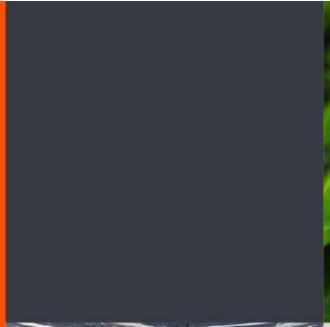
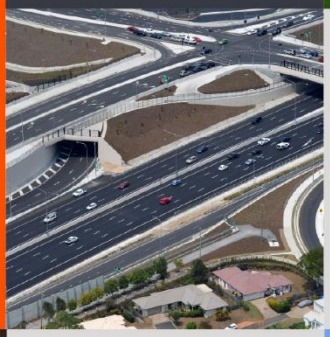


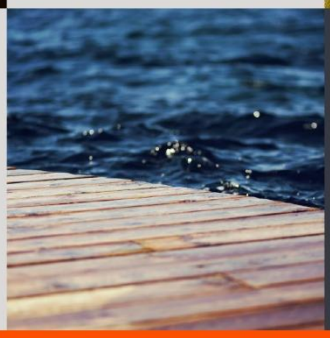

J5908 – Byron Bay STP

ADDITIONAL FLOW PATH – TECHNICAL SPECIFICATION

Prepared for Byron Shire Council

By Planit Consulting Pty Ltd

March 2020

Job No. | Document No. J5908 – TS001



Document Status

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Project Details

Project Name:	Byron Bay STP Additional Flow Path
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Client Project Manager	Andrew Wells
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Contents

1 INTRODUCTION

1.1 General

This contract is for the design and construction of:

- New assets and the modification of existing assets at the Bay Sewerage Treatment Plant in Wallum Place, Byron Bay.
- 650m of DN 300 PVC pipe.
- 480m of 2.5m wide shared concrete path along an existing drainage channel including pedestrian bridge; and,
- Works to clear obstructions at various locations along an existing drainage line located on the south side of the Ewingsdale Road, Byron Bay.

Works under this contract will includes both design and construction elements and will include civil, electrical and mechanical works on site.

The works are necessary to direct the wetland treated effluent water created at the plant through an additional flow path and away from sensitive areas.

Work will be undertaken with the Byron Bay STP site, which is an operating treatment plant. Construction must occur while the STP remains in service.

All works must be constructed in accordance with this specification and the attached Issued For Construction drawings (IFC).

1.2 Principal Supplied Information

The following reference documents are provided to the Tenderer by Council for information purposes only to guide the tenderer of Council's intent for the project:

- Attachment 1 - Technical Specification.
- Attachment 2 - Design Drawings.
- Attachment 3 - Annexure AS4000
- Attachment 4 – Review of Environmental Factors; and,
- Attachment 5 - Byron Shire Council, Capital Works Asset Creation and Disposal Summary Sheet.

The Contractor shall be fully responsible for the use, interpretation or conclusion made by itself or others regarding the information provided. It shall not rely upon these documents for any purpose, including entering into the Contract or performing its obligations under the Contract. Unless expressly provided by the Contract, the Contractor shall not be entitled to any claim arising from or in connection with the inaccuracy, incompleteness or inadequacy of the above information supplied by the Principal.

1.3 Scope of Works

This contract includes the supply of all labour, plant and materials necessary for the complete and proper construction and connection of:

General

- All preconstruction Activities and Plans.
- Site establishment and disestablishment.
- Dilapidation survey before commencing works at the site.
- The location of all underground services on site.
- Provision of traffic management.

- Completion and submission of the Byron Shire Council – Capital works Asset Creation and Disposal Summary Sheet; and
- Provision of Operations and Maintenance manuals and "As Constructed" information as outlined in the specification.

Contractor Designs

- Automatic rake on diversion pit inlet.
- Hopper to collect waste.
- Chute from rake to hopper
- Proposed cage/enclosure for rake and chute.
- Pedestrian bridge

Electrical Works

- Removal and disposal of an Existing switchboard
- Construction, installation and connection of a new switchboard (to be designed by Coastal Works)
- VSDs include in new switchboard
- Connection to power and communications of new flow meters
- Connection to power and communications of new automatic rake and chute
- Connection and communications of new level sensors and level probes

Mechanical Works

- Supply and installation of new collection chute from automatic rake to hopper.

Civil Works

- New 4m wide all-weather vehicle access track to concrete hardstand area.
- New concrete hardstand area
- Removal of existing trees to allow vehicle access to concrete hardstand.
- Excavation and re-grading of existing earth mounding
- Supply and construct walkway over formalised flow path
- Connection of a DN375mm DICL pipe to an existing reinforced concrete pit
- Removal of an existing flow meter
- Construction of concrete pits to house automated control valve
- Construction of concrete pits for flow meters
- Shape swale around existing pit to formalise overflow path
- Supply and construction of DN375 DICL and DN150 DICL recycled water mains and connections.
- New air release valves.
- 650m of DN 300 PVC pipe.
- 480m of 2.5m wide shared concrete path along an existing drainage channel including pedestrian bridge; and,
- Works to clear obstructions at various locations along an existing drainage line located on the south side of the Ewingsdale Road, Byron Bay.

1.4 Site Location

The Works to be carried out under this contract are located in the Byron Bay STP site in Wallum Place, Byron Bay as shown on the drawings.

The Contractor's access on to and around the Site, and use of the Site for temporary works and construction plant, including working and storage areas, location of offices, workshops, sheds, roads, parking and the like, shall be restricted to the Work site boundary as approved by the Superintendent, and subject to such conditions as are stated in the Contract or may be imposed by the Superintendent. The site compound is to be included in the CEMP.

The Contractor shall obtain approval from the appropriate authority and accord with the requirements of all statutory authorities when he uses any other site for the purpose set out in the above paragraph. The Contractor shall confine all his activities to the Site. The Contractor shall take all necessary precautions to exclude members of the public from the Site.

Local Government roads leading to the Site shall be kept clear at all times, and if damaged shall be restored to the satisfaction of the relevant Municipal Council. The cost of any restoration works shall be borne by the Contractor.

Upon completion of all site works, the site shall be cleared and cleaned to the satisfaction of the Superintendent inclusive of obtaining written clearances from other Authorities where required.

1.5 Hold Points

A HOLD POINT where referenced in the Technical Specification, is defined as an inspection or review point for the Superintendent, beyond which work shall not proceed without the Superintendent's express written approval. The Contractor will make suitable arrangements to notify the Superintendent when a Hold Point will be reached so that they can review and/or witness any work process, record or test being undertaken by the Contractor and thus expedite the release of that Hold Point. At least one day written notice should be given to the Superintendent.

1.6 Witness Points

A WITNESS POINT is an identified point in the process where the Engineer or Consultant may review, witness, inspect the method or process of work. The activities however may proceed. Prior notification to the Superintendent is required. At least one day written notice should be given to the Superintendent.

1.7 Accompanying Documents

These other documents will form part of the contract:

1. The Northern Rivers Local Government Development Construction Specification CQS Quality System Requirements
2. The Northern Rivers Local Government Development Construction Specification CQC Quality Control Requirements
3. The Northern Rivers Local Government Development Construction Specification C101 General
4. The Northern Rivers Local Government Development Construction Specification C211 Control of Erosion and Sedimentation
5. The Northern Rivers Local Government Development Construction Specification C220 Stormwater Drainage – General
6. The Northern Rivers Local Government Development Construction Specification C221 Pipe Drainage
7. The Northern Rivers Local Government Development Construction Specification C223 Drainage Structures
8. The Northern Rivers Local Government Development Construction Specification C223C254 Segmental Paving

1.8 Standards and Test Methods

Unless specified in this Technical Specification, and where applicable, materials, workmanship and test methods shall be in accordance with the relevant standard of WSA 04 and the Northern Rivers Local Government Aus-Spec Specification (Design and Construction manuals, available at the following website (http://www.lismore.nsw.gov.au/cp_themes/default/page.asp?p=DOC-IMY-18-62-12).

