
PROCUREMENT DOCUMENT

Bidding Documents for Procurement of Works

Development of Maritime Meteorological Information System in Indonesia (MMS)-2 : Procurement of the Modelling System with Big Data and Artificial Intelligence (including maritime observation equipment, remote sensing, and system integration)

Agence Française de Développement



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PART 1 – Bidding Procedures

Section I - Instructions to Bidders

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A. General

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| 1 | Scope of Bid | <p>1.1 In connection with the Invitation for Bids specified in the Bid Data Sheet (BDS), the Employer, as specified in the BDS, issues these Bidding Documents for the procurement of Works (design, build and operate) as specified in Section VII, Employer's Requirements. The name and identification of this International Procurement Competition (IPC) process are specified in the BDS.</p> <p>1.2 Throughout these Bidding Documents:</p> <ul style="list-style-type: none"> a) The term "in writing" means communicated in written form (including electronic transmission) and delivered against receipt; b) Except where the context requires otherwise, words indicating the singular also include the plural and words indicating the plural also include the singular; and c) "Day" means calendar day, unless otherwise specified as "Business Day". A Business Day is any day that is an official working day of the Employer. It excludes the Employer's official public holidays. |
| 2 | Source of Funds | <p>2.1 The Employer specified in the BDS has received or has applied for financing (hereinafter called "funds") from <i>Agence Française de Développement</i> (hereinafter called "AFD") toward the project named in the BDS. The Employer intends to apply a portion of the funds to eligible payments under the contract(s) for which these Bidding Documents are issued.</p> |
| 3 | Corrupt and Fraudulent Practices | <p>3.1 AFD requires compliance with its policy regarding corrupt and fraudulent practices as set forth in Section VI, AFD Policy - Corrupt and Fraudulent Practices - Environmental and Social Responsibility.</p> <p>3.2 In further pursuance of this policy, Bidders shall permit and shall cause its Subcontractors and subconsultants, to permit AFD to inspect all accounts, records and other documents relating to any Initial Selection process, Bid submission, and contract performance (in the case of award), and to have them audited by auditors appointed by AFD.</p> |
| 4 | Eligible Bidders | <p>4.1 A Bidder may be a firm that is a private entity, a State-owned entity - subject to ITB 4.3 - or any combination of such entities in the form of a joint venture (JV) under an existing agreement or with the intent to enter into such an agreement supported by a letter of intent. In the case of a joint venture, all members shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms. The JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the bidding process and, in the event the JV is awarded the Contract, during contract execution. Unless specified in the BDS, there is no limit on the number of members in a JV.</p> <p>4.2 A Bidder shall not have a conflict of interest. Any Bidder found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest for the purpose of this procurement process, if the Bidder:</p> <ul style="list-style-type: none"> a) Directly or indirectly controls, is controlled by or is under common control with another Bidder; or |

- b) Receives or has received any direct or indirect subsidy from another Bidder; or
- c) Has the same legal representative as another Bidder; or
- d) Has a relationship with another Bidder, directly or through common third parties, that puts it in a position to influence the bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or
- e) Participates, except for alternatives permitted under ITB 13, in more than one bid in this bidding process. Participation by a Bidder (either individually or as a JV member) in more than one Bid will result in the disqualification of all Bids in which such Bidder is involved. However, this does not limit the inclusion of the same Subcontractor in more than one bid; or
- f) Any of its affiliates participated as a consultant in the preparation of the Employer's Requirements or performance requirements of the Works that are the subject of the Bid; or
- g) Any of its affiliates has been hired (or is proposed to be hired) by the Employer as Employer's Representative for the Contract implementation; or
- h) Has a close business or family relationship with a professional staff of the Employer (or of the project implementing agency, or of a recipient of a part of the funds) who: (i) are directly or indirectly involved in the preparation of the bidding documents or specifications of the contract, and/or the bid evaluation process of such contract; or (ii) would be involved in the implementation or supervision of such contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to AFD throughout the procurement process and execution of the contract.

4.3 AFD's eligibility criteria for AFD financing are described in Section V, Eligibility Criteria.

4.4 A Bidder shall not be under suspension from bidding by the Employer as the result of the execution of a Bid–Securing Declaration.

4.5 This bidding is open only to initially selected Bidders.

4.6 A Bidder shall provide such evidence of eligibility satisfactory to the Employer, as the Employer shall reasonably request.

4.7 A firm that is under a sanction of debarment by the Employer from being awarded a contract is eligible to participate in this procurement, unless AFD, at the Employer's request, is satisfied that the debarment; (a) relates to fraud or corruption, and (b) followed a judicial or administrative proceeding that afforded the firm adequate due process.

5 Eligible Materials, Equipment and Services

5.1 The materials, equipment and services to be supplied under the Contract and financed by AFD may have their origin in any country subject to the restrictions specified in Section V, Eligibility Criteria, and all expenditures under the Contract will not contravene such restrictions. At the Employer's request, Bidders may be required to provide evidence of the origin of materials, equipment and services.

5.2 For purposes of ITB 5.1 above, "origin" means the place where the equipment, parts or components, materials and services thereof are

mined, grown, produced or manufactured, and from where the services are provided.

B. Contents of Bidding Documents

6 Sections of Bidding Documents

- 6.1 The Bidding Documents consist of Parts 1, 2, and 3, which include all the Sections specified below, and which should be read in conjunction with any Addenda issued in accordance with ITB 8.

PART 1: Bidding Procedures

- Section I - Instructions to Bidders (ITB)
- Section II – Bid Data Sheet (BDS)
- Section III - Evaluation and Qualification Criteria
- Section IV – Bidding Forms
- Section V – Eligibility Criteria
- Section VI - AFD Policy – Corrupt and Fraudulent Practices – Environmental and Social Responsibility

PART 2: Employer's Requirements

- Section VII – Employer's Requirements

PART 3: Conditions of Contract and Contract Forms

- Section VIII – General Conditions of Contract (GCC)
- Section IX – Particular Conditions of Contract (PCC)
- Section X – Contract Forms

- 6.2 The Invitation for Bids issued by the Employer is not part of the Bidding Documents.

- 6.3 Unless obtained directly from the Employer, the Employer is not responsible for the completeness of the Bidding Documents, responses to requests for clarification, the minutes of the pre-Bid meeting (if any), or amendments to the Bidding Documents in accordance with ITB 8. In case of any contradiction, documents obtained directly from the Employer shall prevail.

- 6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Documents and to furnish with its bid all information and documentation as is required by the Bidding Documents.

7 Clarification of Bidding Documents, Site Visit, Pre-Bid Meeting

- 7.1 A Bidder requiring any clarification of the Bidding Documents shall contact the Employer in writing at the Employer's address **specified in the BDS** or raise its enquiries during the pre-bid meeting if provided for in accordance with ITB 7.4. The Employer will respond in writing to any request for clarification including a description of the inquiry but without identifying its source, provided that such request is received no later than fourteen (14) days prior to the deadline for submission of bids. The Employer shall forward copies of its response to all Bidders who have acquired the Bidding Documents in accordance with ITB 6.3. **If so specified in the BDS**, the Employer shall also promptly publish its response at the web page **identified in the BDS**. Should the clarification result in changes to the essential elements of the Bidding Documents, the Employer shall amend the Bidding Documents following the procedure under ITB 8 and ITB 23.2.

- 7.2 The Bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.
- 7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.
- 7.4 **If so specified in the BDS**, the Bidder's designated representative is invited to attend a pre-bid meeting. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage. Unless otherwise stated in the Bidding Documents, non-attendance at the pre-bid meeting will not be a cause for disqualification of a Bidder.
- 7.5 The Bidder is requested to submit any questions in writing, to reach the Employer not later than seven (7) days before the meeting.
- 7.6 Minutes of the pre-bid meeting, if applicable, including the text of the questions asked by Bidders, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be communicated promptly in writing to all Bidders who have acquired the Bidding Documents in accordance with ITB 6.3. Any modification to the Bidding Documents that may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to ITB 8 and not through the minutes of the pre-bid meeting.
- 8 Amendment of Bidding Documents**
- 8.1 At any time prior to the deadline for submission of bids, the Employer may amend the Bidding Documents by issuing amendments.
- 8.2 Any amendment issued shall be part of the Bidding Documents and shall be communicated in writing to all who have obtained the Bidding Documents from the Employer in accordance with ITB 6.3. The Employer shall also promptly publish the amendment on the Employer's web page in accordance with ITB 7.1.
- 8.3 To give Bidders reasonable time in which to take an amendment into account in preparing their bids, the Employer may, at its discretion, extend the deadline for the submission of bids, pursuant to ITB 23.2.
- C. Preparation of Bids**
- 9 Cost of Bidding**
- 9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer shall not be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
- 10 Language of Bid**
- 10.1 The Bid, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Employer, shall be written in the language **specified in the BDS**. Supporting documents and printed literature that are part of the Bid may be in another language provided that the relevant passages are accompanied by an accurate translation in the language **specified in the BDS**, in which case, for purposes of interpretation of the Bid, such translation shall govern.

11 Documents Comprising the Bid

11.1 The Bid shall comprise two envelopes submitted simultaneously, one containing the Technical Bid and the other the Financial Bid.

11.2 The Technical Bid shall comprise the following:

- a) Bid Submission Form – Technical Bid;
- b) Written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 21.2;
- c) In case of a JV, the JV agreement or the letter of intent to form a JV signed by all intended members of the future JV, in accordance with ITB 11.4;
- d) Alternatives, if permissible in accordance with ITB 13;
- e) Bid Security of Bid-Securing Declaration, in accordance with ITB 20.1;
- f) Statement of Integrity, Eligibility and Social and Environmental Responsibility duly signed, in accordance with ITB 12;
- g) Completed Bidding Forms - Technical Bid as required, in accordance with ITB 12;
- h) Documentary evidence in accordance with ITB 14 establishing the Bidder's continued qualified status;
- i) Documentary evidence in accordance with ITB 15 that the Works offered by the Bidder conform to the Bidding Documents;
- j) Technical proposal and the Schedule of Performance Guarantees in accordance with ITB 16;
- k) List of Subcontractors, in accordance with ITB 16.2;
- l) Any other technical documents **required in the BDS**.

11.3 The Financial Bid (whether base or alternative) shall comprise the following:

- a) Bid Submission Form – Bid Price;
- b) Completed Bidding Forms –Bid Price as required, in accordance with ITB 12;
- c) Any other documents **required in the BDS**.

11.4 In accordance with the requirements under ITB 11.2, bids submitted by a JV shall include a copy of the Joint Venture Agreement entered into by all members. Alternatively, a letter of intent to execute a Joint Venture Agreement in the event of a successful bid shall be signed by all members and submitted with the bid, together with a copy of the proposed Agreement.

11.5 The Bidder shall furnish information on commissions and gratuities, if any, paid or to be paid to agents or any other party relating to this Bid.

12 Bid Submission Forms, Statement of Integrity, Bidding Forms and Schedules

12.1 The Technical Bid and the Financial Bid should be prepared using the Bid Submission Forms (both Technical and Price) and the Statement of Integrity must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under ITB 21.4. All blank spaces shall be filled in with the information requested.

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| 13 Alternative Bids, Alternative Technical Solutions and Alternative Times for Completion | <p>13.1 Unless otherwise specified in the BDS, alternative bids shall not be considered. If permitted, the method for their evaluation shall be described in Section III, Evaluation and Qualification Criteria.</p> <p>13.2 Unless otherwise specified in the BDS, alternative technical solutions shall not be considered. If Bidders are permitted to submit alternative technical solutions and only for specified parts of the Works, such parts shall be identified in Section VII, Employer's Requirements. The methods for their evaluation shall be described in Section III, Evaluation and Qualification Criteria.</p> <p>13.3 Bidders wishing to submit alternative bids and/or alternative technical solutions, substantially compliant with the requirements of the Bidding Documents, if permitted under ITB 13.1 and/or ITB 13.2 shall provide all information necessary for a complete evaluation by the Employer of the alternative bid and/or alternative technical solutions, including but not limited to, drawings, design calculations, technical specifications, breakdown of prices, proposed construction methodology, and other relevant details.</p> <p>13.4 Only one (1) alternative bid per Bidder may be submitted and only one (1) alternative technical solution for each permitted part of the Works may be submitted.</p> <p>13.5 Unless otherwise specified in the BDS, alternative times for completion of the Works shall not be considered. If permitted the method for their evaluation shall be described in Section III, Evaluation and Qualification Criteria</p> |
| 14 Documents Establishing the Qualifications of the Bidder | <p>14.1 In accordance with Section III, Evaluation and Qualification Criteria, to establish that the Bidder continues to meet the criteria used at the time of Initial Selection, the Bidder shall provide in the corresponding information sheets included in Section IV, Bidding Forms, updated information on any assessed aspect that changed from that time.</p> <p>14.2 Any change in the structure or formation of a Bidder after being initially selected and invited to Bid (including, in the case of a JV, any change in the structure or formation of any member thereto) shall be subject to the written approval of the Employer prior to the deadline for submission of Bids. Such approval shall be denied if (i) as a consequence of the change, the Bidder no longer meets the qualification criteria set forth in the Initial Selection Documents; or (ii) in the opinion of the Employer, the change may result in a substantial reduction in competition; or (iii) a Bidder proposes to associate with a disqualified Bidder or in case of a disqualified joint venture, any of its members; or (iv) as a consequence of the change, the Bidder no longer continues to be on the list of Initially Selected Bidders as a result of the Employer's re-evaluation of the Application in accordance with criteria specified in the Initial Selection Documents. Any such change should be submitted to the Employer not later than fourteen (14) days after the date of the Invitation for Bids.</p> <p>14.3 The Bidder shall be responsible for ensuring that any proposed Subcontractor complies with the requirements of ITB 4 and ITB 5. Bidders shall submit an undertaking from each proposed Subcontractor to confirm that they have read, understand and will comply with the ESHS obligations. The Bidder shall provide information in accordance with the requirements in Section III.</p> |

15 Documents Establishing Conformity of the Works

- 15.1 The documentary evidence of the conformity of the Works to the Bidding Documents may be in the form of literature, drawings and data, and shall furnish:
- a) a detailed description of the essential technical and performance characteristics of the Works, including the Contractor's Performance Guarantees under the Schedule of Performance Guarantees of the proposed Works, in response to the Employer's Requirements;
 - b) a list giving full particulars, including available sources, of all spare parts and special tools necessary for the proper and continuing operation of the Works during the Operation Service Period; and
 - c) a commentary on the Employer's Requirements and adequate evidence demonstrating the substantial responsiveness of the Works, to those Employer's Requirements. Bidders shall note that standards for workmanship, materials and equipment designated by the Employer in the Bidding Documents are intended to be descriptive (establishing standards of quality) only and not restrictive. The Bidder may substitute alternative standards, brand names and/or catalogue numbers in its Bid, provided that it demonstrates to the Employer's satisfaction that the substitutions are substantially equivalent or superior to the standards designated in the Employer's Requirements.

16 Technical proposal

- 16.1 The Bidder shall furnish a technical proposal including method statements for the Design, Build and Operation of the Works, work methods, key activities listing any Subcontractor that will do the work, Key Contractor's equipment, Key Contractor's Personnel, Contractor's Performance Guarantees under the Schedule of Performance Guarantees and any other information as stipulated in Section IV, Bidding Forms, in sufficient detail to demonstrate the adequacy of the Bidder's technical proposal to meet the requirements of Section VII, Employer's Requirements and Section III, Evaluation and Qualification Criteria.
- 16.2 For key activities of the Works which the Bidder intends to subcontract, Bidders shall complete the information requested in Criterion 2.1 of Section III, Evaluation and Qualification Criteria. The Bidder shall provide the information requested in Section IV, Bidding Forms for each of the proposed Subcontractors, including manufacturers of key equipment or materials. Bidders are free to list more than one Subcontractor or manufacturer against each key activities of the Works. Quoted prices will be deemed to apply to whichever Subcontractor or manufacturer is appointed, and no adjustment of the prices will be permitted in case of a change of a Subcontractor or manufacturer.
- 16.3 The Bidder shall be responsible for ensuring that any Subcontractor or manufacturer proposed complies with the requirements of ITB 4, and that any material or services to be provided by the Subcontractor or manufacturer comply with the requirements of ITB 5 and Sub-Clause 2.1 of Section III, Evaluation and Qualification Criteria.

17 Bid Prices and Discounts

- 17.1 **Unless otherwise specified in the BDS**, Bidders shall quote for the entire Works on a "single responsibility" basis such that the total lump sum Bid Price, subject to any adjustments in accordance with the Contract, covers all the Contractor's obligations mentioned in or to be reasonably inferred from the Bidding Documents in respect of the

design, build (construction and installation), and operation and maintenance of the Works, as required in Section VII, Employer's Requirements. Items against which no price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed to be covered by the Prices for other items.

- 17.2 Bidders shall give a breakdown of the Prices in the manner and detail called for in the Price Schedules included in Section IV, Bidding Forms.
- 17.3 Where no different Price Schedules are included in the Bidding Documents, Bidders shall present their Prices in the following manner: Separately numbered Schedules included in Section IV, Bidding Forms, shall be used for each of the following elements listed below. The total amount from each Schedule (Nos. 1 to 5) shall be summarized in a Grand Summary (Schedule No. 6) giving the total Bid Price to be entered in the Bid Submission Form - Bid Price. Absence of the total Bid Price in the Bid Submission Form - Bid Price may result in the rejection of the Bid.
- Schedule No. 1: Design Services;
 - Schedule No. 2: Equipment, Materials, Tools and mandatory Spare Parts supplied from abroad;
 - Schedule No. 3: Equipment, Materials, Tools and mandatory Spare Parts supplied from within the Employer's country;
 - Schedule No. 4: Construction Works and Installation Services;
 - Schedule No. 5: Operation Service;
 - Schedule No. 6: Grand Summary; and
 - Schedule No. 7: Recommended Spare Parts.
- 17.4 Bidders shall note that the equipment and mandatory Spare Parts included in Schedule Nos. 2 and 3 above exclude materials used for civil, building, and other construction works. All such materials shall be included and priced under Schedule No. 4, Construction Works and Installation Services.
- 17.5 In the Schedules, Bidders shall give the required details and a breakdown of their Prices as follows:
- a) Schedule No. 1: Design Services:
 - (i) Prices shall include all taxes, duties, levies and Charges payable in the Employer's country up to twenty-eight (28) days prior to the deadline for Bid submission except for VAT which will be quoted separately.
 - b) Schedules No. 2 and 3: Equipment, Materials and Tools to be supplied from abroad and from within the Employer's country:
 - (i) The Price of the equipment, materials and tools shall be quoted using the Incoterm CIP; and
 - (ii) All customs duties and VAT paid or payable in the Employer's country, up to twenty-eight (28) days prior to the deadline for Bid submission shall be quoted separately.
 - c) Schedule No. 4: Construction Works and Installation Services:
 - (i) Prices shall include prices for transportation, insurance and other services incidental to the installation of the Works, all labour, Contractor's equipment, construction works,

materials, consumables and all matters and things of whatsoever nature, training, etc., where identified in the Bidding Documents, as necessary for the proper execution of the installation and other services, including all taxes, duties, levies and charges payable in the Employer's country as of twenty-eight (28) days prior to the deadline for submission of bids to the exception of VAT which will be quoted separately.

d) Schedules No. 5: Operation Service:

- (i) Prices shall include operation, maintenance & knowledge transfer, as well as all taxes, duties, levies and other charges payable in the Employer's country as of twenty-eight (28) days prior to the deadline for submission of bids to the exception of VAT which will be quoted separately.

e) Schedule No. 7: Recommended Spare Parts:

- (i) Prices shall be quoted using the Incoterm CIP;

All customs duties and VAT paid or payable in the Employer's country, up to twenty-eight (28) days prior to the deadline for Bid submission shall be quoted separately

17.6 The latest edition of Incoterms, published by the International Chamber of Commerce shall govern.

- a) Under "CIP" Incoterms defines "delivery" as the place and date where risk transfers from the seller to the buyer.
- b) In these Bidding Documents, when using "CIP" and not referring to the transfer of risk, the term "delivery" shall be interpreted as the date and place where the equipment, materials and services arrive at the named place of destination, and this date shall be reflected in the Delivery and Completion Schedules.

17.7 The price to be quoted in the Bid Submission Form – Bid Price shall be the total price of the Bid, excluding any discounts offered.

17.8 The Bidder shall quote separately any discounts and the methodology for their application in the Bid Submission Form – Bid Price.

17.9 **Unless otherwise specified in the BDS**, the Prices quoted by the Bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of Appendix 1 to the Contract Agreement. In such a case, the Bidder shall furnish the indices and weightings for the price adjustment formulae in the Schedule of Cost Indexation, Appendix to Financial Bid, Section IV, and the Employer may require the Bidder to justify its proposed indices and weightings.

17.10 **Unless otherwise specified in the BDS**, all duties, taxes, and other levies payable by the Contractor under the Contract, as of the date twenty-eight (28) days prior to the deadline for submission of bids, shall be included in the rates and prices and the total Bid Price submitted by the Bidder, in accordance to ITB 17.5.

18 Currencies of Bid and Payment

18.1 The currency(ies) of the Bid and the currency(ies) of payments shall be **as specified in the BDS**.

- 18.2 Bidders may be required by the Employer to justify, to the Employer's satisfaction, their local and foreign currency requirements, and to substantiate that the amounts included in the prices shown in the Schedule of Cost Indexation in the Appendix 1 to Financial Bid are reasonable, in which case a detailed breakdown of the foreign currency requirements shall be provided by Bidders.
- 19 Period of Validity of Bids**
- 19.1 Bids shall remain valid for the period **specified in the BDS** after the Bid submission deadline date prescribed by the Employer in accordance with ITB 23.1. A Bid valid for a shorter period shall be rejected by the Employer as non-responsive.
- 19.2 In exceptional circumstances, prior to the expiration of the Bid validity period, the Employer may request Bidders to extend the period of validity of their bids for a specific additional period. The request and the responses shall be made in writing. A Bidder may refuse the request without forfeiting its bid security or without risking execution of the bid-securing declaration. Except as provided in ITB 19.3, a Bidder agreeing to the request shall not be required or permitted to modify its bid, but will be required to ensure that the bid security is extended for twenty eight (28) days beyond the deadline of the extended validity period.
- 19.3 If the award is delayed by a period exceeding fifty six (56) days beyond the expiry of the initial bid validity, the Contract price shall be determined as follows:
- a) In the case of fixed price contracts, the Contract price shall be the Bid Price adjusted by the factor **specified in the BDS**;
 - b) In the case of adjustable price contracts, no adjustment shall be made;
 - c) In any case, bid evaluation shall be based on the Bid Price without taking into consideration the applicable correction from those indicated above.
- 20 Bid Security/Bid Securing Declaration**
- 20.1 The Bidder shall furnish as part of its bid, either a Bid-Securing Declaration or a Bid Security **as specified in the BDS**, in original form and, in the case of a Bid Security, in the amount and currency **specified in the BDS**.
- 20.2 A Bid-Securing Declaration shall use the form included in Section IV, Bidding Forms.
- 20.3 If a Bid Security is specified pursuant to ITB 20.1, the Bid Security shall be a demand guarantee in any of the following forms at the Bidder's option:
- a) An unconditional guarantee issued by a bank or financial institution (such as an insurance, bonding or surety company);
 - b) An irrevocable letter of credit;
 - c) A cashier's or certified check; or
 - d) Another security **specified in the BDS**;
- from a reputable source from an eligible country as specified in Section V, Eligibility Criteria. If the unconditional guarantee is issued by a financial institution located outside the Employer's Country, the issuing financial institution shall have a correspondent financial institution located in the Employer's Country to make it enforceable

unless the Employer has agreed in writing, prior to Bid submission, that a correspondent financial institution is not required.

- 20.4 In the case of a bank guarantee, the Bid Security shall be submitted either using the Bid Security Form included in Section IV, Bidding Forms, or in another substantially similar format approved by the Employer prior to bid submission. In either case, the form must include the complete name of the Bidder. The Bid Security shall be valid for twenty-eight (28) days beyond the original validity period of the bid, or beyond any period of extension if requested under ITB 19.2.
- 20.5 Any bid not accompanied by a substantially responsive Bid Security or Bid-Securing Declaration shall be rejected by the Employer as non-responsive.
- 20.6 The Bid Security of unsuccessful Bidders as well as of the successful Bidder shall be returned as promptly as possible upon the successful Bidder's signing the Contract and furnishing the Performance Security pursuant to 44.
- 20.7 The Bid Security may be forfeited or the Bid-Securing Declaration executed:
 - a) If a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letter of Bid, or any extension thereto provided by the Bidder; or
 - b) If the successful Bidder fails to:
 - (i) Sign the Contract in accordance with ITB 43; or
 - (ii) Furnish a Performance Security in accordance with ITB 44.
- 20.8 The Bid Security or the Bid-Securing Declaration of a JV shall be in the name of the JV that submits the bid. If the JV has not been legally constituted into a legally enforceable JV at the time of bidding, the Bid Security or the Bid-Securing Declaration shall be in the names of all future members as named in the letter of intent referred to in ITB 4.1 and ITB 11.4.
- 20.9 If a Bid Security is not **required in the BDS** pursuant to ITB 20.1, and:
 - a) If a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letter of Bid or any extension thereto provided by the Bidder, or
 - b) If the successful Bidder fails to sign the Contract in accordance with ITB 43; or furnish a Performance Security in accordance with ITB 44;

the Employer may, **if provided for in the BDS**, declare the Bidder ineligible to be awarded a contract by the Employer for a period of time **as stated in the BDS**.

