

New Track Construction (Inland Rail)

ETC-00-02

Applicability

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1 General

1.1 Introduction

This Technical Specification provides guidance for the construction of plain standard gauge railway track including turnouts on both new and existing alignments, and for loop extensions in accordance with ARTC requirements and the ARTC (Engineering) Code of Practice

This Specification should be read in conjunction with the project specific contract documents, design drawings, earthworks, drainage and signalling specifications to assess the influence of other works on Track Construction.

This specification is supported by, and is to be used in conjunction with the Specifications, Standards and Procedures listed in the ARTC Track and Civil Code of Practice. www.extranet.artc.com.au Contractors undertaking New Track Construction works defined in the specification must ensure that the most up to date and valid reference document is obtained from this source.

Track work Design, Bridges and Culverts, Earth Works and Signal Design and construction are not included in this Specification.

1.2 Definitions

Unless defined otherwise in the contract documents, terms used in this Specification shall have the meanings described in Table 1.

Table 1

Term	Definition
Principal	Shall mean Australian Rail Track Corporation (ARTC).
ARTC Project Manager	Shall mean the person/s appointed by the Principal to act as the nominated Clients Representative.
Contractor	Shall mean the Contractor engaged for the work to be carried out in accordance with the Contract Documents including the Technical Specifications and the design drawings.
Agreed	Shall mean agreed in writing by the ARTC Project Manager.
Ballast	As defined in ARTC's (Engineering) Track & Civil Code of Practice
Formation Level	The design level of the formation complete with capping layer.
Or equal approved	Shall mean equivalent in performance and quality to that specified, and approved by the ARTC Project Manager
Plain Track	Track comprising of rails, sleepers, fastenings and ballast.
Points and Crossings	Turnouts, diamonds, catch points, single and double slips and all other similar types.
Project Quality Plan	Shall mean the Contractor's Project Quality Plan.
Rails	All rails including points, crossings, check rails, stock rails, junction rails, plain rails, etc.
Rail Level	The design level of both rails of tangent track or the low rail of any super-elevated track.

RFT	Request for tender.
Track	All track including points and crossings and plain track.

1.3 Document Scope

This specification covers the activities incorporated in the construction of plain track, and describes the obligations the delivering party will have in the execution and delivery of the Works. References to ARTC construction, Maintenance and Safety systems are made to suit the application of the Specification to generic projects, and will require the level of compliance and application to be determined by the project delivering agency when planning the delivery.

This document scope will comprise ARTC's requirements for the supply of labour, materials and plant for the construction of new track, and includes the following items that may be required to be carried out in accordance with the specific plain track construction Contract.

Standard project activities performed in plain track construction include:

- Project management and supervision
- Co-ordination of notification to the general public and authorities of construction activities and site works
- Setting out of the works
- Construction of track work, interfacing with signalling
- Laying of bottom ballast
- Placement of sleepers or bearers
- Laying of rails
- Stressing and welding of rails
- Laying of top ballast
- Track resurfacing
- Construction of level crossings including interfacing with signalling, line marking, road surface, signage and guardrails where specified on the design drawings
- Maintain the safe and continuous operation of private and public level crossings where they intersect the project
- Co-ordination of track work for main line connection within agreed possessions arranged by the Contractor with the Principal
- Identify the location of services, and protection where required, of all services and equipment within the nominated work scope area
- Protection of rail traffic and ARTC infrastructure during site works
- Environmental, Safety and Traffic management of all construction activities
- Removal and disposal of surplus materials and stockpiling serviceable materials
- Grinding of new rails and turnouts; and
- Submission of handover documentation.

1.4 Responsibilities

In delivering the plain track construction works the Contractor shall be responsible for planning and carrying out the minor earthworks, drainage, track laying works, civil works and signalling interface works in accordance with this Specification, and the development of the Contractor's Project Quality Plan and all associated Contract and handback documents.

Contractor to provide all personnel, equipment, materials and consumables necessary to perform the services as per the contract specifics, and in accordance with the relevant ARTC standards and codes.

1.5 Certification

All materials and manufactured components supplied by the contractor for the works shall be accompanied by a certificate from the Supplier stating compliance with the Specification, relevant ARTC Technical Standards, and relevant Australian Standards together with such details and parameters required to be supplied by those documents and/or the Project Quality Plan.