Any areas not covered by this Specification or the Northern Rivers Local Government Aus-Spec Specification shall be in accordance with the relevant standard of the Standards Association of Australia.

A Standard applicable to the Works shall be the edition last published 14 days prior to the closing date for tenders unless otherwise stated. Copies of any standards quoted or referred to in the Technical Specification shall be kept on the site (in electronic or hard copy) if so specified. Test Methods, other than Australian Standards, specified in the Technical Specifications shall refer to the issue dates current at 14 days prior to the closing date for tenders unless otherwise specified.

1.9 Working Areas

Where the Drawings indicate construction working areas and areas for the storing of materials, use of plant and erection of sheds, work shall not be performed, nor the site occupied outside of these areas without the express permission of the Superintendent.

The Principal will not be responsible for the safe keeping of any of the Contractor's plant, equipment, tools, materials or other property. The Contractor may provide, and pay for, any security fencing considered necessary around any office, workshop or storage area, subject to the Superintendent's approval.

If the Contractor proposes to cut or alter any existing fencing on the Principal's property, the Contractor shall submit proposals to the Superintendent beforehand to provide and maintain temporary fencing to the satisfaction of the Superintendent during the Contract to prevent unauthorised entry to the Principal's property, and shall reinstate the fencing and remove temporary fencing on completion of the work.

1.10 Alignment and Survey

The set-out grid used on the Contract shall be MGA with levels relating to Australian Height Datum (AHD). Chainages and dimensions shown on the Drawings are measured horizontally on plan. It shall be the Contractor's responsibility to set out works from the co-ordinates and other survey information.

The Contractor shall provide their own Permanent Marks and Benchmarks. The Contractor is required to check all level information contained on the Contract Drawings and conduct a site inspection after the survey works to review any apparent discrepancies prior to the commencement of any construction works. This shall constitute a HOLD POINT.

The Contractor shall construct the works in strict conformity with the alignment information shown on the Drawings, except where otherwise directed in writing by the Superintendent.

The Contractor shall be responsible for maintaining the survey monuments and the various control lines regardless of whether they have been set out by the Superintendent or his representative or the Contractor. Before lines are affected by construction operations, the Contractor shall transfer such monuments to side positions clear of operations and shall note, and inform the Superintendent in writing, of the extent of such movement. The Superintendent or his duly authorised representative shall be present when monuments are moved and the Contractor shall provide notice in accordance with the contract.

If there is a major discrepancy between the Contractor's and the Superintendent's calculated volumes, then it will be attempted to resolve the discrepancy. If this is not possible, calculations by an independent surveyor agreed between both parties will be used to resolve the dispute. The cost of this work shall be shared equally between the Contractor and the Principal.

1.11 Schedule of Drawings

The work shall be executed in accordance with the Contract Drawings. The following Drawings are deemed to be the Contract Drawings and shall be read in conjunction with the Technical Specification.

The following Drawings are contained in Attachment 2 - Design Drawings.

Table 1 | Tender Drawings

Drawing No.	Title	Rev

STP ADDITIONAL FLOW PATH DISTRIBUTION PIT AUGMENTATION WORKS DETAILED DESIGN FOR CONSTRUCTION		
J5908 - 0220	COVER, INDEX, NOTES AND LOCALITY PLAN	B
J5908 - 0221	EXISTING CONDITIONS PLAN	B
J5908 - 0222	PROPOSED SITE LAYOUT PLAN	B
J5908 - 0223	DETAILED PIPE LAYOUT	B
J5908 - 0224	DETAILED PIPE SECTIONS	B
J5908 - 0225	EXISTING PUMP STATION LAYOUT, SECTION AND EXISTING FITTINGS SCHEDULE	B
J5908 - 0226	PROPOSED PUMP STATION LAYOUT, SECTION AND NEW FITTINGS SCHEDULE AND NEW FITTINGS SCHEDULE	B
STP ADDITIONAL FLOW PATH		
J5908 001	COVER SHEET AND DRAWING REGISTER	B
J5908 100	GENERAL NOTES	A
J5908 020	KEY PLAN	A
J5908 100	EROSION AND SEDIMENT CONTROL STANDARD DETAILS	A
J5908 200	STORMWATER PRESSURE MAIN - SHEET 1 OF 2	B
J5908 201	STORMWATER PRESSURE MAIN - SHEET 2 OF 2	B
J5908 210	PRESSURE MAIN TRENCHING AND CONSTRUCTION DETAILS	A
J5908 300	PATH PLAN - SHEET 1 OF 2	A
J5908 301	PATH PLAN - SHEET 2 OF 2	A
J5908 310	DETAIL PLAN 1	A
J5908 311	DETAIL PLAN 2	A
J5908 312	DETAIL PLAN 3	A
J5908 320	TYPICAL PATH SECTIONS	A
J5908 330	CONSTRUCTION DETAILS	A
J5908 340	LONGITUDINAL SECTIONS PATH 01 - SHEET 1 OF 2	A
J5908 341	LONGITUDINAL SECTIONS PATH 01 - SHEET 2 OF 2	A
J5908 342	LONGITUDINAL SECTIONS PATH 02 & 03	A
J5908 350	CROSS SECTIONS PATH 01 - SHEET 1 OF 2	A
J5908 351	CROSS SECTIONS PATH 01 - SHEET 2 OF 2	A
J5908 352	CROSS SECTIONS PATH 02	A
J5908 400	DRAIN CLEARING	A
REFERENCED STANDARD DRAWINGS		
NRLG R-04	KERB RAMP	C
NRLG R-07	CONCRETE FOOTPATH DETAIL	B
IPWEA RS-131	ROAD FURNITURE - TRAFFIC SIGN INSTALLATION DETAILS	E

1.12 Statutory Requirements

The Contractor shall ensure that all relevant statutes, regulations, ordinances and by-laws are complied with including the requirements of WorkCover NSW. The Contractor shall obtain and on Final Completion surrender to the Client all necessary approvals and certificates issued by the relevant Authorities.

The Contractor shall ensure Safe Working in confined spaces by ensuring that all work complies with AS 2865 (Safe Working in a Confined Space).

1.13 Quality Control Testing

The type and frequency of quality control testing and compliance testing is set out in the individual parts of the Technical Specification. All testing as required by the Technical Specification shall be arranged and carried out by the Contractor.

All test results shall be made available to the Superintendent within 24 hours of results being available, if requested to do so. The cost of all such testing shall be borne by the Contractor.

The Contractor shall supply any plant necessary to enable compaction and moisture content testing to be carried out at any depth and shall re-compact the excavated soil to the condition as specified for the appropriate part of the work at the Contractor's expense.

1.14 Tolerances

The intent of this Specification is to establish tolerances that are consistent with current construction practice and take into account the effect that deviations will have upon the structural action or operational function of the structures. Deviations from the established lines, grades and dimensions will be permitted within the limits described in this Specification, except that the Superintendent reserves the right to modify the tolerances described in this Specification if such tolerances impair the structural action or operational function of the structure.

Where tolerances are not described in this Specification and are not covered by the relevant Northern Rivers Local Government Aus-Spec (Version 2) Specification or Australian Standard, permissible deviations will be determined by the Superintendent such that they are compatible with tolerances for similar structures.

The Contractor shall be responsible for setting out and constructing each section of the work within the prescribed tolerance limits. Any work in which the prescribed tolerance limits are exceeded shall be remedied or removed and replaced by the Contractor at his own expense. The tolerances unless otherwise stated shall be measured normal to the centreline or axis and in a horizontal plane.

Failure to achieve any of the specified tolerances will necessitate reworking, by the Contractor, to achieve the specified levels and grade. The cost of any such reworking shall be borne by the Contractor. The Contractor may be requested to provide to the Superintendent a Survey Conformance Report evidencing the fact that the tolerances specified have been achieved.