21 Format and Signing of Bid (Technical and Price)

- 21.1 The Bidder shall prepare one original of the documents comprising the Bid as described in ITB 11 and clearly mark it "ORIGINAL". Alternative Bids, if permitted in accordance with ITB 13, shall be clearly marked "ALTERNATIVE". In addition, the Bidder shall submit copies of the bid, in the number **specified in the BDS** and clearly mark them "COPY". In the event of any discrepancy between the original and the copies, the original shall prevail.

- 21.2 The original and all copies of the bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation **as specified in the BDS** and shall be attached to the bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the bid where entries or amendments have been made shall be signed or initialled by the person signing the bid.
- 21.3 In case the Bidder is a JV, the Bid shall be signed by an authorized representative of the JV on behalf of the JV, and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives.
- 21.4 Any inter-lineation, erasures, or overwriting shall be valid only if they are signed or initialled by the person signing the bid.

D. Submission and Opening of Bids

22 Sealing and Marking of Bids

- 22.1 The Bidder shall enclose the original and all copies of the Bid, including alternative bids, if permitted in accordance with ITB 13, in separate sealed envelopes marked "Technical Bids" and "Financial Bids", duly marking the envelopes as "ORIGINAL", "ALTERNATIVE" and "COPY". These envelopes containing the original and the copies shall then be enclosed in one single envelope.
- 22.2 The inner and outer envelopes shall:
- a) Bear the name and address of the Bidder;
 - b) Be addressed to the Employer in accordance with ITB 21.1;
 - c) Bear the specific identification of this bidding process **specified in the BDS**; and
 - d) Bear a warning not to open before the time and date for bid opening.
- 22.3 If all envelopes are not sealed and marked as required, the Employer will assume no responsibility for the misplacement or premature opening of the bid. **When so specified in the BDS**, bidders shall have the option of submitting their bids electronically. Bidders submitting bids electronically shall follow the electronic bid submission procedures **specified in the BDS**.

23 Deadline for Submission of Bids

- 23.1 Bids must be received by the Employer at the address and no later than the date and time **specified in the BDS**.
- 23.2 The Employer may, at its discretion, extend the deadline for the submission of bids by amending the Bidding Documents in accordance with ITB 8, in which case all rights and obligations of the Employer and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.

24 Late Bids

- 24.1 The Employer shall not consider any bid that arrives after the deadline for submission of bids, in accordance with ITB 24. Any bid received by the Employer after the deadline for submission of bids shall be declared late, rejected, and returned unopened to the Bidder.

25 Withdrawal, Substitution and Modification of Bids

- 25.1 A Bidder may withdraw, substitute, or modify its Bid after it has been submitted, and before the deadline for submission of Bids, by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB 21.2. The corresponding substitution or

modification of the bid must accompany the respective written notice. All notices must be:

- a) Prepared and submitted in accordance with ITB 21 and ITB 22 (except that withdrawals notices do not require copies), and in addition, the respective envelopes shall be clearly marked "WITHDRAWAL", "SUBSTITUTION", "MODIFICATION"; and
- b) Received by the Employer prior to the deadline prescribed for submission of bids, in accordance with ITB 23.

25.2 Bids requested to be withdrawn in accordance with ITB 25.1 shall be returned unopened to the Bidders.

25.3 No bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Letter of Bid or any extension thereof.

26 Bids Opening

26.1 The Employer shall open the Technical Bids in public at the address, on the date, and time **specified in the BDS** in the presence of Bidder's designated representatives and anyone who chooses to attend. Any specific electronic bid opening procedures required if electronic bidding is permitted in accordance with ITB 22.3, shall be **as specified in the BDS**. The Financial Bids will remain unopened and will be held in custody of the Employer until the specified time of their opening. If the Technical Bid and the Financial Bid are submitted together in one envelope, the Employer may reject the entire Bid.

26.2 First, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelope with the corresponding bid shall not be opened, but returned to the Bidder. No bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at bid opening. Next, envelopes marked "SUBSTITUTION" shall be opened and read out and exchanged with the corresponding bid being substituted, and the substituted bid shall not be opened, but returned to the Bidder. No bid substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at bid opening. Envelopes marked "MODIFICATION" shall be opened and read out with the corresponding bid. No bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at bid opening.

26.3 All other envelopes holding the Technical Bid shall be opened one at a time, reading out: the name of the Bidder and whether there is a modification; the presence or absence of a bid security or bid-securing declaration, if required; and any other details as the Employer may consider appropriate. Only Technical Bids and alternative Technical Bids read out at bid opening shall be considered for evaluation. At Technical Bid opening, the Employer shall neither discuss the merits of any Bid nor reject any Bid (except for late bids, in accordance with ITB 24.1).

26.4 The Employer shall prepare a record of the bid opening that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, or modification; alternative bids; and the presence or absence of a bid security or bid-securing declaration, if one was required. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's

signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders.

- 26.5 At the end of the evaluation of the Technical Bids, the Employer will invite Bidders who have submitted substantially responsive Technical Bids and who have been determined as being qualified for award to attend the opening of the Financial Bids. The date, time, and location of the public opening of Financial Bids will be advised in writing by the Employer and published at the Employer's web page **identified in the BDS**. Bidders shall be given reasonable notice of the opening of Financial Bids.
- 26.6 The Employer will notify Bidders in writing who have been rejected on the grounds of their Technical Bids being substantially nonresponsive to the requirements of the Bidding Documents, and return their Financial Bids unopened.
- 26.7 The Employer shall conduct the opening of Financial Bids of all Bidders who submitted substantially responsive Technical Bids, in public one at a time and in the presence of Bidders' representatives who choose to attend at the address, on the date, and time specified by the Employer in accordance with ITB 26.5, and the following read out and recorded: the name of the Bidder and whether there is a withdrawal, substitution, or modification; the Bid Price including any discounts and alternative Bids and any other details as the Employer may consider appropriate. Only Financial Bids, discounts and alternative Bids read out and recorded during the opening of Financial Bids shall be considered for evaluation. **Unless otherwise specified in the BDS**, the Bid Submission Forms – Bid Price are to be initialled by a minimum of three representatives of the Employer attending Financial Bid opening. At Financial Bid opening, the Employer shall neither discuss the merits of any Bid nor reject any Bid.
- 26.8 The Employer shall prepare a record of the opening of Financial Bids that shall include, as a minimum: the name of the Bidder, the Price, any discounts, and alternative Bids. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders who submitted Bids on time, and posted online when electronic bidding is permitted.

E. Evaluation and Comparison of Bids

27 Confidentiality

- 27.1 Information relating to the examination, evaluation, and comparison of the Bids, and qualification of the Bidders and recommendation of Contract award shall not be disclosed to Bidders or any other persons not officially concerned with the bidding process until information on Contract award is communicated to all Bidders in accordance with ITB 42.
- 27.2 Any attempt by a Bidder to influence the Employer in the examination, evaluation, and comparison of the Bids, and qualification of the Bidders, or Contract award decisions may result in the rejection of its Bid.
- 27.3 Notwithstanding ITB 26.2, from the time of Bid opening to the time of Contract award, if a Bidder wishes to contact the Employer on any matter related to the bidding process, it shall do so in writing.

- 28 Clarification of Bids**
- 28.1 To assist in the examination, evaluation, and comparison of the bids, and qualification of the Bidders, the Employer may, at its discretion, ask any Bidder for a clarification of its Bid, given a reasonable time for a response. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be in writing. No change, including any voluntary increase or decrease, in the prices or substance of the Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids, in accordance with ITB 35.
- 28.2 If a Bidder does not provide clarifications of its Bid by the date and time set in the Employer's request for clarification, its Bid may be rejected.
- 29 Deviations, Reservations and Omissions**
- 29.1 During the evaluation of Bids, the following definitions apply:
- a) "Deviation" is a departure from the requirements specified in the Bidding Documents;
 - b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Documents; and
 - c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Documents.
- 30 Determination of Responsiveness**
- 30.1 The Employer's determination of a Bid's responsiveness is to be based on the contents of the Bid itself, as defined in ITB 11.
- 30.2 A substantially responsive Bid is one that meets the requirements of the Bidding Documents without material Deviation, Reservation, or Omission. A material Deviation, Reservation, or Omission is one that,
- a) If accepted, would:
 - (i) Affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or
 - (ii) Limit in any substantial way, inconsistent with the Bidding Documents, the Employer's rights or the Bidder's obligations under the proposed Contract; or
 - b) If rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.
- 30.3 The Employer shall examine all aspects of the Technical Bid submitted in accordance with ITB 15 and 16, in particular, to confirm that all requirements of Section VII, Employer's Requirements have been met without any material Deviation, Reservation or Omission.
- 30.4 If a Technical Bid is not substantially responsive to the requirements of the Bidding Documents, it shall be rejected by the Employer and may not subsequently be made responsive by correction of the material Deviation, Reservation, or Omission.
- 31 Non-material Non-conformities**
- 31.1 Provided that a bid is substantially responsive, the Employer may waive any non-material non-conformities (a non-conformity being a Deviation, Reservation or Omission) in the Bid. The Employer shall rectify quantifiable non-material non-conformities related to the Bid Price. To this effect, the Bid Price shall be adjusted by adding the highest price of the item or component as quoted in other substantially responsive bids. If the price of the item or component

cannot be derived from the price of other substantially responsive bids, the Employer shall use its best estimate.

- 31.2 Provided that a Bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify non-material non-conformities in the Bid related to documentation requirements. Requesting information or documentation on such non-conformities shall not be related to any aspect of the price of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

32 Subcontractors

- 32.1 **Unless otherwise stated in the BDS**, the Employer does not intend to execute any specific elements of the Works by Subcontractors selected in advance by the Employer (nominated Subcontractors).
- 32.2 A "specialized Subcontractor" is a Subcontractor hired for specialized work as defined by the Employer in Section VII. The Bidder's Bid shall name the same specialized Subcontractor as submitted in the initial selection application and approved by the Employer, or may name another specialized Subcontractor meeting the requirements specified in the initial selection phase.
- 32.3 If the Bidder proposes to engage any Subcontractors additional to or different from those named in its Initial Selection for major items of the Works, the Bidder shall give details of the name and nationality of the proposed Subcontractors for each of those items. In addition, the bidder shall include in its bid information establishing compliance with the requirements specified by the Employer for these items in the Initial Selection Documents or in Clause 2.1 of Section III.

33 Technical Bids Evaluation

- 33.1 The Employer shall use the criteria and methodologies listed in this Clause and those indicated in Section III, Evaluation and Qualification Criteria. No other evaluation criteria or methodologies shall be permitted.
- 33.2 The Employer will carry out a detailed evaluation of the Technical Bids in accordance with ITB 30 to determine whether the technical aspects are in compliance with the Bidding Documents. The Bid that does not meet minimum acceptable standards of completeness, consistency and detail, and the specified minimum (or maximum, as the case may be) requirements for specified performance requirements, will be rejected for non-responsiveness. In order to reach its determination, the Employer will examine and compare the technical aspects of the Bids on the basis of the information supplied by the Bidders, taking into account the following:
- a) overall completeness and compliance with Section VII, Employer's Requirements; conformity of the Works offered with values specified in the Table of performance requirements, including conformity with the specified minimum (or maximum, as the case may be) requirement corresponding to each functional guarantee, as indicated in the Employer's Requirements, suitability of the Works offered in relation to the environmental and climatic conditions prevailing at the Site, and quality, function and operation of any process control concept included in the Bid;
 - b) compliance with the time schedule called for by the Implementation Schedule and any alternative time schedules

- offered by Bidders, as evidenced by a milestone schedule provided in the Technical Bid;
- c) type, quantity and long-term availability of mandatory and recommended spare parts and maintenance services; and
 - d) other relevant factors, if any, listed in Section III, Evaluation and Qualification Criteria.
- 33.3 If a Technical Bid is declared not substantially compliant with the requirements of the Bidding Documents, the Bid shall be rejected and shall not be further evaluated. Substantially responsive Technical Bids shall be further evaluated and scored. The scores to be given to technical factors and sub-factors are specified in Section III, Evaluation and Qualification Criteria.
- 33.4 Where alternative offers or alternative technical solutions have been allowed in accordance with ITB 13, and offered by the Bidder, the Employer shall make a similar evaluation of the alternatives. Where alternatives have not been allowed but have been offered, they shall be ignored.
- 34 Eligibility and Qualification of the Bidders**
- 34.1 The Employer shall determine to its satisfaction during the evaluation of Technical Bids whether a Bidder continues to meet the eligibility and qualifications criteria specified in ITB 3 and 4, and Section III, Evaluation and Qualification Criteria of the Initial Selection Documents.
- 34.2 An affirmative determination shall be a prerequisite for the opening and evaluation of a Bidder's Financial Bid. A negative determination shall result into the disqualification of the Bid, in which event the Employer shall return the unopened Financial Bid to the Bidder.
- 35 Correction of Arithmetical Errors**
- 35.1 Provided that the Bid is substantially responsive, the Employer shall correct arithmetical errors on the following basis:
- a) Where there are errors between the total of the amounts given under the column for the price breakdown and the amount given under the Total Price, the amounts given under the column for the price breakdown shall prevail and the Total Price shall be corrected accordingly;
 - b) Where there are errors between the total of the amounts given in Price Schedules and the amount given in Grand Summary Price Schedule, the total of the amounts of Price Schedules shall prevail and the Grand Summary Price Schedule shall be corrected accordingly;
 - c) If there is a discrepancy between the grand total price amount given in Grand Summary Price Schedule and the Bid Price of the Bid Submission Form, the grand total price given in Grand Summary Price Schedule shall prevail and the Bid Price of the Bid Submission Form shall be corrected; and
 - d) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a), (b) and (c) above.
- 35.2 Bidders shall be requested to accept correction of arithmetical errors. Failure to accept the correction in accordance with ITB 35.1 shall result in the rejection of the Bid and the Bid Security may be executed.

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| 36 Conversion to Single Currency | 36.1 For evaluation and comparison purposes, the currency(ies) of the Bid shall be converted into a single currency as specified in the BDS. |
| 37 Financial Bid Evaluation | <p>37.1 The Employer shall use the criteria and methodologies listed in this Clause and those indicated in Section III, Evaluation and Qualification Criteria. No other evaluation criteria or methodologies shall be permitted.</p> <p>37.2 To evaluate the Financial Bid, the Employer shall consider the following:</p> <ul style="list-style-type: none"> a) The Bid price, excluding Provisional Sums unless priced competitively and the provision, if any, for contingencies in the Schedules, but including Daywork items, where priced competitively; b) Price adjustment for correction of arithmetic errors in accordance with ITB 35.1; c) Price adjustment due to discounts offered in accordance with ITB 17.7; d) Price adjustment due to quantifiable non-material non-conformities in accordance with ITB 31; e) Converting the amount resulting from applying (a) to (d) above, if relevant, to a single currency in accordance with ITB 36; and f) The discounted operation and maintenance costs over the life cycle of the Works as specified in Section III, Evaluation and Qualification Criteria. <p>37.3 The Employer's evaluation of the Financial Bid shall exclude and not take into account:</p> <ul style="list-style-type: none"> a) In the case of equipment, materials and mandatory spare parts (Schedule No. 2 and 3) supplied from abroad and from the Employer's country, all taxes and duties, applicable in the Employer's country and payable on the equipment and mandatory spare parts if the Contract is awarded to the Bidder; and b) The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract. <p>37.4 If the Bid is seriously unbalanced or front loaded in the opinion of the Employer and after evaluation of the price analyses, taking into consideration the schedule of estimated Contract payments, the Employer may require that the amount of the Performance Security be increased at the expense of the Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.</p> |
| 38 Abnormally low Bid | 38.1 If the Most Advantageous Bid, as defined under Clause 41, is twenty per cent (20%) or more lower than the Employer's estimate, and unless the Employer provides justification that the estimate is inaccurate, the Employer shall require the Bidder to produce detailed price analyses for any or all items of the Schedules, to demonstrate the internal consistency of those prices and priced quantities with the construction methods, resources and schedule proposed as well as with the Employer's Requirements. Notwithstanding the provisions of ITB 31 which shall not be applicable, if one or several inconsistencies are evidenced, the Bid shall be declared non-compliant and rejected. |

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| 39 Evaluation of Combined Technical and Financial Bids | 39.1 The Employer's evaluation of responsive Bids will take into account technical factors, in addition to cost factors in accordance with Section III, Evaluation and Qualification Criteria. The weights to be assigned for the Technical factors and cost are specified in Section III, Evaluation and Qualification Criteria. The Employer will rank the bids based on the combined weighted technical and price scores. |
| 40 Employer's Right to Reject all Bids | 40.1 The Employer reserves the right to annul the bidding process and reject all bids at any time prior to contract award, without thereby incurring any liability to Bidders. In case of annulment, all bids submitted and specifically, Bid Securities, shall be promptly returned to the Bidders. |

F. Award of Contract

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| 41 Most Advantageous Bid | <p>41.1 The Employer shall award the Contract to the Bidder with the Most Advantageous Bid, provided further that the Bidder is determined to be eligible and qualified to perform the Contract satisfactorily.</p> <p>41.2 The Most Advantageous Bid is the Bid of the Bidder that meets the Qualification Criteria, and whose Bid has been determined to be:</p> <ul style="list-style-type: none"> a) substantially responsive to the Bidding Documents; b) the best evaluated Bid i.e. the highest scoring bid in the combined technical and financial evaluation, in accordance with ITB 39. |
| 42 Notification of Award | <p>42.1 Prior to the expiration of the Period of Validity of Bids or any extension thereof, the Employer shall notify the successful Bidder, in writing, that its Bid has been accepted. The notification letter (hereinafter and in the Conditions of Contract and Contract Forms called the "Letter of Acceptance") shall specify the price that the Employer will pay the Contractor in consideration of the execution, completion, and operation of the Works, and the requirement for the Contractor to remedy any defects therein (hereinafter and in the Conditions of Contract and Contract Forms called the "Accepted Contract Amount"). At the same time, the Employer shall also notify all other Bidders of the results of the bidding.</p> <p>42.2 The Employer will publish in an English language newspaper or well-known freely accessible website the results of the bidding process identifying the Bid, and the following information: (i) name of each Bidder who submitted a Bid; (ii) Bid prices as read out at bid opening; (iii) name and evaluated prices of each Bid.</p> <p>42.3 Until a formal Contract Agreement is prepared and executed, the Letter of Acceptance shall constitute a binding Contract.</p> <p>42.4 The Employer shall promptly respond in writing to any unsuccessful Bidder who, after notification of award in accordance with ITB 42.1, requests in writing the grounds on which its Bid was not selected.</p> <p>42.5 If a contract negotiation may be needed. In such case, the Employer shall send to the successful Bidder a letter of invitation to negotiate which should not be mistaken as a Letter of Acceptance which, under FIDIC Conditions of Contract, triggers contractual obligations from both Parties. The Letter of Acceptance shall be sent once the contract negotiation ends successfully. Minutes of negotiation</p> |

meetings, and agreements reached therein, shall be attached to the Letter of Acceptance.

- 43 Signing of Contract**
- 43.1 Promptly upon issuing the Letter of Acceptance, the Employer shall send the successful Bidder the Contract Agreement.
- 43.2 Within twenty-eight (28) days of receipt of the Contract Agreement, the successful Bidder shall sign, date, and return it to the Employer.
- 44 Performance Security**
- 44.1 Within twenty-eight (28) days of the receipt of the Letter of Acceptance from the Employer, the successful Bidder shall furnish the Performance Security in accordance with the General Conditions of Contract, using for that purpose the Performance Security Form included in Section X, Contract Forms, or another form acceptable to the Employer.
- 44.2 Failure of the successful Bidder to submit the above-mentioned Performance Security or sign the Contract Agreement shall constitute sufficient grounds for the annulment of the award, the Contract termination in accordance with GCC Sub-Clause 15.2 and forfeiture of the Bid security or execution of the Bid-Securing Declaration. In that event, the Employer may award the Contract to the next Most Advantageous Bid.

Section II – Bid Data Sheet

Introduction	
ITB 1.1	The number of the Invitation for Bids is: <i>PL.01.01/04/MSDA/STR2/IV/2024</i>
ITB 1.1 & ITB 2.1	The Employer is: Badan Meteorologi, Klimatologi, dan Geofisika (BMKG)
ITB 1.1	<p>The name of the IPC is: Development of Maritime Meteorological Information System in Indonesia (MMS)-2 : Procurement of the Modelling System with Big Data and Artificial Intelligence (including maritime observation equipment, remote sensing, and system integration)</p> <p>The identification number of the IPC is: <i>PL.01.01/05/MSDA/STR2/IV/2024</i></p>
ITB 2.1	The name of the Project is: Modelling System with Big Data and AI (Including Maritim Observation Equipment, Remote Sensing, System Integration) for MMS2
ITB 4.1	Maximum number of members in the JV shall be: <i>No Limit</i>
Bidding Documents	
ITB 7.1	<p>For clarification purposes only, the Employer's address is: Badan Meteorologi, Klimatologi, dan Geofisika (BMKG)</p> <p>Attention: Mr. Shendyko Wicaksono</p> <p>Street Address: Jalan Angkasa I No. 2 Kemayoran, Jakarta Pusat</p> <p>Floor/Room number: Gedung A, 2nd floor/ULP Room</p> <p>City: Jakarta Pusat</p> <p>ZIP/Postal Code: 10610</p> <p>Country: Indonesia</p> <p>Telephone: +62 21 4246321 ext. 1301</p> <p>Facsimile number: +62 21 4246703</p> <p>Electronic mail address: pokja.str2@bmkg.go.id</p> <p>Web page: www.bmkg.go.id</p> <p>no later than fourteen (14) days prior to the deadline for submission of bids</p>
ITB 7.4	<p>A Pre-Bid <i>meeting shall take virtually</i> at the following date, time and place:</p> <p>Date: : <u>April, 17^h 2024</u></p> <p>Time: 01:00 PM Local Time (Jakarta Time UTC +7)</p> <p>Place: <u>Virtual Zoom link: http://bit.ly/MeetingUKPBJBMKG</u></p> <p>Breakout Rooms : MMS2</p> <p>A Site visit conducted by the Employer shall not be organized</p>
Preparation of Bids	
ITB 10.1	<p>The language of the Bid is: English</p> <p>All correspondence exchange shall be in the English language. Language for translation of supporting documents and printed literature is English.</p>

ITB 11.2(I) & ITB 11.3(c)	<p>The Bidder shall submit with its Bid the following additional documents:</p> <p>None</p> <p><i>In the case of Works in an area labelled as orange or red by the French Ministry of Europe and Foreign Affairs¹, the Bidder shall provide with its Bid a security methodology that meets the requirements of the security specifications.</i></p>
ITB 13.1 & ITB 13.2	<p>Alternative bids and alternative technical solutions shall not be permitted.</p> <p>As a "single responsibility contract", the essence of a DBO Contract is that the Contractor designs a solution that meets the Employer's Requirements and delivers Works which are fit-for-purpose.</p> <p>Consequently, pursuant to ITB 33.2, Bidders' design solutions which deviate from any base design solution provided in the Bidding Documents, but which (i) comply with the quality and performance of Works specified in the Employer's Requirements, and (ii) do not change the Employer's rights and Contractor's obligations under the proposed Contract, are not considered as alternative bids and are then allowed.</p>
ITB 13.5 Alternative Times for Completion	Alternative times for completion shall not be permitted.
ITB 17.9	Not Applicable
ITB 17.10	Taxes, duties and fees exemptions, to which payments under the Contract are entitled, are specified in clause 14.1 of the Particular Conditions of Contract.
ITB 18.1	<p>The currency(ies) of the bid and the payment currency(ies) shall be in accordance with described below:</p> <p>Bidders allowed to quote in local and foreign currencies:</p> <p>The unit rates and prices shall be quoted by the Bidder in the Schedules separately in the following currencies:</p> <p>for those inputs to the Works that the Bidder expects to supply from within the Employer's country, in Indonesia, the name of the currency of the Employer's country, and further referred to as "the local currency"; and</p> <p>For those inputs to the Works that the Bidder expects to supply from outside the Employer's country (referred to as "the foreign currency"), in Euros (€).</p>
ITB 19.1	The Bid Validity Period shall be 150 days.
ITB 19.3(a)	The Bid Price shall be adjusted if needed as will be indicated in the request for bid validity extension
ITB 20.1	<p>A Bid Security <i>shall</i> be required.</p> <p>The amount and currency of the bid security shall be <i>EUR 650.000</i></p>
ITB 20.3(d)	Other types of acceptable securities: " <i>None</i> "
ITB 20.9	Not Applicable

¹ Or any other French Ministry responsible for the ranking of foreign countries' security condition, if applicable.

