SC6.4.5 Construction management

(1) This section outlines the standards and provides advice and guidelines for construction management of development and covers pre-construction, construction and quality management systems.

(2) All development works shall be supervised by a Registered Professional Engineer of Queensland with relevant experience. Where the owner or developer does not have such a Professional Engineer in their employ, a Registered Consulting Professional Engineer shall be retained for the purpose of supervising the development works prior to commencement of work.

(3) This section aims to clearly define the role of council, Superintendent, Consultant, Principal Contractor and the Developer. This section seeks to ensure that inherited development works are constructed to achieve a cost effective operation and maintenance asset and perform adequately for their design lives.

(4) Reference and source documents

(a) Development manual planning scheme policy sub-sections to be read and applied in conjunction with this policy sub-section are as follows:
SC6.4.6.1 Water sensitive urban design construction and establishment guidelines
SC6.4.6.2.5 Pipeline testing and restoration (Water supply sub-section)
SC6.4.6.3.4 Pipeline testing and restoration (Sewerage system sub-section)
SC6.4.6.19 Stabilisation
SC6.4.6.22 Pavement markings
SC6.4.6.29 Boundary fencing
SC6.4.6.30 Control of traffic

(b) Australian Standards

AS 1012.1	*Methods of testing concrete - Sampling of fresh concrete*
AS 1012.3.1	*Methods of testing concrete - Determination of properties related to the consistency of concrete - Slump test*
AS 1012.14	*Methods of testing concrete - Method for securing and testing cores from hardened concrete for compressive strength*
AS 1012.4	*Methods of testing concrete - Determination of properties related to the consistency of concrete - Compactibility index*
AS 1012.8	*Methods of testing concrete - Method of making and curing concrete*
AS 1012.9	*Methods of testing concrete - Determination of the compressive strength of concrete specimens*
AS 1141.11	*Methods for sampling and testing aggregates - Particle size distribution*
AS 1141.12	*Methods for sampling and testing of aggregates - Materials finer than 75 micrometre in aggregates (by washing)*
AS 1141.14	*Methods for sampling and testing aggregates - Particle shape, by proportional caliper*
AS 1141.15	*Methods for sampling and testing aggregates - Flakiness index*
AS 1141.18	*Methods for sampling and testing aggregates - Crushed particles in coarse aggregate derived from gravel*
AS 1141.22	*Methods for sampling and testing aggregates - Wet/dry strength variation*
AS 1141.23	*Methods for sampling and testing aggregates - Los Angeles value*
AS 1141.24	*Methods for sampling and testing aggregates - Aggregate soundness - Evaluation by exposure to sodium sulphate solution*

AS 1141.25	*Methods for sampling and testing aggregates - Degradation factor*
AS 1141.25.1	*Methods for sampling and testing aggregates - Degradation factor - Source rock*
AS 1141.42	*Methods for sampling and testing aggregates - Pendulum friction test*
AS 1160	*Bituminous emulsions for the construction and maintenance of pavements*
AS 1289.3.2.1	*Methods of testing soils for engineering purposes - Soil classification tests - Determination of the plastic limit of a soil - Standard method*
AS 1289.3.3.1	*Methods of testing soils for engineering purposes - Soil classification tests - Calculation of the plasticity index of a soil*
AS 1289.3.6.1	*Methods of testing soils for engineering purposes - Soil classification tests - Determination of the particle size distribution of a soil - Standard method of analysis by sieving*
AS 1289.3.7.1	*Methods of testing soils for engineering purposes - Soil classification tests - Determination of the sand equivalent of a soil using a power-operated shaker*
AS 1289.4.2.1	*Methods of testing soils for engineering purposes - Soil chemical tests - Determination of the sulfate content of a natural soil and the sulfate content of the groundwater - Normal method*
AS 1289.4.3.1	*Methods of testing soils for engineering purposes - Soil chemical tests - Determination of the pH value of a soil - Electrometric method*
AS 1289.4.4.1	*Methods of testing soils for engineering purposes - Soil chemical tests - Determination of the electrical resistivity of a soil - Method for sands and granular materials*
AS 1289.5.1.1	*Methods of testing soils for engineering purposes - Soil compaction and density tests - Determination of the dry density/moisture content relation of a soil using standard compactive effort*
AS 1289.5.4.1	*Methods of testing soils for engineering purposes - Soil compaction and density tests - Compaction control test - Dry density ratio, moisture variation and moisture ratio*
AS 1289.5.5.1	*Methods of testing soils for engineering purposes - Soil compaction and density tests - Determination of the minimum and maximum dry density of a cohesionless material - Standard method*
AS 1289.5.7.1	*Methods of testing soils for engineering purposes - Soil compaction and density tests - Compaction control test - Hilf density ratio and Hilf moisture variation (rapid method)*
AS 1289.5.8.1	*Methods of testing soils for engineering purposes - Soil compaction and density tests - Determination of field density and field moisture content of a soil using a nuclear surface moisture–Density gauge - Direct transmission mode*
AS 1289.6.1.1	*Methods of testing soils for engineering purposes - Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen*
AS 1432	*Copper tubes for plumbing, gasfitting and drainage applications*
AS 1477	*PVC pipes and fittings for pressure applications*

AS 1478	*Chemical admixtures for concrete, mortar and grout*
AS 1580.107.3	*Paints and related materials - Methods of test - Determination of wet film thickness by gauge*
AS 1741	*Vitrified clay pipes and fittings with flexible joints - Sewer quality*
AS 1742.3	*Manual of uniform traffic control devices - Traffic control for works on roads*
AS 2008	*Bitumen for pavements*
AS/NZS 2032	*Installation of PVC pipe systems*
AS 2129	*Flanges for pipes, valves and fittings*
AS 2280	*Ductile iron pipes and fittings*
AS 2150	*Hot mix asphalt - A guide to good practice*
AS 2544	*Grey iron pressure fittings*
AS 2638	*Gate valves for waterworks purposes*
AS 2758.1	*Aggregates and rock for engineering purposes - Concrete aggregates*
AS 2891.9.3	*Methods of sampling and testing asphalt - Determination of bulk density of compacted asphalt - Mensuration method*
AS/NZS 1477	*PVC pipes and fittings for pressure applications*
AS 3439	*Low-voltage switchgear and controlgear assemblies*
AS 3582.1	*Supplementary cementitious materials for use with portland and blended cement - Fly ash*
AS 3583.1	*Methods of test for supplementary cementitious materials for use with portland and blended cement - Determination of fineness by the 45 micrometre sieve*
AS 3583.12	*Methods of test for supplementary cementitious materials for use with portland cement - Determination of available alkali*
AS 3583.13	*Methods of test for supplementary cementitious materials for use with portland cement - Determination of chloride ion content*
AS 3583.14	*Methods of test for supplementary cementitious materials for use with portland cement - Determination of insoluble residue content*
AS 3583.2	*Methods of test for supplementary cementitious materials for use with portland cement - Determination of moisture content*
AS 3799	*Liquid membrane-forming curing compounds for concrete*
AS/NZS 3905.12	*Quality system guidelines - Guide to AS/NZS ISO 9001 for architectural and engineering design practices*
AS 3952	*Water supply - Spring hydrant valve for waterworks purposes*
AS 3972	*General purpose and blended cements*
AS 4198	*Precast concrete access chambers for sewerage applications*

AS 4373	*Pruning of Amenity Trees*
AS/NZS 4455	*Masonry units, pavers, flags and segmental retaining wall units*
AS 4687	*Temporary Fencing and Hoardings*
AS 4970	*Protection of trees on development sites*
AS 5101.4	*Methods for preparation and testing of stabilized materials - Unconfined compressive strength of compacted materials*
AS/NZS ISO 9001	*Quality management systems - Requirements*
AS ISO 10006	*Quality management systems - Guidelines for quality management in projects*
AS ISO 10006	*Quality management systems - Guidelines for quality management in projects*
AS ISO 10013	*Guidelines for quality management system documentation*

(c) Department of Transport and Main Roads

Standard specifications roads

MRTS17 - Bitumen
MRTS18 - Polymer Modified Binder
MRTS21 - Bituminous Emulsion
MRTS22 - Supply of Cover Aggregate
MRTS30 - Dense Graded and Open Graded Asphalt

Materials testing manual

Q103A Particle size distribution (wet sieving)
Q104A - Liquid limit (cone penetrometer)
Q104D - One-point liquid limit (cone penetrometer)
Q105 - Plastic limit and plasticity index
Q113A - California bearing ratio (standard compactive effort)
Q115 - Unconfined compressive strength of compacted materials
Q142A - Dry density- moisture relationship (standard compaction)
Q201 - Flakiness index
Q205B - Ten percent fines value (wet)
Q205C - Wet/dry strength variation
Q208A - Degradation factor (source rock)

(d) Other

ASTM International, ASTM-D 2434-68 - *Standard Test Method for Permeability of Granular Soils (Constant Head)*
Environmental Protection (Noise) Policy (EPP (Noise))
International Erosion Control Association, *Best Practice Erosion and Sediment Control Document (BPESC)*
NSW Department of Transport, Roads and Maritime Services (RMS), *Test method T432: Rate of slaking of quicklime, October 2012*
TCC-001
Work Health and Safety Act 2011

SC6.4.5.1 Pre-construction guidelines

SC6.4.5.1.1 Pre-construction steps

The chart presented below indicates the steps required to be undertaken prior to commencement of works.

(1) Notice to commence works

The Developer must give council's Development Assessment Unit (DAU) notification of at least 5 business days (in writing) of their intention to commence construction works. Refer to SC6.4.5.1 Attachment A Development works – notice to commence works. Refer to the Development works - notice to commence works form for a list of requirements to be submitted prior to or at the pre-start meeting.

(2) Pre-start meeting

The nominated Consultant must ensure that a pre-start meeting is conducted on the premises between the contractor, supervising engineer (RPEQ), the design consultant and council representatives. This meeting represents a hold point and works may not proceed until the meeting is held and any further requirements identified during the course of the meeting have been satisfied. The pre-start meeting must be based on an agenda which includes:

(a) introduction of the principal contractor, supervising engineer (RPEQ), design consultant (including any specialist) and council representative. A statement of their respective roles and relevant personnel contact details must also be tabled and distributed at that meeting;

(b) confirmation that all relevant statutory permits/approvals have been obtained;

(c) evidence of current public liability insurance. Refer to SC6.4.5.2(21) Insurance and indemnity;

(d) review and discussion of all relevant conditions of the development approval;

(e) review and confirmation of the site establishment and access arrangements including all necessary site security fencing and signage requirements;

(f) review and discussion of the approved traffic management plan and haulage routes if applicable;

(g) review and discussion on a schedule of "hold-points" to be adopted throughout the construction phase. This schedule of "hold-points" is to be approved by council prior to construction proceeding;

(h) discussion of site specific workplace health and safety issues and an approved work method statement and safety plan in compliance with the *Work Health and Safety Act 2011*;

(i) review of the approved erosion and sediment control plan including site base stormwater management

plans and sediment controls during and post construction. Refer to SC6.4.5.2(11) Erosion and sediment control and SC6.4.3.8 Stormwater quality management plans for further details regarding this requirement;

(j) location confirmation and identification of all existing public utilities, services and council assets if applicable, including any approved demolition/rectification actions if required;

(k) scheduling and identification of all necessary responsible persons to undertake any council required works (e.g. disconnection of irrigation systems, sewer line connections etc.);

(l) review of the vegetation protection plan if applicable and confirmation that any necessary vegetation protection measures are in place;

(m) construction schedule and program and any other details that requires review before construction work commences e.g. work quality plan and/or quality manual review of quality requirements (SC6.4.5.3 Quality management system) and inspection test plan requirements;

(n) if required, a development notice (project sign in accordance with SC6.4.5.2.1(6) Development notice) is to be erected;

(o) confirmation of possession of site by the contractor; and

(p) any other relevant matters specified by the principal contractor, supervising engineer (RPEQ), consultant/s and/or council representative that may be pertinent to the successful completion of the project.

SC6.4.5.1 Attachment A Development works - notice to commence works form

Click here to view SC6.4.5.1 Attachment A Development works - notice to commence works form

Note—this form is to be completed, signed and submitted to council by the developer at least 10 working days prior to commencement of any development works.

SC6.4.5.2 Construction

SC6.4.5.2.1 General standards and guidelines

The following are general standards and guidelines during the construction of development works:

(1) Superintendent

The superintendent is to be nominated or appointed by the supervising engineer (RPEQ) and must be supervised by the RPEQ at all times throughout the construction period. The supervising engineer (RPEQ) is to take full responsibility for all construction work on the development site.

(2) Hours of work

Unless otherwise approved by council (in writing), works involving machinery of any description shall only be carried out on site from 6.30am to 6:30pm Monday to Saturday, subject to legislative requirements. No construction work is to take place on Sundays and public holidays without prior approval. Construction work includes deliveries to the site of the works and the onsite servicing of equipment.

(3) Relocation/alteration and repair to existing utility services

The location and level of all existing public utilities and services and the alignment for any new service utility or service in association are to be identified with the relevant authority or council asset owner. The developer is responsible for any relocation and/or alteration to any public utility installation required as a result of any works carried out in connection with this development at no cost to council.

The contractor is to ensure that utmost care is to be exercised during the progress of the development works to prevent damage to any existing utility or service. Any damage to existing utilities or services directly resulting from the development works shall be the responsibility of the developer.

(4) Provision for traffic management

No works shall be conducted within an existing public road without approval (i.e. Road work permit). Any proposed road closure (partial or full), or traffic diversion is to be presented (with full details of proposed traffic management) for approval. Proposed traffic management is to comply with the relevant sections of SC6.4.6.30 Control of traffic.

The developer is to ensure that all appropriate approvals and permits are obtained from council for work zones, gantries and scaffolding prior to commencement of construction.

The developer shall be held responsible for implementing the approved traffic management plan including the safety of all vehicles, pedestrians and cyclists and must provide all necessary measures to prevent any accident, damage and loss.

(5) Condition of entry to adjoining properties

The developer or its representative must effectively protect all adjoining properties against any loss, damage or injury that may occur as a result of development works.

Works must not be undertaken on adjoining properties without prior written consent of the lawful owner. All adjoining property which has been disturbed as a result of the development shall be reinstated to a finish similar to its pre-development state or to an alternative state agreed to in writing by the affected property owner.

Upon completion of the development works, written approval from any affected property owners will be required by council prior to acceptance of the completed development works.

(6) Development notice

Where required, a project sign is to be erected within the site boundaries on the road frontage of the subject site or any other council approved location that is prominent and visible to the public. The developer is responsible for maintaining the signage for the duration of the construction. The signage shall have the following information (as a minimum):

(a) description of development (include an overall concept plan);

(b) name of developer;

(c) name of project;

(d) street address of the site;

(e) supervising engineer's name and phone number;

(f) consultant's name and phone number;

(g) principal contractor's name and phone number; and

(h) other specialist consultants' names and phone numbers.

(7) Signage and security

All necessary signage and site security shall be provided wholly within the site and in strict accordance with current Workplace Health and Safety (QLD) guidelines and requirements.

(8) Site access

The construction site shall be accessed via one convenient access from a public road. The location and details of this access point is to be approved by council prior to construction commencing. This access point shall be used by all vehicles, equipment and personnel during the approved construction hours of the site. Appropriate vehicle "shake-down" facilities are to be provided at the point of access in accordance with appropriate water quality management objectives for the site. The vehicle shake-down facility is to be a minimum 1.5m long by 3m wide for one-way or 6m wide for two way entrances.

(9) Site fencing

The developer must erect a temporary man-proof fence to restrict unauthorised access into the construction site. The fence is to extend around the entire perimeter of the site with access being provided as outlined above. The developer is to refer to SC6.4.6.29 Boundary fencing for details of the temporary fence.

(10) Site management

The Contractor is responsible for the management of the construction site and control of construction activities throughout the period of works, with particular attention to reducing the impact of the construction work on the public, adjacent and nearby properties and other areas of the site not part of the works. The primary objective is to eliminate the impacts of the temporary and permanent works having regard to:

(a) work health and safety;

(b) erosion control;

(c) acid sulphate soils;

(d) run-off;

(e) traffic management;

(f) disposal of all materials;

(g) gaseous discharges and odour;

(h) noise; and

(i) dust.

Adjacent waterways shall be regularly monitored for turbidity plumes, algal blooms and dead marine life which may be attributable to the construction of the works.

(11) Erosion and sediment control

During the construction phase and up until council accepts the development works or at the end of the defect liability period the contractor shall be responsible for the installation and maintenance of all erosion and sediment control measures on site.

The approved erosion and sediment control plan (ESCP) submitted as part of the operational works or compliance application must be presented during the pre-start meeting. This plan must be presented to council's nominated representative for review and "fit-for-purpose" implementation on the site. If the ESCP requires revision to suit the current conditions of the development site, the plan must be amended to achieve the approved set of water quality outcomes required by council. Upon approval of the ESCP, the procedures and guidelines outlined in the plan for establishing, managing (inspection and monitoring) and maintaining water quality across the development site shall be the responsibility of the contractor.

The Developer/Superintendent must submit to council the as-constructed plans for ESCP, prior to requesting the On-Maintenance inspection.

At the end of the agreed period of implementation and maintenance, all identified temporary sediment control measures must be removed by the developer and the ground reinstated to council's satisfaction.

(12) Suppression of dust

At all times the Contractor shall ensure that dust resulting from the proposed works, including excavation, backfilling, grading and stockpiles is kept to an absolute minimum and to the satisfaction of council, by approved methods.

(13) Noise control

All construction work is to be undertaken pursuant to the *Environmental Protection (Noise) Policy (EPP (Noise))*. Construction works shall be carried out in accordance with the requirements and restrictions relating to hours of work specified in SC6.4.5.2.1(2); and the *Environmental Protection Act 1994*.

(14) Hazardous material

Hazardous materials are to be stored in a hazardous goods store such that it is free from flood and storm tide inundation. The hazardous goods store must ensure that materials cannot enter the environment or cause a public safety nuisance or hazard. Hazardous goods may only be kept on site for the duration of construction and are to be safely removed from site at completion of works, unless otherwise approved by council.

(15) Machinery refuelling

During construction, fuel and petroleum products shall not be stored on the site nor shall construction equipment and machinery be serviced on the site. Procedures shall be developed and implemented by the contractor for the refuelling of machinery and equipment which will minimise any potential for contamination of the site by way of spillage. The procedures shall ensure that refuelling on the site occurs within a designated area that does not drain directly into adjacent stormwater systems or waterways. Any procedures developed and implemented in this regard must include bunding of the refuelling area.

Any spillage of fuels and petroleum products during construction shall be reported to the superintendent. All steps necessary to rectify the contamination shall be undertaken by the contractor prior to the completion of the works and at no cost to council.

(16) Material storage

Materials shall not be stored on site unless approved in writing by the Superintendent or unless material storage details are shown on the drawings and approved by council.

All necessary measures shall be implemented to reduce the potential for environmental damage, which may arise from the storage of materials.

(17) Stockpiling of materials

Wherever possible, materials shall be installed directly in place or continually removed from site, eliminating the need for stockpiles. In all other cases, stockpiling of materials shall be on a temporary basis at the discretion of superintendent.