1.15 Stockpiles

Temporary stockpiles shall not interfere with the Works and shall be located as agreed in writing by the Superintendent.

1.16 Service Locations

The Contractor shall arrange for all existing underground utility and communication assets to be identified using a services locator, or other means approved by the Superintendent prior to excavation commencing.

Excavations in the vicinity of all assets that are located are to be undertaken in a manner that is approved by the asset owner and which does not damage the service.

1.17 Contractor's Infrastructure

The Contractor shall locate and install facilities including site accommodation, for the purpose of these works only upon the Superintendent's approval.

Adequate signage required for site access shall be the responsibility of the Contractor.

All approvals and licences associated with installation and maintenance of facilities and roads shall be the responsibility of the Contractor.

All costs associated with the above shall be at the Contractor's own cost.

1.18 Directions to Contractor

Directions, instruction and the like given in this Specification, whether or not they include the expression 'the Contractor shall' or equivalent, shall be deemed to be given to and accepted by the Contractor, unless otherwise stated in the Contract.

1.19 Principal Supplied Materials

Nil

1.20 Service Connections to Contractor's Site Compound

The Contractor is to establish their site compound in an area agreed to by the Superintendent. Plant will be able to be stored within the work site area with security being the responsibility of the Contractor.

The Contractor is responsible for the provision of any services that are required during the construction activities.

1.21 Traffic Control

The Contractor undertaking works within work areas shall be responsible for the safety of both vehicular and pedestrian traffic during the works.

The Contractor is solely responsible for traffic management. This includes but is not limited to the cost of traffic control, staff, signs, equipment, lights and the preparation, implementation and auditing of Traffic Control Plans.

All Traffic Management shall comply with the RMS NSW requirements for Traffic Control at Work Sites as provided in the 'RMS Traffic Control at Worksites Manual – June 2010 Edition'

All persons engaged in traffic control and traffic management on the site including the preparation, implementation and auditing of Traffic Control Plans shall be accredited by the RMS of NSW and shall hold current tickets for the relevant levels of traffic management as required for works on RMS worksites. All traffic management on all roads shall follow RMS practice. The Contractor is to develop a Traffic Control Plan (TCP) to ensure the safe passage of vehicles on and around the worksite. This plan is to be developed by an RMS certified person and be provided to the Superintendent 7 days prior to any work being carried out on site.

1.22 Works Not Covered by Specification

Work required to complete the Contract as shown on the drawings, but not specifically covered by the Specification shall be completed to current best practice methods and in compliance with the Northern Rivers Local Government Aus-Spec (Version 2) Specification or Australian Standards and any specific manufacturer's installation or construction requirements.

1.23 Contractor Warranty

The Contractor warrants that the works when completed and every part thereof and all materials, articles and goods used or incorporated therein or supplied by the Contractor whether through a subcontractor or supplier or not, and in performance or purported performance of the Contract, whether purchased under any patent or trade name or otherwise, shall comply with the quality, quantity, number, nature, description and condition as required by the Contract. The Contractor is liable for breach of this warranty notwithstanding that the Superintendent may have accepted the works or any part or parts thereof as having been satisfactorily executed or completed.

1.24 Tools, Plant and Equipment

The Contractor must supply all tools, plant and equipment together with trained operators as appropriate, and as are necessary for the execution of the works. It shall be the Contractor's responsibility to ensure that all the same as may be needed by subcontractors is provided by them in terms of their subcontractors if any of the same are not to be provided by the Contractor. The Contractor must also ensure that all the same comply with the requirements of relevant laws applying in the place of execution of the works.

All equipment and plant to be used by the Contractor at either the site or at off-site locations shall:

- Be checked before use, tested and tagged all electrical equipment
- Be suited to the work and meet all operational requirements
- Be in good condition and in sound working order
- Be reliable and have low maintenance requirements
- Comply with all regulatory requirements
- Comply with all design and manufacturer's standards
- Comply with all requirements under this Contract
- Be operated only by suitably trained and licensed personnel.

Plant and equipment that does not comply with the Contract requirements may be rejected for use by the Superintendent. Any plant or equipment which is rejected for use by the Superintendent shall be removed by the Contractor and replaced at the Contractor's expense with plant or equipment which complies with the requirements of this Specification.

The Contractor shall not have any claim against the principal for delays arising from the inability of the Contractor or its subcontractors or agents to obtain spare parts or to have plant or equipment repaired. Any downtime due to maintenance requirements will be considered to have been allowed for in the Contract programme prepared by the Contractor.

All plant and equipment shall be thoroughly tested during its commissioning at the site and at off-site facilities as part of the Contractor's preparatory works. The commissioning tests shall demonstrate that the plant and equipment comply with all the requirements of the Contract documents. Following the completion of all commissioning tests, all plant and equipment shall be inspected by qualified and experienced personnel who shall provide written certification that the plant and equipment complies with all requirements of this Technical Specification.

Vehicles and other 'driver-operated' equipment should only be moved or used by a person who has an appropriate permit, licence or certificate.

1.25 Salvaged Materials

Unless otherwise specified, and subject to the provisions of the conditions of Contract, all materials salvaged from the works shall become the property of the Contractor and shall be removed from the site prior to the practical completion.

1.26 Trucking

No motor vehicle shall leave the site laden with any materials unless it is loaded in a manner that will prevent the discharge or accidental spills and leakage. The Contractor shall ensure that all loose materials are removed from trucks before leaving the site. Loads shall be covered to prevent loose material falling from the vehicle during transportation.

1.27 Work to be Completed Prior to Site Establishment

Notwithstanding any requirements of the conditions of Contract, 7 days prior to the Contractor establishing at the site, the Contractor shall submit to the Superintendent all plans, programmes, licences, certificates, safety information and other documents specified under the Contract as needing to be submitted by the Contractor prior to the commencement of work at this site. These documents include, but are not limited to:

- Work Health and Safety (WHS) plan, noting that the Contractor is responsible for gaining approval of the WHS plan as indicated in the 'WHS Management' section of this Specification.
- Quality plan and relevant Inspection and Test Plans (ITPs) and ITP checklists, in accordance with Section 3 'Quality Management' of this Technical Specification.
- Construction Environmental Management Plan (CEMP), which allows for the items detailed in Section 4 'Environmental Requirements' of this Technical Specification, including an Erosion and Sedimentation Control Plan.
- Traffic Management and Control Plan.
- Contract programme.
- Construction Methodology Plan, the construction methodology is to include a detailed staging plan detailing the proposed sequencing of works and critical hold points.
- All licences and approvals.
- Documentation evidence of induction by the Contractor of employees and visitors to the Contractor's site. Evidence of employee industry WHS certification, operator tickets and competencies and specialist qualifications.
- Insurance certificates.
- All necessary approvals from regulatory authorities and the Superintendent.
- All necessary electrical designs and approvals from certifying authority.
- All additional documentation required for the works

The Superintendent will consider the submitted documents within 7 days and notify the Contractor of any changes required in the documents. The Contractor is to correct any identified issues prior to establishing at the site. Any failure by the Superintendent to identify issues in these documents shall not relieve the Contractor of responsibility for the documents.

1.28 Programming

Prior to the commencement of Contract work, the Contractor must supply a detailed construction programme and construction methodology plan detailing individual activities. The Contractor shall set out the programme on a time scale of calendar weeks with individual activity durations not exceeding 2 weeks. The programme shall show but not be limited to the scope of works and other requirements of the Contract.

With each payment claim, if requested by the Superintendent, the Contractor must submit an updated programme to the same detail as that specified for the original programme and show time extensions granted and progress achieved against the programme. The Contractor must list all specific actions to correct or address any delays which may impact upon the date for practical completion.