ITB 21.1	<p>In addition to the original of the bid, the number of copies is: 3 (Three) paper copies and one (1) digital copy (flashdisk).</p> <p>For Digital Copy files must be saved in separate PDF file format which is between Technical Parts and Financial Parts. It must be marked with a file number and number (for example: Technical Parts_1 of 2, Technical Parts_2 of 2, Financial Parts)</p>
ITB 21.2	<p>The written confirmation of authorization to sign on behalf of the Bidder shall consist of: <i>"a power of attorney established in the name of the signatory of the bid"</i></p>
Submission and Opening of Bids	
ITB 22.2 & ITB 23.1	<p>For <u>Bid submission purposes</u> only, the Employer's address is:</p> <p>Attention: Mr. Shendyko Wicaksono</p> <p>Street Address: Jalan Angkasa I No. 2 Kemayoran, Jakarta Pusat</p> <p>Floor/Room number: Gedung A, 2nd floor/ULP Room</p> <p>City: Jakarta Pusat</p> <p>ZIP/Postal Code: 10610</p> <p>Country: Indonesia Telephone: (+62) 21 4246321 ext 1301</p> <p>the identification of document :</p> <ol style="list-style-type: none"> 1. Bid Document : Bidding Document of Development of Maritime Meteorological Information System in Indonesia (MMS)-2 : Procurement of the Modelling System with Big Data and Artificial Intelligence (including maritime observation equipment, remote sensing, and system integration) 2. Tender Name: Procurement of the Modelling System with Big Data and Artificial Intelligence (including maritime observation equipment, remote sensing, and system integration) <p>The deadline for bid submission is:</p> <p>Date: June, 3rd 2024</p> <p>Time: 11:00 AM Local Time (Jakarta Time UTC +7)</p>
ITB 26.1	<p>The Bid opening for technical bid shall take place physically at:</p> <p>Badan Meteorologi, Klimatologi, dan Geofisika (BMKG)</p> <p>Street Address: Jalan Angkasa I No. 2 Kemayoran, Jakarta Pusat</p> <p>Floor/Room number: Gedung A, 2nd floor/ULP Room</p> <p>City: Jakarta Pusat</p> <p>ZIP/Postal Code: 10610</p> <p>Country: Indonesia Telephone: (+62) 21 4246321 ext 1301</p> <p>Date: June 3rd , 2024</p> <p>Time: 02:00 PM Local Time (Jakarta Time UTC +7)</p> <p>No minimum number of bids is required in order to proceed to bid opening.</p> <p>the bid opening for technical bid procedure shall be:</p> <ol style="list-style-type: none"> 1. Bidders must arrive 30 minutes before the bid opening event begins.

	2. Technical Bid Opening may be attended by maximum three (3) bidder's representative. It is required for Bidder's representative to share the signed Power of Attorney Letter from the authorized principal and signed by the authorized person to attend the Bid Opening meeting
ITB 26.5	<p>their Financial Part of the bid will be opened at the public opening of Financial Parts; Following the completion of the evaluation of the Technical Parts of the Bids, the Employer will notify all Bidders of the location, date and time of the public opening of Financial Parts.</p> <p>The Employer shall also publish a notice of the public opening of the Financial Parts on its website.</p>
ITB 26.7	<p>The bid opening for financial bid procedure shall be:</p> <ol style="list-style-type: none"> 1. Only Financial Part of Bids, Financial Parts of Alternative Bids (if any) and discounts that are opened and read out at Bid opening shall be considered further for evaluation. 2. Bidders must arrive 30 minutes before the bid opening event begins. 3. Technical Bid Opening may be attended by maximum three (3) bidder's representative. It is required for Bidder's representative to share the signed Power of Attorney Letter from the authorized principal and signed by the authorized person to attend the Bid Opening meeting
Evaluation and Comparison of Bids	
ITB 32.1	At this time the Employer <i>does not intend</i> to execute certain specific parts of the Works by Subcontractors selected in advance (nominated Subcontractors). The details (specific parts and Subcontractors' names) are provided in Sub-Clause 4.5 of the PCC-Table A.
ITB 36.1	<p>The currency that shall be used for bid evaluation and comparison purposes to convert all bid price(s) expressed in various currencies into a single currency is: <i>Euro</i></p> <p>The source of exchange rate shall be: <i>BI (Bank Indonesia)</i></p> <p>The date for the exchange rate shall be seven (7) days prior to the date of deadline for bid submission.</p> <p>The currency(ies) of the Bid shall be converted into a single currency in accordance with the procedure under that follows:</p> <p style="padding-left: 40px;">The Employer will convert the amounts in various currencies in which the Bid Price, corrected pursuant to Clause 31, is payable (excluding Provisional Sums but including Daywork where priced competitively) to the single currency identified above at the selling rates established for similar transactions by the authority specified and on the date stipulated above.</p>

Section III – Evaluation and Qualification Criteria

1 EVALUATION

The evaluation of the Bids shall be conducted following the steps as described below:

1.1 **Assessment of compliance of technical proposal with requirements:**

Determination of responsiveness shall be carried out in accordance with ITB 30 and ITB 33.2. In particular, conformity of the Works offered with values specified in the Table of performance requirements in the Employer's Requirements, including conformity with the specified minimum (or maximum, as the case may be) requirement corresponding to each functional guarantee shall be thoroughly verified.

The quantities that are indicated in the section VII are the foreseen quantities recommended by the Employer. In case of proposed alternative quantities from the bidder, its offer will not be rejected provided that the offer complies with the project objectives (indicated in the paragraph 1.4.3 of the section VII) through the verification of the performance indicators specified in paragraph 4 of the section VII.

If the environmental and social risks are evaluated as high and/or impacts as significant, and therefore, the Bidding Documents include ESHS Specifications, then the technical proposal shall comprise an ESHS Methodology. The ESHS Methodology submitted by the Bidder shall be evaluated to determine whether it is substantially responsive (i.e. without material deviation, reservation or omission) to the requirements specified in Section VII, Employer's Requirements - ESHS Specifications. The Bidder shall use the ESHS Methodology Form provided for this purpose in Section IV, Bidding Forms - Technical Proposal. A Bid not comprising an ESHS Methodology or a Bid for which the ESHS Methodology is not substantially responsive (i.e. with material deviation, reservation or omission) shall be rejected.

1.2 **Acceptability of the security methodology**

When the security risks are assessed as high, and therefore, the Bidding Documents include security specifications in Section VII – Employer's Requirements, then the technical proposal must include a security methodology, in accordance with ITB 11.2(l) and ITB 11.3(c) of the Bid Data Sheet.

The security methodology shall be evaluated to determine whether each admissibility requirement specified in the security specifications is met. Otherwise, the Bid will be rejected.

1.3 **Scoring of the Technical Bid:**

Substantially responsive Technical Bids shall be scored in accordance with ITB 33.3. The technical factors and sub-factors, and the corresponding weights are:

The technical factors (sub-factors) and the corresponding weight out of 100% are:	
Technical Factors	Weight in percentage (insert weight in %)
1. Approach and Methodology Including Section VII part 4.1:	60
(i) Design Methodology and work program (including quality of the drawings, calculation notes, explanations of the technology proposed)	40
(ii) Construction - Installation Management strategy and method statement for key construction- Installation activities	10
(iii) Operation Maintenance Plan, including work program	10
2. Key Personnel qualifications and resource schedule	40

(i) CV of Project director	5
(ii) CV of <i>Project managers of the project activities</i>	4
(iii) CV of <i>Computer Science / IT Expert</i>	3
(iv) CV of <i>Information Systems Security Specialist</i>	3
(v) CV System Integrator	3
(vi) CV Expert for Metocean Numerical Modelling	3
(vii) CV Big Data expert	3
(viii) CV Scientific experts on meteorology and oceanography	3
(ix) CV Technical/Mechanical/Electrical Engineer	3
(x) CV Local team in Indonesia - Local Project Coordinator	2
(xi) CV Local team in Indonesia - Local Technical Experts	2
(xii) CV Training manager	3
(xiii) CV Quality Assurance/Quality Control Manager	3

Evaluation of the technical factor N°1 (Approach and Methodology)

The number of points to be assigned for each sub-factors mentioned above shall be broken down as follows:

(i) The methodology is clear and complete: supporting documentation provided, organization described, resources mobilized, list of activities, risks and assumptions	30%
(ii) The methodology is relevant, fully meets the Employer's Requirements and contains innovations	30%
(iii) The work plan is detailed, realistic and in line with the Employer's Requirements and proposed methodology	20%
(iv) The number of experts and the expected number of working days for each expert are adequate to satisfactorily perform each activity.	20%

TOTAL 100%

Evaluation of the technical factor N°2 (Key Personnel qualifications and resource schedule):

The number of points to be assigned for each Key Personnel mentioned above shall be broken down as follows:

General qualifications (general education, training, and experience)	10%
Adequacy for the services (relevant education, training, experience in the sector/similar services)	60%
Relevant experience in the region (working level fluency in local language(s)/knowledge of local culture or administrative system, government organization, etc.)	10%
Number of years of experience of the Key Personnel with the Employer	20%
Total Weight	100%

The total points result will represent for each category against a predetermined score as shown in the table below and based on their level of responsiveness in percentage to the appropriate requirements.

1	Excellent (100%)	:	Full Understanding of Employer's Requirement, Extra Consideration, Superior Proposal
2	Good (80%)	:	Good Understanding of Employer's Requirement, Fine Consideration, Specific Good Proposal
3	Sufficient (60%)	:	General Understanding of Employer's Requirement, Enough Consideration, Common Proposal
4	Insufficient (40%)	:	Inadequate Understanding of Employer's Requirement, Inappropriate consideration, Deficient Proposal
5	Poor (20%)	:	Misunderstanding of Employer's Requirement, Defective Proposal, Not Clear Description
6	Fail (0%)	:	No Submission, Major Misunderstanding of Employer's Requirement Fatal defect in proposal

The minimum scores required to pass are as follows:

- Total average score of the **technical factor** above: not less than seventy percent (70%)

Tenders that pass the Detailed Examination will be accepted from a technical point of view and taken to the next evaluation stage.

1.4 **Evaluation of Bid Price:**

a) **Net Present Value Evaluation**

The Design Build Bid Price shall not be discounted.

Taking into account the Net Present Value Evaluation of the Operation Service Bid Price, the annual amounts in the Operation Service Price Schedules, as adjusted in accordance with ITB 37.2 (a) to (e), shall be discounted using a discount rate *I* of 0 %

b) **Operation and/or Maintenance Costs**

An adjustment to take into account the extended operating and/or maintenance costs of the Works will be added to the Bid Price, for evaluation purposes only. The adjustment will be calculated by determining the total Operation & Maintenance Evaluated Price (OMEP) using the following formula:

$$OMEP = \sum_{x=1}^N OM_x + \sum_{x=1+N}^M \frac{OM_N}{(1+I)^{x-N}}$$

Where:

- N = Number of years of Operation Service already included in the Contract (Sub-Clause 8.2 of PCC);
- M = The life span expectancy of the facility specified in the Table of performance requirements of Section VII, Employer's Requirements;
- x = An index number 1, 2, 3, ... M representing the total number of years to be taken into account in the bid evaluation with regards to operation and/or maintenance costs;
- OM(*) = Operation Service cost for year "x," as provided by the Bidder in the specific Operation Service Price Schedule (Schedule 5) of Price Schedules of Section IV, Bidding

Forms. The rate for the last year priced under the Contract shall be applied for each subsequent year;

I = Discount rate to be used for the Net Present Value calculation.

(*) This cost includes electricity cost even if the electricity payments are made by the Employer.

Asset Replacement (AR) is calculated as follows:

$$AR = EM + EL + IT$$

Where:

EM = Cost of replacement of Electromechanical Equipment, as listed and priced by the Bidder in Schedules 2 and 3, for a replacement period set at ten (10) years during the life span expectancy of the facility specified in the Table of performance requirements of Section VII, Employer's Requirements;

EL = Cost of replacement of Electrical Equipment, as listed and priced by the Bidder in Schedules 2 and 3, for a replacement period set at fifteen (15) years during the life span expectancy of the facility specified in the Table of performance requirements of Section VII, Employer's Requirements;

IT = Cost of replacement of IT and automatic devices, as listed and priced by the Bidder in Schedules 2 and 3, for a replacement period set at five (5) years during the life span expectancy of the facility specified in the Table of performance requirements of Section VII, Employer's Requirements.

$$\textbf{NB: Evaluated Bid Price = Design-Build Price + OMEP + AR}$$

1.5 **Combined Evaluation:**

The Employer will evaluate and compare the Bids that have been determined to be substantially responsive.

The weight to be given for cost is: 70

An Evaluated Bid Score (B) will be calculated for each responsive Bid using the following formula, which permits a comprehensive assessment of the Bid price and the technical merits of each Bid:

$$B = \frac{P_{low}}{P} X + \frac{T}{T_{high}} (1 - X)$$

Where:

P = Evaluated Bid Price;

P_{low} = The lowest of all Evaluated Bid Price among responsive Bids;

T = The total Technical Score awarded to the Bid;

T_{high} = The Technical Score achieved by the Bid that was scored best among all responsive Bids;

X = Weight for Cost.

The Bid with the highest evaluated Bid Score (B) among responsive Bids shall be the Most Advantageous Bid provided the Bidder is qualified to perform the Contract.

1.6 **Personnel:**

The Bidder must demonstrate that it has the personnel for the key positions that meet the following requirements:

No.	Position	Total work experience/ Relevant work experience (years)
1	<i>Project director</i>	10
2	<i>Project managers of the project activities</i>	5
3	<i>Computer Science / IT Expert</i>	3
4	<i>Information Systems Security Specialist</i>	5
5	<i>System Integrator</i>	3
6	<i>Expert for Metocean Numerical Modelling</i>	5
7	<i>Big Data expert</i>	3
8	<i>Scientific experts on meteorology and oceanography</i>	3
9	<i>Technical/Mechanical/Electrical Engineer</i>	3
10	<i>Local team in Indonesia - Local Project Coordinator</i>	3
11	<i>Local team in Indonesia - Local Technical Experts</i>	2
12	<i>Training manager</i>	3
13	<i>Quality Assurance/Quality Control Manager</i>	3

The Bidder shall provide details of the proposed personnel and their experience records using Forms PER-1 and PER-2 included in Section IV - Bidding Forms.

2 QUALIFICATION

2.1 Table of Qualification and Criteria:

Criteria		Compliance Requirements				Documentation
Subject	Requirement	Single Entity Requirements	Joint Venture Requirements (existing or intended)			Submission Requirements
			All Parties Combined	Each Member	One Member	
1 Eligibility						
1.1 Nationality	Nationality in accordance with ITB 4.3	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI-1.1 and ELI-1.2, with attachments
1.2 Conflict of Interest	No conflicts of interest in accordance with ITB 4.4	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Application Submission Form
1.3 AFD Eligibility	Not being ineligible to AFD financing, as described in ITB 4.3	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Statement of Integrity and Environmental and Social Responsibility
Historical Contract Non-Performance						
2.1 History of Non-Performing Contracts	Termination of a contract ¹ did not occur as a result of contractor's default in the past five (5) years.	Must meet requirements	Must meet requirements	Must meet requirements ²	N/A	Form CON-2
2.2 Suspension Based on Execution of Bid Securing Declaration by the Employer	Not under suspension based on execution of a Bid Securing Declaration pursuant to ITB 4.5.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Application Submission Form

¹ Non-performance shall include all terminations of contracts where (a) non-performance was not challenged by the Bidder, including through referral to the dispute resolution mechanism under the respective contract, and (b) contracts that were so challenged but fully settled against the Bidder. Non-performance shall not include contracts where Employers decision was overruled by the dispute resolution mechanism.

² This requirement also applies to contracts executed by the Bidder as JV member.

Criteria		Compliance Requirements				Documentation
Subject	Requirement	Single Entity Requirements	Joint Venture Requirements (existing or intended)			Submission Requirements
			All Parties Combined	Each Member	One Member	
2.3 Pending Litigating	All pending litigation shall in total not represent more than one hundred percent (100%) of the Bidder's net worth and shall be treated as resolved against the Bidder.	Must meet requirement	N/A	Must meet requirement	N/A	Form CON-2
Financial situation and Performance						
3.1 Financial Capabilities	(i) The Bidder shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the cash flow requirements estimated as US\$ 3.500.000 for the subject contract(s) net of the Bidders other commitments;	Must meet requirement	Must meet requirement	N/A	N/A	Forms FIN-3.1, with attachments and FIN-3.3
	(ii) The Bidder shall also demonstrate, to the satisfaction of the Employer, that it has adequate sources of finance to meet the cash flow requirements on contracts currently in progress and for future contract commitments;	Must meet requirement	Must meet requirement	N/A	N/A	Forms FIN-3.1 and FIN-3.4
	(iii) The audited balance sheets or, if not required by the laws of the Bidder's country, other financial statements acceptable to the	Must meet requirement	N/A	N/A	Leader must meet requirement	Form FIN-3.1, with attachments

Criteria		Compliance Requirements				Documentation
Subject	Requirement	Single Entity Requirements	Joint Venture Requirements (existing or intended)			Submission Requirements
			All Parties Combined	Each Member	One Member	
	<p>Employer, for the last three (3) years shall be submitted and demonstrate the current soundness of the Bidder's financial position. The Bidder's financial position will be deemed sound if at least two (2) of the following four (4) criteria are met:</p> <p>a) Average earnings before interest, taxes, depreciation, and amortization (EBITDA) for the last three (3) years > 0;</p> <p>b) Total equity (net worth) for the last three (3) years > 0;</p> <p>c) Average liquidity ratio for the last three (3) years > 1 ((Current assets) / (Current liabilities) > 1);</p> <p>d) Average indebtedness ratio for the last three (3) years < 6 ((Total financial liabilities) / (EBITDA) < 6).</p>					

Criteria		Compliance Requirements				Documentation
Subject	Requirement	Single Entity Requirements	Joint Venture Requirements (existing or intended)			Submission Requirements
			All Parties Combined	Each Member	One Member	
3.2 Minimum Average Annual Turnover	Minimum average annual turnover of 20,000,000 (twenty million Euros) for the last 5 (five) years.	Must meet requirement	Must meet requirement	Must meet twenty per cent (20%) of the requirement	Must meet forty per cent (40%) of the requirement	Form FIN-3.2
Experience						
4.1 General Experience	Experience in the role of prime contractor, JV member, subcontractor, or management contractor for at least the last 5 (five) years	Must meet requirement	N/A	Must meet requirement	N/A	Form EXP-4.1
4.2 Specific Experience	A minimum number of similar ³ contracts specified below that have been satisfactorily and substantially ⁴ completed as a prime contractor, joint venture member ⁵ , management contractor or subcontractor ⁶ between 1 st January 2010 and the application submission deadline: - Minimum of 1 (one) contract minimum value 15,000,000 € (fifteen million Euros) in	Must meet requirement	Must meet requirement ⁶	N/A	NA	Form EXP-4.2

³ The similarity shall be based on the physical size, complexity and technicity of the works. Adding up small value contracts (less than the value specified under requirement) to meet the overall requirement will not be accepted.

⁴ Substantial completion shall be based on 80% or more completed under the contract.

⁵ For contracts under which the Bidder participated as a joint venture member or subcontractor, only the Bidder's share, by value, shall be considered to meet this requirement.

⁶ In the case of a JV, the value of contracts completed by its members shall not be aggregated to determine whether the requirement of the minimum value of a single contract has been met. For instance, if the criterion mentions "two (2) contracts with a minimum value of 50M\$ each", a JV composed of 3 members and having carried out four (4) contracts of 30M\$ each shall not be qualified. On the other hand, if 2 of the 3 members of the JV each carried out one (1) contract of 50M\$, the criterion is met, even if the third member does not have any contract of this value.

Criteria		Compliance Requirements				Documentation
Subject	Requirement	Single Entity Requirements	Joint Venture Requirements (existing or intended)			Submission Requirements
			All Parties Combined	Each Member	One Member	
	marine engeneering, oceanography and meteorology observation systems - Minimum of 1 (one) contract of minimum value 8,000,000 € (eight million Euros) in high performance computing and meteorology modelling - Minimum of 1 (one) contract of minimum value 1,000,000 € (1 million Euros) in capacity building and training of technical and academic staff in oceanography and meteorology systems					
Manufacture's Authorization						
5.1 Manufacture's Authorization	A Bidder that does not manufacture or produce the Goods it offers to supply shall submit the Manufacturer's Authorization, for : a. Coastal Buoys b. Wave Enclosed and Current Profiler c. Development of Remote Sensing Products for atmospheric and ocean System	Must meet requirement	Must meet requirement	N/A	N/A	Form Manufacturer's Authorization

Criteria		Compliance Requirements				Documentation
Subject	Requirement	Single Entity Requirements	Joint Venture Requirements (existing or intended)			Submission Requirements
			All Parties Combined	Each Member	One Member	
	d. MMS HPC and Infrastructure Upgrade					

Criteria		Compliance Requirements				Documentation
Subject	Requirement	Single Entity Requirements	Joint Venture Requirements (existing or intended)			Submission Requirements
			All Parties Combined	Each Member	One Member	
Environmental, Social, Health and Safety (ESHS) ⁷						
5.1 ESHS Certification(s)	Availability of a valid ISO certification or internationally recognized equivalent (equivalency to be demonstrated by Bidder), and applicable to the worksite: <input type="checkbox"/> √ Quality management certificate ISO 9001	Must meet requirement	N/A	N/A	Leader must meet requirement	Form CER
5.2 ESHS Documentation	Availability of in-house policies and procedures acceptable to the Employer for ESHS management: 1. Existence of an Ethics Charter. 2. Existence of a system for monitoring compliance with ESHS commitments for the Candidate's Subcontractors and all its partners. 3. Existence of official company procedures for the management of the following relevant points:	Must meet requirement	N/A	N/A	Leader must meet requirement	1. The ESHS Ethics Charter of the company or equivalent must be provided. 2. A procedure or information on how the Bidder ensures that all members of the Joint Venture, Subcontractors, suppliers and temporary labor (i) are aware and (ii) meet ESHS requirements must be provided. 3. Official internal procedure documents on the topics

⁷ Those ESHS qualification criteria may be reduced or deleted if the worksite management is of minor E&S impact.

Criteria		Compliance Requirements				Documentation
Subject	Requirement	Single Entity Requirements	Joint Venture Requirements (existing or intended)			Submission Requirements
			All Parties Combined	Each Member	One Member	
	<input type="checkbox"/> ESHS resources and facilities and ESHS monitoring organization; <input type="checkbox"/> Health & Safety on worksites; <input type="checkbox"/> Local recruitment and ESHS trainings of local staff (capacity building), ESHS trainings of subcontractors and local partners (transfer of knowledge); <input type="checkbox"/> Relations with stakeholders, information and consultation of local communities and authorities; <input type="checkbox"/> Biodiversity: protection of fauna and flora;					indicated must be provided.
5.3 ESHS Experience	Experience of 1(one) contracts over the last 5 (five) years, where major ESHS measures were carried out or are on progress satisfactorily and in compliance with international standards.	Must meet requirement	N/A	N/A	Leader must meet requirement	Form EXP-ESHS with supporting documents(the bidder shall submit a piece of evidence supporting the ESHS implementation measures)
5.4 ESHS Dedicated Personnel	Availability of in-house personnel dedicated to ESHS issues: Environmental and Social Manager, and/or Health and Safety Manager.	Must meet requirement	N/A	N/A	Leader must meet requirement	Organizational chart evidencing filled ESHS position(s)

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Bid Submission Forms

Bid Submission Form - Technical Bid

[The Bidder shall prepare his Technical Bid on a Letterhead paper specifying his name and address.]

Date: _____

IPC No.: _____

Invitation for Bid No.: _____

Alternative No.: _____

To: _____

We, the undersigned, declare that:

- a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB 8)
- b) We have no conflict of interest in accordance with ITB 4;
- c) We have not been suspended nor declared ineligible by the Employer based on execution of a Bid Securing Declaration in the Employer's country in accordance with ITB 4.4;
- d) We offer to design, build and operate, in conformity with the Bidding Documents, the following Works: _____

- e) Our Bid shall be valid for a period of _____ days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- f) We are not participating, as a Bidder, in more than one bid in this bidding process in accordance with ITB 4.2(e), other than alternative bids submitted in accordance with ITB 13;
- g) We acknowledge and agree that the Employer reserves the right to annul the bidding process and reject all bids at any time prior to contract award without thereby incurring any liability to us; and
- h) We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in any type of fraud and corruption

Name of the Bidder¹: _____

Name of the person duly authorized to sign the Bid on behalf of the Bidder²: _____

Title of the person signing the Bid: _____

Signature of the person named above: _____

Date signed: _____ day of: _____

¹ In the case of the Bid submitted by a JV specify the name of the JV as Bidder.

² Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid.