The location of approved stockpiles shall be in accordance with the ESCP and as a minimum stockpiles shall:

(a) Remain on site for as little time as practical;

(b) Be limited to a height of 2m;

(c) Not to be located within 10m of a residential boundary;

(d) Have batter slopes, covers and drainage which limit the potential for erosion and/or segregation;

(e) Be managed in accordance with SC6.4.5.2 Attachment B;

(f) The contractor is to erect and maintain a temporary sediment fence around all stockpiles for the duration

of the stockpile being on the site.

(18) Vegetation disposal

Burning or burying of waste vegetation on site is not permitted unless otherwise approved by council. Clearing and grubbing of the development site shall otherwise be undertaken in accordance with SC6.4.6.11 Clearing and grubbing.

(19) Work adjacent to trees and protection of environmentally significant vegetation

(a) Protection of trees and vegetation – general

All existing and newly planted trees and vegetation should be noted on the drawings and protected from damage during construction. The approved vegetation protection plan should be available onsite prior to commencement and during works. The vegetation protection plan will identify key stages where monitoring and certification will be required.

As specified in the vegetation protection plan, a vegetation protection zone must be established on site to ensure the required retention of existing trees and vegetation identified for protection and retention. The vegetation protection zones must be identified as *"no-go"* areas for construction traffic and meet the following requirements:

(i) For trees, the extent of the vegetation protection zone is to be determined in accordance with the tree protection zone (TPZ) requirements of AS 4970 - *Protection of trees on development sites.*

(ii) For areas of vegetation not including trees, other areas of natural heritage or hydrologically sensitive features, the extent of the Vegetation Protection Zone is to be determined by a qualified arborist, ecologist, or other approved officer.

(iii) The Vegetation Protection Zone is to be fenced or barricaded to prevent unauthorised vehicle and machinery access, as per AS4970 *Protection of trees on development sites* and AS4687 *Temporary Fencing and Hoardings*.

(iv) Signage to indicate "Vegetation Protection Zone - No Access" should be installed as per AS4970 *Protection of trees on development sites* and AS1319 *Safety signs for the occupational environment*.

(v) Where required, the tree bark is to be protected by wrapping a triple layer of hessian or rubber matting around the tree trunk.

(vi) Fixing of temporary service wires, nails, screws, stays, guys and or any other fixing device to trees should be avoided.

(vii) No fuel, oil dumps or chemicals are allowed to be used or stored within the Vegetation protection zone and the servicing or re-fuelling of equipment and vehicles must be carried out away from the vegetation protection zones.

(viii) Deposition of wind-blown materials (such as cement) into the protection area should be avoided through the attaching of cloth to the Vegetation Protection Zone fencing.

(ix) Soil compaction and removal of top soil within the Vegetation Protection Zone is to be avoided. Where compaction occurs, hand methods to de-compact the soil should be used.

(x) No vehicles are to access or be parked within the Vegetation Protection Zone. Where traffic is unavoidable within the zone, a 300 mm thick layer of mulch over a geotextile fabric should be placed in the area to protect the trees surface roots and to reduce the risk of soil compaction.

(xi) No storage of material, equipment or temporary building is to take place within the Vegetation Protection Zone, including the placing of spoil from excavation against tree trunks.

(b) Fill and excavation near trees and vegetation

(i) Any underground service installations within the Vegetation protection zone must be bored and the utility authorities must utilise a common trench where possible. Where practical, trenching is to be combined with locations where roots need to be severed for other reasons.

(ii) Within the Vegetation protection zone, all excavation must be carried out by hand digging or with the use of "air-excavation" techniques.

(iii) Where required, trees roots or branches are to be cut cleanly without tearing, with clean, sharp tools (chainsaw, secateurs or hand saw) in accordance with the AS 4373 *Pruning of Amenity Trees* and under the supervision of a qualified arborist with formal qualifications (Level 3 Australian Qualification Framework) or at least 5 years recognised experience in arboriculture.

(iv) Cutting of tree roots exceeding 50 mm in diameter should be avoided. Where roots must be cut, this should not unduly disturb the remaining root system.

(v) Any ripped or torn roots are cleanly re-cut as soon as noted.

(vi) Roots to be left exposed for any period of time are covered with wet hessian and maintained in a moist condition until recovered.

(vii) Immediately after cutting of any roots, Copper Naphthanate or an equivalent alternative solution is to be applied to the cut surface to prevent the incursion of rot or disease - as deemed necessary.

(viii) Backfill to excavations around tree roots should be with a soil mix similar in consistency and pH value to that of the existing soil.

(ix) Backfill should be placed in layers of 300 mm loose depth and be compacted to a dry density similar to that of the original surrounding soil using hand methods or light compaction equipment.

(x) Backfill layers should generally match the soil horizon of the surrounding soil.

(xi) The depth of fill within the vegetation protection zone should not exceed 200 mm from the original surface level. Immediately after placing any fill around a tree, the area should be watered thoroughly.

(c) Trees to be transplanted

(i) Trees to be transplanted shall be noted on the drawings and/or shall be marked on site by the superintendent prior to the commencement of construction.

(ii) Requirements and procedures for transplanting of trees are to be issued by council for each particular species.

(d) Damage to tree or vegetation

(i) Any unauthorised removal, damage or disturbance undertaken prior to the identification of the protected zone/s (without the required approval) or within the identified protected zone/s shall be rehabilitated by the contractor to the satisfaction of council and at no cost to council.

(ii) In the event of an unauthorised removal and that rectification works to damaged tree/s or vegetation is impractical, or the rectification work has been carried out by the contractor and is rejected by council, then council may direct the contractor to remove the trees/vegetation as part of the rectification work. The contractor will:

(A) replace the damaged tree/vegetation with a tree/vegetation of the same species and similar size to council's satisfaction; or

(B) replace the damaged tree/vegetation with a tree/vegetation of a similar size but different species to council's satisfaction; or

(C) pay for the cost of replacing the tree/vegetation with the same size and species to council's satisfaction; or

(D) replace the damaged tree/vegetation with a smaller tree/vegetation of an approved species and pay for the difference in cost between the new replacement and a specimen of the same size and species, to council's satisfaction.

(iii) The replacement value of an existing tree/vegetation will be calculated using the Revised Burnley Method under the Draft Australian Standard DR99307 *Amenity Trees – Guide to Valuation system*.

(20) Stormwater quality

Development works may cause changes to the quality, quantity and flow rate of stormwater discharged from the site. During the construction phase where soil disturbance and construction activity significantly increases the risk of soil erosion or where the development is required to implement a Stormwater Quality Management Plan (SQMP) that has been approved during the operational works approval phase. Council will then require a detailed maintenance regime to control stormwater quality during the construction phase to be presented during the pre-start meeting for review and acceptance by council unless a detailed maintenance regime has

been presented and accepted by council during the design process.

If the development works involves construction of stormwater quality device/s or is part a catchment with an existing stormwater quality device, then the developer and his contractor must ensure that no stormwater discharge will be permitted to enter such device (directly or indirectly) unless otherwise permitted by council. Refer to SC6.4.6.1 Water sensitive urban design construction and establishment guidelines.

Any temporary stormwater quality device proposed as part of the development works is to be removed and any land or existing infrastructure disturbed or damaged during the installation of any temporary stormwater quality device shall be reinstated to its former condition to the satisfaction and at no cost to council.

(21) Insurance and indemnity

From the commencement of construction until council accepts the development works or the commencement of the maintenance period, the developer or contractor must insure the works against public liability ~~($10~~ $20 million dollars minimum cover) and other claims arising from the works, and indemnify council against that liability.

Council must be included as an interested party to the insurance policy. The developer must provide council with evidence and a certificate of currency for the insurance and indemnification before commencing the construction works.

(22) Dilapidation survey

Where required by council and where development is directly adjacent to existing infrastructure and improvements, it may be prudent for the developer or his contractor to carry out a dilapidation survey of all the existing adjoining structures prior to construction commencing. This may reduce any damage claims during the construction period. Any damages to adjacent structures as a result of the development works shall be the responsibility of the developer.

(23) Fencing

While undertaking development works, and where appropriate, site fencing is to be erected for the duration of construction activities. Fencing is required to restrict unauthorised site access and to ensure the safety of persons from the subject site and any works on the adjoining road reserve and/or premises.

If existing fencing is to be altered or if there is no existing site fencing, temporary fencing, as a minimum, shall be provided and maintained for the duration of the construction to prevent unauthorised entry into the property or work area from any adjoining road reserve or property. The reinstatement of fencing and removal of temporary fencing on completion of the work shall be undertaken.

A construction site may provide any additional amount of security and/or fencing that is considered necessary that will improve the safety of the public or persons working on the site.

(24) Environment

All work shall be carried out in such a manner as to avoid nuisance and/or Environmental Harm. Development shall be planned and executed so that the works undertaken avoid contamination of the site and its surroundings by taking all reasonable and practical measures to prevent or minimise harm (general environmental duty).

Herbicides and other toxic chemicals shall not be used on the site without the prior written approval of the council or other relevant authority.

(25) Lighting

All lighting associated with the construction activity shall be installed and used so that lighting does not adversely affect the adjoining amenity of nearby sensitive uses, sensitive environmental areas or pose a safety hazard on adjacent road networks. All public road/street lighting systems must be designed in accordance with AS 1158 and must be approved by Ergon prior to construction.

(26) Blasting

Blasting will generally not be permitted. If blasting is necessary and there are no alternatives, it shall be carried out strictly in accordance with SC6.4.6.10 Earthworks (construction) and any other relevant construction specifications found in SC6.4.6 of the Development manual.

(27) Vibration

Ground vibration levels, transmitted from the construction works, rock breaking, drilling, and piling, operating items of plant or other noisy activities shall not exceed levels that are close to the lower level of human perception nor is it to cause any unacceptable damage to any adjoining buildings or infrastructure. Acceptable practices and vibration thresholds shall be determined in accordance with current Statutory Regulations.

Acceptable practices and vibration thresholds shall be determined in accordance with current Statutory Regulations.

A complaints management system should be devised which includes corrective and preventative actions. Consultation with and information supplied to nearby residents, workers and any other sensitive noise receptors is to be undertaken when vibration is known to be generated and is considered sufficient to warrant notification.

Editor's note—the results and recommendations of reporting on noise and vibration, as detailed in SC6.4.3.15 Noise and vibration assessment guidelines, associated with a particular development will be required to be implemented.

Editor's note—the Contractor shall be responsible for any damage and compensation payments as a result of vibration.

The control of ground vibration as a result of blasting shall be strictly in accordance with SC6.4.6.10 Earthworks (construction) and any other relevant construction specifications found in SC6.4.6 of the Development manual and will be solely at the risk and responsibility of the developer.

SC6.4.5.3 Quality management system

(1) Townsville City Council requires an emphasis on quality for the development works being delivered by developers. Where a condition for the approval of the development works requires the works to be completed as a "Quality Controlled and Assured Development", the developer must engage consultants and contractors with the necessary level of Quality Assurance accreditation to undertake and certify the development works.

(2) Quality management system – It is a requirement for a "Quality Controlled and Assured Development Contract" that the contractor shall plan, develop and maintain a documented Quality System in accordance with this section and the current requirements of AS/NZS ISO 9001.

(a) Quality manual
This is a document setting out the general quality policies, procedures and practices of an organisation. The development of this document shall cover and include the requirements as specified in the Quality System Documentation section of AS/NZS 3905.12 with guidance to preparation by AS/NZS ISO 10013. Additionally, it must include standard method statements and inspection and test plans for the activities undertaken by the Contractor. The following details shall be provided by appropriate annexures to the Company Quality Manual:

(i) Organisational Structure – this provides information regarding the management structure of the project with details of the specific responsibilities and authorities of the nominated personnel, which includes but is not limited to:

(A) a project quality management representative – is appointed by the Contractor for a specific project with the authority and responsibility for the implementation and operation of the quality plan, to ensure that Quality System requirements are not subordinated to design and productivity. Details of this person's qualifications, technical experience and present position are also to be provided;

(B) the contracted testing organisation – details of the personnel who will be conducting each type of compliance inspection of testing; and

(C) the person authorised to change construction processes on site; and

(ii) Register of Method Statements – the register shall list all Method Statements that are to be included in the project quality plan for the development contract and shall include any suitable method statements already incorporated in the Company Quality Manual.

(b) Project quality plan
The Quality System as expressed in the project quality plan shall be used throughout the course of the construction to ensure that the quality of the Contractor's and any sub contractor's work complies with all the requirements under this section. The Company Quality Manual, method statements and checklists and other project specific components shall make up the Project Quality Plan. The project quality plan must generally conform to the recommendations of AS/NZS ISO 10006. A concept illustration is shown in Figure SC6.4.5.3.1 Project quality management system documentation.

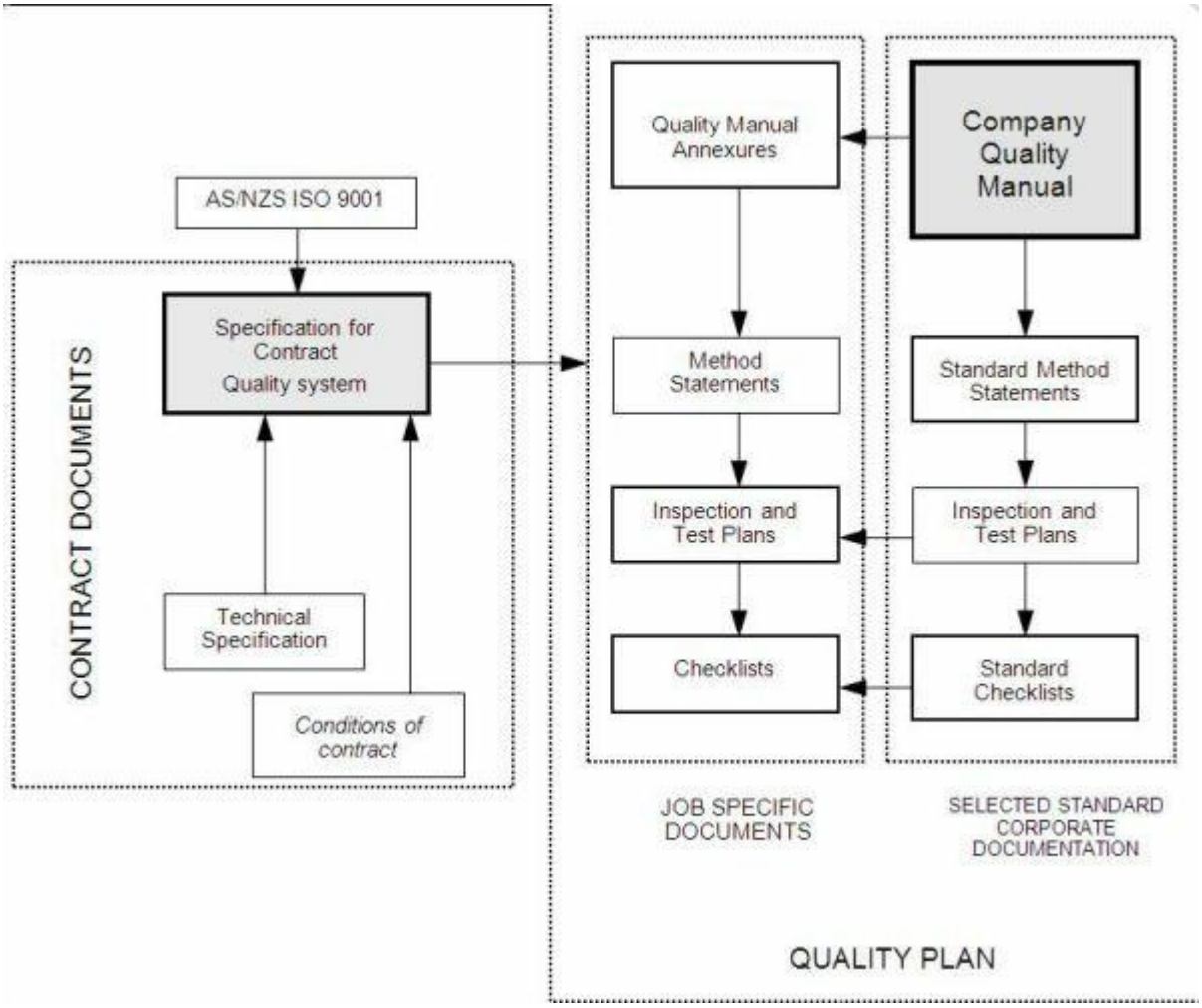

Figure SC6.4.5.3.1 Project quality management system documentation

(3) Where a "Quality Controlled and Assured Development" is not a requirement, a quality plan is not therefore required to be provided but it will be necessary as a minimum requirement that:

(a) the nominated Superintendent or Consultant are suitably and appropriately qualified and experienced;

(b) a work quality plan must be submitted to council for review and acceptance prior the pre-start meeting or commencement of works. The work plan must outline a program of inspection and testing regime that will ensure an adequate control of the progress and correctness of the work in accordance with the accepted design plans and specification;

(c) upon completion of the development works and prior to council accepting the completed development works, all records as required on the work quality plan must be submitted to council to demonstrate compliance with the accepted work quality plan; and

(d) the full cost of all required testing as per the work plan shall be the responsibility of the developer or the contractor. These tests are required to ensure that the materials and the works that were carried out conform to the accepted design specification and standard.

(4) Quality management system procedures

(a) Quality control system

(i) Lots

All items of work shall be subdivided into lots. Each lot shall be given a unique lot number and shall be chosen by the Contractor but must be within the limits given in SC6.4.5.3 Attachment A Maximum lot sizes and minimum test frequencies. In general, the size of the lot shall not exceed one day's output for each work process designated for lot testing.

The lot numbers shall be used as identifiers on all surveys and test results. The Contractor shall determine the bounds of each lot before sampling and shall identify each lot clearly. The

boundaries of a lot may be changed if subsequent events cause the original lot to be no longer essentially homogeneous.

The lot identification system and sample numbering system shall allow test results to be positively identified with material incorporated in the works.

(ii) Sampling and testing

All compliance inspections and tests shall be based on lots. The maximum lot sizes and minimum testing frequencies are listed in the Attachments to the relevant sub-sections and/or in SC6.4.5.3 Attachment A Maximum lot sizes and minimum test frequencies.

Where no minimum frequency of testing, or maximum lot size is stated in the sub-section, the Contractor shall nominate appropriate frequencies for the Superintendent's approval. Sampling shall not be restricted to locations dimensioned or otherwise defined for setting out the works in the drawings or sub-section, but shall be undertaken in a random or unbiased manner, as approved by the Superintendent, at any location within the works to demonstrate its compliance with the sub-section.

Where test methods are nominated in the sub-section, sampling and testing shall be carried out by a (NATA) National Association of Testing Authorities registered laboratory accredited for those test methods and sampling procedures. Sampling shall be conducted by personnel from the NATA registered laboratory which has been accredited for that sampling procedure and shall be supervised by the approved signatory from that laboratory. Test results shall be reported on NATA endorsed test documentation which shall include a statement by the approved signatory certifying that the correct sampling procedures have been followed.

Random sampling techniques shall be used for each lot for the control of compaction of each continuous layer of earthworks, flexible pavement and asphalt. SC6.4.5.3 Attachment B Random sampling defines the method to be used for determining test locations of random sampling in each lot. For quality control of processes other than compaction of layers of earthworks, flexible pavement and asphalt, the sampling locations will be proposed by the Contractor and will require the approval of the Superintendent. All samples shall be each considered to be representative of the lot and all test results will be required to meet the appropriate tolerances for the lot.

