a homogenous material with uniform moisture content within the specified range prior to compaction.

Engineered or General Fill: Engineered or General Fill shall be placed, spread and compacted in layers not exceeding 150mm loose thickness. Each layer as it is placed shall be compacted to 98 percent Standard Relative Compaction before the succeeding layer is placed, except the top 150mm shall be compacted to 100 percent Standard Relative Compaction.

7.3.9 Earthworks for Paved Areas

General: After surface stripping has been completed the Contractor shall progressively excavate and fill to the required lines, levels and cross-sections as required for construction of the paved areas detailed. The bottom of excavations shall be carefully trimmed so as to be free from changes in level greater than 50mm and the top 150mm of the in-situ subgrade shall be compacted to a density of not less than 100 percent Standard Relative Compaction. Rock, boulders and floaters shall be removed to a minimum depth of 150mm below the formation surface and the excavated space filled with compacted material as specified. Where the formation level of a paved area lies above the stripped surface of the ground, fill shall be placed and compacted as detailed and specified.

Compaction: Compaction of backfill within one metre of footings, walls, slabs or other structures shall be by hand-held motorised compaction equipment. Where fill is to be placed against both sides of footings, walls or other structures the Contractor shall raise the fill on opposite sides of the structures equally and compact the fill simultaneously with similar equipment. Where fill is to be placed against one side only of footings, walls or other structures the Contractor shall support such structures to prevent overloading.

8. Concrete for Siteworks

8.1 General

8.1.1 Scope

This section sets down requirements for supplying and placing Portland Cement concrete for site work structures such as pits, drains, footings, or similar.

8.1.2 Standards, Codes & Referenced Specifications

Australian Standards: The following Australian Standards are referenced in this section of the Specification:

AS 1012	Methods of testing concrete
AS 1302	Steel reinforcing bars for concrete
AS 1303	Steel reinforcing wire for concrete
AS 1304	Welded wire reinforcing fabric for concrete
AS 3972	Portland and Blended Cements
AS 1379	The specification and manufacture of concrete
AS 2758	Aggregates and rock for engineering purposes
AS 2758.1	Concrete aggregates
AS 3600	Concrete structures
AS 3610	Formwork for Concrete

Specification Sections: The following specification section is referenced in this section of the Specification:

Section 7 - Site Preparation & Earthworks

8.2 Materials

8.2.1 General

Cement shall be normal Portland Cement Type GP complying with AS 3972.

Fine Aggregate shall conform to the requirements of AS 2758 and shall be graded within the limits shown in Table 4.

Coarse Aggregate shall comply with the requirements of AS 2758 and shall be graded within the limits shown in Table 6 for 20mm graded aggregate.

Water shall be clean fresh water obtained from the mains supply and free from all substances harmful to concrete and reinforcement.

Ready Mixed Concrete shall comply with the requirements of AS 1379.

Steel reinforcement shall comply with the relevant standards AS 1302, AS 1303 and AS 1304 and shall be thoroughly cleaned of rust, scale and any other coating which may destroy bond with the concrete.

Cement grout shall consist of cement and water mixed to form a creamy consistency.

8.2.2 Admixtures

The use of admixtures shall be subject to the approval of the Superintendent.

The Contractor shall submit to the Superintendent details of the proposed source and nature of any admixtures and the proposed amount to be added.

Admixtures shall conform with the requirements of AS 1478 and shall not reduce the strength of the concrete below that specified. Admixtures shall not contain chlorides, chlorine, sulphur, sulphides or sulphites or any other substance detrimental to concrete or steel.

8.2.3 Reinforcement

Reinforcement shall comply with the requirements of AS 1302, AS 1303, AS 1304 and AS 3600.

Reinforcement shall be supplied and stored on site so that they remain free from loose mill scale, loose rust, mud, oil grease and other non-metallic coatings that would reduce the bond between the concrete and the reinforcement.

8.2.4 Concrete Properties

Concrete for site Works shall have a characteristic strength of 32MPa unless noted otherwise on the drawings. Concrete shall comply with mix designs submitted at least two weeks prior to the intended day for placement of any concrete, and approved by the Superintendent.

Cement, sand, coarse aggregate and water shall be mixed in proportions which will achieve at least the compressive strengths specified when tested in an independent NATA registered laboratory in accordance with AS 3600.

Concrete slump shall be 60mm maximum for manually placed concrete and shall be tested in accordance with AS 1012 Part 3.

Concrete shall be mixed off the site in an approved central plant and transported to the site in a premixed condition using specifically constructed transit vehicles and shall conform with the requirements of AS 1379 unless otherwise approved.

Notwithstanding the provisions of AS 1379, all concrete shall be completely discharged within 60 minutes of the introduction of the cement to either the aggregates or the mixer.

There shall be no addition of water or any other material to the concrete at the Site without the approval of the Superintendent.

8.3 Construction

8.3.1 General

Concrete work shall be constructed accurately in locations and to the dimensions and details shown.

The preparation of formation surfaces onto which concrete is to be poured shall be in accordance with the requirements of Section 7 of this specification, "Site Preparation and Earthworks".

8.3.2 Formwork

The design, fabrication, erection and strutting of formwork and falsework shall be in accordance with the requirements of AS 3610.

Formwork shall conform to the shape, lines, levels and dimensions required in the finished structure and shall be constructed of approved timber or metal. Forms shall be clean, substantial and the inside left clean, smooth, watertight and of sufficient strength to resist springing out of shape during and after the placing of concrete. Bluestone or pre-cast concrete kerbing may be used for forming the platforms. Bluestone units used thus must be placed in their final position and thoroughly clean. The concrete supporting the units must be substantially cured prior to using the kerbstones as formwork.

Dirt, chips, sawdust, nails or other foreign material shall be completely removed before any concrete is deposited. Before concrete is placed in forms, inside surfaces of the forms shall be thoroughly coated with oil or other approved agent that will permit the ready release of the forms and will not discolour or damage the concrete. Inside surfaces of kerbstone units used as formwork shall not be coated with a debonding agent.

Unless otherwise shown, forms shall be chamfered for re-entrant angles and filleted for corners. The face of the bevel in each case shall be 20mm. Core holes and embedded items shall be installed where shown.

The formwork for each monolithic section of the work shall be completely constructed before concreting of that section is commenced.

Immediately before placing concrete, the forms shall be thoroughly wetted with water. Forms shall not be removed until the concrete has adequately hardened.

8.3.3 Placing of Reinforcement

Reinforcement shall be formed to the dimension and shapes shown in accordance with the requirements of AS 3600. Reinforcement shall be accurately placed in the positions shown and shall be securely held in position by wiring, or blocking from the forms and wired together at alternate intersections with annealed iron wire of not less than 1.6mm diameter so that it will not be displaced during the placing and compacting of concrete. Welding, tack welding or heating of reinforcement is prohibited.

Metal supports that extend to the surface of the concrete and wooden supports shall not be used. Placing bars on layers of fresh concrete as the

work progresses and adjusting bars during placing of concrete shall not be permitted. Where necessary the reinforcement shall be spliced with the following minimum lap:

1. Steel reinforcement - 40 times nominal diameter of bar.
2. Steel fabric reinforcement - 500mm measured between outer most wire of each sheet.

Unless otherwise shown, the minimum clear cover to reinforcement shall be 1.5 times the diameter of the bars with a minimum of 30mm.

All steel reinforcing shall be provided with an electrical earth by means of suitable tie wire distribution and connections into the earthing system. The Contractor shall ensure that all reinforcing is electrically continuous and suitable lugs are provided at regular intervals for this purpose. The reinforcing contractor shall coordinate with the electrical contractor to ensure reinforcing is adequately tied into the earthing system.

8.3.4 Placing of Concrete

Concrete shall be transported and placed in accordance with the requirements of AS 3600.

Concrete shall be placed continuously against fresh concrete between approved or specified construction joints to form a monolithic section. Concrete shall be deposited as nearly as practicable in its final position. Free dropping of concrete from a height greater than 1200mm or depositing a large quantity to be worked along the forms for excessive distances shall not be permitted. Concrete shall be placed and compacted in such a manner as not to displace any reinforcement.

Concrete which has developed its initial set, or which is not placed in the forms and compacted within 20 minutes after discharge from the mixer, or which has been contaminated by foreign materials, shall not be used.

Placing of concrete shall not be commenced while the ambient air temperature is less than 5°C or higher than 32°C without permission from the Superintendent.

8.3.5 Compaction of Concrete

During and immediately after placing, concrete in formwork shall be compacted with approved high frequency needle vibrators and tamped. Finished concrete shall fill formwork with a dense homogenous mixture entirely free of voids.

Sufficient vibrators, including standby vibrators, must be available on the site prior to the commencement of concreting. Vibrations shall not be applied directly or through the reinforcement to sections or layers of concrete which have hardened to the degree that the concrete ceases to be plastic under

vibration. Vibration shall be of sufficient duration and intensity to thoroughly compact the concrete, but shall not be continued so as to cause segregation.

8.3.6 Construction Joints

Wherever concrete placing has stopped, and concrete has taken its initial set, this joint shall be deemed a construction joint. The location and detail of construction joints shall be as required or approved by the Superintendent.

In the event of any emergency necessitating a special construction joint, mixing and concreting shall proceed until a location for the special construction joint approved by the Superintendent is reached. The placing of concrete shall proceed continuously from joint to joint.

Before placing new concrete against concrete that has set, the forms shall be tightened and the surface of the set concrete shall be roughened, cleaned of foreign matter, laitance and loose or porous material. The surface shall be covered uniformly with a thin coat of cement grout and concreting shall proceed immediately.

8.3.7 Protection & Curing

Exposed faces of freshly placed concrete shall be protected against loss of moisture or damage by rain, by covering with polythene film, wet hessian or other approved material, immediately following the finishing operation. The protection shall be maintained in place for a curing period of seven days, unless a shorter period is authorised by the Superintendent. Concrete surfaces not covered shall be kept moist by flushing or sprinkling.

Throughout the curing period hessian or similar covering shall be continuously maintained in a wet condition while waterproof coverings such as polythene shall be removed once each day and the concrete surface thoroughly wetted.

The concrete temperature of the surface of the setting concrete shall be maintained above 5°C.

Pedestrian traffic shall not be permitted on fresh concrete for a period of at least 24 hours nor vehicle traffic for a period of at least seven days. The Contractor shall provide, erect and maintain all necessary barriers, flags etc. to ensure traffic is controlled.

8.3.8 Finishing

Concrete surfaces shall be true and even, free from honeycombed surface, depressions or projections. Unless otherwise noted, unexposed formed surfaces not specified to be rendered shall be given a Class 4 finish, and all exposed surfaces not specified to be rendered shall be given a Class 3 finish as specified in AS 3610.

8.4 Quality Assurance

8.4.1 Requirements

The Contractor shall implement a quality Assurance programme in accordance with Section 3 of this Specification.

This programme shall comprise Pre-Commencement, Production and Process Control and Post-Construction phases as defined below:

8.4.2 Phase A – Pre-Commencement

Supply of Information on Materials Sources

The following information shall be supplied for the concrete:

- the supplier of the concrete;
- location of the ready mix concrete plant;
- a statement providing details of the concrete mix to be used.

8.4.3 Phase B – Production and Process Control

Programme

The Contractor's production and process control programme shall consist of sampling and testing the materials and product, and a continuous assessment of the adequacy of the production control. The Contractor is responsible for designing and implementing a control program which provides adequate and effective control over the Works, however the minimum amount of control testing that shall be undertaken is set out in this section of the Specification.

The Contractor shall keep a record upon a plan of the Works, of where each work shift's production has been incorporated in the Works.

Strength of Concrete

Concrete tested for strength as specified shall be assessed for compliance with the rules for Production Assessment of strength grade as detailed in Section 6.3 of AS1379.

8.4.4 Phase C – Post-Construction

Tolerances

The deviation of any point on the surface of a concrete element from its position in space as shown shall not exceed 5mm.

The relative deviation of any two points on the surfaces of the concrete element from the position shown or directed shall not exceed 2.5mm.

The misalignment between face linings at the joints in the formwork facing panels and the size of fins and recesses at joints resulting from the formwork joint sealer not being flush with the formed surfaces shall not exceed 2.0mm.

Quality Assurance Records

Within 3 weeks of completion of the Works, the Contractor shall supply two copies of a report detailing the results of all quality control and testing undertaken.

8.4.5 Non-Conforming Materials and Work

Any lot, which does not meet all the requirements of this Specification, shall be rejected.

All non-conforming materials and work shall be repaired or replaced so that the Works meet all the requirements of this Specification.

9. Asphalt Paving

9.1 General

9.1.1 Scope

This section describes the supply, placing and compacting of asphalt paving to the details and locations as shown on the Drawings..

9.1.2 Standards, Codes & Referenced Specifications

Australian Standards: The following Australian Standard is referenced in this Specification section:

AS 1160	Bitumen emulsions for construction and maintenance of pavements
AS 2008	Residual Bitumen for Pavements
AS 2150	Asphalt (Hot Mixed)
AS 2157	Cutback bitumen

Referenced Specifications: The following Standard Specification as published by VicRoads, 60 Denmark Street, Kew, Victoria 3101, is referenced in this Specification section:

Section 407 - Asphalt

9.2 Materials

9.2.1 General

Materials to be used in asphalt paving shall comply with the requirements of VicRoads Standard Specification Section 407 for Type N.

9.2.2 Prime Coat

Prime coat shall consist of approved cationic bituminous emulsion, cutback bitumen grade AMCO complying with AS 2157 or other grade of cutback bitumen or crude tar. The Contractor shall submit the choice of prime coat material and Supplier to the Superintendent for approval.

9.2.3 Binder

Binder shall be residual bitumen complying with AS 2008.

9.2.4 Asphalt

Asphalt material shall comply with VicRoads Standard Specification 407. It shall be designated by a nominal size corresponding approximately to the maximum aggregate size.

The Contractor shall submit to the Superintendent, more than 14 days prior to the intention to place asphalt, a complete description of the materials proposed to be used for asphalt Works. The submission shall contain, but not be limited to, the following:

1. Evidence that the asphalt has been used within the preceding three months by VicRoads (only in the event of asphalt works being required on Whitehorse Road).
2. Written evidence from the asphalt Supplier to indicate compliance of the job unit with the above requirements.
3. Any other information listed in VicRoads Standard Specification Section 407 which may be required by the Superintendent.

9.2.5 Tack Coat

Tack coat shall consist of cationic bitumen emulsion complying with Australian Standard AS 1160 diluted with water as directed by the Superintendent. It shall be rapid breaking type.

9.3 Construction

9.3.1 General

The Contractor shall submit to the Superintendent for approval the complete description of the methods and equipment proposes to be used for constructing asphalt paving. The proposed methods and equipment shall generally comply with the requirements of VicRoads Standard Specification Section 407.

9.3.2 Surface Preparation

Crushed rock pavement surfaces shall be moist and shall be thoroughly cleaned of all foreign and loose matter by brooming or other suitable means immediately prior to priming.

Adjacent concrete work and other surfaces shall be effectively covered before spraying.

9.3.3 Priming

The Contractor shall apply a prime coat to the crushed rock surface.

Cutback bitumen primer of grade AMCO shall be applied at a spraying temperature between 35°C and 55°C.

Spraying shall be carried out using an approved mechanical sprayer at the approved rate which will be between 0.50 and 0.80L/m².

Priming shall not be carried out when the shade temperature is less than 15°C, when rain is imminent, or when the surface is too dry. The Contract Sum will be deemed to include moistening dry surfaces prior to priming.

Pockets of surplus primer shall be distributed over surrounding areas by brooming. No bituminous surfacing shall be laid on priming until it is thoroughly dry and cured.

9.3.4 Asphalt Paving

Asphalt paving shall be laid in accordance with VicRoads Standard Specification Section 407.

9.3.5 Tack Coat

Where a previously primed surface or binder course has become contaminated, dirty or otherwise deteriorated, the Superintendent may require such areas to be tack coated. The cost of this work will be deemed to be included in the Contract Sum.

The tack coat shall be applied uniformly and thinly over the area to be treated immediately prior to asphaltting. It shall be applied only to a cleaned, near dry surface at a rate as directed by the Superintendent.

When spraying the tack coat, a shield shall be used and all necessary precautions taken to protect adjoining surfaces, structures, parked vehicles and traffic.

No bituminous surfacing shall be laid on tack coat until the emulsion has broken and the water has been substantially evaporated.

9.4 Inspection & Testing

9.4.1 Tolerances

General: Each layer shall, after final compaction, conform within the following limits to lines, levels, grades, thicknesses and cross-sections specified or shown on the Drawings or directed by the Superintendent.

Level: The top of each layer shall not vary from the specified level by more than 10mm, except that where asphalt is placed against kerb and channel or spoon drain the surface at the edge of the wearing course shall be flush with or not more than 5mm above the lip of the channel.

Thickness: The thickness of each layer of asphalt shall not be less than specified or shown on the Drawings.

Shape: No point on the finished surface shall lie more than 4mm below a 3m straight edge laid either parallel to the centreline of the pavement or, except on crowned sections, at right angles to the centreline.

9.4.2 General

Testing shall be in accordance with VicRoads Standard Specification Section 407 or as directed by the Superintendent.

If any rework is required it shall be carried out by the Contractor, at the Contractor's expense.

10. Granite Paving

10.1 General

10.1.1 Scope

This section specifies the requirements for paving tram platforms, footpaths and roadways using granite pavers.

10.1.2 Standards, Codes and Referenced Specifications

Australian Standards: The following Australian Standards are referenced in this section of the Specification:

AS 1289	Methods of Testing Soils for Engineering Purposes
AS 4586	Slip Resistance Classification of New Pedestrian Surface Materials
HB 197	An introductory guide to the slip resistance of pedestrian surface materials
AS3972	Portland and blended cements

10.2 Materials

10.2.1 Granite Pavers

Granite pavers shall be supplied to the site by others. The Contractor shall unload the paver units from the supplier's vehicle on-site, using his own unloading equipment. Upon delivery, the Contractor shall take possession of the paver units and shall be responsible for all breakage or other damage to the pavers, including that which occurs during unloading.

The supplied pavers and kerb consists of:

- 295 x 295 x 25mm thick, burgundy flame

NB All remaining granite pavers are to be returned to E-gate.

The contact for the paver supply is:

Ross Leslie	ITALPRO ENTERPRISES (Aust)
Manager	Rob Mannix (Tactile Supply only)
Granite Works (Granite Pavers only)	362-364 Boundary Road
Ph: 9813 5999	Dingley Victoria, 3172
Fax: 9813 5399	0407 110 181

NOTE: The contractor is to install all tactiles to match the paving grid.

10.2.2 Bedding Sand

Bedding sand shall be natural or manufactured (crushed) material, complying with the properties herein specified.

The particle size distribution of the sand when tested in accordance with AS 1289 shall comply with the limits listed in the table below and shall be free from all clay, dirt, organic and other deleterious matter.

AS Sieve Size (mm)	Percentage Passing by Mass
9.5	100
4.75	95-100
2.36	80-100
1.18	50-85
0.600	25-60
0.300	10-30
0.150	5-15
0.075	0-10

Single size or gap-graded sands, or sand containing an excess amount of fines shall not be used. The sand particles shall be sharp, not rounded. Sand shall be washed free of soluble salts or other contaminants which can cause or contribute to efflorescence.

Jointing sand shall be triple washed, and shall all pass the 1.18mm sieve with 10-20% passing the 0.075mm sieve. Bedding sand shall not be used for joint filling.

Brick sand shall conform to industry standards.

10.2.3 Cement

Cement shall be normal Portland Cement Type GP complying with AS 3972.

10.2.4 Water

Water used for mixing mortar, grout or slurry materials shall be clean, fresh and free from injurious amounts of oil, acid, salt, alkali, organic matter, or other deleterious substances. Water approved by Public Health Authorities for domestic consumption will be accepted for use without being tested. Water of questionable quality shall be tested prior to use in the work.

10.2.5 Bedding Mortar

The mortar bed shall consist of, in measures by volume;

- 2 parts Bedding Sand
- 1 part Brick Sand
- 1 part Portland Cement Type GP

Mixing shall be performed in a cement mixer, free of fresh or loose mortar residues, by adding the aggregates to the liquid (which shall initially be proportioned as one part by volume) whilst mixing continuously to ensure a homogeneous consistency free of lumps.

Water may be added in specified proportions to impart to the mix a consistency such that it may be loosely hand shaped into a “cricket ball” which will remain whole when released whilst leaving hand slightly moist (not wet).

The amount of mix shall not exceed the quantity to lay pavers within 45-60 minutes, depending on climatic conditions.

All components shall be measured by means of calibrated containers.

10.2.6 Bonding Slurry

A bonding slurry shall be applied at the interface of the in-situ concrete base and the bedding mortar and at the interface of the bedding mortar and the paver.

The bonding slurry shall consist of, in measures by volume;

1 part Bedding Sand
6 parts Portland Cement Type GP

Mixing shall be performed either by hand, using a clean container and mixing tool, or in a cement mixer by adding sand and cement to the liquid (which shall be initially proportioned as one part by volume) whilst mixing continuously to ensure a smooth, homogeneous consistency, free of lumps.

The amount of mix shall not exceed the quantity to lay pavers within 45 to 60 minutes, depending on climatic conditions.

All components shall be measured by means of calibrated containers.

10.2.7 Joint Material

The joints between Granite Pavers shall be filled with a machine mixed grout, comprising by weight of 16% cement, 16% stonedust, 67% jointing sand and 1% lime or similar. Grout colour, composition and supplier shall be selected by the Contractor, but approved by the Superintendent prior to use.

Hand mixed grout shall not be used to fill joints.

10.3 Construction

10.3.1 General - Granite Paving

Granite tile paving units shall be laid on a 25mm nominal thickness mortar bed over a concrete base pavement in accordance with the Drawings and this Specification.

10.3.2 Paving Layout

Paving units shall be laid perpendicular to the alignment of the tram side edge kerb and in the pattern shown on the Drawings. The Contractor shall be responsible for setting out control lines to ensure the paving is not out of square before laying. Where paving patterns appear ambiguous or the pattern does not fit in practice as shown on the Drawings, the Contractor must clarify the final layout with the Superintendent prior to laying.

10.3.3 Surface Finish

All surfaces shall be finished in conformity with the lines, grades and cross sections shown on the drawings or specified within the following limits:

- Paving shall be shaped to match the level of existing fixtures, (e.g. pit covers, kerb, edging, existing building line) to within 2 mm. Elsewhere the deviation of the finished work from line or level shall not exceed 5 mm at any point, and the rate of change of deviation from line or level shall not exceed 5 mm in 10 m or 0 mm between adjacent blocks. Except on curves or in shaped areas, the deviation of the finished work from a 3 m straightedge shall not exceed 3 mm at any point.
- Unless otherwise specified, all paving shall be shaped to shed surface water from the entire paved area in the direction of natural slope or towards constructed surface drains. The slope at any point on the paving except on a ridge shall be not less than 1%. The surface shall set to fall away from items such as payphones, ticket machines and Real Time Information (RTI) units on all sides of the item.