1.29 Mobilisation and Demobilisation

The Contractor shall include all works associated with mobilising and demobilisation, including but not limited to the following:

- Mobilisation and demobilisation of all plant, equipment and personnel
- Provision of Contract security, insurances, long-service leave levy payment
- Provision of licences, approvals, certificates and permits
- Evidence of the submission and receipt of all WorkCover Authority forms, fees, permits, licences
- Provision of site facilities and temporary site services; and
- Site preparation.

1.30 Data Submittals

The following data submission dates form part of the Contract and indicate the latest dates by which the listed activities shall be completed. Data may be supplied earlier than the indicated dates at the Contractor's discretion.

Table 2 | Data Submittals

No	Activity	Maximum Period from date of Letter of Acceptance or as stated	Format (copies)
1	Final project quality, WHS & environmental management plans	14 Days	Hard Copy (1) and electronic copy
2	Updated Works Program (showing milestones and critical paths)	14 Days	Hard Copy (1) and electronic copy
3	Connection Methodology including details of shut-down times	14 Days	Hard Copy (1) and electronic copy
5	Testing and Commissioning Program	21 Days prior to commissioning	Hard Copy (1) and electronic copy
6	Commissioning report	Within 5 days after satisfactory testing & commissioning	Hard Copy (1) and electronic copy
7	As Constructed Drawings	14 Days after completion of construction	Hard Copy (1) and electronic copy

2 WHS MANAGEMENT

The Work Health and Safety (WHS) requirements contained in this Specification and any document referenced by this Specification, may be in addition to, but are not in substitution for, any statutory requirements under the Work Health and Safety Act or the Work Health and Safety Regulation and do not limit the powers of the Superintendent or the liabilities and responsibilities of the Contractor.

Copies of the Act and the Regulation can be accessed at: http://www.legislation.nsw.gov.au

2.1 Project WHS Management Plan

The Contractor must prepare and implement an acceptable site-specific project WHS management plan. The Project WHS management plan must incorporate site specific safety management plans and risk assessments and safe work method statements.

The Contractor shall submit to the Superintendent at least 14 days prior to commencing site preparation work, the site-specific safety management plan completed in accordance with the Regulation including at least the following:

- Copies of 'General WHS induction training' and 'Work activity WHS induction training' records for all employees (including subcontractor employees) that will be working on site. For persons that begin on site after this date, submit records prior to their beginning work.
- Records of hazard identification/risk assessment/control measures relevant to the work to be completed. The risk assessment must be undertaken in accordance with sub-clause 'Hazard identification and risk assessment'.
- Safe work method statements or a schedule of proposed safe work method statements and timetable for their submission. These are to be submitted to the Superintendent no later than 14 days before commencement of the activity for which the safe work method statements apply.
- Copies of licences required.
- Copies of permits required.

The Contractor shall not commence work on site prior to the submittal of the WHS management plan to the Superintendent.

The Contractor shall not have any claim against the principal arising from delays in approval of the WHS management plan by the Superintendent.

The Contractor hereby indemnifies and keeps indemnified the principal against any loss, damage, expense, costs, penalty, fine or claim whatsoever incurred by or brought against the principal arising from:

- Any personal injury or death caused by or contributed to by the Contractor during the performance of the work under the Contract
- The failure by the Contractor to comply with its obligations arising from a breach by the Contractor of its obligations under occupational health and safety.

2.2 Site Inductions

The Contractor will be required to organise and undertake an induction with Byron Shire Council wastewater staff prior to commencing any works on site.

The Contractor's employees and subcontractors will be required to undergo an induction organised by the Contractor for its site. The Contractor's induction will be in accordance with NSW WorkCover Authority Code of Practice 'Occupational health and safety induction training for construction work', 1 April 1999.

2.3 Notification of Incidents, Non-Disturbance Occurrences and Other Matters

The Contractor must immediately notify the Superintendent of any incident, non-disturbance occurrence or other matter required to be reported to WorkCover under the Regulation. The Contractor must provide the Superintendent with copies of any formal notifications submitted to WorkCover.

The Contractor must immediately notify the Superintendent of any other incident or dangerous occurrence that does not have to be reported to WorkCover and provide a written report on such matters in the format, and within the timeframe, directed by the Superintendent.

If any incident involves the failure of any plant and/or equipment, the Contractor must not permit the continued use of the plant and/or equipment on site until it has been inspected, repaired and certified as fit for use by a qualified person e.g. structural Superintendent, electrician, mechanic, etc, and the certification has been submitted to the Superintendent.

2.4 Investigation, Improvement, Prohibition and Penalty Notices

The Contractor must immediately notify the Superintendent of any investigation, improvement, prohibition and penalty notices issued to the Contractor by WorkCover.

The Contractor must provide the Superintendent with a copy of such notices together with written details of the corrective action(s) taken by the Contractor to rectify the identified issue(s) and preventive action(s) to prevent recurrence.

2.5 Audits

The Contractor must make available to the Superintendent, upon request, all relevant WHS records, including those of subcontractors and suppliers, for the purposes of audit and surveillance. The Contractor must also provide all reasonable assistance during such audits, including attendance by the Contractor.

2.6 Site Safety Rules

Site safety rules for work under this Contract must, as a minimum, include the provisions listed below. The site safety rules must also include a requirement that all employees and visitors to the site comply with the rules.

- Site Induction. All persons working on or visiting the site must attend a site induction by the Contractor.
- Confined Spaces. All work must comply with AS 2865 (Safe Working in a Confined Space).
- Safety helmets. All supervisors, employees, and visitors in the construction area must wear safety helmets at all times. Safety helmets must comply with AS 1801.
- Safety Footwear. All supervisors, employees, and visitors in the construction area must wear safety footwear at all times. Safety footwear must comply with AS 2210.
- Glass Containers. Glass containers are not allowed on the site, other than in lunchrooms.
- Alcohol and Drugs. The consumption of alcohol and illegal drugs on the site is prohibited. Persons under the influence of drugs and/or alcohol will not be permitted to work on or visit the site.
- Incidents. Incidents and injuries must be reported immediately to the Contractor's site representative.
- First Aid. All persons requiring first aid treatment must contact the first aid officer who will administer the treatment and record the person's name and the nature of the injury in the WorkCover register of injuries.
- Fire prevention. Each item of plant on site must carry a 9-kg fire extinguisher on board. Conduct and document a risk assessment to determine the most appropriate type of extinguisher for each item of plant.
- Cleanliness and Tidiness. Work areas must be kept clean and tidy, with rubbish and other safety hazards cleaned up promptly. All protruding nails shall be removed immediately from timber. All vehicles leaving the site must not track soil or debris, etc, onto the roads and all loads must be covered (where applicable).
- Electrical. All temporary electrical work and temporary electrical plant must comply with the WorkCover Code of Practice for Electrical Practices for Construction Work (February 1992).
- Preventing Public Access. Implement security measures to prevent unauthorised access to the construction area.
- Storage of Materials, Plant and Equipment. Ensure that all materials, plant and equipment located on the site are positioned and secured so as to not present a hazard to any person(s). Irrespective of the slope of surface and erection of perimeter fencing, secure pipes to prevent movement. Return all pipes not laid at the end of day to secure stockpile areas.
- White Card (Construction Induction Certificate, Formerly "Green Card"). All persons working on or visiting the site must have completed a WorkCover certified OHS construction induction training course.
- Hazardous Substances. Chemicals and other hazardous substances must be used and stored in compliance with material safety data sheets (MSDS) and details must be recorded on the register of hazardous substances.
- Toolbox Talks. There must be regular discussions between and consultation with those working on the work site on site health and safety matters.
- Mobile Plant. Every owner of plant must ensure that it is registered with WorkCover when required and operators are appropriately qualified. Mobile plant must be fitted with working hazard lights/reversing lights and beepers.