The latest NATA advice of the terms of registration and current signatories for the laboratories are to be included within the quality plan shall which will be providing the compliance test reports.

The NATA registered laboratory must provide inspection, testing and measuring equipment capable of producing the precision and/or degree of accuracy specified in the referenced test methods and this shall be made available by providing evidence or records of calibration.

(iii) Surveying

The Contractor shall engage qualified surveyors who are eligible for membership of the Institution of Surveyors, Australia or the Institution of Engineering and Mining Surveyors, Australia to supervise and take responsibility for all Surveying Control.

(iv) Surveying Control shall include all measurement, calculation and record procedures necessary to:

(A) set out the works;

(B) verify conformance to the drawings and sub-section in relation to dimensions, tolerances and three dimensional position; and

(C) determine lengths, areas or volumes of materials or products, where required for measurement of work.

The procedures and equipment used must be capable of attaining the tolerances required in the relevant construction specification. Sampling for conformance verification purposes shall not be restricted to the locations used to set out the Works.

The Contractor shall submit a survey conformance report to the Superintendent for each lot or

component where design levels, position and/or tolerances have been specified. The report shall show "specified vs. actual" for position (defined by co-ordinates or chainage and offset), level and tolerance as appropriate and shall be certified by the qualified surveyor responsible for the verification survey.

(v) Records and quality control documentation
Conformance records shall be stored and maintained such that they are readily retrievable and in facilities that provide a suitable environment to minimise deterioration or damage and to prevent loss.

The Contractor shall submit all conformance records to the Superintendent for inspection and approval. If requested by the Superintendent, the Contractor shall provide copies of the records or test results at no cost to the Developer.

The Contractor shall maintain a quality register which contains all quality control records such as test results, completed check lists, certificates of compliance, and consignment dockets for materials procured.

Prior to achieving practical completion or the commencement of the defects liability period or prior to acceptance of work as "Finally Complete", the Contractor shall provide council through the Superintendent a copy of the quality register and other required quality control documents as required in this section.

(5) Quality assurance system – is the management of actions covering planning, quality control testing, inspection and verification procedures integrated with production to provide a product fit for the purpose.

(a) Inspection and test plan (ITP) is the document which identifies the specific inspections and tests required to be carried out for on development works including hold points. The ITP is to be prepared by an appropriately experienced consultant identifying specific inspections and tests to be carried out for each item of development works. Refer to council's minimum ITP requirement on SC6.4.5.3 Attachment D Minimum inspection and test plan.

As a minimum, the inspection and test plans must contain the following information:

- lot references;
- activity description;
- specification requirements (if not provided, referenced specification);
- sampling methodology;
- test frequency and method; and
- identify responsibilities for inspection and testing and approval.

The superintendent shall audit the contractor's work on a regular basis and provide sufficient site presence and in particular at inspection points identified in the Inspection and testing plan as set out in the construction schedules and agreed to and accepted by council. Inspections by council shall not in any way diminish the responsibility of the consultant and the superintendent to adequately audit the works. Auditing shall include regular site inspections which will be conducted with the presence of the contractor's representative to confirm acceptability of works as complying with the design intent and other council requirements.

Inspection and test plans will typically have an associated check list which shall require completion for each particular lot. Prior to council's acceptance of completed development works all documentation relating to compliance to the agreed and accepted ITP are to be submitted by the Contractor and/or the Superintendent which will form part of the Consultants' certification that the works have been carried out and inspected in accordance with the agreed and accepted ITP.

(A) Inspections
The contractor shall ensure that any particular stage of work to be inspected has been satisfactorily completed before requesting an inspection by the superintendent and/or council. A minimum of 24 hours' notice (except for off maintenance inspection which requires a minimum of 7 days) is required to enable arrangements to be made for an

inspection. Responses to the requests within the prescribed minimums are not guaranteed, although every effort will be made by council to accommodate request where possible. All council required inspections must be carried out Monday to Friday unless other arrangements have been agreed.

Incoming inspections shall be required for deliveries of materials that will be subsequently included in one or more lots. When completing check lists for particular lots the inspection status shall be cited.

In-process and compliance inspections shall be completed by a responsible officer nominated in the check list and certified by the Contractor's Quality Management Register (QMR) indicating that the work has been completed in accordance with the contract documents.

The Contractor shall establish and maintain a system to ensure and demonstrate that all products or parts of products requiring inspection and/or testing are so inspected and/or tested. The Contractor shall also establish and maintain a system for identifying the inspection status for all lots of work.

(B) Hold points and witness points

To assure compliance with the specified standards and requirements, mandatory hold points shall apply. Hold points are those stages during the construction/manufacturing process where the technical specifications require "approval by the Superintendent" or where a non-conformance report (NCR) or notice of non-conformance (NNC) has been issued. The Contractor shall not proceed past the hold point until approval has been received from the Superintendent to proceed. For ease of identification hold points may also be annotated on the margins of technical specifications.

To obtain the approval to proceed from the Superintendent, the Contractor shall:

- provide the information required by the technical specifications;
- ensure and certify that the particular lot/process is conforming;
- ensure and certify that all underlying and adjacent lots affected by the lot in question are conforming; and
- submit the appropriate form (check list, NCR or NNC) at least 24 hours prior to the time the Contractor wishes to proceed with the placement/construction of the next lot, unless some alternative arrangements have been agreed with the Superintendent.

If the hold point has resulted from a NCR or NNC, the Superintendent's approval may be conditional on a witness point being included.

(b) Quality assurance activities

(A) Document control

In addition to the requirements of AS/NZS ISO 9001 and AS/NZS 3905.2, the quality plan shall specify the method of keeping quality registers, tracking and handling of NCRs, NCC, NNCs and other site correspondence.

(B) Method statements

A document that specifies the key steps and sequence in the manufacture/construction for an activity; what, how and by whom it shall be done; what materials and equipment shall be used to achieve the required quality standards.

Method statements shall be provided for all activities scheduled in SC6.4.5.3 Attachment C Method statement requirements. This requirement applies to both contract and subcontracted work. The documentation shall cover, as applicable, planning, methods, verification and control.

The presentation of method statements may be either descriptive, in the form of flow charts or a combination of both. In either case it must be accompanied by a check list which shall include the

relevant inspection and test points, surveying control points and Hold Points and the officer responsible to verify each check point.

A system audit of each method statement shall be carried out by the Contractor whilst the process is in effect. In the absence of a method statement for activities where it has been specified, this will automatically create a hold point.

(C) Identification of lots and traceability

All items of work shall be subdivided into lots. Lots shall be chosen by the Contractor but shall be within the limits given in SC6.4.5.3 Attachment A. lot numbers are to be used as identifiers on all quality system data. Each lot shall be given a unique lot number. The allocation of lot numbers shall be carried out by the Contractor specific to each item of work and provides a lot numbering system which conforms to these requirements:

The Quality Register must contain records of lot number which provides information such as:

- location of the lot (e.g. start and end chainage, layer and lateral location or a particular structure);
- note regarding conformance/non-conformance (e.g. NCR, CPAR Registers); and
- table of test results (summary) and their respective locations and numerical identification.

In cases where non-conforming lots are identified, a new identification number shall be allocated to the resubmitted documentation, but reference to the original lot number must be included.

The Contractor is responsible in determining the bounds of each lot before sampling and shall physically identify each lot clearly. The physical identification of a lot shall be maintained until the Contractor has ensured that the lot has achieved the specified quality.

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 will clearly identify the bounds of each lot and the lot number. This identification system shall be detailed in the quality plan and shall be maintained during all stages of construction of the lot.

The boundaries of a lot may be changed if subsequent events cause the original lot to be no longer essentially homogeneous. This will require appropriate notation in the Quality Register by the QMR.

The lot identification system, site records and sample numbering system shall allow test results to be positively identified with material incorporated in the works. Traceability is required for concrete loads, asphalt loads and steel plate as follows:

- concrete used in bridge components, cast-in-place box culverts, retaining walls, road pavement sub base and base. Asphalt used in wearing courses, intermediate courses and drainage layers;
- the trace shall start at the batch plant and finish at the location where the concrete or asphalt is incorporated in the Works. Records shall be kept of the batch quantities, mix and despatch time, testing details and location of placement; and
- steel plate in bridge girders and bridge columns. The trace shall start at the steelworks and finish at the location of the plate in the girder or column. Records shall be kept of the steel heat number, testing details and location of the plate in the girder or column.

(D) Surveying control

Surveying control shall be treated as a separate system element and shall include all measurement, calculation and record procedures necessary to:

- set out the Works;
- verify conformance to the drawings and specification in relation to dimensions, tolerances and three dimensional position; and
- determine lengths, areas or volumes of materials or products, where required for

measurement of work.

The method statements for surveying control shall address the process control parameters in AS/NZS 3905.2 for special processes which cannot be fully verified by subsequent inspection and test.

The Contractor shall appoint qualified surveyors who are eligible for membership of the Institution of Surveyors, Australia or the Institution of Engineering and Mining Surveyors, Australia to supervise and take responsibility for all surveying control.

The procedures and equipment used must be capable of attaining the tolerances nominated in the specification. Sampling for conformance verification purposes shall not be restricted to the locations used to set out the Works.

The Contractor shall submit a survey conformance report for each lot or component where design levels, position and/or tolerances have been specified.

The survey conformance report shall show “specified vs. actual” for position (defined by co-ordinates or chainage and offset), level and tolerance as appropriate and shall be certified by the qualified surveyor responsible for the verification survey.

Where work is to be covered up after conformance has been achieved, a hold point shall apply until the survey conformance report has been submitted.

All survey records shall be included in the quality records and recorded in the quality register. Verification field book pages shall be clearly labelled, dated and signed by the surveyor with cross indexed references to equipment used lot/component identification and associated survey conformance reports. Where automatic data recording systems are used for verification surveys, a printout of both raw (field) data and reduced data shall be retained in a similar manner as conventional field books.

(E) Sampling and testing

The inspection and test plans shall include details of the sampling methods. Sampling shall not be restricted to locations dimensioned or otherwise defined for setting out the works in the drawings or specification, but shall be undertaken in a random or unbiased manner, as approved by the Superintendent, at any location within the works to demonstrate its compliance with the specification.

The maximum lot sizes and minimum testing frequencies are listed in the attachments to the relevant sub-sections and/or in SC6.4.5.3 Attachment A to this sub-section. Where no minimum frequency of testing, or maximum lot size is stated in the specification, the inspection and test plan(s) shall nominate appropriate frequencies for the Superintendent's approval.

The inspection and test plans shall also uphold any time limits for testing which may be imposed by the specifications. The responsibility for completion of inspections, tests and documentation shall be stated in the quality plan.

Statistical techniques - random sampling techniques shall be used for each lot for the control of compaction of each continuous layer of earthworks, flexible pavement and asphalt. SC6.4.5.3 Attachment B defines the method to be used for determining test locations of random sampling in each lot. SC6.4.5.3 Attachment A lists the maximum lot sizes and minimum test frequencies for the specified activities.

For compaction control of processes other than layers of earthworks, flexible pavement and asphalt, the sampling procedure will be proposed by the Contractor in his method statement and will require the approval of the Superintendent. In such cases the samples shall be each considered to be representative and all test results will be required to meet the appropriate

tolerances for the lot.

Every testing agency or person providing written test reports for any and all testing undertaken shall use unique consecutive project specific serial numbering of the reports for identification and auditing purposes.

The Contractor shall reinstate all core holes, test holes, excavations and any other disturbance resulting from any testing activity. The reinstatement shall be to a standard which is at least equal to the specified requirements for the particular work.

(F) Records and quality assurance documentation

The Contractor shall keep and maintain all Quality System records in a Quality Register as required by AS/NZS ISO 9001, AS/NZS 3905.2 and this sub-section. They shall be systematically recorded, indexed and filed so as to be retrievable and accessible to the Superintendent or an appointed Quality Auditor on a job basis within 1 working day of requisition.

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

The Contractor shall make the quality records available to the Superintendent at all reasonable times. If requested by the Superintendent, the Contractor shall provide copies of the records or test results at no cost to the developer.

Prior to achieving practical completion or the commencement of the defects liability period or prior to acceptance of work as “Finally Complete”, the Contractor shall provide council, through the Superintendent, a copy of the quality register and other required quality assurance documents as required in this section.

(G) Non-conformance

In circumstances where there is a concern about workmanship, construction methodology or materials (e.g. variation to the approved work specification), council’s representative and/or Superintendent may require the Consultant and/ or contractor respectively to provide a non-conformance certificate (NCC) (template provided at SC6.4.5.3 Attachment E Non-conformance certificate template). The NCC will be required to be endorsed by the relevant design Consultant. A non-conformance report (NCR) (template provided at SC6.4.5.3 Attachment F Non-conformance report template) is required to be issued by the Contractor addressing intended variations to approved specifications, work method statements or standards by providing proposed disposition.

In the event that the above has not been satisfied and to ensure compliance with the required standards, Superintendent and/or council may issue a Notice of Non-Conformance (NNC) (template provided at SC6.4.5.3 Attachment G Notice of non-conformance template) to the Contractor. The NNC shall be issued within 1 working day of the non-conformance being identified during an inspection or during scheduled audit inspections, i.e. hold points and witness points. Upon issuance of the NNC, the Contractor must not continue the particular work in question unless an appropriate disposition (to be provided within five working days from issuance of the corrective and preventive action request (CPAR)) has been provided and agreed in accordance with the CPAR (template provided on SC6.4.5.3 Attachment H Corrective and preventative action request template). This is to be undertaken by the Contractor if the NNC identifies non-conforming work which has been provided by the relevant design or construction consultant (Superintendent). Similarly, for council initiated NNC, work shall commence upon council’s acceptance of the proposed disposition in accordance with the CPAR. To avoid recurrence of non-conformance issues, all CPARs shall require joint sign off by the Contractor and Superintendent, and council for a council issued NNC. This procedure will require the Contractor to record the CPAR on the relevant issued NNC. Under no circumstances will the deliberation on the disposition of a non-conformance issue be used to justify delays to the construction schedule/period.

The Contractor shall advise the Superintendent in the NCR of the proposed disposition of the particular non-conformance. This proposed disposition will constitute corrective action for the lot or lots referred to in the NCR and may comprise one of the following:

- propose additional works to bring the lot up to the specified standard; or
- replace all or part of the lot to bring it up to the specified standard; or
- request utilisation of a lot for a reduced level of service if such a clause exists in the relevant technical specification; or
- for incidental defects, request that the Superintendent accept the lot without alteration as an exception with or without alteration to the respective unit rates.

Any proposed disposition shall be subject to the approval of the Superintendent. Reworked/replaced lots shall be verified to conform to the specified requirements.

The contractor shall establish a suitable numbering and registration system for all NCRs and NNCs. All non-conformance reports and relevant documentation are required to be submitted to council prior acceptance of development works, to ensure that all departure from the originally accepted requirement and appropriate disposition has been done in accordance with the agreed CPAR.

A process flow diagram of the above processes is shown on Figure SC6.4.5.3.2.

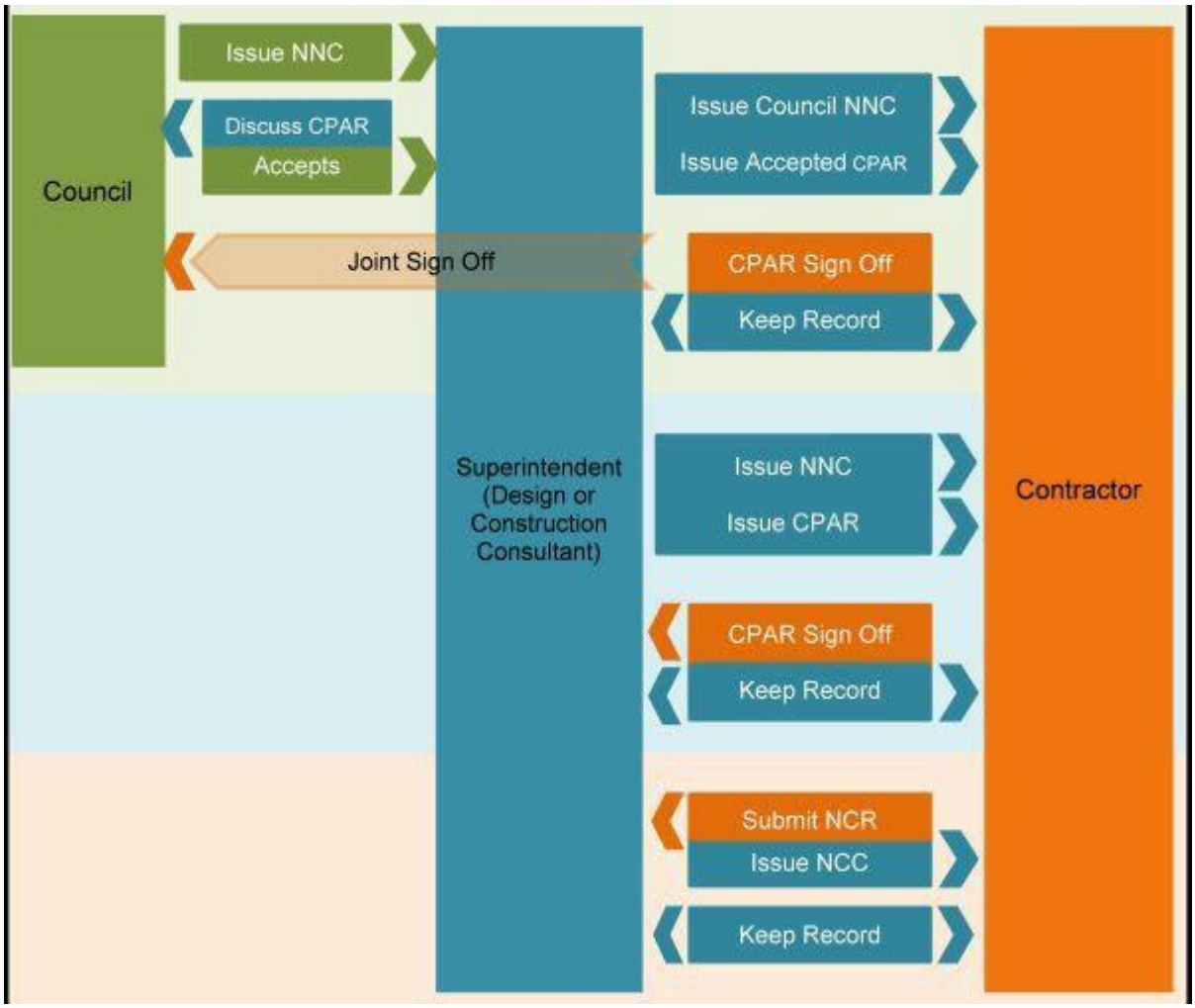

Figure SC6.4.5.3.2 Non-conformance flow diagram

(H) Inspection fees

A works inspection fee (at the rate applicable at the time of payment) must be paid prior to the development works being accepted by council at on maintenance or final completion.