1.6 Testing and Inspections

During the course of the work the Contractor shall arrange for all relevant testing required by the specific contract and ARTC Specifications and procedures and the Contractor's Project Quality Plan to be carried out by an independent testing authority agreed by the ARTC Project Manager.

1.7 Services

All work areas to be subject to a complete services search. The search to include all services associated the infrastructure including (coaxial cable, fibre optic, CTC, signalling, communications and external services (including but not limited to) power, gas, communications, water and sewer and track-side monitoring equipment).

All services shall be identified on a plan provided by the contractor indicating service depth and location with respect to the track. All services to be clearly marked on site and appropriate protection measures taken in accordance with section 9.

1.8 Co-ordination with Service Authorities

The Contractor will be required to liaise with Service Authorities and stakeholders to manage the priorities of service identification and marking on plans where required. The Contractor will be required to ensure that all services are identified to ensure project milestones are not impacted by delays caused by these services.

1.9 Service relocations

The Contractor shall be responsible for temporary design and all works required in carrying out the relocation and/or re-installation of all services affected by the works in accordance with the design drawings, relevant standards, the Contractor's Project Quality Plan and all associated contract specific documents.

1.10 Clearances

The Contractor must at all times maintain structural clearance to operational tracks with appropriate delineation as required and agreed by the ARTC Project Manager.

1.11 Definition of the Site

For the purpose of this Specification, 'Site' means that area of land for which the project will be undertaken, and as detailed on the drawings, plans or instructions as the rail corridor.

1.12 Drawings

The drawings required to perform the plain track laying delivery works will form part of the individual project scope of works.

1.13 Spare Parts

Specific contract documents will itemise spare parts to be provided by the contractor, and the procurement and storage will form part of the contractor's project management plan.

1.14 Works Excluded from the Contract

Works excluded from the contract will be detailed in the project specific contract details.

1.15 Hot Weather

Limitations on working in hot weather contained in ARTC (Engineering) Track & Civil Code of Practice Section 6 (Track Lateral Stability) shall be complied with and the Contractor shall manage the Works Program in accordance with the provisions included in the Contractors accepted Offer.

1.16 Construction under Traffic – Rail

Where the contractor's works is undertaken on active lines, the Contractor shall at all times during the period of construction take all the necessary precautions in accordance with ARTC regulations to avoid any delay, obstruction or stoppage to rail traffic. To enable this the contractor will submit a plan that clearly describes how track access will be managed.

2 Quality Assurance

2.1 Quality System Standard

The Contractor shall maintain a documented Quality System in accordance with this document and with Australian Standard for Quality System AS/NZ ISO 9001/2.

The quality system shall cover the whole of the work undertaken by the contractor for the specified works.

2.2 Project Quality/Delivery Plan

The Project Quality Plan shall align with the requirements of ARTC Procedures within EGP-20-02 detailing how the Contractor will manage and control the quality of the work under the Contract. It shall be based on, and be consistent with any draft tender Project Quality Plan submitted during the tender or RFT. It shall be specific to the work being undertaken, and incorporate the contract specific package of work.

The plan is to be submitted to the ARTC Project Manager within the agreed period detailed in the contract or at least ten (10) working days from the award of contract. Works are not to proceed until the Project Quality Plan is agreed by the ARTC Project Manager. The ARTC Project Manager will review the submitted Project Quality Plan and respond to the contractor within the agreed contract period or ten (10) working days from Contractor submission.

The Project Quality Plan for plain line construction shall include as a minimum:

- Management responsibilities specific to the Contract including the responsibility and authority for quality
- Organisation proposed for the Contract
- Site management and supervision
- Qualifications and competencies including currency of qualification of all staff, including sub-contractors, proposed to be used on the Contract
- Contractor's method of control of sub-contract work
- All work processes and equipment for all works including service identification, signalling, and earthworks interface tasks, and works as built drawing production
- Work method statements for all activities which shall include all requirements nominated in this specification. The Contractor shall include details on at least the following in line with specific contract scope requirements:
 - Equipment and construction methods proposed to be used
 - Storage of materials
 - Provision and placement of bottom ballast including stabilisation
 - Laying of concrete sleepers
 - Laying and stabilisation of top ballast
 - Installation of rails, insulated rail joints and fastenings
 - Turnout assembly and placement