- Personal Protective Equipment. All persons working on or visiting the site that may potentially come into contact with contaminated soil and/or groundwater must wear appropriate personal protective equipment (PPE) as identified in site safe work method statements. All persons working around plant or machinery must wear appropriate ear, eye and foot protection PPE as identified in site safe work method statements.
- Leads and Power Tools. Every owner must ensure all leads and power tools are inspected and tagged by a licensed electrician prior to their use and thereafter at monthly intervals. All details of their inspection must be recorded in a site logbook. Details on the tags and in the logbook must include the licence number of the electrician, date of the inspection and the owners plant number of the item inspected. The maximum length of any power lead must not exceed 30 m.
- Excavation Safety. No persons are to enter excavations deeper than 1.5 m unless permitted according to site safe work method statements.
- Emergency and Evacuation Procedures. All persons working on or visiting the sites must be familiarised with the emergency and evacuation procedures plan in the event of an emergency.
- 10m Permit to Work Near Moving Plant. A permit to work is required from Byron Shire Council if any works are required within 10m of moving plant.
- Sun Protection. Sun protection policy for all staff and visitors to the site to include but not be limited to Long Sleeves, pants and broad brimmed hats or hard hats with brim.
- Non-Smoking Site. Site is to be a non-smoking site; a designated smoking area is to be nominated away from the site if required.

3 QUALITY MANAGEMENT

The Contractor is to operate a corporate quality management system certified to AS/NZS ISO 9001:2000 for all work under the Contract, including work by subcontractors.

The Contractor is to prepare and implement a project quality plan meeting the requirements of its corporate quality management system, this Specification and the Contract documents. The project quality plan is to be submitted to the Superintendent prior to commencing work on site.

The purpose of the project quality plan is to inform and direct the Contractor's personnel about the specific quality practices, resources, sequence of activities, controls and checks that they have to implement during the Contract.

The project quality plan shall include, but not necessarily be limited to the following:

- Inspection and Test Plans (ITPs) and ITP checklists that will be used by the Contractor to verify that the works comply with the requirements of the specifications and Contract documents.
- Identify all hold points and witness points and the nominated authority for the release of each hold point.
- Process control documents/procedures that detail:
- Sequence of operations
- Types of equipment required, capability, maintenance, calibration
- Any special working environment aspects
- Competency and skills of personnel
- Work methods and materials to be used
- Product characteristics, tolerance and workmanship standards to be met
- Inspection, test and control points
- How the process will be monitored to ensure its continuing suitability
- Records to be kept as evidence the work process remain effective
- Defining responsibility for implementing and monitoring work process controls and rectifying any deficiencies.
- How the quality of product from subcontractors and suppliers is managed.

- The process(es) implemented by the Contractor to identify any non-conforming work and rectify that work to meet the requirements of the contract. This shall include a Non-Conformance Reporting (NCR) process, development of remedial actions and approval by the Superintendent.

The Contractor must demonstrate to the Superintendent, whenever requested, that quality obligations under the Specifications are being met at all times. The Principal may arrange independent audits of the Contractor's quality management system. The Contractor is to provide information as requested by the Principal's auditor and rectify any defects or non-conformances.

The Contractor must have appropriately authorised personnel notate the ITP checklists when the quality of work inspected or tested is as specified.

The Contractor must submit copies of Lot conformance reports, including test results and checklists, relating to completed work with each progress payment claim.

The Contractor must retain the records listed below until issue of the Final Payment Certificate. The Contractor must ensure the records are secure against deterioration, damage and loss and are suitably filed and indexed to allow convenient retrieval of individual records. The Contractor must also make the following records available to the Superintendent on request:

- ITPs and checklists
- Quality or test records obtained from subcontractors, manufacturers and suppliers
- Test results obtained from testing laboratories etc.
- Design reports and certifications required under the Contract.

If the Contractor fails to comply with the requirements of the 'Quality management' clause, the Principal may carry out such inspections and tests that the Superintendent determines, and the cost incurred by the Principal shall be borne by the Contractor.

4 ENVIRONMENTAL MANAGEMENT

4.1 General

The environmental impact of the civil works can be minimised by careful management during the construction period. The following practices shall be observed by the Contractor to augment other requirements of the Contract, particularly those included in the Specification Part for 'Earthworks' as part of clearing, topsoiling operations and general rehabilitation procedures.

4.2 Scope

The work to be executed under this Specification consists of the protection of the environment on and adjacent to the Works and the management of the Contractor's activities to minimise environmental disturbance.

4.3 Conservation Risk Assessment

All work is to be carried out in accordance with the Conservation Risk Assessment (CRA) prepared for this project. The CRA is provided in Attachment 4 - Conservation Risk Assessment.

4.4 Rubbish Disposal

Any rubbish on site or resulting from the Works including plant maintenance materials (oils, bitumen, kerosene, etc) shall be disposed of at the nearest authorised waste disposal site, at the Contractor's cost.

4.5 Vegetation Clearing

All clearing shall be undertaken in accordance with the Specification Part for 'Clearing and Grubbing'. Native vegetation shall not be removed except where necessary to accommodate the Works. Under no circumstances is vegetation to be incinerated or burnt. Disposal should be executed as per above.

Development of spoil areas, side/access tracks, drains and laydown areas shall be carried out so as to minimise disturbance of adjoining vegetation.

4.6 Water Management

The Contractor shall maintain all temporary water diversion and protection works against run-off, which are necessary for the construction of the works. The Contractor shall keep all excavations and working areas free of water during excavation and placement of embankment material.

Softening of materials due to the Contractor's failure to drain any existing low points shall not be grounds for unsuitable material claims. The control and management of stormwater drainage through the site will be important during construction of the Works. All temporary erosion and sedimentation control are to be completed prior to commencement of earthworks.

Groundwater

A dewatering management plan is to be prepared and included in the CEMP to cover the treatment management and discharge requirements for any groundwater that may be encountered during the works.

4.7 Dust Control

The Contractor shall ensure that dust from the site of the Works be minimised by utilising water sprays. The Contractor shall comply with the requirements of the Protection of the Environment Operations Act 1999.

4.8 Control of Erosion and Sedimentation

The Contractor is to produce an erosion and sedimentation control plan for the site which is in accordance with the 'Blue Book' and be included as part of the CEMP. Prior to the de-vegetation of any area the Contractor shall ensure that adequate erosion control measures are in place to manage any potential soil loss or transportation of contaminants from that area.

The Contractor shall plan and carry out the whole of the Works to avoid erosion and sedimentation of the site, watercourses and water bodies.

The Contractor shall ensure that effective erosion and sedimentation control is provided at all times during the Contract. Erosion and sedimentation control measures shall include, but shall not be limited to the following:

- Prompt completion of all permanent and temporary drainage works, once commenced, to minimise the period of exposure of disturbed areas.
- Stabilisation of diversion and catch drains to divert uncontaminated runoff from outside the site, clear of the site. Catch drains shall be installed and lined, as specified, before the adjacent ground is disturbed and excavation is commenced.
- Provision of contour and diversion drains across exposed areas before, during and immediately after clearing and the re-establishment and maintenance of these drains during soil removal and earthworks operations.
- Limitation of areas of erodible material exposed at any time to those areas being actively worked.
- Grass seeding or hydro-mulching, and watering, of all disturbed areas.

The cost of installation, maintenance, inspection and removal of these measures shall be included in the rates and prices generally for the work under the Contract.

Runoff from all areas where the natural surface is disturbed by construction, including access roads, depot and stockpile sites, shall be free of pollutants as defined in the Protection of the Environment Act 1999 before it is either dispersed to stable areas or directed to natural watercourses. The Contractor shall be responsible for all temporary erosion and sedimentation control measures required for this purpose. Finalising the Sedimentation and Control Plan and completion of erosion and sedimentation measures shall constitute HOLD POINTS.

The Contractor shall inspect all erosion and sedimentation control works after each rain period and during periods of prolonged rainfall. Any defects revealed by such inspections shall be rectified immediately and these works shall be cleaned, repaired and augmented as required, to ensure effective control thereafter. The Contractor shall report to the Superintendent the defects that occurred and the proposed method to be employed to ensure such a defect does not occur in the future.

