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**ICHEME**

**SCHEDULE 2: DOCUMENTATION**

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# 1. INTRODUCTION

This Schedule sets out the Purchaser's requirements with regard to the Documentation to be submitted by the Contractor to the Project Manager during the execution of the Works, as defined in the Contract. The Documentation will be used by the Project Manager to manage and monitor the Contractor's delivery of the Works, and shall include documents for:

- Project management
- Design
- Manufacturing
- Pre-delivery inspection and testing
- Construction
- Erection
- Installation
- Pre-commissioning inspection and testing
- Commissioning
- Performance testing
- Acceptance and Take Over
- Post Take Over support
- Plant and systems sign off

The Contractor shall submit reviewable Design Data to ~~a delivery timetable agreed by~~enable the Project Manager ~~to enable the Purchaser~~ to review and monitor the work progress of the Contractor and verify compliance with the requirements and conditions set out in the Contract.

As-built project Documentation will be contained in the Operation and Maintenance Documentation and referenced within the Health and Safety File as necessary.

In addition, this Schedule describes the minimum requirements for:

- Project management and coordination
- Schedule management
- Cost management
- Project controls
- Risk management
- Reporting (monthly and weekly)
- Document management and control
- Handling of modifications and deviations to ensure consistent and satisfactory treatment of any Variations

The Contractor is to additionally refer to Schedule 22.4 *Architectural Specifications*, and Schedule 22.7 *ERF Landscape Specifications and Specific Requirements* for detail of the specialist Documentation required to meet the architectural and landscaping requirements.

In this Schedule 2, where there is a requirement for 'approval', then this explicitly means that the Contractor must provide hold point and seek the Project Manager's approval prior to proceeding onto the next stage of the related works. The Project Manager is to respond

within 10 Business Days in accordance with the requirements of Clause 21 of the Conditions of Contract.

Where in this Schedule 2, an action is identified as for 'review' or 'review and comment', then this requires the Contractor to consider the comments provided by the Project Manager. Where the Project Manager fails to undertake a review and provide comments within 10 business days, then the assumption is that the Project Manager has no comments on the Documents provided by the Contractor.

The approval and review and comment provided by the Project Manager does not relieve the Contractor of the responsibility and liability to provide the Works in compliance with the Contract.

# 2. GENERAL REQUIREMENTS

## 2.1 Organisation

The Contractor shall designate a person responsible for the control and management of all the Contractor's Documentation. The identity of this person shall be stated in the Contractor's organisation chart.

## 2.2 Master Information Delivery Plan

The Contractor shall prepare a master information delivery document plan (the Master Information Delivery Plan) of all Documentation to be prepared for the Works. This shall include all information deliverables (including models) ~~and be broken down into constituent task information delivery plans~~.

The Master Information Delivery Plan (MIDP) shall include, in respect of each document, the ~~document's title, filename and a short description of its content~~main attributes. The Contractor shall ensure the Master Information Delivery Plan includes Documentation search and filter functionality (using excel workbook or similar) to enable grouping by functional system / discipline as appropriate. Additionally, the Master Information Delivery Plan shall include, in respect of each document, the ~~revision, status and the date of issue of such document (or expected date of first issue for the document if it has not been issued yet). The Contractor shall comply with the Purchaser's required timings for the submission of Documentation as specified in section 3 Reviewable Project and Design Data, and also Schedule 22.4 *Architectural Specifications* and Schedule 22.7 *ERF Landscape Specifications and Specific Requirements*.~~following attributes:

- Common data: Originator, Document Reference, Document Title.
- From the Contractor's Document Management Systems (part 1): Document Set, Document Type, Deliverable Reference, Document Subtype, Document Subtitle, Client Deliverable (Yes/No).
- From the Contractor's Document Management Systems (part 2): Revision, Purpose of Issue, Status, Reason of Issue, Stage.
- From the Purchaser's Document Management Systems: Revision, Purpose of Issue, Status, Key RDD (Yes/No), Planned Purpose of Issue.

As set out in the *NLHPP Information Management Plan – Operation of Programme CDE* (Doc Ref.NP-ARP-XXXX-XXX-ME-PM-090001), the Purpose of Issue (POI) specifies the intended application of the document and the permitted use of its contents, indicating why it has been issued and the purpose for which it is considered suitable.

| POI | Description |
|---|---|
| S2 – Suitable for Information | The file is available to be shared and used for information |
| S3 – Suitable for Review and Comment | Used to gain feedback on document prior to formal acceptance |

| | |
|---|---|
| S4 – Suitable for Stage Approval | Issued for formal acceptance |
| Ready for Authorisation | Upgrade to the issued document at S4 ("P" revision changed to "C" revision) |

The documents that are selected in the MIDP as "Client Deliverable" shall be agreed with the Project Manager, including the "Planned Purpose of Issue" which can be For Information, For Review or For Approval.

In this Schedule 2, where there is a requirement for 'approval', then this means that the Contractor must complete the workflow for S3 / S4 followed by Ready for Authorisation. For the actions identified as for 'for review' or 'review and comment', the Contractor must complete the workflow for S3 only.

"Key RDD" means a subset of the Reviewable Design Data ("RDD") identified by the Project Manager as requiring the Project Manager's approval under this Contract. The Project Manager shall determine and maintain the Key RDD register and shall notify the Contractor of any additions, removals or revisions to the Key RDD from time to time. Upon such notification, the Contractor shall comply with the requirements of this Contract in respect of the revised Key RDD.

The Contractor shall comply with the Purchaser's required timings for the submission of Documentation as specified in Section 3 Reviewable Project and Design Data, and also Schedule 22.4 *Architectural Specifications* and Schedule 22.7 *ERF Landscape Specifications and Specific Requirements*.

The Contractor shall update the Master Information Delivery Plan at least monthly and include it in the Contractor's monthly report for the Project Manager's ~~approval~~information.

### 2.3 Language

All Documentation shall be in English.

### 2.4 Plant Identification System

The Contractor shall use KKS numbering consistently throughout all Documentation. Documentation and components shall be named and referred to in accordance with the KKS system as described in Schedule 22.3.2 *KKS Manual*. The Contractor shall write KKS numbers on the drawings next to each component.

Diagrams and lists shall further be provided with all necessary cross references to facilitate usage.

### 2.5 Exchange of Documentation

The Purchaser's Document Management Systems (DMS) shall be used during the Works for exchange and storage of all Documentation in so far that it is viable for the nature of the Documentation to be used in the Works. The Contractor will, as far as is possible, and subject to technical feasibility, system compatibility and applicable cyber-security requirements, integrate their own system with the Purchaser's DMS to facilitate this

process. The Contractor may use their own document management system for exchange of information within their own organisations and with their supply chain.

The Contractor shall prepare and follow a manual for operating, structuring and importing the Documentation into the DMS. It is the Contractor's responsibility to ensure all Subcontractor documentation also follows the agreed DMS structure.

Documentation shall be supplied in a readable format (PDF) as well as where reasonably required for operation, maintenance, interface management or Contract administration an editable / workable version for the Purchaser. If the workable version is supplied in a format which is not editable by the Purchaser's current software as listed below, suitable software shall be included in the Works. The Contractor shall not be required to transfer proprietary, commercially sensitive or licensed software, tools or source files unless expressly stated in the Contract.

The Purchaser has the following software:

- Autodesk AutoCAD, DWG-format, for 2D drawings
- Autodesk NavisWorks, NWD-format, for viewing of 3D models
- MS Office
- Primavera P6
- Adobe Reader

The CMMS as further described in Schedule 22.3.4 *CMMS* shall also be used for the storage of Operation and Maintenance Documentation (including the As-Built Documentation) however, the Contractor may propose alternative storage for the As-Built Documentation as an option for the Purchaser to consider and adopt at the Purchaser's sole discretion.

### 2.6 Filenames

It is the Contractor's responsibility to ensure that where reasonably practicable all its Documentation including that of its Subcontractors follows the agreed file naming structure, which will be clarified during dialogue. It is recognised that the Contractor and its suppliers / Subcontractors will have advanced quality management systems with established numbering systems to support ongoing operations and maintenance (O&M) of plant and equipment that is common to other plants. The Contractor shall set out its intended approach to document numbering identifying where it can and cannot incorporate the Purchaser's numbering system.

### 2.7 The Contractor's Documentation System

The Contractor shall prepare, distribute and archive Documentation according to fixed procedures ~~approved by and~~ in accordance with the Purchaser's requirements.

All Documentation prepared in relation to the Works shall be filed by the Contractor for a minimum of 8 years after the issue of the Final Certificate. During this period, the ~~Purchaser~~Project Manager may request the Documentation from the Contractor free of charge. At the end of the 8-year period, the ~~Purchaser~~Project Manager may request and the Contractor shall provide the Documentation free of charge.

The ~~Purchaser~~Project Manager may require hard copies of any issued Documentation to review during the construction period of the Works and at the end of the 8-year period. This shall only be required in relation to any issued Documentation and shall not include work in progress versions. During the construction period of the Works, the Contractor is required to supply all hard copy Documentation within 2 Business Days of the ~~Purchaser's~~Project Manager's reasonable request.

The requirements for hard copy drawings at the end of the 8-year period will be confirmed by the ~~Purchaser~~Project Manager. Any Documentation required to be provided by the end of the 8-year period following the issue of the Final Certificate shall be provided in digital format and suitable for printing legibly in ISO standard paper sizes. The Contractor shall supply digital documents within 2 Business Days of the ~~Purchaser's~~Project Manager's request.

~~The Contractor shall keep all Documentation concerning Works that were not progressed (e.g. designs not developed to construction issue, equipment considered but not ultimately procured, etc.) until a period of 12 months after the end of the Defects Liability Period has expired.~~

### 2.8 Electronic Documentation

The Contractor shall deliver all Documentation as an electronic version, hard copies will also be supplied where requested specifically by the ~~Purchaser~~Project Manager.

The Contractor shall ensure a consistent document naming and numbering system in accordance with its quality management system and shall prepare Documentation and data which enables integration between a number of principal software platforms / systems. The control and monitoring system (CMS), computerised maintenance management system (CMMS), DMS and Enterprise Resource Planning (ERP) will be the general interface for the Purchaser and Operator to perform all tasks associated with operation and maintenance of the complete ERF. The Contractor shall arrange and customise the design, structure and layout of the Documentation to facilitate integration of the electronic version of the operation and maintenance Documentation with the Purchaser's and/or the Operator's (as appropriate) systems.

The Contractor shall and shall ensure that its Subcontractors ~~shall~~ enter electronic documents and data into the integrated system only once; double entry shall not be permitted.

### 2.9 Drawings

The Contractor shall prepare all drawings required for the design and construction of the Works including, for the avoidance of doubt, 2D drawings. Drawings include, but are not limited to, plans, elevations, sections, isometric and other views, arrangement drawings, equipment drawings, process flow diagrams, piping and instrumentation diagram.

The Contractor shall prepare drawings in accordance with a Documentation standard ~~approved by the Purchaser and where reasonably practicable in accordance with any Purchaser's instructions~~agreed with the Project Manager, for example, regarding drawing header, drawing number, drawing registration number, recipient list. The Contractor shall remain solely responsible for the technical content and design adequacy of all drawings.

Schemes, diagrams and tables shall allow for the Purchaser's insertion of numbers and terminal symbols.

Drawings shall be submitted in AUTOCAD's DWG format.

When submitting drawings in a larger format than A3, a copy of the drawing in A3-format shall also be included. For the avoidance of doubt, all drawings submitted by the Contractor shall be legible at A3.

The format sizes shall comply with ISO 216, A series. Largest format: A0.

As a minimum, drawings, tables, diagrams and descriptions must be printable in A3 format enabling the copies to be readable with a text height of min. 2 mm, unless otherwise agreed with the Project Manager. All drawings, including but not limited to circuit diagram drawings, functional plans, component drawings shall be readable in A3 format.

All drawings, tables, diagrams and descriptions shall be submitted marked with symbols following the most recent standards and norms:

- EN, European Standard in the English version
- ISO/IEC, standards submitted by the International Organisation for Standardization and the International Electrotechnical Commission respectively.
- DIN Deutsches Institut für Normung e.V., or British Standards Institution.
- The Purchaser's specifications.

Blueprints shall be typed in black on a white background.

### 2.9.1 Process Flow Diagrams (PFD)

PFDs are diagrams to indicate the general flow of processes and equipment. The PFDs shall show the relationship between major equipment of the Plant.

The Contractor shall submit PFDs according to ISO 10628 and 3511. The overview PFD must show the entire process in a diagram with sub-processes and main components. PFDs for sub-processes or function chain shall be prepared for each part process or functional chain. The level of detail displayed should be reflective of the purpose of the drawing.

### 2.9.2 Piping and Instrumentation Diagrams (P&ID)

Each sub-process shall be accompanied by one or more detailed P&IDs with KKS numbers for all aggregates and measuring points inserted in accordance with ISO 14084 The P&ID shall be numbered with drawing number according to KKS, and there shall be mutual references appearing for all pipe lines etc. between the part processes.

Symbols on process diagrams should be created as intelligent P&ID system to be agreed with the ~~Purchaser~~Project Manager with attributes containing basic process data and specifications.

## 2.10 3D Models

The Contractor shall undertake the entire design of the Works in a digital 3D-CAD environment, where all discipline models (mechanical, electrical etc.) shall be included as

well as all design carried out by Subcontractors, where appropriate in accordance with the Exchange Information Requirements.

### 2.10.1 Aggregate model

The Contractor shall include all Works in a common aggregate model. This model shall include the input from all associated disciplines and incorporate a Site plan and subterranean services including, but not limited to, pipes, cables, ducting, draw-pits, manholes.

The Contractor shall submit the aggregate model in the 3D Viewer format Navisworks. It shall be well organised and user-friendly. A clear split shall be present between the different disciplines and also the different Subcontractors, e.g. what belongs to the designer of the turbine installation and what belongs to civil designer. It shall be possible to separate (select and deselect) each of the discipline's models to visually focus on individual discipline models. No objects / components shall be present in more than one model, e.g. the plinth for a silo should only be included in the civil model and not in the equipment model. The 3D model shall be able to function in a standalone environment without links. The Contractor shall include fixed viewpoints corresponding to all 2D plan and sections in the aggregate model.

The Contractor is responsible for quality assurance of the aggregate model.

The Contractor shall enable the Purchaser to use the aggregate model for purposes including, but not limited to, the following:

- Space management and layout review
- Visual communication and visualisation
- Layout coordination with any external stakeholders
- Object Information of e.g. systems and components properties data (BIM)

### 2.10.2 3D modelling

The Contractor shall orientate all 3D-CAD models according to the same overall reference points and modular grid system. See coordinate system drawing included in Schedule 22.5.2 *Layout Drawings*.

Where reasonably practicable the Contractor shall provide properties and data from its electro-mechanical suppliers (plant data) in line with ISO 19650. The Contractor shall ensure that all electro-mechanical equipment from the 3D model is categorised and numbered according to the KKS system. This shall be done on objects, components, layers or model levels.

The Contractor shall provide 3D-CAD models in AutoCAD format in a timely manner when requested to do so by the ~~Purchaser~~Project Manager. The Contractor shall provide 3D As-Built models to the Purchaser as part of the As-Built Documentation in Navisworks format and AutoCAD format including all digital information and properties data (BIM). The As-Built model shall include equipment, however piping smaller than DN50 can be omitted in the model, unless it is for drainage, exhaust or includes instrumentation. For cabling, cable trays smaller than 200 mm can be omitted from the model. The As-Built models shall incorporate all changes made during construction, commissioning and testing.

# 3. REVIEWABLE PROJECT AND DESIGN DATA

## 3.1 General Procedure

This section describes the process for the review of Documentation, which the Contractor shall submit to the Project Manager either for approval, for review and comment or for information (as applicable).

The Contractor is also referred to Section 1 within this Schedule 2 wherein the requirements for approval and review and comment are detailed.

The Contractor shall submit reviewable data to serve as one of the Purchaser's methods for reviewing and monitoring the work progress of the Contractor and verification of compliance with the requirements and conditions set out in the Contract.

The Contractor's progress on delivering the Works will be reviewed and monitored using both a quantitative and qualitative approach.

The provisions of this Schedule shall apply whenever any item, document or course of action specific to design is required to be reviewed, commented on, approved or otherwise processed in accordance with the Contract.

## 3.2 Documents to be Reviewed

The Contractor shall, as described in section 2.2 *Master Information Delivery Plan* of this Schedule, prepare a Master Information Delivery Plan as part of the Works, which the Contractor shall keep updated throughout the Works. The ~~Purchaser~~Project Manager may, in addition to the documents in the reviewable data packages listed herein, select any further documents from the Contractor's Master Information Delivery Plan for information where reasonably required in connection with material project risks, statutory compliance, operational readiness or identified interface requirements.

The Contractor shall refer to Appendix 1 of this Schedule for the list of ~~reviewable~~Reviewable Design Data. The Documentation required is divided into the following categories:

- Project ~~Management~~Delivery
- Layout
- Buildings and Civils
- Building Services
- Architecture
- Mechanical Process Equipment
- Electrical
- Automation

Each category has more than one ~~reviewable~~Reviewable Design Data package corresponding to increasing development of design. The Contractor shall submit updated data from previous packages to the extent required by the ~~Purchaser~~Project Manager.

All documents that have been materially changed compared to previously submitted packages and where such resubmission is reasonably necessary to support review of the

relevant package shall be resubmitted again as part of the next ~~reviewable~~Reviewable Design Data package within the relevant category.

Reviewable Design Data shall be delivered according to the timings specified in this Schedule and in Schedule 11 *Times of completion.*

### 3.3 ~~3.3~~ Compliance with Environmental Permitting

The Works shall be designed and built in compliance with all relevant environmental Legislation and shall comply with the Environmental Permit including all subsequent variations, changes, additions and approvals relating to the Environmental Permit, and with all relevant environmental Legislation and Guidance.