- Interfacing with signalling equipment
- Testing and Commissioning of installed Equipment
- Track surfacing
- Rail welding and destressing of the welded rail
- Initial grinding of new rails and turnouts
- Identification and relocation of services
- Management of trackside signage and monuments
- Level crossing installation and surfacing
- Removal from site redundant materials and stockpiling serviceable materials
- Provision of manuals and training of ARTC staff on the application of resilient fastenings
- All witness and hold points; and
- Inspection test and handover plans.

2.3 Inspection and Tests

During the course of the work the Contractor shall arrange for all relevant testing required by the Project Quality Plan and the applicable ARTC Specification or Australian standard to be carried out by suitably qualified personnel or external agencies agreed to by the ARTC Project Manager.

Inspection and Test Plans shall be submitted to the ARTC Project Manager for acceptance prior to any work commencing. Inspection and test plans shall consider ARTC procedure EGP-20-02 and:

- Identify tests/inspections scope against Contract requirements including all referenced ARTC or Australian standards
- Identify records to be maintained or particular tests and/or inspections
- Nominate key inspection triggers and the requirements to enable on time completion
- Clearly show alignment of inspection activities with asset/project critical handover events
- Detail test equipment to be used for specified tests and/or inspections

Contractor shall also undertake additional testing at no cost to ARTC if in the ARTC Project Managers opinion the Contractor supplied materials do not conform to the requirements of this Contract or the specified ARTC or relevant Australian standards.

2.4 Records

The Contractor shall establish and maintain a system of records that provides objective and substantiated evidence that the requirements of the contract have been satisfied, and the completed works is complete and compliant.

The Contractor shall make all records pertaining to the Contract available to the ARTC Project Manager at all reasonable times and, where requested by the ARTC Project Manager, provide a copy of the records.

At the completion of a package of works the contractor shall provide all necessary construction records in Tiff or other agreed electronic medium and format, and in accordance with the project handover plan.

2.5 Quality Audit and Non-conformances

The Contractor shall give the ARTC Project Manager access to its or its sub-contractor's premises or working area and to make documentation available for review.

The Contractor shall make or arrange to be available all facilities, documentation, records and personnel, including those of sub-contractors, that are reasonably required for any audits or surveillance to be undertaken by ARTC to ensure specified requirements are being met, and that ARTC issued improvement notices are being actioned.

All non-conformances shall be promptly reported to the ARTC Project Manager via non-conformance reports that shall include Corrective Action Plan.

2.6 Occupational Health and Safety

The Contractor shall incorporate into the Project Quality Plan a system covering the management of occupational health and safety in accordance with the relevant Statutory Occupational Health and Safety Acts. The system element shall provide prompt notification to the ARTC Project Manager of any accident or injury occurring at site.

When requested by the ARTC Project Manager, the Contractor shall provide relevant project personnel to attend meetings for the purpose of reviewing occupational health and safety matters relating to the contract.

The Contractor shall provide and maintain an environment that is safe and without risks to health and safety for employees and others, in the course of their work and onto site.

The Contractor shall provide OH&S reports and statistics as identified by the ARTC Project Manager.

2.7 Rail Safety Act

The Contractor shall comply with the relevant Rail Safety Act and all ARTC Rules, regulations and procedures applicable under ARTC Accreditation.

3 Protection of the Environment

3.1 General

All work shall be performed in accordance with hours of works defined in the project delivery plan and consent conditions.

3.2 Disposal of Material

All surplus and recovered materials removed during the course of new track construction, shall be disposed of as directed by the ARTC Project Manager. Consideration must be given to the possible "contaminated material" classification of some materials. Serviceable materials shall be stockpiled as directed by the relevant contract.

3.3 Dust Suppression

The Contractor shall take all measures necessary to comply with EPA Regulations and reduce airborne dust on site. The management of dust suppression will be as included in the scope of works and the contractor must make allowance for this in the project execution. The Contractor shall affect adequate dust control measures and ensure the safety and convenience of the public, are not adversely affected.