The Contractor shall provide and maintain access for cleaning out sediment control works. The Contractor shall regularly maintain structures such that a minimum of 60% capacity is available at all times. The sediment removed from such controls shall be disposed of at locations where it will not again erode onto the construction areas or into watercourses and is allowed by its possible contamination level.

All temporary control measures are to be removed by the Contractor when works are completed and/or when directed by the Superintendent. All materials used therein shall be removed from the site of the work or disposed of by the Contractor and the site reinstated to the satisfaction of the Superintendent. The cost for this work shall be deemed to be included in the Contract Sum.

4.9 Acid Sulphate Soils

Any acid sulphate soils must be dealt with in accordance with the CEMP as developed by the Contractor.

5 CONTRACTOR DESIGN

5.1 General

The Contractor shall be responsible for the design computations, drawings and certification and for the submission of design to the Superintendent for approval prior to construction for all D&C scope items.

D&C items under this contract are as identified on the drawings, and scope of works. Items include but are not limited to:

- Automatic rake on diversion pit inlet
- Hopper to collect waste
- Chute from rake to hopper
- Proposed cage/enclosure for rake and chute
- Pedestrian bridge

5.2 Documentation

Within 4 weeks of the contract award a design documentation list clearly identifying each proposed drawing and document is to be submitted by the Contractor for the D&C scope. The documentation list shall include current revision and issue dates.

- Revised and updated Control Philosophy, including details for design and construct items.
- New general arrangement drawings including Layout and Sectional.
- Electrical design and documentation requirements for the design and construct items

5.3 Review and Acceptance

Marked-up copies with comments will be returned to the Contractor within 3 weeks of receipt of documents unless specified otherwise.

Final drawings are to be submitted to the Superintendent within 1 week and the Contractor shall allow 1 week for final acceptance to proceed.

5.4 Safety in Design / HAZOP Workshop

A Safety in Design/ HAZOP Workshop will be conducted following acceptance of the preliminary design documentation.

Attendees will include:

- Appropriate personnel from the Contractor who understand the design
- Byron Shire Council staff including Wannon Water Operators.
- A facilitator supplied by the Superintendent; and,
- Other persons deemed appropriate by the Superintendent.

The workshop will be held at a location nominated by the Superintendent.

During the workshop, revisions or alternations to the design may be suggested. The Superintendent, in consultation with the Contractor will determine which items are required under the Contract and which items are variations to the Contract.

6 CLEARING AND GRUBBING

6.1 General

The work to be executed under this section of the Specification consists of the clearing of all vegetation, both living and dead, all minor man-made structures, all other rubbish or materials which are unsuitable for use in the Works, and the grubbing of trees and stumps from the area of works. This works should be completed in accordance with the Northern Rivers Local Government Aus-Spec Specification C212 CLEARING AND GRUBBING.

In advance of, or in conjunction with, clearing and grubbing operations, effective erosion and sedimentation control measures shall be implemented as required under 'Environmental Management' in Section 4 of the Specification.

6.2 Clearing

The area to be cleared for the formation is that which will be occupied by the completed formation as detailed on the Contract Drawings.

Unless otherwise specified, all timber cleared in accordance with this specification shall be chipped and stockpiled onsite at a location to be agreed by the Superintendent.

6.3 Grubbing

All trees and stumps, on or within the limits of clearing, unable to be felled and removed by the clearing methods used by the Contractor shall be removed by grubbing.

Grubbing operations shall be carried out to a depth of 0.5 m below the natural surface. Any organic matter remaining under future roadways or structures shall be completely removed.

6.4 Fire Precaution

Fires are not permitted on site.

6.5 Disposal of Trees and Rubbish

All vegetation not chipped for stockpiling shall be removed from site and disposed of at an approved location or facility. Under no circumstances shall vegetation be incinerated or burnt on site.

7 MATERIALS

7.1 General

This part of the Specification covers additional requirements for the acceptable materials to be supplied and installed as part of this contract. These works should be completed in accordance with the Northern Rivers Local Government Aus-Spec Specification C401 - Water Reticulation.

7.2 Pipes

7.2.1 PVC

PVC pipes shall be rubber ring jointed spigot and socket pipes complying with AS/NZS 1260, unless noted otherwise on the drawings.

Pipes shall be supplied accompanied by a certificate from the manufacturer which proves compliance with AS/NZS 1260. All certificates must be presented to the Superintendent and approved prior to incorporation into the works.

PVC pipe is to be PVC-M PN16.

7.2.2 Ductile Iron (DI)

Ductile iron pipes and fittings shall be rubber rings jointed Class K12 ductile iron.

7.3 Flanges

All pipe and fitting flange drilling shall be to AS4087 figure B5. Bolts shall be SS316 and nuts and washers SS304. Anti-seize paste shall be applied to threads.

7.4 Storage of Pipes and Fittings

The Contractor shall take every care not to damage pipes and fittings during handling and storage. Methods and equipment adopted for handling and hauling shall be to the manufacturers' requirements or to the satisfaction of the Superintendent.

If pipes have become polluted due to negligence, the Contractor must clean or replace the pipes as approved by the Superintendent, at the Contractor's expense.

7.5 Pipe Jointing Rings

Rubber rings for pipe joints must be stored in a cool area, preferably 20°C or less, away from direct sunlight. They must be protected to ensure that there is no contact with petroleum products.

7.6 Lifting

Pipes and fittings must be handled in accordance with safe lifting practice. The lifting capacity of the equipment must not be exceeded. Approved must be used for lifting.

Where slings are used for lifting UPVC pipes, they must be of a soft textile type. Pipes and fittings are to be carefully lowered from the delivery vehicle.

Any UPVC or fitting that is scratched to a depth greater than 1mm must not be used in the Works. These pipes and fittings must be removed from the Works and replaced.

7.7 Valves

All valves shall be Tyco unless otherwise approved by the Superintendent.

7.8 Flow Meters

All flow meters shall be ABB unless otherwise approved by the Superintendent.

7.9 Level Sensor

Level Sensors shall be RX2100-WL Data Logger MicroRX Water Level Station unless otherwise approved by the Superintendent

8 PIPELINE CONSTRUCTION

8.1 General

Works should be completed in accordance with the Northern Rivers Local Government Aus-Spec Specification C401 Water Reticulation.

It shall be expressly understood that no extra payments will be made for excavation or construction in rock and/or water bearing ground or any other conditions whatsoever. The Contractor shall make every effort to investigate and familiarise the site prior to tendering.

8.2 Notices

8.2.1 Notice to the Principals Authorised Person

The Contractor shall provide the Superintendent a minimum of three (3) working days' notice of its intention to perform any of the following works:

a) Pressure testing of pipeline; and,

b) Placement of concrete.

The Contractor shall undertake these works only in the presence of the Superintendent or his Representative unless the Superintendent's prior approval has been received for these works to be performed in his absence and/or without notice. The submission of these details shall constitute a HOLD POINT.

8.2.2 Notice to Other Authorities

The Contractor must liaise directly with each authority responsible for assets in the area affected by construction works to establish their requirements, and notification of "commencement of works".

8.2.3 Notice to Property Owners / Customers

The Contractor must give the Superintendent, property owners and affected landowners/occupiers, seven (7) days' notice before entering private property for the purpose of constructing the Works or affecting supply of service.

8.3 Storage and Disposal of Spoil

Excavated material shall be deposited in such a manner so not to obstruct any drain, roadway, right of way or access to any building or premises. No public street, path or right of way, which is in normal everyday use

shall be blocked by the Contractor's plant or excavated material unless written permission to do so has previously been obtained from the local Council or other controlling authority. The Contractor shall seek and obtain such approval in ample time to prevent delays in construction while awaiting approval.

The Contractor shall leave a clear space of one metre (or as required by the regulations of the relevant Authority) between the edge of the excavation and any materials stacked adjacent to the excavation.

