CONSTRUCTION SIG
Chartered Quality Institute

CQI Construction Special Interest Group (ConSIG)

Recommended Quality Requirements For Major Infrastructure Projects

Approved for use

Jon Adshead
Chair ConSIG Steering Committee

Document History:

Version:	Date:	Prepared by:	Checked by:	Authorised by:	Reason for Issue:
1.0	25/8/2020	Jon Elliot	David Myers	Dan Keeling	For Issue

Contents

Document Context

Working Group 4 of the Chartered Quality Institute Construction Special Interest Group was tasked with producing a best practice guidance document to assist projects in compiling the Contract Quality Requirements for their scope of works.

The Working Group was led by Jon Elliot CQP FCQI who was supported by Dan Keeling CQP FCQI and David Myers CQP, MCQI.

The team used the quality conditions included in the various current UK major infrastructure projects (Crossrail, Tideway, Hs2 and Heathrow) to produce this best in class set of model requirements.

This document is intended to reflect the most stringent set of requirements for use on highly complex projects where the Client has a very low “appetite for risk” and is prepared to reflect this in the conditions of contract, resource and program.

The team recognise that not all Clients or projects will wish to strictly adhere to this model, therefore the team anticipates that the model will be amended as required by the collaborative team delivering any project to suit their needs.. Changes should include alignment with:

1) The contracting mechanisms that are being deployed and
2) The risk appetite of the client organisation
3) The need for safety in the facility (buildings, roads rail, nuclear).

For simplicity, the term *Project Manager* has been used to represent Client, Employer, etc. The NEC duties of *Supervisor* have been merged into those of the Project Manager. The term Project Information has been used to represent the terms Works Information, contract documentation, etc.

The Team also recognise that Contract Quality Requirements form only one part of the overall contract documentation. It is important that bespoke project Quality Requirements are produced holistically to reduce duplication or contradiction with other parts of the contract documents.

It is important that the commercial and contractual impact of all Quality Requirements are assessed by the appropriate project teams before publication.

1 Quality System Definitions and Acronyms

The following Quality System terms and acronyms are used in this part of the Project Requirements. The definitions given are derived from ISO 9000 and standard conditions of contract.

Clause	A Clause under the *conditions of contract.*
Agreed Defects Listing	An agreed listing of Defects specifically established with the Project Manager infrastructure manager for an element of the work that they are adopting.
Conformity	Fulfilment of specified requirements.
Contract Quality Plan	A document setting out how the quality requirements of the Contract, as specified in the Project Requirements, shall be achieved, controlled, assured, demonstrated and managed.
Correction	Action to eliminate a detected nonconformity
Corrective Action	Action to eliminate the cause of a detected nonconformity
Corrective Action Report (CAR)	Raised to record a failure to implement a specified process or contractual requirement. Generally identified during an audit.
Defect	As defined in the *conditions of contract*.
Inspection & Test Plans (ITPs)	Plans specifying the activities required to establish whether product conformity is achieved. They identify the responsibilities for executing the activities, the governing specifications, drawings, etc., the documents controlling them and the records required. These are prepared to support the Contract Quality Plan for a particular element of the *works.*
Method Statement	Documented plan for a defined work activity or group of activities produced by a competent person from the *Contractor* who will perform the work; identifies applicable drawings, access, methodology, personnel, Equipment, Plant and Materials, ,tools, and how the work will be controlled; assesses the risks associated with the work being performed or from the use of materials together with specific mitigations to manage those risks, and establishes emergency plans
Non Conformance Report(NCR)	Raised to record a Non-conformity (Defect) in the *works* (product, workmanship, or electronic system).
Non-conformity	A Defect as defined in the *conditions of contract*. (The term Non-conformity is used to be consistent with the industry practice and includes failure to comply with quality management documents such as procedures for managing the *works* described in the Project Requirements.)
Preventive Action	Action to eliminate the cause of a potential nonconformity or other undesirable potential situation

Outstanding Works List	A document to record work that has not been completed at an inspection or acceptance stage. (Appendix 1).
Quality Management System	The management system for achieving the quality requirements described in the Project Requirements and for demonstrating to the *Project Manager* such achievement, including the provision of documentary evidence and supporting records.
Quality Record	A record established to provide evidence of conformity with specified requirements
Quality System Procedures (QSPs)	Documents that specify operational techniques or activities that are used to fulfil requirements for quality, and as such support the Contract Quality Plan.
Quality Verification Plan (QVP)	A tool to identify project requirements and to verify that they have been through the planning and execution of verification activities for each stage of the project.
Snagging List	A List of items required to complete works in an area, system or subsystem following contract or sectional completion.

Note: Contract Quality Plans are supported by applicable procedures (including QSPs), Inspection & Test Plans, Method Statements and Standards. The *Contractor* is to minimise the duplication of information in the various quality system documents.

2 Organisational Context

The *Contractor* shall operate a QMS that meets the requirements of ISO 9001 (International Quality Management System Standard) and is assessed by a United Kingdom Accreditation Service (UKAS) Accredited Certification Body (or one that has mutual accreditation with UKAS). The *Contractor*'s scope of ISO 9001 registration covers the works. Third party registration of assessed capability (i.e. approval to ISO 9001) does not demonstrate that the specified QMS requirements under this contract have been achieved.