SC6.4.5.3 Attachment A Maximum lot sizes and minimum test frequencies

General

Where material/product quality certification can be obtained from the supplier, tests listed per contract/separable part need not be repeated and where no Queensland Department of Transport and Main Roads (DTMR) Test Methods are available, Australian Standards or NSW Roads and Traffic Authority (RTA) Test Methods are specified.

Table SC6.4.5.3.1 Earthworks (SC6.4.6.10)

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Stripping Topsoil	Surface Levels	10,000m^2	1 Cross Section per 25m	Survey
Excavation	Geometry	10,000m^2	1 Cross Section per 25m	Survey
Floor of Cuttings	Material Quality—CBR	5,000m^2	1 per 1,000m^2* or Material Type	AS1289.6.1.1 DTMR Materials Testing Manual
	Compaction	10,000m^2	1 per 500m^2	AS1289.5.4.1
Deflection Control	Benkelman Beam Deflection or Equivalent	Per days production	4 per 1000 m^2 or minimum 10 per lot	DTMR Materials Testing Manual
	No visible vertical movement under proof roll	One layer 5,000m^2 or max 1 day's placement	Whole area	Visual
Foundation for Embankments	Compaction	5,000m^2	1 per 500m^2	AS1289.5.4.1
Embankments				
• General	Geometry	One layer 10,000m^2	1 Cross Section per 25m	Survey
	Material Quality - CBR	One layer 5,000m^2	1 per 800m^3 or Material Type	AS1289.6.1.1
	Compaction/Moisture Content	One layer 5,000m^2	1 per 250m^3	AS1289.5.1.1 AS1289.5.4.1 AS1289.5.7.1
Road Carriageway Embankments				
• Select Zone	Geometry	One layer 10,000m^2	1 Cross Section per 25m	Survey
	Material Quality			
	• Maximum Particle Size	10,000m^2	1 per 1,000m^3*	AS1289.6.1.1
	• CBR	10,000m^2	1 per 500m^3* or Material Type	
	Compaction/Moisture Content	One layer 5,000m^2	1 per 500m^2	AS1289.5.1.1, AS1289.5.4.1 AS1289.5.7.1

Fill Adjacent to Structures: Bridges, Retaining Walls and Cast-in-Situ Culverts	Material Quality			
	• Maximum Particle Size	1 Structure	1 per 200m^3	AS1289.3.3.1 AS1141.11
	• Plasticity Index	1 Structure	1 per 200m^3	AS1289.3.3.1
	Compaction/Moisture Content	1 Structure	2 per lot	AS1289.5.1.1, AS1289.5.4.1 AS1289.5.7.1

* **Note**—or part thereof, per lot.

Table SC6.4.5.3.2 Stormwater drainage (SC6.4.6.4), Drainage structures (SC6.4.6.5), Pipe drainage (SC6.4.6.6), Precast box culverts (SC6.4.6.7) and Open drains (SC6.4.6.9)

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Supply of Precast Units	Precast Quality— Suppliers documentary evidence and certification	1 batch	1 per type/size/class per batch	
Siting and Excavation	Geometry	1 drainage line/structure	1 per drainage line/structure	Survey
Foundation	Compaction	1 drainage line/structure	1 per 40 lin m*	AS1289.5.4.1, AS1289.5.7.1 Visual
Material surrounding Steel Structures	Material Quality • pH/Electrical Resistivity	1 drainage line/structure	1 per material	AS1289.4.3.1 AS1289.4.4.1
Bedding *(Bed, haunch, sides and overlay for HS type support)*	Material Quality • Particle Size Distribution	1 contract	1 per 200m^3*	AS1141.11
	Compaction/Moisture Content	1 drainage line/structure	1 per layer, per 40 lin m	AS1289.5.7.1, AS1289.5.4.1
Concrete Bedding or Lining	Geometry		1 Cross Section per 25m	Survey and 3m Straight Edge
Installation of Precast Units	Geometry	1 drainage line/structure	1 per drainage line/structure	Survey
Selected Backfill *(Backfill, sides and overlay for non HS type support)*	Material Quality • Maximum Particle Size	1 contract	1 per 500m^3*	
	• Plasticity Index	1 contract	1 per 500m^3*	AS1289.3.3.1
	Compaction/Moisture Content	1 drainage line/structure	2 per lot	AS1289.5.7.1, AS1289.5.4.1
Rock Fill for Gabions/ Wire Mattresses	Material Quality:			
	• Wet Strength	1 contract	1 per contract	AS1141.22
	• Wet/Dry Strength Variation	1 contract	1 per contract	AS1141.22
Kerb and Gutter	Geometry	1,000 lin m	1 Cross Section per 25m and change of direction	Survey and 3m Straight Edge

* **Note**—or part thereof, per lot.

Table SC6.4.5.3.3 Subsoil, foundation and pavement drains (SC6.4.6.20), Subsurface drainage (SC6.4.6.21), Drainage mats (SC6.4.6.8)

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Material Supply	Material Quality—Supplier's documentary evidence and certification of:			
	Pipe	1 contract/size	1 per type/size	
	Filter Material			
	• Grading (Type A, B, C, D)	1 contract/size	1 per type	AS1141.11
	• Coefficient of Permeability (Type B)	1 contract/size	1 per type	AS1289.5.5.1 ASTM-D2434-68
	• Grading Variation after Treatment (Type B)	1 contract/size	1 per type	AS1141.11
	• Wet Strength (Type C, D)	1 contract/size	1 per type	AS1141.22
	• 10% Fines Wet/Dry (Type C, D)	1 contract/size	1 per type	AS1141.22
	• Appearance (Type D)	1 contract	1 per type	Table B1 Appendix B of AS2758.1
	Geotextile - Supplier's documentary evidence	1 contract	1 per type	AS3706 (Test) AS3705
Excavation - Trench Base	Line and Grade	1 drainage line	1 per drainage line	Survey
Bedding and Backfill				
• Filter Material	Geometry	1 drainage line	Visual	Survey
	Compaction	1 drainage line	1 per line	AS1289.5.6.1
• Selected Backfill	Geometry	1 drainage line	Visual	Survey
	Compaction	1 drainage line	1 per line	AS1289.4.1
• Earth Backfill	Geometry	1 drainage line	Visual	Survey
Drainage Mat	Geometry	2000m^2	1 Cross Section per 25m	Survey

Table SC6.4.5.3.4 Stabilisation (SC6.4.6.19)

Activity	Key quality verification requirements	Maximum lot size	Minimum test frequency	Test method
Material Supply	Material Quality - Supplier's documentary evidence and certification of (as per MRTS07A, MRTS07B, MRTS07C and MRTS08):			
	• Cement	1 contract	Type	AS3972
	• Quicklime			
	• Available Lime (CaO content)	1 contract	Type	AS3588.12
	• Slaking Rate	1 contract	1 per contract	T432
	• Particle Size Dist'n	1 contract	1 per contract	AS1141.11
	• Hydrated Lime			
	• Available Lime ($CaOH_2$)	1 contract	1 per contract	AS3583.12
	• Residue on Sieving	1 contract	1 per contract	AS3583.14
	• Ground Blast Furnace Slag	1 contract	1 per contract	AS3583.2
	• Flyash	1 contract	1 per contract	AS3583.1
	• Blended Stabilising Agent	1 contract	1 per contract	
	• Water			
	• Chloride ion content	1 contract	1 per contract	AS3583.13
	• Sulphate ion content	1 contract	1 per contract	AS1289.4.2.1
	• Undissolved solids	1 contract	1 per contract	
Mix Design	NATA certification - Supplier's documentary evidence and certification	1 mix	1 per mix	
Stationary Mixing Plant	Application rate of stabilising agent	1 day's production	1 per 100t	
	Unconfined Compressive strength of product	1 day's production	1 per 400t	AS5101.4
In-Situ Spreading	Spread rate	1 layer 1,000m^2	1 per lot or 1 per 500m^2	DTMR Materials Testing Manual
	Mix uniformity	1 layer 1,000m^2	1 per 500m^2	Visual
	Unconfined Compressive Strength of product	1 day's production	1 per 100t	AS5101.4

Trimming and Compaction	Geometry	1 layer 3,000m2, or 1day's placement	One cross section per 25m	Survey
	Surface Quality	"	10 per 200m lane length*	3m Straight Edge
	Average Layer thickness	"	1 per lot	
	Average Width	"	1 per lot	Measure/Survey
	Compaction	1 layer 5000m2 or min. of 3 if less than 5000m2	1 per lot	As specified in SC6.4.6.19(5)

Note— or part thereof, per lot.

Table SC6.4.5.3.5 Flexible pavements (SC6.4.6.12)

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Pavement Materials Supply	Material Quality - Supplier's documentary evidence and certification to meet MRTS05, MRTS07B and MRTS08 requirements - Type 2.1 for base, Type 2.3 for subbase and Type 2.4 for lower subbase.	1 contract		
	• Particle Size Distribution		1 per 1,000t	Q103A, AS1289.3.6.1
	• Fine and Particle Size Distribution Ratio			
	• Liquid Limit		1 per 1,000t	Q104A, Q104D
	• Plastic Limit		1 per 1,000t	Q105, AS1289.3.2.1
	• Plasticity Index		1 per 1,000t	Q105, AS1289.3.2.1
	California Bearing Ration (soaked)		1 per 5,000t	Q113A
	• Particle Shape		1 per 1,000t	Q201, AS1141.15
	• Ten Percent Fines Value (Wet)		1 per 5,000t	Q205B, AS1141.22
	• Wet/Dry Strength Variation		1 per 5,000t	Q205C, AS1141.22
	Degradation Factor (Source Rock)		1 per contract	Q208A, AS1141.25.1
	• Unconfined Compressive Strength (Standard Compaction)		1 per 5,000t	TCC-001, Q115, AS5101.4

	• Unconfined Compressive Strength (Bound/Modified)	1 contract	1 per mix design	Q115, AS5101.4
	Lime modified/Modified pavement materials	1 contract	1 per type	As specified in SC6.4.5.3.4 Stabilisation
Compaction Assessment	Geometry: Alignment and Level	One layer 2,000m² or	1 Cross Section per 15m	Survey
	Width and Surface Trim	max 1 day's placement	10 per selected 200 lin m*	Measure and 3m Straight Edge
	Compaction/Moisture Content/	One layer 5,000m² or	10 per 5,000m² layer or	AS1289.5.1.1, Q142A,
	Dry Density Testing	max 1 day's placement	3 per lot if less	AS1289.5.4.1 AS1289.5.8.1
Deflection Control	Benkelman Beam Deflection or Equivalent	Per days production	4 per 1000 m² or minimum 10 per lot	Q701
	No visible vertical movement under proof roll	One layer 5,000m² or max 1 day's placement	Whole area	Visual

* **Note**—or part thereof, per lot.

Table SC6.4.5.3.6 Sprayed bituminous surfacing (SC6.4.6.17)

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Materials Supply	Material Quality - Suppliers documentary evidence and certification of:			
	• Class 170 Bitumen	1 contract	1 per contract	MRTS.17
	• Refinery Cutback Bitumen	1 contract	1 per contract	MRTS.17
	• Polymer Modified Binder	1 contract	1 per contract	MRTS.18
	• Bitumen Adhesion Agent	1 contract	1 per contract	
	• Cutback Oils	1 contract	1 per contract	
	• Aggregate Precoating Agent	1 contract	1 per contract	
	• Aggregate	1 contract	1 per contract	MRTS.22
Application Rates	Binder	1 day's operation	Calculate per spray run	As per spray sheet
	Aggregate	1 day's operation	Calculate per spray run	As per spray sheet

Note— one per contract or change in material.

Table SC6.4.5.3.7 Asphaltic concrete (SC6.4.6.13)

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Materials Supply	Material Quality - Supplier's documentary evidence and certification of:			
	Coarse and Fine Aggregates			MRTS 30
	• Grading	1 wk's prod'n	1 per contract or material change	MRTS 30
	- Moisture Content	1 wk's prod'n	1 per contract or material change	MRTS 30
	- Wet Strength	1 contract	1 per contract or material change	MRTS 30
	- Wet/Dry Strength Variation	1 contract	1 per contract or material change	MRTS 30
	- Particle Shape	1 contract	1 per contract or material change	MRTS 30
	- Fractured Faces	1 contract	1 per contract or material change	MRTS 30
	• Polishing Agg Friction Value	1 contract	1 per contract or material change	MRTS 30
	- Mineral Filler	1 contract or 1 month's production	1 per contract or material change	MRTS 30
	- Bitumen Binder	1 refinery batching	1 per contract or material change	MRTS 17
	Polymer Modified Bitumen			MRTS 18
	• Elasticity Recovery at 60ºC	1 production batch by supplier	1 per contract or material change	MRTS 30
	• Viscosity on ER at 60ºC			MRTS 30
	• Torsional Recovery at 25ºC			MRTS 30
	• Viscosity at 180ºC - Bitumen Adhesion Agent	1 contract	1 per contract or material change	MRTS 30
	• Resistance to Stripping			
	• Reclaimed Asphalt Pavement (RAP)	1 stockpile	1 per contract or material change	MRTS 30

	• Bitumen Emulsion	1 contract	1 per contract or material change	MRTS 21
Mix Design-Nominated Mix	Approval of mix and NATA certification. Supplier's documentary evidence and certification	1 mix per contract	1 per mix	
Production Mix	Temperature Moisture Content Grading Binder Content	1 per truck load SC6.4.6.13 Asphaltic concrete as included as separate table below. Additionally, max lot size one 12 hr shift's production.		Measure MRTS 30 MRTS 30 MRTS 30
Laying and Compaction	Temperature	1 day's laying per site	1 per truck load	Measure
	Levels	1 day's laying per site	1 cross section per 25m	Survey
	Shape	1 day's laying	10 per 200m* lane	3m Straight Edge
	Relative Compaction/Layer Thickness	1 day's laying	6 cores per lot or 10 nuclear density tests per lot	As per MRTS30 Compaction requirements or Nuclear Density Meter

Note—* or part thereof, per lot.

Table SC6.4.5.3.8 Minimum testing frequencies for asphalt production

Quantity of Asphalt in production lot	Minimum Frequency of Testing
Less than 100 tonnes	MRTS 30
101 to 300 tonnes	MRTS 30
301 to 600 tonnes	MRTS 30
Over 600 tonnes	MRTS 30

Table SC6.4.5.3.9 Ready-mixed concrete production and supply (SC6.4.6.14 and SC6.4.6.15)

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Raw Materials Supply	Material Quality—Supplier's documentary evidence and certification of:	1 contract	1 per contract or material change	
	• Cement	1 contract	1 per contract or material change	AS 3972
	• Flyash	1 contract	1 per contract or material change	AS 3582.1
	• Water	1 contract	1 per contract or material change	AS3583.13, AS1289.4.2.1
	• Admixtures	1 contract	1 per contract or material change	AS 1478
	Fine Aggregates (SC6.4.615 only)	1 contract	1 per contract or material change	
	• Grading	1 contract	1 per contract or material change	AS1141.11
	• Moisture Content	1 contract	1 per contract or material change	Q102A, Q102B or Q102D
	• Sulphate Soundness	1 contract	1 per contract or material change	AS1141.24
	• Bulk Density	1 contract	1 per contract or material change	AS 2758.1
	• Unit Mass (particle density)	1 contract	1 per contract or material change	AS 2758.1
	• Water Absorption	1 contract	1 per contract or material change	AS 2758.1
	• Material Finer 2µm	1 contract	1 per contract or material change	AS 2758.1
	• Deleterious Material (Impurities/Reactive)	1 contract	1 per contract or material change	AS 2758.1
	• Combined Aggregates (SC6.4.6.14 and SC6.4.6.15)	1 contract	1 per contract or material change	Q102A, Q102B or Q102D
	• Grading	1 contract	1 per contract or material change	AS1141.11
	• Moisture Content	1 contract	1 per contract or material change	

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
	• Wet Strength	1 contract	1 per contract or material change	AS1141.22
	• Wet/Dry Strength Variations	1 contract	1 per contract or material change	AS1141.22
	• Sulphate Soundness	1 contract	1 per contract or material change	AS1141.24
	• Particle Shape	1 contract	1 per contract or material change	AS1141.14
	• Fractured Faces	1 contract	1 per contract or material change	AS1141.18
	• Bulk Density	1 contract	1 per contract or material change	AS 2758.1
	• Unit Mass (particle density)	1 contract	1 per contract or material change	AS 2758.1
	• Water Absorption	1 contract	1 per contract or material change	AS 2758.1
	• Material Finer 75µm	1 contract	1 per contract or material change	AS 2758.1
Raw Materials Supply	• Weak Particles	1 contract	1 per contract	AS 2758.1
	• Light Particles	1 contract	1 per contract	AS 2758.1
	• Deleterious Materials (Impurities/Reactive)	1 contract	1 per contract	AS 2758.1
	• Iron Unsoundness	1 contract	1 per contract	AS 2758.1
	• Falling/Dusting Unsoundness	1 contract	1 per contract	AS 2758.1
Mix Design (kerb mix)	Compressive Strength	1 contract mix	1 per mix per contract	AS1012.1, AS1012.8, AS1012.9
	Aggregate Moisture Content	1 contract mix	1 per mix per contract	Q102A, Q102B or Q102D
	Non Conformance - Compressive Strength	Superintendent to determine		AS1012.14
	Consistency - Slump	1 contract mix	1 per mix per contract	AS1012.3.1
	Air Content	1 contract mix	1 per mix per contract	AS1012.4.2 (Method 4.2)
	Shrinkage	1 contract mix	1 per mix per contract	AS1012.13

Table SC6.4.5.3.10 Mass concrete subbase (SC6.4.6.14)

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Concrete Supply	Refer to Table SC6.4.3.30			
	Concrete/Air Temperature	50m³	1 per 50m³	Measure
	Air Content	50m³	1 per 50m³	AS1012.4.2 (Method 4.2)
	Consistency - Slump	50m³	1 per load	AS1012.3.1
	- Compactibility Index	50m³	1 per load	AS1012.3.4
	Compressive Strength (7 day)	50m³	1 pair per 50m³	AS1012.1 AS1012.8 AS1012.9
	Compressive Strength (28 day)	50m³	1 pair per 50m³	AS1012.1 AS1012.8 AS1012.9
	Non Conformance - Compressive Strength	Superintendent to determine		AS1012.14
Placement	Thickness	50m³	5m grid on plan area	Survey and check with subgrade survey
	Geometry	50m³	1 cross section per 15m	Survey and 3m Straight Edge
Curing	Material Quality - Supplier's documentary evidence and certification	1 contract	1 per production batch	AS1160 (Bitumen Emulsion)
	Application Rate	1 day's work	1 per 1000m²*	AS3799 - Liquid membrane forming curing compound for concrete
Joints	Geometry	50m³	All joints	Survey

* **Note**—or part thereof, per lot

Table SC6.4.5.3.11 Plain or reinforced concrete base (SC6.4.6.15)