Appendix to Technical Bid: Statement of Integrity, Eligibility and Environmental and Social Responsibility

Reference of the bid or proposal _____ (the "**Contract**")

To: _____ (the "**Contracting Authority**")

1. We recognise and accept that *Agence Française de Développement* ("**AFD**") only finances projects of the Contracting Authority subject to its own conditions which are set out in the Financing Agreement which benefits directly or indirectly to the Contracting Authority. As a matter of consequence, no legal relationship exists between AFD and our company, our joint venture or our suppliers, contractors, subcontractors, consultants or subconsultants. The Contracting Authority retains exclusive responsibility for the preparation and implementation of the procurement process and performance of the contract. The Contracting Authority means the Purchaser, the Employer, the Client, as the case may be, for the procurement of goods, works, plants, consulting services or non-consulting services.
2. We hereby certify that neither we nor any other member of our joint venture or any of our suppliers, contractors, subcontractors, consultants or subconsultants are in any of the following situations:
 - 2.1 Being bankrupt, wound up or ceasing our activities, having our activities administered by the courts, having entered into receivership, reorganisation or being in any analogous situation arising from any similar procedure;
 - 2.2 Having been:
 - a) convicted, within the past five years by a court decision, which has the force of *res judicata* in the country where the Contract is implemented, of fraud, corruption or of any other offense committed during a procurement process or performance of a contract (in the event of such conviction, you may attach to this Statement of Integrity supporting information showing that this conviction is not relevant in the context of this Contract);
 - b) subject to an administrative sanction within the past five years by the European Union or by the competent authorities of the country where we are constituted, for fraud, corruption or for any other offense committed during a procurement process or performance of a contract (in the event of such sanction, you may attach to this Statement of Integrity supporting information showing that this sanction is not relevant in the context of this Contract);
 - c) convicted, within the past five years by a court decision, which has the force of *res judicata*, of fraud, corruption or of any other offense committed during the procurement process or performance of an AFD-financed contract;
 - 2.3 Being listed for financial sanctions by the United Nations, the European Union and/or France for the purposes of fight-against-terrorist financing or threat to international peace and security;
 - 2.4 Having been subject within the past five years to a contract termination fully settled against us for significant or persistent failure to comply with our contractual obligations during contract performance, unless this termination was challenged and dispute resolution is still pending or has not confirmed a full settlement against us;
 - 2.5 Not having fulfilled our fiscal obligations regarding payments of taxes in accordance with the legal provisions of either the country where we are constituted or the Contracting Authority's country;
 - 2.6 Being subject to an exclusion decision of the World Bank and being listed on the website <http://www.worldbank.org/debar> (in the event of such exclusion, you may attach to this

- Statement of Integrity supporting information showing that this exclusion is not relevant in the context of this Contract);
- 2.7 Having created false documents or committed misrepresentation in documentation requested by the Contracting Authority as part of the procurement process of this Contract.
3. We hereby certify that neither we, nor any of the members of our joint venture or any of our suppliers, contractors, subcontractors, consultants or subconsultants are in any of the following situations of conflict of interest:
- 3.1 Being an affiliate controlled by the Contracting Authority or a shareholder controlling the Contracting Authority, unless the stemming conflict of interest has been brought to the attention of AFD and resolved to its satisfaction;
- 3.2 Having a business or family relationship with a Contracting Authority's staff involved in the procurement process or the supervision of the resulting Contract, unless the stemming conflict of interest has been brought to the attention of AFD and resolved to its satisfaction;
- 3.3 Being controlled by or controlling another bidder or consultant, or being under common control with another bidder or consultant, or receiving from or granting subsidies directly or indirectly to another bidder or consultant, having the same legal representative as another bidder or consultant, maintaining direct or indirect contacts with another bidder or consultant which allows us to have or give access to information contained in the respective applications, bids or proposals, influencing them or influencing decisions of the Contracting Authority;
- 3.4 Being engaged in a consulting services activity, which, by its nature, may be in conflict with the assignments that we would carry out for the Contracting Authority;
- 3.5 In the case of procurement of goods, works or plants:
- a) Having prepared or having been associated with a consultant who prepared specifications, drawings, calculations and other documentation to be used in the procurement process of this Contract;
- b) Having been recruited (or being proposed to be recruited) ourselves or any of our affiliates, to carry out works supervision or inspection for this Contract.
4. If we are a state-owned entity, and to compete in a procurement process, we certify that we have legal and financial autonomy and that we operate under commercial laws and regulations.
5. We undertake to bring to the attention of the Contracting Authority, which will inform AFD, any change in situation with regard to points 2 to 4 here above.
6. In the context of the procurement process and performance of the corresponding contract:
- 6.1 We have not and we will not engage in any dishonest conduct (act or omission) deliberately intended to deceive others, to intentionally conceal items, to violate or vitiate someone's consent, to make them circumvent legal or regulatory requirements and/or to violate their internal rules in order to obtain illegitimate profit;
- 6.2 We have not and we will not engage in any dishonest conduct (act or omission) contrary to our legal or regulatory obligations or our internal rules in order to obtain illegitimate profit;
- 6.3 We have not promised, offered or given and we will not promise, offer or give, directly or indirectly to (i) any Person who holds a legislative, executive, administrative or judicial mandate within the State of the Contracting Authority regardless of whether that Person was nominated or elected, regardless of the permanent or temporary, paid or unpaid nature of the position and regardless of the hierarchical level the Person occupies, (ii) any other Person who performs a public function, including for a State institution or a State-owned company, or who provides a public service, or (iii) any other person defined as a Public Officer by the national laws of the Contracting Authority's country, an undue advantage of any kind, for himself or for another Person or entity, for such Public Officer to act or refrain from acting in his official capacity;

- 6.4 We have not promised, offered or given and we will not promise, offer or give, directly or indirectly to any Person who occupies an executive position in a private sector entity or works for such an entity, regardless of the nature of his/her capacity, any undue advantage of any kind, for himself or another Person or entity for such Person to perform or refrain from performing any act in breach of its legal, contractual or professional obligations;
- 6.5 We have not and we will not engage in any practice likely to influence the contract award process to the detriment of the Contracting Authority and, in particular, in any anti-competitive practice having for object or for effect to prevent, restrict or distort competition, namely by limiting access to the market or the free exercise of competition by other undertakings;
- 6.6 Neither we nor any of the members of our joint venture or any of our suppliers, contractors, subcontractors, consultants or subconsultants shall acquire or supply any equipment nor operate in any sectors under an embargo of the United Nations, the European Union or France;
- 6.7 We commit ourselves to comply with and ensure that all of our suppliers, contractors, subcontractors, consultants or subconsultants comply with international environmental and labour standards, consistent with laws and regulations applicable in the country of implementation of the Contract, including the fundamental conventions of the International Labour Organisation (ILO) and international environmental treaties. Moreover, we shall implement environmental and social risks mitigation measures when specified in the environmental and social commitment plan (ESCP) provided by the Contracting Authority.
7. We, as well as members of our joint venture and our suppliers, contractors, subcontractors, consultants or subconsultants authorise AFD to inspect accounts, records and other documents relating to the procurement process and performance of the contract and to have them audited by auditors appointed by AFD.

Name: _____ In the capacity of: _____

Duly empowered to sign in the name and on behalf of¹: _____

Signature: _____

Dated: _____

¹ In case of joint venture, insert the name of the joint venture. The person who will sign the application, bid or proposal on behalf of the applicant, bidder or consultant shall attach a power of attorney from the applicant, bidder or consultant.

Bid Submission Form – Bid Price

[The Bidder shall prepare his Financial Bid on a Letterhead paper specifying his name and address.]

Date: _____

IPC No.: _____

Invitation for Bid No.: _____

Alternative No.: _____

To: _____

We, the undersigned, declare that:

- a) We have examined the Conditions of Contract, Employer's Requirements, Schedules, Contract Data, including Addenda Nos. _____ issued in accordance with Instructions to Bidders (ITB) 8;
- b) We have understood and checked these documents and have ascertained that they contain no errors or other defects as identified in our Bid. We accordingly offer to design, execute and complete the Works and remedy any defects therein so that they are fit for the purposes defined in the Contract, and to operate and maintain the facility under license from the Employer for the period and in conformity with the terms and conditions contained in the Contract for the amount of _____ (excluding VAT) or such other amount as may be determined in accordance with the Contract;
- c) This amount is made up of the following components:
 - (i) For the Design-Build of the Works, the lump sum amount of _____ (excluding VAT);
 - (ii) For the Operation Service, the amount of _____ (excluding VAT);
 - (iii) The total amount of VAT is: _____.
- d) The discounts offered and the methodology for their application are:
 - (i) The discounts offered are: _____;
 - (ii) The exact method of calculations to determine the net price after application of discounts is shown below: _____.
- e) We are fully aware of the onus given in this Contract to compliance with performance requirements, of our obligations accordingly, and of our liability to the Employer in case we breach such obligations. We are fully aware of the implication of the performance damages regime set out under the Contract. We understand that, when entering to the Contract, the Employer relies on our representation that we have the necessary skills and experience for complying with those obligations;
- f) If our Bid is accepted, we commit to obtain a Performance Security in accordance with ITB 44 of the Bidding Documents;
- g) We further undertake, together with the Employer, to jointly appoint the Dispute Board (DB) in accordance with the requirements of the Contract;
- h) We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding Contract between us, until a formal Contract Agreement is prepared and executed;

- i) We acknowledge and agree that the Employer reserves the right to annul the bidding process and reject all bids at any time prior to Contract award without thereby incurring any liability to us; and
- j) We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in any type of fraud and corruption.

Name of the Bidder¹: _____

Name of the person duly authorized to sign the Bid on behalf of the Bidder²: _____

Title of the person signing the Bid: _____

Signature of the person named above: _____

Date signed: _____ day of: _____

¹ In the case of the Bid submitted by a JV specify the name of the JV as Bidder.

² Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid.

Table B: Foreign Currency

The Bidder shall fill a table similar to the following one for each foreign currency of payment, as appropriate.

Index Code	Index Description/ Identification	Publication Source for the Index	Base Value in [month] ¹
(T)			
(S)			
()			

Bidder's Signature: _____

Appendix 1 to Financial Bid - Summary of Payment Currencies

Table: Option A

To be used only with Option A: "Bidders to quote entirely in local currency"
(Sub-clause BDS 18.1)

Name of payment currency	A) Amount of currency	B) Rate of exchange (local currency per unit of foreign	C) Local currency equivalent (C = A x B)	D) Percentage of Total Bid Price ($100 \times C /$ TPB)
Local currency: _____		1.00		
Foreign currency: € or US\$				
Total Bid Price				100
Provisional sums expressed in local currency	<i>[To be entered by the Employer]</i>		<i>[To be entered by the Employer]</i>	
TOTAL BID PRICE (including provisional sum)				

Table: Option B

To be used only with Option B: "Bidders allowed to quote in local and foreign currencies"
(Sub-Clause BDS 18.1)

Name of currencies	Amounts payable
Local currency: _____	
Foreign currency (€ or US\$): _____	

Provisional sums expressed in local currency:_____	<i>[To be entered by the Employer]</i>
--	--

Price Schedules

- **Schedule No. 1:** Design Services;
- **Schedule No. 2:** Equipment, Materials, Tools and mandatory Spare Parts supplied from abroad;
- **Schedule No. 3:** Equipment, Materials, Tools and mandatory Spare Parts supplied from within the Employer's country;
- **Schedule No. 4:** Construction Works and Installation Services;
- **Schedule No. 5:** Operation Service;
- **Schedule No. 6:** Grand Summary; and
- **Schedule No. 7:** Recommended Spare Parts.

Schedule No. 1: Design Services

Item	Description	Quantity	Unit Price ¹ (excluding VAT)		Total Price ¹ (excluding VAT)		VAT
			Local Currency Portion	Foreign Currency Portion	Local Currency Portion	Foreign Currency Portion	Local Currency Portion
1	2	3	4	5	6 = 3 x 4	7 = 3 x 5	8
TOTAL Columns 6 and 7 to be also included in Schedule No.6: Grand Summary							

Name of Bidder: _____

Signature of Bidder: _____

¹ Specify currency in accordance with ITB 18.1 of the BDS.

**Schedule No. 2: Equipment, Materials, Tools and mandatory Spare Parts
supplied from abroad**

Item	Description	Country of Origin	Quantity	Unit Price ¹		Total CIP Price	VAT and Customs Duties	
				Foreign Currency	CIP		Foreign Currency	Local Currency
1	2	3	4	5	6	7 = 4 x 6	8	9
TOTAL Column 7 to be also included in Schedule No.6: Grand Summary								

Name of Bidder:

Signature of Bidder: _____

¹ Specify currency in accordance with ITB 18.1 of the BDS.

**Schedule No. 3: Equipment, Materials, Tools and mandatory Spare Parts
supplied from within the Employer's country**

Item	Description	Quantity	Unit Price ¹		Total CIP Price	VAT and Customs Duties
			Local Currency	CIP Price		
1	2	3	4	5	6 = 3 x 5	7
TOTAL Column 6 to be also included in Schedule No.6: Grand Summary						

Name of Bidder: _____

Signature of Bidder: _____

¹ Specify currency in accordance with ITB 18.1 of the BDS.

Schedule No. 4: Construction Works and Installation Services

Item	Description	Quantity	Unit Price ¹ (excluding VAT)		Total Price ¹ (excluding VAT)		VAT
			Local Currency Portion	Foreign Currency Portion	Local Currency Portion	Foreign Currency Portion	Local Currency Portion
1	2	3	4	5	6 = 3 x 4	7 = 3 x 5	8
1	...						
2	...						
3	...						
4	...						
5	Inland transportation to the Site						
6	Environmental, Social, Health and Safety (ESHS) requirements (Breakdown as per ESHS Cost Schedule provided hereafter)						
7	[Security measures (Breakdown as per Security Cost Schedule provided hereafter)] ²						
8	Training						
9	Provisional Sum for the Employer's share of the Dispute Board ³						
10							
Etc.							
TOTAL Columns 6 and 7 to be also included in Schedule No.6: Grand Summary							

Name of Bidder: _____

Signature of Bidder: _____

¹ Specify currency in accordance with ITB 18.1 of the BDS.

² To be deleted if no security specifications are included in the Bidding Documents.

³ As described in PCC Sub-Clause 13.5. Sum filled in by the Employer in the Bidding Documents, and to be inserted by the Contractor in this Schedule without any alteration. No Contractor's overhead charges and profit percentage applies.

Environmental, Social, Health and Safety (ESHS) Cost Schedule

Item N°	Description	ESHS Specifications Clause N°	Unit	Amount excluded VAT [specify currency]	VAT Amount
ESHS 1	Resources allocated to ESHS management	Clause 4	Lump sum		
ESHS 2	Drafting and updating the ESHS documentation, reporting, inspections	Clauses 1, 2, 3, 5, 6, 7, 9	Lump sum	<i>[Cost ESHS 1 should exclude all or part of the costs of those tasks]</i>	
ESHS 3	Implementation of the Health and Safety Plan: Meetings, health care centre, medical check-ups, emergencies and evacuations, safety protective equipment, hygiene	Clauses 1, 9, 21 to 25, 27 to 35, 37, 38	Lump sum	<i>[Cost ESHS 1 should exclude all or part of the costs of those tasks]</i>	
ESHS 4	Accommodation, drinking water, meals and transportation of staff (*) (*): The Bidder shall detail the financial conditions of the supply of accommodation, meals and transport to its staff: <ul style="list-style-type: none"> – Accommodation – Meals – Transport 	Clauses 36, 40, 41	Lump sum Lump sum Lump sum	<i>[The cost for "Site mobilization" should exclude all or part of the costs of those tasks]</i>	
ESHS 5	Training and local recruitment management costs	Clauses 8, 39	Lump sum	<i>[Cost ESHS 1 should exclude all or part of the costs associated to those tasks]</i>	
ESHS 6	Protection of adjacent areas, biodiversity, prevention of erosion and wastewater management	Clauses 10, 11, 12, 17, 18	Lump sum		
ESHS 7	Traffic, noise and atmospheric emissions management, land take	Clauses 13, 14, 42, 43, 44	Lump sum		
ESHS 8	Waste and hazardous products management	Clauses 15, 26	Lump sum		

Item N°	Description	ESHS Specifications Clause N°	Unit	Amount excluded VAT [specify currency]	VAT Amount
ESHS 9	Vegetation clearing and Site rehabilitation	Clauses 16, 19, 20	Lump sum	<i>[The cost for "Site mobilization" should exclude all or part of the costs associated to those tasks]</i>	
Total for Bill ESHS				_____	_____
<p>ESHS costs are deemed to cover operations on all Sites (as defined in Clause 1.3 of ESHS Specifications).</p> <p>Interim Payment Certificates shall include the portion of each ESHS cost amounting to the percentage of the actual progress achieved in executing the ESHS measures in compliance with the ESHS Specifications and approved by the Employer's Representative.</p> <p>If the ESHS specifications are not included in the Bidding Documents, this ESHS Cost Schedule is not applicable.</p>					

Security Cost Schedule

Price N°	Category Title	Reference of Security Specifications	Unit Price (currency)	VAT
Security Item				
Security 1	Security organisation	Article 4.1		
Security 2	Travel within the country and to the relevant area	Article 4.2		
Security 3	Accommodation during assignments	Article 4.3		
Security 4	Accommodation and security on project sites and worksites	Article 4.4		
Security 5	Communication	Article 4.5		
Other	This price may remunerate all the other services described in Articles 1 to 3 of the Security Specifications.	Articles 1 to 3, 5 to 6		
TOTAL Security Item			_____	_____
<p>The prices include all activities and measures defined in the security specifications and correspond to additional costs compared to an environment without security risk.</p> <p>A breakdown of security price items shall be included in the Bid.</p> <p>If security specifications are not included in the Bidding Documents, this Security Cost Schedule is not applicable.</p>				

Schedule No. 5: Operation Service

	Currency	Contractor's Fixed Fee (From Price Schedule 5.1) (1)	Contractor's Variable Fee (From Price Schedule 5.2) (2)				Electricity Payment (From Price Schedule 5.3) (3)				Total Operation Service Bid Price (excluding VAT) (1) + (2) + (3) <u>or</u> (1) + (2) ¹				VAT			
			Year 1	Year 2	Etc.	Y ²	Year 1	Year 2	Etc.	Y ²	Year 1	Year 2	Etc.	Y ²	Year 1	Year 2	Etc.	Y ²
1. Bid Price in Foreign Currency																		
Foreign Currency (if any)	[state currency]																	
2. Bid Price in local currency	[state currency]																	
TOTAL per Year																		
TOTAL to be also included in Schedule No.6: Grand Summary																		

Name of Bidder: _____

Signature of Bidder: _____

¹ If cost of electricity is deemed under the contract to be paid by the Employer, Price Schedule 5.3 (column (3)) shall not be included in the Total Operation Service Bid Price.

² Insert number of years of the Operation Service Period.

Schedule No. 5.1: Contractor's Annual Fixed Fee (including training and knowledge transfer)

Fixed Fee Item	Currency	Annual Fixed Fee	No. of Years	Total Fixed Fees for the Operation Service Period ¹ (excluding VAT)	VAT
		(1)	(2)	(1) x (2)	
1. Fixed Price in Foreign Currency					
Foreign Currency (if any)	<i>[state currency]</i>	<i>[enter amount]</i>	Y ²	<i>[calculated value]</i>	
2. Fixed Price in local currency					
Fixed Fee	<i>[state currency]</i>	<i>[enter amount]</i>	Y ²	<i>[calculated value]</i>	

¹ Total to be carried forward in Schedule No.5: Plant Operation Service.

² Insert number of years of the Operation Service Period.

Schedule No. 5.2: Contractor's Variable Fee

Applicability range of this Schedule: *[In case the variable fee fluctuates depending on the production range of the facility, or another parameter, specify the production rate of the facility / parameter within which this Schedule applies. Insert as many sets of this Schedule as are required to cover the various production ranges / parameters of the facility.]*

Contractor's Variable Fee (CVF) Bid Price

		Unit	CVF Bid Price ¹ (Calculated values: CVF x Annual Production in Line 1)				Total Year 1 to Y	VAT
			Year 1	Year 2	Etc.	Y ²		
1	Annual water production (forecast) <i>[The Contractor shall use the value specified by the Employer in Section VII – Employer's Requirements]</i>	m ³						
2	CVF Bid Price in Foreign Currency	<i>[state currency]</i>						
	CVF – Foreign Currency (if any)	CVF/m ³						
3	CVF Bid Price in Local Currency	<i>[state currency]</i>						
	CVF – Local Currency	CVF/m ³						

[Note: This Schedule 5.2, as well as Schedule 5.3 (and schedule 5.4, if inserted for dealing with chemicals) below is based on an applicability range which is to be filled in. Indeed various production conditions can lead to different cost structures. As a consequence, there can be several sets of Schedules 5.2 and 5.3 (and 5.4, if any) that can be used by the Bidder to reflect the specificities of this process. As an example for a WTP producing 50,000 m³/day, there can be:

- One set of Variable Fees per m³/produced, and of Guaranteed Maximum Energy Consumption Rate to be applied to the plant when it produces in between 0 and 10,000 m³/day
- Then another set in between 10,000 m³/day and 30,000 m³/day, etc.]

¹ Numbers to be carried forward in Schedule No.5: Plant Operation Service.

² Insert as many columns as the number of years of the Operation Service Period.

Schedule No. 5.3: Contractor's Electricity Payment

Applicability range of this Schedule: *[In case the electricity consumption rate varies depending on the production range of the plant, or another factor, specify the production rate of the plant / factor within which this Schedule applies. Insert as many sets of this Schedule as are required to cover the various production ranges / parameters of the plant. The value to carry forward to Schedule 5 shall then be the sum of the values in each individual Schedule 5.3].*

Contractor's Variable Fee (CVF) Bid Price

[The Contractor shall use in his calculation the values of the Contractor's Performance Guarantees (i.e. guaranteed maximum energy consumption rate) indicated by the Contractor in Bid Price in the Schedule of Performance Guarantees (Section IV, Bidding Forms)]

		Unit	Electricity Annual Amount				Total Year 1 to Y	VAT
			Year 1	Year 2	Etc.	Y ¹		
1	Annual water production (forecast) <i>[The Contractor shall use the value specified by the Employer in Section VII – Employer's Requirements]</i>	m ³						
2	Nominal Average Tariff in local currency per kWh	<i>[Tariff in local Currency to be stated]</i>						
3	Annual electricity consumption (kWh) (Line 1 x Bidder's guaranteed Maximum Energy Consumption Rate in accordance with Schedule of Performance Guarantees)	kWh						
4	Annual Contractor's Electricity Payment in Local Currency (Line 2 x Line 3)	<i>[state currency]</i>						
TOTAL to be also included in Schedule No.5: Operation Service								

¹ Insert as many columns as the number of years of the Operation Service Period.

It should be noted that the Employer may wish to apply the same principles for chemicals consumption, since it is another major cost item within the operating expenditure of a facility. Indeed, the Employer may then wish to:

- bear the risk of the relevant chemical tariff fluctuation but only up to the Guaranteed Maximum Chemical Consumption;
- make the Contractor liable for cost overrun in case the actual chemical consumption exceeds the Guaranteed Maximum Chemical Consumption defined by the Contractor in his/her bid; and
- share the savings made by the Employer in case the relevant chemical consumption falls below the relevant Guaranteed Maximum Consumption Rate, as an incentive for the Contractor to do better than committed in his/her Bid and in Contract.

In such case, the Employer should:

- Introduce a Schedule 5.4, in similar terms as those used under Schedule 5.3 for electricity.
- Amend Schedule 5 to accommodate for an additional column reflecting the Contractor's Chemicals payment, which will capture price data flowing from Schedule 5.4.
- Insert Key Performance Indicators related to chemicals, if and as need be under the Employer's Requirements and the Schedule of Performance Guarantees.
- Amend the Appendixes 1 to 3 to the Contract Agreement so as to introduce similar terms for chemicals payment and performance damages as the ones used for electricity payment and performance damages.

Schedule No. 6: Grand Summary

Schedule No.	Title	Total Price ¹ (excluding VAT and Customs Duties)	
		Foreign	Local
1	Design Services		
2	Equipment, Materials, Tools and mandatory Spare Parts supplied from abroad		
3	Equipment, Materials, Tools and mandatory Spare Parts supplied from within the Employer's country ²		
4	Construction Works and Installation Services		
Sum of (1) to (4)	Subtotal for the Design-Build of the Works, to be also included in the Letter of Bid		
5	Works Operation Service		
Total of (5)	Subtotal for the Operation Service, to be to be also included in the Letter of Bid		
GRAND TOTAL to be also included in the Letter of Bid			
TOTAL VAT and Customs Duties			

Name of Bidder: _____

Signature of Bidder: _____

¹ Specify currency in accordance with ITB 18.1 of the BDS.

Schedule No. 7: Recommended Spare Parts

Item	Description	Quantity	Unit Price ¹		Total CIP Price	VAT and Customs Duties
			Local Currency	CIP Price		
1	2	3	4	5	6 = 3 x 5	7

Name of Bidder: _____

Signature of Bidder: _____

¹ Specify currency in accordance with ITB 18.1 of the BDS.