The *Contractor*'s subcontractors and all suppliers shall operate a management system compliant to the current version of ISO 9001 assessed by a United Kingdom Accreditation Service (UKAS) Accredited Certification Body (or suitable equivalent).

Where the *Contractor* is a joint venture, all members shall have ISO 9001 accreditation. The *Contractor* shall adopt a single common QMS:

Where the *Contractor* is a joint venture, consortium or alliance, the *Contractor* shall describe the interrelationship between the JV's management systems and identify the partner responsible for assembling and retaining all *Contractor* records.

The *Contractor* shall define any JV in a Relationship Management Plan (RMP) according to ISO 44001:2017 within two months of the starting date. The *Contractor* shall submit the RMP to the *Project Manager* for acceptance.

3 Leadership

3.1 Reporting Structure

The *Contractor* shall submit a copy of the project organisation chart for acceptance. The chart shall show, the reporting structure of key persons.

The QM shall be part of the Senior Management Team, independent of the design and construction functions and have an independent link to senior director level. The Quality Manager shall be full-time for the duration of the contract, dedicated to quality matters on this contract, and shall be provided with adequate resources and authority to enable the quality of work on the contract to be managed effectively.

3.2 Quality Policy

A Quality Policy confirming a commitment to the management of quality and identifying quality objectives shall be submitted for acceptance. The policy shall reflect the context of the organisation and project scope. The policy shall provide a framework for setting quality objectives, meeting project requirements and demonstrating a commitment for the continual improvement of the management system. The policy shall be communicated throughout the organisation.

3.3 Roles, Responsibilities and Authorities

The *Contractor* shall submit for acceptance clear definition of how the responsibilities and authorities for the management of the quality management system are assigned, communicated and understood within the organisation

4 Planning

4.1 Quality Objectives

The *Contractor*'s Contract Quality Plan will describe how performance against the quality objectives outlined in the *Contractor*'s Quality Policy and other accepted KPIs will be measured and reported

4.2 Contract Quality Plan (CQP)

Within 4 weeks of the starting date, the *Contractor* shall produce a project specific Contract Quality Plan (CQP) and submit it to the *Project Manager* for acceptance. The CQP shall follow the guidance of and comply with BS EN ISO 9001 (compliance matrix required).

The CQP shall detail the inter-relationship of the CQP with other associated *Contractor* documentation .

Unless agreed with the *Project Manager*, the *Contractor* and subcontractors and suppliers of any tier shall not start any activity on any part of the works for which the CQP, applicable QSPs or ITPs have not gained *Project Manager* acceptance. Where these documents together adequately address ongoing and imminent works but not the entire scope of the works, the *Project Manager* may give limited acceptance to the *Contractor*'s submission in order to allow limited activities to proceed.

The Quality Plan shall include a full list of the *Contractor*'s applicable Quality System Procedures (QSPs). The *Contractor* shall be responsible to ensure that these are adequate to support the Contract Quality Plan.

The *Contractor* shall immediately comply with an instruction from the *Project Manager* to correct a failure to comply with the quality plan.

The CQP may be rejected by the *Project Manager* and further improvements to be requested if :-

- the plan is not practicable;
- the plan does not show the information which the contract requires;
- the plan does not comply with the Project Requirements and defined scope.
- the plan does not address all the areas covered by the latest version of ISO9001 and ISO10005

4.3 Contract Quality Plan Content

The CQP shall :-

- cover the relevant phases of the contract (correlation and condition survey, design, procurement, manufacture, construction, installation, testing, commissioning and maintenance);
- contain a policy confirming a commitment to the management of quality and identify quality objectives;
- describe how performance against quality policies and objectives will be measured and reported;
- incorporate or reference the full list of applicable QSPs;
- include or reference roles and responsibilities within the organisation, including those for all quality personnel;

- identify responsibility for implementation of arrangements for inspection & testing, as well as who is responsible for certifying that compliance with requirements has been achieved;
- organisation structure and reporting lines
- describe the interrelationship between partners' quality systems where the *Contractor* is a joint venture or consortium and identify the partner responsible for assembling and retaining all *Contractor* records for the contract;
- include criteria and methods to monitor and measure the effectiveness and efficiency of processes required for managing quality and the competent resource needed to undertake these activities;
- identify quality-related key performance indicators, including those related to the measurement against quality objectives and others based on inspection attendances and the results of surveillances;
- identify continual improvement activities;
- identify the management of the self-certification process and define how the proposed number and structure of certification packages and programme for delivery will be controlled. The resource required for self-certification shall be defined.
- describe the design control systems and procedures.
- describe how the *Contractor* will manage the quality of supplied products or service by 3rd parties
- describe the processes for the management of change during design and during build
- describe how quality management inductions, regular leadership events and 'toolbox talks' to communicate the plan and to instil and embed a culture of 'right first time' will be scheduled, delivered and documented.
- incorporate comprehensive quality system audit procedures including a quality audit schedule and the process for the preparation of audit reports;
- incorporate reference to the use of Project mandated databases.
- describe the statistical process techniques to prevent the occurrence of Non-conformities;
- provide for regular management reviews of the contract Quality Management System and subsequent updating as necessary;
- include Contractor's and Subcontractors' systems/procedures for design manufacture construction installation and testing;
- include contract Completion procedures which shall provide for review and verification of records by the *Contractor*'s Quality Manager.
- Allow for audits to be undertaken by the *Project Manager* and others
- Include testing and commissioning procedures; and
- Include processes for the management of issues raised in the defects period.