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Concrete Supply	Refer to Table 6.4.3.30			
	Concrete/Air Temperature	50m^3	1 per 50m^3	Measure
	Air Content	50m^3	1 per 50m^3	AS1012.4 Method 2
	Consistency - Slump	50m^3	1 per load	AS1012.3.1
	Mass per unit volume (prior crushing of 7-day specimen)	50m^3	1 per 50m^3	AS1012.12.2
	Compressive Strength (7 day)	50m^3	1 pair per 50m^3*	AS1012.1 AS1012.8 AS1012.9
	Compressive Strength (28 day)	50m^3	1 pair per 50m^3*	AS1012.1 AS1012.8 AS1012.9
	Non Conformance - Compressive Strength	Superintendent to determine		AS1012.14
Steel Reinforcement	Material Quality - Supplier's documentary evidence and certification	1 contract	1 per production batch	AS4671
	- Splicing (welded)	1 contract		AS1554.3
Placement	Relative Compaction			
	• Machine Placed	50m^3	1 per 50m^3*	AS1012.14 AS1012.2
	• Hand Placed	Area between 2 consecutive const. joints or 50m^3 (whichever is the lesser)	2 per lot	AS1012.14 AS1012.2
	Thickness	50m^3	5m grid on plan area	Survey
	Geometry	50m^3	1 cross section per 15m	Survey and 3m Straight Edge
Ride Quality	Profile Factor	1000m^2	10/lane/lot	3m Straight Edge
Surface Texture	Texture Depth	1000m^2	2 per lot	Survey
Curing	Material Quality—Supplier's documentary evidence and certification	1 contract	1 per production batch	AS1160 (Bitumen Emulsion)

	Application Rate	1 day's work	1 per 1000m²*	AS3799 - Liquid membrane
Joints	Sealant Material Quality Supplier's documentary evidence and certification	1 contract	1 per prod'n batch	
	Geometry	50m³	All joints	Survey

*** Note—**or part thereof, per lot

Table SC6.4.5.3.12 Bituminous microsurfacing (SC6.4.6.17)

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Materials Supply	Material Quality—Supplier's documentary evidence and certification of:			
	• Bitumen (prior to emulsification)	1 contract	1 per contract or change in material	AS2008
	• Bitumen Emulsion - Residual Binder Content (Residue from Evaporation)	1 contract	2 per bulk delivery	AS1160, App.D
	• Mineral Aggregates - Degradation Factor	1 contract	1 per contract or 6 month period	AS1141.25
	- Los Angeles Value	1 contract	"	AS1141.23
	- Aggregate Wet Strength	1 contract	"	AS1141.22
	- Wet/Dry Strength Variation	1 contract	"	AS1141.22
	- Polished Aggregate Friction Value	1 contract	"	AS1141.42
	- Sand Equivalent	1 contract	"	AS1289.3.7.1
	• Mineral Filler	1 month's prod'n	"	AS2350
	• Combined Aggregate Grading	1 contract	"	AS1141.11 AS1141.12
Mix Design—Nominated Mix	Approval of mix and NATA certification—Supplier's documentary evidence and certification	1 contract	1 per mix	
Production Mix	Grading	1 day's prod'n or 50m³ (whichever is the lesser)	2 per 50m³*	AS2891.3.1
	Residual Binder Content		2 per 50m³*	AS2891.3.1
Laying	Levels	1 layer, max 200m³	1 cross section per 15m	Survey
	Surface Quality	1 layer, max 200m³	10 per 100m* lane length	3m Straight Edge

*** Note—**or part thereof, per lot

Table SC6.4.5.3.13 Segmental paving (SC6.4.6.18)

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Materials Supply	Material Quality—Supplier's documentary evidence and certification of:			
	• Concrete Segmental Paving Units	1 contract	1 per contract	AS/NZS 4455
	• Clay Segmental Paving Units	1 contract	1 per contract	AS/NZS 4455
	• Bedding Sand - Grading	1 contract	1 per contract or change in material	AS1141.11
	• Joint Filling Sand - Grading	1 contract	1 per contract or change in material	AS1141.11
Base	Geometry	One layer 5000m², max 1 day's placement	One cross section per 25m	Survey
	Surface Quality	"	10 per 200m² or lot	3m Straight Edge
Edge Restraints	Refer SC6.4.6.28 Minor Concrete Work	1 day's placement	1 per 10 lin m	Measure/Survey
Laying Paver Units	Joint Width	1 day's placement	All joints	Measure
	Geometry	1 day's placement	One cross section per 15m	Survey
	Surface Quality	1 day's placement	10 per 200m² or lot	3m Straight Edge

Table SC6.4.5.3.14 Minor concrete works (SC6.4.6.28)

1 per contract or material change

1 per contract or material change

1 per contract or material change

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Subgrade	Compaction	1000 lin m or 1000m^2	1 per 200 lin m or 200m^2	AS1289.5.4.1
Gravel Subbase Construction	Compaction	1 days placement	1 per 100 lin m or 100m^2	AS1289.5.4.1
	Subbase Geometry	1 days placement	1 per 25 lin m	3m Straight Edge
Steel Reinforcement	Material Quality—Suppliers documentary evidence and certification	1 delivery	1 per production batch	AS4671
Fibre Reinforcement concrete	Requirements as per SC6.4.6.28.6(1) - Reinforcement of concrete (Minor concrete works)			
Ready-Mixed Concrete Supply	Material Quality—Suppliers documentary evidence and certification	1 contract	1 per mix type	
	Consistency - Slump	15m^3	1 per load	AS1012.3.1 (Method 1)
	Compressive Strength (7 and 28 day)	15m^3	2 pairs per 15m^3	AS1012.1, AS1012.8, AS1012.9
	ALL TESTING—MINIMUM LOT SIZE 3m^3. No testing on loads less than 3m^3 if supplier can provide documentation of in production testing.			
Raw Materials Supply	Material Quality - Supplier's documentary evidence and certification	1 contract	1 per contract or material change	
	Cement	1 contract	1 per contract or material change	AS3972
	Water	1 contract	1 per contract or material change	AS3583.13 AS1289.4.2.1
	Admixtures	1 contract	1 per contract or material change	AS1478.1

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
	• Fine Aggregrates			
	Grading	1 contract	1 per contract or material change	AS1141.11
	Moisture Content	1 contract	1 per contract or material change	Q102A, Q102B, Q102D
	Bulk Density	1 contract	1 per contract or material change	AS2758.1
	Water Absorption	1 contract	1 per contract or material change	AS2758.1
	Mineral Finer 2µm	1 cantract	1 per contract or material change	AS2758.1
	Deleterious Material (Impurities/Reactive)	1 contract	1 per contract or material change	AS2758.1
	• Coarse			
	Aggregate Grading	1 contract	1 per contract or material change	AS1141.11
	Moisture Content	1 contract	1 per contract or material change	Q102A, Q102B, Q102D
	Crushing Value	1 contract	1 per contract or material change	AS1141.21
	Soundness	1 contract	1 per contract or material change	AS1141.24
	Particle Shape	1 contract	1 per contract or material change	AS1141.14
	Bulk Density	1 contract	1 per contract or material change	AS2758.1
	Unit Mass (particle density)	1 contract	1 per contract or material change	AS2758.1
	Water Absorption	1 contract	1 per contract or material change	AS2758.1
	Mineral Finer 75 µm	1 contract	1 per contract or material change	AS2758.1
	Weak Particles	1 contract	1 per contract or material change	AS2758.1
	Light Particles	1 contract	1 per contract or material change	AS2758.1

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
	Deleterious Materials (Impurities/Reactive	1 contract	1 per contract or material change	AS2758.1
	Iron Unsoundness	1 contract	1 per contract or material change	AS2758.1
	Fall/Dusting Unsoundness	1 contract	1 per contract or material change	AS2758.1
	Percentage Wear	1 contract	1 per contract or material change	AS1141.23
Concrete Supply (Mixing at site)	Consistency - Slump	15m^3	1 per load	AS1012.3.1
	Compressive Strength (7 days) Compressive Strength (28 days)	15m^3 15m^3	2 pairs per 15m^3 or part thereof, 1 pair for 7 day test and the other pair for the 28 day test	AS1012.1, AS1012.8
Concrete Placement	Finished Levels	15m^3	1 cross section per 15m	Survey and 3m Straight Edge
	Surface Dimensions	Single fabrication	As required to confirm design dimensions	Measure
	Finishing of unformed surfaces Geometry	15m^3	1 cross section per 15m^3	Survey and 3m Straight Edge
	Joints - Geometry	50m^3	All joints	Survey
Curing	Material Quality - Supplier's documentary evidence and certification	1 contract	1 per production batch	AS3799
	Application Rate	1 day's work	1 per 1000m^{2*}	
Backfilling	Material Quality			
	• Maximum particle size	1 contract/ material type	1 per 200m^3	Q103
	• Plasticity Index	1 contract/ material type	1 per 200m^3	AS1289.3.3.1
	Compaction	1 days work or max 200m^2	1 per 200m^2	AS1289.5.4.1
Sprayed Concrete	Test Panels and Cores	1 contract	3 test panels and 4 cores per mix design	AS1012.4, AS1012.9 AS1012.14

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
	Compressive Strength Cores	15m^3	per 15m^3	AS1012.4 AS1012.9 AS1012.14
	Curing Material Quality—Supplier's documentary evidence and certification	1 contract	1 per production batch	

*** Note—**or part thereof, per lot

Table SC6.4.5.3.15 Pavement markings (SC6.4.6.22)

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Materials Supply	Material Quality - Supplier's documentary evidence and certification of:			
	• Paint	1 contract	1 per contract or change in material	
	• Glass Beads	1 contract	"	
	• Thermoplastic Material	1 contract	"	
	• Raised Pavement Markers (including temporary raised pavement markers)	1 contract	"	
Paint Application	Wet Film Thickness	1 contract	1 per site visit	AS 1580.107.3 Or Q513
	Application Rate of Glass Beads	1 contract	1 per contract	SC6.4.6.22 Attachment A
Thermoplastic Application	Cold Film Thickness	1 contract	1 per site visit	Measure by micrometer
	Application Rate of Glass Beads	1 contract	1 per contract	SC6.4.6.22 Attachment A

Table SC6.4.5.3.16 Signposting (SC6.4.6.24)

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Materials Supply	Material Quality—Supplier's documentary evidence and certification of:			
	• Sign Blanks	1 contract	1 per contract, or change in material	
	• Aluminium Extrusion Backing	1 contract	"	
	• Retro-reflective Material	1 contract	"	
	• Non-reflective Paint	1 contract	"	
	• Non-reflective Sheet Material	1 contract	"	
	• Steel Sign Support Structures	1 contract	"	
Concrete Foundations	Refer SC6.4.6.28			

Table SC6.4.5.3.17 Water reticulation (SC6.4.6.2)

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Materials Supply	Material Quality—Supplier's documentary evidence and certification of:			
	• uPVC Pipes	1 contract	1 per contract	AS2977
	• Ductile Iron Pipes	1 contract	1 per contract	AS2280 and AS2129
	• Copper Pipe	1 contract	1 per contract	AS1432
	• Polyethylene Pipe	1 contract	1 per contract	AS1159
	• Stop Valves Material	1 contract	1 per contract	AS2638 and AS2129
	• Non Return Valves	1 contract	1 per contract	AS3578
	• Spring Hydrants	1 contract	1 per contract	AS2544 or AS3952
Siting and Excavation	Geometry	1 line	1 per line	Survey
Bedding	Material Quality			

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
	• Grading	1 contract	1 per contract per source	AS2032
Thrust and Anchor Blocks	Refer to Table SC6.4.5.3.14			
Chamber Covers and Frames	Geometry	1 cover/frame	1 per cover/frame	survey
Testing of Pipelines	Pressure testing Bacteriological testing	1 line 1 line	1 per line 1 per line	As specified in SC6.4.6.2.5 As specified in SC6.4.6.2.5(3) and (4)
Backfill and Compaction	Compaction	1 line	1 per 2 layers max 100m^2	AS1289.5.7.1, AS1289.5.4.1
Switchgear and Control gear Assembly	Electrical function	each installation	1 factory test per installation	AS3439
Commissioning of Pumping Station	Certification testing of electrical installation in accordance with relevant Australian Standards	1 installation	1 per installation	

Table SC6.4.5.3.18 Sewerage system (Construction specification SC6.4.6.3)

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Materials Supply	Material Quality—Supplier's documentary evidence and certification of:			
	• uPVC Pipes	1 contract	1 per contract	AS1477
	• Ductile Iron Pipes	1 contract	1 per contract	AS2280 and AS2129
	• Vitrified Clay Pipes	1 contract	1 per contract	AS1741
	• Precast Access Chambers	1 contract	1 per contract	AS4198
Siting and Excavation	Geometry	1 line/structure	1 per line/ structure	Survey
Bedding	Material Quality • Grading	1 contract	1 per contract per source	Q103
Concrete Bedding	Refer Table SC6.4.5.3.14			

Activity	Key Quality Verification Requirements	Maximum Lot Size	Minimum Test Frequency	Test Method
Laying and Jointing of Pipes, Access Chambers, Structures	Geometry	1 line	1 per line	Survey
Thrust and Anchor Blocks	Table SC6.4.5.3.14			
Cast-in-situ Access Chambers	Material Quality			
	• Tri-Calcium Aluminate Content	1 contract	1 per contract per source	AS3972
	• Fineness Index	1 contract	"	AS3972
	• Minimum Cement Content	1 contract	"	AS3972
Acceptance Test of Gravitation Mains and Access Chambers	• Compressed Air Testing	1 line	1 per line	As specified SC6.4.6.3.4
Testing of Rising Mains	• Hydrostatic test pressure	1 line	1 per line (max 1000m)	As specified in SC6.4.6.3.4(10)
Backfill and Compaction	Compaction	1 line	1 per 2 layers max 100m^2	AS1289.5.7.1, AS1289.5.4.1 per SC6.4.6.3(24)
Switchgear and Control gear Assembly	Electrical Compliance	each installation	1 factory test per installation	AS3439
Commissioning of Pumping Station	Certification testing of electrical installation in accordance with relevant Australian Standards	1 installation	1 per installation	As specified in SC6.4.6.3.5(9)

SC6.4.5.3 Attachment B Random sampling

(1) General

Random sampling of test locations shall be used to control relative compaction of each layer of (which are generally rectangular in area):

(a) earthworks;

(b) selected material zone; and

(c) stormwater drainage.

The number of samples (n) per lot shall be as indicated in the specific sub-sections which are summarised in SC6.4.5.3 Attachment A.

(2) Locations

Sampling locations within a lot for the control of relative compaction shall be determined as follows:

(a) representing the lot as a rectangle, sub-divide the lot lengthwise into equi-area sub-lots in accordance with the number of samples selected (n) in accordance with Table SC6.4.5.3.19;

(b) establish six grid lines within the lot, as illustrated in Figure SC6.4.5.3.3;

(c) throw a die to select a number between 1 and 6. This determines which grid line to use for the sample location in sub-lot 1;

(d) throw die to select a group (1-6) in Table SC6.4.5.3.19;

(e) throw die twice to select two random numbers (between 1 and 6) for row and column in Table SC6.4.5.3.19 and obtain random fraction R;

(f) length co-ordinate for sample location in Sub-lot 1 = RL/n; and

(g) for sample location in next sub-lot:

(i) add L/n to previous length co-ordinate; and

(ii) add 1 (on a cycle of 6) to previous grid line.

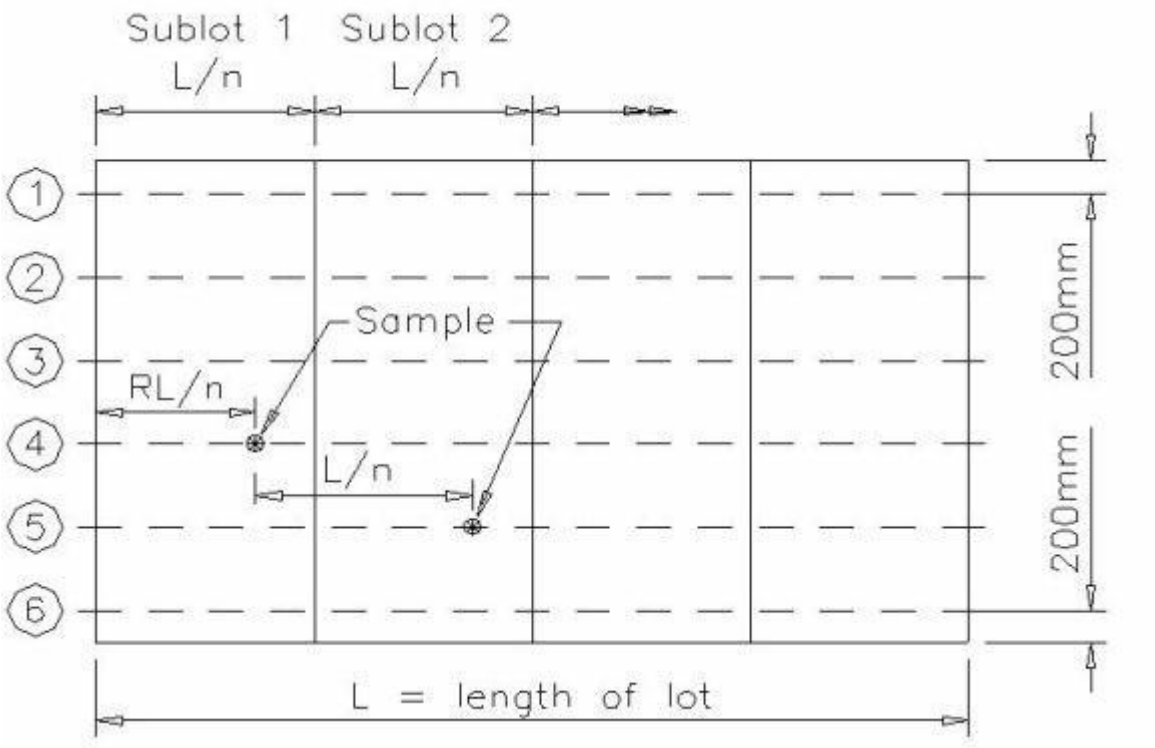

Figure SC6.4.5.3.3 Sampling locations for rectangular lot

Table SC6.4.5.3.19 Table of random fractions

GROUP	ROW	COLUMN					
		(1)	(2)	(3)	(4)	(5)	(6)
(1)	(1)	0.78178	0.45467	0.00347	0.27296	0.00020	0.36517
	(2)	0.59678	0.67931	0.25434	0.59054	0.32444	0.41504
	(3)	0.14464	0.17269	0.61154	0.18291	0.83242	0.50776
	(4)	0.89010	0.44764	0.07451	0.20428	0.49513	0.91440
	(5)	0.91941	0.47726	0.33160	0.30670	0.65114	0.36852
	(6)	0.51085	0.38148	0.22169	0.66578	0.67050	0.69559
(2)	(1)	0.81891	0.48626	0.88892	0.82994	0.16941	0.81528
	(2)	0.37410	0.60232	0.12070	0.79017	0.32981	0.34908
	(3)	0.45921	0.15648	0.58052	0.37413	0.08124	0.97145
	(4)	0.86614	0.94719	0.78872	0.91972	0.45149	0.15107
	(5)	0.26590	0.41140	0.95477	0.81267	0.24018	0.07324
	(6)	0.95205	0.39438	0.73697	0.59427	0.71146	0.00575
(3)	(1)	0.18694	0.36502	0.17828	0.84312	0.57003	0.58583
	(2)	0.91211	0.86936	0.43030	0.27672	0.47393	0.10342
	(3)	0.80714	0.34295	0.00775	0.90855	0.33368	0.21842
	(4)	0.67579	0.92686	0.18005	0.00645	0.11256	0.05278
	(5)	0.03184	0.69876	0.16676	0.43346	0.86992	0.03275
	(6)	0.15623	0.02905	0.72763	0.19095	0.80847	0.39729
(4)	(1)	0.72109	0.17970	0.22505	0.35561	0.98935	0.27818
	(2)	0.37348	0.19381	0.43331	0.75033	0.99963	0.42232
	(3)	0.12129	0.32386	0.56705	0.87165	0.84460	0.92955
	(4)	0.54948	0.08844	0.47061	0.78419	0.18731	0.93485
	(5)	0.15097	0.44967	0.48759	0.84161	0.19212	0.05146
	(6)	0.32360	0.66850	0.99382	0.94050	0.96449	0.96217
(5)	(1)	0.68091	0.54191	0.10910	0.94237	0.23161	0.15167
	(2)	0.97121	0.83626	0.70896	0.45296	0.69475	0.11264
	(3)	0.19723	0.98260	0.57429	0.94789	0.64457	0.20809
	(4)	0.84036	0.14095	0.29451	0.40256	0.34521	0.64924
	(5)	0.97500	0.98056	0.82276	0.97130	0.77329	0.89855
	(6)	0.83244	0.30828	0.06882	0.68471	0.71081	0.91649
(6)	(1)	0.75892	0.29685	0.70044	0.91238	0.53356	0.45239
	(2)	0.13229	0.19701	0.36074	0.32254	0.62045	0.26691
	(3)	0.34789	0.22179	0.91891	0.87651	0.91011	0.97469
	(4)	0.97211	0.68943	0.12831	0.50006	0.20793	0.61151
	(5)	0.24954	0.17809	0.56093	0.51524	0.69135	0.68967
	(6)	0.10062	0.11852	0.47089	0.64765	0.44644	0.35548

SC6.4.5.3 Attachment C Method statement requirements

General

(1) Method statements are required to describe the key steps and sequence in the construction activities, how and by whom each step shall be undertaken and what materials and equipment shall be used. Method statements may include a flow chart to clarify the sequence of key steps. One or more method statements may address a construction activity.