The Environmental Permit applies to the whole EcoPark including the ERF and RRF and is provided in Schedule 22.9 *Site Conditions, Permits and Constraints* Appendix 15 *Environmental Permit*.

The Contractor shall not deviate from the requirements set out in the Environmental Permit unless approved in advance by the Project Manager~~, Purchaser~~ and the Environment Agency. Preparation of any such Environmental Permit variations shall be the Contractor's responsibility. The Contractor shall take all reasonable measures to minimise any time and cost expense impact to the Purchaser.

Any Environmental Permit variation applications and supporting Documentation to be submitted to the Environment Agency must be submitted to the Project Manager for review and approval before the Documentation is formally submitted to the Environment Agency.

The tables A 1 and A 2 in Appendix 2 of this Schedule contain pre-operation and improvement conditions that have been extracted from the Environmental Permit and indicate where the Purchaser has identified a particular need for contribution from the Contractor. A column indicating responsibility (between Purchaser and Contractor) has been added.

The Contractor shall make allowance in their programme and costs for these works and for the Project Manager to review and approve prior to submission to the Environment Agency.

The response deadlines given in these tables are for the submission of final information to the Environment Agency. Any application and supporting Documentation to be submitted to the Environment Agency must be submitted to the Project Manager for review and approval in accordance with the requirements of Clause 21 of the Conditions of Contract prior to any due date for submission to the Environment Agency.

All formal submissions to the Environment Agency are to be conducted via the Purchaser unless instructed otherwise by the Project Manager.

# 4. OPERATION AND MAINTENANCE DOCUMENTATION

The Contractor shall provide the Operation and Maintenance Documentation defined in this section 4 to include all necessary Documentation for operation, maintenance and further development of the Plant in a reliable, safe and efficient manner, including but not limited to:

- General documentation
- Operation manual and instructions
- Maintenance manual and instructions
- Design documentation
- Technical documentation of all systems, sub-systems and components, divided into mechanical, electrical and CMS / automation components
- Quality assurance documentation
- Test logs and certificates

This Operation and Maintenance Documentation shall comprise, but shall not be limited to:

- as-built 3D model
- drawings including process flow diagrams and piping and instrumentation diagrams
- system specifications
- component specifications
- function specifications
- design calculations, where required for operations and maintenance purposes
- calculation data
- production specifications
- inspection plans
- quality assurance reports
- certificates
- correspondence with authorities, which will be provided by the Contractor for the Purchaser's records in addition to the O&M Manual
- ATEX documentation
- CE/UKCA documentation
- operation instructions and curves for all operation modes including start-up, shut-down and emergency power operation
- trouble-shooting guidelines
- maintenance instructions
- safety instructions
- installation manuals
- commissioning & test reports
- component catalogue
- component list
- spare parts list
- lubrication list
- setpoint lists

The Contractor shall provide a structural outline of its O&M manual no later than 24 months prior to the planned date for completion of construction. This shall contain sufficient

information to allow the ~~Purchaser,~~Project Manager and the Operator ~~and its operations team~~ to devise an effective O&M organisation (see also Schedule 9 *Training by Contractor*).

The Contractor shall deliver a draft of the Operation and Maintenance Documentation for the Project Manager's ~~approval~~review and comment prior to the start of cold commissioning as set out in Schedule 15 *Take Over procedures.* The draft version shall be at a minimum 90% complete concerning quantity and at a minimum 90% complete concerning quality. At Take Over, the Contractor shall deliver the final Operation and Maintenance Documentation to the Purchaser.

The Contractor shall keep the final Operation and Maintenance Documentation updated during the Defects Liability Period by sending correction sheets and uploading revised files when documents are updated. The Contractor shall include a document list which clearly indicates the actual revisions in the document packages, and which documents have been amended during the Defects Liability Period.

The Contractor shall ensure that the Operation and Maintenance Documentation shall comply with the latest version of EN ISO 20607 Safety of Machinery – Instruction Handbook – General drafting principles.

The Contractor shall ensure that Operation and Maintenance Documentation relating specifically to the buildings services, buildings systems, (in accordance with the provisions set out in Schedule 22.2.12 *Building Services Elements)* shall follow the standard form and template defined within BSRIA BG79/2020: Handover Information and O&M Manuals.

### 4.1 ~~Hard Copy Documentation~~Not Used

~~The Contractor shall agree the layout and structure of the Documentation hard copies with the Project Manager in accordance with the procedure specified in section 3 *Reviewable Project and Design Data* and Appendix 1 of this Schedule respectively. The Contractor shall adjust its structure, without extra payment, to ensure standardisation of documentation structure including Documentation from all its Subcontractors in so far as reasonably practicable.~~

~~The number of paper copies shall be agreed with the Project Manager and shall as minimum be two copies. Prints on paper shall always be accompanied by electronic files.~~

~~The Contractor shall assemble the hard copy binders according to the following instructions:~~

- ~~All dividers shall be in colour and numbered successively. The font size of the number on the dividers shall reflect its level in the table of contents, i.e. the lower the level the smaller the font size.~~
- ~~The first page(s) of each binder shall be a detailed table of contents for the binder in question. There shall also be a table of contents for each divider.~~
- ~~For each component there shall be a data sheet stating the data of the component, including as a minimum: KKS number, unambiguous type designation (type, serial number, size and model), technical data (including but not limited to IP class, colour code, power consumption.), detailed information on Subcontractor / supplier (including but not limited to contact name, company address, telephone number, fax number, e-mail). If the component is part of a larger unit (such as electric motor, gear, frequency converter,~~

pump) reference shall also be made to the binder / divider which contains relevant data sheets.

- A detailed table of contents shall be prepared for chapters / sections that extend over more than one binder. The table of contents shall be included in each relevant binder and shall list the contents of the entire chapter / section. Moreover, it shall be indicated in which binder each chapter / section can be found.
- Where there is more than one drawing, a drawing list shall be included. All drawing lists shall include a descriptive text to make it easier for the Purchaser to locate the drawing. An introductory sheet and descriptive text are not necessary, if the drawing information is contained within the drawing data.
- All binders containing Documentation shall have the same front page and back. The back of the binder shall state the chapter as well as the number (binder x of y). The design of the front page and the system applied to the back shall be approved by the Purchaser.

Any deviations from the above requirements shall require the Purchaser's prior written approval.

# 5. DECOMMISSIONING PLAN

The Contractor shall provide a decommissioning plan and shall state the means and methods to decommission the Plant at the end of its working life. The decommissioning plan shall be presented in draft form within 12 months from the Effective Date. The final version of the decommissioning plan shall be presented within 3 months of the Take-Over Date.

# 6. PROJECT CO-ORDINATION

## 6.1 Project Organisation

### 6.1.1 Contractor's Project Organisation

The Contractor shall set up and maintain the appropriate organisation for the delivery of the Works in accordance with the Approved Programme, including management of Subcontractors, and for administrative co-operation with and reporting to the Purchaser to enable it to discharge its duties under the Contract.

The Contractor shall coordinate the work of all Contractor Related Parties.

~~The Contractor shall have the necessary number of employees, tools and other means of production facilities available.~~

~~The Contractor is responsible for ensuring communication within its Project Organisation avoids any miscommunication in the execution of the Works which may be caused due to language barriers and/or semantics and in the event of any miscommunications resulting in Defects the Contractor shall rectify any such Defects immediately. .~~

The Contractor and its staff shall have sufficient and suitable experience from similar projects or operations and must be able to substantiate previous management and performance of similar works during this procurement.

The Contractor shall update the organisation plan to account for any modifications. An updated organisation chart shall be included in the monthly report.

The ~~Purchaser's approval~~Project Manager's review and comment of the Contractor's organisation does not release the Contractor from the full responsibility as to the competence and capacity of its organisation and its Subcontractors.

## 6.2 ~~Staffing Schedules~~Not Used

~~The Contractor shall issue a Site staffing schedule at the Effective Date.~~

~~The Contractor shall prepare a preliminary staffing schedule for all parts of the Works, which shall be subject to approval by the Project Manager and, once approved, frozen as a basis for reporting actual staffing in relation to planned staffing. The reporting basis may not be changed without a specific request and in agreement with the Project Manager.~~

~~The staffing schedule shall be presented as a histogram with an associated table showing the number of staff. Staffing schedules shall include planned and actual staffing at the time of reporting.~~

~~The Contractor's Site staffing schedule shall be updated and issued each time the Site staff changes. The staffing will be coordinated with the Project Manager and Contract Manager.~~

~~If the Works develop in a way that renders the document and approved staffing schedules obsolete or no longer reflecting the actual situation in a satisfactory manner, the Contractor is obliged to revise the schedules accordingly. The Project Manager may also from time to time require the Contractor to prepare revised document and staffing schedules. Additionally, the Contractor shall provide a clarification note on which parts of the schedule~~

~~are revised and the effect on Works milestones and how it will affect critical paths and slack. Any revisions to the staffing schedule that affect the key personnel defined within Schedule 8 *Contractor's Named Personnel* shall be subject to the Project Manager's prior approval.~~

## 6.3 Project Controls

### 6.3.1 Project Controls General Requirements

The Contractor shall submit within 8 weeks of the Effective Date an outline of their approach to project controls for the duration of the Works. This shall be in the form of a project controls management plan and shall show that the following elements will align with the Purchaser's requirements outlined in this Schedule:

- Work Breakdown Structure (WBS)
- Organisation structure
- ~~Cost~~Commercial management
- Programme management
- Risk management
- Reporting
- Change management

- Systems to be utilised for
  - Programme management
  - ~~Cost~~Commercial management
  - Risk management
  - Change management
- People
  - Project controls team structure

### 6.3.2 Performance Measurement Baseline (PMB)

The Contractor shall set a baseline within 8 weeks of the Effective Date against which earned value management reporting will be undertaken. The baseline shall fully integrate the scope, schedule, time and ~~cost~~value of the project and will be referred to as the performance measurement baseline (PMB). The PMB will be maintained such that all approved changes to the ~~contract price~~Contract Price are captured in line with the change management process.

### 6.3.3 Earned Value Reporting & ~~Cost~~Commercial Management

The Contractor shall provide monthly, in line with the monthly reporting cycle set out in section 7 of this Schedule 2, a Primavera Schedule (P6) loaded with units to represent scope value. The scope units should equal the original contract value and should be time-phased across the schedule and be embedded within the Engineering, Procurement, Construction and Commissioning elements of the schedule. The units should be profiled across activities within the programme to enable the ~~Purchaser~~Project Manager to undertake their own earned value assessment of the Contractor's schedule performance~~.~~ linked to the contract milestone payments. For clarity, the Contractor is not required to report actual costs.

### 6.3.4 Not Used

~~**6.3.4 Key Performance Indicators (KPI's)**~~

~~A set of key performance indicators (KPI's) will be required as part of the monthly update cycle. These will cover key areas of the construction and fitout of the project, allowing progress of these elements to be tracked against the PMB. These will be agreed between the Project Manager and the Contractor within 8 weeks of the Effective Date.~~

## 6.4 Programme

The Contractor shall prepare and submit a programme to the Project Manager for approval as required by clause 13 of the Conditions of Contract.

The Contractor shall submit the programme using Primavera P6 Professional R18 (P6) unless otherwise notified by the Project Manager. The Contractor shall provide full unrestricted access to the native P6 programmes.

The Contractor shall provide sufficient, suitably qualified and experienced resources to develop, maintain and manage the programme. The Contractor may only change the key planning resource, as defined in Schedule 8 *Contractor's Named Personnel,* with the approval of the Project Manager.

In addition to the information require by Sub-clause 13.2A of the Conditions of Contract, all programmes submitted for approval shall include the following information:

1. Effective Date, access dates and key events defined in this Schedule.
2. The order and timing of the operations which the Contractor plans to do in order to deliver the Works.
3. The order and timing of the work of the Purchaser and other third parties.
4. Provisions for
    a. Float / slack (the amount of time that a task in a project network can be delayed without causing a delay to subsequent tasks)
    b. health and safety requirements, and
    c. the procedures set out in the Contract
5. The dates when, in order to provide the Works in accordance with the programme, the Contractor will need
    a. access to part of the Site, if later than the access date
    b. acceptances
    c. Plant and Materials and other things to be provided by the Purchaser
    d. Information from others.
6. For key and critical operations, a statement of how the Contractor plans to do the work identifying the principal Equipment and other resources which will be used. The matters comprising key and critical operations will be agreed between the Purchaser and Contractor within four (4) weeks of the Effective Date.
7. Other information which the scope of the Works requires the Contractor to show on a programme submitted for approval.
8. All major milestones to completion of the Works.
9. The dates of submission of any Design Data and any other deliverables required under the Contract.

10. The agreed dates when Documentation is submitted for review, comment, acceptance and approval activities (as applicable) by the Project Manager, in respect of design or third-party consents.
11. The dates when the Contractor Consents submissions are made.
12. Access dates and information required from others as coded milestones (give/ gets).
13. Lead times for critical plant or Equipment.
14. The dates of submission of the documents and management plans defined within the Schedules of this Contract.
15. The dates of submission of any other programmes and safe system of works;
16. The dates of submission of any logistics plan.
17. The dates of commencement of all permanent construction and installation activities and key or critical temporary construction and installation activities. The matters comprising key and critical permanent and temporary construction and installation activities will be agreed between the Purchaser and Contractor within four (4) weeks of the Effective Date.
18. The dates of key or critical site inspection and tests and required approval milestones. The matters comprising key or critical site inspection and tests and required approval milestones will be agreed between the Purchaser and Contractor within four (4) weeks of the Effective Date.
19. All quality hold points and quality control points; and
20. The dates of all necessary approvals, acceptances, reviews and consents from the Project Manager.

Programme software settings (P6), activity codes and calendars shall be in accordance with the Project Manager's requirements. As a minimum the Contractor shall use the global activity codes for the Contract number, location and work element. The Contractor may use any additional codes it requires, but these must only be at 'project' level within P6. The coding requirements will be agreed between the Purchaser and Contractor within four (4) weeks of the Effective Date.

All calendars used shall be set in days and shall include public holidays and non-work periods.

The Contractor shall supply a reference document which defines the project's WBS, activity ID numbering system, activity codes and project calendars, including working time directives and a summary of statutory holidays applied to calendars for each year of the Contract.

Each programme submitted to the Project Manager for approval shall:

1. Contain a unique activities number, the re-use or change of activity IDs is not permitted;
2. Ensure activity descriptions reference the parent WBS;
3. Ensure activity descriptions are shown in the format noun, verb, and deliverable;
4. Ensure all activities are logically linked to maintain the integrity of the critical path;
5. Show free and total float (or slack) for each activity;
6. Use critical path method network format showing all programmed activities;

7. Demonstrate the critical path(s), early start and finish dates, late start and finish dates, free, total and terminal float calculations;
8. Clearly identify periods for the Project Manager's review, comment, acceptance and approval (as applicable);
9. Code milestones in line with NLHPP Programme standards; and
10. Complete a Defence Contract Management Agency (DCMA) check in Acumen Fuse.

None of the following logic is to be used within any programme issued for approval unless otherwise agreed by the Project Manager:

1. Artificially imposed constraints;
2. Out of sequence logic;
3. Tasks lacking predecessors or successors (except the first and last activities);
4. Start to finish links;
5. Leads/ lags (activities shall be shown for waiting periods); and
6. Excessive durations.

The programme shall be prepared using recognised industry practice and shall provide a robust basis for critical path and delay analysis.

The Contractor shall undertake periodic schedule quality assessments using Acumen Fuse and the DCMA 14-Point Assessment. The results shall be submitted to the Project Manager together with explanations of any metric failures and details of any corrective actions proposed. The Project Manager may challenge any aspect of the programme that materially affects the reliability of critical path analysis, progress assessment or forecast completion.

### 6.4.1 Interfaces, third party approvals and statutory requirements

The Contractor shall identify any third-party approval or dependencies on behalf of the Purchaser and incorporate these in the programme. The Contractor shall show within the programme as an activity the 'period and shall allow necessary periods of reply' for the whole of the Worksall third-party approvals.

The Contractor shall allow sufficient time and time allowance within the programme for:

1. Any necessary re-submissions (if a submission is rejected); or
2. For escalation (if a third-party stakeholder fails to reply, for example).

Subject to complying with its obligations under Sub-clause 23.4A of the Conditions of Contract, the Contractor is to notify the Project Manager and the Purchaser of its intention to interact with any Statutory Body or third party. The Contractor is required to also provide assistance to the Purchaser in the management of interfaces, third party approvals and the fulfilment of statutory requirements as necessary.

### 6.4.2 Design

The Contractor shall show on all their programmes submitted for approval design activities that include but not be limited to the following content:

1. Front end engineering design activities;
2. Logically linked to the procurement and construction activities;

~~3.~~ The Contractor shall show on all their programmes submitted for approval design activities as required to ~~deliver packages of work as set out in Appendix 1;~~manage the Works and the interdependencies with the Purchaser and others.

~~4. Clearly show the design co-ordination between the various design disciplines;~~

~~5. Clearly show the Purchaser's and/or others' interdependencies whether this be design input or approval; and~~

~~6. Design reviews with the Purchaser.~~

### 6.4.3 Procurement

The procurement section of the programme shall as a minimum identify subcontracts as per the Contractor's obligations defined within this Schedule and Schedule 7 *Subcontracting*. Each procurement item in the programme shall provide sufficient detail to allow visibility of progress through various control points. Typical control points include, but are not limited to:

1. Production of tender documents;
2. Issue invitation to tender (ITT);
3. Tenders received;
4. Contract award periods;

~~5. Preconstruction design complete; and~~

~~6. Material Delivery.~~

The procurement section of the programme must also align with the requirements of Schedule 7 *Subcontracting.*

### 6.4.4 Construction

The construction section of the Contractor's programme, shall as a minimum identify:

1. Construction (including early, enabling, civils, mechanical and engineering, electrical and I&C, buildings and landscape works);
2. Logically linked to the design and procurement activities;

~~3. Key method statements (including preparation and approval);~~

3. ~~4.~~ Mobilisation/set up activities;
4. ~~5.~~ Temporary works;
5. ~~6.~~ Detailed durations for construction activities for the Works. The Contractor shall incorporate the detailed Subcontractor programmes into the live programme at a suitable level of detail as agreed with the Project Manager;
6. ~~7.~~ Site inspections and tests; and
7. ~~8.~~ All necessary Project Manager's approvals.