4.4 Quality System Procedure (QSPs)

The Contract Quality Plan shall be supported by comprehensive QSPs. The primary activities addressed by QSPs and to be implemented by the *Contractor* shall, unless agreed with the *Project Manager*, include but not be limited to those activities shown in Appendix A.

The *Contractor* and *Project Manager* shall agree which QSPs shall require the *Project Manager*'s acceptance .

4.5 Risks and Opportunities

The *Contractor* shall produce a Risk Management Plan for acceptance. This plan to determine the risks and opportunities that may affect the QMS and its ability to achieve the intended results. The plan shall detail how actions required to address these risks and opportunities are identified, implemented and evaluated. Where appropriate, preventive actions identified during audits, etc. shall be considered for addition to the Risk Register.

4.6 QMS Change Management

The *Contractor*'s CQP shall detail the process by which changes to the QMS are determined and undertaken in a planned manner.

5 Support

5.1 Resources

The Contractor's Quality Manager shall be a key person under the contract.

The *Contractor* shall demonstrate that adequate resources are provided to fulfil the requirements for quality management, inspection & testing and self-certification as detailed in this schedule.

The *Contractor* shall ensure that it's Quality Manager is supported by quality management resources possessing the required competencies to enable the works to be delivered to the quality required by the Project Requirements. The *Contractor* assigns its quality management resources to the works commensurate with the complexity and duration of the works.

5.2 Organisation

The *Contractor* shall include, or make reference to, a copy of the organisation chart in the CQP. The chart shall show :

- The reporting structure of key persons
- Other management and supervisory personnel on the Contract
- Identify personnel responsible for safety critical work
- Identify personnel responsible for key self-certification activities.

The CQP shall detail or reference the roles and responsibilities within the organisation including those for all quality personnel.

5.3 Competence and Awareness

5.3.1 General

The *Contractor* shall submit for acceptance a procedure the management of Training, Competency and Awareness.

5.3.2 Matrix of Authorised Competent People

The *Contractor* shall provide a Matrix of Authorised Competent People for all signatories that approve:

- design
- design review and approval plans;
- production
- production inspection, sampling and test plans;
- design and production certificates of compliance / declarations of conformity / justification of concessions requests.
- Inspection records, self-certification records and completion certificates

Ensure that staff undertaking these activities have evidence of their competence to carry out the particular activity.

Signatories for design shall have chartered status (or equivalent qualification if the design house is based outside of the UK) from the relevant professional body for the appropriate scope of design activity.

Signatories for production (manufacturing, assembly and commissioning) shall comply with the appropriate national standard(s)/sector scheme(s), or will hold an appropriate relevant Engineering degree

5.3.3 Quality Manager

The Quality Manager shall:

- develop and implement a Contract Quality Plan that complies with ISO 10005 and a Contract Assurance Plan that complies with current project requirements
- ensure that appropriate training is developed and provided for all personnel to include induction and training for staff with specific quality responsibilities;
- manage all quality/assurance personnel;
- approve the quality elements of the *Contractor's* method statements;
- ensure compliance with quality related legal and contractual requirements;
- provide advice and instruction to construction teams to deal rapidly and effectively with quality Non-conformities and complaints;
- analyse individual quality Non-conformities and complaints to identify trends, root causes and the corrective and preventive actions needed;
- ensure the provision and review of ITPs;
- ensure audits and surveillance of the *Contractor* and his subcontractors and suppliers including compliance with legal and contractual requirements are undertaken;
- produce information for the Management Review with top management and attend the Management Review meeting to ensure that the quality management system remains suitable, adequate and effective; and report to the *Project Manager* on all quality issues.

The Quality Manager shall have the following key competencies :-

- appropriate experience of quality management and the delivery functions of the *Contractor*/supplier under self-certification contracts;
- good knowledge and practical experience of developing, implementing and improving quality management systems;
- be a full member of the Chartered Quality Institute (or an equivalent recognised quality body) or an appropriate engineering institute; and
- be a competent auditor or have access to competent auditors

5.4 Document and Data Control

5.4.1 General

The *Contractor* shall submit for acceptance a procedure for the Control of Documents and Data. The document shall make reference to the management of BIM and the BIM Execution Plan where required by the *Project Manager*.

5.4.2 Document Management Team

The *Contractor* shall operate a dedicated document management team that acts as the single point for the registration, receipt, distribution and issue of all contract documentation. The document management team is solely responsible for the issue of the *Contractor*'s transmittals and the acknowledgement of receipt of the *Project Manager*'s transmittals.

The mandated Project Electronic Document Management System (EDMS) shall be utilised.

5.4.3 Contract Master Deliverables List

Within 4 weeks of the starting date the *Contractor* shall produce a Contract Master Deliverables List and submit it to the *Project Manager* for acceptance.