10.3.4 Laying Granite Paving Units

Tile paving units shall be:

- fully bedded in a sand/cement mortar mix of a nominal compacted thickness of 15mm and a maximum compacted thickness of 25mm;
- placed with a 5 to 6mm wide joint between units
- laid within 1 hour from the time the cement is mixed with the sand and
- laid in accordance with the following installation procedure:
 1. Sweep the concrete base pavement and remove all foreign materials
 2. Dampen the concrete base pavement with clean water. Using a hand broom, apply the slurry mix, approx. 1mm thick, to the base pavement area about to be paved
 3. With the slurry still wet, place the mortar mix into position and loosely screed so that combined bed and stone thickness is higher than desired surface level by approximately 5mm
 4. Bed down dry stone (moist is acceptable but not soaked) and hit evenly over whole stone surface with a rubber mallet to approximately 2mm higher than desired finished surface level
 5. Remove stone, by means of lifting tool or by hand, fill voids with additional mortar and then loosen up bed slightly by criss-crossing hand trowel through bed
 6. Apply coating of slurry to underside of the paver ensuring that the initial application is stiffly brushed into the stone in a rotating motion, and build up slurry to approximately 1mm thickness
 7. Bed down stone as per step (5) to finished surface level.
 8. Fill any voids with mortar at front edge and/or front corners of stone with a trowel

10.3.5 Grouting of Joints

Joints between tile paving units shall be grouted, no less than 12 hours after paving, in accordance with the following procedure:

1. Remove all foreign materials within the joints

2. Dampen joints with sponge and pour grout mix into joints ensuring full penetration for the thickness of the paving slab by lightly tamping down a trowel edge into the grouting mix
3. Using a rubber squeegee or similar tool, spread grout evenly into all joints until filled flush with the top of the paving unit
4. Remove excess grout, allow initial set and lightly broom off remaining excess perpendicular to joints
5. Wipe paving units clean with damp sponge
6. The grout colour is to match the colour of the pavers it abuts. A sample is to be prepared for inspection and approval by the superintendent.

10.3.6 Cutting and Grinding

The Contractor is deemed to have made due allowance in his tender price for the cutting of paving units at and around covers, trees surrounds, kerbs, building line, platform furniture and access ramps etc and the grinding of paved surfaces to eliminate lips between paving units, particularly at grade transitions. Paving units shall be cut and ground wet to control dust. Diagonal cuts in paving shall not be permitted unless approved by the Superintendent. All excess paving units are to be returned to Yarra Trams' Infrastructure compound at the Contractors' expense.

10.3.7 Opening of Pavement to Pedestrians

The Contractor shall prevent public access to the platforms and other paved areas until all Works by the Principal's sub-contractors are complete, and all paving is complete.

Prior to acceptance for opening to pedestrians all surfaces and pavement structures shall be true to levels, grades, thicknesses and cross-sections shown on the Drawings. All pavements shall be finished to lines and levels nominated to ensure positive drainage to all drainage outlets.

Pedestrian traffic shall be prevented from accessing paved areas within the first 24 hours of curing. No vehicular traffic shall be allowed on the finished pavement.

10.4 Quality Assurance

10.4.1 Requirements

The Contractor shall implement a Quality Assurance program in accordance with Section 3 of this Specification.

This program shall comprise Pre-Commencement Phase, Production and Process Control and Post-Construction phases as defined below:

10.4.2 Pre-Commencement Phase

Supply of Information on Materials Sources

The following information shall be supplied to the Superintendent for the material:

- supplier of paving units
- delivery program for paving units
- supplier of grout material

10.4.3 Production and Process Control Phase

Program

The Contractor's production and process control program shall consist of sampling and testing the materials and product, and a continuous assessment of the adequacy of the production control. The Contractor is responsible for designing and implementing a control program which provides adequate and effective control over the Works, however the minimum amount of control testing that shall be undertaken is set out in this section of the Specification.

The Contractor shall keep a record upon a plan of the Works, of where each work shift's production has been incorporated in the Works.

The finished surface shall be tested for smoothness by the Contractor using hand-held straight edges as soon as possible after completion or as required but not later than the next working day following completion of the block paving. Joints at service intrusions, etc., and joints between the block paving and edge restraints shall be tested immediately on completion using the hand-held straight edge.

Straight edge tests shall be carried out as directed on longitudinal lines parallel to each other and to the centreline of the pavement at not more than two (2) metre intervals.

The transverse smoothness shall be tested at right angles to the centreline of the pavement using a hand-held straight edge at two metre intervals or as directed.

10.4.4 Post-Construction Phase

Tolerances

General

Each layer shall, after final completion, conform within the following limits to lines, levels, grades, thicknesses and cross-sections specified or shown on the drawings.

Level

The top of each layer shall not vary from the specified level by more than 5mm.

Shape

No point on the finished surface shall lie more than 3mm below a 3m straight edge laid in either the longitudinal or transverse direction of the pavement.

Quality Assurance Records

Within 1 weeks of completion of the Works, the Contractor shall supply two copies of a report detailing the results of all quality control and testing undertaken.

Non-Conforming Materials and Work

All non-conforming materials and work shall be repaired or replaced so that the Works meet all the requirements of this Specification.

Warranties

The Contractor shall submit to the Superintendent after completion of Works, any warranties associated with pavers, grout or other materials used in the Works.

11. Street Furniture

11.1 General

11.1.1 Scope

This Section specifies requirements for the supply and installation of street furniture items for this Contract.

11.2 Materials

11.2.1 Fabrication and Approved Suppliers

Furniture items shall be fabricated in accordance with the drawings specified in the table below. The table and list below includes the names of "Approved Suppliers" who have previously achieved "The Approved Standard" on a prototype for a particular item and have a previous benchmark sample by which to measure by for this Contract.

In the event that the Contractor nominates an alternative supplier, the Contractor shall allow for the fabrication of one (1) complete prototype, including all fittings, for approval by the Superintendent prior to completing the remainder of the work. The prototype approved by the Superintendent (in writing) will be deemed the "The Approved Standard" and will be used as the benchmark for every other supplied item. The Superintendent will reject items that do not conform with "The Approved Standard"

Item Description	Approved Supplier/s
MCC 80 Litre Rubbish Bin (<i>square – powder coat finish ultra silver 610</i>) Interpon	C
Audio Bollard – <i>Powder coat finish, ultra silver 610- interpon</i>	

Approved Suppliers of Street Furniture & other Standard Infrastructure Items

The following suppliers have achieved "The Approved Standard" on a prototype for a particular item and have a previous benchmark sample by which to measure by for this Contract.

- C. Bromax Fabrications**
PO Box 697
CROYDON VIC 3156
Tel (03) 9720 5099

11.3 Construction

11.3.1 Handling and Storage of New and Existing Street Furniture

Where applicable, the Contractor shall remove any existing street furniture, inclusive of light poles, with care and return to Whitehorse City Council.

The Contractor shall be responsible for the security, handling and storage of street furniture and shall be liable for any damage caused during its removal, handling, storage and installation.

11.3.2 Installation

Street furniture shall be installed in the positions shown on the Drawings or as directed by the Superintendent. The Contractor shall contact the Superintendent two days prior to commencement of street furniture installation to confirm the final exact locations of all new street furniture.

Poles and street furniture posts, legs and sockets shall be set vertically to within a tolerance of 1 in 250.

Unless otherwise specified in the Drawings, sockets shall be set flush with the finished pavement surface.

Concrete foundations for street furniture and sockets shall be in accordance with the Drawings.

11.4 Quality Assurance

11.4.1 General Requirements

The Contractor shall implement a Quality Assurance program in accordance with Section 3 of this Specification.

This program shall comprise Pre-Commencement Phase and Post-Construction phases as defined below:

11.4.2 Pre-Commencement Phase

Supply of Information / Prototype

The following shall be supplied for furniture items:

- manufacturer's name
- prototype (if "Approved Standard" not achieved by the supplier).

11.4.3 Post-Construction Phase

Quality Assurance Records

Within 3 weeks of completion of the Works, the Contractor shall supply two copies of a report detailing the results of all quality control undertaken.

Non-Conforming Materials and Work

All non-conforming materials and work shall be repaired or replaced so that the Works meet all the requirements of this Specification.

12. Platform Furniture and Fencing

12.1 General

This Section specifies requirements for the supply and installation of platform furniture and fencing to on tram “super stops”.

12.2 Tram Shelter

12.2.1 Supply and installation

The supply and installation of the tram shelter is to be coordinated by the Contractor. The contractor is to refer to The J C Decaux standard drawings and jig set up procedure.

The supply and installation is to be completed by:

J.C. DeCaux Australia
Steve Borey – Installation Manager
Mobile: 0407 657 857

It is the Contractor’s responsibility to ensure that the construction of the Works does not compromise J.C.Deaux’s installation of the tram shelter. In any such instance the Contractor will be directed to rectify the matter at his own cost.

The contractor to provide safe access to the works site for the supplier, and co-ordinate his activities to meet the completion date.

12.2.2 Tram Shelter Conduits

The connection of shelter electric supply is to be coordinated by the Contractor. A minimum of 2 weeks notice shall be given to the supplier for its works.

J.C. DeCaux will have a Registered Electrical Contractor (REC). The REC has overall responsibility for the electrical work associated with the shelter and will be required to liaise with the Contractor’s REC. The Contractor’s REC must co-operate with and keep J.C. DeCaux’s REC informed at all times of any potential issue with respect to the completion of the electrical work as a whole. It is the Contractor’s responsibility to ensure that the construction of the Works does not compromise J.C. DeCaux’s electrical Works. In any such instance the Contractor will be directed to rectify the matter at his own cost.

12.2.3 Electrical Conduit

Refer to the Connell Wagner design and specification for electrical services for conduit requirements.

The layout of the underground conduits shown on drawing is indicative only and the Contractor shall coordinate and liaise on site with J.C.DeCaux to determine the final routing and requirements.

12.2.4 Shelter Concrete Footing

The Contractor is to excavate and construct the shelter footing as shown on the drawings. The Contractor is to supply and install hold down bolts to J.C.DeCaux's requirements, and as shown on the drawings. The Contractor shall take special care to ensure the accuracy of shelter footing levels and hold-down bolt locations. Any rework required to correct inaccuracies in bolt location or footing level shall be carried out at the Contractor's expense. The Contractor should also take care to ensure the correct placement of conduits.

12.2.5 Electrical Cabling

The Contractor's registered Electrical Contractor (REC) shall supply and install power cabling between the shelters and the switchboard as per J.C. DeCaux requirements.

12.3 Fencing

12.3.1 Supply and Installation

The Contractor shall supply and install the fence footing hold-down bolts as shown on the drawings.

12.4 Real Time Information System

12.4.1 Supply and Installation

The Contractor shall supply and install footing hold-down bolts and conduits in the concrete slab for all parts of the Real Time Information System, as shown on the drawings. The Contractor shall co-ordinate the works as per 13.2 above, provide 2 weeks notice and make allowance for safe access by others to install the Real Time Information system. Further, the contractor shall supply communication and electrical cabling as per Pixeltech requirements.

The contact for the supply of the Real Time Information System is:

Michael Krivitsky
Director
Pixeltech Design
Ph: 9529 8777
Fax: 9529 5764

12.5 Ticket Vending System

12.5.1 Supply and Installation

The Contractor shall supply and install conduits and other minor items associated with the Ticket Vending System, as shown on the drawings.

12.6 Payphones

12.6.1 Supply and Installation

The Contractor shall supply and install conduits and hold-down bolts associated with the Payphones, as shown on the drawings.

12.7 Other Furniture

12.7.1 Supply and Installation

The Contractor shall supply and install other platform furniture as shown on the drawings. Seats and rubbish bins shall be supplied according to the Street Furniture section of this Specification.

13. Traffic & Parking Signs and Pavement Markings

13.1 General

13.1.1 Scope

This Section specifies requirements for the supply and installation of Traffic and Parking Signs and Pavement Markings.

13.1.2 Standards, Codes and Referenced Specifications

The following documents which are referenced in this section form part of this Specification only to the extent that they are referred to herein:

Australian Standards:

AS 1742	Manual of uniform traffic control devices
AS 1743	Road signs - specification
AS 1744	Forms of letters and numerals for road signs
AS 2009	Glass beads for road marking materials
AS 4049	Paints and related materials – road marking materials.

VicRoads:

Section 714	Erection of Signs
Section 722	Painted Pavement Markings New Installations
Section 724	Longlife Pavement Markings New Installations

13.1.3 Definitions

Roadmarking is the term used to define all transverse lines and markings such as Stop/Give Way lines, pedestrian lines, arrows, and legends.

Linemarking is the term used to define all longitudinal lines such as centre, lane, edge, turn and continuity lines.

Pavement marking is the term used to define all linemarking and road marking.

13.2 Materials

13.2.1 Traffic & Parking Signs, Posts and Sockets

Traffic & parking signs and posts shall be in accordance with Australian Standards AS 1742, AS 1743 and AS 1744, VicRoads Standard Specification Section 714 and details shown on the Drawings.

Posts and fittings (except for sockets) shall be in accordance with VicRoads Standard Specification Section 714.

Unless otherwise specified on the Drawings, sign posts for regulatory parking signs shall be 60.3mm outside diameter galvanised pipe, 3mm wall thickness and 3.0 metres in length.

Sockets shall be in accordance with Whitehorse City Council standards or as otherwise shown on the drawings.

13.2.2 Approved Suppliers

The following suppliers of signs are approved:

De Neefe Signs

25 Brisbane Street
ELTHAM VIC 3095
Tel 9431 0999

Artcraft Pty Ltd

26 Metropolitan Ave
NUNAWADING VIC 3131
Tel 9878 7877

13.2.3 Pavement Marking Materials

Unless otherwise specified on the Drawings, all pavement markings shall be painted using a white water-borne or solvent-borne chlorinated rubber paint approved by the Superintendent and approved under the Australian Paint Approval Scheme (APAS).

Pavement marking materials shall be in accordance with the following:

(a) *Paint*

Paints shall comply with the requirements of AS 4049.1 and VicRoads Standard Specification Section 722.04.

(b) *Longlife Materials*

Thermoplastic, Cold –Applied Plastic materials and Pliant Polymer Marking Tape shall comply with the requirements of AS 4049.2 and VicRoads Standard Specification Section 724.04

(c) *Glass Beads*

Glass beads used on markings shall comply with the requirements for drop-on beads in AS 2009 and VicRoads Standard Specification Sections 722.04 and 724.04 as appropriate.

13.3 Construction

13.3.1 Traffic & Parking Signs, Posts and Sockets

Traffic & parking signs and posts shall be erected where shown on the Drawings in accordance with the requirements of AS 1742, AS 1743 and AS 1744, VicRoads Standard Specification Section 714 and City of Whitehorse standards for sockets, or as otherwise shown on the drawings.

Posts and sockets shall be set vertically to within a tolerance of 1 in 250.

13.3.2 Pavement Marking Installation

Pavement marking installation shall be in accordance with the following:

(a) Layout of markings

The set out for pavement markings shall be as detailed on the Drawings.

(b) Paint

Two coats of paint shall be applied to all markings. The first coat shall be applied immediately following completion of Works to the pavement wearing surface.

The painting of pavement markings shall comply with the requirements of AS 4049.1 and VicRoads Standard Specification Section 722 except for period of repainting, which shall be within two (2) to four (4) weeks after the initial treatment.

The Contractor may be required to install temporary markings to suit his construction program.

(c) Longlife Materails

The application of Thermoplastic, Cold –Applied Plastic materials and Pliant Polymer Marking Tape shall comply with the requirements of AS 4049.2 and VicRoads Standard Specification Section 724

13.3.3 Removal of Existing Pavement Marking

Redundant line marking shall be completely removed by grinding.

13.4 Quality Assurance

13.4.1 General Requirements

The Contractor shall implement a Quality Assurance program in accordance with Section 3 of this Specification.

This program shall comprise Pre-Commencement Phase and Post-Construction phases as defined below:

13.4.2 Pre-Commencement Phase

Supply of Information on Materials

The following information shall be supplied for the Pavement Marking Materials:

- product name and type
- manufacturer's name
- product specification

13.4.3 Post-Construction Phase

Quality Assurance Records

Within 3 weeks of completion of the Works, the Contractor shall supply two copies of a report detailing the results of all quality control undertaken.

Non-Conforming Materials and Work

All non-conforming materials and work shall be repaired or replaced so that the Works meet all the requirements of this Specification.

14. Kerb and Channel

14.1 General

14.1.1 Scope

This section specifies requirements for the supply and laying of bluestone and precast concrete kerb units and bluestone pitcher channels.

14.1.2 Standards, Codes and Referenced Specifications

The following documents which are referenced in this section form part of this Specification only to the extent that they are referred to herein:

Australian Standards:

- AS 1302 Steel Reinforcing Bars for Concrete
- AS 1379 Specification and Supply of Concrete.

14.2 Materials

14.2.1 Bedding Concrete

Concrete shall be N20 standard strength grade, 30mm Slump, complying with the requirements of AS1379.

14.2.2 Bluestone Kerb Units

Source Material

Bluestone for the platform kerbs shall be supplied by the contractor. The basalt stone used to produce kerb and channel units shall have the following qualities:

- Appearance shall be grey, sound, fine grained and free of veining, fracture lines or other defects considered injurious to strength
- Secondary Minerals Content shall be maximum 2% by volume
- Bulk Density shall be minimum 2.0 t/cu.m
- Water Absorption shall be maximum 2.5% by weight
- Flexural Strength shall be minimum 11MPa (both dry and soaked)
- Abrasion Resistance shall be 30 (as determined by the Taber abrader method)

The basalt shall be quarried only with black powder or other approved soft blasting technique and not supplied from a quarry used for aggregate.

Surface Finish

Bluestone kerb units shall be diamond sawn finished with a 2mm chamfer on all edges. The external (visible) face of each bluestone unit shall:

- have less than 30% surface perforations by area
- have no catspaws exceeding 5mm in diameter
- not exhibit any signs of mortar fill in surface perforations or vesiculations
- be free of saw marks, chips or other defects

Standard Dimensions, Geometry and Tolerances

Bluestone kerb, as specified in the Drawings, shall be manufactured in accordance with the following:

- Kerb stone standard unit dimensions and tolerances:
 - **Type A** - 300mm (wide) \pm 1mm x 400mm (deep) \pm 3mm
 - **Type B** - 300 mm(wide) \pm 1mm x 400mm(deep) \pm 4mm
 - **Type C** – 200mm(wide) \pm 1mm x 500mm(deep) \pm 2mm.
- Kerb unit length shall be no less than 800mm and no greater than 1200mm
- All top surface face edges shall be finished with a 4mm chamfer
- The ends of straight kerb stones shall be cut square to the long edge such that the two diagonals across each face are equal in length
- The ends of radial stones shall be cut along the radial line
- The radius of radial stones shall be measured to the face (outside edge) of the unit
- Special pieces required for access ramps and overflow kerbs shall be cut to meet the requirements of the drawings.

Approved Suppliers

The following bluestone material suppliers are approved:

- MELOCCO STONE – (Gavin Elders)
849 PRINCESS HWY,
SPRINGVALE VIC 3171
Tel (03) 9546 0211 Fax (03) 9547 1105

14.3 Construction

14.3.1 Setting

Kerb units and bluestone pitchers shall be laid butted together on 20MPa, 30mm slump concrete of 75mm minimum thickness in accordance with the lines, levels and details shown on the Drawings.

Unless otherwise specified on the Drawings, multi-row bluestone pitcher channels shall be laid in a stretcher bond pattern.

The Contractor shall be responsible for setting out control lines to ensure that paving is not out of square before laying. Where paving pattern appears to be ambiguous or does not match adjoining paving, the Contractor must clarify the final layout with the Superintendent before laying.

14.3.2 Setting Tolerances

Kerb Units

The following tolerances shall apply to the setting of kerb units:

- The allowable tolerance of the finished work from line or level on the tram side kerb shall be \pm 3mm.
- At all other points the allowable tolerance of the finished work from line or level shall be \pm 3mm.
- The maximum allowable joint width between new units shall be 3mm.

14.3.3 Joints

Kerb Units

Joints between kerb units shall not be grouted unless approved by the Superintendent. The Superintendent may permit the filling of joints in cases where short straight units are used to form long sweep radials. The fill material shall be an approved proprietary brand product.

14.3.4 Cutting

Cutting of kerb units and pitchers may be required to suit the geometry of the work or to square off the ends of weathered, second hand kerb to meet setting tolerances specified above. The Contractor shall comply with the following requirements with respect to cutting of kerb units:

- Closure units (residual pieces) or access ramps segments shall be no less than 500mm in length.
- For all other applications, kerb unit length shall be no less than 800mm in length
- Units cut on site shall be cut wet in a contained area, to minimise nuisance caused by dust and noise.

14.4 Quality Assurance

14.4.1 Requirements

The Contractor shall implement a Quality Assurance program in accordance with Section 3 of this Specification.

This program shall comprise a Post-Construction phase as defined below:

14.4.2 Post-Construction Phase

Tolerances

The deviation of any point on the line or level of the kerb shall not exceed 5mm..

- The deviation of the finished work from line or level on the tram side of the platform shall be $\pm 3\text{mm}$.
- At all other points the deviation of the finished work from line or level shall be $\pm 3\text{mm}$.
- The maximum joint width between new units shall be 3mm.

Quality Assurance Records

Within 3 weeks of completion of the Works, the Contractor shall supply two copies of a report detailing the results of all quality control undertaken.

Non-Conforming Materials and Work

All non-conforming materials and work shall be repaired or replaced so that the Works meet all the requirements of this Specification.

15. Underground Conduits

15.1 General

15.1.1 Scope

This section specifies requirements for the supply and installation of underground conduits.

15.1.2 Standards and rules

Underground conduits are to comply with AS 3000 for electrical conduits and TS009 for communications conduits and all other relevant Australian Standards and to the requirements of the Electricity Distribution Company, Telstra and other relevant local authorities.

15.2 Cables and Conduits in Trenches

15.2.1 Sand bed and surround

Provide clean sand under and around cables and conduits installed underground. Clear the bottom of the trench of all rocks, stones and other hard and sharp materials. Fill the trench to a depth of 50mm with a layer of selected filling prior to cable placement.

15.2.2 Sealing ducts and conduits

Seal buried entries to ducts and conduits using waterproof seals. Seal spare ducts and conduits immediately after installation. Seal other ducts and conduits after cable installation. Seal the joints of all conduits or pipes enclosing PVC/PVC and XLPE/PVC wiring with approved PVC jointing compound.

15.2.3 Draw wires

Arrange so that cables may be drawn out of the duct or conduit in the event of any cable failure. Install 4 mm² polypropylene draw string or 2.5 mm² galvanised steel wire in conduits for future installation of cable.

Water proofing: Provide puddle flanges around conduits where they pass into cable pits. Install bell mouth accessory on end of conduit located within wall of pits and flush with inside surface of pits on conduits > 100mm dia.

15.2.4 Pipe ducts and conduits

Electrical buried in ground conduits: Orange heavy duty UPVC conduit.

Communications buried in ground conduits: White UPVC conduit.

Minimum Cover: Electrical Conduit under roadway min. 600mm cover
Electrical Conduit under concrete pavement min 300mm cover
Communication Conduit under roadway min 600mm cover
Communication Conduit under concrete pavement min 300mm cover

Bedding: 50 mm thick, compacted fill and extending the full width of the trench.

Layout: Avoid sharp bends and locate drawing in points above ground.

Cleaning: Swab clean before installing any cables.

15.3 Cable Pits

15.3.1 General

Sizes: Minimum 300 x 300mm. Allow for turning of cables at above the minimum acceptable bending radius.

Location: As shown on the drawings. Tolerance shall be within 10mm of the specified point horizontally.

Cable support: Use galvanised iron brackets to separate layers of cables in the pit.

Slack cables: Leave sufficient length of slack cables in pits to cater for future alteration.

Allow for concrete haunching around multiple conduits to prevent pit collapse where multiple conduit entry points are required.

15.3.2 Proprietary cable pits

For pits $\leq 1.2 \times 1.2$ m, provide proprietary concrete or polymer moulded pits.

15.3.3 In situ construction

For pits $> 1.2 \times 1.2$ m, select from the following:

- Proprietary cable pits.
- Construct walls and bottoms from rendered brickwork or 75 mm thick reinforced concrete. Incorporate a waterproofing agent in the render or concrete. Minimum wall thickness as follows:
 - 100 mm for double boxed reinforced pit
 - 125 mm for double boxed un-reinforced pit
 - 150 mm for single boxed un-reinforced pit

15.3.4 Pit covers

General: Provide pit covers to suit expected loads of pedestrian or vehicular traffic in the location in which it is installed fitted flush with the top of the pit or lid surround.