### 6.4.5 Testing and commissioning

The Contractor shall show on their programme submitted for approval, periods for the testing and commissioning activities as defined elsewhere within the Specification and Schedules.

### 6.4.6 Risk and contingency

The Contractor shall comply with risk management general requirements.

### 6.4.7 ~~Cost loading the programme~~Not Used

~~The Contractor shall apportion costs to the activities across the levels of the WBS, as defined in Schedule 19 *Terms of Payment*, in the programme submitted for approval.~~

~~The total cost of the activities shall equate to the Contract Price and alignment of the costs will need to be demonstrated between the WBS and the Cost Breakdown Structure (CBS).~~

### 6.4.8 Coding structures

~~The Contractor shall comply with the Purchaser's coding requirements for P6. These coding structures shall be used by the Contractor for all project controls requirements unless agreed otherwise by the Project Manager. The coding requirements will be agreed between the Purchaser and Contractor within four (4) weeks of the Effective Date.~~

The Contractor shall maintain coding, grouping and reporting structures for P6 that provide sufficient transparency to enable assessment of critical path, interfaces, progress, change, schedule contingency and forecast completion.

The coding requirements will be agreed between the Project Manager and Contractor within four (4) weeks of the Effective Date.

### 6.4.9 Baseline programmes

The Contractor shall comply with the ~~Purchaser's P6 provided baseline protocol. The~~ P6 baseline protocol which will be agreed between the ~~Purchaser~~Project Manager and Contractor within four (4) weeks of the Effective Date.

### 6.4.10 Programme Submission

The Contractor submits a monthly draft programme update by midday on the first Friday in the next month. The Contractor shall submit any updated programme for via Asite and through CEMAR.

Each programme submitted for approval and each draft programme update shall show the Project ID, be clearly titled, numbered, revision coded and dated in accordance with the agreed document control requirements.

The Contractor shall adopt the ~~Purchaser's~~ Primavera Layout File (PLF) and provide P6 PLFs to support reporting ~~where requested~~. The PLF requirements will be agreed between the ~~Purchaser~~Project Manager and Contractor within four (4) weeks of the Effective Date.

All programmes submitted for approval shall be accompanied by the following documents:

1. Programme narrative;
2. Programme change log~~;~~.

~~3. Other documents as required by the Purchaser in support of the programme.~~

### 6.4.11 Contractor's summary programme

The Contractor shall submit in P6 a summary of the Contractor's design, procurement, construction, commissioning and Take Over activities.

The summary programme shall be prepared using P6 and shall represent a rolled-up summary of the Approved Programme (e.g. WBS level 2/3). This Approved Programme shall show all the key stages in the design, procurement, construction, commissioning and take over activities as well as any major off-site works.

An updated summary programme shall be included with each programme the Contractor submits for approval to the Project Manager.

### 6.4.12 Work Breakdown Structure

The Contractor's programme shall be developed using the programme WBS. The programme WBS is a deliverable oriented hierarchical arrangement of scope, ranging from the highest level of deliverable, down to detailed task-based activities. The WBS shall be maintained throughout the duration of the Works.

The WBS hierarchy shall have the following form:

**North London ERF Project**

CONSTRUCTION PHASE - PROGRAMME WIDE

PAYMENT MILESTONES (SCHEDULE 19)

KEY EVENTS (AS PER SCHEDULE 11)

INTERFACE MILESTONES

CONSENTS APPLICATION

QA PROGRAMME

CONSTRUCTION PHASE - (PRE MAIN WORKS)

ENGINEERING

PROCUREMENT

CONSTRUCTION PHASE (MAIN WORKS)

TEMPORARY WORKS

ECO PARK NORTH (PHASE-1 EAST)

REMEDIATION & ENABLING WORKS & EARTHWORKS PHASE 1 - EASTERN AREA

CONSTRUCTION MAIN WORKS

ARCHITECTURE MOCK-UP

ECO PARK NORTH (PHASE-2 FULL SITE)

REMEDIATION & ENABLING WORKS & EARTHWORKS PHASE 2 - WESTERN AREA

CONSTRUCTION MAIN WORKS

CIVIL WORKS & STEEL STRUCTURE

MECHANICAL ERECTION

ELECTRICAL AND I&C ERECTION

URBANIZATION

COMMISSIONING

O&M TRAINING

CONSTRUCTION COMPLETION CERTIFICATE & COMMISSIONING

At the WBS level the Contractor will plan its activities by deliverable. Where agreed by the Project Manager, the Contractor may plan certain activities at a general contract level.

### 6.4.13 Work of the Purchaser and Others

The Contractor shall submit for approval by the Project Manager an interface register, which shall include details of interface activities that involve other third parties. It shall also detail all the Contractor's requirements ~~from the Project Manager,~~in respect of the Purchaser and other third parties. In each instance, the Contractor shall indicate the date by which the following are required:

1. Permission-to-work certificates and other necessary permits, certificates, licences and permissions as may be required by the Contractor from any Statutory Body;
2. Technical data, drawings, designs, manuals, materials or Equipment required to be provided by the Contractor or third parties; and
3. Consent requirements and approvals.

### 6.4.14 Programme narrative

A programme narrative and an Acumen Fuse Defence Contract Management Agency report is a requirement with the first and subsequent programmes submitted for approval explaining the key changes including re-planning or resequencing the impact of variations.

### 6.4.15 Revised programme narrative

Revised programmes submitted for approval shall be accompanied by an updated programme narrative, explaining the key changes and impact to the critical path.

~~The Contractor shall ensure that they do not alter the structure, format or content of the report without the prior agreement of the Project Manager.~~

### 6.4.16 Baseline programme

The first Approved Programme shall be used by the Contractor as a baseline programme for assessing progress (original contract baseline). This shall be saved in the project,

primary and secondary baseline in P6 for variance analysis. As programmes are approved by the Project Manager these shall be saved as the current contract baseline. These shall be saved in the project and primary baseline in P6. The prior submissions (previous period) will be stored in the tertiary baseline in P6. If a programme is submitted and approved this shall be saved in the project and primary baseline. The requirements for each primary, secondary and tertiary baseline will be agreed between the ~~Purchaser~~Project Manager and Contractor within four (4) weeks of the Effective Date.

The Contractor shall report progress against the original contract baseline programme as well as the Approved Programme unless otherwise instructed by the Project Manager.

### 6.4.17 Revised Programme

Revised programmes submitted for approval shall include:

1. Change log detailing all new activities;
2. Changed durations;
3. Changed calendar assignments; and
4. Changed dependencies.

Any special measures required to recover delays shall be highlighted.

### 6.4.18 Period Progress Updates / Programme Analysis Reports

The ~~Purchaser's~~Project Manager's assessment date for management and reporting purposes shall be known as the period end date.

Period programme updates shall align to the ~~Purchaser's~~Project Manager's progress date. Actual progress shall be reported for each activity reforecast to show:

1. The physical percentage of work which is complete;
2. The remaining duration of work;
3. The actual start date;
4. The actual completion date; and
5. The completed Milestones.

For activities which have been completed, the Contractor shall show the actual finish date, set the percentage of completion at 100% and set the remaining duration to zero. This should not be changed retrospectively.

Activities which have started shall have the actual start date input and physical percentage (%) of completion progressed. All activities within the programme shall be set to 'physical' percentage (%) of completion and not be based on percentage of resource expended or duration exhausted.

For activities relating to design works, the physical percentage of completion shall be determined by achievement of control points, as agreed by the Project Manager.

Each programme submitted for approval shall be scheduled to the relevant data date. ~~Significant changes to the critical path, re-sequenced work and float erosion shall be clearly explained in the programme narrative.~~

Any automatic scheduling settings in the Contractor's software which automatically update progress shall be disabled.

The narrative shall conform to the Purchaser's requirements and include:

- P6 (XER) and PDF format progressed to NLHPP Programme's period end/ status date; and
- Allow for the Contractor's planning manager to meets regularly with the Purchaser's planning manager or delegate to review progress and agree corrective actions.

### 6.5 Risk Management

The Contractor shall submit, within 8 weeks of the Effective Date ~~an outline of its approach to managing risk~~a summary risk management plan describing its risk management approach and reporting framework for the duration of the Works. This should be in the form of a risk management plan and shall include, but shall not be limited to:

- Risk management principles~~ and to comply~~ .
- Alignment with the NLHPP Programme objectives expressly defined in the Contract.
- Methodology and approach to risk management in line with the risk management process outlined below
- Approach to align the early warning process with project risk management.
- Risk management organisation – including roles and responsibilities
- Communication protocols and proposed schedule of risk management activity, commensurate with the scale and complexity of the Works and limited to activities reasonably required for effective risk management.
- Details of the software to be used for risk analysis (cost and schedule~~)~~, or equivalent industry-recognised tools capable of producing substantially similar outputs.
- ~~Details~~A high-level description of the data acquisition process related to risk assessment activities

The risk management shall be linked with the contract process of early warning notification and management as detailed in clause 13A of the Conditions of Contract. For the avoidance of doubt, inclusion of a matter within the risk register shall not, of itself, constitute an Early Warning Notice or any other contractual notice unless expressly stated in the Contract.

#### 6.5.1 Risk Management Process

The risk management process shall be as follows:

- Identification of risks and opportunities
- Assessing risk – qualitative and quantitative cost and schedule risk assessment (pre and post mitigation risk exposure shall be quantified for each risk)
- Mitigating risk – identification of risk mitigation and control measures as well as ownership of those actions
- Reporting risk – risk and risk mitigation reports
- Monitoring, reviewing, communicating and managing the process in order to ensure a risk register is maintained as appropriate and that the communication of risks and opportunities are effectively communicated.

The Contractor shall undertake risk review meetings to ensure that risks, as a minimum, are:

- Recorded in a risk register as they are identified
- Reviewed monthly (as a minimum)
- Assessed and quantified (including cost, schedule and reputation impact) during reviews.
- Mitigated as soon as practicable.

Risk reviews shall be collaborative and involve the Project Manager and the Contractor during each scheduled risk review meeting.

The Contractor shall retain each month a complete record of the risk register and shall provide the same to the Project Manager within one week of request~~. The risk register shall comply with the NLHPP Programme template and shall include as a minimum:~~, provided that the information supplied may be limited to risks material to the Works and shall not require disclosure of proprietary internal analyses or commercially sensitive information not relevant to the management of the Works.

The risk register shall include as a minimum:

- Risk event description, the cause(s) and impact(s) on the Works
- State the named risk owner
- Probability (how likely the event is deemed to occur)
- The minimum, most likely and maximum cost and time impact
- Substantiation of the cost
- Insert the schedule activity code most applicable to the risk event
- Expected Monetary Value (EMV) – probability multiplied by most likely cost impact.
- SMART proposed mitigation activity for each risk.
- Cost of mitigation

### 6.5.2 Reporting

The Contractor ~~is expected to~~shall submit a monthly report of risk management activity to the Project Manager. ~~This shall include an updated risk register containing full details as highlighted above. Where appropriate, advance warning of potential notifications shall be included in the project risk register.~~ The monthly risk report shall include:

- Latest project risk register, focusing on material risks relevant to the Works.
- 
- Summary of change (new risks identified or closed)
- Top 10 risks by impact
- Progress against mitigation plans

### 6.5.3 Quantitative Schedule Risk Analysis (QSRA)

The Contractor shall provide with the first programme submission a schedule of risk analysis and summary report. The Contractor ~~is expected to use an appropriate software to undertake the analysis (e.g. Primavera Risk Analyser, Safran)~~shall undertake appropriate

analysis in accordance with a methodology, assumptions and confidence levels agreed with the Project Manager for reporting purposes. This analysis will consider:

- Discrete risk and associated delay (minimum, most likely and maximum days)
- Duration uncertainty
- Interface risks

The Contractor shall provide a summary report which includes:

- P50, P80 statistics on agreed milestones, provided that such forecasts are for planning and reporting purposes only and shall not amend any contractual milestone, completion date or entitlement under the Contract.

~~• Schedule check output to confirm quality of programme used~~

- List of risks modelled and the associated risk (reference to risk register)
- Summary graph of critical (criticality)

Following the first QSRA submission, the Contractor shall undertake the QSRA on quarterly basis, or following a material change to the Programme affecting key project milestones, and communicate the schedule of risk and analysis report to the Project Manager. Unless required to evaluate a material project issue, the Contractor shall not be required to disclose detailed model assumptions, calculations or proprietary analytical methodologies.

### 6.6 Stakeholder Management Plan

The Contractor's obligations are as defined in Schedule 24 *Stakeholder Management and Collaboration*.

### 6.7 Correspondence Management Plan

The Contractor's obligations are as defined in Schedule 24 *Stakeholder Management and Collaboration*.

# 7. REPORTING

## 7.1 Monthly Reporting

~~After the Effective Date, the Contractor shall prepare a monthly report covering the current status of the Works progress and additional attachments to be updated on a monthly basis, as elaborated in the sections below.~~

The monthly report shall focus on matters materially affecting safety, programme, cost, quality, commissioning, environmental compliance, operational readiness and completion of the Works.

Monthly reports will report up to the end of each period, which is the last Friday of each month. The report shall be sent to the Project Manager no later than the first Friday of the following month.

~~The monthly report shall cover the entire Works, including all subcontracted works and shall be based on project management documents, such as the Approved Programme, the QA-Plan and the Health, Safety and Environment Plan. The structure of the monthly report is subject to change if required by the Project Manager.~~

~~If special conditions arise that have potential or actual consequences for progress or cost, the Contractor shall notify the Project Manager immediately and outside the agreed reporting routine if necessary in accordance with the requirements of Clause 13A *Early Warning Notices* of the Conditions of Contract.~~

~~Any additional requirements for ad-hoc reporting shall be agreed between Project Manager and Contractor as required.~~

## 7.2 Structure of Monthly Report

The Contractor shall ensure the overall structure of the monthly report covers, as a minimum, the subjects described below:

1. Front page including Contract reference, name of Contractor and period for monthly report
2. Index of contents
3. Traffic light report (red, amber and green) cover the key areas of Cost, schedule, risk, health & safety and overall project performance
4. Summary of progress and activities in the previous period such as
    a. design, purchase, inspection and/or Site activities
    b. Milestones achieved or clarification if they are not completed
    c. Quality assurance status
    d. Status of DCO compliance ~~(Using DCO tracker)~~
    e. Status of the Environmental Permit compliance ~~(Using permitting tracker)~~
5. Planned activities for the next period
    a. Planned milestones to reach
    b. Planned purchase, inspections, Site tests etc.

~~6. Input to open issues on the action list~~

~~7. Topics to be discussed in the next contracts meeting, including open questions from the previous period from mail, request for information etc.~~

6. ~~8.~~ Organisation / Staff to include:
    a. Changes in organisation / staff

    ~~b. Working hours spend in the last period divided into hours spent in own office and on Site~~

    ~~c. photographs of new joiners and bios for adding to the organisation chart and for communications~~

7. ~~9.~~ Status on health & safety and wellbeing (As defined in Schedule 4 *Health and Safety*).
8. ~~10.~~ Status on environmental management, including narrative on how the CEMP/CoCP requirements are progressing
9. ~~11.~~ Status and actions against requirements and targets relating to:
    a. Stakeholder Management and Collaboration (as defined in Schedule 24 *Stakeholder Management and Collaboration*).
    b. Social Value (as defined in Schedule 25 *Social Value*)
    c. Embodied carbon (as defined in Schedule 5 *Environmental Protection and Waste Disposal*)
10. ~~12.~~ Application for payment
    a. Status of payment milestones (Schedule 19 *Terms of Payment*)
    b. Status of claims and Variations
11. ~~13.~~ Appendices
    a. Updated Master Information Delivery Plan
    b. Updated detailed Works programme with progress reporting, and critical path,
    c. Updated organisation chart (including position, name and contact information)

    ~~d. Updated staffing schedule~~

    d. ~~e.~~ Updated quality programme and *quality assurance (*QA) activities carried out during the current month and planned for the next month

    ~~f. Updated decision log (as defined in section 7.3 of this Schedule)~~

    e. ~~g.~~ Updated list of Variations (as defined in section 7.4 of this Schedule)
    f. ~~h.~~ Updated list of makes (as defined in section 7.57.3 of this Schedule)

    ~~i. Updated correspondence log (as defined in section 7.8 of this Schedule and Schedule 24 *Stakeholder Management and Collaboration*)~~

Some of the listed subjects and appendices above are explained further in the following sections. The intention of having different appendices is to keep a current version of these documents during the Works as they are considered working documents with effect from the Effective Date.

### 7.3 ~~Decision log~~Not Used

~~The Contractor shall keep a log of all decided clarifications and deviations to the Contract and decisions to be taken by the Purchaser or Project Manager.~~

~~The change and decision log shall contain Contract information, revision number and document number/ID.~~

~~The log shall report and include following information as a minimum:~~

~~a. Title of clarification/deviation/decision~~
~~b. Explanation~~
~~c. Date of raised question/clarification~~
~~d. Status (open/closed)~~
~~e. Decision~~
~~f. Date of decision~~
~~g. Where relevant the meeting at which the decision was made and attendees.~~

### 7.4 ~~List of Variations~~Not Used

~~The list of Variations shall contain an overview of raised deviations, Variations and notifications. The list of Variations shall contain contract information, revision number and document number / ID. Reference to requirements given in section 9 *Notifications of discrepancies and Variations*.~~

~~The Contractor shall issue the list of Variations together with the monthly report and include the following information as a minimum:~~

~~a. ID number~~
~~b. Reference to P&ID or other relevant document~~
~~c. Short explanation of cause for modification~~
~~d. Short description of the modification~~
~~e. Cost impact~~
~~f. Programme impact~~
~~g. Risk impact~~
~~h. DCO and planning approval impact~~
~~i. Quality impact~~
~~j. Design intent impact~~
~~k. Status of Variation (open/closed)~~
~~l. Date of decision~~

### 7.5 List of Makes

A list shall be supplied for the purpose of mutual standardisation of makes (brands) between sections of Plant. The Contractor shall also refer to the nominated supplier list in Schedule 7 *Subcontracting.*

The Contractor shall ensure the list contains the type of equipment, as well as purpose and a variety of characteristic data, such as flow, pressure, temperature, material and other which is necessary to define the selection of the equipment in question.