6 Operation

6.1 Operation Planning and Control

The *Contractor* shall ensure that all operations (including those of their supply chain) are planned and carried out under the controlled conditions described in the *Contractor*'s accepted CQP and the requirements of the Project Requirements.

6.2 Customer Communication

The *Contractor*'s Project Director and Quality Manager shall attend the - regular Quality Focus Meetings, providing inputs and monthly reports on quality, including:

- Management system status
- Audit progress results, CARs, and outstanding issues
- Progress on certification and records
- Status of RFIs, NCRs and summary of actions taken to close out
- Quality issues identified and or anticipated
- Improvement activities
- Performance against Employer and internal quality key indicators

Representatives from the *Client* and *Contractor* construction teams shall attend the QFMs.

Quality Key Performance Indicator (KPI) Report

The Supplier shall provide monthly reports on quality management progress and performance using the standard reporting template unless otherwise specified / agreed by the Employer. Guidance on how to complete, manage and monitor the KPI report is provided within the template.

The *Contractor* and the *Project Manager* agree the reporting format, including the required key performance indicators (KPI's), within eight weeks of the contract starting date.

6.3 Product Requirements

The *Contractor* shall develop a Quality verification Plan (QVP) as a tool to identify project requirements and to verify that they have been through the planning and execution of verification activities for each stage of the project.

Verification activities are planned in the early phases of the project (mainly in design) and executed in the later stages of the project (mainly during construction).

The format of the QVP shall be agreed and the document submitted for acceptance.

The QVP shall

- describe the controls to be implemented to manage records of compliance of the self-certification process for the design and production and testing phases of the project.

- ensure that every requirement is:
  - verified in design.
  - communicated between design and construction.
  - verified and validated in production through the control of production quality; and witnessed by the appropriate bodies (client or regulatory where necessary).
  - verified by testing and commissioning if appropriate

The QVP shall include a Quality Register that shall

- be developed, approved, and maintained by the lead designer/principal *Contractor* who shall ensure adequate co-ordination, integration and co-operation between the interested parties.
- identify the systems to be assured, the plan setting out how they are assured and who is accountable for providing the assurance statements.
- indicate the current status of planning and certification
- identify safety critical assets.

6.4 Design Management

The *Contractor* shall submit a Design Management Plan (DMP) for acceptance. The plan to detail the methods and controls to be implemented for

- Design Planning
- Design Inputs
- Design Controls
- Design Outputs
- Design Changes.

The DMP shall describe how:-

- error free design output and full compliance with the Project Requirements and the defined scope is verified
- production information is assessed to ensure adequate specification, planning and production process control is available
- changes to the design are captured, documented and processed.
- on-site changes will be reviewed to ensure continuing conformity to requirements

6.5 Control of externally provided processes, products and services

Control of subcontractor and all suppliers to be documented. Requirements of subcontractor and all suppliers for the production of QMS documentation is to be defined.

Subcontractor and Supplier documents that are to be submitted for acceptance to the *Project Manager* will be defined in a documented procedure.

The *Contractor* shall ensure that the Project's quality certification requirements are established in the preparation of materials orders and orders for manufactured goods.

The *Contractor* shall state in the CQP, the controls and systems implemented to ensure that Subcontractors and other suppliers, and the works, services, Plant and Materials they provide achieve the required standards and are compliant with Project Requirements, including:

- identification of the works, services, Plant and Materials to be provided by Subcontractors and other supplies.
- selection, evaluation and re-evaluation of the Subcontractors and other suppliers.
- assessment and monitoring of the Subcontractors and other supplies QMS.
- identification and specification of all relevant requirements and obligations.
- Validation and Verification of works, services, Plant and Materials supplied.
- interface management between the *Contractor*, Subcontractors, and other suppliers.
- hand-over of works, Plant and Materials to the *Contractor*; and
- outsourcing of work to other *Contractor*s.

Unless otherwise accepted by the *Project Manager* plant and materials forming part of the permanent works or temporary works incorporated into the works shall be procured from sources that hold appropriate certification from a UKAS accredited certification body (or one that has mutual recognition with UKAS).

All subcontractors and suppliers to identify the person responsible for on-site quality.

7 Production Control

7.1 Assurance

The *Contractor* shall implement a progressive assurance regime.

Progressive assurance means that there will be continual confirmation of compliance by the generation of contemporaneous records.

7.2 Inspection and Testing

Unless otherwise accepted by the *Project Manager*, the *Contractor* and his Subcontractors and suppliers shall use the agreed Project proformas for inspection and test plans and construction certificates.

The *Contractor* shall produce and maintain a schedule of Inspection and Test Plans (ITPs) linked to the QVP and submit for acceptance.

The *Contractor* and their suppliers and subcontractors of any tier shall maintain ITPs appropriate for the service they provide. The *Contractor*/Project Manager will identify which ITPs require acceptance by the Project Manager.

Unless otherwise accepted by the *Project Manager*, the *Contractor* shall:

- submit the ITP to the *Project Manager* for acceptance at least five weeks prior to works commencing, with the relevant method statements
- not start the relevant works until the *Project Manager* has accepted the ITP
- agree dates for inspections of works with the *Project Manager* five days in advance of the inspections
- communicate with the *Project Manager* to amend ITPs including the requirement for additional inspections or tests.