(2) Each method statement will be supported by a check list which shall identify relevant inspections, test points, materials requirements and hold points. Each requirement on the check list will have an officer responsible

identified and will require the nominated officer to sign off the requirement so indicating its satisfactory execution.

(3) Method statements and check lists shall be compatible with the appropriate Inspection and test plan. Check lists will be completed for each lot of work during construction and compiled with other documents to comprise the quality register.

(4) The Contractor shall submit method statements and check lists to describe the key steps in those construction activities listed below that are identified with a preceding asterisk (*).

Item	Enter * here if required	Activity	Sub-section Number
1		Control of Traffic	SC6.4.6.30
2		Temporary Roadways and Detours	SC6.4.6.30
3		Clearing and Grubbing	SC6.4.6.11
4		Earthworks - Cut	SC6.4.6.10
5		Earthworks - Unsuitable Material	SC6.4.6.10
6		Earthworks - Embankment	SC6.4.6.10
7		Compaction and Quality Control	SC6.4.6.10
8		Siting, Excavation, Bedding, Backfilling and Compaction of Stormwater Drainage	SC6.4.6.4
9		Installation of Pipe Drainage	SC6.4.6.6
10		Installation of Precast Box Culverts	SC6.4.6.7
11		Siting and Installation of Drainage Structures	SC6.4.6.5
12		Construction of Lined Open Drains including Kerb and Gutter	SC6.4.6.9
13		Stabilisation of Pavement or Subgrade Materials	SC6.4.6.19
14		Provision of Subsurface Drainage as subsoil drains, pavement drains or free draining layer	SC6.4.6.20-21, SC6.4.6.8
15		Construction of Flexible Pavement Layers	SC6.4.6.12
16		Construction of Concrete Pavement Layers	SC6.4.6.14-15
17		Construction of Asphaltic Concrete Pavement Layers	SC6.4.6.13
18		Sprayed Bituminous Surfacing	SC6.4.6.16
19		Bituminous Microsurfacing	SC6.4.6.17
20		Construction of Segmental Paving	SC6.4.6.18
21		Pavement Marking	SC6.4.6.22
22		Minor Concrete Works	SC6.4.6.28
23		Landscaping	SC6.4.6.28

SC6.4.5.3 Attachment D Minimum inspection and test plan

Table SC6.4.5.3.20 Water supply-hold points

Clause title/ Item	Requirement	Notice for inspection	Release by
Materials			
General	Submit alternative products and materials for approval.	2 weeks before ordering	Council (Water Authority)
Pipeline construction			
General–Work accreditation	Provide proof of accreditation for approval.	1 week prior commencement of work	Superintendent
General–Change of Pipeline Alignment	Approval of the proposed alignment from the Water Authority.	1 week	Council (Water Authority)
Earthworks–Excavation near existing services	Approval from relevant Authority for the excavation.	1 week	Superintendent

Clause title/ Item	Requirement	Notice for inspection	Release by
Minimum Trench Width for Pipelines–Excavation across paved or improved surfaces	Approval from the Authority or Owner prior to commencing any excavation across paved or improved surfaces.	1 week	Superintendent
Pipe Bedding–Trench completed	Present the completed excavated trench prior to pipe laying, jointing and bedding.	2 working days	Superintendent
Laying and Jointing of Pipes–Existing asbestos cement pipe cutting and disposal	Submit method statement for approval.	2 working days	Superintendent
Pipe testing and restoration			
Testing of Pipelines	Conduct pressure testing.	7 days	Superintendent and Council
Testing of Pipelines– unsatisfactory test results, defects and leakage	Conduct pressure testing upon completion of rectification work.	3 days	Superintendent and Council
Backfill and Compaction– Completion of work	Present the laid and jointed pipes for approval prior to the commencement of trench backfilling.	2 working days	Superintendent
Restoration of Surfaces	Restore progressively and as soon as possible after the section of works is completed.	2 working days	Superintendent
Pump stations			
Pumps	Provide written warranty from the manufacturer for approval.	2 weeks before ordering	Superintendent
Electrical Compliance– ompliance with required standard	Supply a proof of compliance**–**Test certificate.	1 week	Superintendent
Electrical Installation–oute of underground cabling	Submit underground cabling requirements and route for approval.	2 weeks	Superintendent
Testing and Commissioning of Pump Station–Compliance with the Specification Requirements	Submit required test results.	1 week	Water Authority and Superintendent
Testing and Commissioning of Pump Station–Commissioning	Give notice of intention to undertake commissioning. Provide pre-commissioning record sheets.	2 weeks	Water Authority and Superintendent
Construction compliance			
Works–as–executed details and Operation and Maintenance Manuals	Submit work-as executed drawing and Operating and Maintenance Manuals.	2 weeks before operating	Water Authority and Superintendent

Table SC6.4.5.3.21 Water supply-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause title/ Item	Requirement	Notice for inspection
Materials		
General–Compliance with manufacturers recommendations	Contractor to inspect material and products at time of delivery for compliance.	2 working days
General–Certification	Provide product or material certification prior to delivery to the works.	3 working days (Pipes and Fittings) 1 week (Valves and Hydrants)
Pipeline construction		
Location–Set out	Confirm the set out locations prior to construction.	3 working days
Crossings–Crossings authority approvals	Approval from relevant Authority and payment of fees.	2 weeks
Earthworks–Open excavation	Contractor to provide appropriate safety measures for open excavation.	Progressive
Laying and Jointing of Pipes–Inspection prior laying	Contractor to present to the Superintendent materials prior laying (if required).	Progressive
Pipe testing and restoration		
Disinfection and Flushing of Pipelines	Provide evidence of compliance with this requirement.	2 working days upon completion of activity.
Restoration of Surfaces–Disposal of surplus material	Superintendent approval is required prior spreading/disposal.	2 working days progressive

Table SC6.4.5.3.22 Sewerage systems-hold points

Clause title/ Item	Requirement	Notice for inspection	Release by
Materials			
General	Submit alternative products and materials for approval.	2 weeks before ordering	Superintendent
Pipeline construction			
General–Work accreditation	Provide proof of accreditation for approval.	1 week prior commencement of work	Superintendent
General–Change of Pipeline Alignment	Approval of the proposed alignment from the Sewer Authority.	1 week	Superintendent and Council (Sewer Authority)
Earthworks–Prior Excavation	Approval from relevant Authority for the excavation.	1 week	Superintendent
Excavation near underground services–Protection of other services	Submit for approval give notice of any interference to the works caused by an existing service and submit a proposed work method statement.	1 week	Superintendent
Pipe Bedding–Foundation Condition/Water Charged Ground	Notify Superintendent and confirm method of foundation support from the designer.	Progressive	Superintendent
Wrapping Pipelines–Damage to sleeving	Rectify any damage to sleeving before backfilling trench.	Progressive	Superintendent

Clause title/ Item	Requirement	Notice for inspection	Release by
Bedding and Backfill Compaction Requirements– Notification of pipeline laid and jointed.	Present the laid and jointed pipes for approval before the trench backfilling.	Progressive	Superintendent
Bedding and Backfill Compaction Requirements–Embankment	Submit proposal for construction of embankments.	1 week	Superintendent
Pipeline testing and restoration			
Acceptance Test of Gravitation Sewers and Maintenance Holes– acceptance Testing	Present all sewers and maintenance holes for acceptance testing.	1 week	Superintendent and Sewer Authority
Acceptance Test of Gravitation Sewers and Maintenance Holes–Hydrostatic testing	Submit proposed alternative testing regime for approval.	1 week	Superintendent and Sewer Authority
Connection to Existing Sewers	Submit request to connect to the existing sewer and give notice of works including any affected occupants.	3 weeks before connection	Superintendent and Sewer Authority
Testing of Rising Mains–Pressure Test	Present rising main for acceptance testing.	1 week	Superintendent and Sewer Authority
Restoration of Surfaces– Original condition requirement	Restore progressively and as soon as possible after the section of works is completed.	2 working days	Superintendent
Pump stations			
General–Authorised products and materials	Submit alternative products and materials for approval.	2 weeks before ordering	Superintendent
Pumps	Provide written warranty of the equipment.	Upon delivery on site	Superintendent
Electrical Compliance– Compliance with required standard	Supply a proof of compliance – Test certificate.	1 week	Superintendent
Electrical Installation– Route of underground cabling	Submit underground cabling requirements and route for approval.	2 weeks	Superintendent
Testing and Commissioning of Pump Station–Compliance with the Specification Requirements	Submit required test results.	1 week	Sewer Authority and Superintendent
Testing and Commissioning of Pump Station–Commissioning	Give notice of intention to undertake commissioning. Provide pre-commissioning record sheets.	2 weeks	Sewer Authority and Superintendent
Practical Completion of Pump Station	Fulfil all the requirements for issuance of Certificate of Practical Completion.	2 weeks	Superintendent
Construction compliance			
Works–as–executed details and Operation and Maintenance Manuals	Submit work-as executed drawing and Operating and Maintenance Manuals.	1 week before operating	Sewer Authority and Superintendent

Table SC6.4.5.3.23 Sewerage systems-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause title/item	Requirement	Notice for inspection
Materials		
General–Compliance with Manufacturer's recommendations	Contractor to Inspect material and products at time of delivery for compliance.	2 working days
General–Certification	Provide product or material certification prior to delivery to the works.	3 working days (Pipes and Fittings) 1 week (Valves)
Pipeline construction		
Crossings–Crossings Authority approvals	Approval from relevant Authority and payment of fees.	2 weeks
Earthworks–Open excavation	Contractor to provide appropriate safety measures for open excavation	Progressive
Bedding and Backfill Compaction Requirements–NATA	Provide NATA certified test results for all testing.	2 working days progressive
Thrust and Anchor Blocks for Rising Main–Verification of Bearing Pressures	Give notice if the allowable bearing pressure of the ground and the design pressure of the pipeline differ from actual pressures on site.	1 week
Pipeline testing and restoration		
General–Initial Tests (Sewers and Maintenance Holes)	Give notice prior commencement of initial testing.	2 days progressive
Ovality Test and CCTV Inspection– Deflection testing and pipeline verification	Submit proposal for deflection testing (Ovality Test). Submit CCTV Results.	1 week (Ovality Test) 2 days upon completion of inspection
Acceptance Test of Gravitation Sewers and Maintenance Holes	Submit acceptance test results.	Progressive
Visual Inspection and Measurement of Infiltration–Infiltration testing	Submit method of infiltration testing.	1 week
Testing of Rising Main	Submit acceptance test results.	Progressive
Restoration of Surfaces–Disposal of surplus material	Superintendent approval is required prior to spreading/disposal.	2 working days progressive
Pump stations		
General - Conformance with manufacturers recommendations	Inspect material and products at time of delivery.	2 working days
Electrical Compliance–approval of all design and materials	Submit all design drawings and materials to each Authority having jurisdiction for approval.	2 weeks before ordering

Table SC6.4.5.3.24 Stormwater drainage-hold points

Clause title/Item	Requirement	Notice for inspection	Release by
Construction			
Temporary drainage–Erosion and Sediment Control	Confirmation of accepted project ESCP and completion of erosion and sedimentation control measures.	1 week prior to site commencement	Superintendent and Council
Siting of Culverts–Survey set-out	Submit survey set-out of culvert inlets and outlets for approval.	1 week prior to proceeding	Superintendent
Siting of Culverts–Changes by Contractor	Submit proposed changes for approval.	1 week prior to proceeding	Superintendent
Excavation–Public utilities	Obtain approval for adjacent excavation with relevant authorities.	1 week prior to proceeding	Superintendent
Construction traffic– Protection measures	Submit certification and verification of protection measures.	3 working days	Superintendent

Table SC6.4.5.3.25 Stormwater drainage-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause title/Item	Requirement	Notice for inspection
Construction		
Excavation–Notice	Identify unsuitable materials and inadequate support material for removal and disposal at the foundation level of the structure.	progressive
Backfilling–In situ concrete structures	Do not backfill against in situ concrete structures within 14 days of concrete placement.	progressive
Backfilling–Tolerance	Check shape of culvert during backfilling.	progressive
Compaction adjacent to culverts or drainage structures	Inform the Superintendent prior rectification any damage.	2 working days before proceeding

Table SC6.4.5.3.26 Drainage structures-hold points

Clause title/Item	Requirement	Notice for inspection	Release by
Construction			
Precast Units–Product drawings and Quality	Submit details of precast or proprietary items for approval and Submit quality test results.	1 working day and 3 working days before delivery respectively	Superintendent
Excavation	Excavation and compaction of foundation as documented.	1 working day	Superintendent
Backfill–Commencement	Obtain approval for commencement.	1 workday day	Superintendent

Table SC6.4.5.3.27 Drainage structures-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause title/Item	Requirement	Notice for inspection
Construction		
Headwalls and Wingwalls – Batter retention	If dimensions on drawings are unable to satisfy batter retention, notify the Superintendent.	3 working days
Precast units	Give notice of installation of precast pits and junction boxes.	1 week
Construction	Submit for approval part omission of concrete lining.	3 working days

Table SC6.4.5.3.28 Pipe drainage-hold points

Clause title/Item	Requirement	Notice for inspection	Release by
Common requirements			
General–Material Certification	Submit conformance certificate and other relevant manufacturer quality documentation.	24 hours in advance of dispatch to site	Superintendent
General–Alternative materials	Submit full product details in accordance with AS/NZS 2566.1.	4 weeks prior to commencing work	Superintendent and Council
General–Backfilling	Present the completed installation and jointed pipes for inspection.	Progressive before backfilling	Superintendent and Council
General–Protection of structures	Submit design proposal for protective measures for approval.	3 days prior	Superintendent and Council
Steel pipes and pipe arches			
Materials and Surface Treatment	Engineer's certification for the pipe materials and surface treatments.	Prior to practical completion	Superintendent
UPVC pipes			
Materials–Proprietary product with external diameter of ≥450mm	Submit for approval prior to construction.	4 weeks	Superintendent and Council

Table SC6.4.5.3.29 Pipe drainage-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause title/Item	Requirement	Notice for inspection
Precast reinforced concrete and fibre reinforced concrete pipes		
Excavation–Wide Trench Condition	If deemed as a wide trench, confirm appropriate pipe strength/trench support.	Progressive
Bedding	Source of bedding material -advise Superintendent.	Progressive
Bedding–Cementitious stabilisation	Provide if erosion of bedding material may occur.	1 week

Table SC6.4.5.3.30 Precast box culverts-hold points

Clause title/Item	Requirement	Notice for inspection	Release by
Materials			
Culvert Units, Link and Base Slabs	Submit certificate of conformance.	3 working days prior to dispatch	Superintendent
Proof load testing	Submit certificate and test results.	3 working days prior to dispatch	Superintendent
Construction			
Construction of coffer dams	Submit construction details for approval.	1 week prior to construction	Superintendent
Prior placement of bedding	Inspection of foundation and approval of proposed bedding.	2 days before placing material	Superintendent
Backfill—Inspection of seals	Present joints and seals for before backfilling.	1 working day	Superintendent
Construction loading on culvert —Constraint	Do not load base slab until strength has reached 20 MPa.	1 working day	Superintendent

Table SC6.4.5.3.31 Precast box culverts-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause title/Item	Requirement	Notice for inspection
Materials		
Handling, Delivery and Storage	Inspect box culvert units for conformance.	1 week prior to installation
Construction		
Coffer Dams—Timber or bracing removal	Inspect removal of bracing materials.	1 working day
Installation of Precast in situ base slabs	Attainment of concrete minimum compressive strength.	1 working day

Table SC6.4.5.3.32 Drainage mats-hold points

Item/Clause title	Requirement	Notice for inspection	Release by
Type A mats / Type B mats			
Geotextile, Damaged geotextile	Approval of condition or repair of geotextile.	1 working day before next activity	Superintendent
Filter material, Thickness	Approval of thickness and layers of filter material.	3 working days before placing filters	Superintendent

Table SC6.4.5.3.33 Drainage mats-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Item	Requirement	Notice for inspection
Type A mats /Type B mats		
Filter material, Protective layer	Inspection of placement of protective layer over mat extension.	3 working days before placing materials
Discharge, Outlets	Inspection of outlet proposals.	7 days before set-out of layers

Table SC6.4.5.3.34 Open drains-hold points

Clause title/Item	Requirement	Notice for inspection	Release by
Pre-construction planning			
Provision for traffic	Submit Traffic Guidance Scheme for approval.	2 weeks prior to site commencement	Superintendent
Temporary drainage	Submit details of procedures/devices for approval.	2 weeks prior to site commencement	Superintendent
Materials			
Proprietary Products	Submit proprietary products and manufacturer's instructions.	7 days prior to commencement on site	Superintendent
Gabions/Wire mattresses	NATA compliance certificates for proposed Gabions.	7 days prior to commencement on site	Superintendent
Rock fill material	NATA compliance certificates for proposed rock fill material.	7 days prior to commencement on site	Superintendent
Geotextile	NATA compliance certificates for proposed Geotextile material.	7 days prior to commencement on site	Superintendent
Open drains			
Excavation	Approval to divert drain to avoid trees and/or rocks.	1 working day before set-out.	Superintendent.
Excavation	Location and construction of drains to prevent salination.	1 working day before set-out.	Superintendent.
Kerb and channel (gutter)			
Foundation	Approval for shape and compaction of foundation material.	1 working day before forming	Superintendent