3.4 Fire Risk

The Contractor shall comply with all statutory obligations with respect to the management of bushfire hazards.

The Contractor must comply with any Total Fire Bans imposed by Government Authorities, including the restrictions imposed on burning off, hot-work, slashing, grinding, the use of naked flames or any further restrictions imposed by the controlling authority or Acts.

To effectively manage fire risk on site, the Contractor shall prepare work method statements as part of his Project Quality Plan, and identify qualified fire protection personnel.

4 Access

4.1 Access to the New Formation

If the Contractor requires access to a part of the Site where access has not been provided or agreed, the Contractor shall supply to the ARTC Project Manager a plan for obtaining such access, and shall not commence work until approval has been given.

The completed formation shall not be used as a vehicular access road, unless the strict controlled condition of use has been agreed by the ARTC Project Manager, and only under conditions where approved access will not result in damage to the capping, formation, ditches, shoulders and slopes.

The provision of additional roads or the upgrading of existing access roads will be as included in the specific contract scope.

4.2 Access along Public Roads

The Contractor shall comply with all local and statutory authority requirements with respect to the use of public roads in gaining access to the Site.

Vehicles or equipment hauling material over public roads shall be fitted with tight tailgates and appropriate load covers. Vehicles, when loaded, shall comply with the requirements of the relevant Roads Acts, or such lower load limits as set by the relevant authority.

If the Contractor wishes to use public roads surrounding the site for the purpose of undertaking the work under the Contract, the Contractor shall obtain approval from the relevant authority for the use of these public roads.

4.3 Use of Structures by Construction Plant

Unless specified within the contract documents structures, including bridges underpasses and culverts have not been designed to accommodate the passage of heavy construction plant, accordingly plant with a Design Loading greater than that shown on the Design Drawings for the bridges or culverts shall not be permitted to travel on structures.

4.4 Access Roads through Private Properties

If the Contractor proposes to use adjacent properties for access purposes outside of that identified within the Contract Document, it is the Contractor's responsibility to make those arrangements and obtain agreement with each such property owner. However, the Contractor shall notify the ARTC Project Manager of the proposed arrangements before contacting property owners and all communications with property owners shall be vetted by the ARTC prior to contact.

The Contractor's access requirements through private properties must be made as part of the tender process, and will not be accepted as a variation unless stated as in the ARTC accepted offer.

5 Standards and References

5.1 General

All design, materials, equipment, workmanship and installations shall comply with the latest revision of the ARTC Engineering Standards, and Australian Standards relating to the relevant element or component of works unless otherwise noted in this Specification or advised in the accepted Tender.

Where conflict exists between any Statutory Requirements, standards, reference documents, and this Specification, the most stringent requirement shall apply and the contractor may seek direction from ARTC.

The Contractor should where necessary raise timely Request for Information(RFI) or Instruction through the Contract process. The Contractor shall not deviate from the provisions of the relevant standards and specifications without first obtaining consent from the ARTC Project Manager in writing.

Latest ARTC Engineering Standards available from www.artc.com.au/

Australian Standards are available from <http://www.standards.com.au/>

The Contractor should refer to the Contract document for specific direction on relevant Standards, specifications and References.

5.2 Changes to ARTC Standards

ARTC undertakes regular reviews of the standards, procedures and instructions that apply to the operation and maintenance of its networks. As such Contractors are advised to ensure the most up to date version of ARTC specifications, standards, procedures or instructions being used are obtained from this source.

5.3 Applicable Track and Civil ARTC Standards

The full suite of Track and Civil Standards that apply to this Specification and are available on the ARTC website at www.artc.com.au.

The ARTC Engineering Track & Civil Code of Practice provides for the structure and application of ARTC standards, specification, instructions and guidelines for their use.

As each individual project or task has differing scopes and deliverables the extent of relevance of standards will vary, and the following are listed as indicative standards which would have application to a generic project, and further content is available at www.extranet.com.au.