The *Contractor* shall ensure staff nominated to undertake sampling, inspection and testing are competent to carry out the activities to which they have been assigned

The *Contractor* shall agree the ITP key inspection activities with the *Project Manager* prior to construction and record the completion of inspections and tests and identify records of the results. For key inspection activities staff shall be independent of the production team. Key inspection activities to be agreed with the *Project Manager* prior to construction.

All on-site and off-site testing shall be carried out by laboratories accredited by UKAS or similar acceptable national body or by persons accredited to similar standards. The samples shall be taken by staff appointed by the laboratory. The requirement for UKAS accreditation may be waived for the testing of systems and their components, subject to an alternative testing proposal by the *Contractor* and the acceptance of the proposal by the *Project Manager*.

The *Contractor* shall note within the ITPs details of the key inspection interventions, which are:

- Hold Points – these are mandatory interventions where work stops until inspection and/or testing has been successfully completed and witnessed by the *Project Manager*. The *Contractor* shall ensure a minimum of five days' notice is provided for Hold Points in the UK and a minimum of ten days' notice for those outside the UK.
- Witness Points – these are a point in the process where a witness is required; works can proceed if inspection is passed.
- Review Points – these are a point in the process where a review of inspections/tests are conducted; work is proceeding.

The *Project Manager* shall identify their key inspection interventions as part of the ITP review and acceptance process.

The *Contractor* shall provide to the *Project Manager* a weekly schedule of inspections and tests to be undertaken (to include planned and achieved).

The Employer, the *Project Manager* and their nominated agents reserve the right to witness any inspection/test activity during any stage of the works.

The *Contractor* shall not cover up works identified as a hold point until the inspection has taken place.

Verification of the quality and material traceability of each element of the works shall be the responsibility of the *Contractor* and shall be achieved through checks, tests, inspections, audits and reviews, planned and implemented in accordance with the Contract Quality Plan and ITPs developed by the *Contractor*.

As soon as possible after any part of the works or any Plant and Materials are known or appear to be not in accordance with the Project Requirements, the *Contractor* shall submit proposals to the *Project Manager* for opening up, inspection, testing, making good or removal and re-execution. The Contractor's proposal shall identify all connected or similar works and include measures to prevent recurrence of the identified issue. The *Contractor* complies with the *Project Manager*'s requirements or instructions in connection with such proposals.

The *Contractor* shall maintain a schedule of all inspection, measuring and test equipment used for the works that includes records of calibration to nationally recognised standards

The *Contractor* shall provide all necessary facilities and Equipment to allow for all testing and inspections to be carried out.

7.3 Materials Acceptance

The *Contractor* shall develop a Materials Proposal Schedule (MPS) for acceptance which lists all proposed permanent works materials and products and indicating any variances from the specified material requirements. The schedule shall include :-

- All permanent works materials, both architectural and non-architectural
- Samples/mock-ups required including Test Panels and Quality Benchmarking
- Target submission dates

The *Contractor* shall regularly submit the Material Proposal Schedule commencing within 6 weeks following the starting date.

The *Contractor* shall:

- identify, schedule and agree with stakeholders and other interested parties the Samples/ Benchmarks, mock-ups and prototypes needed to verify/ validate design or to control production quality.
- ensure that where required, agreed Samples/ Benchmarks are clearly identified and readily accessible for quality control and briefing purposes.
- establish arrangements for monitoring and reporting progress of compliance with samples/ Benchmarks and quality standards.

The *Contractor* shall utilise an accepted template for the purpose of recording material and product acceptances for the works and submit such records to the *Project Manager* for acceptance.

The *Project Manager* will agree which materials submissions are required for formal submission and acceptance including items requiring acceptance by Others.

Materials for which submissions are required for *Project Manager*'s acceptance, shall not be incorporated into the works prior to acceptance being obtained.

7.4 Non-conformance Management

Where the *Contractor* has identified that any specified work activity has not been carried out in accordance with agreed procedural requirements, the *Contractor* shall raise a non-conformance report (NCR).

Unless otherwise accepted by the *Project Manager*, the *Contractor* shall enter each NCR, including subcontractor NCRs, into the Project NCR system.

Where a non-conformity in a works item is noted that cannot be put back into compliance within 24 hrs of identification the *Contractor* shall raise an NCR. NCRs shall also be raised where a specified work activity has not been carried out in accordance of the procedural requirements.

The *Contractor* shall monitor and track all non-conformities within the works regardless of who identifies the non-conformity

Each NCR requiring a concession or a design change shall be referred to the *Project Manager* by the *Contractor* for appropriate resolution. Agreed remedial actions to be completed prior to the commencement of any further activities that may render the non-conforming item inaccessible, difficult to repair or increase the cost of the repair.

Project Manager's acceptance is always required where a change to the Project Requirements is proposed or required by the *Contractor* in order to resolve any Non-conformity.

7.5 Asset Management

The Employer will develop and manage asset information provision processes which shall provide assurance that asset information is of suitable quality and to minimise the overall cost of asset information provision to both the *Contractor* and the Employer. These processes may be refined over the life of the contract to improve the effectiveness of asset information provision.