### 7.6 Weekly Reporting

After the Effective Date, the Contractor shall prepare a report covering current status of the progress of all Site activity and additional attachments which will be updated weekly. The Contractor shall ensure the overall structure of the weekly report covers, as a minimum, the subjects described below:

1. Health, Safety and Wellbeing (HS&W)
    a. General status with respect to the ongoing HS&W works on Site
    b. Status on reported near miss and work incidents
2. ~~Resource~~Resources and Materials
    a. Resource shall be the actual numbers of personnel on Site divided into the relevant disciplines
    b. Materials shall be the delivered Material/equipment onto the Site.
3. Status on the ongoing Works
    a. Listing of ongoing Works
4. Time schedule and look ahead programme
    a. Listing of the actual work progress including a 6 weeks look ahead programme and planning schedule

~~5. Technical topics including open questions from the previous period from correspondence, request for information etc.~~

~~6. Quality on installed equipment and/or ongoing commissioning results~~

~~a. Where identified lack of quality on the installed equipment are listed and handled~~

~~7. Training~~

~~a. At the appropriate time and in accordance with the Approved Programme, the Contractor shall set out the progress of training against the training programme and bring to the Project Manager's and Purchaser's attention any potential issues so that appropriate actions can be co-ordinated.~~

~~8. Risk and Issues~~

~~a. Provide an update on the top 10 risks and issues identified on the risk register~~

~~9. Contractual issues~~

~~a. Normally handled in the monthly and / or ad-hoc project meetings but follow-on actions may be updated weekly for further discussion as required~~

~~The weekly report shall cover all Site activity, including all subcontracted works, and shall be based on project management documents, including but not limited to, required plans and programmes as listed in the reviewable Design Data. The structure of the weekly report is subject to change if required by the Project Manager.~~

~~The weekly report shall be coordinated with the occurrence of meetings covering Site, Works, technical and HS&W aspects as detailed further in section 8 Meetings.~~

### 7.7 Site Logbook

The Contractor shall keep and maintain a Site logbook for Works related matters recording events, procedures and progress. ~~The logbook shall be used to inform weekly reporting as detailed above.~~

The logbook shall remain on Site and be made available for the reference of the ~~Purchaser and the~~ Project Manager at all times:

The logbook shall include, as a minimum:

- ~~calendar - dates~~
- weather statistics - general, temperature, rainfall, windspeed and direction, humidity
- ~~key personnel - contact details~~
- ~~work activities - description - location~~
- ~~conditions upon installation~~
- unusual conditions
- activities - inspections, tests, submittals, reviews

### 7.8 ~~Correspondence Log~~Not Used

~~The term 'correspondence' refers to letters, monthly reports, minutes of meetings, and despatch notes.~~

~~The Contractor shall set up and maintain a chronological register / log for all outgoing and incoming correspondence in connection with the Works.~~

# 8. MEETINGS

## 8.1 General

Where equivalent assurance can be achieved through agreed digital systems, dashboards, reports or collaborative platforms, the Parties may agree to replace or reduce meeting requirements.

Each meeting will require an agenda, stating the purpose of the meeting and the topic to be covered. The agenda must include the required attendees, the meeting location, date and time and state who is responsible for chairing the meeting. The chairperson can be a nominated employee from either the Purchaser or the Contractor. The agenda must also indicate who is responsible for recording and distributing minutes.

Meeting outputs shall be limited to decisions, agreed actions, risk mitigations and matters requiring escalation. Every meeting shall produce one of the following outputs:

- decisions;
- actions;
- issue resolutions;
- risk mitigations.

The Purchaser and Contractor shall ensure ~~it completes~~they complete all actions within the timescale(s) agreed and recorded within all minutes of the meeting.

## 8.2 Contract Meetings

The Contract Manager shall participate in Contract meetings with the ~~Purchaser and~~ Project Manager. Contract meetings will be conducted once a month. The Contract Meeting will take place within 9 Business Days after the Contractor's delivery of the monthly report. At the Contract meetings the attendees will review and discuss the monthly report on contractual issues related to commercial, cost, programme, risk, quality, health and safety. The Contractor's participation in such discussions shall not prejudice either Party's rights under the Contract.

The Contract meetings will take place at the Purchaser's offices or the Contractor's on Site offices to be determined on a case by case basis.

## 8.3 Works Coordination Meetings

~~The Contract Manager shall participate in Works coordination meetings with the Project Manager. The frequency of the meetings is to be determined by the Project Manager as required by the current stage of the Works.~~

The Contractor shall be responsible for all interface management for all its works including the works of its Subcontractors. The Contractor shall further engage with the Purchaser and any other parties that the Purchaser is directly responsible for in Works Co-ordination Meetings to enable the Purchaser and the work by others to be fully integrated into the Works.

Works Co-ordination Meetings shall be planned and conducted on a proportionate and risk-based basis and shall be used to support decision-making, assurance, coordination and risk management. The Parties shall seek to minimise unnecessary meetings and avoid duplication of matters addressed through other governance forums or digital systems.

The purpose of the Works coordination meetings is to plan and coordinate the Works.

~~Examples of Works coordination meeting agenda are:~~

- ~~Layout workshop~~
- ~~Process interface coordination meetings (with external interfaces)~~
- ~~Risk assessment workshops~~
- ~~Certification / sign off meetings~~
- ~~Standardisation meetings~~
- ~~KKS meetings~~
- ~~HS&W aspects~~
- ~~Construction planning meeting~~
- ~~DCO compliance planning and planning discharge meeting~~
- ~~Environmental Permit compliance progress and permit submissions meeting~~
- ~~Commissioning planning meeting~~
- ~~Training planning meetings~~
- ~~Architectural design development meetings~~
- ~~Embodied carbon and material efficiency design review~~

### 8.4 Technical Meetings

Technical specialists of the Contractor shall participate in technical meetings with the ~~Purchaser,~~ Project Manager and ~~the~~ Project Manager's Representatives.

~~Technical meetings will be scheduled on an ad-hoc basis and in addition to the Contract meetings and Works coordination meetings. The technical meetings will focus on specific technical issues.~~

Some technical meetings with issues of common interest could be with several Subcontractors.

Technical meetings shall be arranged by either party only where required and only to resolve specific design, interface, commissioning, operational readiness or risk-related matters. Each meeting shall have a defined purpose, agenda, attendees and required outcome.

~~The same conditions apply for technical meetings as for Works coordination meetings.~~

~~Examples of technical meetings and workshops are listed below:~~

- ~~Design meetings for discussion of review of reviewable Design Data~~
- ~~Design meetings for discussion of technical procurement specifications for Subcontractors~~
- ~~Mechanical meetings~~
- ~~Electrical meetings~~
- ~~CMS meetings~~

- ~~Human Machine Interface meetings~~
- ~~Functional safety meetings~~
- ~~Balance of Plant (BOP) meetings~~

### 8.5 Site coordination meetings and toolbox meetings

The Contractor shall conduct Site coordination meetings on a weekly basis as a minimum.

The purpose of these meetings is to coordinate all Subcontractors working on Site. All working processes shall be coordinated and Site plans and level plans including storage areas will be coordinated (including but not limited to cranes, deliveries, scaffolding and working areas).

All Subcontractors at Site shall be represented at the Site coordination meetings.

The Contractor shall conduct a toolbox meeting every morning.

The ~~Purchaser and / or~~ Project Manager may participate in a Site coordination meeting or the toolbox meetings. Attendance by the Project Manager shall be observational and shall not involve directing Site activities or workforce management.

During the period of training, as defined in the Contractor's Programme the Contractor shall provide as a minimum a weekly report setting out the progress of training against the training programme (as further detailed in Schedule 9 *Training by Contractor*) and bring to the Project Manager's attention any potential issues so that appropriate actions can be co-ordinated.

### 8.6 HS&W meetings

The Contractor shall refer to Schedule 4 *Health and Safety.*

### 8.7 Social value meetings

The Contractor shall refer to Schedule 25 *Social Value.*

### 8.8 Stakeholder and collaboration meetings

The Contractor shall refer to Schedule 24 *Stakeholder Management and Collaboration.*

### 8.9 Other meetings

The ~~Purchaser may~~Project Manager may reasonably require ~~Contractor~~ attendance at ~~other meetings over the duration of the Works, for example, meetings with Statutory Bodies. The Contractor shall ensure that suitable Contractor personnel are available to attend and participate in all meetings as required by the Purchaser. The Contractor shall prepare for any meetings as required, including the production of requested information and / or Documentation, and follow up on any actions agreed by the Purchaser as a result of the meetings.~~ additional meetings where necessary to address a material issue, emerging risk, statutory matter, interface matter or decision affecting delivery of the Works.

# 9. NOTIFICATIONS OF DISCREPANCIES AND VARIATIONS

This procedure describes the guidelines for handling of modifications and deviations to ensure consistent and satisfactory treatment of any Variations. This is to be read in conjunction with Schedule 18 *Valuation of Variations and claims* and clauses 16-19 of the Conditions of Contract.

The Purchaser's DMS will include a specific contract management module for the exchange of notifications, Variations and deviations (and any other contractual correspondence) using electronic pro-forma templates linked to automatic workflows. This system is to be used to conduct all exchanges of this type.

## 9.1 Notices of Discrepancies

In accordance with Sub-clause 21.13 of the Conditions of Contract, where there is a Discrepancy as described in that sub-clause which is not dealt with in the Contractor's Documentation which has been approved by the Project Manager or in the Contractor's approved design, the Contractor shall notify the Project Manager.

### 9.1.1 Notice from Contractor

The Contractor shall notify the Project Manager about any Discrepancies which may be of significance for the Contractor's ability to fulfil the terms of the Contract. The purpose of such notification is to give the Project Manager the opportunity to take corrective action to remove the Discrepancy or to instruct the Contractor as to how it should be dealt with. Separate notifications shall be sent for different occurrences of Discrepancies.

The Contractor shall state as precisely as possible the particular Discrepancy in its notice to the Project Manager.

The Contractor's notice shall specify relevant information in terms of location, drawing and contract references etc. in conformity with the section and heading numbering in the Contract, as far as this is possible. The Contractor may submit a proposal as to how this Discrepancy should be dealt with.

The Contractor shall set a reasonable deadline for the Project Manager to instruct how this Discrepancy should be dealt with, but as a minimum this will be 14 days from submission of the proposal by the Contractors.

The Contractor shall state the possible consequences if this Discrepancy is not dealt with within the given deadline, including any impact on progress and costs.

If an attachment is used for one or more items, the number of pages in the attachment shall be stated on the Contractor's notice and all pages in the attachment shall be marked with data indicating the Contractor's notice to which it relates. If the Contractor does not include any attachments in the notification, this shall be indicated in the Contractor's notice.

The Project Manager shall issue an instruction as to how the Discrepancy shall be dealt with in accordance with the deadline unless the Project Manager notifies the Contractor that it will need more time to consider the Discrepancy in advance of the deadline.

### 9.1.2 Registration/follow-up

The Contractor shall keep a log of notifications of any Discrepancies affecting the Works including any subcontracted works. The Project Manager will establish a central log in which all notifications of Discrepancies and their status will be recorded for all contracts.

## 9.2 Modifications to the Contract

Variation Orders will be issued on the request of the Contractor or if the Project Manager wishes to modify the Works in accordance with the Conditions of Contract.

### 9.2.1 Proposal for a Variation

The Contractor shall issue a notice of proposal for a Variation to the Project Manager

If the proposal concerns several contracts or transferred subcontracts, a separate 'notice of proposal' for a Variation shall be issued for each contract.

The Contractor's proposal for a Variation shall specify relevant information in terms of location, drawing and Contract references in conformity with the section and heading numbering in the contract, as far as this is possible.

The proposal for a Variation shall include a description of the Variations and estimations on cost and impact on the Approved Programme.

### 9.2.2 Variation Order Submission

When the Project Manager accepts a proposal for a Variation, having requested and reviewed additional information from the Contractor in accordance with Clause 17 of the Conditions of Contract, the Project Manager will issue a Variation Order to the Contractor. The Contractor will sign and return one copy of the Variation Order to the Project Manager.

The Variation Order has the status of a purchase order and belongs in contractual terms to the Contract which is stated by contract number on the form. If not specified otherwise, all conditions and provisions of the Contract will apply in full, including previously ordered Variations and additions. All subsequent reference to the Variation Order shall be made with the Variation Order number.

The Variation Order number consists of the contract number + project identification + serial number.

### 9.2.3 Registration / follow-up

The Contractor shall keep a log of its proposals for a Variation affecting the Works including subcontracted works. The log shall be attached to the monthly report. The Project Manager will establish a central register where all proposals for a Variation and their status are recorded.

# 10. APPPENDIX 1 - REVIEWABLE DESIGN DATA

All Design Data shall be prepared in accordance with the requirements of this Contract. Before its submission by the Contractor, the reviewable Design Data shall be sufficiently developed and detailed to enable the Project Manager to appropriately conduct a review of its design, function, space requirements, quality and compliance with this Contract. The Contractor shall remain solely responsible for the adequacy and compliance of the design notwithstanding any review by the Project Manager.

## 10.1 Project Delivery

The reviewable data for project management includes selected key information about organisation, progress, health and safety, quality assurance, CE/UKCA marking, functional safety, manufacturing, training, Site and commissioning. In addition, the Contractor shall submit all standards to be applied in its undertaking of the Works for ~~Purchaser~~Project Manager review.

The reviewable Design Data for project management is divided into five packages: PD1, PD2, PD3, PD4 and PD5. In addition, the Contractor shall deliver a number of documents monthly and a number of specific documents delivered after the Effective Date, or before submitting its first invoice under the Contract.

The ~~reviewable~~Reviewable Design Data is not an exhaustive list of documents the Contractor is requested to submit to the Project Manager. The Project Manager may, in addition to the listed documents in the table, select any further documents from the Contractor's Master Information Delivery Plan for review. In addition, certain documents shall be issued to the Project Manager for review on ad-hoc basis as they occur; for example, the Contractor shall provide the Project Manager with technical specifications and Subcontractor responses as a result of Contractor enquiries for all key components in accordance with the requirements of Schedule 7 *Subcontracting* prior to the Contractor's purchase of such larger components, e.g. the technical specifications for selected equipment to be subcontracted.

### 10.1.1 Required Documents

Documents to be delivered as part of the ~~reviewable~~Reviewable Design Data are listed in the table below. The following abbreviations are used:

**M**: First delivery at milestone date. Henceforth monthly delivery of the document in the monthly report

**T**: Template to be approved by the Project Manager beforehand.

**W**: First delivery at milestone date. Henceforth weekly delivery of the document in the respective project phase.

**X**: Delivery of completed and final document at milestone date, but when information in documents is changed, the documents shall be updated and re-issued in due time, at the latest together with the next following monthly report.

**Draft:** Is indicated where this is requested. Unless otherwise stated this shall be considered 90% complete from a quality and quantity perspective.