No excavated material shall be deposited against the wall of any building or fence unless the Contractor has first obtained the written permission of the owner and occupier of such property. Notwithstanding such permission being obtained, the Contractor shall make good all damage immediately the material has been removed.

Excavated material, which is not required for backfilling, shall, at the discretion of the Superintendent, be removed from the Site of the Works by and at the full expense of the Contractor.

The Contractor must remove excess material promptly from the site when directed to do so. If the Contractor fails to comply with this request within 3 days, the Principal may cause the excess material to be removed and deduct all expense incurred in so doing from moneys that are owing or will become owing to the Contractor under this Contract.

The cost of complying with this clause shall be deemed to be included in the Lump Sum or in the appropriate item in the Schedule of Quantities and Rates.

8.4 Unsuitable Material

This clause applies to the treatment of 'Unsuitable Material' below subgrade in excavations.

It shall be the responsibility of the Contractor to notify the Superintendent, of areas where treatment of Unsuitable Material may be required and to demonstrate to the satisfaction of the Superintendent the unsuitability of that material. Removal of Unsuitable Material shall constitute a HOLD POINT.

Unsuitable material does not include that which has become saturated, due to the Contractor having neglected to protect the work by providing adequate drainage, or otherwise suitable material in a wet condition which can be removed, dried out and reused.

Any acid sulphate soils must be dealt with in accordance with the CEMP as developed by the Contractor.

8.5 Dewatering

Keep all excavations free of water. Provide, maintain and operate intercepting Works to prevent surface water from entering the excavations. Any dewatering works shall be undertaken in accordance with the dewatering management plan. Provide all equipment necessary for dewatering the excavations and keeping the Works free from water.

Only lower the water table by well points or other external dewatering methods if no damage is likely to be caused to adjacent structures and services or the environment.

Ensure that all downstream Works that are under construction, completed or in use are protected at all times against the effects of any drainage that is discharged or likely to be discharged from the Works.

Do not discharge dewatering to sewers, storm water drains or watercourses without appropriate authorisation and without complying with the Owner's or Regulator's requirements.

8.6 Pipe Bedding

Refer to clause C401.26.2 of the Northern Rivers Local Government Development Construction Specification C401, Crusher screenings must not be used without the permission of the Superintendent.

8.7 Blasting

Blasting will NOT be permitted

8.8 Connection to Existing

Connection to existing water mains shall in accordance with C401.38 Connection to Existing Pipes.

9 PIPELINE TESTING AND RESTORATION

9.1 General

These works should be completed in accordance with the Northern Rivers Local Government Aus-Spec Specification C401 Water Reticulation.

9.2 Pipeline Testing

All testing shall in accordance with C401.37 Testing of Pipelines of the Northern Rivers Local Government Development Construction Specification C401.

9.3 Disinfection

Following satisfactory pipeline testing, The Contractor shall disinfect and test all new water mains for compliance with WSA 03-2011-3.1 Section 19.7 Water Quality Testing and Section 20 Disinfection.

This shall constitute a HOLD POINT.

9.4 Backfill and Compaction

Further to clause C401.40 Backfill and Compaction, where shown on the drawings as "Special Backfill" the Contractor shall backfill in accordance with C401.40.4

9.5 Reinstatement

The Contractor shall maintain and reinstate all areas affected by construction activities to the satisfaction of the Superintendent. Where finished levels differ from the original ground lines, these surfaces shall be restored to their original levels or if permitted by the Superintendent, regraded to provide a smooth transition to the design surface profile.

9.5.1 Private Property, Reserves and Nature Strips

In nature strips, reserves and in private property, the topsoiled surface over excavations shall be slightly mounded to allow for trench consolidation.

9.5.2 Roads, Driveways and Other Facilities

All items damaged or broken during any activity shall be reinstated or replaced to the equivalent condition prior to the commencement of the work and to the approval of the Superintendent and the responsible Authority or owner.

Prior to the expiration of the defects liability period the Contractor shall make good the surface of any trench or excavation.

9.5.3 Topsoil

Topsoil shall be kept separate from other excavated material and once the trench has been backfilled, the topsoil shall be spread over the backfilled trench to a minimum depth of 150mm. In all cases when insufficient topsoil exists to maintain a depth of 150mm, topsoil specifically approved by the Superintendent

shall be imported to ensure such depth is achieved. The cost of importing the topsoil shall be included in the various items tendered for in the Lump Sum.

At places where water is liable to concentrate along the line of the trench and wash away backfill, the Contractor shall provide for the collection and passage of such water without damage or scour to the trench or adjoining lands.

Topsoil shall be fertile, friable soil containing organic matter, which is reasonably free from subsoil, refuse, tree roots larger than 20mm in diameter and 300mm in length, noxious weeds, clay lumps and stones larger than 50mm diameter.

9.5.4 Treatment of Topsoil Stockpiles

Topsoil shall be spread over other works areas to achieve 100mm minimum compacted thickness measured normal to the slope in order to reinstate the original ground profile.

9.6 Compaction Testing

Trench compaction testing is required on all water mains.

Compaction tests shall be in accordance with Methods for Testing Soils for Engineering Purposes AS 1289. All costs for performing these tests shall be borne by the Contractor.

Testing locations for each test shall be randomly select within the relevant backfill layer. Under no circumstances shall the contractor or his staff or agents direct the laboratory staff where to take tests, except where the contactor requires additional test at its own cost.

Compaction test results are to be forwarded with the Work-As-Executed Plans.

9.7 Minimum Testing Frequency and Compaction

The following tables show the minimum frequency and compaction required. These are based on conventional field density and laboratory reference testing

The Contractor shall test at least one (1) location.

This shall constitute a HOLD POINT.

9.7.1 Roads, Road Shoulders, Median Strips and Footpaths

Table 3 | Testing Requirements - Roads, Road Shoulders, Median Strips and Footpaths

Location	Frequency	Results
Road Base Course	Every 50m - 3 tests within top 100mm.	Top 100mm 98% (dry density ratio).
Road sub-base	Every 50m - 3 tests within depth range 100-300mm.	Below 100mm 95% (dry density ratio) if FCR. Below 100mm 85% (dry density ratio) if sand (where permitted).
Under roads, road shoulders, median strips (below sub-base)	Every 40m - 1 test per 2 layers	Below 100mm 95% (dry density ratio) if FCR. Below 100mm 85% (dry density ratio) if sand (where permitted)
Footpaths	Every 100m - tests within top 100mm Every 100m - 3 tests within depth range 100-300mm.	Top 100mm 98% (dry density ratio). Below 100mm 95 (dry density ratio) if FCR. Below 100mm 85% (dry density ratio) if

		sand (where permitted)

9.7.2 Cohesionless Soils

Table 4 | Testing Requirements - Cohesionless Soils

Location	Frequency	Results
Road reserves, excluding traffic areas	Every 40m - 1 test per 2 layers.	65% (dry density ratio).
All other areas	Every 100m - 1 test per 2 layers	60% (dry density ratio).

8.6.3 Cohesive Soils

Table 5 | Testing Requirements - Cohesive Soils

Location	Frequency	Results
All areas	Every 100m - 1 test per 2 layers	Within 600mm of FSL 95% (dry density ratio). Below 600mm of FSL 90% (dry density ratio).

10 NEW REINFORCED CONCRETE

10.1 Standards

All works and materials shall comply with applicable portions of the current edition of all Australian Standards and Codes of Practice pertaining to the works including but not limited to:

- AS 3600 Concrete Structures
- AS 1379 Ready Mixed Concrete
- AS 1012 Methods of Testing Concrete
- AS 3610 Rules for Construction and Design of Formwork
- AS 3850 Tilt-up Concrete Construction
- AS 3850-2015 Tilt-up Prefabricated Concrete Elements

10.2 Concrete Materials

10.2.1 Portland Cement

AS 3972 Portland cement type GP SL.

10.2.2 Aggregates

Shall comply with AS 2758.1

Maximum size of coarse aggregate shall be 20mm. The nominal size of coarse aggregate may be reduced in areas of difficult placing and compacting provided approval has been given by the Superintendent.