The *Contractor* shall be responsible for the provision of asset labels; the *Contractor* shall complete and submit to the *Project Manager* the Asset Data Collection forms in a timely manner thus allowing the Employer to issue the required asset label information.

7.6 Readiness Reviews

The *Contractor* shall submit for acceptance a procedure for the identification and undertaking of documented Readiness Reviews.

Where the requirement for Readiness Review has been identified, the *Contractor* shall not commence the works until the *Contractor* has carried out documented readiness review with the *Project Manager*.

7.7 Deliverable Records

The *Contractor* shall produce records to demonstrate that :-

- the works have been executed in accordance with this Contract Project Information;
- the works are progressing in accordance with the Project Requirements; and
- the works have been completed in compliance with the applicable law.

Records means all drawings, CAD files and models, specifications, calculations, schedules, reports, consents, approvals, permits, licences, authorisations and the like that evidence the progress and compliance of the works through to the defects date.

Access to all records shall be granted to the Employer or *Project Manager* for inspection and audit.

Contractor Records are to be retained by the *Contractor* for the periods identified in the Contract.

These records include documents submitted during the course of the works to verify compliance with the requirements specified elsewhere in Project Requirements.

Records shall be sufficiently detailed to provide assurance of compliance with the Project Requirements and provide support to the *Contractor*'s self-certification process. All records shall be signed off by a competent person.

The *Contractor* shall utilise the Employer's standard record templates for records where provided by the *Project Manager*.

Completion of the works shall not be certified by the Project Manager until all records required by the contract have been delivered to and accepted by the *Project Manager*.

The *Contractor* shall keep a set of IFC construction drawings, associated data and specifications on Site marked up preferable using heavy red lines to accurately record all changes during construction, including any *Project Manager*'s instructions and technical queries, requests for information, field change documents, Non-conformance reports or other relevant data.

Deliverable Records shall be collated, packaged, indexed and submitted by the *Contractor* in a phased manner for each element, activity or section in accordance with the Project Requirements.

Deliverable records shall include but not be limited to the Appendix B listing-

7.8 Certification

Self-certification is the process whereby the *Contractor* can demonstrate that all the requirements of the contract have been fulfilled.

The *Contractor* shall submit for acceptance a Self-Certification Plan identifying the detailed process for self-certification, the proposed number and structure of certification packages, programme for delivery and the dedicated resource to be assigned to this activity.

Unless otherwise accepted by the Project Manager, the *Contractor* and his Subcontractors and suppliers shall use the Project proformas for construction certificates.

The *Contractor* self-certifies the quality of the works by :-

- the provision of progressive assurance that the *Contractor*'s design and the works comply with the requirements of the contract ;
- the provision and maintenance of records;
- the requirements for the retention of records by the *Contractor* and the submission of records to the *Project Manager*
- the certification of all parts of the works.

The *Contractor* shall establish and maintain controls over *Contractor* designed elements of the works which will ensure that the *Contractor*'s design output documents are traceable to the Employer's requirements documents and that the required level of technical acceptance has been obtained prior to the issue of detailed design deliverables for construction.

The *Contractor* shall ensure that Subcontractors provide manufacturing and fabrication certification in accordance with the requirements of the Project Requirements.

Construction Certificates shall be issued by the *Contractor* to provide the documentary evidence required by *Project Manager* to demonstrate that the works and the Project have been constructed in accordance with:

- The Project Requirements
- The *Contractor*s Design accepted by the *Project Manager*
- The specified Construction requirements for Project completion and hoandover.

The *Contractor* shall prepare a structure of proposed sub-construction and construction certificates for the works for acceptance by the *Project Manager*, the sub-construction certificates and construction certificates shall be identified within the accepted programme as deliverable items. The structure shall indicate the planned and actual dates at which certificate packages are to be presented to the *Project Manager* for acceptance.

All certificates of compliance/ declarations of conformity shall be issued by an Authorised Competent Person.

7.9 Contract Completion & Handover

The *Contractor* shall prepare and submit for acceptance to the Project Manager a Contract Completion and Handover Plan.

A Defects Certificate shall be prepared in accordance with the conditions of Contract. The defects certificate shall include a consolidated listing of outstanding or defective works including items from snagging lists and NCRs.

A joint completion inspection shall be undertaken by the *Project Manager* with the *Contractor* and other parties prior to the Completion date. The completion inspection shall comprise:-

- An examination of the record package against the specified requirements.
- A physical inspection of the completed works giving sufficient time before handover to the Employer to allow any defects to be corrected.
- An agreed listing of defective works shall be completed before the appropriate Completion date and recorded by the *Contractor*.
- The *Project Manager* is required to certify Completion in accordance with the Contract. In the event that notified Defects remain, that the *Project Manager* considers do not prevent the Employer from using the works, such Defects shall be corrected by the *Contractor* before the defects date.
- Other defects may be added to this list by the Employer between Completion and the defects date.

The Contractor shall participate in a contract review of the quality aspects of the works as directed by the Project Manager at appropriate stages of the works.

8 Performance Evaluation

8.1 Monitoring, Measurement, Analysis and Evaluation

The *Contractor* shall actively monitor the data obtained to support the identified project KPIs and the *Contractor*'s Quality Objectives.