Technical Proposal

The technical proposal is expected in particular to include as a minimum, though not being limited to, the following contractual warranties, representations and statements of information:

- The details of the Contractor's proposed design engineering solution for the Works
- The Operation and Maintenance Plan proposed by the Bidder which fulfils the Operation Management Requirements contained in the Employer's Requirements
- The Contractor's method statements for the Design-Build Period
- The Bidder's proposed Site organization
- The list of proposed Subcontractors and suppliers of Works under the Contract, in furtherance to the Conditions of Contract Sub-Clause 4.4 and which have their origin in the Eligibility Criteria as defined under Section V of this Bidding Document. The Bidder shall use the specific form for that purpose which is included in the following pages.
- The programme the Contractor intends to observe when executing its obligations under the Contract, complying with the level of details described in the Employer's Requirements, and demonstrating the Contractor's ability to meet the Time for Completion and his other time-related obligations.
- The proposed Contractor's Equipment and Personnel to deliver the Contractor's obligations under the Contract, and meeting the Employer's Requirements – specific forms shall be used by the Bidders in this respect, and are included in the following pages

If a technical proposal is declared not substantially compliant with the requirements of the Bidding Documents, the Bid shall be rejected and shall not be further evaluated.

List of forms comprising the technical proposal:

- Schedule of Performance Guarantees
- Design proposal
- Design-Build Programme, Organization Chart and Construction Management Strategy
- Operation proposal
- Environmental, Social, Health and Safety (ESHS) Methodology
- List of Subcontractors
- Personnel proposed (forms PER-1 and PER-2)
- Equipment proposed (form EQU)

Schedule of Performance Guarantees

The Contractor is required to provide, as part of his Technical Bid, the schedule below reflecting the performance requirements which are included in Section VII, Employer's Requirements, where he will specify the values of the Contractor's Performance Guarantees and the Chemical's Name, as shown below:

[This table is provided as an example: please refer to the actual Table of performance requirements provided in Section VII, Employer's Requirements. The Bidder shall only fill in the columns of the Contractor's Performance Guarantees and the Chemical's Name.]

No.	KPI Name	Chemical's Name	KPI Description	KPI Minimum Value (if any)	KPI Maximum Value (if any)	KPI Measurement / Testing Methodology	Contractor's Performance Guarantees
1	Energy Consumption	NA	<i>[The power consumption of the entire plant, per m³ of treated water shall be less or equal to the guaranteed value.]</i>	N/A	<i>[kWh/m³]</i>	Measurement methodology as per Employer's Requirements	<i>[Insert Value]</i>
2	<i>[Chemical Type] – Water Treatment</i>	<i>[Chemical Name¹]</i>	<i>[The chemical consumption of this reagent, per m³ of treated water, shall be less or equal to the guaranteed value.]</i>	N/A	<i>[kg/m³ for solids, l/m³ for liquids]</i>	Measurement methodology as per Employer's Requirements	<i>[Insert Value]</i>
3	<i>[Chemical Type] – Sludge Treatment</i>	<i>[Chemical Name¹]</i>	<i>[The chemical consumption of this reagent, per ton of produced sludge, shall be less or equal to the guaranteed value.]</i>	N/A	<i>[kg/ton for solids, l/ton for liquids]</i>	Measurement methodology as per Employer's Requirements	<i>[Insert Value]</i>
4	<i>[Etc.]</i>						<i>[Insert Value]</i>

¹ **Chemical name:** the Contractor shall provide the name of the reagent among the choices given by the Employer's list of chemicals, this is the chemical base on which the Contractor's guaranteed value is provided. The Contractor is allowed to propose alternative chemical(s) to the ones listed by the Employer, provided that the Contractor can demonstrate, to the reasonable satisfaction of the Employer, that such alternative chemical(s) is(are) locally available for any future purchase by the Employer hence will not put the Employer into any higher risk of supply scarcity than if a chemical was chosen from the Employer's list.

Design Proposal

The Bidder shall submit a design proposal which should address all requirements specified in Section VII, Employer's Requirements. The following list is provided as an indicative outline of a possible Technical Bid structure:

- a) Overview
- b) References
- c) Engineering design qualification (Criteria concerning the design personnel requirements, consistent with such requirement in Section III, Evaluation and Qualification Criteria)
- d) Analysis results and Interpretation (if the Bidder is required to realise their proper analysis of raw water in addition of the data provided by the Employer's Requirement)
- e) Design criteria and basis
- f) Technical narrative
- g) Process flow diagram
- h) Process design and calculation of components (including structural modelling and Load application)
- i) Layout arrangement, component plans and spot details in A3
- j) Proposed design deliverables for Contract execution
- k) Site Investigation Reports (optional)

The Works shall be designed to withstand all description in accordance with the Employer's Requirements, and the appropriate codes and standards

A soft copy of engineering design calculations (input and output) for all elements in its original electronic file format, along with a hard copy, shall be submitted.

Work Programme, Organization Chart and Construction Management Strategy for Design-Build

1. Design-Build Work Programme

The Bidder shall set out a work programme for design and construction of the Works to be undertaken, including identification of major milestones and critical path. The proposed work programme shall be developed based on the Employer's Requirements and shall describe the:

- a) design of the Works, including the submission of the design deliverables, review and approval of the design by the Employer's Representative
- b) processes and deliverables needed to commence the Works;
- c) execution of the Works within the Time for Completion, highlighting activities imposing constraints on the construction sequence; and
- d) testing, commissioning and handing over of the completed Works.

2. Organization Chart

The Bidder shall provide an organization chart illustrating the proposed management structure and reporting lines for delivery of the Design Build. The organization chart shall include the names of all Key Personnel.

3. Construction Management Strategy

The Bidder shall submit a construction management strategy which should address all requirements specified in Section VII, Employer's Requirements. The following list is provided as an indicative outline of a possible Technical Bid structure:

- a) organizational arrangements for the construction management including: team structure, roles and responsibilities, interface arrangements, approval procedures and quality assurance arrangements;
- b) Subcontractor selection and management;
- c) proposals for training all Contractor's personnel attending Site;
- d) stakeholder engagement;
- e) obtaining and managing consents, permits and approvals;
- f) Site setup proposals including access, accommodation, welfare facilities, arrangement for Works and Material storage;
- g) construction phasing proposals including sequence of work and management of conflicting activities;
- h) ensuring that geotechnical investigations or other advance works meet the ESHS requirements;
- i) risk management approach for geotechnical and subsurface aspects of the Works;
- j) quality management system including a draft of the quality management plan;
- k) sustainability aspects demonstrating the Bidder's approach and commitment to sustainable construction practices (e.g. energy efficiency, reduction of wastages, material reduction and sources of materials etc.);
- l) arrangements for testing upon completion of the Works;
- m) arrangements for site handover, including completion of as-built drawings, preparation of operation and maintenance manuals, and any other relevant aspects; and
- n) Reporting arrangements.

Operation Service

The Bidder shall set out a detailed plan for the Operation Service which should address all requirements specified in Section VII, Employer's Requirements. The following list is provided as an indicative outline of a possible Technical Bid structure:

- a) Organisation and key personnel;
- b) Operations proposals;
- c) Preventative and reactive maintenance;
- d) Monitoring water/wastewater quality and flows;
- e) The operational systems to be developed, including details of any standards to be adopted or followed for example with respect to managing environmental, social and health and safety risks during operation;
- f) Training of Contractor's Personnel;
- g) Knowledge transfer to Employer's personnel;
- h) Asset replacement;
- i) Preparation of required documents and manuals;
- j) Quality assurance;
- k) Hand-back arrangements;
- l) Emergency Preparedness and Response Plan; and
- m) Reporting arrangements.

Environmental, Social, Health and Safety (ESHS) Methodology

The Bidder shall provide an ESHS Methodology providing information on how the Bidder shall meet the requirements and objectives specified in Section VII, Employer's Requirements - ESHS Specifications. **If the ESHS Specifications are not included in the Bidding Documents, this requirement is not applicable.**

The ESHS Methodology submitted shall be in the form of a preliminary draft of the Worksite Environmental and Social Management Plan (Worksite - ESMP), the content of which is detailed in Appendix 1 to ESHS Specifications.

In order to address the highly sensitive ESHS issues highlighted during the project's environmental and social impact assessment, **the ESHS Methodology shall provide detailed information on the management of the items listed in the table of Annex 3, paragraph 1. "Essential ESHS issues of worksite management" in Section VII, Employer's Requirements.** The purpose is not for the Bidder to provide one more time policies and internal procedures which were requested in the Prequalification phase but to provide a concrete ESHS methodology adapted to the worksites environment.

A Bid for which the ESHS Methodology is evaluated as non-substantially responsive (i.e. with material deviation, reservation or omission) to the ESHS Specifications shall be rejected.

List of Subcontractors

Proposed Subcontractors for Major Activities/Sub-Activities

The following Subcontractors and/or manufacturers are proposed for carrying out the activity/sub-activity indicated. For any additional Subcontractor (that is not the specialized Subcontractor accepted in the initial selection process or subsequently approved by the Employer in accordance with ITB 14.2), Bidders are free to propose more than one for each activity/sub-activity, in accordance with ITB 32.3.

Activity/Sub-Activity	Proposed Subcontractors	Nationality

Bidders shall submit an undertaking from each proposed Subcontractor to confirm that they have read, understand and will comply with the ESHS obligations using the Form hereby attached.

Form of Subcontractor ESHS Undertaking

Date: _____

Bid No.: _____

Alternative No.: _____

Contract title: *[insert the name of the Contract]***To:** *[insert the name of the Employer's agency]*

We, the undersigned, confirm that we have read, understand and will comply with the ESHS Specifications for the above mentioned contract.

Name of the proposed Subcontractor: _____

Name and title of the person signing this undertaking on behalf of the Subcontractor: _____

*[Signature of the person named above]*_____
[Date signed]

Name of the person duly authorized to sign the Bid on behalf of the Bidder: _____

Title of the person signing the Bid: _____

Signature of the person named above: _____

Date signed (day month year): _____

Personnel Proposed

Form PER-1: Contractor's Representative and Key Proposed Personnel

Bidders should provide the names of suitably qualified personnel to meet the specified requirements stated in Section III, Evaluation and Qualification Criteria. The data on their experience should be supplied using the Form PER-2 below for each candidate.

Bidders should submit a fully detailed Key Personnel resource schedule for the whole contract implementation period. The resource schedule must include:

- the name and role for each Key Personnel position
- The duration of each Key Personnel appointment
- The level of effort (time) allocated to each Key Personnel position and its distribution throughout the contract implementation period.

	Title of position	Name of candidate	
Key Personnel for Design-Build			
1	<i>[Contractor's Representative]</i>		
2	<i>[Design Manager]</i>		
3	<i>[Environmental Impact and Social Expert]</i>		
4	<i>[Health and Safety Specialist]</i>		
5	<i>[Construction Manager]</i>		
9	<i>[Environmental Specialist]</i>		
Etc.	<i>[Etc.]</i>		
Key Personnel for Operation Service			
10	<i>[Operation Service Manager]</i>		
11	<i>[Modify/add others as appropriate]</i>		

Form PER-2: Resume and Declaration of Contractor's Representative and Key Personnel

Name of Bidder: _____

Position: _____		
Personnel information	Name: _____	Date of birth: _____
	Professional qualifications: _____ _____	
Present employment	Name of Employer: _____	
	Address of Employer: _____ _____	
	Telephone: _____	Contact (manager / personnel officer): _____
	Fax: _____	Email: _____
	Job title: _____ _____	Years with present Employer: _____

Summarize professional experience over the last 20 years, in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

From	To	Company / Project / Position / Relevant technical and management experience

Declaration

I, the undersigned Key Personnel, certify that to the best of my knowledge and belief, the information contained in this Form PER-2 correctly describes myself, my qualifications and my experience.

I confirm that I am available as certified in the following table and throughout the expected time schedule for this position as provided in the Bid:

Commitment	Details
Commitment to duration of contract:	<i>[insert period (start and end dates) for which this Key Personnel is available to work on this contract]</i>
Time commitment:	<i>[insert the number of days/week/months/ that this Key Personnel will be engaged]</i>

I understand that any misrepresentation or omission in this Form may:

- a) be taken into consideration during Bid evaluation;
- b) my disqualification from participating in the Bid;
- c) my dismissal from the Contract.

Name of Key Personnel *[insert name]*: _____

Signature: _____

Date (day month year): _____

Countersignature of authorized representative of the Bidder:

Signature: _____

Date: (day month year): _____

Form EQU: Equipment

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed in Section III, Evaluation and Qualification Criteria. A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder.

Item of equipment	
Equipment information	Name of manufacturer: _____ _____
	Model and power rating: _____ _____
	Capacity: _____ _____
	Year of manufacture: _____ _____
Current status	Current location: _____ _____
	Details of current commitments: _____ _____ _____
Source	Indicate source of the equipment: <input type="checkbox"/> Owned <input type="checkbox"/> Leased <input type="checkbox"/> Rented <input type="checkbox"/> Specially manufactured

Omit the following information for equipment owned by the Bidder.

Owner	Name of owner: _____	
	Address of owner: _____ _____ _____	
	Telephone: _____	Contact name and title: _____ _____
	Fax: _____	Email: _____
Agreements	Details of rental / lease / manufacture agreements specific to the project: _____ _____ _____ _____	

Bidders Qualification Forms

The Bidder shall update the information provided during the corresponding initial selection exercise to demonstrate that he continues to meet the criteria used at the time of initial selection by using the relevant Forms included in Section IV, Bidding Forms. If needed, the Bidder may use any of the Initial Selection Documents forms to notify a change which occurred following the Initial Selection. The Employer reserves the right to request updated financial resources from the Bidder.

Form ELI-1.1 Bidder Information Form

Date: _____
ICB No. and title: _____
Page _____ of _____ pages

Bidder's name
In case of Joint Venture (JV), name of each member:
Bidder's actual or intended country of registration: <i>[indicate country of Constitution]</i>
Bidder's actual or intended year of incorporation:
Bidder's legal address [in country of registration]:
Bidder's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above. <input type="checkbox"/> In case of JV, letter of intent to form JV or JV agreement, in accordance with ITB 4.1. <input type="checkbox"/> In case of Government-owned enterprise or institution, in accordance with ITB 4.3 documents establishing: <ul style="list-style-type: none"> • Legal and financial autonomy • Operation under commercial law • Establishing that the Bidder is not dependent agency of the Employer
2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

Form ELI-1.2

Bidder's JV Information Form

(to be completed for each member of Bidder's JV and any Specialized subcontractor if applicable)

Date: _____
ICB No. and title: _____
Page _____ of _____ pages

Bidder's JV name:
JV member's name:
JV member's country of registration:
JV member's year of constitution:
JV member's legal address in country of constitution:
JV member's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above. <input type="checkbox"/> In case of a Government-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and absence of dependent status, in accordance with ITB 4.3. 2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

Form CON-2

Historical Contract Non-Performance, Pending Litigation and Litigation History

(to be completed by the Bidder and by each member of the Bidder's JV)

Bidder's Name: _____

Date: _____

JV Member's Name _____

ICB No. and title: _____

Page _____ of _____ pages

Non-Performed Contracts in accordance with Section III, Evaluation and Qualification Criteria			
<input type="checkbox"/> Contract non-performance did not occur since 1 st January <i>[insert current year number less 5]</i> specified in Section III, Evaluation and Qualification Criteria, Sub-Factor 2.1.			
<input type="checkbox"/> Contract(s) not performed since 1 st January <i>[insert current year number less 5]</i> specified in Section III, Evaluation and Qualification Criteria, requirement 2.1			
Year	Non-performed portion of contract	Contract Identification	Total Contract Amount (current value, currency, exchange rate and US\$ equivalent)
<i>[insert year]</i>	<i>[insert amount and percentage]</i>	Contract Identification: <i>[indicate complete contract name/number, and any other identification]</i> Name of Employer: <i>[insert full name]</i> Address of Employer: <i>[insert street/city/country]</i> Reason(s) for non performance: <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>
Pending Litigation, in accordance with Section III, Qualification Criteria and Requirements			
<input type="checkbox"/> No pending litigation in accordance with Section III, Qualification Criteria and Requirements, Sub-Factor 2.3.			
<input type="checkbox"/> Pending litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3 as indicated below.			

Year of dispute	Amount in dispute (currency)	Contract Identification	Total Contract Amount (currency), US\$ Equivalent (exchange rate)
		Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Matter in dispute: _____ Party who initiated the dispute: _____ Status of dispute: _____	

Form FIN-3.1

Financial Situation and Performance

Bidder's Name: _____

Date: _____

JV Member's Name: _____

ICB No. and title: _____

Page _____ of _____ pages

1. Financial data

Type of Financial information in (currency)	Historic information for previous _____ years, _____				
	(amount in currency, currency, exchange rate, US\$ equivalent)				
	Year 1	Year 2	Year 3	Year 4	Year 5
Statement of Financial Position (Information from Balance Sheet)					
Total Assets (TA)					
Total Liabilities (TL)					
Total Equity/Net Worth (NW)					
Current Assets (CA)					
Current Liabilities (CL)					
Working Capital (WC)					
Information from Income Statement					
Total Revenue (TR)					
Profits Before Taxes (PBT)					
Cash Flow Information					
Cash Flow from Operating Activities					

2. Financial documents

The Bidder and its parties shall provide copies of financial statements for _____ years pursuant Section III, Evaluation and Qualifications Criteria, Sub-factor 3.1. The financial statements shall:

- (a) reflect the financial situation of the Bidder or in case of JV member , and not an affiliated entity (such as parent company or group member).
 - (b) be independently audited or certified in accordance with local legislation.
 - (c) be complete, including all notes to the financial statements.
 - (d) correspond to accounting periods already completed and audited.
- ☐ Attached are copies of financial statements¹ for the _____years required above and complying with the requirements

¹ If the most recent set of financial statements is for a period earlier than 12 months from the date of bid, the reason for this should be justified.

Form FIN–3.2

Average Annual Construction Turnover

Bidder's Name: _____

Date: _____

JV Member's Name _____

ICB No. and title: _____

Page _____ of _____ pages

		Annual turnover data (construction only)	
Year	Amount Currency	Exchange rate	US\$ equivalent
<i>[indicate year]</i>	<i>[insert amount and indicate currency]</i>		
Average Annual Construction Turnover *			

* See Section III, Evaluation and Qualification Criteria, Sub-Factor 3.2.

Form FIN–3.3: Financial Resources

[The following table shall be filled in by the Bidder and all parties combined in case of a Joint Venture.]

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject contract as required during the Initial Selection process (see Section III, Initial Selection Criteria and Requirements).

Financial Resources		
No.	Source of financing	Amount (US\$ equivalent)
1		
2		
3		
...		

Form FIN-3.4:
Current Contract Commitments / Works in Progress

Bidders and each member to a JV should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full Completion Certificate has yet to be issued.

Current Contract Commitments					
No.	Name of Contract	Employer's Contact Address, Telephone and Fax	Value of Outstanding Work (Current US\$ Equivalent)	Estimated Completion Date	Average Monthly Invoicing Over Last Six Months (US\$/month)
1					
2					
3					
4					
5					
...					

Form EXP-4.1 General Construction Experience

(Each Bidder or member of a JV must fill this form)

Bidder's Name: _____

Date: _____

JV Member's Name _____

ICB No. and title: _____

Page _____ of _____ pages

Starting Year*	Ending Year	Contract Identification	Role of Bidder
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	

*** See Section III Evaluation and Qualification Criteria – Sub
Factor 4.1**

Form EXP-4.2(a)

Specific Construction and Contract Management Experience

(each Bidder or member of a JV or subcontractor must fill this form)

Bidder's Name: _____

Date: _____

JV Member's Name/Subcontractor name _____

ICB No. and title: _____

Page _____ of _____ pages

Similar Contract No.	Information			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Management Contractor <input type="checkbox"/>	Sub-contractor <input type="checkbox"/>
Total Contract Amount			US\$ equivalent	
If member in a JV or sub-contractor, specify participation in total Contract amount				
Employer's Name:				
Address:				
Telephone/fax number				
E-mail:				

Form EXP-4.2(a) (cont.)
Specific Construction and Contract Management
Experience (cont.)

Similar Contract No.	Information
Description of the similarity in accordance with Sub-Factor 4.2(a) of Section III:	
1. Amount	
2. Physical size of required works items	
3. Complexity	
4. Methods/Technology	
5. Construction rate for key activities	
6. Other Characteristics	

Form EXP-4.2(b)

Construction Experience in Key Activities

Bidder's Name: _____

Date: _____

Bidder's JV Member Name: _____

Sub-contractor's Name : _____

ICB No. and title: _____

Page _____ of
_____ pages

1. Key Activity No One: _____

Information				
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Management Contractor <input type="checkbox"/>	Sub-contractor <input type="checkbox"/>
Total Contract Amount			US\$ equivalent	
Quantity (Volume, number or rate of production, as applicable) performed under the contract per year or part of the year	Total quantity in the contract (i)	Percentage participation (ii)	Actual Quantity Performed (i) x (ii)	
Year 1				
Year 2				
Year 3				
Year 4				
Employer's Name:				

	Information
Address:	
Telephone/fax number	
E-mail:	
Description of the key activities in accordance with Sub-Factor 4.2(b) of Section III:	

2. Key Activity No. Two

3.

Form of Bid Security

Demand Guarantee

Beneficiary: _____

Invitation of Bids No.: _____

Date: _____

Bid Guarantee No.: _____

Guarantor: _____

We have been informed that _____ (hereinafter called "**the Bidder**") has submitted or will submit to the Beneficiary its bid (hereinafter called "**the Bid**") for the execution of _____ under Invitation for Bids No. _____ ("**the IFB**").

Furthermore, we understand that, according to the Beneficiary's conditions, bids must be supported by a bid guarantee.

At the request of the Bidder, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of _____ (_____) upon receipt by us of the Beneficiary's first demand, supported by the Beneficiary's statement, whether in the demand itself or a separate signed document accompanying or identifying the demand, stating that either the Bidder:

- a) Has withdrawn its Bid during the period of bid validity set forth in the Bidder's Letter of Bid ("**the Bid Validity Period**"), or any extension thereto provided by the Bidder; or
- b) Having been notified of the acceptance of its Bid by the Beneficiary during the Bid Validity Period or any extension thereto provided by the Bidder, (i) has failed to execute the Contract Agreement, or (ii) has failed to furnish the Performance Security, in accordance with the Instructions to Bidders ("**ITB**") of the Beneficiary's Bidding Documents.

This guarantee will expire:

- a) if the Bidder is the successful Bidder, upon our receipt of copies of the Contract Agreement signed by the Bidder and the Performance Security issued to the Beneficiary in relation to such Contract Agreement; or
- b) if the Bidder is not the successful Bidder, upon the earlier of (i) our receipt of a copy of the Beneficiary's notification to the Bidder of the results of the bidding process; or (ii) twenty-eight days after the end of the Bid Validity Period.

Consequently, any demand for payment under this guarantee must be received by us at the office indicated above on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758.

_____ [Signature(s)]

Form of Bid-Securing Declaration

Date: _____

Bid No.: _____

Alternative No.: _____

To: _____

We understand that, according to your conditions, bids must be supported by a Bid-Securing Declaration.

We accept that we will automatically be suspended from being eligible for bidding in any contract with the entity that invited Bids for the period of time of _____ starting on _____, if we are in breach of our obligation(s) under the bid conditions, because we:

- a) Have withdrawn our Bid during the period of bid validity specified in the Letter of Bid or any extension thereto accepted by us; or
- b) Having been notified of the acceptance of our Bid by the Employer during the period of bid validity or any extension thereto accepted by us, (i) fail or refuse to execute the Contract Agreement, if required, or (ii) fail or refuse to furnish the Performance Security, in accordance with the ITB.

We understand this Bid-Securing Declaration shall expire if we are not the successful Bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Bidder; or (ii) twenty-eight (28) days after the expiration of our Bid.

Name of the Bidder¹: _____Name of the person duly authorized to sign the Bid on behalf of the Bidder²: _____

Title of the person signing the Bid: _____

Signature of the person named above: _____

Date signed: _____ day of: _____

[Note: In case of a Joint Venture, the Bid-Securing Declaration must be in the name of all members of the Joint Venture that submits the Bid.]

¹ In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder.

² Person signing the Bid shall have the power of attorney given by the Bidder attached to the Bid.

Manufacturer's Authorization

Date: _____

ICB No.: _____

To: _____

WHEREAS

We _____, who are official manufacturers of _____, having factories at _____, do hereby authorize _____ to submit a bid the purpose of which is to provide the following goods, manufactured by us _____, and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with Clause 27 of the General Conditions, with respect to the goods offered by the above firm.