Standard ID	Standard Title
ETF-05-01	Track Geometry Standards for Construction Upgrades and Maintenance
COP Section 2	Sleepers and Fasteners
ETD-02-05	Concrete Sleepers-Design
ETF-02-01	Use of resilient Fasteners
ETM-06-09	Weld Track Stability Analysis
ETE-01-03	Non-Destructive Testing of Rail (for Internal & Surface Defects)
ETM-01-01	Rail Weld Geometry Standard
ETA-04-01	Ballast Specification
ETA-01-01	Manufacture and Testing of Pre-Assembled Glued Insulated Rail Joints
TMS10	Standard for Laying Continuously Welded Rail
ETA-03-03	Technical Specification for Manufacture of Components for Points & Crossing Structures
ETC-03-01	Turnout Replacement
PP135	Mechanised Track Surfacing
PEO-GL-001	Business Rules for Working in ARTC Corridor
RLS-PR-003	Protocol for Entering The ARTC RAIL Corridor
EGP-04-01	Engineering Drawings & Documentation

6 Supply and Delivery of Materials

6.1 Materials Supplied by the Principal

Materials to be supplied by the Principal will be included in the contract documentation supplied to the Contractor. Planning and coordination of the delivery of these materials shall be the responsibility of the Contractor, unless specified in accepted contract scope.

The Contractor Project Quality Plan shall identify all material handover and inventory management procedures including inspection criteria for approval of the ARTC Project Manager.

6.2 Materials Supplied by Contractor

The Contractor shall supply to site all materials to complete the works in accordance with the agreed contract and shall be in accordance with the relevant ARTC Standards, AS standards or as approved for use by the ARTC Project Manager.

The Contractor shall in its Project Quality Plan describe what procedures and tests will be adopted to ensure that all materials comply with ARTC standards and Specifications.

6.3 Handling, transport and storage of Materials

The Contractor in its Project Quality Plan shall describe what procedures will be adopted in transporting materials from the source supplier and delivery to Site, the handling and temporary storage (if any) of materials on Site, and the handling to the workface to ensure that all track materials will retain their integrity and compliance with the standards specified in this Specification.

7 Survey

7.1 Setting out of the Works

Setting out of the works shall be conducted in accordance with the provisions of the relevant Government Regulations and the ARTC agreed design drawings.

The Contractor shall be responsible for maintaining existing survey monuments, control lines and recovery pegs. All new pegs and stakes shall remain in place until all track work is completed to the satisfaction of the ARTC Project Manager.

Proposals for the setting out of the works shall be included in the Contractor's Project Quality Plan.

7.2 Marking Out

The contractor shall mark out on site all equipment and services that may be affected by the works. Signalling equipment and cables shall be marked with bright orange paint. All other equipment shall be suitably marked so as to avoid unintended damage

7.3 Location of Signalling Equipment

The Contractor shall interface with ARTC for the conduct of Signalling interface works and undertake all requirements to protect Signalling works during the performance of its scope of works.

8 Track work Construction

8.1 Earthworks

Earthworks are separate from the plain track construction and are excluded from the scope of this specification, but contractors are to be converse with the specifications for earth work constructions where works are occurring in conjunction, or as a precursor to track construction works to assure interface issues are managed.

8.2 Drainage

Drainage works are separate from the plain track construction and are excluded from the scope of this specification, but contractors are to be converse with the specifications for drainage work constructions where works are occurring in conjunction, or as a precursor to track construction works to assure interface issues are managed.

8.3 Preparation for Laying Track

The top surface of the formation shall be protected from damage at all times. The layout of bottom ballast or rail shall be undertaken so as not to damage the formation or capping layer. The bearing surfaces of all sleepers, the bottom of rails and other bearing surfaces shall be cleaned and free of all dirt before rails are laid, and all survey or bench marks must be protected from disturbance.

8.4 Ballasting

Ballasting works shall be considerate of all requirements of ARTC (Engineering) Track & Civil Code of Practice.

Where placing bottom ballast other than by ballast train, bottom ballast shall be placed in one or two layers (each approximately the same depth) to allow for compaction to a total height as specified in ARTC(Engineering) Track & Civil Code of Practice. The ballast is to be placed so as to avoid centre binding of the sleepers.

Each layer of the ballast shall be compacted by a minimum of two passes of a 12tonne smooth drum roller to the satisfaction of the ARTC Project Manager, and shall take place over the full width of the ballast.