Table SC6.4.5.3.35 Open drains-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause title/Item	Requirement	Notice for inspection
Open drains		
Excavation	Unsuitable material removal and disposal.	Progressive
Excavation	Spoil site locations.	Prior to placement
Embankment	Embankment compaction and revegetation.	Progressive
Construction	Grade and compaction of open drains.	Progressive
Construction	Proprietary items installed to manufacturers recommendations.	Progressive
Types	Maintain catch drains.	Progressive
Types	Construct minor diversion and contour drains, table drains, swales and depressed medians.	Progressive
Types	Channels preserving the existing stream bed.	Progressive
Lining		
Concrete lining	Instruction on weephole location.	1 working day before concreting.
Concrete lining	Joints and tolerances.	1 working day before concreting.
Stone pitching	Bedding material and placement.	1 working day before concreting.
Kerb and channel (gutter)		
Stormwater outlets	Positive drainage to channel.	Progressive
Vehicular or pedestrian access	Siting, location and bedding compaction.	Progressive
Backfilling and reinstatement		
Backfill behind kerbs	Backfilling timing, material and compaction.	1 working day prior to backfilling
Pavement backfill	Backfill adjacent new gutter material and location.	1 working day prior to backfilling
Rock filled wire mattresses and gabion– Completion	Inspection of rockfill material and filling method.	On completion of works

Table SC6.4.5.3.36 Earthworks-hold points

Clause/subclause	Requirement	Notice for inspection	Release by
Stockpile Sites	Approval to use any stockpile site not shown on the Drawings.	3 working days before stockpiling	Superintendent
Treatment of Floors of Cuttings–Prior ripping floors of cuttings	Present in situ material for inspection to determine suitability of pavement support.	Before ripping commences	Superintendent
Treatment of Floors of Cuttings–Compacting floors of cuttings	Inspection of compacted cutting floor.	Prior to placing any subsequent layers over the completed cutting floor	Superintendent and Council
Unsuitable material–Floor inspection	Re-present the floor of the excavation after the removal of unsuitable material.	Prior to backfilling with replacement material	Superintendent
Foundations for Embankments	Inspection of the embankment foundation area.	1 working day prior to next activity	Superintendent
Foundation for Embankments–Other Embankments (Bridging layer)	Inspection and direction for bridging layer where required	3 working days before proceeding	Superintendent
Trimming tops of embankments	Inspection of the completed surface to receive subsequent pavement layers.	Prior to placing any subsequent pavement layers	Superintendent
Selected material zone	Inspection of the completed select material zone surface prior to placing any subsequent pavement layers.	1 working day before proceeding	Superintendent
Fill adjacent to structures–General	Concrete strength required for early filling to structures.	3 working days prior to fill placement	Superintendent
Deflection monitoring or proof rolling	Present the completed work for deflection monitoring or proof rolling.	2 working days before next activity	Superintendent and Council

Table SC6.4.5.3.37 Earthworks-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause/subclause	Requirement	Notice for inspection
Natural Surface and Earthworks Materials	Survey method and results, including any discrepancies.	At least 7 days notice
Cuttings–Floors of cuttings	Floors to be no more than 50 mm above or below the designed floor and provide suitable support.	1 working day before next activity
Batters–Excavation beyond the batter line	Minor change in the general slope of the batter to suit the site conditions.	1 working day before next activity
Transition from cut to fill–Terrace	Excavate a terrace for the width of the selected material zone to a depth of 900 mm below and parallel to the cutting floor.	1 working day before excavating terrace
Unsuitable Material	Material deemed unsuitable for embankment or pavement support in its present position.	Progressive
Placing Fill for Embankment Construction–Rock material	Modify grading of fill material to achieve compaction.	Progressive
Fill adjacent to structures–Treatment at weepholes	Proposal to use synthetic membrane geotextile.	3 working days before proposed use
Spoil–Haulage disposal	Obtain planning approval and any permits.	3 working days before commencing activity
Borrow–Requirement	Obtain planning approval and any permits.	3 working days before commencing activity

Table SC6.4.5.3.38 Clearing and grubbing-hold points

Clause/subclause	Requirement	Notice for inspection	Release by
Limits of clearing			
Survey	Decision on the removal of miscellaneous items.	7 days before proposed removal	Superintendent
Extent of clearing	Submit peg out and extent of clearing survey.	7 days before proposed commencement of clearing	Superintendent and Council
Clearing Operations			
Tagging	Confirm clearing perimeters and mark trees to be preserved.	7 days before proposed site clearing	Superintendent and Authorised Council Officer
Work near trees noted for protection	Work method statement for works within the exclusion zone.	7 days before proposed works	Superintendent
Excavation within 4m of tree trunks	Develop appropriate work methods to avoid damage to the tree for approval.	7 days before proposed excavation	Superintendent
Trees within proposed embankment areas	Direction to remove or protect trees within proposed embankments.	7 days before proposed site clearing	Superintendent
Unsound trees in road reserve	Direction on removal of trees or branches not within the clearing limits.	7 days before proposed site clearing	Superintendent
Timber falling on private property	Written consent of owner to leave in place or to enter property to remove.	Prior to carrying out works	Superintendent
Damage	Approval for any rehabilitation of vegetation or fauna habitat.	3 working days prior to carrying out works	Superintendent and Authorised Council Officer
Grubbing			
Blasting	Explosives not permitted without prior approval.	Progressive	Superintendent
Disposal of materials			
Burning of material	Approval prior to disposal of timber and other combustible materials by burning.	Prior to burning	Superintendent

Table SC6.4.5.3.39 Clearing and grubbing-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause/subclause	Requirement	Notice for inspection
Existing Utility services–Marking	Locate all underground pipe and cables.	Before commencing any earthworks
Trees to be preserved–Work near trees noted for protection	Exclusion zone around protected trees.	Progressive
Trees to be preserved–Tree protection	Trees and roots not to be cut or damaged.	Progressive
Grubbing–Backfill	Backfill and compact grub holes.	Progressive
Chipping of cleared vegetation–Stockpiling	Stockpile location approval.	Prior to stockpiling

Table SC6.4.5.3.40 Flexible pavements-hold points

Clause title/Item	Requirement	Notice for inspection	Release by
Activity plan			
Pavement construction plan	Prepare and submit pavement plan.	4 weeks before commencing site work	Superintendent
Inspection, sampling and testing			
Notification	Written notice for testing times and provide test results.	3 working days prior to testing or inspection	Superintendent
Materials			
Proposed materials	Prepare and submit schedule detailing material properties including NATA test results and certificate.	2 weeks before ordering materials	Superintendent
Bound or modified materials	Complete and submit (SC6.4.6.19 Attachment A).	2 weeks before ordering materials	Superintendent
Variations to approved materials	Submit details of changes to approved materials.	1 week before use in works	Superintendent
Lime modified base and subbase materials			
Lime modification	Submit proposals to modify materials.	2 weeks before placing	Superintendent
Stationary Plant or In-situ lime modification	Submit proposals for the in-situ use of hydrated lime or quicklime.	2 weeks before activity	Superintendent
Spreading			
Underlying layer	Inspection to determine suitability of underlying layer.	1 working day before placing next layer	Superintendent
Temperature	Submit proposal to proceed outside allowable conditions.	1 working day before placement	Superintendent
Trimming, compaction and curing			
Plant	Submit details of proposed hand operated plant.	1 week before use	Superintendent
Subsequent layers	Submit completed test results of previous layer.	1 working day before placing next layer	Superintendent
Acceptance of compaction			
Lots for acceptance	Submit compaction test results.	1 working day after testing	Superintendent
Compaction requirements and acceptance	Submit evidence that compaction is within tolerances.	1 working day after test results	Superintendent
Tolerances			
General	Submit lot survey reports.	1 working day before next activity	Superintendent
Action on rejection			
Corrective action–rejected unbound layers	Submit proposal for corrective action.	1 working day before next activity	Superintendent
Corrective action–rejected bound layers	Submit proposal for corrective action.	3 working days before next activity	Superintendent
Removal and replacement of rejected course			
Extent of removal	Submit proposal to remove less than full width.	1 working day before next activity	Superintendent

Clause title/Item	Requirement	Notice for inspection	Release by
Prior to replacement	Give notice for inspection of underlying material.	1 working day before next activity	Superintendent
Replacement	Submit proposed methods to make good.	1 working day before next activity	Superintendent
Maintenance before completion of wearing course			
Pavement condition before primerseal	Dry-back, re-prepare and give notice for inspection.	3 working days before next activity	Superintendent and Council
Opening bound pavement to traffic	Give notice of proposed opening to traffic.	3 working days before proposed opening	Superintendent

Table SC6.4.5.3.41 Flexible pavements-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause title/Item	Requirement	Notice for inspection
Delivery to site		
Delivered materials	Give notice for inspection.	Progressive
Delivery of modified or bound materials		
Delivery of materials	Provide delivery dockets at point of delivery.	Progressive
Stockpiling of unbound materials		
Location	Give notice of proposed alternative locations.	2 weeks before stockpiling
Trimming, compaction and curing		
Compaction	Give notice of proposal to use alternative layer thickness.	2 weeks before activity
Rework	Give notice for inspection of reworked wetted up layer.	Progressive
Curing of bound materials	Give notice of water curing activities.	Progressive
Acceptance of compaction		
Nuclear density Meter testing	Give notice of proposal to use Nuclear density meter.	1 working day before use
Tolerances		
Layer width	Give notice of completion of layer width.	Progressive
Levels and Surface Trims	Give notice of completed surface layer.	Progressive

Table SC6.4.5.3.42 Asphaltic concrete-hold points

Clause/subclause	Requirement	Notice for inspection	Release by
Plant	Evidence that plant is registered and insured.	2 weeks before using plant	Superintendent
Delivery—work records	Submission for counter signing.	Each day for daily completion	Superintendent
Asphalt mix design			
Approved Mix	Submit approved mix design for Superintendent confirmation.	7 days before using mix	Superintendent
Production Mix— Production Sampling and Testing	Submission of all documented test results.	Within 7 days of delivery of material	Superintendent
Asphalt mixes incorporating RAP	Mixes containing more than 20% RAP to be submitted for assessment.	7 days before using mix	Superintendent
Placing	Present surface prior spreading.		Superintendent
Joints—General	Submit plan of joints location for approval.	7 days before commencing	Superintendent
Preparation of Pavement — Rectification of Pavement Surface	Prepare surface to the satisfaction of the Superintendent.		Superintendent
Laying—Paver	Provide notice of proposed pavers.		Superintendent
Removal and Replacement of Rejected Material	Present surface after removal of the rejected material.		Superintendent

Table SC6.4.5.3.43 Asphaltic concrete-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause/subclause	Requirement	Notice for inspection
Plant	Superintendent to assess faulty plant.	Progressive
Production	Superintendent to access the mixing plant to verify production procedures and the supplier's compliance with the Contractor's Project Quality Manual and Quality Plan.	Progressive
Aggregate—General	Source subject to inspection and approval of Superintendent.	3 weeks before importing aggregate

Table SC6.4.5.3.44 Mass concrete subbase-hold points

Clause title/Item	Requirement	Notice for inspection	Release by
Materials for concrete			
Materials	Submit details of concrete mix and materials.	Submit as part of confirmation of nominated mix	Superintendent
Design and control of concrete mixes			
Nominated mix	Submit details of concrete mix and materials including NATA certificates and test results.	21 working days before using the nominated mix (Progressive)	Superintendent and Council
Variations to nominated mix and materials	Submit details of any change to nominated mix and materials.	21 working days before implementing change	Superintendent
Conformance for concrete strength and thickness			
Sampling, curing and testing of fresh concrete	Inspection of sampling procedure.	Progressive	Superintendent
Acceptance criteria	Submit test results.	Progressive	Superintendent
Acceptance criteria for cored concrete (non-conformance)	Submit test results.	Progressive	Superintendent
Production, transport and consistency of concrete			
Concrete production and transport	Submit proposed work methods.	At least 21 working days before starting	Superintendent
Placing and finishing concrete subbase			
Subbase Paving plan	ubmit as part of Quality lan.	21 working days before starting	Superintendent
Construction—Placing	ritten notice to commence including trial section).	7 days before starting	Superintendent
Trial Concrete Subbase —Construction	Inspection of the trial concrete subbase.	1 working day after placing trial section	Superintendent
Trial Concrete Subbase —Deficient trial section	Provide justification of the methods used in producing deficient work for assessment.	1 working day after deficiency identified	Superintendent

Table SC6.4.5.3.45 Mass concrete subbase-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause title/Item	Requirement	Notice for inspection
Conformance for concrete strength and thickness		
Testing by specimens cut from the work	Coring witnessed by Superintendent	3 working days
Restoration after coring	Inspection of restoration work	3 working days after cutting
Placing and finishing concrete subbase		
Curing – Efficiency Index	Submit certificate of compliance for the curing compound	Progressive
Average application rate	Average rate checked by the Contractor and certified by the Superintendent	Progressive
Bond breaker and spall treatment		
Treatment of Unplanned Cracks	Check for cracks and repair/reject	Progressive

Table SC6.4.5.3.46 Plain and reinforced concrete base-hold points

Clause title / Item	Requirement	Notice of inspection	Release by
Design and control of concrete mix			
Nominated mix	Submit details and certificates for nominated concrete mix and material constituents including NATA certificates and test results	21 working days before using the nominated mix	Superintendent
Variations to nominated mix and materials	Submit details of any change to nominated mix and materials	21 working days before implementing change	Superintendent
Steel reinforcement			
Placing and cover requirements	Approval of placement and fastening of reinforcing steel	4 working hours before concrete placement	Superintendent
Production, transport and consistency of concrete			
Concrete production and transport	Submit proposed methods and equipment	4 weeks before starting	Superintendent
Placing and finishing concrete base			
Subbase survey	Work-as-executed survey of the subbase.	7 days before starting any works	Superintendent
Surface texture	Submit details of proposed texturing device and method of texturing	Before texturing	Superintendent
Trial of Concrete Base Construction	Obtain approval for the trial section	5 working days before main works	Superintendent
Trial of Concrete Base—Deficient trial section	Provide justification of the methods used in producing deficient work for assessment	2 working days after construction	Superintendent
Joints			
Permanent sealing—General	Submit proposed method for permanent joint sealing	4 weeks before installation	Superintendent
Slab anchors			
Excavation	Submit compacted excavated surface	1 working day before concreting	Superintendent
Testing of concrete for compressive strength			
Sampling	Inspection of sampling procedure	Progressive	Superintendent
Acceptance criteria	Submit test results	Progressive	Superintendent
Acceptance criteria for cored concrete	Submit test results	Progressive	Superintendent
Removal and replacement of base			
General	Submit proposed method of removal to preserve adjoining base and underlying subbase	7 working days before replacement works	Superintendent

Table SC6.4.5.3.47 Plain and reinforced concrete base-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Witness Points Off Site		
Clause/ subclause	**Requirement**	**Notice of inspection**
Materials for concrete		
Aggregates - Storage	Storage and handling to preserve quality of aggregate	Progressive
Steel reinforcement		
General	Provide NATA certificates and manufacturer's information.	Before delivering to site
Bar chairs	Demonstrate load bearing capacity	Before delivering to site
Joints		
Silicone Sealant	Provide NATA certificate and manufacturer's information	4 weeks before joint work
Witness Points On Site		
Joints		
Permanent Sealant	Locations as shown on drawings and change to spacing	Progressive
Placing and finishing concrete base		
Consistency	Provide slump check test results	Progressive
Protection of Work - Ambient conditions	Provide details of protection methods for cold or hot weather and rain	Progressive
Traffic considerations	Provide traffic management measures	Progressive
Rate of Evaporation and moisture loss	Provide details of precautionary measures to prevent moisture loss when evaporation rate exceeds prescribed limits	Progressive
Paving (Mechanical and Hand Paving)	Construction joint if hand or mechanical paving is disrupted	Progressive
Alignment and Surface Tolerances - Assessment of base thickness	Survey of base surface, edge alignment and thickness	Progressive
Curing – Efficiency Index	Submit certificate of compliance for the curing compound	Progressive
Testing of concrete for compressive strength		
Testing of specimens cut from the work	Carry out coring in presence of the Superintendent	
Repair and Restore work after coring	Restore holes with non-shrink cementitious concrete	After coring
Conformance of concrete strength, compaction and thickness		
Relative Compaction	Testing conformance of required relative compaction	Progressive

Table SC6.4.5.3.48 Sprayed bitumen surfacing-hold points

Clause title/Item	**Requirement**	**Notice for inspection**	**Release by**
Design of bituminous surfacing			
Confirmation of Design and Materials Compliance	Submit the sprayed seal design and additional details for approval	2 weeks before commencing work	Superintendent
Plant	Evidence that plant is registered and insured	2 weeks before using plant	Superintendent

Table SC6.4.5.3.49 Sprayed bitumen surfacing-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause title/Item	Requirement	Notice for inspection
Application and rolling of aggregate		
Removal of loose aggregate, Loose aggregate particles	Completion within specified time	Various to allow inspection of performance in conformance with Tables of time limits
Removal of surplus and waste material	Demonstrate that materials are properly disposed	Progressive
Protection - New work	Demonstrate that line marking and warning signs are in place to protect new work	Progressive

Table SC6.4.5.3.50 Bituminous microsurfacing-hold points

Clause title/Item	Requirement	Notice for inspection	Release by
Mix design			
Nominated Mix—Design and control of bituminous mix	Submit details of nominated mix with NATA Certification	7 days before commencing	Superintendent
Production and paving			
Production mix Bituminous —microsurfacing	Target application rate and nominal layer thickness for approval	7 days before commencing	Superintendent
Sampling and testing of production mix	Compliance with maximum permitted variations from approved mix	During mixing	Superintendent
Weather limitations	Cease works if weather conditions are not appropriate	Progressive	Superintendent
Paving unit calibration	Documentation for detailed calibration	7 days before using paving unit	Superintendent
Preparation of Pavement	Provide cleaned surface for inspection	1 working day prior to spreading works	Superintendent
Spreading—Traffic	Capable of carring traffic in short period after slurry surfacing to the approval of Superintendent	One hour after spreading	Superintendent
Surface texture—Test run	Demonstrate surface texture	1 working day before commencing	Superintendent
Non-conformance—Materials and finished surfacing	Approval for correction or replacement	1 working day before corrective action	Superintendent

Table SC6.4.5.3.51 Bituminous microsurfacing-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause title/Item	Requirement	Notice for inspection
Witness Points Off Site		
Materials		
Binder—Compliance	Submit NATA test results for the nominated binder	7 days prior to commencing works
Mineral Aggregates—Quality	Submit NATA test results for the nominated mineral aggregates	7 days prior to commencing works
Mineral Filler—Quality Compliance	Submit NATA test results for the nominated binder	7 days prior to commencing works
Witness Point On Site		
Spreading—Clean up	Leave road fixtures in clean and satisfactory condition	Progressive