**Ad hoc:** Is indicated for documents shall be delivered as soon as they are ready for review

| | Document | Effective Date | PD1<br>1 month after the Effective Date | PD2<br>6 months before erection | PD3<br>3 months before erection | PD4<br>~~3~~6 months before commis. | PD5<br>Before trial run |
|---|---|---|---|---|---|---|---|
| | **Organisation** | | | | | | |
| 1.1 | Organisation plan | X | | | | | |
| 1.2 | Organisation chart | M | | | | | |
| 1.3 | Staffing schedule | M | | | | | |
| | **Reporting** | | | | | | |
| 2.1 | Monthly Reports | T | M | | | | |
| | **Programme** | | | | | | |
| 3.1 | Contractor's programme | | M[1] | | | | |
| 3.2 | Six-week programmes for construction and erection | | | T | W | | |
| 3.3 | Six-week programme for commissioning | | | T | | W | |
| | **Documents** | | | | | | |
| 4.1 | Master Information Delivery Plan | M | | | | | |
| 4.2 | Complete list of standards, codes and regulations used for design, fabrication, inspection and testing | M | | | | | |
| 4.3 | Project Execution Plan | M | | | | | |
| 4.4 | Risk Management Plan | M | | | | | |
| 4.5 | Stakeholder Management Plan | M | | | | | |
| 4.6 | Correspondence Management Plan | M | | | | | |
| 4.7 | Relationship Management Plan | M | | | | | |
| | **Quality Assurance** | | | | | | |
| 5.1 | QA Manual | X | | | | | |
| 5.2 | Quality Programme | M | | | | | |

| | Document | Effective Date | PD1<br>1 month after the Effective Date | PD2<br>6 months before erection | PD3<br>3 months before erection | PD4<br>~~3~~6 months before commis. | PD5<br>Before trial run |
|---|---|---|---|---|---|---|---|
| 5.3 | Quality control plans | M | | | | | |
| | **Health & Safety** | | | | | | |
| 6.1 | Health and safety plan, including Construction Phase Plan and CDM Management Plan. | X | | | | | |
| 6.2 | All necessary input to Purchaser's HS&W coordinator for construction | | T | X | | | |
| 6.3 | Access and maintenance study | | T | Draft | X | | |
| 6.4 | COSHH data sheets / Material SDS | | | X | | | |
| 6.5 | Health and Safety File | | | T | | | **X** |
| | **Management of Materials and Wastes** | | | | | | |
| 7.1 | Construction Environmental Management Plan | T | X | | | | |
| 7.2 | Construction Carbon and Energy Management Plan | T | X | | | | |
| 7.3 | Embodied Carbon Model | Timings are defined in Schedule 5 *Environmental Protection and Waste Disposal* | | | | | |
| 7.4 | Site Waste Management Plan | | Draft | | | | |
| 7.5 | Construction Travel Plan – Energy Recovery Facility Construction Phase | | Draft | | | | |
| | **CE / UKCA marking** | | | | | | |
| 8.1 | CE / UKCA plan | Draft | X | | | | |
| 8.2 | Declaration of Conformity | | T | | | Draft | X |
| 8.3 | User manual | | T | | | Draft | X |
| 8.4 | Risk assessments | | T+M[6] | | | | |

| | Document | Effective Date | PD1<br>1 month after the Effective Date | PD2<br>6 months before erection | PD3<br>3 months before erection | PD4<br>~~3~~6 months before commis. | PD5<br>Before trial run |
|---|---|---|---|---|---|---|---|
| 8.5 | Interface list | | M | | | | |
| 8.6 | Technical File | | | | | Draft | X |
| | **ATEX** | | | | | | |
| 9.1 | Explosion properties and assumptions | | X | | | | |
| 9.2 | Hazardous area classification (Document and drawings/modelling) | | Draft | X | | | |
| 9.3 | Ignition source assessment | | | Draft | X | | |
| 9.4 | List of equipment in hazardous areas | | | Draft | | | |
| 9.5 | Verification Document | | | | | Draft | X |
| | **Functional Safety** | | | | | | |
| 10.1 | Functional Safety Management plan | | X | | | | |
| 10.2 | Safety Requirement Specifications | | T | Draft | X | | |
| 10.3 | SIL Assessment | | T+M[6] | | | | |
| 10.4 | SIL Verification | | | | | X | |
| 10.5 | SIF Validation plan including FAT and SAT | | | | T[2] | X[2] | |
| 10.6 | Proof-test procedures | | | | T | X | |
| | **Manufacturing** | | | | | | |
| 11.1 | Plan for Subcontracts | | M | | | | |
| 11.2 | Inspection and test plan | | X | | | | |

| | Document | Effective Date | PD1<br>1 month after the Effective Date | PD2<br>6 months before erection | PD3<br>3 months before erection | PD4<br>~~3~~6 months before commis. | PD5<br>Before trial run |
|---|---|---|---|---|---|---|---|
| 11.3 | Technical Procurement Specifications | | Ad hoc | Ad hoc | Ad hoc | | |
| 11.4 | List of Makes (standardisation) | | M | | | | |
| 11.5 | List of Wear- and Spare Parts | Draft | | | | X | |
| 11.6 | CMMS data inputs | | | T + M | | X | |
| | **Construction and erection** | | | | | | |
| 12.1 | Site Plan | Draft | | | X | | |
| 12.2 | Cranage Plan | Draft | X | | | | |
| 12.3 | Construction and erection progress reporting | | | | T+W | | |
| 12.4 | Plan for – Construction Completion | | | | | X | |
| 12.5 | Construction Completion Certificate | | | | | T+X[3] | |
| | **Commissioning** | | | | | | |
| 13.1 | Plan for Commissioning | | | T | | X | |
| 13.2 | Commissioning progress reporting | | | | | T + W | |
| 13.3 | Reports for Cold and Hot test | | | | | T | Ad hoc |
| 13.4 | Performance Test Concept and Programme | | | | | T | X |
| | **Training** | | | | | | |
| 14.1 | Training Programme | | | Draft | X | | |

| | Document | Effective Date | PD1<br>1 month after the Effective Date | PD2<br>6 months before erection | PD3<br>3 months before erection | PD4<br>~~3~~6 months before commis. | PD5<br>Before trial run |
|---|---|---|---|---|---|---|---|
| 14.2 | Training Documents | | | Draft | X | | |
| | **Operation and Maintenance Documentation** | | | | | | |
| 15.1 | Operation and Maintenance Documentation | | | T | | Draft[4] | |
| | **Performance testing** | | | | | | |
| 16 | Detailed performance testing plan | | | | | | Draft[5] |

1: The Contractor shall produce a detailed baseline schedule for ongoing review and comparison for the duration of the Works

2: SIF Validation plan including FAT and SAT shall be completed before commencement of FAT as determines which are witnessed

3: Construction Completion Certificate shall be delivered before start commissioning

4: Final Operation and Maintenance Documentation shall be delivered before Take Over and kept updated by the Contractor during the Defects Liability Period

5: The Contractor shall prepare and submit to the Project Manager for its approval a detailed Performance test plan ~~not~~no later than ~~four (4) weeks~~30 days prior to the ~~planned date for Take Over~~start of testing.

6: Risk assessment reports must be issued shortly after each risk assessment activity e.g. after HAZOP and after LOPA workshops.

## 10.2 Layout

Layout data is divided into five packages; LD1, LD2, LD3, LD4, and LD5, corresponding to the development stage of the Works. The required content of each package is defined below. The Contractor shall ~~in its submission of the Master Information Delivery Plan, for each development stage, group the different documents into both limited and logical packages. The Contractor shall~~ arrange for these documents to be reviewed in a timely and efficient manner and shall follow the agreed clarification process with the ~~Purchaser~~Project Manager. The proposal for grouping and timing of documents shall be submitted to the Project Manager for review. Note the content listed is indicative and not considered exhaustive.

The Contractor shall submit a change log together with the 3D model to ensure the Project Manager can easily identify changes from previous 3D model iterations. The Contractor shall clearly state which parts of the 3D model are close to design freeze and where the

Contractor expects the ~~Purchaser~~Project Manager to provide comments for the Contractor in due time to agree to changes in the design.

After submission of LD5, the Contractor shall submit an updated 3D model monthly until the Contractor has completed the detailed design for the Plant ~~as agreed by the Purchaser~~.

After completed detailed design of the Plant, an updated 3D model shall be submitted by the Contractor ~~once deemed necessary by the Purchaser~~.

Requirements for the 3D model format is detailed in section 2.10 *3D Modelling*.

### ~~10.2.1 LD1 (2 months after the Effective Date or as agreed in the Master Information Delivery Plan)~~

LD1 comprises:

- Updated 3D model including all discipline models and shall include as a minimum
    - Foundation and concrete structure
    - Steel structures
    - Facade and roof structure
    - Position and size of rooms
    - Staircase towers
    - All rooms with preliminary doors, gates etc.
    - All major process components
    - All major pipes and ducts
    - All main cable routings
    - Main galleries, stairs
    - Service crane coverage area and lifting shafts
    - Traffic study
    - Site infrastructure with e.g. access, roadways, fencing, barriers, other buildings, landscaping, other infrastructure
- 2D-drawings shall include main dimensions, modular grid and names of components etc.

### ~~10.2.2 LD2 (5 months after the Effective Date or as agreed in the Master Information Delivery Plan)~~

LD2 comprises:

- Updated 3D model including all discipline models and shall include as a minimum
    - Foundation and concrete structure
    - Steel structures
    - Facade and roof structure
    - All rooms with doors, gates etc.
    - Plinths
    - Pump pits and collection pits
    - Space reservation for ventilation and other building service installation.
    - All large openings in facade, roof, walls and floors

- Drainage and utilities connections
- All process components including main armatures and access openings (hatches, manholes)
- All major pipes and ducts
- All major cable routing
- Galleries, stairs etc.
- Service crane coverage area and lifting shafts
- Erection openings
- Hazardous areas (ATEX classified areas)
- Schedule of colours for Plant elements (RAL code)

- Site infrastructure with e.g. access, roadways, fencing, barriers, other buildings, landscaping, other infrastructure

- Updated 2D drawings for all main levels, longitudinal and cross sections corresponding to the 3D-model.

~~**10.2.3 LD3 (7 months after the Effective Date or as agreed in the Master Information Delivery Plan)**~~

LD3 comprises:

- Updated 3D model including all discipline models and shall include as a minimum

  - Foundation and concrete structure
  - Steel structures
  - Facade and roof structure
  - All rooms with doors, gates etc.
  - Plinths
  - Pump pits and collection pits
  - Ventilation systems and other building service installation
  - All openings in facade, roof, walls and floors
  - Drainage and utilities connections
  - All process components including main armatures and access openings (hatches, manholes)
  - All pipes and ducts, including armatures
  - All cable routing
  - Galleries, stairs etc.
  - Service crane coverage area and lifting shafts, etc
  - Erection openings
  - Hazardous areas (ATEX classified areas)
  - Schedule of colours for Plant elements (RAL code)
  - Site infrastructure with e.g. access, roadways, fencing, barriers, other buildings, landscaping, other infrastructure

- Updated 2D drawings for all main levels, longitudinal and cross sections corresponding to the 3D-model.

### ~~10.2.4 LD4 (9 months after the Effective Date or as agreed in the Master Information Delivery Plan)~~

LD4 comprises:

- Updated 3D model including all discipline models and shall include as a minimum

    - Foundation and concrete structure
    - Steel structures
    - Facade and roof structure
    - All rooms with doors, gates etc.
    - Plinths
    - Pump pits and collection pits
    - Ventilation systems and other building service installation
    - All openings in facade, roof, walls and floors
    - Drainage and utilities connections
    - All process components including main armatures and access openings (hatches, manholes)
    - All pipes and ducts, including armatures
    - All cable routing
    - All lifting equipment
    - Galleries, stairs
    - Service crane coverage area and lifting shafts
    - Erection openings
    - Hazardous areas (ATEX classified areas)
    - Schedule of colours for Plant elements (RAL code)

    - Site infrastructure with e.g. access, roadways, fencing, barriers, other buildings, landscaping, other infrastructure

- Lifting concept. The Contractor shall provide a lifting concept in the form of drawings and tables. The lifting concept shall illustrate how all components will be removed / lifted / transported in case of maintenance (service or replacement).

- Updated 2D drawings for all main levels, longitudinal and cross sections corresponding to the 3D-model.

### ~~10.2.5 LD5 (12 months after the Effective Date or as agreed in the Master Information Delivery Plan)~~

LD 5 comprises:

- Final 3D model
- Final 2D drawings for all main levels, longitudinal and cross sections corresponding to the 3D-model

### 10.3 Buildings and Civils

The Contractor shall supply details sufficient for the Project Manager to monitor and review the basic and detailed civils and building design stages of the Works as carried out by the Contractor and associated Subcontractors. ~~The Project Manager will examine and comment upon all civil engineering and building works design drawings and specifications for compliance with the Specification, and to comment on the implications of any amendments.~~

~~All Design Data shall be prepared in accordance with the requirements of this Contract. Before its submission by the Contractor, the reviewable Design Data shall be sufficiently developed and detailed to enable the Purchaser to appropriately conduct a review of its design, function, space requirements, quality and compliance with this Contract. The Contractor shall submit the documents listed in section 10.3.1 *Required Documents* at the level of detail~~The buildings and civils data is divided into different documents and packages corresponding to the ~~progress of each document (~~development stage of the Works (Issued for Information ~~(~~IFI,~~)~~ Issued for Design ~~(~~IFD~~)~~, Issued for Construction ~~(~~IFC)~~) and at~~

~~the times defined~~The Contractor shall submit the required content of the packages as set out in the Master Information Delivery Plan.

The Contractor shall in its submission of the Master Information Delivery Plan, for each development stage and group the different documents into both limited and logical packages. The Contractor shall arrange for these documents to be reviewed in a timely and efficient manner and shall follow the agreed clarification process with the ~~Purchaser~~Project Manager. The proposal for grouping and timing of documents shall be submitted to the Project Manager for review.

~~The Contractor shall provide regular updates on a weekly basis, as per the design progress and submission dates included in the Master Information Delivery Plan, for review by the Purchaser.~~

The quality and quantity of all data submitted by the Contractor shall be reflective of the current Works design stage. In addition, the Contractor shall provide regular progress updates.

~~The Contractor shall maintain all Documentation up to date for the duration of the Contract.~~ Note the content listed is indicative and not considered exhaustive~~:~~.

#### 10.3.1 Required Documents

The Contractor's ~~civils~~ deliverables ~~for review by~~to the Purchaser shall include, but not be limited to, the following documents:

- Design philosophy
- Temporary works philosophy and design (if applicable)
- Design calculations and assumptions list for all civils Works
- Geotechnical Investigation Reports
- Geotechnical Design Reports
- Ground Investigations Factual Reports
- Weights and loadings data and diagram

- Vehicle movement study (internal and external)
- All Documentation required for local authority sign off – including discharge of planning conditions and Building regulation approval
- Noise studies
- Fire plans and approval from insurers
- Design life assessment
- Reinforcement schedules
- Holding down bolt schedules
- Room schedules and data sheets
- Internal finishes schedule
- Test certificates
- All civils drawings including those from all specialist Subcontractors. Drawings shall reference the ERF datum gridlines with dimensions in millimetres and shall be at a maximum scale of 1:100. Drawings to cover minimum of:
    - General civil arrangement drawings and field drawings covering plant area showing buildings and structure at grade level
        - Ground floor layout
        - Plans at each intermediate floor
        - Views on all principle elevations
        - Sectional views throughout the ERF
        - Roof layout
    - Architectural drawings, including specialist cladding requirements as set out in Schedule 22.4 *Architectural Specifications*
    - Architectural exterior and interior fabrication drawings and shop drawings, including those produced by the Contractor, supplier and/or manufacturers
    - Working drawings for the architectural façade prototypes
    - Foundation layout and design including bunker / pits
    - Ground remediation including gas protection
    - Bulk earthworks
    - Bunker / pit water ingress / egress control
    - Water drainage drawings and underground piping including attenuation, interceptors etc.
    - Utility connections
    - Infrastructure drawings with termination points
    - Building framing drawings, including cladding details and roofing material profile
    - Structural steelwork fabrication drawings and static calculation
    - Precast concrete floors and staircases
    - Reinforcement detail drawings
    - External works layouts
    - Landscaping

### 10.4 Building Services

The Building Services data is divided into 5 packages; BSD1, BSD2, BSD3, BSD4 and BSD5, corresponding to the development stages of the Works. The Contractor shall submit the required content of the packages ~~at the times defined~~as set out in the Master Information Delivery Plan. The Contractor shall in its submission of the Master Information

Delivery Plan, for each development stage, group the different documents into both limited and logical packages. The Contractor shall arrange for these documents to be reviewed in a timely and efficient manner and shall follow the agreed clarification process with the ~~Purchaser~~Project Manager. The proposal for grouping and timing of documents shall be submitted to the Project Manager for review. Note the content listed is indicative and not considered exhaustive:

The quality and quantity of all data submitted by the Contractor shall be reflective of the current Works design stage. In addition, the Contractor shall provide regular progress updates ~~for specific documents as per the design progress and submission dates included in the Master Information Delivery Plan, to the Project Manager for review~~.

BSD1 – ~~(2 months after the Effective Date or as agreed in the Master Information Delivery Plan)~~ Building Services data based on the Concept Design (BSRIA BG6/2018 Stage 2)
During Stage 2, the initial Concept Design is produced in line with the requirements of the Initial Project Brief.

BSD2 – ~~(5 months after the Effective Date or as agreed in the Master Information Delivery Plan)~~ Building Services data based on the Developed Design (BSRIA BG6/2018 Stage 3)
During Stage 3, the Concept Design is further developed and, crucially, the design work of the core designers is progressed until the spatial coordination exercises have been completed between the main design disciplines. This process may require a number of iterations of the design and different tools may be used, including design workshops.

BSD3 – ~~(9 months after the Effective Date or as agreed in the Master Information Delivery Plan)~~ Building Services data based on final Technical Design (BSRIA BG6/2018 Stage 4)
The Building Services engineering designs are now further refined to provide technical definition of the project. The level of detail produced by each designer will depend on whether the construction on site will be built in accordance with the information produced by the design team or based on information developed by a specialist subcontractor.

BSD4 – ~~(14 months after the Effective Date or as agreed in the Master Information Delivery Plan)~~ Building Services data based on the Installation design (BSRIA BG6/2018 Stage 5)
BSD4 consists of documents, which are designed in detail and released for construction, implementation, manufacturing and installation.

BSD5 – ~~(2 months before Take Over or as agreed in the Master Information Delivery Plan)~~
Building Services data based on As Built design (BSRIA BG6/2018 Stage 6)
BSD5 consists of documents, and drawings showing the building and services installations as installed at the date of practical completion e.g. record drawings.