Pit covers shall be ACO light duty recessed solid bottom "Lock and Seal" mild steel access cover and frame with locking bolts as required. Cut paving to fit into access lid and match surrounding pavement layout. Coordinate with the paving contractor for lay out of pits and paving. Pit lids shall have pavers set in, with paver joints aligning with adjacent pavers. Pit lids shall sit flush with the surrounding pavement.

Provide engraved brass plaques set into the infill material of the access cover to indicate function of pit. Labels shall be engraved "Electricity" for electrical pits and "Communications" for communication pits.

Standard: To AS 3996.

Maximum weight: 40 kg for any section of the cover (non-trafficable, >5000kg for trafficable).

Lifting handles: Provide a lifting handle for each size of cover section.

15.3.5 Drainage

General: Provide drainage from the bottom of cable pits, to a subsoil drainage pipe wrapped around the base of the pit and surrounded by crushed rock..

Drainage Pipe: Minimum size $\Phi 75\text{mm}$ x 1000 mm long. The entire pipe shall sit below the base level of the pit.

15.4 Underground Cable Routes

15.4.1 General

Provide all changes in grade or direction in easy stages, and bends with a radius of not less than fifteen times the conduits overall diameter.

15.4.2 Survey

Accurately record the routes of underground cables before backfilling. Accurately plot conduit routes, pits, junction boxes, etc., and note levels of ducts at the following points:

- Changes in direction.
- Entry and exit from structures and pits.
- Changes in depth.

15.4.3 Marker tape

Where electric bricks or covers are not provided over underground wiring, provide a 150mm wide yellow or orange marker tape bearing the words "WARNING - Electric cable buried below", laid in the trench 150mm below ground level.

15.5 Boring

If under road boring is required in lieu of trenches, engage a suitably qualified person to do the work.

Ensure a tight fit to the service pipes. If voids are encountered, fill by pressure grouting.

15.6 Reinstatement

Reinstate existing services removed or disturbed by trench excavations to match existing and adjacent work.

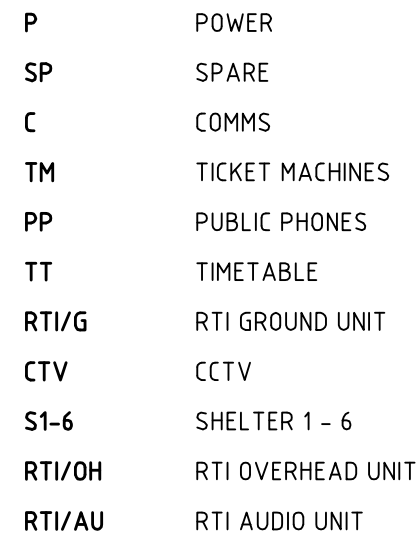
Reinstate paving and roads to match adjacent work, paved surfaces and assets disturbed or removed during excavation of trenching.

Reinstate concrete surfaces to the original level. If necessary, provide steel reinforcement keyed to the adjacent concrete and laid to prevent the reinstated concrete from subsiding and cracking.

15.7 Shop Drawings

Submit shop drawings of each of the proposed pits showing:

- Pit type, size and dimensions.
- Manufacturer's details.
- Maximum cover loading.
- Pit function marking details.
- Orientation of pit lid with paving setout.



1. REFER TO SPECIFICATION FOR FURTHER DETAILS.	8. TICKET MACHINE CONDUITING TO BE CONTINUOUS THROUGH PITS.
2. USE ACO "CABLE MATE" POLYMER CONCRETE PRECAST PITS OR APPROVED EQUIVALENT.	9. CONDUITS TO BE BROUGHT INTO RTI/SHELTER POLE. TELSTRA SERVICE TO BE BROUGHT IN VIA IC32. TERMINATE TELSTRA SERVICE FOR RTI EQUIPMENT AT ACCESS PANEL IN POLE WITH RJ45 CONNECTION. EXTEND ELECTRICAL CONDUITS UP THE POLE TO PROVIDE SEGREGATION FROM COMMUNICATION SERVICES. REFER DETAIL ON THIS DRAWING.
3. ALL PIT COVERS TO BE ACO "LOCK & SEAL ACCESS COVER" TYPE OR EQUIVALENT SUCH THAT PAVERS CAN BE LAID WITHIN THE RECESSED PIT. COVER PAVERS SHOULD BE LAID IN THE COVER TO MATCH ADJACENT PLATFORM PAVERS.	10. CONDUITS FOR TICKET MACHINE TO BE TERMINATED & CAPPED AT FUTURE LOCATION.
4. PIT LOCATIONS SHOWN ARE APPROXIMATE. FINAL LOCATIONS TO BE CO-ORDINATED ON SITE.	11. PROVIDE 70mm ² Cu/PVC/PVC EARTH CONNECTION BETWEEN PLATFORM REINFORCEMENT AND NEGATIVE DC TRAM RAIL. FIX EARTH TO RAIL IN ACCORDANCE WITH YARRA TRAMS REQUIREMENTS. ENSURE ALL METALLIC STRUCTURES ON PLATFORM ARE BONDED TOGETHER REFER DETAIL ON DRAWING.
5. CO-ORDINATE WITH EQUIPMENT INSTALLERS FOR FINAL LOCATION OF EQUIPMENT AND CONDUIT ENTRIES.	12. LIASE WITH ELECTRICAL DISTRIBUTOR TO PROVIDE A POINT OF SUPPLY TO THE PLATFORM TO CATER FOR THE PLATFORM EQUIPMENT (1063A).
6. SWITCHBOARD ENCLOSURE SHALL BE IP56 STAINLESS STEEL ENCLOSURE, NHP MODEL NO. AS100 84.	
7. POWER CABLEING TO PAY PHONES SUPPLIED BY TELSTRA. ALLOW TO INSTALL 2C 2.5mm ² Cu /PVC/PVC CABLEING TO PAYPHONE. PROVIDE A 6mm ² Cu /PVC/PVC EARTH CABLE BONDED TO THE MAIN EARTH AND RUN IN THE PAY PHONE POWER CONDUIT.	

Connell Wagner

A person using Connell Wagner drawings and other data accepts the risk of:

1. using the drawings and other data in electronic form without requesting and checking them for accuracy against the original hard copy versions;
2. using the drawings or other data for any purpose not agreed to in writing by Connell Wagner.



TRAM STOP ENHANCEMENT PROJECT

Drawing Title:

COLLINS STREET
BETWEEN SPENCER ST AND KING ST
CONDUIT LAYOUT PLAN

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

CW Project No.

Scale

Drawing No.

P3

NOTE:
QUAD GUARD SETOUT IS TO
OVERALL SYSTEM

300 5200 4100 27900 4700 5200

OVERHEAD REAL
TIME INFORMATION
DISPLAY

DIRECTIONAL TACTILES WITH
4 WIDTHS PLAIN LOCATED CENTRALLY

PROVISION FOR
PUBLIC PHONE

LITTER BIN

TIMETABLE UNIT

FENCE

PROVISION FOR
TICKET MACHINE

AUDIO BOLLARD

SEWER PIT

RTI (GROUND UNIT)

QUAD

RAMP

RAMP

COLLINS

STREET

300

9000

5200

4100

27900

4700

5200

2800

DIRECTIONAL TACTILES WITH
4 WIDTHS PLAIN LOCATED CENTRALLY

TIMETABLE UNIT

LITTER BIN

AUDIO BOLLARD

PROVISION FOR TELEPHONE
PROVISION FOR
TICKET MACHINE
RTI (GROUND UNIT)

SHELTER 4

SHELTER 5

SHELTER 6

RAMP

QUAD

TRANSPORT
HOUSE

ISSUED FOR
CONSTRUCTION

REF.	ZONE	REVISION	DATE	APPD.
D	-	AU, TT RELOCATED	16.6.03	
C	-	RAMP EXTENDED	3.6.03	
B	-	FURNITURE & TACTILE AMEDEMMENT	2.6.03	

SUPER STOP ON COLLINS
BETWEEN SPENCER & KING STREETS

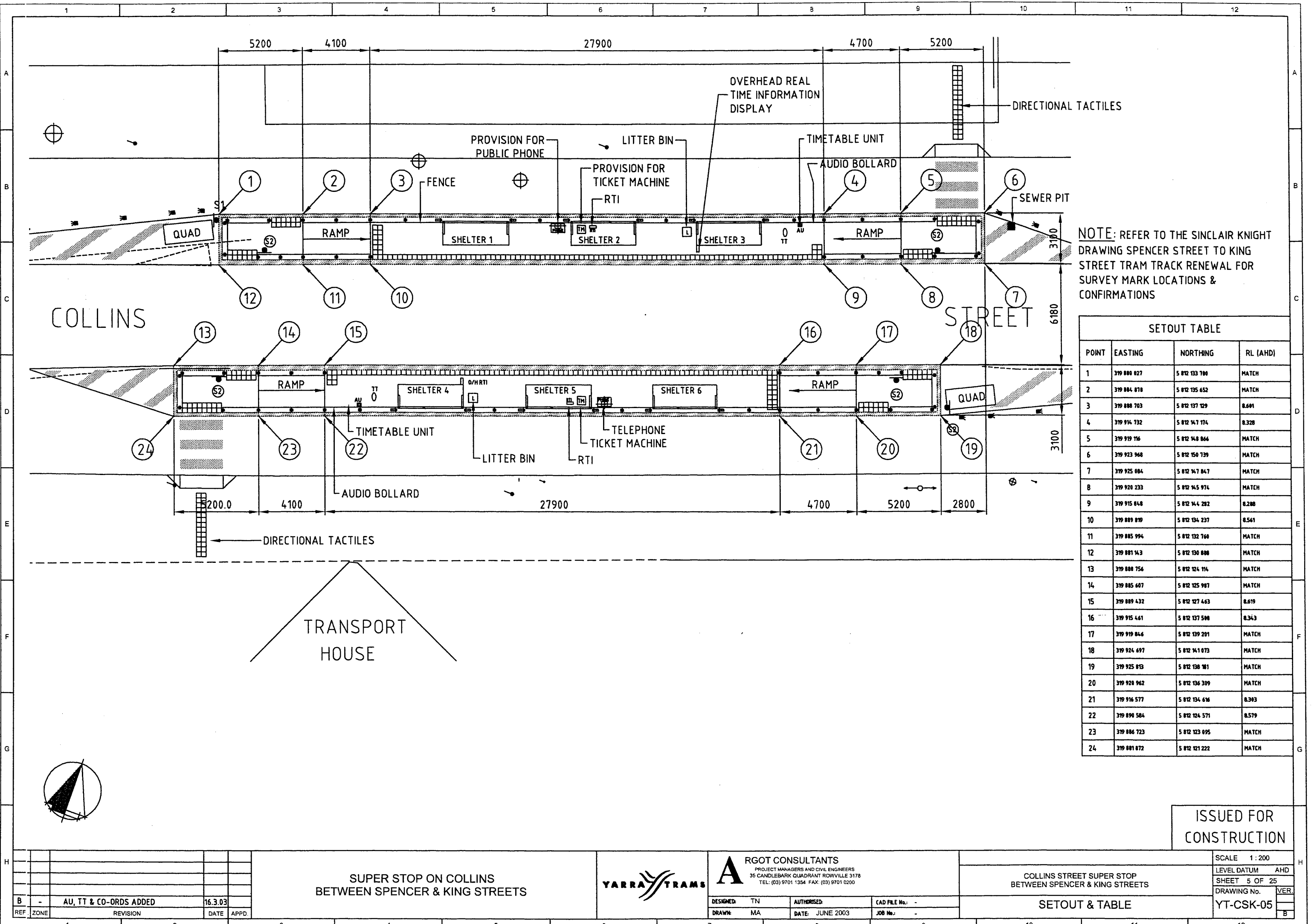
YARRA TRAMS

RGOT CONSULTANTS
PROJECT MANAGERS AND CIVIL ENGINEERS
35 CANDLEBARK QUADRANT ROWVILLE 3178
TEL: (03) 9701 1354 FAX: (03) 9701 0200

DESIGNED: TN
DRAWN: MA
AUTHORISED:
DATE: JUNE 2003
CAD FILE No.:
JOB No.:

COLLINS STREET SUPER STOP
BETWEEN SPENCER & KING STREETS
GENERAL PLATFORM ARRANGEMENT

SCALE 1:200
LEVEL DATUM AHD
SHEET 4 OF 25
DRAWING No. YT-CSK-04
VER. D



NOTE: REFER TO THE SINCLAIR KNIGHT DRAWING SPENCER STREET TO KING STREET TRAM TRACK RENEWAL FOR SURVEY MARK LOCATIONS & CONFIRMATIONS

SETOUT TABLE			
POINT	EASTING	NORTHING	RL (AHD)
1	319 880 827	5 812 133 788	MATCH
2	319 884 878	5 812 135 652	MATCH
3	319 888 703	5 812 137 129	8.681
4	319 914 732	5 812 147 174	8.328
5	319 919 716	5 812 148 866	MATCH
6	319 923 968	5 812 150 739	MATCH
7	319 925 884	5 812 147 847	MATCH
8	319 928 233	5 812 145 974	MATCH
9	319 915 848	5 812 144 282	8.288
10	319 889 879	5 812 134 237	8.561
11	319 885 994	5 812 132 768	MATCH
12	319 881 143	5 812 130 888	MATCH
13	319 888 756	5 812 124 114	MATCH
14	319 885 607	5 812 125 987	MATCH
15	319 889 432	5 812 127 463	8.619
16	319 915 461	5 812 137 588	8.343
17	319 919 846	5 812 139 201	MATCH
18	319 924 497	5 812 141 073	MATCH
19	319 925 813	5 812 138 181	MATCH
20	319 928 962	5 812 136 309	MATCH
21	319 916 577	5 812 134 616	8.383
22	319 898 584	5 812 124 571	8.579
23	319 886 723	5 812 123 095	MATCH
24	319 881 872	5 812 121 222	MATCH

ISSUED FOR CONSTRUCTION

REF	ZONE	REVISION	DATE	APPD.
B	-	AU, TT & CO-ORDS ADDED	16.3.03	

SUPER STOP ON COLLINS
BETWEEN SPENCER & KING STREETS



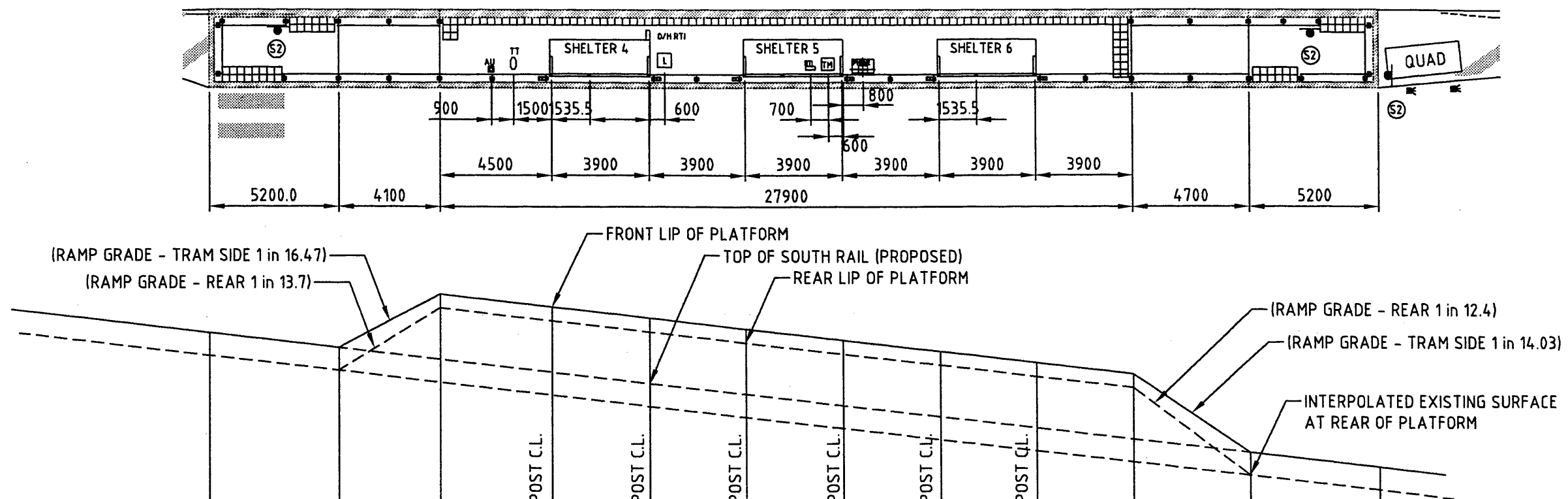
ARGOT CONSULTANTS
PROJECT MANAGERS AND CIVIL ENGINEERS
35 CANDLEBARK QUADRANT ROWVILLE 3178
TEL: (03) 9701 1354 FAX: (03) 9701 0200

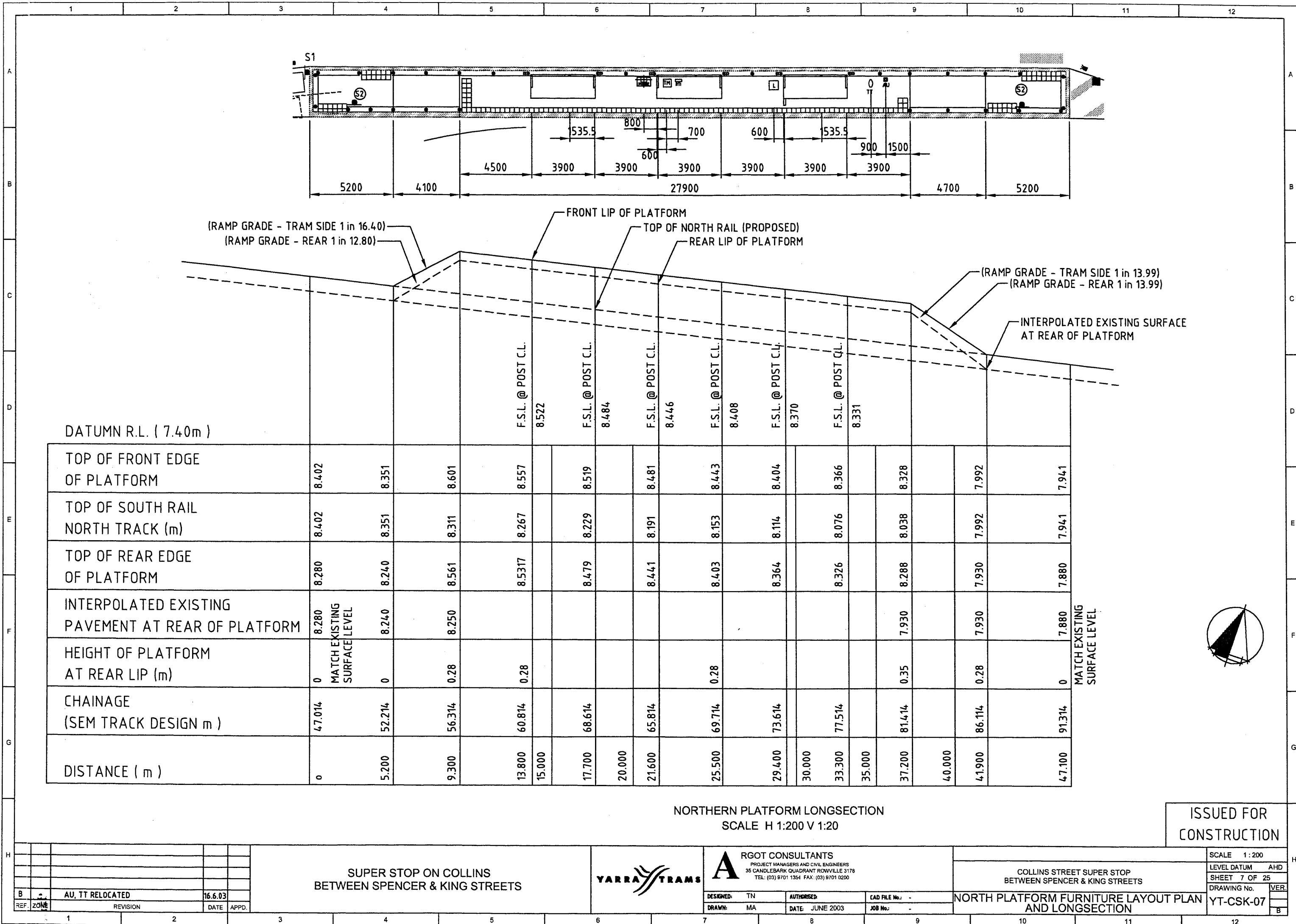
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DRAWN: MA	DATE: JUNE 2003	JOB No.:

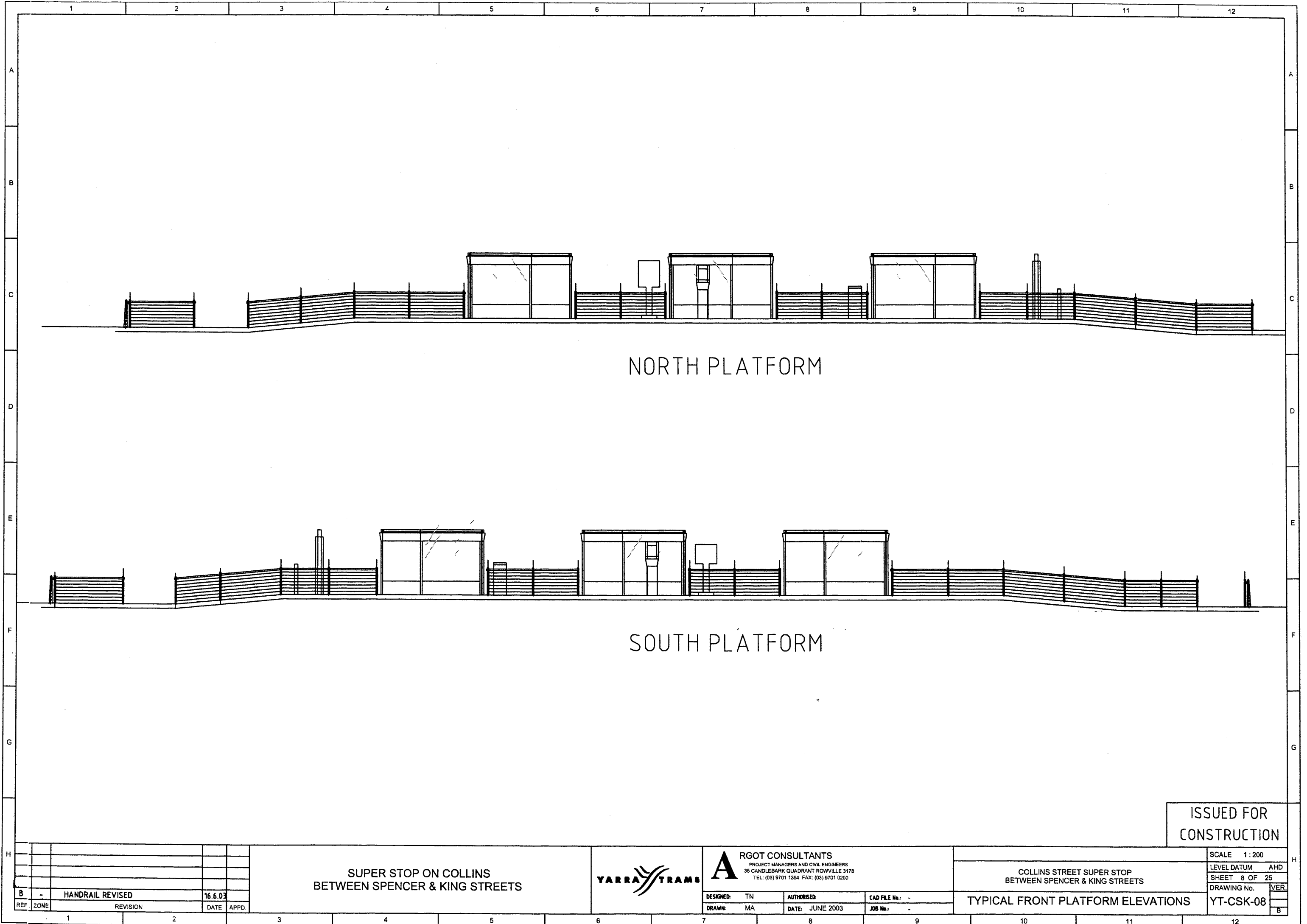
COLLINS STREET SUPER STOP
BETWEEN SPENCER & KING STREETS

SETOUT & TABLE

SCALE 1:200
LEVEL DATUM AHD
SHEET 5 OF 25
DRAWING No. YT-CSK-05
VER. B







NORTH PLATFORM

SOUTH PLATFORM

SUPER STOP ON COLLINS
BETWEEN SPENCER & KING STREETS



RGOT CONSULTANTS
PROJECT MANAGERS AND CIVIL ENGINEERS
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TEL: (03) 9701 1354 FAX: (03) 9701 0200