Top and any final trim ballast should be placed by ballast train unless approved by the Superintendent.

The Contractor shall provide a transition length between varying ballast depths so that the change in depth does not exceed 25mm per 5metres.

Ballasting shall be undertaken in accordance with the Contractor's Project Quality Plan which shall include material handling and inventory management.

8.5 Laying out Sleepers

Concrete sleepers unless local conditions or specific contracts stipulate shall be laid out nominally at 600mm centres, square to the centreline of straight track and radial to curved track. Variations in distance between sleepers shall not exceed 10mm. On curves, the spacing shall be measured on the outer rail where the variation shall not exceed 25mm.

Sleepers shall be handled and laid out in accordance with the Contractor's Project Quality Plan.

No sleeper with visual damage should be installed without the ARTC Project Managers approval who may reject sleepers damaged during handling and placement.

8.6 Placing of Rails

The Contractor shall utilise an industry accepted method of handling rail, and this method must be clearly described in the contractors works execution plans.

All rails shall be unloaded, transported and handled so that kinking, bending, bruising or other damage is avoided.

The Contractor shall inspect rails upon unloading at the Site and any rail showing bends or kinks shall be brought to the notice of the ARTC Project Manager. If, in the opinion of the ARTC Project Manager, the integrity of the rail has been compromised and the rails are not fit for use, the ARTC Project Manager may direct the Contractor to replace the defective length of rail or part thereof.

The rails shall be set true to gauge to the tolerances specified in ARTC Technical Standard unless agreed otherwise by the ARTC Project Manager.

All rails laid on curves sharper than 400 m radius shall have the last eight metres of each end of the rail uniformly curved by an agreed rail bending process to suit the radius of the curve.

Rails shall be handled in accordance with the Contractor's Project Quality Plan.

8.7 Turnout Manufacture and Assembly

Turnout and control assemblies shall be provided in accordance with the relevant agreed contract, and the Contractor shall be responsible for material receipt, handling and inventory management in accordance with the approved Project Quality Plan.

The Contractor will provide a specific Method Statement for turnout handling and construction that clearly identifies the protection of materials from damage.

Any contractor supplied Points and crossings components shall be in accordance with the contract design drawings, and relevant ARTC Standard and ARTC Specification.

Turnout assembly, placement and surfacing shall be in accordance with the most current ARTC Specification and the ARTC (Engineering) Track & Civil Code of Practice relating to Turnouts and the related specifications.

8.8 Junction Rails

When joining rails of different profiles junction rails shall be used, the profiles of the adjoining rails must be compliant with the ARTC standard for acceptable profile, including the calculation of head loss.

8.9 Surfacing

Mechanical Surfacing shall be performed in accordance with the ARTC Standard for track resurfacing.

The track shall be lifted, lined and accurately consolidated to the design line and level. The maximum lift of track in one lift shall be 100mm.

The ballast shall be tamped by means of mechanical tampers of approved type so that ballast is uniformly compacted from the centreline of each rail.

Tamping of sleepers must be provided by tamper tines compressing ballast at opposite ends of the sleeper in unison at depths that will allow for the full squeeze cycle, and pressure of the automated tamping machine.

Tamper tines shall not contact the formation capping at any time.

The ballast shall be vibration-compacted by a suitable method. The Contractor is to submit full details of the proposed track stabilisation method to be used in the Project Quality Plan.

The top surface of the ballast shoulders shall be an extension of the top line of the sleepers in accordance with ARTC (Engineering) Track & Civil Code of Practice - Ballast Technical Standard. Ballast shall be swept clean, such that all sleeper tops and rail fastenings are fully exposed, but ballast cribs are not showing voids.

Following surfacing the track geometry shall comply with the tolerances specified in the relevant ARTC Standard and (Engineering) Track & Civil Code of Practice. Surfacing shall be undertaken in accordance with the Contractor's Project Quality Plan.

8.10 Rail Welding Practice

The Contractors flashbutt welding procedure including testing shall be submitted to the ARTC Project Manager for approval prior to any welding commencing. The procedure shall align with the ARTC (Engineering) Track & Civil Code of Practice and relevant Technical Notes

All rails are to be flashbutt welded to long lengths of no more than 660m or as in accordance with the contract scope, and rail ends aligned to avoid fixed points such as level crossings and switch approaches. Aluminothermic welding (Thermit) may be used only on approval from the ARTC Project Manager, and all Thermit welds must be clearly indicated on weld maps in project planning.