### 10.4.1 Required Documents

The ~~Building Services reviewable Design Data~~Contractor's deliverables to the Purchaser shall include, but ~~shall~~ not be limited to, the ~~data described in table below and detailed after.~~following documents:

~~Where appropriate to the completed design stage, the Building Services Documentation shall be submitted for review and comment by the Purchaser and Project Manager.~~

| | Document/Deliverable | BSD1 | BSD2 | BSD3 | BSD4 | BSD5 |
|---|---|---|---|---|---|---|
| 1.1 | Fire strategy documentation – including interfaces with building services. | X | X | X | | |
| 1.2 | LZCT Energy feasibility Study | X | X | | | |
| 1.3 | Building Regulation Part L and draft EPC | X | X | X | X | |
| 1.4 | Room Data Sheets | X | X | X | X | X |
| 1.5 | Evidence in line with the BREEAM targets | X | X | X | X | X |
| 1.6 | Stage 2 strategy report and drawings | X | | | | |
| 1.7 | Basis of Design report | X | X | X | X | X |
| 1.8 | Stage 3 report and drawings | | X | | | |
| 1.9 | Stage 4 specification and drawings | | | X | | |
| 1.10 | Installation drawings | | | | X | |
| 1.11 | Record drawings | | | | | X |
| 1.12 | CDM Risk assessment | X | X | X | X | X |
| 1.13 | Maintenance and Commissioning report | X | X | X | X | X |
| | **Mechanical** | | | | | |
| 2.1 | BIM Model – as Navisworks or similar | X | X | X | X | X |
| 2.2 | Thermal comfort calculations | | X | X | X | |
| 2.3 | Ventilation calculations including CFD analysis | | X | X | X | |
| 2.4 | Domestic water calculations | | X | X | X | |
| 2.5 | Drainage Calculations | | X | X | X | |
| 2.6 | Water load estimates | X | X | X | X | |
| 2.7 | Mechanical Report / Specification | X | X | X | X | X |

| | Document/Deliverable | BSD1 | BSD2 | BSD3 | BSD4 | BSD5 |
|---|---|---|---|---|---|---|
| 2.8 | Controls Philosophy & Specification | | X | X | X | X |
| 2.9 | Schematics | X | X | X | X | X |
| 2.10 | Plant Room layouts | X | X | X | X | X |
| 2.11 | HVAC layouts | | X | X | X | X |
| 2.12 | Domestic water services layouts | | X | X | X | X |
| 2.13 | Above ground drainage layouts | | X | X | X | X |
| 2.14 | Fire protection system layouts | | X | X | X | X |
| 2.15 | Schedule of equipment | | X | X | X | X |
| | **Electrical** | | | | | |
| 3.1 | BIM Model – as Navisworks or similar | X | X | X | X | X |
| 3.2 | Lighting calculations | | X | X | X | |
| 3.3 | Maximum demand load estimate | X | X | X | X | |
| 3.4 | Cable Calculations | | X | X | X | |
| 3.5 | Schematics | X | X | X | X | X |
| 3.6 | Switch room layouts | X | X | X | X | X |
| 3.7 | Switch Room Elevations | | | X | X | X |
| 3.8 | Comms Room Layouts | X | X | X | X | X |
| 3.9 | Containment Layouts | | X | X | X | X |
| 3.10 | Small Power Layouts | | X | X | X | X |
| 3.11 | Lighting (General & Emergency) Layouts | | X | X | X | X |
| 3.12 | Fire Alarm Layouts | | X | X | X | X |
| 3.13 | Security Layouts | | X | X | X | X |
| 3.14 | External Lighting Layout | | X | X | X | X |
| 3.15 | External services Layout | | X | X | X | X |
| 3.16 | Electrical Specification | | | X | X | X |
| 3.17 | Luminaire Schedule | | X | X | X | X |

| | Document/Deliverable | BSD1 | BSD2 | BSD3 | BSD4 | BSD5 |
|---|---|---|---|---|---|---|
| 3.18 | Equipment Schedule | | X | X | X | X |
| 3.19 | Distribution Board Schedules | | | X | X | X |
| | **General** | | | | | |
| 4.1 | As Built Energy performance Certificate (EPC) | | | | | X |
| 4.2 | CIBSE Building Log book | | | X | X | X |
| 4.3 | Operation and Maintenance Manuals | | | | | X |
| 4.4 | FAT and SAT procedures | | | X | X | |
| 4.5 | Additional test reports | | | X | X | X |
| 4.6 | Operation and Maintenance Manuals | | | | | X |

### 10.5 Architecture

The Contractor's architectural deliverables ~~for review by~~to the Purchaser ~~and Project Manager~~ shall include but not be limited to the required documents set out in table 10.5.1 below. The Contractor must also take account of the requirements specified in Schedule 22.4 *Architectural Specifications*. The required documents shall be coordinated with all relevant information as provided by the Purchaser, including MEP, fire, and primary and secondary structural layouts.

~~Where appropriate to the completed design stage, the architectural Documentation shall be submitted for review and comment by the Purchaser and Project Manager.~~

The Architecture data is divided into 5 packages; AD1, AD2, AD3, AD4 and AD5, corresponding to the development stages of the Works. The Contractor shall submit the required content of the packages ~~at the times defined~~as set out in the Master Information Delivery Plan. The Contractor shall in its submission of the Master Information Delivery Plan, for each development stage, group the different documents into both limited and logical packages. The Contractor shall arrange for these documents to be reviewed in a timely and efficient manner and shall follow the agreed clarification process with the ~~Purchaser~~Project Manager. The proposal for grouping and timing of documents shall be submitted to the Project Manager for review. Note the content listed is indicative and should not be considered exhaustive.

The quality and quantity of all data submitted by the Contractor shall be reflective of the current Works design stage. In addition, the Contractor shall provide regular progress updates ~~for specific documents as per the design progress and submission dates included in the Master Information Delivery Plan, to the Project Manager for review~~.

AD1 – ~~(2 months after the Effective Date or as agreed in the Master Information Delivery Plan) architectural~~Architectural Documentation based on the Reference Design (RIBA Stage 2)
During Stage 2, the initial Concept Design is produced in line with the requirements of the Initial Project Brief.

AD2 – ~~(5 months after the Effective Date or as agreed in the Master Information Delivery Plan) architectural~~Architectural Documentation based on the Developed Design (RIBA Stage 3)
During Stage 3, the Concept Design is further developed and, crucially, the design work of the core designers is progressed until the spatial coordination exercises have been completed between the main design disciplines. This process may require a number of iterations of the design and different tools may be used, including design workshops.

AD3 – ~~(9 months after the Effective Date or as agreed in the Master Information Delivery Plan) architectural~~Architectural Documentation based on final Technical Design (RIBA Stage 4)
The coordinated architectural designs are now further refined to provide technical definition of the Works. The level of detail produced by each designer will depend on whether the construction on Site will be built in accordance with the information produced by the design team or based on information developed by a specialist Subcontractor.

AD4 – ~~(14 months after the Effective Date or as agreed in the Master Information Delivery Plan) architectural~~Architectural Documentation based on the Installation design (RIBA Stage 5)
AD4 consists of documents, which are designed in detail and released for construction, implementation, manufacturing and installation.

AD5 – ~~(2 months before Take Over or as agreed in the Master Information Delivery Plan)~~ architectural Documentation based on As Built design (RIBA Stage 6)
AD5 consists of documents, and drawings showing the building and services installations as installed at the date of Take Over e.g. record drawings.

### 10.5.1 Required Documents

The Contractor's deliverables to the Purchaser shall include, but not be limited to, the following documents:

| Architectural Deliverables Series | General Description of Series | AD1 | AD2 | AD3 | AD4 | AD5 |
|---|---|---|---|---|---|---|
| **Existing Conditions** | Existing Conditions / Demolitions | x | x | x | x | X |
| **General Site Plans** | Location Plans | X | x | x | x | x |

| Architectural Deliverables Series | General Description of Series | AD1 | AD2 | AD3 | AD4 | AD5 |
|---|---|---|---|---|---|---|
| | Scale 1:500/1:250 (Alphabetical & Numerical Zones) | x | x | X | x | X |
| | Grid Plans | x | x | x | X | X |
| **GA Plans** | Key Floor Plans (Small Scale – 1:200 / 100 / as appropriate.) | X | x | x | x | x |
| | Detail Component Plans (1:50s) | | x | x | X | X |
| **GA Scoping Finish Plans** | Walls, Floors, Ceilings, Scale 1:100/1:50 Numbered as per A02 series | | x | x | x | X |
| **GA Elevations** | Scale 1:200 / 1:100 | x | x | x | X | X |
| **GA sections** | Scale 1:200 / 1:100 | x | x | x | X | x |
| **Envelope Assembly** | Detail Plan, Elevation and section of each envelope assembly. These Scale 1:50 50 1:20 | | x | x | x | x |
| **Setting Out / Profile Plans** | | | | x | x | X |
| **Reflected Ceiling Plans /Soffits** | | | X | X | x | x |
| **Internal Elevations + sections** | Scale 1:50 to 1:20 | | x | x | X | X |
| | Numbered as required in 000's series | | | | | |
| | 1001, 1002 etc. Wall sections | | | | | |
| | 2001, 2002 etc. Internal Elevations | | | | | |
| **Building Details** | Numbered as required in 000's series | | x | x | X | X |
| (section / plan / etc.) | 1001, 1002 etc. Builders Works | | | | | |
| | 2001, 2002 etc. Metalwork | | | | | |
| | 3001, 3002 etc. Cladding | | | | | |
| | Misc details | | | | | |
| **Floor Finish Plans** | Scale 1:100/1:50 Numbered as per A02 series | x | X | X | x | |
| | Details | | | X | X | X |
| **Fitout Plans (Furniture Layouts)** | Furniture Layout Plans | | x | X | X | X |
| | 1001, 1002 etc. Fixture 1 | | | | | |
| | 2001, 2002 etc. Fixture 2 ( as appropriate.) | | | | | |
| **Cores (Stairs, Escalators, Lifts)** | Core Plans and sections | x | x | X | x | X |
| | Core Details | | | X | X | X |

| Architectural Deliverables Series | General Description of Series | AD1 | AD2 | AD3 | AD4 | AD5 |
|---|---|---|---|---|---|---|
| **Wet Area Details** | Wet Areas: Plans & Elevations | | X | X | X | X |
| | Wet Areas: Details | | | X | X | X |
| **Joinery Details** | Wall & Ceiling Details | | X | x | x | X |
| | Cladding Details | x | x | x | X | X |
| **General Metalwork eg balustrades** | Plans | | x | X | x | x |
| | Details | | | X | X | x |
| **Doors** | Schedules | x | x | X | X | X |
| | Plans (as required) | | | X | X | X |
| | Details | | | X | x | X |
| **Windows** | Schedules | | x | x | x | X |
| | Plans (as required) | | | x | X | X |
| | Details | | | x | x | X |
| **Finishes** | Interior/Exterior Schedules | x | x | x | X | X |
| **FFE Architecture and Interior Design Schedule** | Schedules | x | x | x | x | X |
| **Specifications** | Detail Architectural Specifications | x | x | x | x | x |
| **Design Reports** | Design report detailing design decision making and variations from the reference design | x | x | x | X | x |
| **3d Visualisations** | CGI for all major building exteriors, feature interiors, and ERF site aerial | x | x | x | x | x |
| **Architectural BIM Model** | | x | x | x | x | x |
| **Mock Up Design** | Details and method statements for 1:1 Mock-ups for all key architectural elements | | | x | x | |
| **Manufacturing and Construction Submittals** | As set out in Schedule 22.4 *Architectural Specification* | | | x | x | |

### 10.6 Mechanical Process Equipment

The mechanical process data is divided into different documents and packages corresponding to the development stage of the Works (IFI, IFD, IFC). The Contractor shall submit the required documents ~~at the times defined~~as set out in the Master Information Delivery Plan. The Contractor shall in its submission of the Master Information Delivery Plan, for each development stage, group the different documents into both limited and logical packages. The Contractor shall arrange for these documents to be reviewed in a timely and efficient manner and shall follow the agreed clarification process with the

~~Purchaser~~Project Manager. The proposal for grouping and timing of documents shall be submitted to the Project Manager for review. Note the content listed is indicative and not considered exhaustive.

The quality and quantity of all data submitted by the Contractor shall be reflective of the current Works design stage (IFI, IFD, IFC). In addition, the Contractor shall provide regular progress updates ~~for specific documents as per the design progress and submissions dates included in the Master Information Delivery Plan, for the Project Manager's review~~.

### 10.6.1 Required Documents

The Contractor's deliverables to the Purchaser shall include, but not be limited to, the following documents:

| | Document | IFI | IFD | IFC |
|---|---|---|---|---|
| | **Process Technology** | | | |
| 1.1 | Process descriptions | x | x | x |
| 1.2 | Capacity Diagram | x | | |
| 1.3 | Detailed Guideline for P&ID creation | x | | |
| 1.4 | Process Flow Diagrams | x | x | x |
| 1.5 | P&I Diagrams | x | x | x |
| 1.6 | Sizing calculations and design basis | X | x | |
| 1.7 | Energy and mass balance (water-steam cycle, air, flue gas, consumables, bottom ash, ash, residuals, compressed air etc.) | X | x | |
| 1.8 | Media specifications | x | x | |
| 1.9 | Static and dynamic strength calculations of steel structures (for crane, boiler etc.) | x | x | |
| 1.10 | Heat transfer calculations | X | | |
| 1.11 | Pressure loss calculations | X | | |
| 1.12 | CFD analysis | X | x | x |
| 1.13 | Interface list with interface specifications (including utilities as applicable) | X | x | x |
| 1.14 | Noise and vibration study | X | | |
| 1.15 | Odour dispersion model | X | | |
| | **Equipment** | | | |
| 2.1 | General arrangement of equipment | X | x | x |
| 2.2 | Detailed drawings of equipment | | x | x |

| | Document | IFI | IFD | IFC |
|---|---|---|---|---|
| 2.3 | Component specifications | | x | x |
| 2.4 | Equipment data sheets | | x | x |
| 2.5 | Compressed air consumer list | X | x | x |
| 2.6 | Dimensions of all piping, incl. pressure loss calculations | | x | x |
| 2.7 | Isometrics and stress calculations for piping systems | | x | x |
| 2.8 | Piping classifications | | x | x |
| 2.9 | Piping and pipe component list | | x | x |
| 2.10 | Piping supports and spring suspensions | | x | x |
| 2.11 | Piping routing layout with plans and sections, incl. connections at interfaces | | x | x |
| 2.12 | Insulation calculation and specifications | X | x | |
| 2.13 | Nozzle specifications | | x | |
| 2.14 | Design life assessment | X | x | |
| 2.15 | Refractory design including the selection of relevant materials | X | x | |
| 2.16 | Pressure equipment list according to PED | x | x | |
| 2.17 | Approval documentation of boiler, piping and pressure vessels | | | x |
| 2.18 | Noise emission source list | X | X | |
| | **Installation** | | | |
| 3.1 | Cleaning and passivation concept for water-steam cycle | | | x |
| 3.2 | Installation manuals for components and part systems | | X | X |
| 3.3 | Welding procedures, qualifications, logs and location maps | | | X |
| | **Test** | | | |
| 4.1 | FAT and SAT procedures | x | x | |
| 4.2 | FAT plans | | x | x |
| 4.3 | SAT plans | | x | x |

### 10.6.2 Further Description of Selected Required Documents

**Process descriptions**

Description of each process and the interdependency of process, operation, and consumption data / performance data from various operational phase shall include, but not

be limited to, requirements for auxiliary facilities / service systems. The descriptions shall comprise the KKS function and aggregate level.

**Capacity Diagram**

The Capacity Diagram defines the operating window and includes detailed definitions and limitations of all operational conditions of the process as detailed elsewhere in the Specification.

**Detailed guideline for P&ID creation**

The guidelines for P&ID creation governs the production of the P&ID's in terms of form, content and application. Specifications of diagrams and graphical symbols are to be described taking into account the standards stated in section 2.9.2 of this Schedule 2. Suggested page layout and readability, includes, but is not limited to, headers, footers, drawing headers, arrangement of components, and font sizes. Representation of standard E&IC functions, typicals and coding are to be proposed. Local operator stations, local controls and black boxes (if any) shall be included in the description.

**Process flow diagrams**

Process flow diagrams shall be prepared in accordance with the standards stated in section 2.9.1 of this Schedule 2 including, but not limited to, schedules with data at all points of interfaces, such as pressure, temperature, quantities, etc.

**P&IDs**

The P&IDs shall be prepared according to the standards stated in section 2.9.2 of this Schedule 2 and the detailed guidelines for P&ID creation as agreed with the Project Manager (see document description above), including tag numbers for all pipes, instruments, valves and other equipment.

**Sizing calculations and design basis**

Sizing calculations and design basis shall include data for dimensioning of components, i.e. characteristics of feed systems, pumps, blowers, valves and heat exchangers, travel time calculations for crane systems, steam turbine design and performance curves etc.

**Energy and mass balance**

As a general requirement mass and energy balances shall cover all media which are processed throughout the entire Plant; this includes, but is not limited to water, steam, condensate, air, flue gas, bottom ash, reagents, liquids, suspensions, ash, residuals, compressed air.

The balances of the process are to be closed including all in-going and out-going media streams. The balances shall refer to relevant flow diagrams so that the media flow can be easily identified on the diagrams and in data tables.

The applicable units and standard conditions (e.g. standard temperature 273.15 K or 0 °C, standard pressure 101 325 Pa) are to be stated clearly.

One balance shall be provided for each load case, i.e. for the nominal load case and the relevant other design load cases. Relevant design load cases are minimal and maximal design loads representing the complete operational window, e.g. for the boiler the mass and

energy balances are calculated according to the Capacity Diagram. The steam-water cycle calculations shall take clean and fouled heat exchanger conditions into account.

Water balances shall include quality parameters including, but not limited to, chemical concentrations and temperatures.

Relevant peak flows and the corresponding durations of the peak flow in question shall be calculated and stated.

**Interface list**

The interface list shall include specifications covering data for connection points for all media, including, but not limited to, position xyz-coordinates and orientations, media specification, pressure and pressure losses, temperatures, flows, forces, moments, material choices and specification of flange or other connections, such as necessary tolerances etc.

The list shall include normal operation data and design data. Special care shall be taken to specify maxima and short time peaks, e.g. for determination of necessary buffer volumes for utilities.

**Equipment data sheets**

Equipment data sheets (typically data sheets from Subcontractors) shall include project data for components, such as technical specifications, dimensions, weight, materials, performance curves etc.

**Compressed air consumer list**

The compressed air consumer list shall contain peak values, cycle time, consumption per cycle, maximal mean value, effective average consumption, minimum compressed air quality and pressure, and compressed air consumption at blackout or other trip situations.

**Noise emission source list**

The noise emission source list shall include, but not be limited to, specification of sound level, sound pressure, position, surface, and frequency spectrum for the largest noise emitters as agreed with the Project Manager.