DESIGNED: TN	AUTHORISED:	CAD FILE No.: -
DRAWN: MA	DATE: JUNE 2003	JOB No.: -

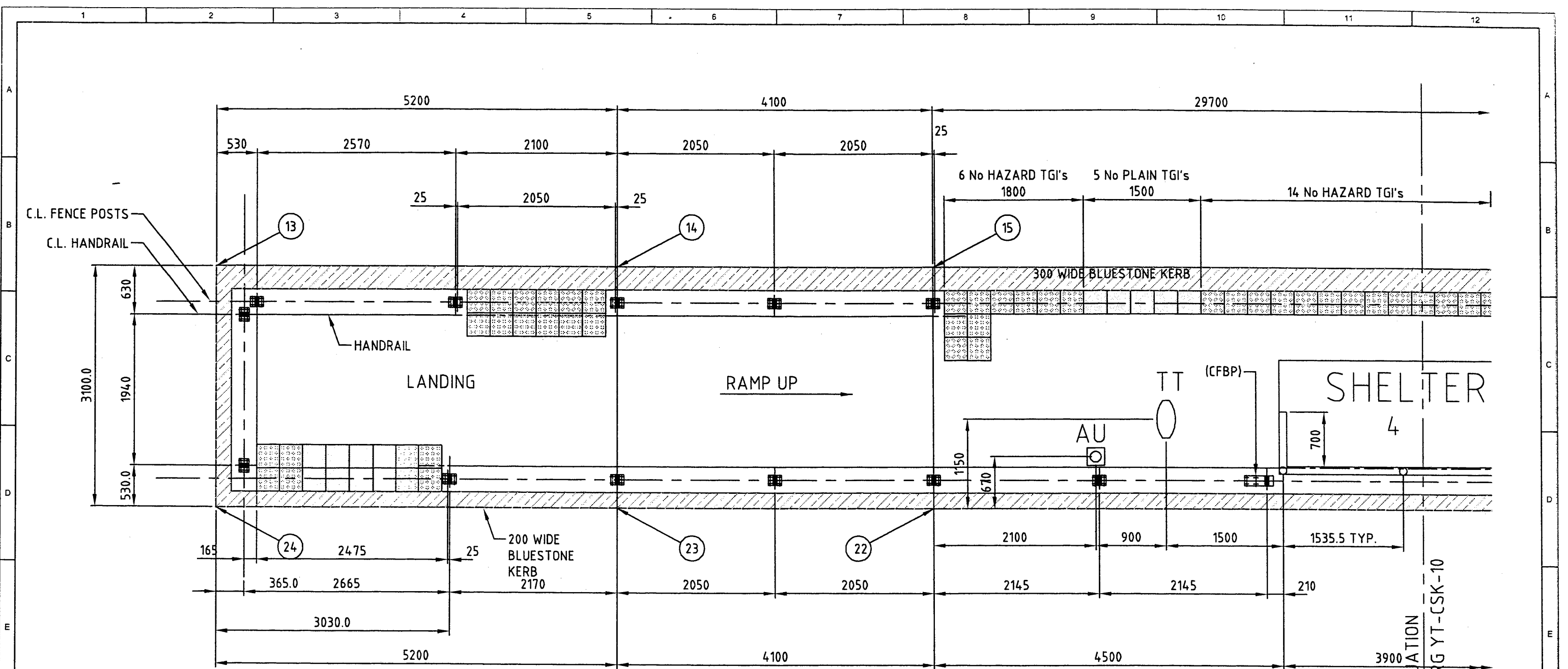
COLLINS STREET SUPER STOP
BETWEEN SPENCER & KING STREETS

TYPICAL FRONT PLATFORM ELEVATIONS

ISSUED FOR
CONSTRUCTION

SCALE 1:200
LEVEL DATUM AHD
SHEET 8 OF 25
DRAWING No. YT-CSK-08
VER. B

REF	ZONE	REVISION	DATE	APPD.
B	-	HANDRAIL REVISED	16.6.03	



SOUTHERN PLATFORM PLAN
SCALE 1:50

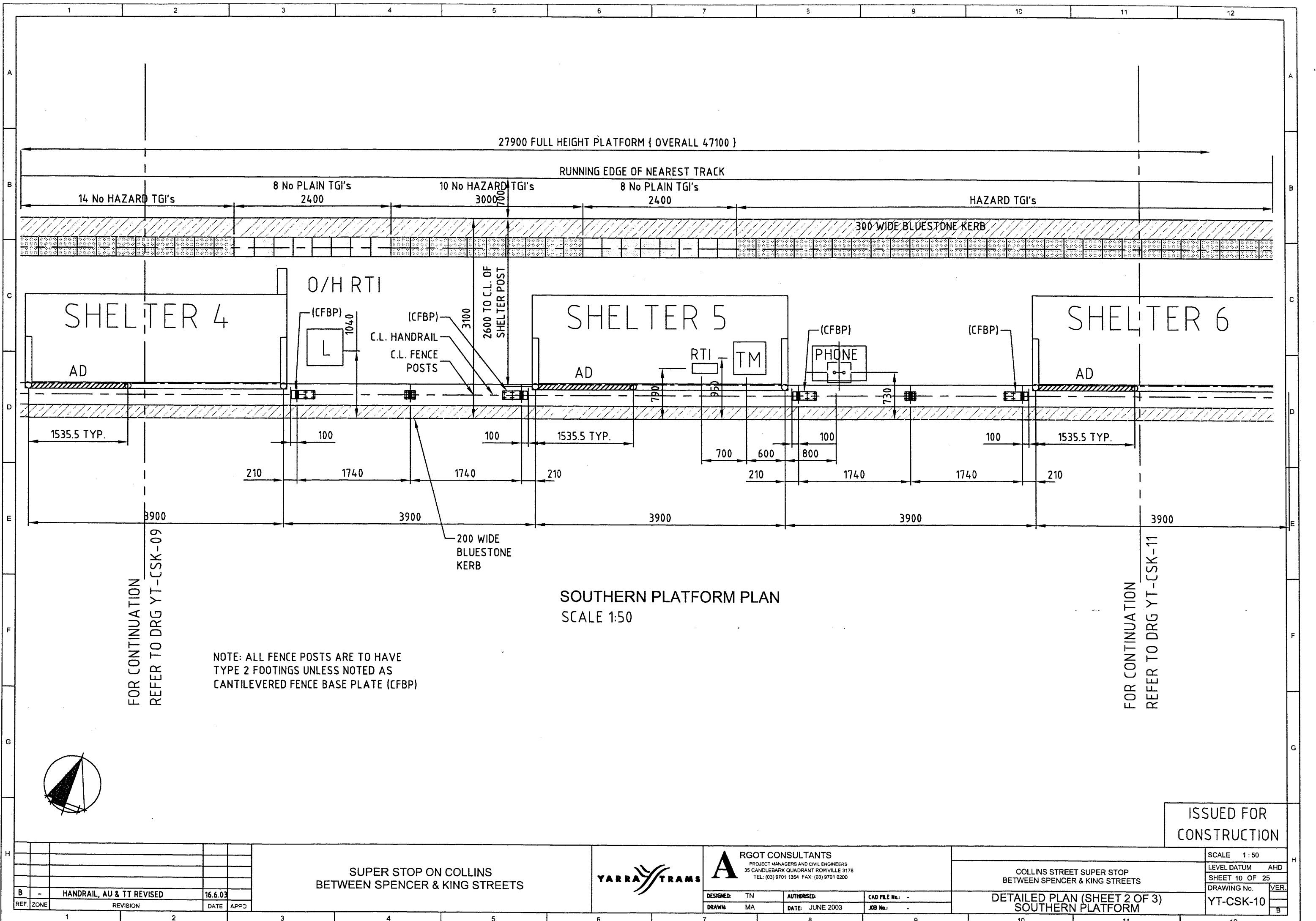
NOTE: ALL FENCE POSTS ARE TO HAVE
TYPE 2 FOOTINGS UNLESS NOTED AS
CANTILEVERED FENCE BASE PLATE (CFBP)

FOR CONTINUATION
REFER TO DRG YT-CSK-10



ISSUED FOR
CONSTRUCTION

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FOR CONTINUATION
REFER TO DRG YT-CSK-09

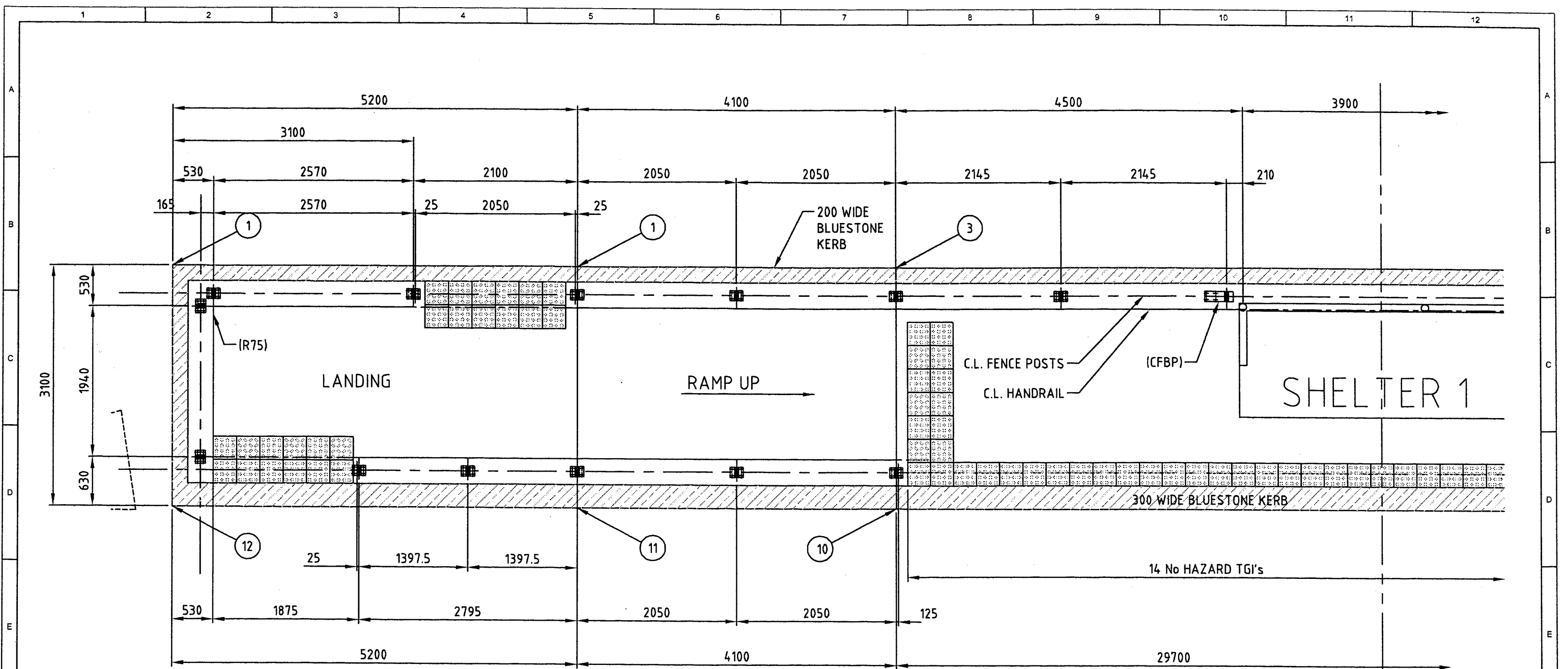
FOR CONTINUATION
REFER TO DRG YT-CSK-11

NOTE: ALL FENCE POSTS ARE TO HAVE
TYPE 2 FOOTINGS UNLESS NOTED AS
CANTILEVERED FENCE BASE PLATE (CFBP)

SOUTHERN PLATFORM PLAN
SCALE 1:50

ISSUED FOR
CONSTRUCTION

SUPER STOP ON COLLINS BETWEEN SPENCER & KING STREETS						RGOT CONSULTANTS PROJECT MANAGERS AND CIVIL ENGINEERS 35 CANDLEBARK QUADRANT ROWVILLE 3178 TEL: (03) 9701 1354 FAX: (03) 9701 0200			COLLINS STREET SUPER STOP BETWEEN SPENCER & KING STREETS			SCALE 1:50 LEVEL DATUM AHD SHEET 10 OF 25 DRAWING No. VER. YT-CSK-10 B		
DESIGNED: TN			AUTHORISED:			CAD FILE No.:			DRAWING No. VER.			YT-CSK-10 B		
DRAWN: MA			DATE: JUNE 2003			JOB No.:			YT-CSK-10 B			YT-CSK-10 B		
HANDRAIL, AU & TT REVISED			16.6.03											
REF. ZONE			REVISION			DATE			APPRO					



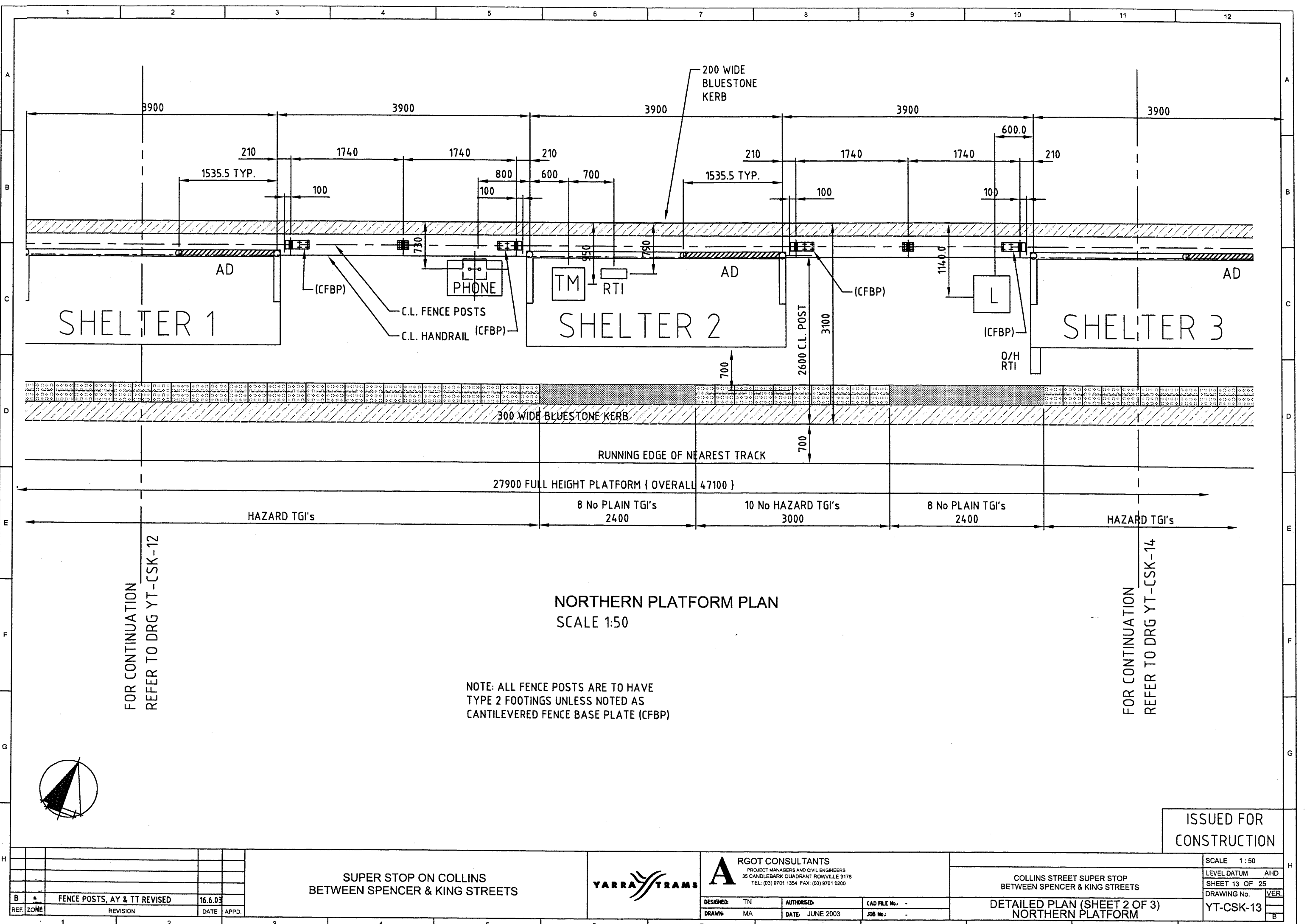
NORTHERN PLATFORM PLAN
SCALE 1:50

NOTE: ALL FENCE POSTS ARE TO HAVE
TYPE 2 FOOTINGS UNLESS NOTED AS
CANTILEVERED FENCE BASE PLATE (CFBP)

FOR CONTINUATION
REFER TO DRG YT-CSK-13

ISSUED FOR
CONSTRUCTION

SUPER STOP ON COLLINS BETWEEN SPENCER & KING STREETS							RGOT CONSULTANTS PROJECT MANAGERS AND CIVIL ENGINEERS 35 CANDLEBARK QUADRANT ROWVILLE 3178 TEL: (03) 9701 1354 FAX: (03) 9701 0200			COLLINS STREET SUPER STOP BETWEEN SPENCER & KING STREETS DETAILED PLAN (SHEET 1 OF 3) NORTHERN PLATFORM		SCALE 1:50 LEVEL DATUM AHD SHEET 12 OF 25 DRAWING No. YT-CSK-12 VER. B
B	-	FENCE POSTS, AU & TT REVISED	16.6.03		DESIGNED: TN	AUTHORISED:	CAD FILE No.:					
REF.	ZONE	REVISION	DATE	APPD.	DRAWN: MA	DATE: JUNE 2003	JOB No.:					



FOR CONTINUATION
REFER TO DRG YT-CSK-12

FOR CONTINUATION
REFER TO DRG YT-CSK-14

NORTHERN PLATFORM PLAN SCALE 1:50

NOTE: ALL FENCE POSTS ARE TO HAVE
TYPE 2 FOOTINGS UNLESS NOTED AS
CANTILEVERED FENCE BASE PLATE (CFBP)

ISSUED FOR
CONSTRUCTION

SUPER STOP ON COLLINS
BETWEEN SPENCER & KING STREETS



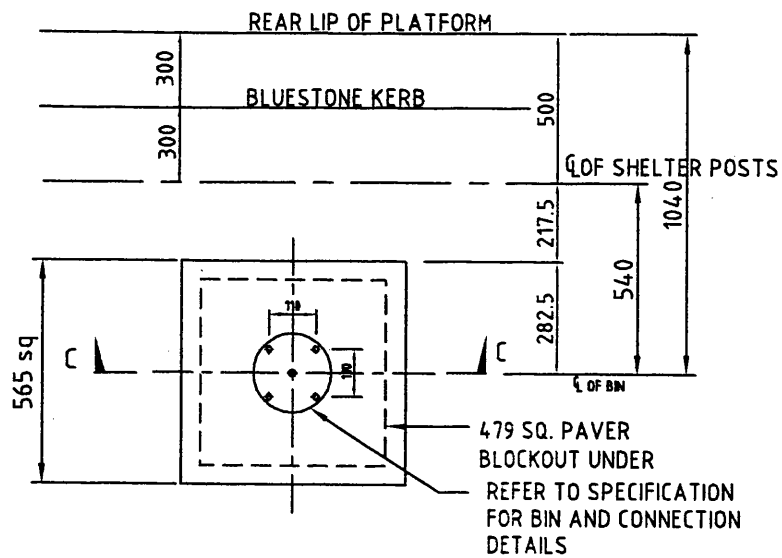
ARGOT CONSULTANTS
PROJECT MANAGERS AND CIVIL ENGINEERS
35 CANDLEBARK QUADRANT ROWVILLE 3178
TEL: (03) 9701 1354 FAX: (03) 9701 0200

DESIGNED: TN
DRAWN: MA
AUTHORISED:
DATE: JUNE 2003
CAD FILE No.:
JOB No.:

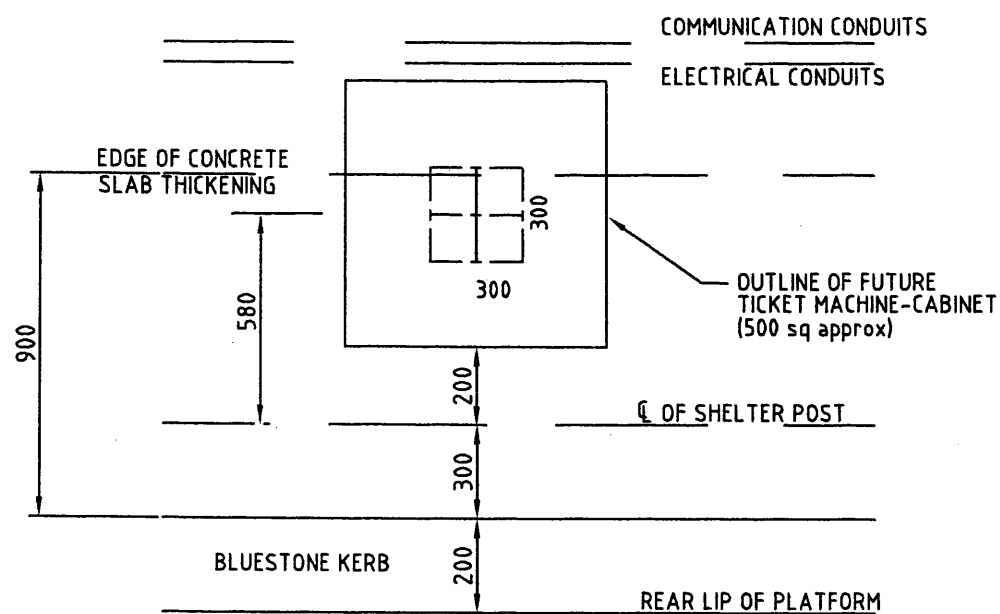
COLLINS STREET SUPER STOP
BETWEEN SPENCER & KING STREETS
DETAILED PLAN (SHEET 2 OF 3)
NORTHERN PLATFORM