Approved Aluminothermic welding shall be carried out in accordance with ARTC Technical Standards and the ARTC (Engineering) Track & Civil Code of Practice

All welds shall be geometrically and ultrasonically tested in accordance with the contract and in accordance with relevant ARTC Technical Standard and any defective or non-conforming weld found, shall be replaced by the Contractor in line with agreed contract conditions.

Rail welders shall be certified by an accredited training organisation and have a proven history of compliant weld installation supplied by the contractor and agreed by the ARTC Project Manager. ARTC's Project Managers agreement of the contractors welding personnel shall not relieve the Contractor of any responsibility for the quality and satisfactory performance of the welder. The contractor remains the owner of all welds as defects, until welds pass QA and ND testing to ARTC satisfaction.

Each team of welders shall be equipped with suitable fire-fighting equipment for controlling fire outbreaks to comply with local and legislative requirements. Welding procedures during summer months, particularly during times of total fire bans that require the issue of a 'Hot Work Authority' shall comply with statutory requirements.

Each new weld shall be marked and recorded as per the contract agreed weld map and have ARTC Project Manager agreement.

Storage of welding materials on site should be in accordance with manufacturer's instructions.

8.11 Welded Rail Adjustment

All rails shall be continuously welded unless specified otherwise on the contract specific design drawings, Specifications and other Contract Documents.

Adjustment welding procedure shall incorporate all requirements of the ARTC Engineering Code of Practice and relevant welding procedures and instructions including Work Instruction ETW-01-05.

On completion of all tamping and lining, the rails shall be adjusted and welded to provide a stress-free condition in accordance with ARTC standard.

Maximum length between anchor points for adjustment will be in accordance with the relevant ARTC welding standard. Actual adjustment length will depend on equipment and practices used to ensure an even distribution of the adjustment over the adjustment length, and included in a stress plan agreed with the ARTC Project Manager and include in the contract scope.

All flashbutt, aluminothermic welding and rail adjustment, shall be undertaken in accordance with the Contractor's Project Quality Plan and comply with ARTC welding standards and procedures.

8.12 Weld Return Records

The Contractor shall provide a record of each weld installed in the track, the format of the weld recording is to be in accordance with agreed contract document recording process, and will be provided by the Contractor in the agreed format and submitted to the ARTC Project Manager as part of the Contractor's Project Quality Plan.

The forms shall include, but is not limited to, the following:

- Date weld was installed
- Flashbutt welding machine performance data (flash time, upset time and hold time)
- Ambient temperature and rail temperature when the weld was installed
- Batch details of weld, including date of manufacture, batch number, supplier
- Location of weld (including track, rail, chainage LH/RH, up rail or down rail)
- Identify whether weld installed was a Free Weld (FW) or Adjustment Weld (ADJ), and if adjustment weld, the stress records including the length of rail adjusted, the chainage for the anchor points, and the length of anchor block
- Vertical and horizontal alignment of the weld and ultrasonic testing details; and
- All welders' details (including name, company, welding certificate no.)

8.13 Rail Lubricators

Any existing rail lubricators within the project limits must be removed and re-instated following new rail installation and tested to confirm effective operation. Non-operational or damaged rail lubricators shall be reported to the ARTC Project Manager for repair.

New lubricators where required shall be installed in accordance with ARTC (Engineering) Track & Civil Code of Practice.

9 Planning and Restrictions

9.1 General Planning

Should plain track construction works be undertaken on active lines, or during closures/shutdowns the work may require the imposition of restrictions on the normal train operations.

To reduce the impact of construction works on train operations construction works must be planned to minimise disruption to normal train operations, and the length of the work face minimised.

Track possessions will be provided as specified in specific contract documents, and ARTC will where required provide information of train running to assist the contractor to develop track access window plans.