## 10.7 Electrical

Electrical data is divided into different documents and packages corresponding to the development stage of the Works (IFI, IFD, IFC). The Contractor shall submit the required documents ~~at the times defined~~as set out in the Master Information Delivery Plan. The Contractor shall in its submission of the Master Information Delivery Plan, for each development stage, group the different documents into both limited and logical packages. The Contractor shall arrange for these documents to be reviewed in a timely and efficient manner and shall follow the agreed clarification process with the ~~Purchaser~~Project Manager. The proposal for grouping and timing of documents shall be submitted to the Project Manager for review. Note the content listed is indicative and not considered exhaustive:

The quality and quantity of all data submitted by the Contractor shall be reflective of the current Works design stage (IFI, IFD, IFC). In addition, the Contractor shall provide regular progress updates ~~for specific documents as per the design progress and submission dates included in the Master Information Delivery Plan to the Project Manager for review~~.

### 10.7.1 Required Documents

The ~~electrical reviewable Design Data~~Contractor's deliverables to the Purchaser shall include, but ~~shall~~ not be limited to, the ~~data described in table below and detailed after~~ following documents:

| | Document | IFI | IFD | IFC |
|---|---|---|---|---|
| | **General** | | | |
| 1.1 | Technical specifications and requirements | X | X | |
| 1.2 | Overall single line diagram | X | X | |
| 1.3 | Consumer lists | X | X | X |
| 1.4 | Load calculations | | X | X |
| 1.5 | Consumers (>15 kW) detailed datasheets | X | X | X |
| 1.6 | Functional description | | X | X |
| 1.7 | Emergency and safety systems | X | X | |
| 1.8 | Distribution switchboard feeders typical | X | X | |
| 1.9 | MCC and ACC typical | | X | X |
| | **Equipment** | | | |
| 3.1 | Switchboard, detailed single line diagrams | | X | X |
| 3.2 | Switchboards layout drawings | | X | X |
| 3.3 | Circuit diagrams | | X | X |
| 3.4 | Terminal and termination diagrams | | X | X |
| 3.5 | Heat loss calculations | X | X | |
| 3.6 | Electrical calculations | | X | X |
| 3.7 | Cable, busbar calculations | | X | X |
| 3.8 | Discrimination verification | | X | X |
| 3.9 | Short circuit calculations | X | X | X |
| 3.10 | Voltage drop | X | X | X |
| 3.11 | Harmonic content | X | X | X |
| 3.12 | Cable plan | X | X | X |
| | **Installation** | | | |
| 4.1 | Equipment location, layout and dimensions | X | | X |
| 4.2 | Main cable routing layout | X | X | |
| 4.4 | Cable lists | | X | X |

| | Document | IFI | IFD | IFC |
|---|---|---|---|---|
| 4.5 | Cable types | X | | |
| 4.6 | Installation manuals for components and part systems | X | X | X |
| | **Test** | | | |
| 5.1 | FAT and SAT procedures | X | X | |
| 5.2 | FAT protocols | | X | X |
| 5.3 | SAT protocols | | X | X |
| 5.4 | Additional test reports | | X | X |
| | **Other** | | | |
| 6.1 | Grid company requirements | | X | X |

### 10.7.2 Further Description of Selected Required Documents

**Technical specifications / requirements**

Any technical specifications intended to be used for subcontracting of items of equipment from sub-suppliers.

**Overall single line diagram**

Power system layout with system voltages and system earthing, identification of all generators, transformers, switchboards, distribution boards, battery systems and major consumers. Single line diagram / consumer list for all switchboards and consumers, with information of switchboard connections, consumer rating, cable dimensions and setting of protective devices. Rating of generators (kVA/kW), all transformers (kVA), any major consumers (kVA/kW), capacity of battery and charger for battery systems.

**Consumers lists**

The list of consumers shall provide information such as: consumer identification, installed power, efficiency, power factor, absorbed power, current, load factor, start condition, emergency operation, diagram etc. All consumers shall be listed and the power summarised for each switchboard, for emergency supply and total for the Plant.

**Load calculations**

Power load analyses for all operation modes of the system including emergency power supply and UPS power supply systems. Considerations concerning size of the emergency supply for energising the necessary distribution transformers and capability of operating the required consumers during emergency supply.

**Consumers (>90 kW) datasheets**

Specific datasheets for power consumers with rating exceeding 90 kW.

**Functional description**

Description explaining functionality and operation of local, remote and automatically control of the switchboard (e.g. protection, interlocks, redundancy, trips and shutdowns, other safety actions, standby start).

**Emergency and safety systems**

Information of emergency stop, safety, safety operation precautions, interlock systems etc. showing fail-to-safe functionality.

**Switchboards, detailed single line diagrams**

Single line diagram / consumer list for all switchboards and consumers, with information of switchboard connections, consumer rating, cable dimensions and setting of protective devices. Rating of generators (kVA/kW), all transformers (kVA), any major consumers (kVA/kW), capacity of battery and charger for battery systems. Power cables and bus bar dimensions internal in the equipment including circuit protection. Table with switchgear rating for power circuits (e.g. making and breaking capacity).

**Switchboards Layout Drawings**

External and internal layout drawings showing arrangement of components of panels, parts of switchboards, motor starters. Location of instruments and devices for operation (front panel layout).

**Circuits Diagrams**

Separate power and control schematic circuit diagrams. Specifying all connections of an installation. The circuit diagrams must provide information about the internal electrical connections of a unit or assembly of units. Providing information on protection synchronisation, breaker interlocks, under voltage trips, remote control circuits, interfaces to other item of equipment including component lists with information such as manufacture, type, component reference marking and cross reference.

**Terminal Diagrams**

Diagrams showing the terminals, terminal rows, and the internal and/or external conductors connected to them shall be provided.

**Termination Diagrams**

Diagrams representing the connections between the various units of an installation shall be provided. The connection diagrams must provide information about the external electrical connections between units of equipment.

For each function (e.g. a motor control, a valve, a measuring point, etc.) a connection diagram must be supplied showing the external wiring and components and connection points with cable number, cable type, core number, or colour.

For connection to field equipment, the complete external wiring to the field equipment is also shown on the drawing. For each connection to another panel the drawing shows one terminal in the other panel, with panel and drawing number reference.

**Heat loss calculations**

For all items of equipment, switchboards, generators, transformers, power converters, motors etc., heat losses shall be listed in tables and informed. Total heat losses for items of electrical equipment located in the same room shall be summed and summarised in separate tables.

**Electrical calculation**

Short circuit levels (peak value and symmetrical root mean square at 0.5 cycle) for all switchboards in the distribution system. Two phase and earth fault currents shall also be noted.

Voltage drop calculation. Both stationary values as well as voltage drop when starting large consumers (e.g. voltage drop main switchboard to the motor terminals).

Content of voltage harmonic distortion due to more than 20% of connected load is by semi-conductor assemblies, in relation to connected generating capacity. Harmonic distortion should be given for all operating modes of the system.

**Discrimination verification**

Discrimination for feeders in the distribution system including list of settings of protection for short circuit, overcurrent and earth fault. The analysis shall include main switchboards, emergency switchboards, and all sub-distribution systems including battery /UPS systems. Minimum and maximum short circuit currents, as well as generator decrement curves should be stated in the discrimination analysis.

**Equipment location, layout and dimensions**

Drawings providing information for equipment, location of equipment parts, e.g. motors, actuators, terminal blocks, plugging units, sub-assemblies, modules. Information of dimensions for equipment. The drawings must show the item designations applied in related diagrams and the coordinate codes.

**Cable routing layout**

Drawings providing information for routing layout and cross section of cable trays systems etc.

**Cable, busbar calculations**

Calculations for cables and busbar systems, used between electrical components and internal in switchboards. To include but not be limited to voltage drop, current carrying capacity, respecting ambient conditions, installation method, short circuit withstand capacity.

**Cable Plan**

A layout drawing showing the unit or the installation with additional marking of cable routes and cable numbers shall be provided.

**Cable List**

The list of cables must include all cables to/from panel, equipment and junction boxes. The list of cables must include at least the following information:

Cable number, cable type, cable dimension, from unit or panel, to unit or panel and coordinate codes, if applicable, voltage, no. of cores and length.

**Cable types**

Information for the provided for the cables intended to be used in the system. Maker, cross sectional drawing, field of application, voltage class root mean square Uo/U, cable type and number of cores - conductor cross-sections (mm²), number of strands in each conductor, insulation thickness (mm), sheath thickness inner and outer (mm), braiding core diameter (mm), overall diameter (mm), insulating material, insulating screening, material inner sheath, material outer sheath, material outer braid, compliance standards.

**FAT procedures.**

Test procedures for routine tests and tests planned at the manufacturer's works. (e.g. start, stop, protection, interlocks, redundancy, trips and shutdowns, other safety actions, alarms).

**SAT protocols**

Test procedures for tests and tests planned at Site. (e.g. start, stop, protection, interlocks, redundancy, trips and shutdowns, other safety actions, alarms).

**Other test protocols**

Test procedures for tests and tests planned at Site in combination with other parties. (e.g. Grid company requirements test etc.).

**Grid company requirements**

Documentation and calculating to gain full compliance with grid company requirements - Including system stability analyses, discrimination analyses etc.

### 10.8 Automation

Automation data is divided into different documents and packages corresponding to the development stage of the Works (IFI, IFD, IFC). The Contractor shall submit the required documents ~~at the times defined~~as set out in the Master Information Delivery Plan. The Contractor shall in its submission of the Master Information Delivery Plan, for each development stage, group the different documents into both limited and logical packages. The Contractor shall arrange for these documents to be reviewed in a timely and efficient manner and shall follow the agreed clarification process with the ~~Purchaser~~Project Manager. The proposal for grouping and timing of documents shall be submitted to the Project Manager for review. Note the content listed is indicative and not considered exhaustive.

The quality and quantity of all data submitted by the Contractor shall be reflective of the current Works design stage (IFI, IFC, IFD). In addition, the Contractor shall provide regular progress updates ~~for specific documents as per the design progress and submission dates included in the Master Information Delivery Plan, for the Project Manager's review~~.

#### 10.8.1 Required Documents

The ~~automation reviewable Design Data~~Contractor's deliverables to the Purchaser shall include, but ~~shall~~ not be limited to, the ~~data described in table below~~following documents:

| | Document | IFI | IFD | IFC |
|---|---|---|---|---|
| | **General** | | | |
| 1.1 | Process Control Description and Philosophy (CDP) | X | X | |
| 1.2 | Technical specifications/requirements | X | X | |
| 1.3 | Programming manual | X | X | X |
| 1.4 | CMS topology/configuration | X | X | |
| 1.5 | CMS typical SW (standard modules for motor, valves etc.) | X | X | |
| 1.6 | CMS typical (HW) circuit diagrams (standard diagram for motor, valves etc.) | X | X | |
| 1.7 | Instrument lists (with type indicated block/ redundancy philosophy / location) | X | X | |
| 1.8 | Signal list or other list, including signal list from MCC etc. | X | X | |
| 1.9 | Signal lists/bus and RIO design | | X | X |
| | **CMS Equipment** | | | |
| 3.1 | Loop diagrams with verbal description | X | X | |
| 3.2 | Control flow charts and sequences | | X | X |
| 3.3 | Functional design specifications | | X | X |
| 3.4 | Single drive control loop sheets | | X | X |
| 3.5 | Closed loop control loop sheets | | X | X |
| 3.6 | Operator HMI presentation | | X | |
| 3.7 | Operation and environmental reports | | X | X |
| 3.8 | CMS texts | | X | X |
| 3.9 | IO interface cabinets/units | | | X |
| 3.10 | Process station cubicles (PLC) / hardware | | | X |
| 3.11 | CCTV system cubicles/ racks/ hardware | | | X |
| 3.12 | PLC - program listing | X | X | X |
| 3.13 | Measuring points (instruments) – data sheets | X | X | X |
| 3.14 | List of parameters for components | X | X | X |
| 3.15 | Calibration certificates for instruments | X | X | X |
| | **Installation** | | | |
| 4.1 | Control equipment location, layout and dimensions (RIO cabinets, network cabinets, CMS cabinets) | X | | X |
| 4.2 | Signal list allocation (z,x,y coordinate) | | | X |
| 4.3 | Instrument hook-up | X | | X |
| 4.4 | Field instrument locations | | | X |
| 4.5 | Cable routing layout | X | X | |
| 4.6 | Cable types | | | X |
| 4.7 | Cable lists | | | X |

| | Document | IFI | IFD | IFC |
|---|---|---|---|---|
| 4.8 | Cable termination | | X | X |
| 4.9 | Settings of parameters and limit values | | | |
| 4.10 | Complete CMS products descriptions, system manuals, instructions etc. | | X | X |
| 4.11 | Software descriptions | | X | X |
| 4.12 | Back-up copies of all programs | | | X |
| | **Tests** | | | |
| 5.1 | CMS FAT procedures | X | X | |
| 5.2 | CMS SAT procedures | | X | X |

### 10.8.2 Further Description of Selected Required Documents

**Process Control Description and Philosophy (CDP)**

The Contractor shall prepare a CDP to explain in plain (i.e. non-technical) language to the Purchaser how the process and Plant will be operated. The CDP shall contain the overall control and operational philosophy of the Plant, including description of the start/stop procedures as well as description of interactions between the sub-systems and processes during operation. Furthermore, the CDP shall contain the control philosophy of each process section of the Plant and descriptions of the general and specific operational modes and automatic functions throughout the Plant. The CDP shall contain references to the process and instrumentation diagrams and shall include tables and data summarising the content in appendices, if appropriate to support the descriptions. The CDP shall serve as basis for the Contractor's detailed design and preparation of the detailed functional descriptions of all dedicated systems.

**Technical specifications / requirements**

Any technical specifications intended to be used for Subcontracting of items of equipment from sub suppliers.

**Programming manual**

The programming manual shall address all items relevant for the Contractor's engineer who shall programme automation for the Works.

The programming manual shall be finished at the end of basic design. The programming manual is vital for coordination so a milestone can be included to make it possible to help insure a quality assured version is issued when the last corrections are completed.

**CMS typical SW**

Description of library of standard software modules.

**CMS typical circuit diagrams**

Circuit diagram/loop diagrams showing interface between CMS and MCC/ACC/RIO etc.

Instrument lists with info needed for design. Type, bus / traditional, unit / common, needed split because of process requirements / redundancy.

The list shall include all data needed to create the single drive and closed loop control loop diagrams.

**Signal lists / bus and RIO design**

Design of buses and other IO interface based on input from the CMS typical circuit diagrams.

**Loop diagrams with verbal description**

Loop diagrams with verbal description shall be used for designing master controller implementation with the ~~Purchaser~~Project Manager, and as a tool to communicate with all technical disciplines in a simple and practical way.

**Control flow charts and sequences**

The flow charts shall show and describe the structure of the various control sequences in a simple way.

**Functional design specification (FDS) and control schedules**

The FDS and control schedules shall include all information necessary for coding / programming of the CMS.

Where the Works include a local control panel a functional description and a description of the local control and operation facilities shall be included.

The FDS shall include a verbal description of the Works, functions, operational sequences and interlocks covering both normal and abnormal operation.

Control schedules are to include as a minimum:

- For each motor control, valve control. All conditions for automatic start / stop, manual start / stop, emergency stop.
- For each group control: All conditions for activating the group start and group stop sequences, for continuing to next step of the sequence, etc. and the feedback signal to the "head" of the group control from all motor controls, etc. activated by the group start and stop sequences.
- For each measuring point or other input: cross references to all functions where the signal is used for analogue inputs with specifications of all limit values.

**Single drive control loop sheets:**

The typical documentation shall be based on that agreed in the CMS typical circuit diagrams (analogue part) (HW) and shall include all information required for each component to facilitate debugging / investigation of failures (i.e. not info split across multiple documents)

**Closed loop control loop sheets**

The documentation shall be based on that agreed in the CMS typical circuit diagrams (other than analogue part) (HW). The documentation shall include all information required for each component to facilitate debugging / investigation of failures (information shall not be split across multiple documents).

**Operator Human Machine Interface (HMI) presentation**

Samples of Operator HMI (Graphics). Principles to be approved in advance by the ~~Purchaser~~Project Manager.

**Operation and environmental reports**

A first draft shall be presented for the ~~Purchaser~~Project Manager for comments. A second draft shall be provided to the ~~Purchaser~~Project Manager for approval.

**CMS texts**

The texts to be used on graphics for motors, valves etc.

**IO interface cabinets/units**

All design and technical information about all cabinets.

**Process station cubicles (PLC) / hardware**

All design and technical info about all cabinets.

**CCTV system cubicles / racks / hardware**

All design and technical info about all cabinets.

**PLC - program listing**

Complete Documentation of the entire PLC-program including, but not limited to:

**Measuring points (instruments) – data sheets**

Manufacturer data sheets and technical specifications. Hook up drawing showing the instrument installation with all mechanical details for mounting.

**Location drawing of field instrumentation**

The location drawing must contain detailed information on location of instruments and control equipment. The location drawing must show the item designations applied in related diagrams and the co-ordinate codes of instrumentation.

**List of parameters for components**

List showing all parameters, which may be changed/selected in microprocessor based components.

**Calibration certificates for instruments**

Certificates for each instrument providing information on precision, linearity, calibration condition, etc. shall be included.

**Control equipment location, layout and dimensions**

All info needed to install, pull cables and terminate cables.

**Signal list allocation**

All info needed to install, pull cables and terminate cables.

**Cable types**

First draft of cable routing is requirements and principles. Second draft is initial layout to coordinate details.

**Cable lists**

Cable types to be approved before construction.

**CMS product descriptions**

Complete descriptions of the used hard- and software products, system manuals, instructions etc. for the CMS

**Software descriptions**

Program Documentation, software descriptions with summaries and indexes, designation / explanation of file names etc.