SCALE 1:50
LEVEL DATUM AHD
SHEET 13 OF 25
DRAWING No. YT-CSK-13
VER. B

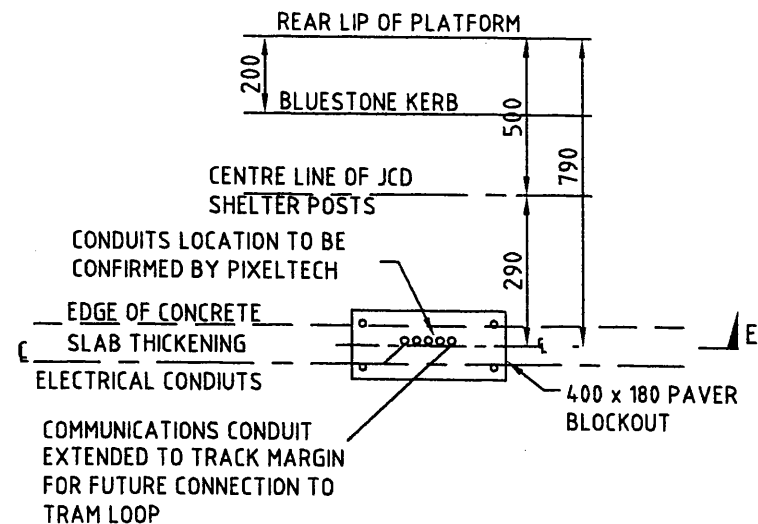
REF.	ZONE	REVISION	DATE	APPD.
B		FENCE POSTS, AY & TT REVISED	16.6.03	



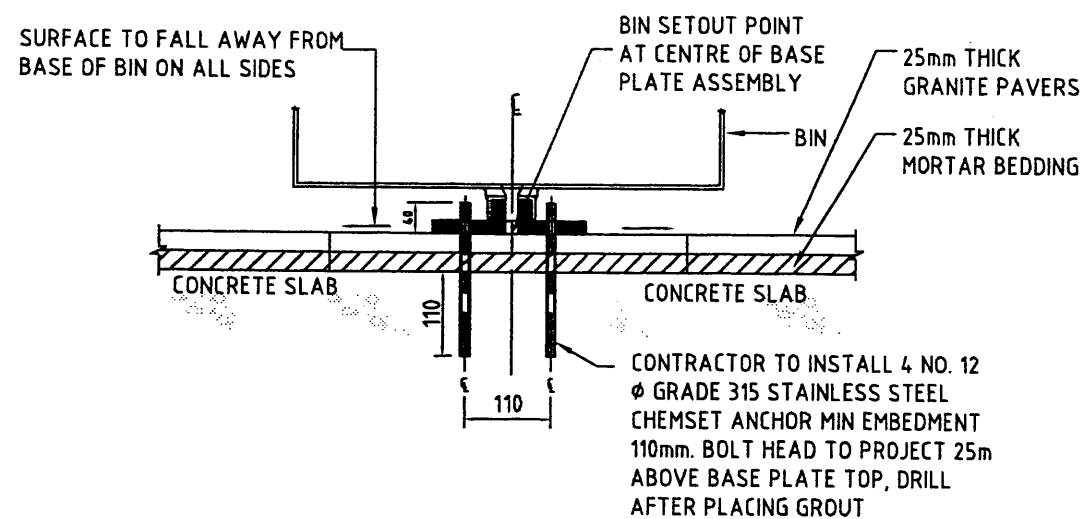
DETAIL 1 - LITTER BIN DETAIL
SCALE: 1:20



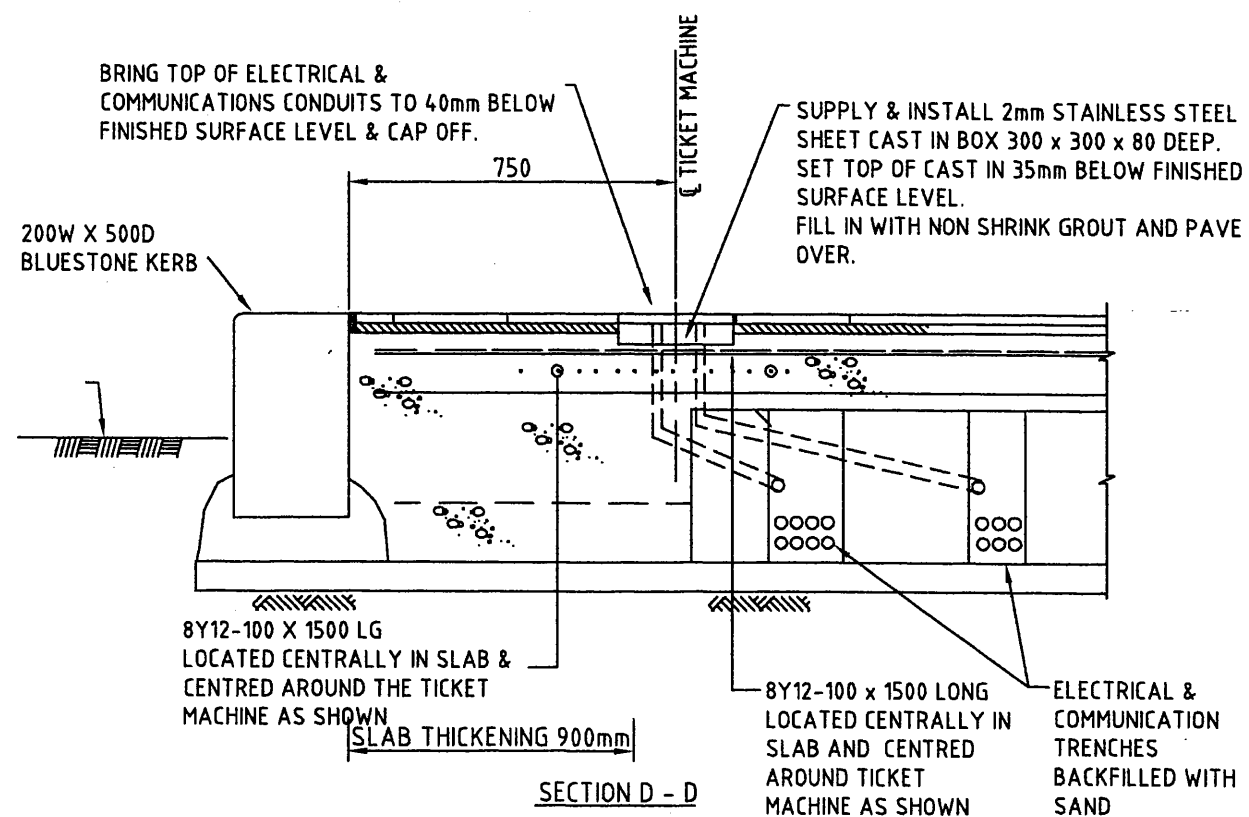
DETAIL 2 - PROVISION FOR TICKET MACHINE CABINET DETAIL



DETAIL 3 - RTI GROUND UNIT
SCALE: 1:20



SECTION C-C
SCALE: 1:10



SECTION D - D

ISSUED FOR
CONSTRUCTION

SUPER STOP ON COLLINS
BETWEEN SPENCER & KING STREETS



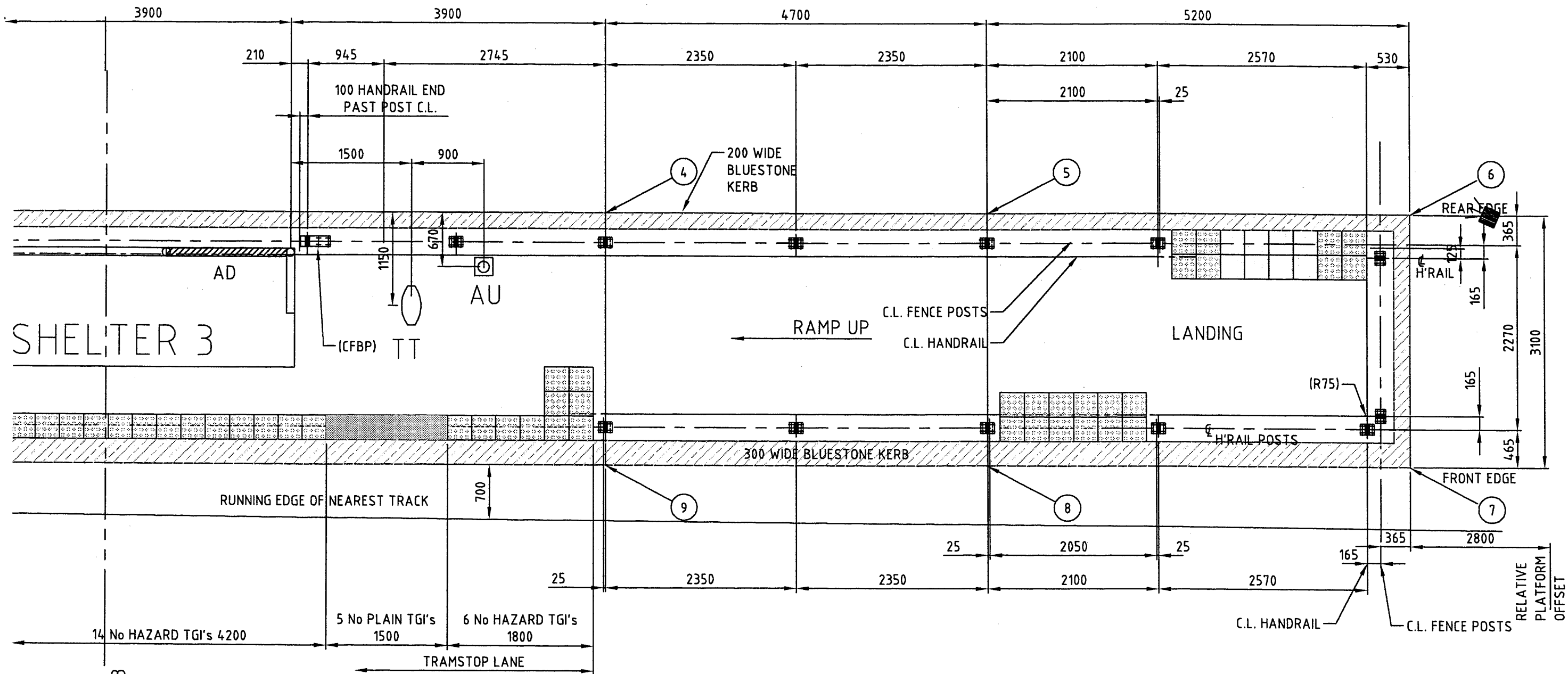
RGOT CONSULTANTS
PROJECT MANAGERS AND CIVIL ENGINEERS
35 CANDLEBARK QUADRANT ROWVILLE 3178
TEL: (03) 9701 1354 FAX: (03) 9701 0200

DESIGNED: TN
DRAWN: MA
AUTHORISED: DATE: JUNE 2003
CAD FILE No.:
JOB No.:

COLLINS STREET SUPER STOP
BETWEEN SPENCER & KING STREETS

PLATFORM DETAILS & SECTIONS - SHEET2

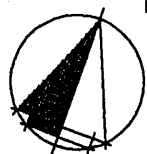
SCALE 1:20
LEVEL DATUM AHD
SHEET 16 OF 25
DRAWING No. YT-CSK-16
VER. B



NORTHERN PLATFORM PLAN
SCALE 1:50

NOTE: ALL FENCE POSTS ARE TO HAVE
TYPE 2 FOOTINGS UNLESS NOTED AS
CANTILEVERED FENCE BASE PLATE (CFBP)

FOR CONTINUATION
REFER TO DRG YT-CSK-13



ISSUED FOR
CONSTRUCTION

SUPER STOP ON COLLINS
BETWEEN SPENCER & KING STREETS



ARGOT CONSULTANTS
PROJECT MANAGERS AND CIVIL ENGINEERS
35 CANDLEBARK QUADRANT ROWVILLE 3178
TEL: (03) 9701 1354 FAX: (03) 9701 0200

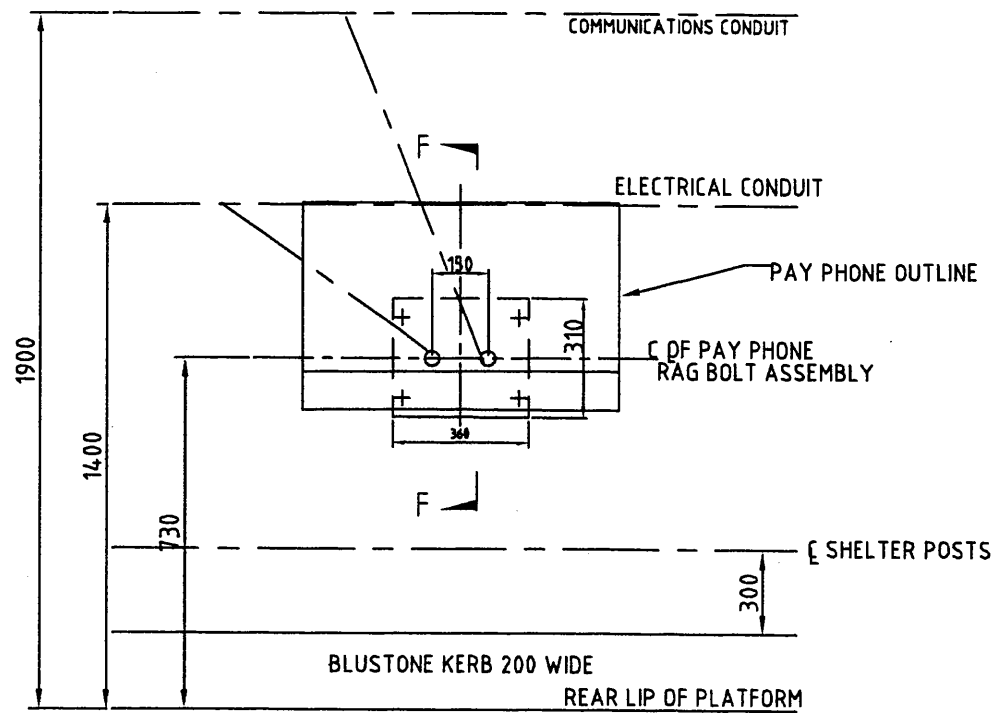
DESIGNED: TN
DRAWN: MA
AUTHORISED: DATE: JUNE 2003
CAD FILE No.:
JOB No.:

COLLINS STREET SUPER STOP
BETWEEN SPENCER & KING STREETS

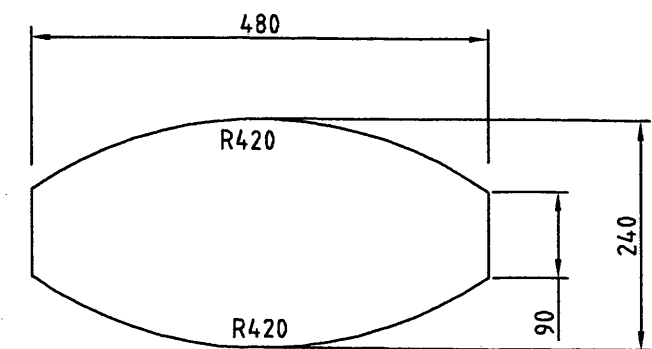
DETAILED PLAN (SHEET 3 OF 3)
NORTHERN PLATFORM

SCALE 1:50
LEVEL DATUM AHD
SHEET 14 OF 25
DRAWING No. YT-CSK-14
VER. B

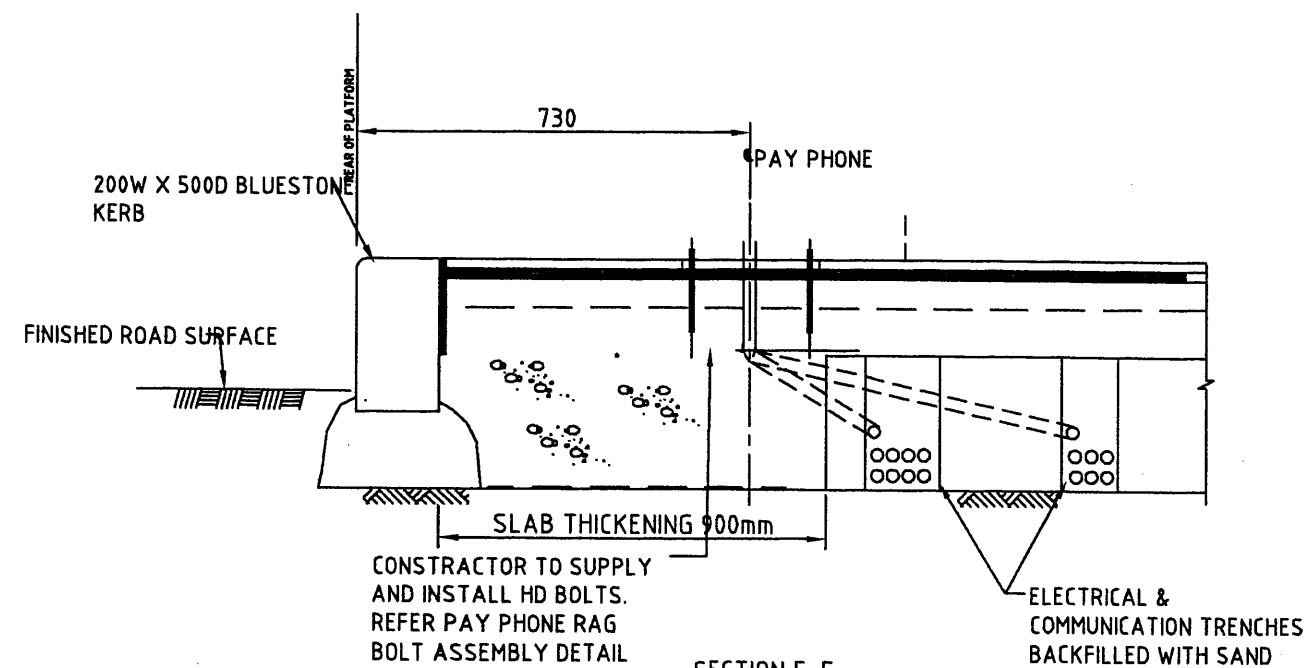
ZONE	REVISION	DATE	APPD.
B	FENCE POSTS, AU & TT REVISED	16.6.03	



DETAIL 4 PAY PHONE DETAIL

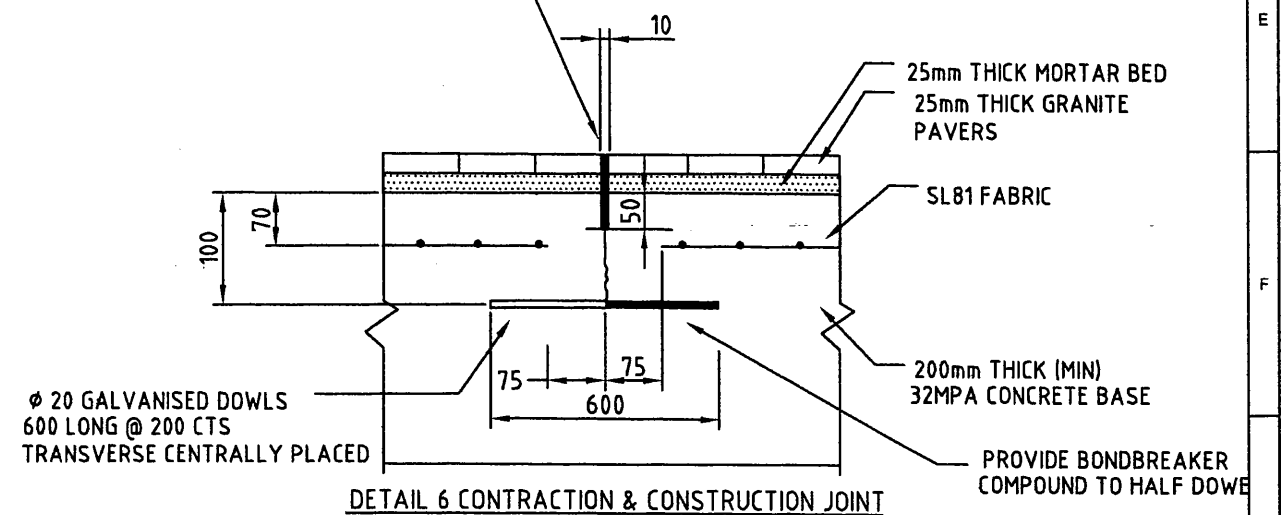


DETAIL 5 TIMETABLE (TT) CUT OUT DIMENSIONS



SECTION F-F

SEALANT @ CONSTRUCTION JOINT SHALL BE "THC 900" BT TREMCO (COLOUR TO MATCH GROUT). APPLICATION ACCORDING TO MANUFACTURERS SPECIFICATIONS (ENSURE COMPRESSIBLE BACKING ROD IS INSTALLED)