Signed: _____

Name: _____

Title: _____

Duly authorized to sign this Authorization on behalf of: _____

Dated on _____ day of _____, _____

Section V – Eligibility Criteria

Eligibility in AFD-Financed Procurement

1. Financing allocated by AFD to a Contracting Authority has been entirely untied since 1st January 2002. To the exception of any equipment or any sector which is subject to an embargo by the United Nations, the European Union or France, all goods, works, plants, consulting services and non-consulting services are eligible for AFD financing regardless of the country of origin of the supplier, contractor, subcontractor, consultant or subconsultant inputs or resources used in the implementation processes. The Contracting Authority means the Purchaser, the Employer, the Client, as the case may be, for the procurement of goods, works, plants, consulting services or non-consulting services.
2. Natural or legal Persons¹ (including all members of a joint venture or any of their suppliers, contractors, subcontractors, consultants or subconsultants) shall not be awarded an AFD-financed contract if, on the date of submission of an application, a bid or a proposal, or on the date of award of a contract, they:
 - 2.1 Are bankrupt or being wound up or ceasing their activities, are having their activities administered by the courts, have entered into receivership, or are in any analogous situation arising from a similar procedure;
 - 2.2 Have been:
 - a) convicted, within the past five years by a court decision, which has the force of res judicata in the country where the contract is implemented, of fraud, corruption or of any other offense committed during a procurement process or performance of a contract, unless they provide supporting information together with their Statement of Integrity (Form available as Appendix to the Application, Bid or Proposal Submission Form) which shows that this conviction is not relevant in the context of the Contract;
 - b) subject to an administrative sanction within the past five years by the European Union or by the competent authorities of the country where they are constituted, for fraud, corruption or for any other offense committed during a procurement process or performance of a contract, unless they provide supporting information together with their Statement of Integrity (Form available as Appendix to the Application, Bid or Proposal Submission Form) which shows that this sanction is not relevant in the context of the Contract;
 - c) convicted, within the past five years by a court decision, which has the force of res judicata, of fraud, corruption or of any other offense committed during the procurement process or performance of an AFD-financed contract;
 - 2.3 Are listed for financial sanctions by the United Nations, the European Union and/or France for the purposes of fight-against-terrorist financing or threat to international peace and security;
 - 2.4 Have been subject within the past five years to a contract termination fully settled against them for significant or persistent failure to comply with their contractual obligations during contract performance, unless this termination was challenged and dispute resolution is still pending or has not confirmed a full settlement against them;
 - 2.5 Have not fulfilled their fiscal obligations regarding payments of taxes in accordance with the legal provisions of either the country where they are constituted or the Contracting Authority's country;
 - 2.6 Are subject to an exclusion decision of the World Bank and are listed on the website <http://www.worldbank.org/debarr>, unless they provide supporting information together with

¹ Means any Person whether natural or legal, firm, company, corporation, government, state or state agency or any association, or group of two or more of the foregoing (whether or not having separate legal status).

their Statement of Integrity (Form available as Appendix to the Application, Bid or Proposal Submission Form) which shows that this exclusion is not relevant in the context of the Contract;

- 2.7 Have created false documents or committed misrepresentation in documentation requested by the Contracting Authority as part of the procurement process of the Contract.
3. State-owned entities may compete only if they can establish that they (i) are legally and financially autonomous, and (ii) operate under commercial law. To be eligible, a state-owned entity shall establish to AFD's satisfaction, through all relevant documents, including its Charter and other information AFD may request, that it: (i) is a legal entity separate from their state (ii) does not currently receive substantial subsidies or budget support; (iii) operates like any commercial enterprise, and, inter alia, is not obliged to pass on its surplus to their state, can acquire rights and liabilities, borrow funds and be liable for repayment of its debts, and can be declared bankrupt.

Section VI – AFD Policy - Corrupt and Fraudulent Practices – Environmental and Social Responsibility

1. Corrupt and Fraudulent Practices

The Contracting Authority and the suppliers, contractors, subcontractors, consultants or subconsultants must observe the highest standard of ethics during the procurement process and performance of the contract. The Contracting Authority means the Purchaser, the Employer, the Client, as the case may be, for the procurement of goods, works, plants, consulting services or non-consulting services.

By signing the Statement of Integrity the suppliers, contractors, subcontractors, consultants or subconsultants declare that (i) “it did not engage in any practice likely to influence the contract award process to the Contracting Authority’s detriment, and that it did not and will not get involved in any anti-competitive practice”, and that (ii) “the procurement process and the performance of the contract did not and shall not give rise to any act of corruption or fraud”.

Moreover, AFD requires including in the Procurement Documents and AFD-financed contracts a provision requiring that suppliers, contractors, subcontractors, consultants or subconsultants will permit AFD to inspect their accounts and records relating to the procurement process and performance of the AFD-financed contract, and to have them audited by auditors appointed by AFD.

AFD reserves the right to take any action it deems appropriate to check that these ethics rules are observed and reserves, in particular, the rights to:

- a) Reject a proposal for a contract award if it is established that during the selection process the bidder or consultant that is recommended for the award has been convicted of corruption, directly or by means of an agent, or has engaged in fraud or anti-competitive practices in view of being awarded the Contract;
- b) Declare misprocurement when it is established that, at any time, the Contracting Authority, the suppliers, contractors, subcontractors, consultants or subconsultants their representatives have engaged in acts of corruption, fraud or anti-competitive practices during the procurement process or performance of the contract without the Contracting Authority having taken appropriate action in due time satisfactory to AFD to remedy the situation, including by failing to inform AFD at the time they knew of such practices.

AFD defines, for the purposes of this provision, the terms set forth below as follows:

- a) Corruption of a Public Officer means:
 - The act of promising, offering or giving to a Public Officer, directly or indirectly, an undue advantage of any kind for himself or for another Person¹ or entity, for such Public Officer to act or refrain from acting in his official capacity; or
 - The act by which a Public Officer solicits or accepts, directly or indirectly, an undue advantage of any kind for himself or for another Person or entity, for such Public Officer to act or refrain from acting in his official capacity.
- b) A Public Officer shall be construed as meaning:
 - Any person who holds a legislative, executive, administrative or judicial mandate (within the country of the Contracting Authority) regardless of whether that natural Person was nominated or elected, regardless of the permanent or temporary, paid or unpaid nature of the position and regardless of the hierarchical level the natural Person occupies;
 - Any other natural Person who performs a public function, including for a State institution or a State-owned company, or who provides a public service;

¹ Means any Person whether natural or legal, firm, company, corporation, government, state or state agency or any association, or group of two or more of the foregoing (whether or not having separate legal status).

- Any other natural Person defined as a Public Officer by the national laws of the country of the Contracting Authority.
- c) Corruption of a Private Person² means:
- The act of promising, offering or giving to any Private Person, directly or indirectly, an undue advantage of any kind for himself or for another Person or entity, for such Private Person to perform or refrain from performing any act in breach of its legal, contractual or professional obligations; or;
 - The act by which any Private Person solicits or accepts, directly or indirectly, an undue advantage of any kind for himself or for another Person or entity, for such Private Person to perform or refrain from performing any act in breach of its legal, contractual or professional obligations.
- d) Fraud means any dishonest conduct (act or omission), whether or not it constitutes a criminal offence, deliberately intended to deceive others, to intentionally conceal items, to violate or vitiate consent, to circumvent legal or regulatory requirements and/or to violate internal rules in order to obtain illegitimate profit.
- e) Anti-competitive practices mean:
- Any concerted or implied practices which have as their object or effect the prevention, restriction or distortion of competition within a marketplace, especially where they (i) limit access to the marketplace or free exercise of competition by other undertakings, (ii) prevent free, competition-driven price determination by artificially causing price increases or decreases, (iii) restrict or control production, markets, investments or technical progress; or (iv) divide up market shares or sources of supply;
 - Any abuse by one undertaking or a group of undertakings which hold a dominant position on an internal market or on a substantial part of it;
 - Any practice whereby prices are quoted or set unreasonably low, the object of which is to eliminate an undertaking or any of its products from a market or to prevent it from entering the market.

2. Environmental and Social Responsibility

In order to promote sustainable development, AFD seeks to ensure that internationally recognised environmental and social standards are complied with. Suppliers, contractors, subcontractors, consultants or subconsultants for AFD-financed contracts shall consequently undertake in the Statement of Integrity to:

- a) Comply with and ensure that all their subcontractors or subconsultants comply with international environmental and labour standards, consistent with applicable law and regulations in the country of implementation of the contract, including the fundamental conventions of the International Labour Organisation (ILO) and international environmental treaties;
- b) Implement environmental and social risks mitigation measures when specified in the environmental and social management plan (ESMP) provided by the Contracting Authority.

² Means any natural Person other than a Public Officer.

PART 2 – Employer's Requirements

Section VII - Employer's Requirements

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Glossary

Term or Abbreviation	Description
AFD	Agence Française de Développement
AI	Artificial Intelligence
AIS	Automatic Identification System
API	An application programming interface (API) is a computing interface which defines interactions between multiple software intermediaries
AMSS	Automatic message Switching System
ASCAT	Advanced Scatterometer instrument aboard the EUMETSAT Metop satellites providing Surface Winds images, Ice images, Ultra High Resolution (UHR) winds images
AWOS	Automated airport weather station
B2B	Business to Business
B2C	Business to Consumer
BCP	Business Continuity Plan (BCP).
BMKG	Badan Meteorologi, Klimatologi, dan Geofisika (Meteorology, Climatology and Geophysics Agency). BMKG is the National Meteorological Service of Indonesia
BNPB	Badan Nasional Penanggulangan Bencana (National Disaster Management Authority)
CAWO	Coupled Atmosphere-Wave-Ocean Model (delivered during MMS1)
CIPS	Central Information and Processing System. CIPS is the data & task center that was implemented during STR1 project. This system will be updated in the frame of SUS and MMS Data and Task center on SUS Data Center on MMS CIPS is a component of the Fully Integrated Single Platform
CMSS	AMSS of BMKG connected to GTS
CONTRACTOR	“Contractor” means the person named as Contractor in the Letter of Tender accepted by the Employer and the legal successors in title to this person
CTD	Conductivity Temperature Depth
DL	Deep Learning - family of machine learning methods based on artificial neural networks
DRC	Disaster Recovery Centre
ECEF	Acronym for earth-centered, earth-fixed
ECMWF	European Centre for Medium-Range Weather Forecasts

Term or Abbreviation	Description
EMPLOYER	“Employer” means the person named as Employer in the Contract Data and the legal successors in title to this person
ENGINEER	Employer Representative. In this project, the Employer is acting as the Employer's Representative.
ENSO	The El Niño-Southern Oscillation (ENSO) is a recurring climate pattern involving changes in the temperature of waters in the central and eastern tropical Pacific Ocean. On periods ranging from about three to seven years, the surface waters across a large swath of the tropical Pacific Ocean warm or cool by anywhere from 1°C to 3°C, compared to normal.
ESHS	Acronym for Environment, Social, Health and Safety
ESMF	Acronym for Environment and Social Management Framework
ESMP	Acronym for Environment and Social Management Plan
GCC	General Conditions of Contract - please refer to section VIII
GFS	NOAA (National Oceanic and Atmospheric Administration) Global Numerical Weather Model NOAA is the National Meteorological Service of United States
GOOS	Global Ocean Observing System
GTS	Global Telecommunication System
GUI	Graphical User Interface
HPC	High performance computer
ICD	Interface Control Document
Infrastructure Resource Manager	Container-orchestration system for automating computer application deployment, scaling, and management
Interfacing Contractor	Contractor engaged by the Employer or other agencies having an interface issue with the Contractor for the Project.
IROC	Improved Regional Ocean Model
IOC	Intergovernmental Oceanographic Commission of UNESCO
IOD	The Indian Ocean Dipole (IOD), also known as the Indian Niño, is an irregular oscillation of sea surface temperatures in which the western Indian Ocean becomes alternately warmer (positive phase) and then colder (negative phase) than the eastern part of the ocean.
JCOMM	Joint Technical Commission on Oceanography and Marine Meteorology
KMA	Korea Meteorological Administration
KML	Keyhole Markup Language (KML) is an XML notation for expressing geographic annotation and visualization within two-dimensional maps and three-dimensional Earth browsers

Term or Abbreviation	Description
KPI	Acronym for Key performance Indicator
METEOFACORY	System in charge of Public Weather Services and Early Warnings disseminations
MIDAS	BMKG Web portal dedicated to oceanographic and marine scientists. This system will be upgraded as part of MMS1 scope
MJO	MJO (Madden-Julian Oscillation), is an eastward moving disturbance of clouds, rainfall, winds, and pressure that traverses the planet in the tropics and returns to its initial starting point in 30 to 60 days, on average
MMOFDC	Marine Met-Ocean Forecasting Data Center
NMC	National meteorological center
MMS	Maritime Meteorological System
MMS1	Maritime Meteorological System Part 1 (project with financial contribution of the French Treasury)
MMS2	Maritime Meteorological System Part 2 (project with financial contribution of the AFD)
NDF	National Digital Forecast
NWP	Numerical Weather Prediction
OFS	Ocean Forecast System. It corresponds to the operation Marin and Ocean models of BMKG
OSCAR	Observing Systems Capability Analysis and Review Tool OSCAR is a web-based application developed by WMO in support of Earth Observation applications, studies and global coordination It allows to retrieve WIGOS metadata for all surface-based observing stations and platforms For more details please refer to https://oscar.wmo.int/surface/#/
PCM	Project Coordination Meeting
PDS	Project Design Study
PGDDS	Product Generation, Display, and Dissemination System
PMP	Project Management Plan
PPK	BMKG Project Director
PWS	Public Weather Services
RFI	Requests for Information
RODS	Remote Operational Display systems
RTH	Regional Telecommunication Hub

Term or Abbreviation	Description
SC	Steering Committee
SOP	Standard Operation procedure
STR1	Strengthening Weather and Climate Capacity Phase I (STR1) program
STR2	Strengthening Weather and Climate Capacity Phase II (STR2) program
SUS	Scaling Up the Current Weather System contract
SST	Sea surface temperature
SWAN	Regional Wind-wave model used for CAWO model
SYNERGIE-WEB	Forecasting system (SUS delivery)
TCHP	Tropical Cyclone Heat Potential
TRANSMET	Automatic Message Switching System delivered during STR1/SUS
VISUMET	Public Weather Display System delivered on MMS1
WIGOS	WMO Integrated Global Observing System (WIGOS) provides a framework for the integration and sharing of observational data from National Meteorological and Hydrological Services (NMHSs) and other sources.
WIS	WMO Information System
WRF	The Weather Research and Forecasting (WRF) model is a numerical weather prediction (NWP) system designed to serve both atmospheric research and operational forecasting needs
WMO	World Meteorological Organization

1 General Information

1.1 Background and History

In 2011, BMKG has launched a project of the complete strengthening and optimization of its infrastructure, activities, and operational procedures in order to expand its capabilities, improving on its core mission for safety of Indonesian population, and increasing its support to all weather-sensible economic sectors. This project, named STR1, was completed by the end of 2016 after 1-year support period.

In 2019, BMKG has started the implementation of the Strengthening Weather and Climate Capacity Phase II (STR2) program, which consists in 2 projects:

1. Scaling Up the Current Weather System (SUS). This contract is in force since June 2020 with Meteo France International contractor (MFI). SUS is funded by the French Treasury.
2. Maritime Meteorology System (MMS). MMS is split up in two components: MMS1 is funded by the French Treasury and MMS2 is funded by Agence Française de Développement - AFD. MMS1 tender was launched in October 2019 and the MMS1 contract will be in force before end of 2020

The Badan Meteorologi, Klimatologi, dan Geofisika (BMKG) has received funds from Agence Française de Développement (AFD) toward the cost of Development of Marine Observation Infrastructure and Forecasting Technology for **Maritime Meteorological System – 2 (MMS2)**, and it intends to apply part of the funds to payments under the contract for the implementation of this project.

1.2 Context and faced challenges

Indonesia has a unique geographical position flanked by two continents, Asia and Australia, and two oceans, Pacific and Indian. Indonesia is also located on the equator and is an archipelago with a total area of maritime that nearly covers an area of 6 million square kilometers, or almost 70% of the total area of the territory of Indonesia.

Maritime area is a key element in the identity, security and development of Indonesia, the world's largest archipelago of about 17,000 islands. The existence of effective systems for the collection, analysis and dissemination of marine meteorological data to weather-sensitive populations and sectors is a major challenge for Indonesia.

The development of maritime activities in Indonesia is generating a growing demand for reliable information and services from the BMKG (National Meteorological Service of Indonesia).

Indonesia is a country highly exposed to the effects of climate change. Knowledge, monitoring of climate change and prediction of climatic events is necessary to reduce the effects on populations, infrastructures and economic sectors.

The marine meteorological services are recognized as critical to the safety and economics of shipping and offshore operations.

With increasing maritime activities in accordance with the work plan of the current government, the demands for the availability of maritime weather information will increase.

Therefore, it is important for BMKG, as an institution authorized to issue marine weather and climate information, to improve the accuracy of marine observations and weather and ocean predictions.

Significant number of accidents at sea due to weather conditions not observed in real time and poorly predicted at the appropriate scale.

Modelling marine weather phenomena in Indonesia is now difficult due to the low number of equipment installed.

The 10 existing automatic marine weather stations are insufficient on an archipelago scale: the number, quality and frequency of information collected by these stations do not allow for improved or validated weather prediction models.

Lack of information on vulnerability to climate change risks and extreme events, enabling the development of scenarios and climate change projections, allowing the study of the impacts of climate change on economic sectors at national/regional level.

1.3 BMKG organigram

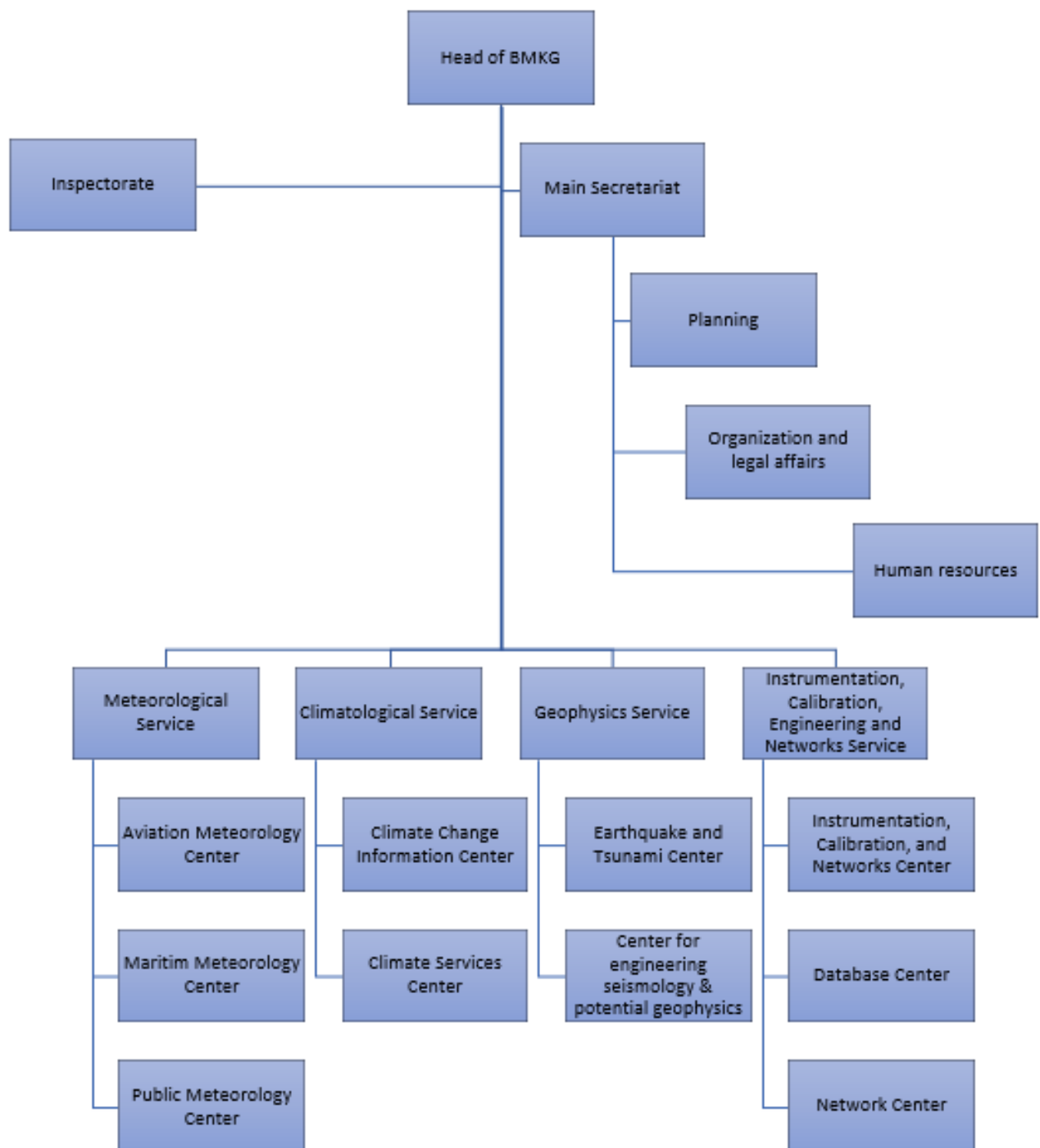


Figure 1 - BMKG Organigram

1.4 Existing situation

1.4.1 Legacy systems at BMKG

The main legacy BMKG systems are:

- The CMSS for the national data collection/distribution and International data exchange
- The DATABASE system hosting the following applications.
 - BMKG marine and Ocean Modeling (BMKG-OFS)
 - BMKG atmospheric modeling (BMKG-WRF)
 - BMKG Web portal
 - BMKG Climate Early Warning System (BMKG-CEWS)
 - BMKG Southeast Asian Climate Assessment & dataset (BMKG-SACA&D), providing series of daily observations.
 - And other BMKG applications
- The BMKG-DATABASE application main outputs are disseminated through the
 - BMKG portal: <https://www.bmkg.go.id/>
 - BMKG mobile application (Info BMKG)

1.4.2 Systems at BMKG delivered during STR1 project.

On end 2012, the STR1 program was launched with MFI supplier. The STR1 systems engineering, and deployment was finalized at the end of 2015. STR1 consisted in:

- Implementing a meteorological observation infrastructure in the 33 Indonesian provinces (including lightning detection network over Java island).
- Setting up state-of-the-art and integrated information systems at a central level in Jakarta, as well as in 5 Regional Centers.
- Assisting BMKG enhancing its service capacity in order to respond more efficiently to its end-users' growing expectations for personalized meteorological products.

The following activities were implemented during STR1 project.

- Deployment of 33 Automatic Weather Stations (AWS)
- Deployment of 33 Mesonetwork stations
- Delivery of a data collection systems collecting the 33 AWS and 33 Mesonetwork stations
- VOS (Voluntary Observation System) implementation on 5 ships
- Delivery of manual observation equipment
- Implementation of an observation calibration and maintenance unit
- Delivery of an Airport Weather Observing System
- Delivery of a wind profiler system
- Deployment of 5 upper air observation systems with hydrogen generators
- Deployment of 9 lightning sensors

- Installation of a WIS-compliant DCPC system
- Deployment of AMSS in BMKG National Centers and regional centers
- Implementation of Data & Task center
- Deployment a Met Pilot Briefing System in 4 airports
- Deployment of new Forecaster's workstations in national center and regional centers
- Deployment of Public Weather Service systems in the National center and regional centers
- Deployment of TV broadcast system in BMKG National center and RCTI TV channel
- Delivery of a CDMS (Climate Data Management System) at BMKG national center
- Meteo France, ECMWF, NOAA, BOM models data flow
- Atmospheric Local models computation
- Air Pollution model computation
- Scientific training to BMKG experts

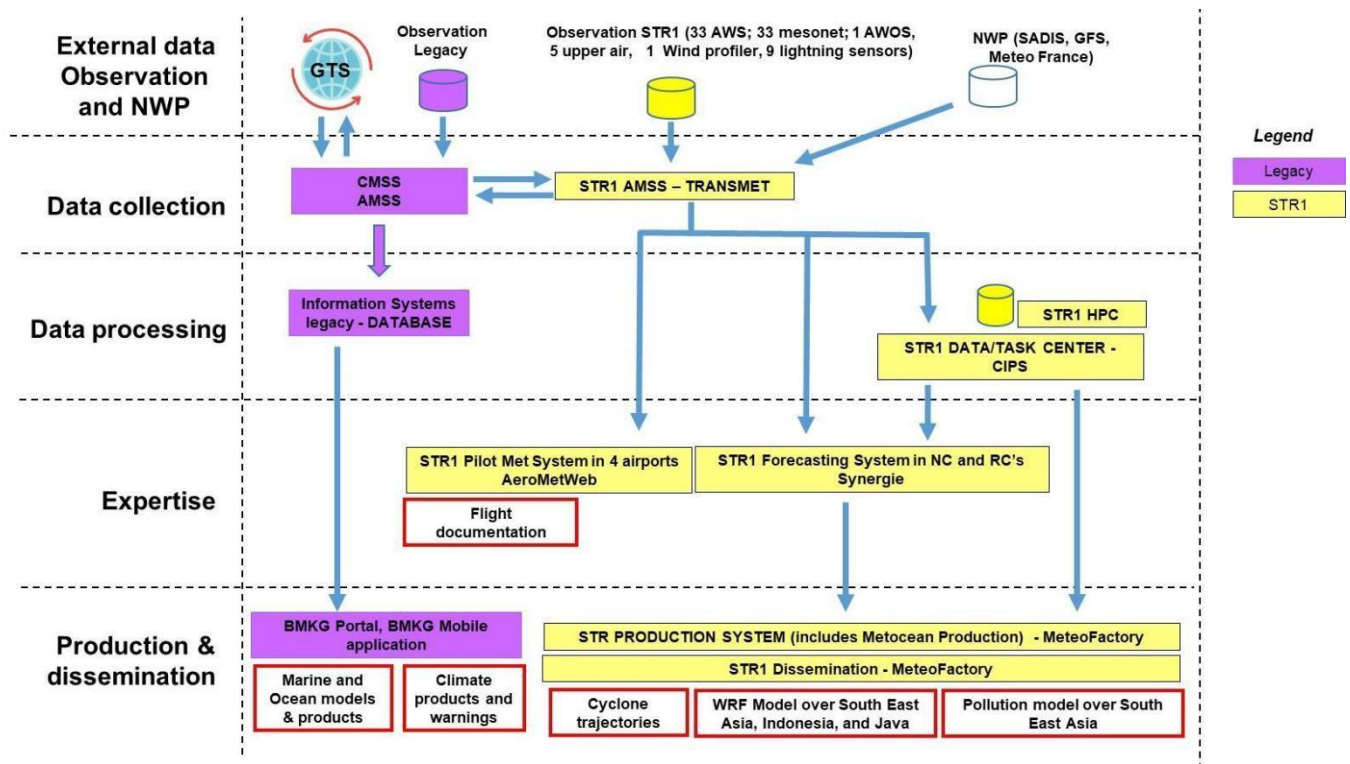


Figure 2 - Summary of existing situation at BMKG after STR1 project (main products)

2 STR2 project

The STR2 program has the overall objective to establish a comprehensive weather and climate information system, in particular better early warning systems for the whole Indonesian continent and maritime domain and to improve the dissemination of the related information to the entire community, including aviation, maritime activities, and the general public

It is divided is made of the following projects:

- **SUS project:** Scaling Up Strengthening BMKG Climate and Weather Service Capacity (SUS). SUS project implementation which started in 2020, should end at end of 2023.
- **MMS project:** Development of Marine Observation Infrastructure and Forecasting Technology for Maritime Meteorological System (MMS). This project is funded by two different sources from France but must remain a seamlessly integrated project. Practically, MMS is divided into two projects, **MMS1 Project** (funded by French treasury) and **MMS2 Project** (funded by AFD). MMS1 Project implementation which started in 2022, should end at end of 2024.