**Program back-up copies**

Back-up copies of all programs, including compilers – for maintenance, restoring, reconfiguring and modification of the CMS System

# 11. APPENDIX 2 – ENVIRONMENTAL PERMITS

| Ref | Topic / Report | Pre-Operational Measures (text as stated within the Environmental Permit) | Contractor Response Deadline | Responsibility | Reference to Detailed Requirements |
|---|---|---|---|---|---|
| PO1B | Site Environment Management System | Prior to the commencement of commissioning of the energy recovery facility, the Operator shall send a summary of the site Environment Management System (EMS) to the Environment Agency and make available for inspection all documents and procedures which form part of the EMS including operational procedures relevant to the energy recovery facility. The EMS shall be developed in line with the requirements set out in Environment Agency web guide on developing a management system for environmental permits (found on www.gov.uk). The documents and procedures set out in the EMS shall form the written management system referenced in condition 1.1.1 (a) of the permit. | Initial information (draft operational/maintenance procedures, etc.) to be issued to the Project Manager (as a minimum 28 weeks prior to the start of cold commissioning) for engagement with Environment Agency.<br><br>Further information may be requested following consultation with the Environment Agency | Documents to be provided by Contractor and then to be submitted by Purchaser | Reference Schedule 2 – *Documentation* and Schedule 14 *Criteria for Completion of Construction.* |
| PO2 | CHP / Heat Offtake Report | Prior to the commencement of construction, the Operator shall send a report to the Environment Agency which will contain a comprehensive review of the options available for utilising the heat generated by the waste incineration process in order to ensure that it is recovered as far as practicable. The review shall detail any identified proposals for improving the recovery and utilisation of waste heat and shall provide a timetable for their implementation. | Contractor to provide heat offtake report based on its design. The Purchaser will be responsible for completing the report and submitting it to the EA as detailed in Schedule 3 *Responsibilities of the Purchaser*<br><br>Information may be requested on an as required basis. | Documents to be provided by the Contractor and then to be submitted by Purchaser | Schedule 22.1.3 *Technical Specifications for Turbine / Generator / ACC / District Heating* |
| PO3 | IBA Sampling and Testing Protocol | Prior to the commencement of commissioning, the Operator shall submit to the Environment Agency for approval a protocol for the sampling and testing of incinerator bottom ash for the purposes of assessing its hazard status. Sampling and testing shall be carried out in accordance with the protocol as approved. | Date for submission of Contractor information TBC.<br><br>Contractor to provide a draft sampling procedure and any other necessary information to enable the Purchaser to produce draft protocol based on the Contractor's detailed design. | Development of draft sampling procedure by Contractor which will then be reviewed and developed into a protocol for submission by Purchaser with additional support | ~~Reference Schedule 2 – *Documentation,* Schedule 14 *Criteria for Completion of Construction* and~~ Schedule 22.1.4 *Technical Specifications for Auxiliary Equipment* |

| Ref | Topic / Report | Pre-Operational Measures (text as stated within the Environmental Permit) | Contractor Response Deadline | Responsibility | Reference to Detailed Requirements |
|---|---|---|---|---|---|
| | | | Initial draft protocol to be issued to the Project Manager (as a minimum ~~28~~52 weeks prior to the start of cold commissioning) for engagement with Environment Agency.<br><br>Final plan to be submitted 28 weeks prior to the start of cold commissioning | from Contractor where necessary | |
| PO4B | Commissioning Plan | Prior to the commencement of commissioning of the energy recovery facility; the Operator shall provide a written commissioning plan, including timelines for completion, for approval by the Environment Agency. The commissioning plan shall include the expected emissions to the environment during the different stages of commissioning, the expected durations of commissioning activities and the actions to be taken to protect the environment and report to the Environment Agency in the event that actual emissions exceed expected emissions. Commissioning shall be carried out in accordance with the commissioning plan as approved. | ~~At~~Aa a minimum ~~28~~52 weeks prior to the start of cold commissioning a draft commissioning plan shall be issued to the Project Manager by the Contractor for engagement with the Environment Agency.<br><br>Final plan to be submitted ~~10~~28 weeks prior to the start of cold commissioning | Commissioning Plan to be provided by the Contractor and submitted~~,~~ ~~submission~~ by the Purchaser | ~~Reference Schedule 2 – *Documentation* and Schedule 14 *Criteria for Completion of Construction*~~ |
| PO5B | Waste Acceptance Procedure Report | Prior to the commencement of commissioning of the energy recovery facility, the Operator shall submit a written report to the Agency detailing the waste acceptance procedure to be used at the site. The waste acceptance procedure shall include the process and systems by which wastes unsuitable for incineration at the site will be controlled. The procedure shall be implemented in accordance with the written approval from the Environment Agency. | Draft Waste Acceptance Protocol to be produced by Contractor based on the Contractors design. Initial draft protocol to be issued to the Project Manager as a minimum 28 weeks prior to the start of cold commissioning for engagement with Environment Agency. The Purchaser shall complete and submit the report based on its operational requirements. | Draft Waste Acceptance Protocol documents to be provided by Contractor with the final protocol submission being undertaken by Purchaser | Reference Schedule 2 – *Documentation* and Schedule 14 *Criteria for Completion of Construction* |

| Ref | Topic / Report | Pre-Operational Measures (text as stated within the Environmental Permit) | Contractor Response Deadline | Responsibility | Reference to Detailed Requirements |
|---|---|---|---|---|---|
| | | | Further information on the design intent may be requested following consultation. | | |
| PO6 | Furnace Design Report | After completion of furnace design and at least three calendar months before any furnace operation; the operator shall submit a written report to the Environment Agency of the details of the computational fluid dynamic (CFD) modelling. The report shall demonstrate whether the design combustion conditions comply with the residence time and temperature requirements as defined by Chapter IV of the IED. | After completion of furnace design and as a minimum 28 weeks before any furnace operation, CFD modelling and report to be issued to the Project Manager for review and comment prior to issuing to the Environment Agency for approval. Date to be proposed by Contractor to allow Environment Agency approval without disruption to Contractor's programme<br><br>Date for submission of Contractor information TBC. | Report and supporting documents to be provided by the Contractor and submitted by the Purchaser | Reference detailed requirements within Schedule 22.1.1 *Technical Specifications for Incinerator / Boiler* |
| PO7B | Soil and Groundwater Baseline Condition Report (requirements of Article 22(2) of IED) | Prior to the commencement of commissioning, the Operator shall submit a report on the baseline conditions of soil and groundwater at the installation. The report shall contain the information necessary to determine the state of soil and groundwater contamination so as to make a quantified comparison with the state upon definitive cessation of activities provided for in Article 22(3) of the IED. The report shall contain information, supplementary to that already provided in application Site Condition Report, needed to meet the information requirements of Article 22(2) of the IED. | Information in relation to the final validation report to be submitted to the Purchaser at least 28 weeks prior to the start of cold commissioning | The Contractor will provide the necessary information in relation to the final validation report, which is to be submitted by the Purchaser. The Contractor will support any discussions with the Environment Agency, as well as preparation of responses to enquiries. | Reference Schedule 2 – *Documentation* and Schedule 14 *Criteria for Completion of Construction* |

| Ref | Topic / Report | Pre-Operational Measures (text as stated within the Environmental Permit) | Contractor Response Deadline | Responsibility | Reference to Detailed Requirements |
|---|---|---|---|---|---|
| PO9 | Emissions to Air Report | At least three months before operation, the Operator shall submit a written report to the Environment Agency specifying arrangements for continuous and periodic monitoring of emissions to air to comply with Environment Agency guidance notes M1 and M2. The report shall include the following:<br>• Plant and equipment details, including accreditation to MCERTS<br>• Methods and standards for sampling and analysis<br>Details of monitoring locations, access and working platforms | Date for submission of Contractor information TBC.<br>Contractor to issue design information in relation to the air emissions report as required by the EA to the Project Manager at least 28 weeks prior to the start of cold commissioning for engagement with Environment Agency. | The design shall be compliant with the EA's requirements.<br>Design information to be provided by Contractor and air emissions report to be developed and submitted by the Purchaser. | Reference Schedule 2 – *Documentation* and Schedule 14 *Criteria for Completion of Construction* and Schedule 22.1.2 *Technical Specifications for Flue Gas Treatment System* |
| PO10B | EA Fire Prevention Plan Report | The operator shall submit a written report to the Environment Agency demonstrating how the site meets the relevant criteria set out within the Environment Agency's Fire Prevention Plan guidance. The report shall be submitted to the Environment Agency for approval. | Date for submission of Contractor information TBC.<br>Contractor to provide final design information as required by the EA based on the Contractor's design to the Project Manager at least 28 weeks prior to cold commissioning | Design information to be provided by Contractor and developed into a report and submitted by the Purchaser | Reference Schedule 2 – *Documentation* and Schedule 14 *Criteria for Completion of Construction* |
| PO11 | FGT Design Report | At least 6 months prior to construction of the Energy Recovery Facility the operator shall submit a report to the Environment Agency providing detailed designs for the proposed flue gas treatment system and obtain the Environment Agency's written approval to it. The report shall include but is not limited to the following considerations:<br>1. that the final design will meet the requirements of BAT;<br>2. that the application still accurately reflects the final operating proposals; and<br>3. that the environmental impact assessment still accurately reflects the predicted impacts from the | Contractor to issue the FGT design report at least 6 months prior to construction (notice period to be confirmed) of the flue gas treatment system of the ERF.<br>Date for submission of Contractor information TBC. Date to ensure changes required by the EA can be accommodated by the Contractor within its programme. | Report and supporting documents to be provided by Contractor and submitted by the Purchaser | Reference detailed requirements within Schedule 22.1.2 *Technical Specifications for Flue Gas Treatment System* |

| Ref | Topic / Report | Pre-Operational Measures (text as stated within the Environmental Permit) | Contractor Response Deadline | Responsibility | Reference to Detailed Requirements |
|---|---|---|---|---|---|
| | | proposal.<br><br>The operator shall submit a written report to the Environment Agency for approval, 6 months prior to construction, detailing the findings of this review. | | | |
| PO12B | Odour Management Plan | The Operator shall submit a written Odour Management Plan (OMP) to the Environment Agency for approval. The OMP should demonstrate how emissions of odour will be either prevented or where this is not practicable, minimise odour in line with Environment Agency guidance H4. | Date for submission of Contractor information TBC.<br><br>Contractor's draft template Odour Management Plan to be issued to the Project Manager on completion of initial design and updated at least 28 weeks prior to the start of cold commissioning. The Purchaser shall complete and submit the report based on its operational requirements. | Draft Odour Management Plan template and supporting documents to be provided by Contractor to support the Purchaser's development of an Odour Management Plan which will be submitted by, the Purchaser | Reference Schedule 2 – *Documentation* and Schedule 14 *Criteria for Completion of Construction* |
| PO13 | Wastewater Treatment Plant | The operator shall submit a report to the Environment Agency providing detailed designs for the wastewater treatment plant. The operator shall undertake a review of the final detailed design prior to installation to ensure that:<br><br>1. the final design will meet the requirements of BAT; and<br><br>2. the predicated emissions from the proposal will not result in an unacceptable deterioration of the receiving waters. This shall be supported by a risk assessment using the Environment Agency's H1 screening tool<br><br>The operator shall submit a written report to the Environment Agency for approval, 6 months prior to construction, detailing the findings of this review. | Contractor to submit design report in accordance with EA requirements to the Project Manager at least 28 weeks prior to the construction of the wastewater treatment plant.<br><br>Date for submission of Contractor information TBC to ensure EA approval does not delay the Contractor's programme | Wastewater treatment plant design report and supporting documents to be provided by Contractor to support the Purchaser's review document which will be submitted to the EA by Purchaser | Reference Schedule 2 - *Documentation* |

Table A 1 - Pre-operational Conditions - Energy Recovery Facility

| Ref | Topic / Report | Improvement Measures (text as stated within Environmental Permit) | Contractor Response Deadline | Responsibility | Reference to Detailed Requirement |
|---|---|---|---|---|---|
| IC1B | EMS Implementation | The Operator shall submit a written report to the Environment Agency on the implementation of the energy recovery facility Environmental Management System and the progress made in the certification of the system by an external body or if appropriate submit a schedule by which the EMS will be certified. | Information on the design, maintenance, operation, etc. of the ERF to be submitted to the Project Manager from Contractor prior to Take Over. Final EMS submission submitted by the Operator 26 weeks after Take Over. | Design and maintenance documentation required to support the EMS will be submitted by the Contractor and be submitted by the Purchaser. | Reference Schedule 15 *Take Over Procedures* |
| IC2 | Dust Emissions | The Operator shall submit a written proposal to the Environment Agency to carry out tests to determine the size distribution of the particulate matter in the exhaust gas emissions to air from emission point A1 and A2, identifying the fractions within the PM10, and PM2.5 ranges. The proposal shall include a timetable for approval by the Environment Agency to carry out such tests and produce a report on the results. On receipt of written agreement by the Environment Agency to the proposal and the timetable, the Operator shall carry out the tests and submit to the Environment Agency a report on the results. | Contractor to supply details and justification of sampling locations and equipment required and relevant procedures to collect the necessary samples. Associated test results provided following the emission tests undertaken as part of performance testing, Test results shall be issued to the Project Manager within 4 weeks of the tests being carried out. | Documents and test results to be provided by the Contractor, submission by Purchaser | Reference Schedule 2 – *Documentation* and Schedule 14 *Criteria for Completion of Construction*. Reference Schedule 15 *Take Over Procedures* |
| IC3B | Post Commissioning Report | The Operator shall submit a written report to the Environment Agency on the commissioning of the energy recovery facility. The report shall summarise the environmental performance of the plant as installed against the design parameters set out in the Application. The report shall also include a review of the performance of the facility against the conditions of this permit and details of procedures developed during commissioning for achieving and demonstrating compliance with permit conditions. | Within 16 weeks of the completion of commissioning and performance testing of the ERF the Contractor shall issue the commissioning report to the Project Manager. | Commissioning Report and all supporting documents to be provided by the Contractor including the report template and submission by the Purchaser. | Reference Schedule 2 – *Documentation* and Schedule 15 *Take Over Procedures*. Schedule 16 *Performance Tests and Procedures.* |
| IC4 | Furnace Operation Report | The Operator shall carry out checks to verify the residence time, minimum temperature and oxygen content of the | Prior to the issue of the Take Over Certificate the Contractor | Documents to be provided by the Contractor and | Reference Schedule 2 – *Documentation* and |

| Ref | Topic / Report | Improvement Measures (text as stated within Environmental Permit) | Contractor Response Deadline | Responsibility | Reference to Detailed Requirement |
|---|---|---|---|---|---|
| | | exhaust gases in the furnace whilst operating under the anticipated most unfavourable operating conditions. The results shall be submitted in writing to the Environment Agency. | shall undertake and report on the verification measurements of the combustion chamber design/CFD modelling. Testing shall include the residence time, temperature and oxygen content of the combustion chamber. | submitted by the Purchaser. | Schedule 15 *Take Over Procedures.* |
| IC5 | SCR and emissions operation report | The Operator shall submit a written report to the Environment Agency describing the performance and optimization of the Selective Catalytic Reduction (SCR) system and combustion settings to minimise oxides of nitrogen (NOx) emissions within the emission limit values described in this permit with the minimisation of nitrous oxide emissions. The report shall include an assessment of the level of NOx and N2O emissions that can be achieved under optimum operating conditions.<br>The report shall also provide details of the optimisation (including dosing rates) for the control of acid gases and dioxins. | Within 16 weeks of the completion of commissioning and performance testing of the ERF the Contractor shall issue the commissioning report to the Project Manager. Report to include all EA requirements. | Documents to be provided by the Contractor including the report template and to be submitted by the Purchaser. | Reference Schedule 2 – *Documentation* and Schedule 15 *Take Over Procedures* |
| IC6 | CEMS calibration and verification | The Operator shall submit a written summary report to the Agency to confirm by the results of calibration and verification testing that the performance of Continuous Emission Monitors for parameters as specified in Table S3.1 and Table S3.1(a) complies with the requirements of BS EN 14181, specifically the requirements of QAL1, QAL2 and QAL3. | Contractor to supply initial calibration and verification report to be issued to the Environment Agency prior to the issue of the Take Over Certificate.<br>Full verification report to be submitted within 12 weeks of commissioning of the ERF and prior to start of Performance Tests. | Report and supporting documents to be provided by the Contractor and to be submitted by the Purchaser | |
| IC7 | Drainage Plans | The operator shall submit a drainage plan to the Environment Agency to confirm the routes of both foul effluent, “domestic” effluent and surface water run | The Contractor shall supply a drainage plan as required by the EA. Date of submission to | Report and supporting documents to be provided by the Contractor and to be | |

| Ref | Topic / Report | Improvement Measures (text as stated within Environmental Permit) | Contractor Response Deadline | Responsibility | Reference to Detailed Requirement |
|---|---|---|---|---|---|
| | | off/discharge. | be confirmed by the Contractor to ensure EA approval does not delay the Contractor's programme. | submitted by the Purchaser | |
| Para 3.4 | Noise Management Plan | The Contractor shall provide suitable information relating to the noise design and noise reduction in design, including the Contractor's noise and vibration model, to enable the Purchaser to develop a Noise Management Plan for submission to the EA. The plan will include a report indicating how noise and vibrations have been modelled and the scheme to include all noise sources and noise emissions at all receptors agreed with the planning authorities. | Contractor to provide preliminary noise and vibration model five months after the Effective Date, with an updated model to follow nine months after the Effective Date and a final model 14 months after the Effective Date. | Contractor to provide necessary information to enable Purchaser to prepare Noise and Vibration Management Plan for submission to the EA. | |
| General | Reporting required by the EA | Contractor to maintain records and provide reports as required by the EA up to the point at which a Take Over Certificate is issued for the facility. | Contractor to maintain records and provide reports required by the EA prior to Take Over. All necessary records to be handed over to the Operator at Take Over. | Report and supporting documentation by Contractor and to be submitted by the Purchaser | |

Table A 2 - Improvement Programme Requirements - Energy Recovery Facility

# 12. APPENDIX 3 – EXCHANGE INFORMATION REQUIREMENTS

~~13.~~

| **Summary report:**<br>**Litera Compare for Word 11.9.0.82 Document comparison done on 12/11/2026 16:14:48** | |
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| Embedded Excel | 0 |
| Format changes | 0 |
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