DETAIL 6 CONTRACTION & CONSTRUCTION JOINT

ISSUED FOR
CONSTRUCTION

REF.	ZONE	REVISION	DATE	APPD.
B	-	GENERAL REVISIONS	16.6.03	

SUPER STOP ON COLLINS
BETWEEN SPENCER & KING STREETS

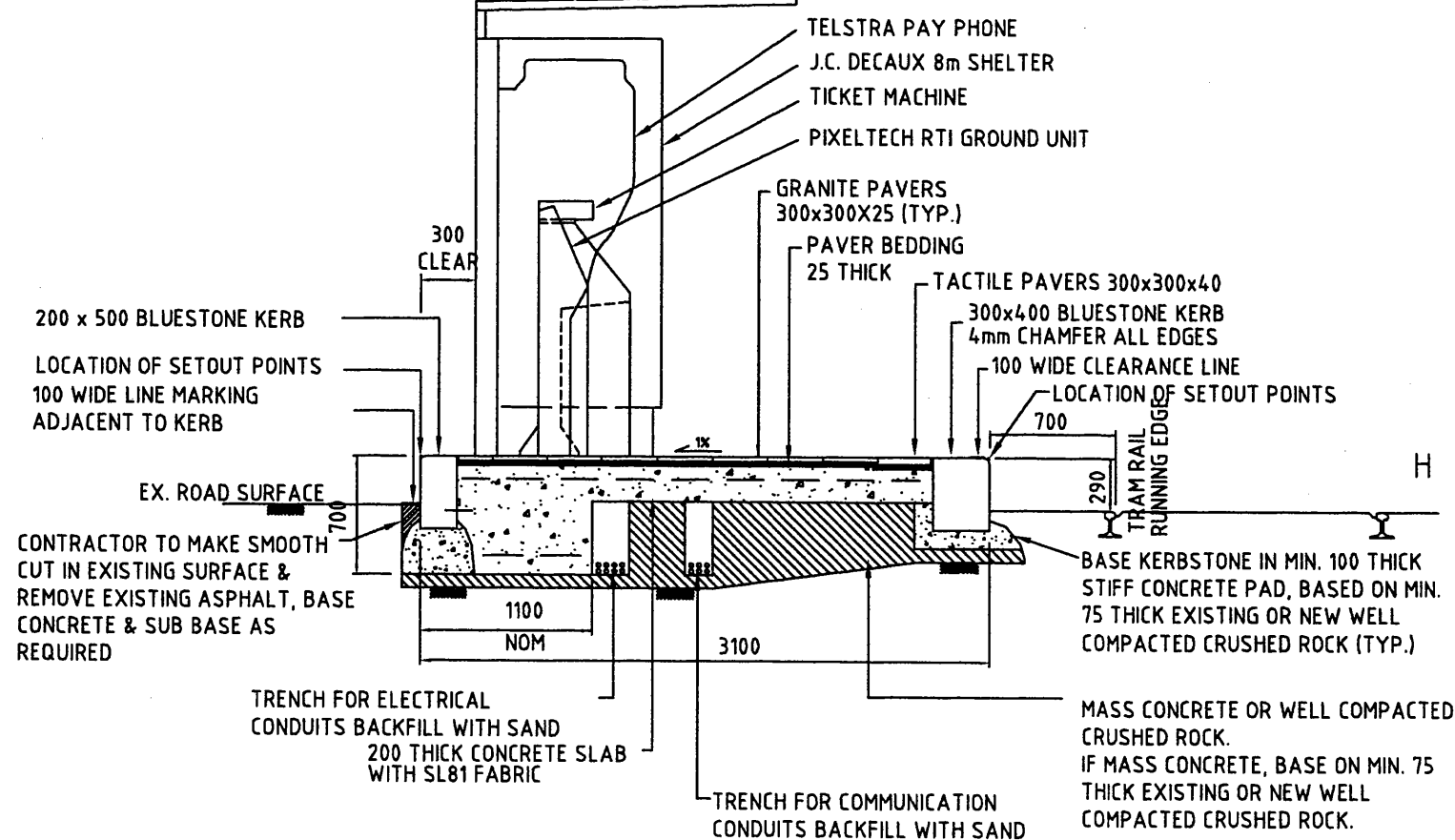


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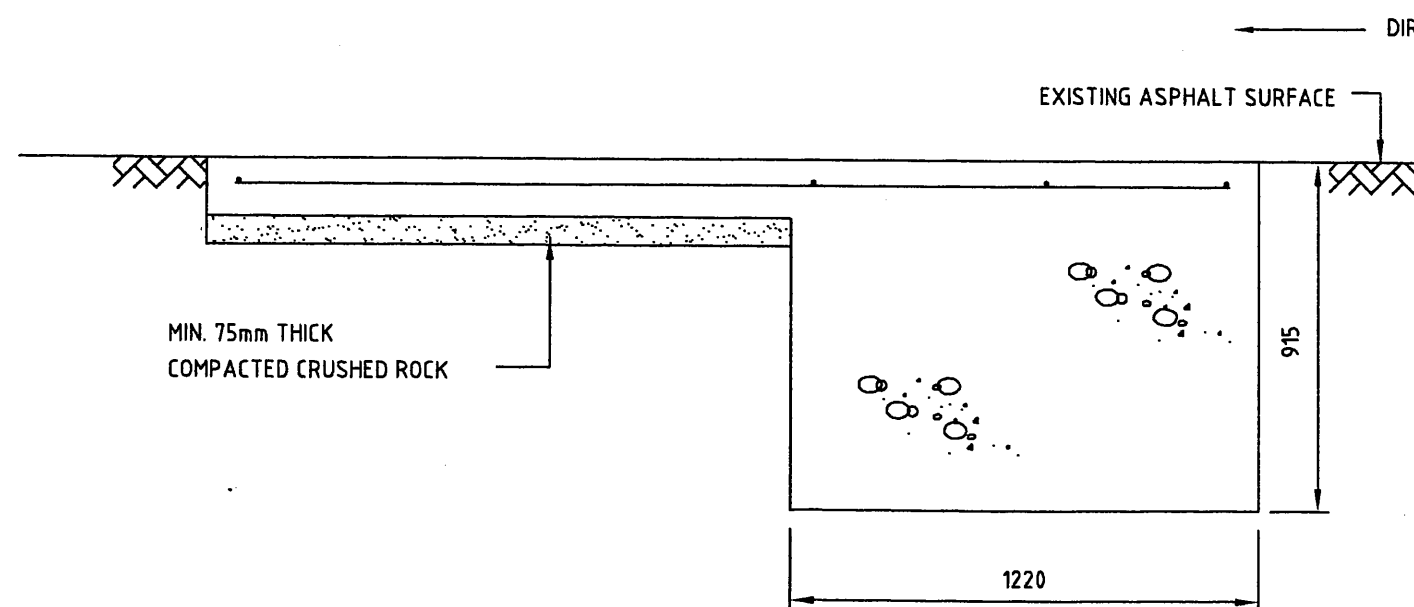
DESIGNED: TN
DRAWN: MA
AUTHORISED: -
DATE: JUNE 2003
CAD FILE No.: -
JOB No.: -

COLLINS STREET SUPER STOP
BETWEEN SPENCER & KING STREETS
PLATFORM DETAILS & SECTIONS - SHEET 3

SCALE 1:20
LEVEL DATUM AHD
SHEET 17 OF 25
DRAWING No. YT-CSK-17
VER. B

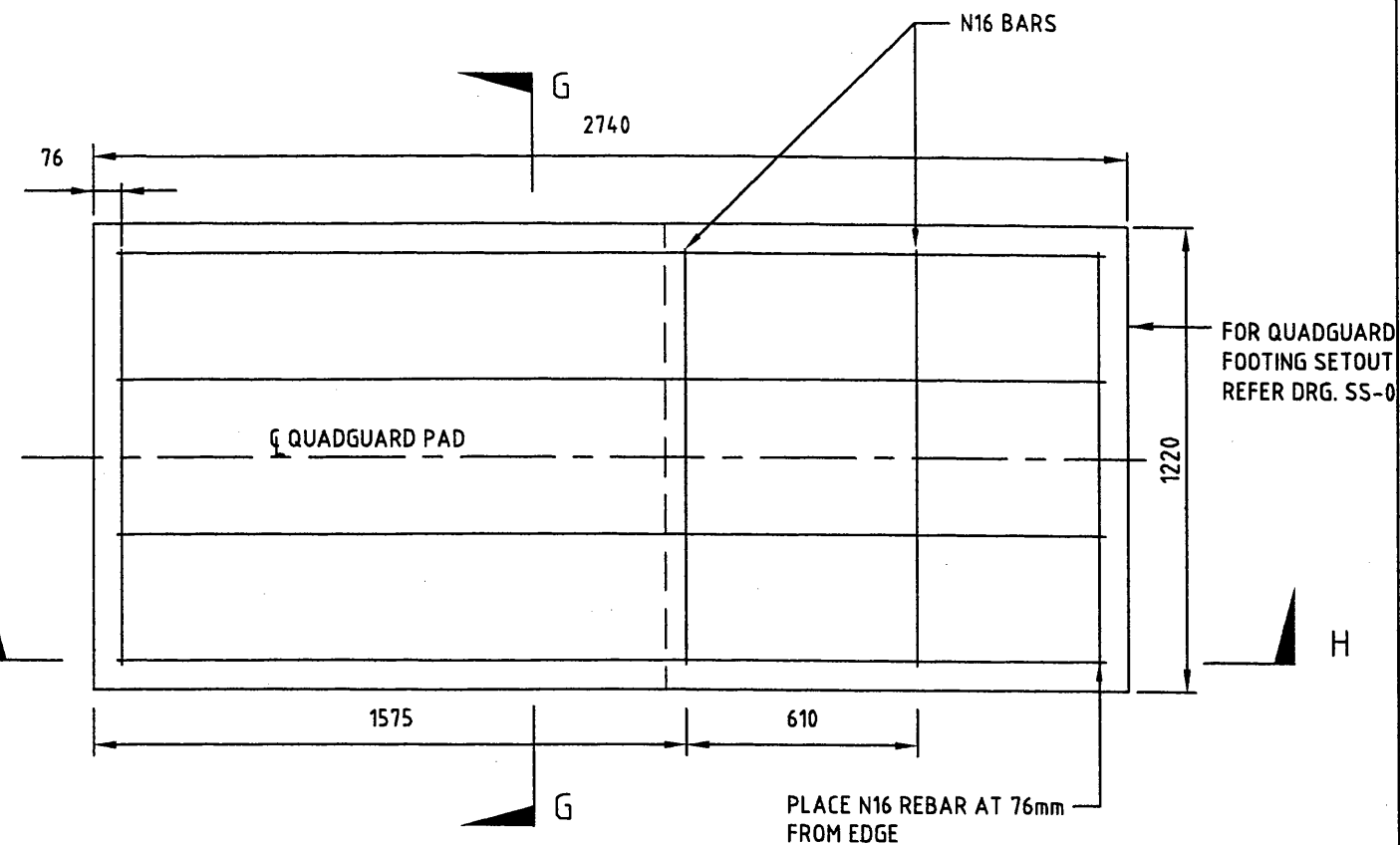


TYPICAL PLATFORM CROSS SECTION



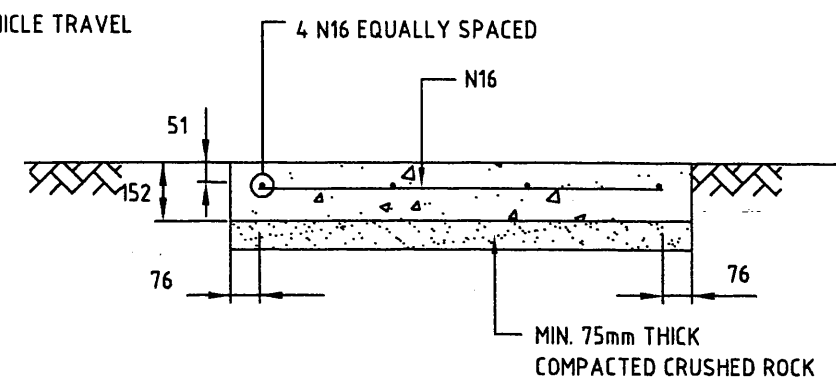
SECTION H-H

SCALE: 1:20



QUADGUARD (QS3602) FOOTING DETAIL

SCALE: 1:20



SECTION G-G

SCALE: 1:20

ISSUED FOR
CONSTRUCTION

REF	ZONE	REVISION	DATE	APPD.
B	-	GENERAL REVISIONS	16.6.03	

SUPER STOP ON COLLINS
BETWEEN SPENCER & KING STREETS



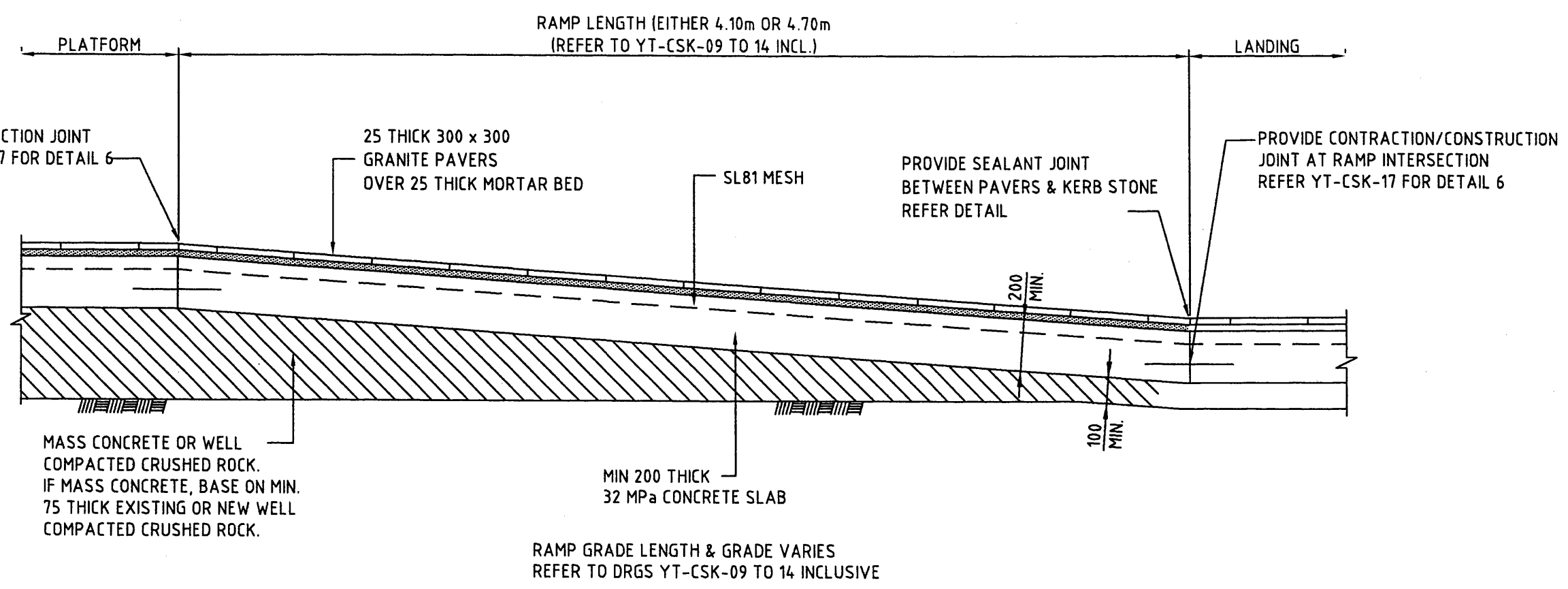
ARGOT CONSULTANTS
PROJECT MANAGERS AND CIVIL ENGINEERS
35 CANDLEBARK QUADRANT ROWVILLE 3178
TEL: (03) 9701 1354 FAX: (03) 9701 0200

DESIGNED: TN
DRAWN: MA
AUTHORISED:
DATE: JUNE 2003
CAD FILE No.:
JOB No.:

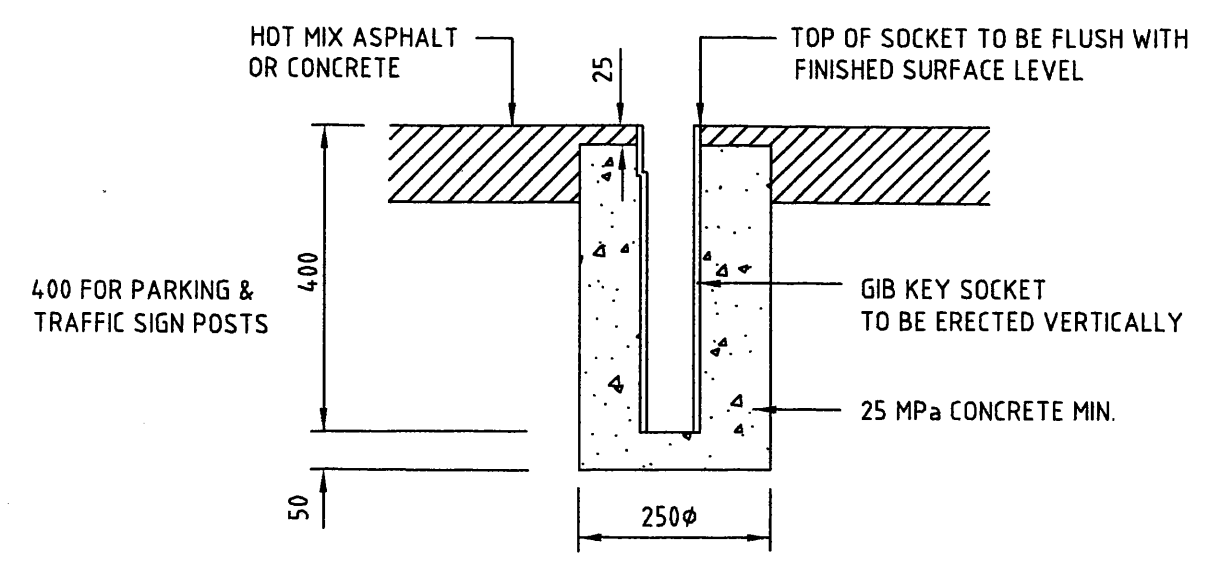
COLLINS STREET SUPER STOP
BETWEEN SPENCER & KING STREETS

PLATFORM DETAILS & SECTIONS - SHEET 4

SCALE 1:20
LEVEL DATUM AHD
SHEET 18 OF 25
DRAWING No. YT-CSK-18
VER.



TYPICAL ACCESS RAMP SECTION
1:20



TYPICAL GIB KEY SOCKET DETAIL 7
NOT TO SCALE

**ISSUED FOR
CONSTRUCTION**

REF.	ZONE	REVISION	DATE	APPD.
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2				
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**SUPER STOP ON COLLINS
BETWEEN SPENCER & KING STREETS**



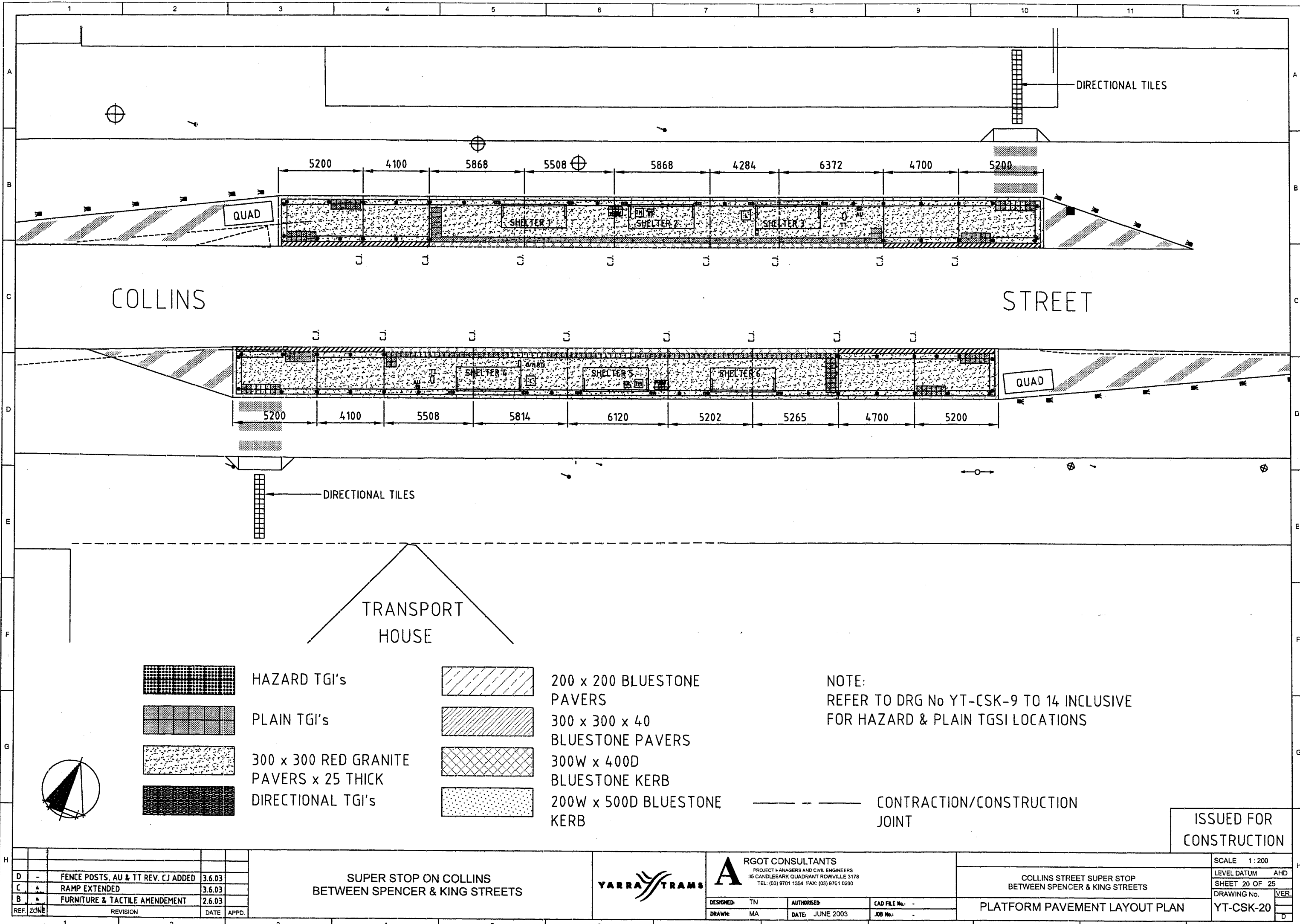
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35 CANDLEBARK QUADRANT ROWVILLE 3178
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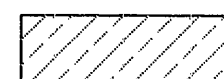
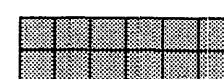

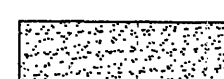


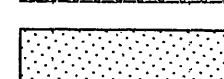
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DRAWN: MA	DATE: JUNE 2003	JOB No.:

**COLLINS STREET SUPER STOP
BETWEEN SPENCER & KING STREETS**

PLATFORM DETAILS & SECTIONS - SHEET 5

SCALE	1:20
LEVEL DATUM	AHD
SHEET	19 OF 25
DRAWING No.	VER.
YT-CSK-19	A



- | | | | |
|---|---|--|---------------------------------|
|  | HAZARD TGI's |  | 200 x 200 BLUESTONE PAVERS |
|  | PLAIN TGI's |  | 300 x 300 x 40 BLUESTONE PAVERS |
|  | 300 x 300 RED GRANITE PAVERS x 25 THICK |  | 300W x 400D BLUESTONE KERB |
|  | DIRECTIONAL TGI's |  | 200W x 500D BLUESTONE KERB |

NOTE:
REFER TO DRG No YT-CSK-9 TO 14 INCLUSIVE
FOR HAZARD & PLAIN TGI LOCATIONS

CONTRACTION/CONSTRUCTION
JOINT

ISSUED FOR
CONSTRUCTION

REF.	ZONE	REVISION	DATE	APPD.
D	-	FENCE POSTS, AU & TT REV. CJ ADDED	3.6.03	
C	*	RAMP EXTENDED	3.6.03	
B	*	FURNITURE & TACTILE AMEUREMENT	2.6.03	

SUPER STOP ON COLLINS
BETWEEN SPENCER & KING STREETS



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DESIGNED: TN

AUTHORISED:

CAD FILE No.:

DRAWN: MA

DATE: JUNE 2003

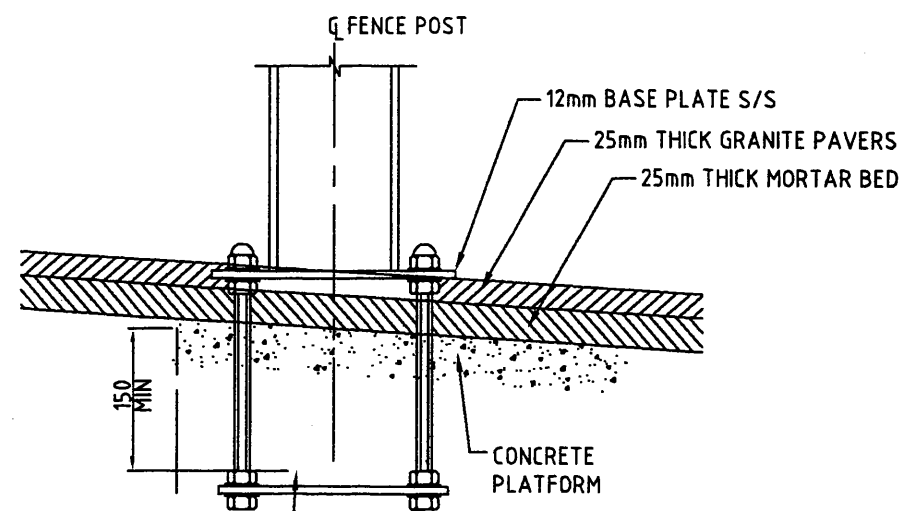
JOB No.:

COLLINS STREET SUPER STOP

BETWEEN SPENCER & KING STREETS

PLATFORM PAVEMENT LAYOUT PLAN

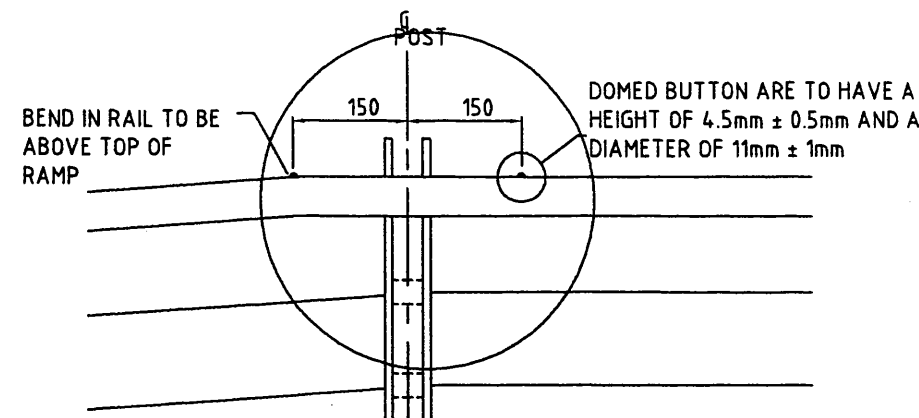
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LEVEL DATUM	AHD
SHEET	20 OF 25
DRAWING No.	VER
YT-CSK-20	D