The *Contractor* shall report the data obtained as part of their monthly quality report, which shall include the following :-

- Management system status;
- Audit progress results, CARs, Observations and outstanding issues;
- Status of concessions/changes to Project Information
- Status of design documentation including design queries arising from construction:
- Surveillance progress results, issues raised and outstanding:
- Status of ITPs:
- Inspection activities and resources:
- Status of NCRs
- Progress on certification and records;
- Quality issues identified and / or anticipated;
- Investigations into quality non-conformance.
- Improvement activities and performance against the agreed key performance indicators.

8.2 Audit and Surveillance

Within a month of the starting date, the *Contractor* shall produce a documented procedure to describe their management of the audit and surveillance process. The procedure shall be submitted to the *Project Manager* for acceptance.

Within a month of the starting date, the *Contractor* shall produce a schedule of the quality audits they propose. The schedule shall be submitted to the *Project Manager* for acceptance. The *Contractor* shall actively maintain this schedule and submit revisions to the *Project Manager* for acceptance on a monthly basis.

The *Contractor*'s audit schedule shall be developed using a risk based approach and ensure that all key activities are audited at a time and frequency appropriate to the significance of the activity under review.

The *Contractor* performs all audits in accordance with the guidelines of BS EN IS0 19011 (Guidelines for auditing management systems) and submits all audit reports to the *Project Manager* for acceptance.

The *Contractor* submits audit reports to the *Project Manager* for acceptance.

The *Contractor* records, tracks and manages the close out of any non-conformities and Defects identified during audits by implementing the necessary corrective actions to rectify the non-conformity/Defect, and the causes.

The *Contractor* shall allow the Employer, the *Project Manager* or any authorised Third Parties statutory authorities to conduct audits, inspections and tests of the works that are being executed in connection with their assets, the works and to observe the execution of activities and the Contract. Wherever possible, such audits shall be undertaken collaboratively in conjunction with the Contractor's own audit schedule.

The *Contractor*'s audit schedule will be supplemented by quality related site surveillance activities, undertaken in accordance with an accepted schedule, which verify compliance of production with the requirements of the Project Requirements and relevant Inspection and Test Plans. Surveillances shall be identified on the Contractor's accepted Audit Schedule.

8.3 Management Review

The *Contractor* shall undertake regular management reviews of the contract Quality Management System and subsequent updating as necessary. The Client shall be invited to participate in these reviews.

9 Improvement

9.1 Non-conformance and Corrective Action

The *Contractor* shall perform root cause analysis to identify the causes of non-conformities and Defects. The results of these shall be used to implement system and process improvements and, where appropriate, management actions. The *Contractor* communicates the results of the analysis to the *Project Manager* and relevant stakeholders as part of his reporting process.

9.2 Continual Improvement

The *Contractor* develops quality improvement initiatives as required under the contract and in accordance with their QMS. The *Contractor* also contributes to and participates in the identification, discussion and implementation of lessons learned initiatives agreed with the *Project Manager*. The *Contractor* shall submit details of relevant quality improvements and lessons learned initiatives, identified from previous projects, to the *Project Manager* for his acceptance within four weeks of the starting date.

If the *Contractor's* performance is considered by the Employer to be below the required standard then the *Contractor* develops and submits a performance improvement plan, including timescales for its implementation to the *Project Manager* for acceptance..

Appendix A – Quality System Procedures

Activity	QSP Requirement
General Management	• skills and required competency levels for all personnel performing quality related activities and associated training needs. • control of documents & data • certification control and co-ordination; • administration of non-conformities and reporting to the *Project Manager* • monitoring the activities of subcontractors and suppliers of any tier to ensure their compliance with the contract; • approval of QPs by others including design, manufacture construction installation and testing and commissioning • configuration management
Design	• design control, preparation, review, verification and·change control • design risk assessments • configuration management • systems engineering • assurance • human factors
Procurement	• preparation and acceptance of material requisitions and approval of purchase orders in accordance with accepted specifications • Selection of Consultants, Subcontractors, Suppliers. • Monitoring the activities of Consultants, Subcontractors, Suppliers and sub-tiers thereof to ensure their compliance with the Contract
Manufacturing	• interim,/routine and final inspection of work • material supplier's quality verification • preparation review and acceptance of ITPs • monitoring against ITPs • Qualification Test and Factory Acceptance Test (FAI/FAT) certification • inspection certificates, certificates of conformity • delivery, handling and packaging
Production	• equipment, plant and material control • surveying, setting out and monitoring of the works • receiving inspection • Interim/routine and final inspection of the works and all materials including temporary works • Material suppliers quality verification • preparation review and acceptance of ITPs, quality check sheets and test plans • preparation of method statements • monitoring against ITPs and method statements • control and calibration of measuring and test equipment; • scheduling of necessary testing • on/offsite testing of materials • monitoring of safe systems of working • traceability of materials • quality verification and surveillance inspection of the partially completed and completed works and collation of quality verification records
Test and Commissioning	• setting to work and the verification of plant, materials and system compliance through conducting testing and commissioning;… • A testing and commissioning plan covering all phases and listing all processes