10.2.3 Mixing Water

Shall be clean and free from oil, acid and injurious amounts of vegetable matter, alkalis and other impurities.

10.3 Supervision

All concrete work shall be carried out under the direct supervision of a capable foreman experienced in reinforced concrete construction.

10.4 Steel Reinforcement

Steel reinforcement shall be of the grade and type shown on the drawings and shall comply with the appropriate following specifications.

- AS 4671 - Steel Reinforcing Materials

All reinforcement shall be placed with locations, sizes and grades being those specified on the drawings. Minimum cover and spacings shall be as specified in the project documents and AS 3600. The contractor shall give the Superintendent adequate notice to allow inspection of all reinforcement prior to pouring of concrete.

Provide and build in bolts, ties, fixings, sleeves or pipes where passing through concrete as required for fixings including those of sub-contractors, and unless specified otherwise, all penetrations into water retaining structures shall be installed with surrounding self-expanding water-stops.

Special precautions shall be taken in fixing reinforcement for all exposed concrete surfaces. Ensure the wire legs do not project into the cover concrete and that no loose tie wires remain in the forms. Use only fully plastic bar chairs for supporting the reinforcement; plastic coated or tipped chairs are not acceptable.

10.5 Concrete Mixing

All concrete shall be ready mixed and delivered to the project in accordance with AS 1379 Ready Mixed Concrete.

The Concrete Supplier shall furnish duplicate delivery dockets with each load of concrete delivered to the project.

The delivery dockets shall indicate the delivery date and time dispatched, name and location of project, name of Contractor, truck number, number of cubic metres in the load, and the items listed under concrete properties.

10.6 Control Test for Concrete

All concrete shall be sampled on the site of work and tested in accordance with AS 1012, Methods and Testing Concrete. The frequency of sampling shall confirm to the requirements of AS 3600 - Concrete Structures Code.

The Contractor shall allow for and pay all costs involved in sampling and testing concrete and shall maintain on site, in good order, all equipment necessary in taking slump and compression test specimens or arrange to have these tests performed by a licensed testing authority.

The contractor shall allow to make at least 4 standard cylinders as directed from each sample, and test 2 cylinders at 7 days, then 2 cylinders at 28 days at an approved NATA laboratory.

Copies of all test results shall be forwarded to the Superintendent directly from the testing authority as soon as the results become available. Seven-day test results must be received by the Superintendent within fourteen days of the date of the relevant concrete pour.

10.7 Control and Construction Joints

Form control joints where specified on the drawings and construct in accordance with the details shown.

Plan construction joints in advance and with the approval of the Superintendent. Use dowels and keys where indicated or required by the Superintendent.

Provide and install expansion joints as detailed on the drawings.

10.8 Depositing

The Contractor shall ensure that the concrete pumps used on site are in good condition and capable of handling all the specified grades and types of concrete.

Concrete shall be continuously poured between approved construction joints. If pouring of a section is disrupted by an unforeseen contingency, form a construction joint in a location approved by the Superintendent or demolish the section and recommence that section.

Place concrete so that, except at the beginning of the section, new concrete shall be continuously placed against concrete, which is still fresh, and not set, in order to ensure a perfect monolithic structure will result. Where concrete is poured against hardened concrete, a proper construction or expansion joint, as approved by the Superintendent shall be formed.

Thoroughly vibrate concrete to prevent voids with approved mechanical vibrators having a frequency of not less than 5000 cycles per minute.

No concrete shall be poured when the temperature is less than 5 degrees Celsius without observing the precautions stated in the Australian Standard. When the shade temperature exceeds 27 degrees Celsius, 'Daratard' shall be used in accordance with the manufacturer's recommendations. No concrete shall be mixed or placed when the shade temperature exceeds 30 degrees Celsius.

Where areas are exposed, concreting shall be discontinued during rain and, should rain commence to fall during pouring operations, work shall stop and arrangements made to protect fresh concrete. Concrete work damaged by rain, water and other causes shall be demolished, removed from site and re-cast at the contractor's expense.

10.9 Curing and Protection

After concrete has been placed, all exposed surfaces shall be protected by a sprayed-on film membrane against loss of moisture for a period of at least 7 days and against damage by rain until the concrete has hardened.

Freshly placed concrete shall be maintained at a temperature not less than 10 degrees Celsius for at least 5 days after placing. Protective material shall be in place within 6 hours of placing concrete and shall remain for at least 5 days.

Refer to AS3600 requirements for depositing, placing and curing of concrete during periods of hot weather.

11 ELECTRICAL WORKS

11.1 General

The contractor shall connect the new flow meters (DN250 and DN150) to existing power and communications.

11.2 Standards and Regulations

Materials and workmanship shall conform to the requirements of:

- AS/NZS 3000:2007
- Service and Installation Rules of New South Wales
- NSW Electrical Safety Act, Regulations and Code of Practices;
- Any other Authority having jurisdiction over the works;
- All relevant Australian Standards; and,
- To the satisfaction of the Contract Administrator.

The contractor shall be responsible for supplying all equipment and materials in complete accordance with the requirements of all relevant authorities and obtaining all necessary approvals.

11.3 Electrical Work

All electrical work shall be performed by qualified electrical workers holding an appropriate certification/licence issued by NSW Fair Trading.

The person or firm responsible for the electrical work shall hold an Electrical Contractors Licence issued by NSW Fair Trading.

11.4 Approvals

The contractor is responsible for all Essential Energy submissions and approvals to carry out the proposed works including any other service provider approvals required for the works.

11.5 Conduits

Conduits shall be of an adequate size to suit the installation requirements. The use of bends must be kept to an absolute minimum. All bends must be long radius type.

11.6 New Underground Cable Routes

The routes of all new underground cables shall be accurately marked up on a site plan, complete with dimensions from permanent landmarks/features. A laminated copy of this plan is to be left in the switchboard and other copies included in the O&M manuals.

11.7 Documented Electrical Test Results

At the completion of electrical installation works all circuits shall be tested for safe operation in accordance with the Electrical Safety Act and the requirements of this specification. The test instrument readings and results shall be recorded and documented in a report to be delivered to the Superintendent. The report is to include the electrical contractors licence number and be signed by the contractor.

The testing required shall include:

- Earth continuity;
- Insulation resistance;
- Polarity;
- Earth fault loop impedance;
- RCD trip times; and
- Correct circuit connections.

Practical completion shall not be granted until the documented test results are received by the Superintendent.

12 CONSTRUCTION COMPLIANCE

12.1 Work as Executed Drawings

Within 14 days of achieving Practical Completion of the works, the Contractor shall provide the Superintendent with a full set of work as executed drawings in AutoCAD and PDF format. Electronic copies of the contract drawings will be provided in AutoCAD format to the Contractor to enable the production of the work as executed drawings.

12.2 As Constructed Notes

The submission of "As Constructed" notes must include a table that contains (where applicable) the following headings:

1. Design Grade, Offset, Invert Level
2. Actual Grade, Offset, Invert Level.

The table must also contain the acceptable tolerance limit from the WSAA codes and a column showing where construction is within allowable tolerances (Yes) and where construction is not within acceptable tolerances (No).

Do not submit "As Constructed" records that do not comply. Should works not comply, please discuss with the Contract Administrator if they cannot be rectified.

A similar table is also required confirming the compaction test results have passed and the required number of tests have been performed.

Any asset not constructed as per design will also require change to be certified plan of subdivision if the new location does not comply with Byron Shire Council's easement width requirements.

12.3 Capital Works Asset Creation and Disposal Summary Sheet

Within 3 weeks of achieving Practical Completion of the works, the Contractor shall complete and provide to the Superintendent the Byron Shire Council - Capital works Asset Creation and Disposal Summary Sheet. A copy of the sheet to be completed is provided in Attachment 6 - Capital Works and Asset Creation Sheet.