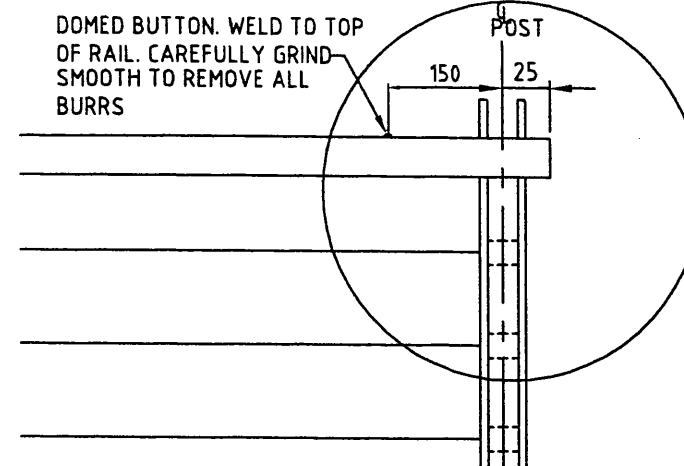
REFER TO TYPE 2
POST FOOTING
DETAILS

NOTE:
ENSURE FENCE POST IS ERECTED
VERTICALLY AT RAMPS BY JACKING
NUTS AS REQUIRED

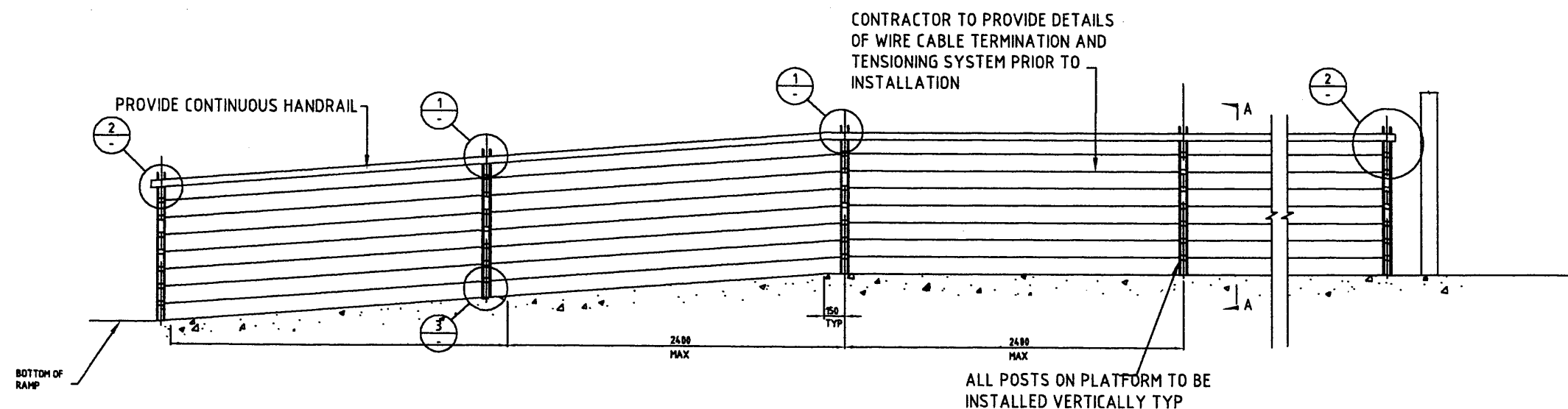
DETAIL 3 - INDICATIVE BASE PLATE ORIENTATION



DETAIL 1



DETAIL 2



INDICATIVE FENCE DETAIL & LAYOUT

REFER TO SHEETS YT-CSK-09 TO 14 INCLUSIVE

NOTES:

1. ALL FENCING (OTHER THAN HANDRAIL) TO BE GRADE 304 STAINLESS STEEL CLEAR POWDER COATED.
2. ALL WELDS TO BE 4mm CFW USING 308L WELDING WIRE/ELECTRODES UNO.
3. ALL EXPOSED STAINLESS STEEL SHALL HAVE WELD SPLATTER, FLUX, DAGS AND BURRS REMOVED. ALL EXPOSED SEALING AND BUTT WELDS SHALL BE GROUND FLUSH. ALL OTHER EXPOSED WELDS SHALL BE CONSISTENT AND NEAT IN APPEARANCE, OR GROUND SMOOTH. PROVIDE 1mm CHAMFER TO ALL EXPOSED EDGES UNO.
4. PICKLING AND PASSIVATION TREATMENT TO BE CARRIED OUT ON ALL COMPONENTS AFTER WELDING.
5. SURFACE FINISH TO BE CLASS 8 WITH CLEAR POWDER COAT FOR ALL EXPOSED STAINLESS STEEL.
6. FOOTING DESIGN NOT INTENDED FOR IMPACT PRONE LOCATIONS. FENCING NOT TO BE PLACED WITHIN 1.5m OF TRAFFICABLE LANE WITHOUT APPROVAL FROM YARRA TRAMS. REFER SPECIFIC SITE DRAWINGS FOR FENCE LAYOUT AND ALTERNATIVE DETAILS.
7. HANDRAILS TO BE GRADE 316 STAINLESS STEEL.

**ISSUED FOR
CONSTRUCTION**

**SUPER STOP ON COLLINS
BETWEEN SPENCER & KING STREETS**



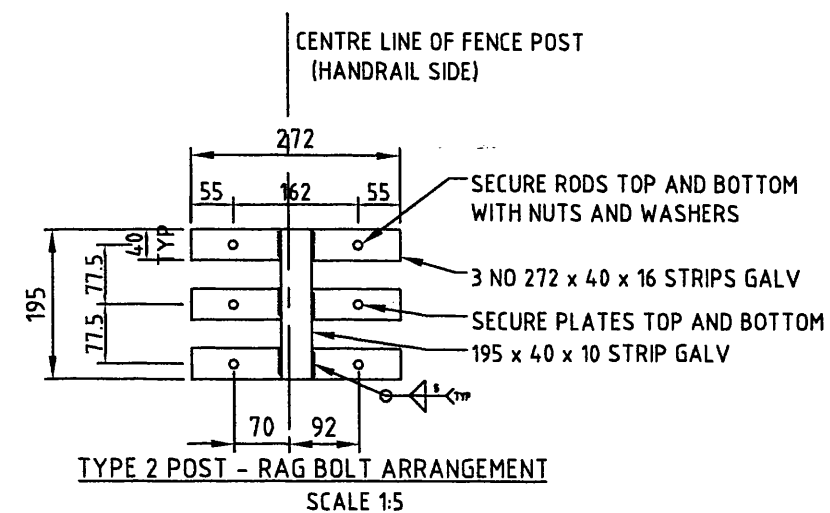
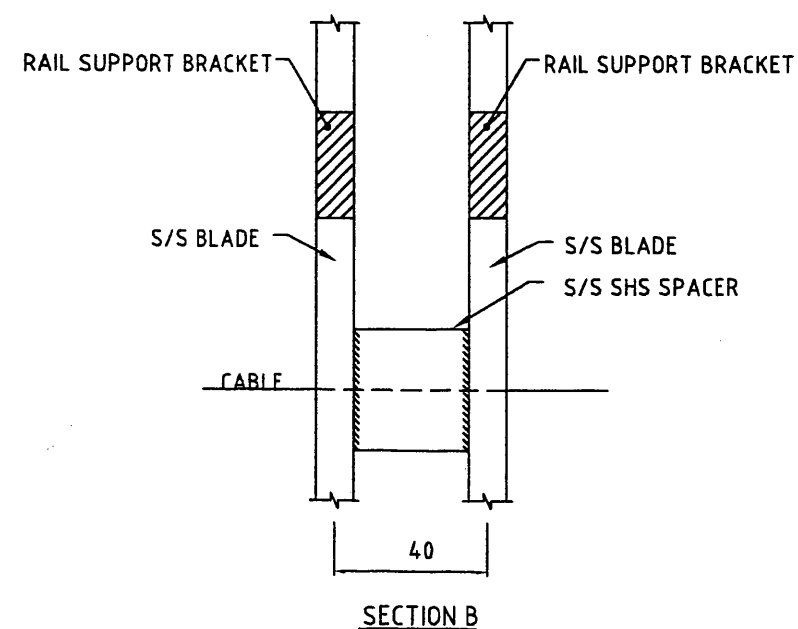
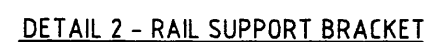
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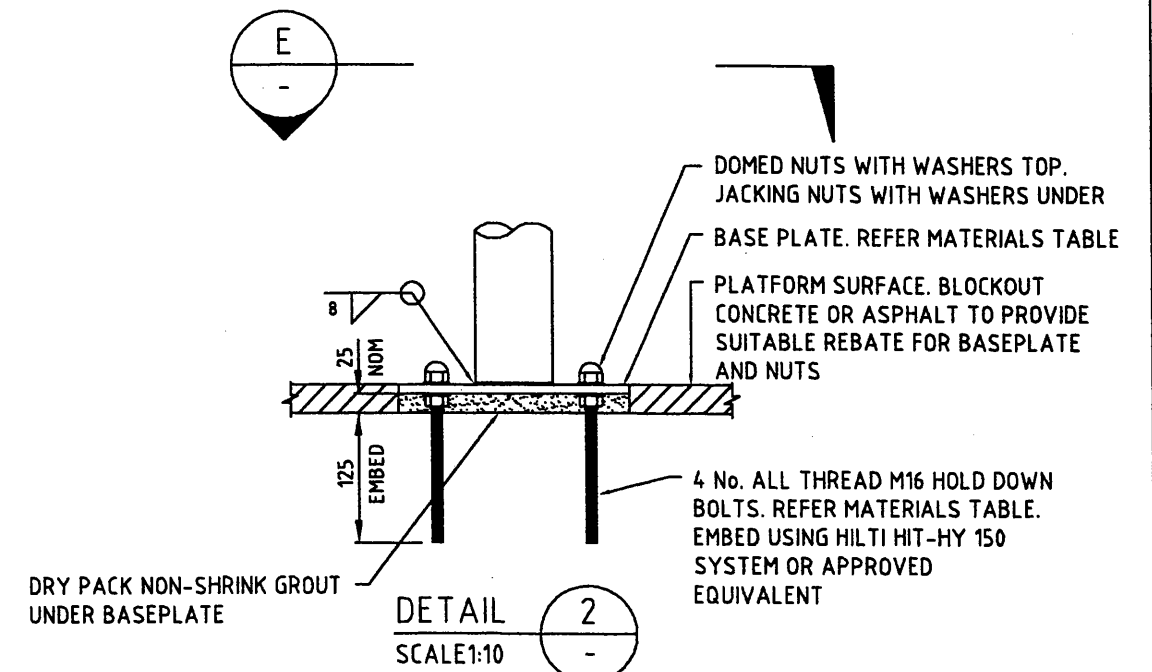
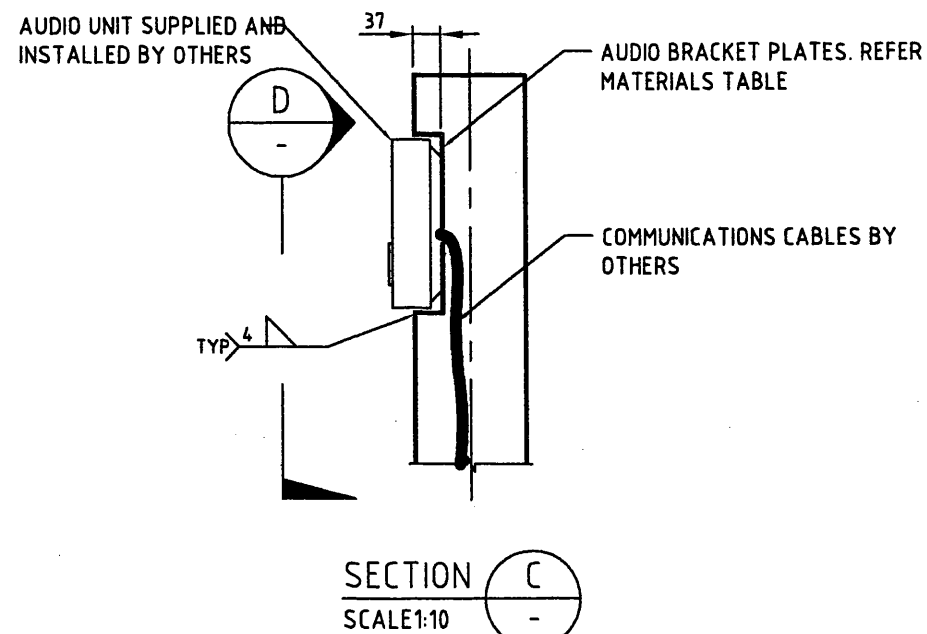
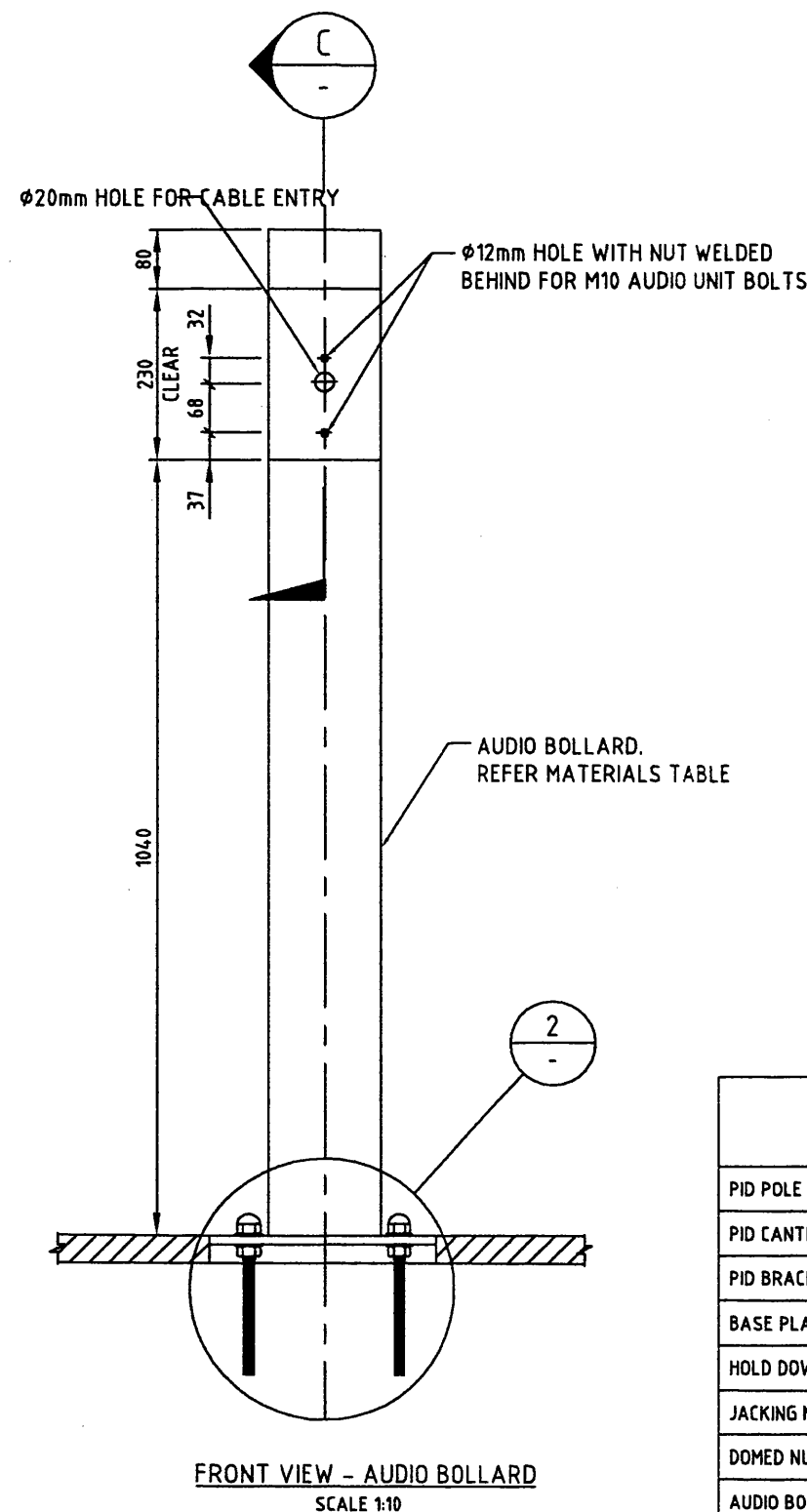
**COLLINS STREET SUPER STOP
BETWEEN SPENCER & KING STREETS**
INDICATIVE TYPE C FENCE ELEVATION & DETAIL

SCALE 1:20
LEVEL DATUM AHD
SHEET 21 OF 25
DRAWING No. VER.
YT-CSK-21 A

REF.	ZONE	REVISION	DATE	APPD.
B		GENERAL REVISIONS	16.6.03	



11-CSR-22	B
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	STEEL		STAINLESS STEEL	
	DETAILS	FINISH	DETAILS	FINISH
PID POLE	139.7x3.0 CHS GRADE 350	HOT DIP GALV & POWDER COAT IN INTERPON ULTRA SILVER 610	-	-
PID CANTILEVER	139.7x3.0 CHS GRADE 350	HOT DIP GALV & POWDER COAT IN INTERPON ULTRA SILVER 610	-	-
PID BRACKET PLATES	8 PLATE UNO GRADE 250	HOT DIP GALV & POWDER COAT IN INTERPON ULTRA SILVER 610	-	-
BASE PLATE	12 PLATE GRADE 250	HOT DIP GALV & POWDER COAT IN INTERPON ULTRA SILVER 610	12 PLATE GRADE 304	NO. 4 WITH CLEAR POWDER COAT
HOLD DOWN BOLTS	STAINLESS STEEL A4-70	MILL FINISH	STAINLESS STEEL A4-70	MILL FINISH
JACKING NUTS	STAINLESS STEEL A4-70	MILL FINISH	STAINLESS STEEL A4-70	MILL FINISH
DOMED NUTS	STAINLESS STEEL A4-70	MILL FINISH	STAINLESS STEEL A4-70	MILL FINISH
AUDIO BOLLARD	139.7x3.0 CHS GRADE 350	HOT DIP GALV & POWDER COAT IN INTERPON ULTRA SILVER 610	141 OD x 3.05 WT GRADE 304 STAINLESS STEEL PIPE	NO. 4 WITH CLEAR POWDER COAT
AUDIO BRACKET PLATES	5 PLATE GRADE 250	HOT DIP GALV & POWDER COAT IN INTERPON ULTRA SILVER 610	5 PLATE GRADE 304	NO. 4 WITH CLEAR POWDER COAT

MATERIALS TABLE

ISSUED FOR
CONSTRUCTION

REF	ZONE	REVISION	DATE	APPD.

SUPER STOP ON COLLINS
BETWEEN SPENCER & KING STREETS



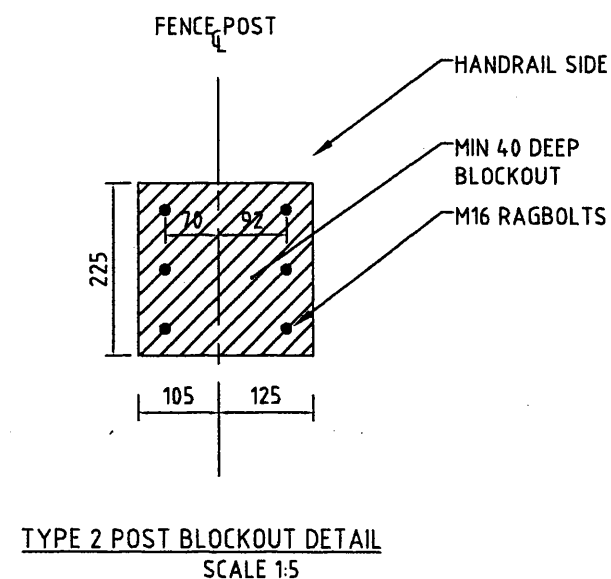
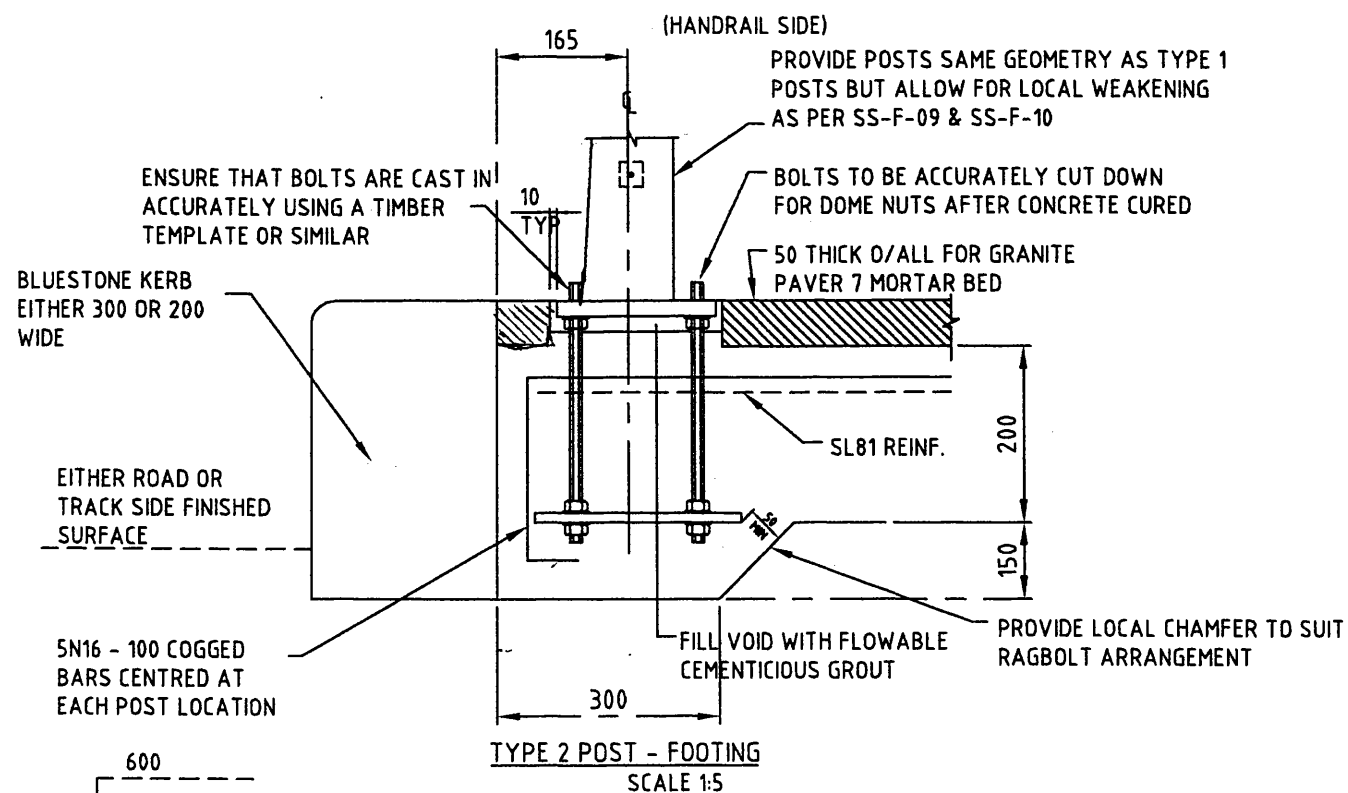
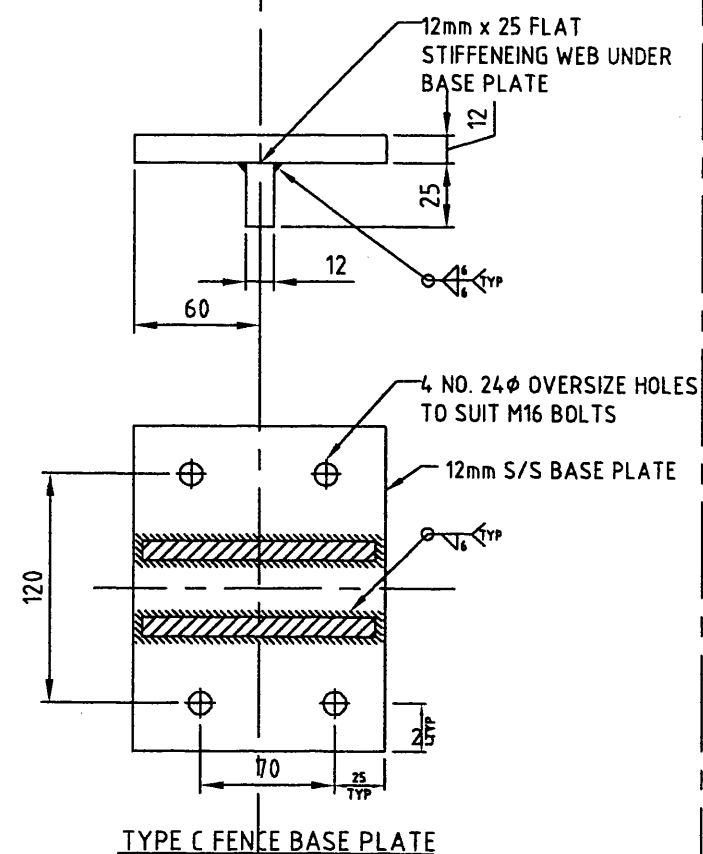
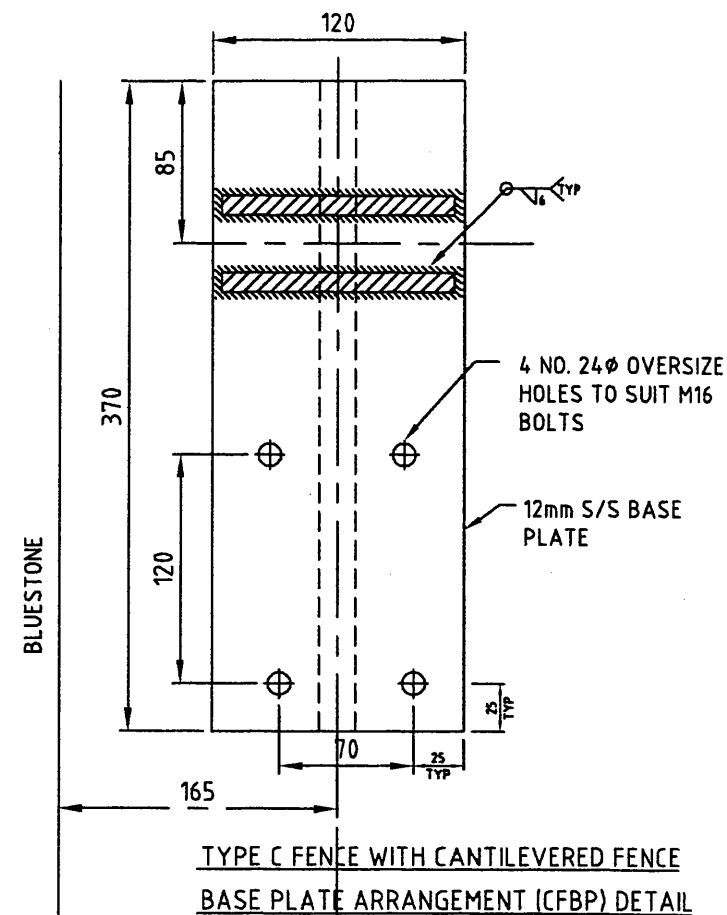
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AUTHORISED:
DATE: JUNE 2003
CAD FILE No.:
JOB No.:

COLLINS STREET SUPER STOP
BETWEEN SPENCER & KING STREETS

AUDIO UNIT & BOLLARD DETAILS

SCALE 1:20
LEVEL DATUM AHD
SHEET 23 OF 25
DRAWING No. VER.
YT-CSK-23
A



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CONSTRUCTION

SUPER STOP ON COLLINS
BETWEEN SPENCER & KING STREETS

YARRA TRAMS

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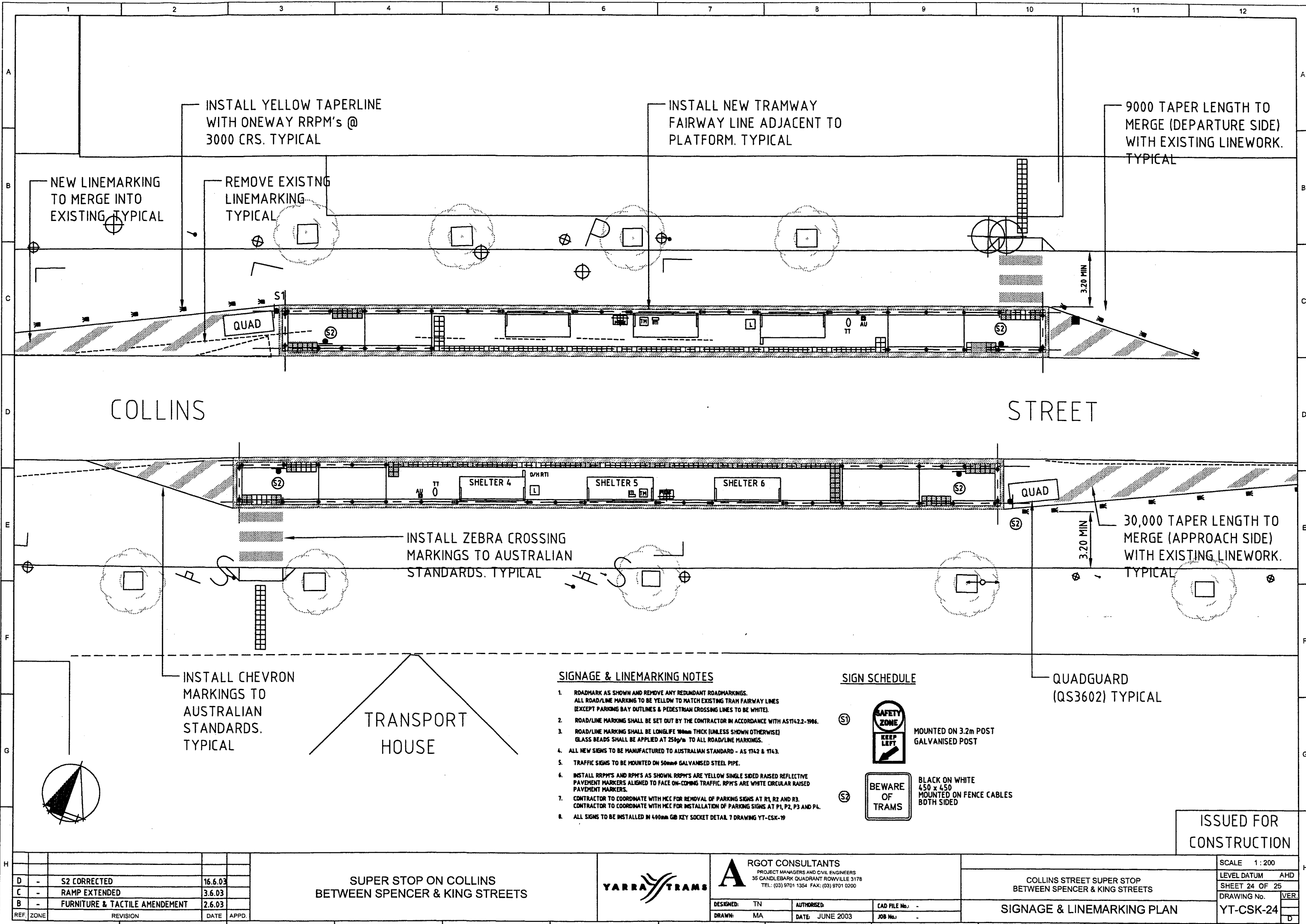
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AUTHORISED: DATE: JUNE 2003
JOB No.:

CAD FILE No.:
JOB No.:

COLLINS STREET SUPER STOP
BETWEEN SPENCER & KING STREETS

AUDIO UNIT & BOLLARD DETAILS


SCALE 1:20
LEVEL DATUM AHD
SHEET 25 OF 25
DRAWING No. YR-CSK-25
VER. A




SIGNAGE & LINEMARKING NOTES

- ROADMARK AS SHOWN AND REMOVE ANY REDUNDANT ROADMARKINGS. ALL ROAD/LINE MARKING TO BE YELLOW TO MATCH EXISTING TRAM FAIRWAY LINES (EXCEPT PARKING BAY OUTLINES & PEDESTRIAN CROSSING LINES TO BE WHITE).
- ROAD/LINE MARKING SHALL BE SET OUT BY THE CONTRACTOR IN ACCORDANCE WITH AS1742.2-1986.
- ROAD/LINE MARKING SHALL BE LONG LIFE 100mm THICK (UNLESS SHOWN OTHERWISE) GLASS BEADS SHALL BE APPLIED AT 250g/m² TO ALL ROAD/LINE MARKINGS.
- ALL NEW SIGNS TO BE MANUFACTURED TO AUSTRALIAN STANDARD - AS 1742 & 1743.
- TRAFFIC SIGNS TO BE MOUNTED ON 50mm² GALVANISED STEEL PIPE.
- INSTALL RRPM's AND RPH's AS SHOWN. RRPM's ARE YELLOW SINGLE SIDED RAISED REFLECTIVE PAVEMENT MARKERS ALIGNED TO FACE ON-COMING TRAFFIC. RPH's ARE WHITE CIRCULAR RAISED PAVEMENT MARKERS.
- CONTRACTOR TO COORDINATE WITH MCC FOR REMOVAL OF PARKING SIGNS AT R1, R2 AND R3. CONTRACTOR TO COORDINATE WITH MCC FOR INSTALLATION OF PARKING SIGNS AT P1, P2, P3 AND P4.
- ALL SIGNS TO BE INSTALLED IN 400mm GIB KEY SOCKET DETAIL 7 DRAWING YT-CSK-19

SIGN SCHEDULE



MOUNTED ON 3.2m POST GALVANISED POST



BLACK ON WHITE 450 x 450 MOUNTED ON FENCE CABLES BOTH SIDED

REF.	ZONE	REVISION	DATE	APPD.
D	-	S2 CORRECTED	16.6.03	
C	-	RAMP EXTENDED	3.6.03	
B	-	FURNITURE & TACTILE AMEUREMENT	2.6.03	

**SUPER STOP ON COLLINS
BETWEEN SPENCER & KING STREETS**



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AUTHORISED:
DATE: JUNE 2003

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**COLLINS STREET SUPER STOP
BETWEEN SPENCER & KING STREETS**

SIGNAGE & LINEMARKING PLAN

**ISSUED FOR
CONSTRUCTION**

SCALE 1:200
LEVEL DATUM AHD
SHEET 24 OF 25
DRAWING No. YT-CSK-24
VER. D

COLLINS STREET SUPER STOP BETWEEN SPENCER & KING STREETS

SHEET INDEX	
DRAWING No	DESCRIPTION
YT-CSK-01	FACE SHEET & DRAWING INDEX
YT-CSK-02	EXISTING CONDITIONS & SERVICES PLAN
YT-CSK-03	OVERALL PLATFORM AND PARKING ARRANGEMENT
YT-CSK-04	GENERAL PLATFORM ARRANGEMENT
YT-CSK-05	SETOUT AND TABLE
YT-CSK-06	SOUTH PLATFORM FURNITURE LAYOUT PLAN & LONGSECTION
YT-CSK-07	NORTH PLATFORM FURNITURE LAYOUT PLAN & LONGSECTION
YT-CSK-08	TYPICAL FRONT ELEVATIONS - PLATFORMS
YT-CSK-09	DETAILED PLAN - SHEET 1 OF 3 SOUTH PLATFORM
YT-CSK-10	DETAILED PLAN - SHEET 2 OF 3 SOUTH PLATFORM
YT-CSK-11	DETAILED PLAN - SHEET 3 OF 3 SOUTH PLATFORM
YT-CSK-12	DETAILED PLAN - SHEET 1 OF 3 NORTH PLATFORM
YT-CSK-13	DETAILED PLAN - SHEET 2 OF 3 NORTH PLATFORM
YT-CSK-14	DETAILED PLAN - SHEET 3 OF 3 NORTH PLATFORM
YT-CSK-15	PLATFORM DETAILS & SECTIONS SHEET 1
YT-CSK-16	PLATFORM DETAILS & SECTIONS SHEET 2
YT-CSK-17	PLATFORM DETAILS & SECTIONS SHEET 3
YT-CSK-18	PLATFORM DETAILS & SECTIONS SHEET 4
YT-CSK-19	PLATFORM DETAILS & SECTIONS SHEET 5
YT-CSK-20	PLATFORM PAVEMENT LAYOUT PLAN
YT-CSK-21	INDICATIVE TYPE C FENCE ELEVATION & DETAILS
YT-CSK-22	TYPE C FENCE DETAIL
YT-CSK-23	AUDIO UNIT AND BOLLARD DETAILS
YT-CSK-24	SIGNAGE & LINE MARKING PLAN
YT-CSK-25	ADDITIONAL FENCE BASE DETAILS

NOTE: THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE CONNELL WAGNER ELECTRICAL PACKAGE DRAWINGS FOR CONDUIT LAYOUT OF COMMUNICATIONS & ELECTRICAL SUPPLY.

NOTES

REINFORCEMENT NOTES

- R1 REFER TO DRG YT-CSK-05 FOR SETOUT AND DETAIL REFERENCES
R2 ALL REINFORCEMENT IS TO BE IN ACCORDANCE WITH AS 3600
R3 COVER TO REINFORCEMENT TO BE 40mm TO TOP OF SLAB & 25mm TO BOTTOM OF SLAB

FENCING & FURNITURE NOTES

- F1 REFER TO DRG YT-CSK-09 TO 14 INCLUSIVE FOR SETOUT AND FURNITURE DETAIL REFERENCES
F2 FURNITURE TO BE SUPPLIED IN ACCORDANCE WITH THE SPECIFICATIONS
F3 REFER TO DRG YT-CSK-21 & 22 FOR FENCING DETAILS AND NOTES

CONCRETE NOTES

- C1 ALL PLATFORM AND RAMP CONCRETE SHALL BE MINIMUM GRADE 32 MPa ALL OTHER CONCRETE TO BE 15 MPa U.N.O.
C2 PLACING OF ALL CONCRETE SHALL BE IN ACCORDANCE WITH AS 3600
C3 CONCRETE SURFACE FINISHES SHALL BE IN ACCORDANCE WITH AS 3610
C4 CONCRETE JOINTS SHALL BE LOCATED AS SHOWN AND AT OTHER LOCATIONS AS REQUIRED BY CONSTRUCTION METHODS

BASE COURSE NOTES

- B1 CONCRETE SHALL BE PLACED ON SOUND UNDISTURBED INSITU MATERIAL OR ON 100mm MINIMUM THICK MECHANICALLY COMPACTED CRUSHED ROCK

DEMOLITION NOTES

- D1 THE CONTRACTOR SHALL CAREFULLY REMOVE ALL ITEMS ASSOCIATED WITH THE EXISTING SAFETY ZONE, EXCEPT THOSE TO BE REVISED FOR ENHANCED TRAM STOP. REMOVED ITEMS SHALL BE TRANSPORTED TO THE YARRA TRAMS DEPOT AT E-GATE

GENERAL NOTES

- G1 ALL WORKS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH THE SPECIFICATIONS AND THESE DRAWINGS. WHERE A DISCREPANCY OCCURS THESE DRAWING TAKE PRECEDENCE.

DESETOUT NOTES

- S1 THE SETOUT OF THE PLATFORM AND FURNITURE SHALL BE IN ACCORDANCE WITH DRAWING YT-CSK-05
S2 OFFSET TO FACE OF TRAMSIDE KERB IS MEASURED FROM THE ADJACENT TRAMRAIL RUNNING EDGE. THE OFFSET IS TO BE CONSTRUCTED WITH A 5mm TOLERANCE AT ALL LOCATIONS
S3 THE HEIGHT OF THE TRAMSIDE KERB IS MEASURED FROM THE CROWN OF THE ADJACENT RAIL. THE HEIGHT IS TO BE CONSTRUCTED WITH A 5mm TOLERANCE AT ALL LOCATIONS
REFER TO DRAWING YT-CSK-06 & 07 FOR OTHER LEVEL INFORMATION

ELECTRICAL AND COMMUNICATION NOTES

- E1 REFER TO THE CONNELL WAGNER ELECTRICAL & COMMUNICATION PACKAGE

PAVING NOTES

- P1 HAZARD TGIS IS TO CONFORM TO TYPE B IN AS 1428.4 "IVORY" CERAMIC, 10mm THICK
P2 SMOOTH GSI SURFACE FINISH IS TO CONFORM TO LEVEL "V" AS 4586. ALL PAVERS ARE TO BE LAID ON BEDDING AS PER THE SPECIFICATIONSS USING 5mmGROUT JOINS. PAVERS TO BE 295 x 295 IN PLAN. BLUESTONE KERBING ON RAMPS TO BE CUT TO PROVIDE A 75mm MINIMUM EMBEDMENT BELOW THE SURFACE LEVEL

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SUPER STOP ON COLLINS
BETWEEN SPENCER & KING STREETS



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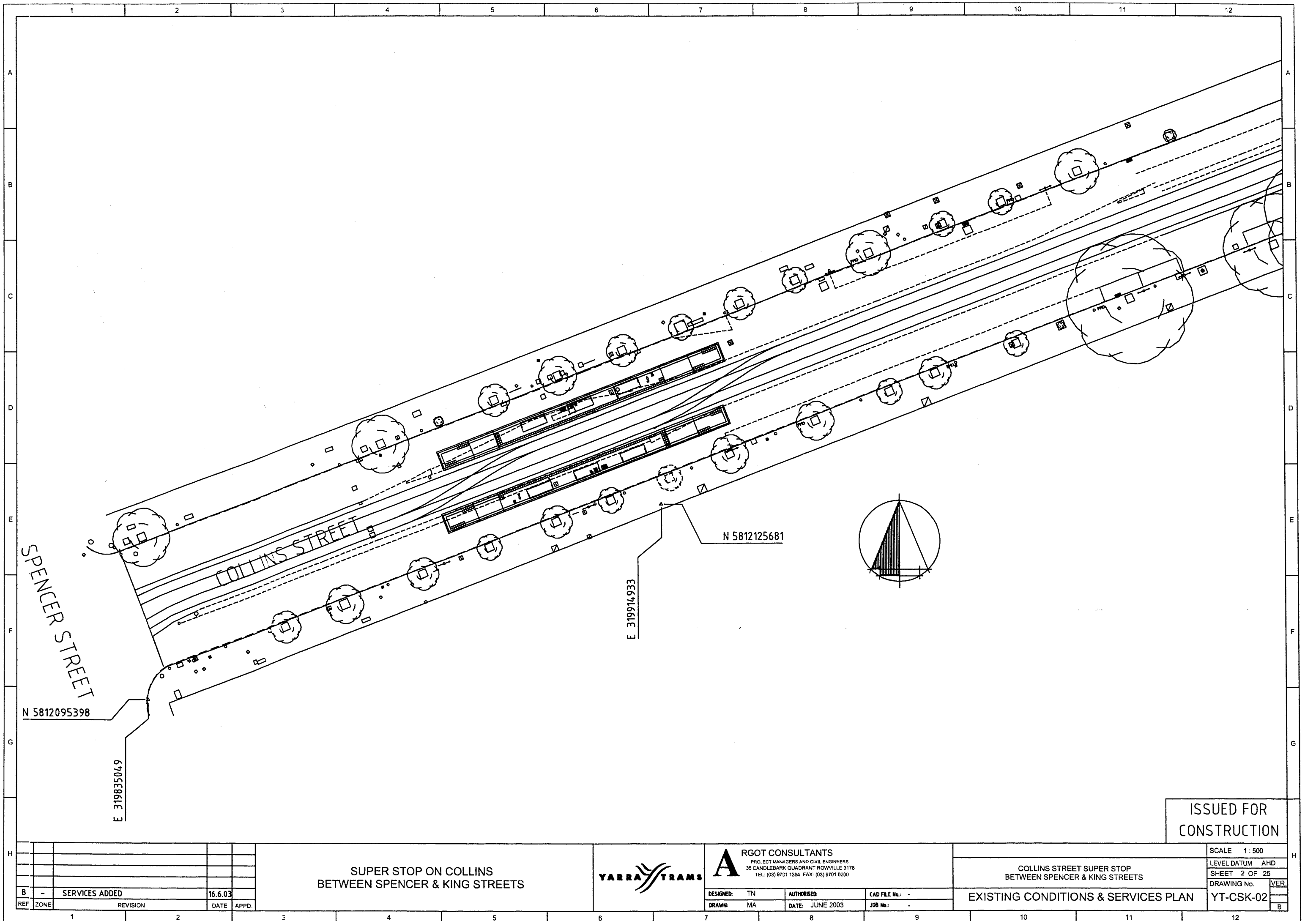
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DRAWN: MA DATE: JUNE 2003 JOB No.: PLAN.DWG

COLLINS STREET SUPER STOP
BETWEEN SPENCER & KING STREETS

FACE SHEET & DRAWING INDEX

SCALE NTS
LEVEL DATUM AHD
SHEET 1 OF 25
DRAWING No. VER.
YT-CSK-01
B

REF. ZONE DRG No 25 ADDED 16.6.03
REVISION DATE APPD.



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BETWEEN SPENCER & KING STREETS



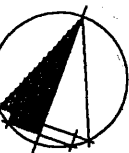
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COLLINS STREET SUPER STOP
BETWEEN SPENCER & KING STREETS
EXISTING CONDITIONS & SERVICES PLAN

SCALE 1:500
LEVEL DATUM AHD
SHEET 2 OF 25
DRAWING No. YT-CSK-02
VER. B

REF	ZONE	REVISION	DATE	APPD.
B	-	SERVICES ADDED	16.6.03	



PARKING	EXISTING PARKING BAYS					PROPOSED PARKING BAYS				
	LOCATIONS	BUS	LOADING*	TAXI	PARKING	DISABLED	BUS	LOADING*	TAXI	PARKING
NORTH CARRIAGEWAY										
	SPENCER ST - KING ST	-	4	-	6	-	-	3	-	7
	EAST OF KING ST	-	-	-	-	-	-	-	-	-
SOUTH CARRIAGEWAY										
	SPENCER ST - KING ST	-	2	2	11	1	-	2	2	7
	EAST OF KING ST	-	-	-	-	-	-	-	-	5
	TOTAL	0	6	2	17	1	0	5	2	19
	NET CHANGE	0	+1	0	+2	0				

* BASED ON 6m BAY LENGTH

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SUPER STOP ON COLLINS
BETWEEN SPENCER & KING STREETS



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AUTHORISED:
DATE: MAY 2003
CAD FILE No.: PLAN.DWG
JOB No.: PLAN.DWG

COLLINS STREET SUPER STOP
BETWEEN SPENCER & KING STREETS

OVERALL PLATFORM & PARKING ARRANGEMENT

SCALE 1:1000
LEVEL DATUM AHD
SHEET 3 OF 25
DRAWING No. YT-CSK-03
VER. B