Appendix B – Listing of Deliverable Records

Quality Management and Assurance Requirements	Project Phase			
	Supplier Tender	Concept Design	Developed & Technical Design	Construction
ISO 9001 Quality Management System	✓	✓	✓	✓
ISO 10005 Supplier Quality Plan	✓	✓	✓	✓
Matrix of Authorised Competent People	✓	✓	✓	✓
Review & Approval Plan & Records		✓	✓	✓
BIM Execution Plan			✓	✓
United Kingdom Accreditation Service, Accredited Testing & Inspection Service Provider		✓	✓	✓
Concession Requests and Register		✓	✓	✓
Design Certificate of Compliance		✓	✓	✓
Request for Information Register		✓	✓	✓
Audit Programme		✓	✓	✓
Monthly Project Quality Key Performance Indicator Reports		✓	✓	✓
Non-Conformance Register / Reports		✓	✓	✓
Quality Verification Plan		✓	✓	✓
Quality Forum Terms of Reference & Actions Log			✓	✓
Samples & Benchmarks Register/ Approvals				✓
Inspection & Test Plan & Records				✓
Production Certificate of Compliance				✓

Appendix C - Application Matrix for Agreed Defects List, Snagging Lists, RFIs, NCRs and CARs

Report Type	Use	When applicable	Raised By	Closing	Examples
Non Conformance Reports (NCRs)	To identify defective work or failure to implement agreed processes on site to: • track the resolution, • hold further work if required • track preventive actions • track the recurrence of issues • monitor the cost of resolution • in some cases remedial work is not possible but preventive measures are possible All NCRs are raised within the Project system unless agreed otherwise with the *Project Manager.*	Raised when: • a Defect/ Non-conformity in the works is identified. NCRs will not be raised for minor defects subject to standard remedial measures or minor items of incomplete work. • a specified activity has not been carried out in accordance with agreed project documentation.	Generated by anyone in the Site Team (*Contractor* or *Project Manager*) who identifies a Defect in the work or a process that is not being followed	Closing is in two parts: Acceptance of the final disposition of the work or the process finally implemented, by the acceptance authority for the work. Acceptance of implemented preventive measures by the *Project Manager*. Note: All open NCRs in the Project system shall be tracked on the COWL within punchworks	<u>Work</u> • Structural defect in concrete. • Earthwork tests show a lack of compaction. • Environmental incident. <u>Process</u> • Required documentation not in place. • Missed/ineffective test or inspection • Unauthorised late working
Corrective Action Reports CARs	To identify a general failure to implement a specified process to: • identify the actions required to correct process failure. • track preventive actions	As the result of an audit finding or review of a specific issue where there was either a significant risk of a reportable incident, or repeated failures to satisfactorily implement a specified process.	Raised by auditors or management system personnel.	Closed by the *Project Manager* but subject to further verification by an auditor at the appropriate management system manager's discretion.	The lack of measures to prevent the recurrence of Non-Conformities.
Snagging Lists/ Outstanding Works Lists	To record and track areas of incomplete work or minor Defects raised during construction and that can be corrected in a subsequent phase of the work prior to the Completion Date.	Used to record work that has not been completed correctly or is outstanding, at an inspection or acceptance stage. Snagging items are minor Defects subject to standard remedial measures or minor items of incomplete work .	Person responsible for inspection/ reviewing the completion of the work prior to the Completion Date.	The originator or the agent responsible for acceptance of the work signs off the snagging list, once all actions are completed.	Post concrete inspection flaws. Weld failures

Report Type	Use	When applicable	Raised By	Closing	Examples
Agreed Defects List	This Defects List is attached to the Completion Certificate, issued by the *Project Manager*	The Defects List will operate for 12 months after the date of issue of the Completion Certificate.	The Defects List is prepared by the *Contractor* and the *Project Manager* and signed off by the *Project Manager*	The *Contractor* ensures that all work stated on the Defects List is corrected within the *defect correction period* for each Defect. The *Contractor* notifies the *Project Manager* when each Defect is corrected and the *Project Manager* accepts if the Defect has been corrected	
Site Query/ Requests for Information (RFI)s	To request information, clarification or agreement to a proposed action. All RFIs are raised within the Project system unless agreed otherwise with the *Project Manager*	Used at any stage of the contract to obtain information. Not to be used in place of NCRs	Generated by anyone in the Site Team (*Contractor or Project Manager)*	Closing shall be in accordance with the requirements of the Project procedure. The *Contractor* identifies any relevant RFIs on its record drawings	Request for information on outstanding 'holds' on drawings.
Consolidated Outstanding Works List (COWL) List	A listing per area, system, or sub-system, held on the snagging database, which may include: • Outstanding programmed works • Outstanding inspections/tests • Work to correct Defects (snagging lists) • Outstanding deliverables • Outstanding documents under the contract • Outstanding records and/or certification • Outstanding NCRs Items are taken off as they are completed/resolved, but no new items can be added.	Initiated immediately prior to an area, system, or subsystem completing a construction stage or being offered for handover	Nominated *Contractor* and *Project Manager* personnel	Close out of Consolidated Outstanding Works List items shall be managed by the *Project Manager* but the action is always on the *Contractor*	As listed under "Use"