Table SC6.4.5.3.52 Segmental paving-hold points

Clause title/Item	Requirement	Notice for inspection	Release by
Materials			
General—Nominated materials	Submit segmental paving materials and supplier.	2 weeks before ordering	Superintendent
Construction			
Subgrade Preparation—Dimensions and specification	Present the finished subgrade for approval	1 working day before proceeding	Superintendent
Subbase—Dimensions and specification	Present finished subbase for approval	1 working day before proceeding	Superintendent
Base—Dimensions and specification	Present the finished base for approval	2 working days before proceeding	Superintendent

Table SC6.4.5.3.53 Segmental paving-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Item	Requirement	Notice for inspection
Construction		
Opening to Traffic—Inspection	Regularly inspect joints after completion	Progressive

Table SC6.4.5.3.54 Stabilisation-hold points

Clause/subclause	Requirement	Notice for inspection	Release by
Materials proposed for use in the work	Submit NATA certificate of compliance	14 days prior to commencement of works	Superintendent
Field Working Period —Laboratory	Nominate the specific field working period specified in the Stabilisation Mix Design	14 days prior to commencement of works	Superintendent
Materials			
Cement—Storage	Re-test cement stored in excess of 3 months	2 working days prior to usage	Superintendent
Stabilisation Process —Proposed equipment and procedures	Submit a Work Plan nominating proposed plant and work sequence	14 days prior to commencement	Superintendent
Application of stabilising agent—In situ application	Proposals for special processes of supply of stabilising agent into the mixing bowl	7 days prior to mixing	Superintendent
Mixing—In situ mixing process	Demonstration of equipment mixing efficiency in trial section	7 days prior to production stabilisation	Superintendent
Trimming and Compaction—Trimming	Work methods to exclude laminations and slurrying	3 working days prior to production stabilisation	Superintendent
Trimming and Compaction—Survey control methods	Use of trimmed material as fill or spoil	3 working days prior to disposition	Superintendent
Curing—Method statement	Submit details of proposed curing method	As directed	Superintendent
Trial section of stabilised earthworks			
General	Submit a trial section of stabilised earthworks	5 working days prior to commencement of works	Superintendent and Council
General	Any deficient sections will require to be investigated and may be directed to remove	Progressive	Superintendent and Council

Table SC6.4.5.3.55 Stabilisation-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause/subclause	Requirement	Notice for inspection
Witness Points Off Site		
Materials		
Cement	Proof of quality and source	Progressive
Quicklime	Proof of quality and source	Progressive
Hydrated lime	Proof of quality and source	Progressive
Ground granulated blast furnace slag	Proof of quality and source	Progressive
Flyash	Proof of quality and source	Progressive
Blended stabilising agent		
Blended stabilising agent —Standard	Proof of quality and source	Progressive
Blended stabilising agent —Handling and storage	Comply with supplier's handling and storage requirements and arrange sampling of agent	Progressive
Witness Points On Site		
Quality Requirements— Compaction	Adjustment of Field Working Period for site conditions	Progressive
Application of stabilising agent —Stationary mixing plant	Monitoring application of stabilising agent at the plant	Progressive
Application of stabilising agent —Stationary mixing plant	Removal of spilled stabilising agent	Immediately upon spillage event
Application of stabilising agent —Spreading out	Actual spread to be recorded and checked	Progressive
Application of stabilising agent —Spreading out	Record average spreading rate using load cells	Progressive
Mixing—Stationary mixing plant	Test unconfined compressive strength	Progressive
Mixing—In situ mixing process	Visual inspection to ensure uniform mixing and record	Progressive
Mixing—In situ mixing process	Additional passes of mixing equipment to improve uniformity	Progressive
Trimming and Compaction—Survey control methods	Survey to confirm pavement layer thickness remains within tolerances after trimming	Progressive
Trimming and Compaction —Straight edge test	Conform to surface tolerances prior to sealing or practical completion of work component	As directed by Superintendent
Dimensions—Width	Random measurement of stabilised layer width	As directed by Superintendent

Table SC6.4.5.3.56 Subsoil, foundation and pavement drains-hold points

Item/Clause title	Requirement	Notice for inspection	Release by
Construction			
Subsoil and Sub-Pavement Drains / Foundation drains —Excavation	Inspect excavated trench	1 working day prior to filling	Superintendent
Subsoil and Sub-Pavement Drains / Foundation drains—Laying of Pipes	Present bedding of compacted filter material laid to line and grade	3 working days before next activity	Superintendent
General—Filter material	Type of filter material	3 working days before ordering material	Superintendent
Intra-pavement drains —Laying of pipe	Provide certification that drain has adequate crushing strength	3 working days before ordering	Superintendent
Intra-pavement drains —Laying of pipe	Submit details of proposed method of securing pipes	7 days before pipe laying	Superintendent
Edge drains—Laying of pipe	Submit details of proposed method of securing pipes	7 days before pipe laying	Superintendent

Table SC6.4.5.3.57 Subsoil, foundation and pavement drains-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Item/Clause title	Requirement	Notice for inspection
Construction		
Subsoil and Sub-Pavement Drains / Foundation drains—Pipes	Lay on compacted bed to documented line and level	1 working day before filling
Subsoil and Sub-Pavement Drains —Backfilling	Backfilling to documented level and relative compaction	1 working day before covering with geotextile
Foundation drains—Backfilling	Backfilling to documented level and relative compaction	1 working day before covering with geotextile
Geotextile—Installation	Placement of fabric conformance	1 working day before filling
Geotextile—Installation	Ensure exposure periods are within the constraints	Progressive
Cleanouts—Field testing	Perform flushing test	Progressive (timing depending on the construction of pavement layers)

Table SC6.4.5.3.58 Subsurface drainage-witness points

Item/Clause title	Requirement	Notice for inspection	Release by
General			
Siting of Work	Submit the proposed set-out in addition to the designed set-out	7 days before planned execution	Superintendent
Siting of Work—Proposed changes	Present the proposed new set-out for approval	3 days before planned execution	Superintendent
Excavation—Existing underground services	Submit evidence of approval of the relevant authorities.	14 days before planned excavation	Superintendent
Excavation—Trenches	Approval of completed trenches required prior to installation of drainage work	1 working day prior to installation of drainage work	Superintendent
Materials			
Subsurface drainage pipes—General	Submit compliance certificates	7 days before proceeding to provide pipes	Superintendent
Other subsurface drainage pipes	Submit details of proposed alternative pipes and evidence of conformity for approval.	7 days before proceeding to provide pipes	Superintendent
Geotextile—General	Provide documentation of conformity of geotextile and installation process	14 days before proceeding to provide geotextile	Superintendent
Recording of drainage			
Recording of subsurface drainage Information	Progressive supply of subsurface drainage details	5 working days after completion of each drain or drainage system	Superintendent

Table SC6.4.5.3.59 Subsurface drainage-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Item/Clause title	Requirement	Notice for inspection
General		
Temporary drainage during construction	Locate materials and equipment clear of water courses	7 days prior to positioning

Table SC6.4.5.3.60 Pavement markings-hold points

Clause title/subclause	Requirement	Notice for inspection	Release by
General			
Material Quality	Submit NATA Test Reports on materials	7 days before work is scheduled to commence	Superintendent
Surface preparation—Wet Weather	Superintendent direction on suspension of work	Progressive	Superintendent
Removal of pavement markings			
General—Removal of redundant markings	Submit method for approval	1 working day before commencement of activity	Superintendent

Table SC6.4.5.3.61 Pavement markings-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause title/subclause	Requirement	Notice for inspection
General		
Setting Out—Net	Set out in accordance with the drawings	Progressive
Pavement marking paint		
Application of Paint Beads—Glass beads applied to other paint markings	Application method to be approved by Superintendent	Progressive
Field testing—Application Rate	Application to be checked for quality	Progressive
Thermoplastic pavement marking material		
Field testing—Application Rate	Application to be checked for quality	Progressive
Pavement marking tape		
Removal of Pavement Marking Tape	Direction to remove pavement marking tape	Progressive
Raised pavement markers		
Installation of Raised Pavement Markers	Installation to be checked for quality (allow adhesive to set)	Progressive

Table SC6.4.5.3.62 Guide posts-hold points

Clause/subclause	Requirement	Notice for inspection	Release by
General			
Materials—Proprietary posts—Proposed supplier	Supply details of the proposed guide posts	Two weeks before manufacture	Superintendent
Construction			
Erection of Guide Posts —Proprietary guideposts	Provide manufacturers anchorage instructions	5 working days	Superintendent
Erection of Guide Posts —Guide posts on concrete pavements	Provide fixing details	5 working days	Superintendent

Table SC6.4.5.3.63 Guide posts-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause/ subclause	Requirement	Notice for inspection
Construction		
General—Location of guide posts and proximity to underground services	Locations shown on drawings or as specified Check for existing underground services	Two weeks before installation
Erection of Guide Posts—Backfilling	Firm embedment in ground	Progressive
Delineators—Fixing	Arrangement of delineators relative to traffic direction	Progressive

Table SC6.4.5.3.64 Signposting-hold points

Clause/subclause	Requirement	Notice for inspection	Release by
Materials			
General—Approved Supplier	Details of proposed suppliers provided to the Superintendent including documentary evidence	1 week prior to ordering	Superintendent
General—Documentary Evidence	Evidence that materials and parts proposed comply with the requirements of this specification	1 week prior to engaging supplier	Superintendent
Retro-Reflective Material for Background and Legend	Details of material and compatibility in application and durability	1 week prior to ordering	Superintendent
Sign Support Structures —Attachment of signs	Details of proposed attachment systems	2 weeks prior to fabricating attachment systems	Superintendent
Erection of new signs			
Setting Out	Approval of the location and alignment of the sign support structure	1 week prior to erection	Superintendent
Setting Out—Existing underground services	Locate services and protect against damage	1 week prior to erection	Superintendent
Special requirements			
Street Name, Service and Tourist Signs	Submit details of manufacturer for approval by council	1 week prior to ordering	Council

Table SC6.4.5.3.65 Signposting-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause/subclause	Requirement	Notice for inspection
Erection of new signs		
Setting Out	Submit details of and set out for each support structure	1 week before installing signs
Clearing	Clear vegetation after set-out on advice from council	3 working days before clearing
Sign Structure Footings —Excavation	Excavation as shown on drawings and as directed, including disposal of material	1 working day before next activity
Erection—Sign Damage	Repair or replace damaged signs	1 week before installing signs
Adjustment of existing signs and support structures		
General	Conform to Drawings and Superintendent direction	1 week before adjusting signs

Table SC6.4.5.3.66 Non rigid road safety barrier system-hold points

Item/Clause title	Requirement	Notice for inspection	Release by
Materials			
Certification—Evidence of Conformance	Provide documentary evidence of conformity of steel components	1 week prior to erection	Superintendent
Construction			
General— Set Out	Set out to drawings or as directed	2 working days prior to erection	Superintendent
End Treatment of Road Safety Barriers—MELT	Submit alternative MELT locations	1 week prior to ordering	Superintendent

Table SC6.4.5.3.67 Non rigid road safety barrier system-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Item	Requirement	Notice for inspection
Construction		
General—Sequence of Construction (pavements)	Erection after pavement activities	1 week before installation – progressive
General—Underground Obstruction	Alternative method due to obstructions	1 week before setting posts
Erection of Steel Posts—Damage to posts	Assessment by Superintendent for replacement	3 working days before removal of damaged post
Erection of Road Safety Barrier Rails—Excessive damage to rails	Assessment and rejection by Superintendent	1 working day after perceived damage

Table SC6.4.5.3.68 Minor concrete works-hold points

Clause/subclause	Requirement	Notice for inspection	Release by
General			
Excavation and Foundation General—Ground preparation—Base preparation	Inspect prepared surface or sand underlay	1 working day prior to covering	Superintendent
Excavation and Foundation General—Ground preparation—Polymeric film underlay installation	Inspect membrane or film underlay installed	1 working days prior to covering	Superintendent
Approval of Formworks Design	Formwork design certificates	3 working days	Superintendent
Erection—Formwork	Certification of installed formwork and inspection	1 working day prior to covering	Superintendent
Materials for concrete			
Nominated Mix	Submit details of nominated mix for approval	7 working days	Superintendent
Reinforcement for concrete			
Steel reinforcement placement—Approval of reinforcement before concrete placement	Inspect reinforcement placement	1 working day prior to covering	Superintendent
Cores, fixings and embedded items—General	Shop drawings for cores, fixings and embedded items	7 working days prior to commencing works	Superintendent

Clause/subclause	Requirement	Notice for inspection	Release by
Loads on minor concrete structures	Approval for early loading of the structure by design strength in situ tests	3 working days	Superintendent
Sprayed concrete general—Method statement	Submit proposal for spraying	14 days prior	Superintendent

Table SC6.4.5.3.69 Minor concrete works-witness points

Clause title/Item	Requirement	Notice for inspection
General		
Ground preparation—Mass concrete bedding on earth foundations	Inspect concrete blinding slab prior to placing forms or materials	1 working day prior to covering
Concrete quality requirements —Formwork	Check erection tolerances	1 working day
Materials for concrete		
Certificate of compliance	NATA certificates for all materials	7 days prior to commencing on site
Handling and treatment of concrete		
Mixing of concrete—Hand Mix On Site	Submit proposal for use	7 days prior
Mixing of concrete—Pre-mixed supply	Submit delivery dockets and subcontractors details	Progressive
Concrete quality requirements —Flatness	Confirm unformed surfaces	1 working day
Concrete quality requirements —Surface quality	Confirm surface quality	1 working day
Concrete curing	Certified test results for curing compound	7 days prior
Joints	Submit proposal for sawn joints	7 days prior
Concrete placing and compaction —Testing	Certified test results for compressive strength	Progressive
Reinforcement for concrete		
Steel reinforcement placement —Delivery and receipt of reinforcement	Submit notice for test inspection	7 days
Steel reinforcement placement —Placing	Submit proposed changes to reinforcement	2 days prior to commencing on site
Steel reinforcement placement —Damaged galvanising	Submit proposed repair method	2 working days prior
Steel reinforcement placement —Provision for concrete placement	Submit proposed changes to spacing, cover, splicing or welding or reinforcement	2 working days prior
Cores, fixings and embedded items—Cutting or coring	Approval for cutting or coring hardened concrete	2 working days prior
Sprayed concrete—Sprayed concrete test panel	Approval of sample panels	7 days

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Table SC6.4.5.3.70 Boundary fencing-hold points

Clause title / item	Requirement	Notice for inspection	Release by
Materials			
General—Material approval	Submit source, type, Certificate of compliance and manufacturer for each type of material	One week before ordering each type	Superintendent
Construction			
General—Clearing and grubbing	Confirm approval for tree removal	One week before next activity	Superintendent
Erection of posts			
Depth of posts	Method of installing and proposed type of posts to be used	One week before manufacture or order	Superintendent
Erection of wires—General	Approval for any proprietary fasteners	One week before manufacture or order	Superintendent
Flood gates—General	Approval to proceed with flood gates and type	One week before fabricating flood gates	Superintendent
Removal and disposal of surplus material and rubbish	Approval required for burn off for combustible materials	Prior to burning	Superintendent
Bedding—Cattle Grids	Approval for bedding requirements	One week before fabricating flood gate	Superintendent

Table SC6.4.5.3.71 Boundary fencing-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Item	Requirement	Notice for inspection
Materials		
Galvanised Posts, Braces and Rails —Welded Joints	Welding sites to be cleaned and painted	Progressive
Gates—Dimensions and Fittings	Fitting alternatives	3 working days before fabrication
Construction		
Stock-Proof Fencing—Erection of posts—Depth of posts	Posts sunk to the required depths	Progressive
Crossing of Watercourses and Depressions	Secure by installing longer posts as directed	Progressive
Flood gates—Small water courses	Provide required waterway area	Progressive
Erection of Gates	Double gates to be directed	One week before ordering
Removal and disposal of surplus material and rubbish	All surplus material to be removed	Progressive

Table SC6.4.5.3.72 Control of traffic-hold points

Clause title/Item	Requirement	Notice for inspection	Release by
General			
Traffic guidance scheme (TGS)—Approval	Approval of Traffic guidance scheme	2 weeks before proposed commencement on site	Superintendent.
Traffic guidance scheme (TGS)—Relevant Authority Approval	Provide evidence of approvals from Council and other Authorities	4 weeks before proposed commencement on site	Superintendent
Traffic Guidance Scheme (TGS)—Non-complex TGS	Carry out a risk assessment for works not involving complex TGS or staged works	4 weeks before proposed commencement on site	Superintendent.
Side Roads and Property Accesses—Proposed access	Provide Proposal for access	5 working days prior to carrying out works	Superintendent.
Side Roads and Property Accesses—Notice to property owners	Approval to deny vehicular access and provide notice to property owners	3 working days prior to carrying out works	Superintendent.
Temporary roadways and detours			
Approval	Submit design of all proposed temporary roadways and detours	5 working days prior to carrying out works	Superintendent.
Opening to Traffic	Present completed temporary roadways and detours to the Superintendent for approval prior allowing traffic	5 working days prior to carrying out works	Superintendent.
Arrangements for traffic			
Construction Under Traffic—Approval	Approval required to construct under traffic	3 working days prior to carrying out works	Superintendent.
Construction Under Traffic—Details	Submit full details of temporary signposting, traffic control devices and traffic control methods for approval	5 working days prior to carrying out works	Superintendent.
Opening Completed Work—Written Notice	Provide written notice to the Superintendent confirming date of opening of completed works.	5 working days prior to opening of completed works	Superintendent.
Traffic control devices			
Adequate Traffic Control Devices—Default by Contractor	Rectify inadequate traffic control devices	1 working day of notice	Superintendent.

Table SC6.4.5.3.73 Control of traffic-witness points

Note—the Contractor must notify the Superintendent and/or council of impeding works, where the option of attendance may be exercised by the Superintendent and council.

Clause/Item	Requirement	Notice for inspection by the Superintendent
General		
Traffic Guidance Scheme (TGS)—Site Copy	A copy of the approved Traffic Guidance Scheme must be kept on site	Progressive
Traffic Guidance Scheme—Safety Audit	For complex traffic arrangements and staged works carry out safety audits	Progressive
Traffic Controllers—Personnel	Submit names and declaration of proposed traffic controllers	Prior to commencing work
Temporary Speed Zoning—Record	Diary and method of works	Progressive
Temporary roadways and detours		
Drainage—Pavements	Pavement designed and constructed not to pond water	Progressive
Surfacing—Extent	Width of wearing surface and position of finish tying into existing works	3 working days prior to carrying out works
Traffic control devices		
Arrangement of traffic control devices	Arrangement and placement as per the approved TGS	Progressive
Temporary markings—Line Marking	Ineffective line marking, remark within 48 hours.	Progressive
Temporary markings—Old Markings Removed	Obliterate or remove old markings.	Progressive
Raised Pavement Markers—Ineffective Markers	Replace ineffective markers within 24 hours.	Progressive

SC6.4.5.3 Attachment E Non conformance Certificate (NCC) - Template

Click here to obtain a copy of the following form.

SC6.4.5.3 Attachment F Non Conformance Report (NCR) - Template

Click here to obtain a copy of the following form.

SC6.4.5.3 Attachment G Notice of Non Conformance Report (NNC) - Template

Click here to obtain a copy of the following form.

SC6.4.5.3 Attachment H Corrective and Preventive Action Request (CPAR) - Template

Click here to obtain a copy of the following form.