MMS2 Project implementation is starting now, with this tender aiming to implement part of the MMS2 project.

Indeed, MMS2 project is divided into 3 packages, each one to be implemented through separate tenders :

- **Package 1:** Procurement of Weather Radars (C and S Band), which should be launched in T3 2024
- **Package 2:** Procurement of Maritime Radars (HF Radar Array), which should be launched in T3 2024
- **Package 3:** Development of Maritime Meteorological Information System in Indonesia (MMS)-2 : Procurement of the Modelling System with Big Data and Artificial Intelligence (including maritime observation equipment, remote sensing, and system integration), which will be implemented through this contract.

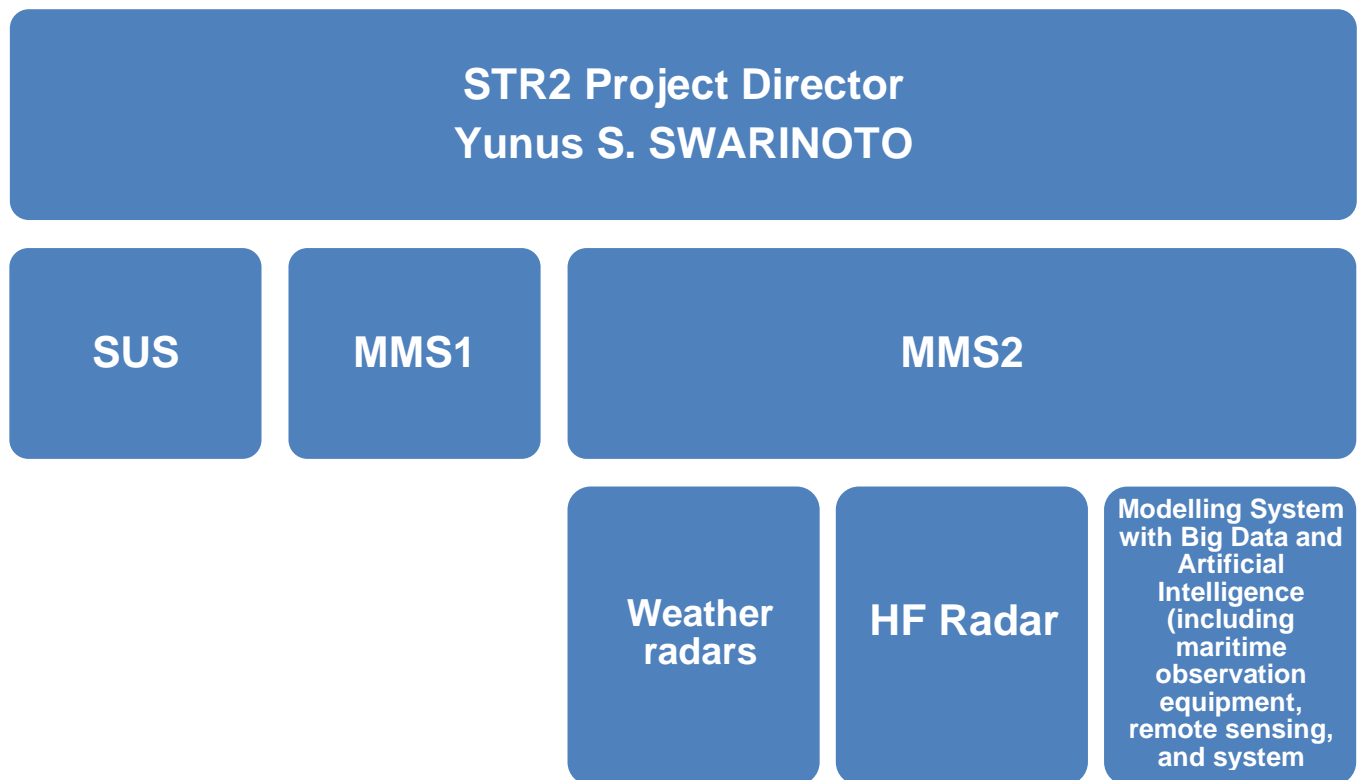


Figure 3 - BMKG STR2 project structure

2.1 SUS systems

The following activities are being implemented in the frame of SUS.

- **Observation systems**
 - 9 lightning detectors
- **Forecasting and Production System**
 - Web-based weather forecasting and analysis tools
 - End user production system
 - Climate data production and dissemination system
 - Web-based pilot briefing system
 - End user specific service system
 - Video graphic production system
- **Infrastructure and Communication System**
 - Extended central information processing system
 - General IT and network infrastructure
 - Transmet
 - WIGOS module
- **Transversal Services**
 - Integration
 - Technical Support
 - Atmospheric model

2.2 MMS objectives

2.2.1 General Project Objective

The MMS project overall objective is the development of an integrated marine weather information system in Indonesia in order to provide efficient Maritime Services to Population and Maritime Sector's Performances

MMS is organized into 4 components:

1. The implementation of a maritime observation network with data collection
2. Development of the Meteo-Oceanographics Modelling and Prediction Center
3. Production and Dissemination
4. Capacity Building and Training

2.2.2 New Modelling capacity

The modelling capacity will be improved thanks to a new HPC capacity (MMS1 scope) enabling:

- To develop a Coupled Atmosphere/Wave/Ocean model covering Southeast Asia (CAWO - MMS1 scope)
- To derive further activities (MMS2 scope) based on CAWO model with:
 - High resolution local coastal models
 - Ensemble modelling
 - Data assimilation

2.2.3 Detailed description of the MMS (1 and 2) project objectives

Overall objective: BMKG develops an integrated marine weather information system in Indonesia.

Component 1: Implementation of a maritime observation network with data collection

- The weather observation network is operational and covers all Indonesian waters.
- Detect disasters: Detect quickly natural disasters and deploy warning systems to stakeholders with greater anticipation.
- Enhancement of BMKG visibility at International scale, especially the maritime observation meteorological data exchange.
- Observation network data and satellite data are acquired by the MMS data center and are available for the modeling applications for WMO.

Component 2: Development of the Meteo-Oceanographics Modelling and Prediction Center

- Storage and modelling capacities are strengthened.
- Risks coming from hydro-meteorological disasters are reduced by improving knowledge of oceanographic characteristics and weather phenomena.
- Scientific cooperation with WMO is intensified.
- The presence of BMKG at international level is strengthened.
- Understanding of phenomena related to air-sea interaction, and its role in the variability of the weather and climate in Indonesia is improved.
- Increase the capacity of the BMKG in its coastal activities that can serve as support to the Indonesian government and strengthen maritime sectors in Indonesia.
- Improve understanding, monitoring and appreciation of impacts of climate-related variations.
- Improve contribution of international research in the field of ocean climate affecting global climate change.

Component 3: Production and Dissemination

- Forecasting and warning services are efficient.
- Dissemination of meteorological information to every stakeholder/to reach all level of society.
- Meteorological information is adapted to users' needs and broadcasted in a suitable format.
- Marine production is adapted to each region.
- BMKG increases its revenues thanks to specific products provided to economic sectors.

Component 4: Capacity Building and Training

- BMKG's staff is autonomous and able to maintain the operational capability of the system.

- BMKG's R&D staff is able to develop and improve new products.

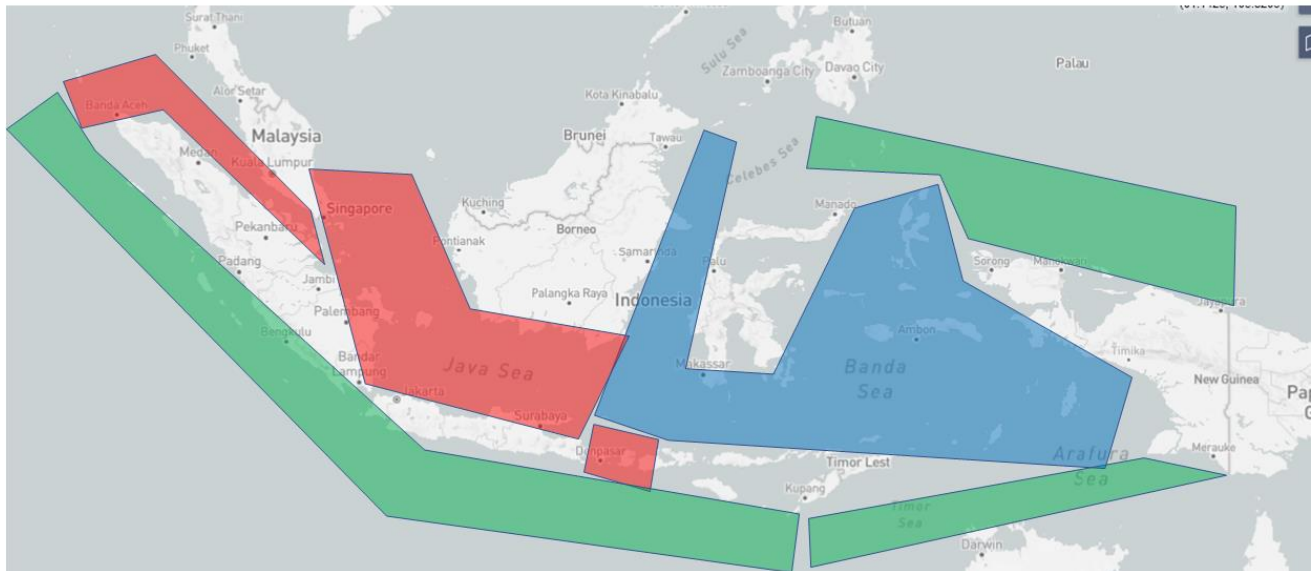


Figure 4 - BMKG Priorities for improving the marine weather improvements

2.3 MMS activities

2.3.1 MMS1 activities

The following activities are being implemented in the frame of MMS1.

- **Observation systems**
 - 74 Surface Ocean Drifters
 - 48 profiling floats
 - 40 Marine AWS
 - 40 Vessel AWS
 - 2 pairs HF radars
 - Marine Observation Data Acquisition
- **Modelling**
 - Atmosphere-Ocean-Marine model (CAWO model)
 - Drifting Tools
- **Data Processing**
 - AMSS
 - Data center
- **Production & dissemination**
 - Forecasting & PWS
 - Extranet/Intranet

2.3.2 Complementary information's related to SUS and MMS1

Data processing, production and dissemination systems deployed in of SUS and MMS1

- TRANSMET = Automatic Message Switching System (STR1, SUS, and MMS)

- CIPS Data Centre and API (one instance on SUS and one instance on MMS)
- CIPS Task Centre (one instance on SUS, no task center on MMS)
- SYNERGIE-WEB = forecasting tool for forecasters (SUS and MMS1 and MMS2)
- AEROMETWEB = Pilot Briefing system (STR1 and SUS)
- METEOFACORY = Public Weather Service & Early Warning System (STR1, SUS, MMS1)
- EXTRAMET = extranet generator

The CAWO model (MMS1 project)

A Coupled Ocean-Atmosphere-Wave-Ocean Model with a 3km is currently under delivery at BMKG in the frame of the MMS1 project.

CAWO parameter	Value
Domain	90E, 145E, 15S, 15 N
Atmospheric component	WRF
Wave component	SWAN
Ocean component	ROMS
Runs per day	4 runs per day
Resolution	3 km
Forecast up to	10 days
Forecast ranges	1 hour

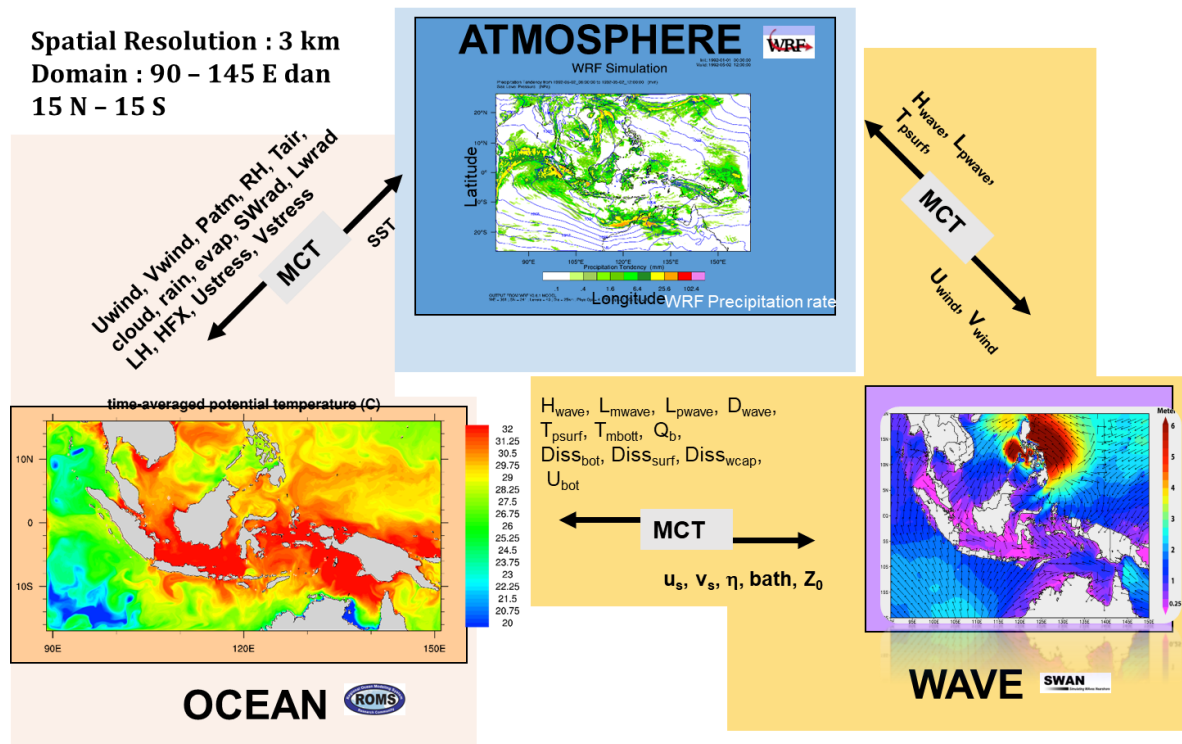


Figure 5 - Synoptic of Coupled Ocean-Atmosphere-Wave-Ocean Model (MMS1 delivery)

2.3.3 MMS2 activities

The following MMS2 activities will be implemented.

Package 1: Weather radars

- S band weather radars
- C band Weather radars

Providing the procurement process for package 1 is successful, the deployment of about 4 S band and 1 C bands radars are planned for T4 2025.

Package 2: Maritime Radar (HF Radar Array)

Providing the procurement process for package 2 is successful, the deployment of about 10 HF radars are planned for T4 2025.

Package 3: Development of Maritime Meteorological Information System in Indonesia (MMS)-2 : Procurement of the Modelling System with Big Data and Artificial Intelligence (including maritime observation equipment, remote sensing, and system integration)

- **Observation Systems**
 - Coastal Buoys
 - Wave enclosed and current profile system
 - Met Ocean Remote sensing
- **Meteorological and Oceanographic Modelling System**

- Big data and AI platform with operational services and use cases
- Ensemble Forecasting System
- MMS HPC and infrastructure upgrade
- **Transversal Services**
 - Development of STMKG laboratory
 - Transversal services

2.3.4 Summary of MMS1 and MMS2 activities

Activity	Qty (indicative)	MMS 1	MMS2 packages	Additional Details
Component 1: Implementation of a maritime observation network with data collection				
Coastal buoy for measure meteorological-oceanographic data	2 unit		Package 3	
Surface Ocean Drifter	74 unit	✓		
Profiling Floats	48 unit	✓		24 Open ocean profilers in MMS 1 24 Coastal ocean profilers in MMS 1
Marine AWS	40 unit	✓		
Vessel AWS	40 unit	✓		
HF Coastal Ocean-surface Wave Radar Single	See comment	✓	Package 2	2 pairs (4 units) on MMS1 10 pairs (20 units) on MMS2
Weather Radar S Band Dual Polar	4 unit		Package 1	
Weather Radar C Band Dual Polar Solid State	1 unit		Package 1	
Wave enclosed and current profiler System.	8 unit		Package 3	
Development of Remote Sensing Product for atmospheric and ocean System	1 pack		Package 3	

Activity	Qty (indicative)	MMS 1	MMS2 packages	Additional Details
Component 2: Development of the Meteo-Oceanographics Modelling and Prediction Center				
Fully Integrated Single Platform	1 pack	✓		
Operational and Research & Development Super Computing Platform	1 pack	✓	Package 3	1,3 Pflops in MMS1 650 Tflops in MMS2
Big Data & AI Platform System (with a dedicated AI HPC)	1 pack		Package 3	
Increase MMS Infrastructure	1 pack		Package 3	To increase the MMS data center computation and storage capacity already installed in MMS1
Development of STMKG Lab. Training & development equipment	1 pack		Package 3	
Integrated Model Forecasting Technology	1 pack	✓		
Ensemble Forecasting System for weather and sea state forecast and Limited area modelling	1 pack		Package 3	
Component 3: Production and Dissemination				
Weather interactive tools for forecaster (Meteofactory)	22 packs	✓		
Component 4: Capacity Building and Training				
Courses on Instrumentation	1 pack	✓	Package 1, Package 2, and Package 3	
Courses on Numerical Model	1 pack	✓	Package 3	
Courses on Analysis and Description	1 pack	✓	Package 3	

Activity	Qty (indicative)	MMS 1	MMS2 packages	Additional Details
Courses on IT	1 pack	✓	Package 3	
Course on Big Data and AI	1 pack		Package 3	

3 MMS2 Package 3 Site Status and Conditions

3.1 Sites list

Activity	Qty	Related sites
Coastal buoy	2 Units	<ol style="list-style-type: none"> 1. Bawean 2. Bandaneira
Wave enclosed and current profiler	8 Units	<ol style="list-style-type: none"> 1. Merak – Banten; 2. Bakauheni – Lampung; 3. Tanjung Priok – Jakarta; 4. Tanjung Perak – Jawa Timur; 5. Padangbai – Bali; 6. Lembar – Nusa Tenggara Barat; 7. Kayangan – Nusa Tenggara Barat; 8. Poto Tano – Nusa Tenggara Barat.
Development of Remote Sensing Product for atmospheric and ocean System	1 Pack	BMKG Headquarters (Jakarta – Kemayoran)
Big Data AI & HPC Nodes Infrastructure and Data Integration System	1 Pack	BMKG Headquarters (Jakarta – Kemayoran)
Development of STMKG Laboratory.	1 Pack	STMGK
Ensemble forecasting system	1 Pack	BMKG Headquarters (Jakarta – Kemayoran)

3.1.1 Sites Description

Please refer to the Appendix 3

3.1.2 Site Work Requirements

No	Site Status and Conditions Requirements
	Site Surveys
3.1.2.1.	The Contractor shall carry out all further site investigations he deems necessary for the design of the Works.
3.1.2.2.	The survey shall be carried out by the Contractor and agreed with the Employer.
	Access to site during installation
3.1.2.3.	Entry to and exit from the Site shall be only available at the locations for which the Employer has given his consent.
3.1.2.4.	The Contractor shall make its own arrangements, subject to the consent of The Employer, for any further access required to the Site.

No	Site Status and Conditions Requirements
3.1.2.5.	In addition, the Contractor shall ensure that access to every portion of the Site is continually available to the Employer.
3.1.2.6.	The Contractor shall be responsible for ensuring that any entry or exit through the Site boundaries are controlled such that no disturbance to residents or damage to public or private property occur as a result of the use of such entry or exit by his employees and Sub-Contractors.
3.1.2.7.	Alternative access shall be provided to premises should interference with the existing access, public or private, is necessary to enable the Works to be carried out. The arrangements for the alternative access shall be as agreed by the Employer and the concerned agency. Unless agreed otherwise, the permanent access shall be reinstated as soon as practicable after the Work is complete and the alternative access shall be removed immediately it is no longer required, and the ground surfaces reinstated. Proper signage and guidance shall be provided for traffic/users diversions.
	Site Establishment
3.1.2.8.	The Contractor shall provide and maintain its own site accommodation at locations consented by the Employer. Offices, sheds, stores, mess rooms, garages, workshops, other accommodation on the Site shall be maintained in a clean, stable and secure condition.
	Contractors Co-ordination with others (if any)
Information	The Employer will inform the Contractor, in case of another activity on the Site Work from another Contractor that might disturb or interrupt the Contractor.
3.1.2.9.	The Contractor shall, in accordance with the Employer requirements, coordinate the Contractor's own Works under the Contract with that of the Interfacing Parties. In addition, the Contractor shall take all necessary steps to ensure that the Works are coordinated and integrated with the Works of the Interfacing Parties and others, and shall comply with any applicable directions which the Employer may give
3.1.2.10.	The Contractor shall carefully review pertinent information made available by the Employer relating to the nature and programming of the Interfacing Parties' contracts and use such information in its planning of the Works
3.1.2.11.	The Contractor shall communicate, coordinate and exchange information directly with the Interfacing Parties. Information necessary to fulfill the Contractor's interface obligations shall be directly requested and obtained from the Interfacing Parties and receipt acknowledged. Conversely, the Contractor shall provide directly to the Interfacing Parties information within the Contractor's scope that is required by them
3.1.2.12.	The Contractor shall advise the Employer in writing of any problems encountered in obtaining necessary information and/or lack of cooperation from any Interfacing Contractor (Contractor engaged by the Employer or other agencies having an interface issue with the Contractor for this Project). In the event that the Employer considers that the resolution of an Interface is not proceeding satisfactorily, the Employer will review the matter and establish a coordinated plan directing the Contractor and the Interfacing Parties as to the required action
3.1.2.13.	Any claim of additional costs by the Interfacing Parties as a result of the Contractor's failure to keep to specified dates shall be addressed by the Contractor.

No	Site Status and Conditions Requirements
	Climatic Conditions and Disaster Risks on Site
3.1.2.14.	The Contractor shall, in the design, construction of the Works and operation. take full account of the climatic conditions and disaster risks throughout the Site. Indicative information on climatic conditions and disaster are given in Appendix 3.
	Site Safety Requirements
3.1.2.15.	The hereunder specifications are applicable during the site works until the site acceptance of each site. In case of required intervention of the contractor during warranty, extended warranty, or system wide warranty periods, then the hereunder safety requirements shall be applicable.
3.1.2.16.	The Contractor shall be responsible for the security of the Site until the Site Acceptance Tests or trial operations.
	General Requirements
3.1.2.17.	The Contractor shall take all measures necessary to safeguard the health and welfare of the general public, employees and all other persons entitled to be upon the Site and shall ensure that the Works are carried out in a safe and efficient manner
3.1.2.18.	The Contractor, his Sub-Contractors and all persons employed by him on the Site shall comply in every respect with the provisions of any relevant statutory regulations and/or with the requirements of Indonesia Law as may be considered applicable to the Works
3.1.2.19.	The compensation for affected workers or their relatives shall be paid by the Contractor in such cases utmost expeditiously in accordance with the Workmen's Compensation Act
	Technical Proposal
3.1.2.20.	The technical proposal shall identify and evaluate the security threats in relation to the contract.
3.1.2.21.	The technical proposal shall describe the measures planned to monitor local security.
3.1.2.22.	The bidder shall describe the modes of travel within Indonesia, the physical means of travel and the security measures planned in connection with such travels.
3.1.2.23.	The bidder shall describe the roles and measures planned for the Contractor itself, for external participants and those expected from the Employer and local authorities, identifying each actor.