9.2 Speed Restrictions

The contractor is to take perceivable caution to limit the number and length of Temporary speed restrictions, and should only be applied where essential to maintain safety and integrity of rail operations or in an emergency and in accordance with the relevant ARTC code and priority. The Contractor shall prepare a submission outlining the reasons for the restriction, its severity and expected duration, along with the proposed remediation plan for the ARTC Project Manager.

9.3 Contract Program

The Contractor shall submit to the ARTC Project Manager for agreement a works program in accordance with the timeline in the executed contract.

This program shall become the contract program for the measurement of work performance and work control.

The Contractor shall provide a monthly report in accordance with the contract and include progress against program, applicable production rates, and further information as described in the contract details.

9.4 Safe Working

All safeworking is to be undertaken in accordance with ARTC regulations, with all contract staff holding appropriate and current competencies, medical checks and licenses to perform the delivery and certification work under the Contract.

Qualified and experienced safeworkers are to be provided on site for track protection, and to provide certification of infrastructure assets for the safe return of the track to service.

The Contractor is also responsible for the effective on track protection of vehicles and machinery, and for providing safeworking for the operation / travel of rail bound equipment and for the communication with Train Control.

9.5 Staff Rail Safety Training

All staff performing work on site under the contract shall have track safety awareness certification for the respective jurisdiction.

The Contractor shall comply with ARTC Business Rules and Corridor Access.

10 Acceptance Criteria for Track work

The Contractor shall ensure compliance with all requirements of the contracted works in relation to the plain line construction. This includes, but is not limited to, the following items.

10.1 Completion of work

The Contractor shall complete the contracted scope for the plain line, track work and further scope as per the executed contract in accordance with this Specification, the relevant ARTC Standards and as defined in the design drawings.

The Contractor shall undertake a survey as described in the contracted works documents or scope, of the completed track work to certify that the track work has been placed within the specified tolerances.

For the purposes of measurement, the finished track work shall conform to the measurements and tolerances specified in ARTC Technical Specification for track works.

On completion, the Contractor shall leave the work site neat and tidy.

10.2 Track Subject to Traffic

The Contractor shall have the liability to maintain the new track in proper alignment and surface until the Works are completed and accepted, and the agreed handover process has been completed.

10.3 Handover Documentation

- Contractor shall develop a contract specific handover plans as required for the required stages and scope of works as part of the QA, and project delivery planning. This plan will provide an exhaustive list of the documents, plans, surveys, licenses, warranties, manuals and inspection and test data such as: Final Survey including the as-constructed location of the track including line, level, superelevation, tangent points, transitions and turnout coordinates
- Works-As-Executed Drawings (see clause 10.3.1)
- Line diagrams for new sections and updated diagrams for existing sections.
- Ellipse Metadata upload for all added and changed assets.
- List of all information previously provided under contract and the contractors quality management plan including all ITPs, test results for all materials such as cables. Stressing and weld return forms.
- Details of warranties, defect liabilities including incomplete works and possible future issues for each asset including applicable service agreements and relevant contact details.
- As Built data for track centres, platform and structural clearances
- As built Signal data including Arrangement Plans, cable routes, bonding, track circuits, train detection systems, signal details (Ellipse data) and insulated rail joints,
- Civil data including cut/fill over 3m, rock-bolting, soil nailing, and retaining structures, Detention basins and sump/pit details. Soil & waste import, winning and disposal.

- Details of all access roads including access and egress locations.
- Maintenance plans and operating manuals for all new and amended assets plus training Manuals where not consistent with ARTC practices.
- Interface, test & commissioning reports, certificates, readiness & handover documentation.
- Details for all testing equipment including operation manuals.
- Details of all spare parts provided.
- Details of rail lubricators, way-side equipment and signage including operating & maintenance manuals.
- Authorised representative evidence that contractual standards and compliance requirements have been complied with.

10.3.1 'Works-as-Executed' Drawings

The Contractor shall provide Works-As-Executed Drawings for the works to the satisfaction of the ARTC Project manager. The drawings are to be submitted in AutoCAD format and in accordance with the Principal's Digital Engineering Management Requirements, or as stated in the executed contract documents. The drawings are to include, but are not be limited to, the updating of the design drawings and any additional drawings necessary to depict the as-constructed works.

Documentation shall be in accordance with ARTC procedure EGP-04-01.