No	Site Status and Conditions Requirements
	Contractual, Legal Obligations, And Code of Practices
3.1.2.24.	The contractor shall comply with the statutory and contractual obligations regarding safety, rescue and industrial health imposed on the Contractor and the means by which the Contractor will supervise, monitor and audit his site safety assurance system to ensure due compliance with these obligations.
3.1.2.25.	Labour safety arrangements by the Contractor shall be in accordance with the applicable legislation in Indonesia.
3.1.2.26.	Considering the possibility, the design and construction shall be undertaken in strict accordance with all applicable legislation within the Republic of Indonesia.
3.1.2.27.	The Contractor shall comply with all safety and industrial health legislation including, without limitation, the rules and regulation of the National Safety Council of Indonesia
3.1.2.28.	During the works, and where applicable, the Contractor shall keep on the site copies of safety and industrial health regulations and documents.
3.1.2.29.	All regulations and documents referred in this clause shall be translated into languages which are understood by the operators and supervisors engaged by the Contractor or sub-Contractors and such translations shall be shared with the Contractor or sub-Contractors staff mobilized on the site works.
	Appointment, Duties and Responsibilities of Safety Staff
3.1.2.30.	The name(s) and experience of person(s) within the Contractor's proposed management structure who would be responsible for coordinating and monitoring the overall safety performance of the Contractor, all Sub-Contractors and safety officers as required shall be identified and got approved from the Engineer
3.1.2.31.	The contractor shall describe the safety staff and its organizational structure until site acceptance or trial operations. The safety manager should identify the personnel to be engaged, if necessary for site safety assurance, the responsibilities of the participants and the subdivision of the site safety assurance tasks into elements which can be effectively controlled, technically and managerially
3.1.2.32.	Names, addresses, telephone, email and fax numbers of all safety staff during the site implementation shall be listed where known
3.1.2.33.	The powers vested in the safety staff, which shall be sufficient to enable them to take urgent and appropriate action to make safe the site and prevent unsafe working practices or other infringements of the safety plan or statutory regulations
3.1.2.34.	The safety manager's duties, throughout the period of the Contract, shall be entirely connected with the safety and industrial health aspects of the Contractor's activities on the site
3.1.2.35.	The safety manager shall be a suitably qualified and experienced person who shall supervise and monitor compliance with the site safety plan.

No	Site Status and Conditions Requirements
3.1.2.36.	The safety manager shall, in particular but without limitation, carry out auditing of the operation of the site safety plan in accordance with a rolling program to be submitted, from time to time, to the Engineer for his consent
3.1.2.37.	The Contractor's shall describe the organization of its team and how the team members communicate, with a focus on the direct line of communication between the Safety Manager and the rest of the team
3.1.2.38.	The Contractor shall instruct and require the Contractor's site representative and the person responsible to be directly accountable in all matters concerning site safety.
	Sub-Contractors
3.1.2.39.	The means by which safety, rescue and industrial health matters and requirements will be communicated to sub-Contractors of all tiers and their due compliance with the site safety plan and all relevant statutory regulations shall be ensured by the Contractor
3.1.2.40.	The Contractor shall describe the method by which the safety procedures and practices proposed by sub- Contractors will be reviewed for compliance with the site safety plan and statutory regulations including the provision of hazard and risk assessments and method statements
3.1.2.41.	Where applicable, the Contractor shall provide its sub-Contractors with copies of the site safety plan and shall incorporate into all sub-contract documentation provisions to ensure the compliance with such plan at all tiers of the sub-contracting.
3.1.2.42.	The Contractor shall be responsible of all its subcontractors site works regarding site safety
	Policy for Identifying Hazards
3.1.2.43.	The Contractor shall produce a list of safety and health hazards identified for this Contract and the procedures and method statements for achieving effective and efficient minimization of the risks associated with such hazards
	Accident Reporting, Crisis Management Process
3.1.2.44.	The Contractor shall describe the Contractor's procedure for reporting and investigating accidents, dangerous occurrences or occupational illness
3.1.2.45.	The Engineer shall be notified by the Contractor immediately of occurrence of any accidents whether on-site or off-site in which the Contractor, its personnel or plant, or those of its sub-Contractors are directly or indirectly involved and which results in any injuries to any persons, loss / damage to plant and machinery, disruption of traffic etc.

No	Site Status and Conditions Requirements
3.1.2.46.	Such initial notification may be verbal and shall be followed by a written comprehensive report within 24 hours of the accident.
3.1.2.47.	Additionally, the Contractor shall notify the Engineer in writing within twenty-four (24) hours of any incident occurring whether on-site or off-site at which the Contractor or any sub-Contractors are involved and could have resulted in serious injuries to persons or significant damage to the Works. Failure to report such incidences shall be considered as a serious breach of Safety Procedures.
3.1.2.48.	The Contractor shall prove that it has set up a crisis management process involving the local organization and its head office. It shall describe the main procedures for triggering this process and its key operating procedures. For this purpose, the Contractor shall describe the alert process, from the local organization to its head office, and the interaction with the Employer.
	Safety Devices
3.1.2.49.	When required, all plant and equipment used on or around the site shall be operated by suitably trained and qualified personnel
	Fire Regulation and Safety
3.1.2.50.	The term "naked light" shall be deemed to include electric arcs and oxyacetylene or other flames used in welding or cutting metals.
3.1.2.51.	Oxyacetylene burning equipment will not be permitted in any confined space. If required, the burning equipment of the oxy-propane type shall be used.
	Electrical Safety
3.1.2.52.	The Contractor will review the interfaces with the Employer operations and prepare a specific safety plan for all works that may affect The Employer operations.
3.1.2.53.	No flammable material shall be stored in places other than the rooms specially constructed for this purpose in accordance with the provisions of Indonesian Explosives Act
3.1.2.54.	Protective and safety equipment such as rubber gauntlets or gloves, earthing rods, linemen's belt, portable artificial respiration apparatus, safety goggles etc., shall be provided as per the requirement of the Work
3.1.2.55.	Necessary number of caution boards such as "Staff working online, Don't switch on" shall be readily available in the vicinity of electrical installation.
3.1.2.56.	In the case of premises to be built by the contractor, charts displaying methods of giving artificial respiration to a recipient of electrical shock (one in English and another one in the regional language) shall be prominently displayed at appropriate places.
3.1.2.57.	No work shall be undertaken on live installations, or on installation, which could be energized unless another person is present to immediately isolate the electric supply in case of any accident and to render first aid, if necessary.

No	Site Status and Conditions Requirements
3.1.2.58.	Insulated tools and vigilance against dropped tools are essential for safe work near live installations.
3.1.2.59.	The electrical switch controls in distribution boards shall be clearly marked to indicate the areas being controlled by them.
3.1.2.60.	Before starting any work on the existing installation, it shall be ensured that the electric supply to that portion is cut off. Precautions, like displaying "Staff at Work" caution boards on the controlling switches, removing fuse carrier from these switches shall be taken against accidental operation. Caution boards shall be kept with the person working on the installation.
3.1.2.61.	All electrical panels & switchgear shall conform to relevant Standard.
3.1.2.62.	All equipment / sub-systems shall conform to relevant IEC standard on Electromagnetic Compatibility (EMC).
3.1.2.63.	Cable routes of all the newly laid cables by the Contractor shall be clearly identified
3.1.2.64.	The Contractor shall ensure grounding of the installed equipment and the use of automatic cut-off devices with associated insulation control.
3.1.2.65.	All installed equipment shall be earthed, and the grounds of the same installation shall be connected to a grounded outlet by protective conductors.
3.1.2.66.	Where necessary, the Contractor shall ensure protection against direct lightning strikes on created buildings or technical installation
3.1.2.67.	The Contractor shall ensure protection against lightning falling on the ground in the vicinity of the cables
3.1.2.68.	Surge Protection shall be carried out.
3.1.2.69.	The Contractor shall interconnect the earth networks if it is necessary.
	Labour Safety
3.1.2.70.	The Contractor shall take measures for placing the dangerous parts of the installed equipment (e.g., high voltage equipment) out of the reach of personnel and users, if it is necessary
3.1.2.71.	The Contractor shall maintain site boundary fences, if it is necessary. Notices shall be displayed at Intervals around the Site to warn the public of the dangers of entering the Site.
	Site Safety Plan
3.1.2.72.	<ul style="list-style-type: none"> The site safety plan shall cover the following:

No	Site Status and Conditions Requirements
	<ul style="list-style-type: none"> • Safety Equipment • First Aid • Disciplinary procedures • Safety Devices • Fire Regulations and Safety • Electrical Safety • Labor Safety

3.2 Technical Standards and Applicable Regulations

No	Technical Standards and Applicable Regulations Requirements
Information	It is the Employer's intention that Indonesian Standards shall be used in design and implementation of the Works for Project, where these are applicable to, and conform with the Outline Design Specifications and where these are compatible with materials, equipment, systems and processes that shall be proposed by the Contractor and approved by the Engineer, under the terms of the Contract.
3.2.1.	Installation or other stages of the Contract shall be equivalent to applicable European standards (CEN – European committee for Standardization) in order to comply with quality and sustainability standards set as guidelines in the Employer's Requirements.
3.2.2.	Where the Contractor determines that the application of alternative International Codes or Standards are more applicable for particular materials, equipment or processes and shall be advantageous to the Project then their use shall be permitted providing that they are equal to or better than the applicable European Standards.
3.2.3.	<p>In the event of a conflict between the provisions of the following documents regarding technical standards and applicable regulations, the order of precedence shall be:</p> <ul style="list-style-type: none"> (i) Employer Requirements (ii) Technical Proposal from the Contractor (iii) Applicable WMO and IOC standards, in particular Guide to Marine Meteorological Services – WMO-No. 471, Manual on Marine Meteorological Services WMO-No.558 (IOC-JCOMM), Framework for Ocean Observing (GOOS) (iv) Applicable Standards
3.2.4.	When required by the Engineer, all applied standards shall be submitted to The Employer in the English language for approval except where such standards are specified in the Technical proposal.

4 Systems Overview

The following figure is a conceptual view of STR2:

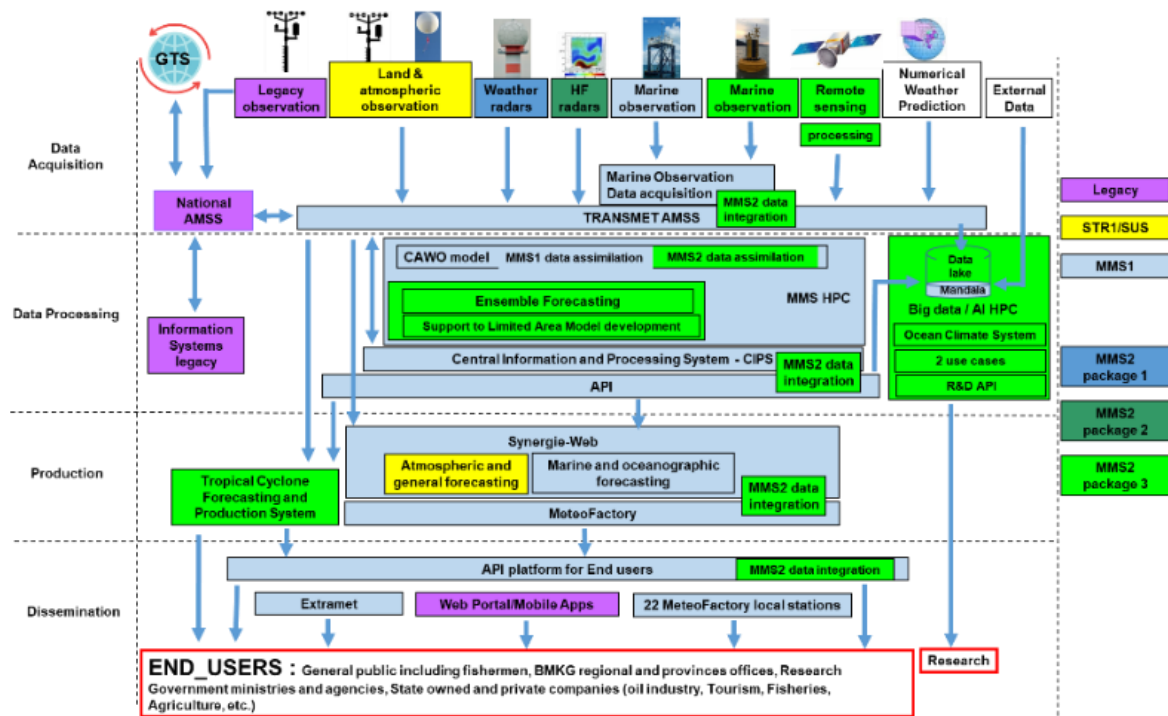


Figure 6 - STR2 (SUS/MMS1/MMS2) Global Integrated Architecture

The hereunder figure shows the modelling data flow:

- Observation data collection
- Observations and global models receptions through TRANSMET
- Observation and models storage in the CIPS data storage
- Data assimilation from observations
- MMS Model dataflow
- Models output transmission to Synergie-Web and Meteofactory
- Model-based products dissemination through Meteofactory, Web portal, mobile applications, Extranet

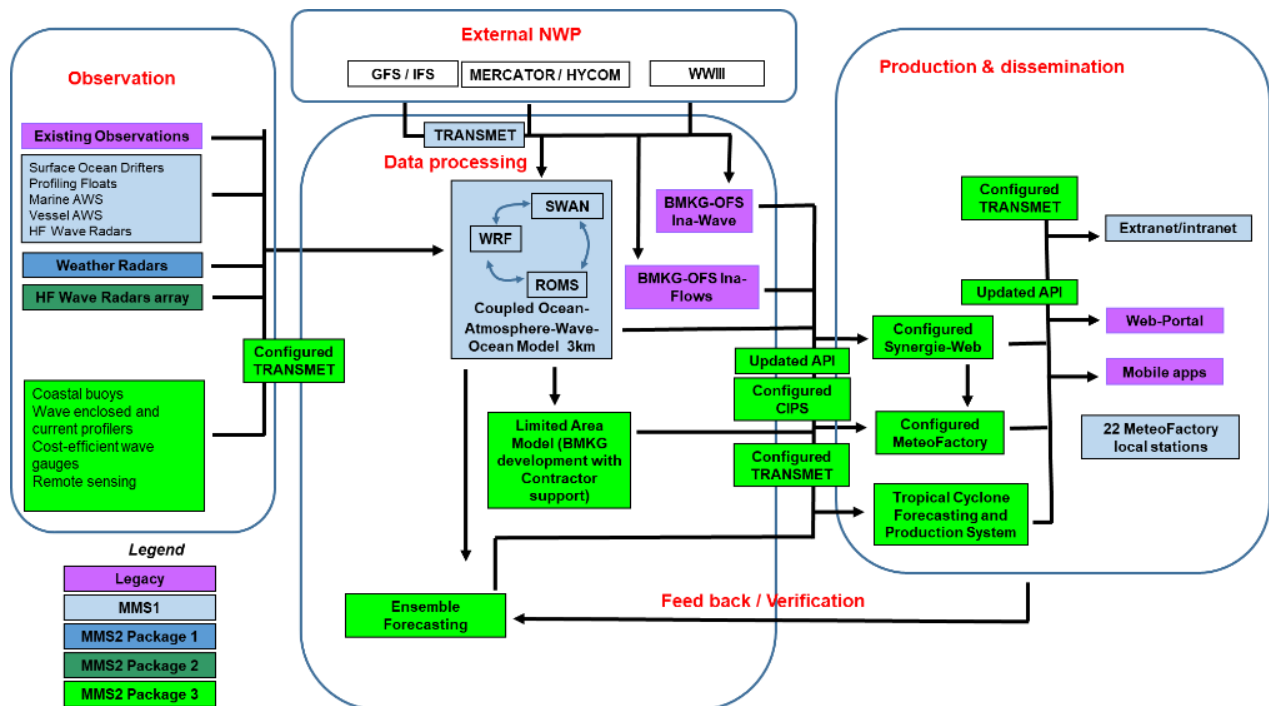


Figure 7 - Overview of MMS Modelling dataflow

No	Indicative Phasing Requirements
4.1.	<p>The Contractor shall provide in its proposal a project schedule including the following milestones:</p> <ul style="list-style-type: none"> • T0 at down-payment • Delivery of the Initial Design and Study • Factory acceptances • Shipments • Site acceptances • Standard warranty & extended warranty with technical support until Project technical Completion • Project Technical Completion at T0+ 3 years • End of System Wide Warranty at T0 + 4 years
4.2.	<p>The contractor shall provide the detailed implementation timeline for each item showing the main milestones (Factory acceptance, site acceptance, standard warranty, etc.) in its proposal.</p>

5 Performance Requirements

No	Performance Requirements
5.1.	The Contractor shall support The Employer in reaching the Project Key Performance Indicators according to the hereunder table
5.2.	The Contractor shall provide specific dashboard(s) enabling to measure and monitor KPIs thanks to user-friendly comprehensive graphical user interface
5.3.	The Contractor shall issue a KPI report every 6 months.
5.4.	<p>The Key Performance Indicator (KPI) in this bidding document guides establishing primary targets in the MMS2 Package 3 project activities. The final scope of KPIs can be determined through a survey and project design study (PDS).</p> <p>The contractor and Employer must refine and finalize the detailed Key Performance Indicator (KPI) specifications during the Final System Design Review (FSD) activity, subject to agreement and approval by the employer.</p>

General Key Performance Index of MMS2

KPI-ID	KPI Name	Unit	Associated objectives	Target values	Sources and means of verification	Commitment to reach KPI value	Contractor Support for KPI measurement
KPI 1.1.1	MMS2 observation systems availability	YES/NO	The weather observation network is operational and covers all Indonesian waters	T0: NO Project completion: YES	All deployed MMS2 sensors are operational with a data availability complying with the paragraph <insert a link on the paragraph Summary of Systems and Data availability during Technical Support >	CONTRACTOR Package 1 CONTRACTOR Package 2 CONTRACTOR Package 3	CONTRACTOR Package 3
KPI 1.1.2	Marine Areas coverage by MMS2 sensors	YES/NO	The weather observation network is operational and covers all Indonesian waters	T0: NO Project completion: YES	<ul style="list-style-type: none"> - At least 50% of each type of deployed equipment are located in the marine areas of priority 1 AND - At least 20% of each type of deployed equipment are located in the marine areas of priority 2 AND - For At least 10% of each type of deployed equipment are located in the marine areas of priority 3 <p>The marine areas priorities are indicated in Figure 4 – BMKG Priorities for improving the marine weather improvements.</p>	EMPLOYER	CONTRACTOR Package 3

KPI 1.1.3	Yearly average forecasting time of marine weather disasters	Hours	<p>Detect disasters: Detect quickly natural disasters and deploy warning systems to stakeholders with greater anticipation.</p> <p>Forecasting and warning services are efficient.</p> <p>Dissemination of meteorological information to every stakeholder/to reach all level of society</p>	To be agreed during Phase 1 of Detailed Design Study	<p>Average of forecasting time before the occurrence of the disaster as recorded by BNPB.</p> <p>Undetected disaster will lead to a null forecasting time.</p> <p>The forecasting time is defined as the duration between the warning dissemination from BMKG (as recorded in MMS2 system) and the disaster occurrence time as recorded by BNPB.</p> <p>Application on</p> <ul style="list-style-type: none"> - coastal floods - marine storm in the Indonesia maritime zones - The maritime zones are visible on https://maritim.bmkg.go.id/area/pe_layanan 	CONTRACTOR Package 3 and EMPLOYER	CONTRACTOR Package 3 with EMPLOYER support for getting BNPB records
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KPI 1.2.1:	MMS2 observation reports availability	Percentage	Observation network data and satellite data are acquired by the STR2 data center and are available for the modeling applications for WMO	Project completion:90 %	No of daily MMS2 observation reports retrieved from MMS data center / No of expected MMS2 observation reports (according to already deployed systems) Monthly average)	CONTRACTOR Package 1 CONTRACTOR Package 2 CONTRACTOR Package 3	CONTRACTOR Package 3
KPI 1.2.2:	Capability to send on GTS any conventional marine observation	YES/NO	Enhancement of BMKG existence in international scale, especially the maritime observation meteorological data exchange	T0: NO Project completion: YES	Verify the possibility to configure automatic generation of a WMO-compliant message for any buoy report stored in the MMS data center and to send it automatically to TRANSMET with the relevant WMO abbreviated heading	CONTRACTOR Package 3	NOT REQUIRED
KPI 2.1.1:	Model data retention for each model data in main site	No of months	Storage and modelling capacities are strengthened	Project completion: 12 End of wide system warranty :24	Check archive duration for CAWO and Limited Area.	CONTRACTOR Package 3	CONTRACTOR Package 3

KPI 2.2.1	Number of BMKG scientists in the BMKG R&D department in the field of oceanography/marine meteorology	Number disaggregated by gender	Improve contribution of international research in the field of ocean climate affecting global climate change.	Project completion: 5	BMKG staff assessment	EMPLOYER	NOT REQUIRED
KPI 2.2.2	Capability to display in the forecaster station 5 new marine remote sensing products	Percentage	Understanding of phenomena related to air-sea interaction, and its role in the variability of the weather and climate in Indonesia is improved.	Project completion: 100%	Visualization on the forecasting workstation	EMPLOYER	NOT REQUIRED
KPI 2.3.1	Capability to run 3 Limited Area Models with high-resolution	YES/NO	Increase the capacity of the BMKG in its various coastal activities that can serve as support to the Indonesian government and strengthen maritime sectors in Indonesia	Project completion: YES	Visualization on the forecasting workstation	CONTRACTOR Package 3	NOT REQUIRED
KPI 2.4.1	Technical environment for implementing	YES/NO	Storage and modelling	Project completion: YES	Ability to run different ensemble members with tools to configure	CONTRACTOR	CONTRACTOR

	ensemble forecasting is available		capacities are strengthened.		different model initializations on those members	Package 3	Package 3
KPI 3.1.1	Availability of operational forecasting models.	Percentage	Forecasting and warning services are efficient	Project completion: 95%	No of available model outputs / no of expected models (based on arrival time of full model on the forecasting station) at the time of forecaster's shift. Monthly average	CONTRACTOR Package 3	CONTRACTOR Package 3
KPI 3.1.2	Relevance of warning products (hit rates vs false alarms)	Percentage	Forecasting and warning services are efficient	Project completion: Relevant alarms > 75% and wrong alarms < 10%	Contingency table on warnings Relevant alarms / all events as recorded by BNPB Wrong alarms / all alarms Yearly average	CONTRACTOR Package 3 and EMPLOYER	CONTRACTOR Package 3 with BMKG support for getting BNPB records
KPI 3.1.3	One SOP (Standard Operation Procedure) for each type of marine Early warning	YES/NO	Forecasting and warning services are efficient	Project completion : YES	SOP review	CONTRACTOR Package 3 and EMPLOYER	NOT REQUIRED
KPI 3.1.4	The regional forecasters use same systems, and SOPs with similar practices in the frame of a BMKG National Digital Forecast (NDF)	Percentage	Forecasting and warning services are efficient	Project completion: 100%	No of compliant centers (using delivered SOP – as audited by BMKG) / No of centers	EMPLOYER	NOT REQUIRED

KPI 3.2.1	Bi-annual stakeholder steering committee	YES/NO	Dissemination of meteorological information to every stakeholder/to reach all level of society.	Project completion: YES	Minutes of meetings of bi-annual stakeholder steering committee	EMPLOYER	NOT REQUIRED
KPI 3.2.2	Number of types of operational products tailored for stakeholders' communities	Number	Meteorological information is adapted to users' needs and broadcasted in a suitable format.	To be agreed during Phase 1 of Detailed Design Study	MeteoFactory assessment	EMPLOYER	CONTRACTOR Package 3
KPI 3.2.3	Number of private organizations using at least one MMS product.	Number		Project completion: 5	Stakeholder's assessment	EMPLOYER	NOT REQUIRED
KPI 3.2.4	Number of government institutions/agencies using at least one MMS product.	Number	Marine production is adapted to each region	To be agreed during Phase 1 of Detailed Design Study	Stakeholder's assessment	EMPLOYER	NOT REQUIRED
KPI 3.2.5	Average number of products instances prepared by a marine station.	Monthly Number		To be agreed during Phase 1 of Detailed Design Study	MeteoFactory assessment	EMPLOYER	CONTRACTOR Package 3
KPI 3.2.6	Public/private Stakeholder's testimonials stating an improvement in their operations thanks to weather marine products.	Number	Meteorological information is adapted to users' needs and broadcasted in a suitable format	To be agreed during Phase 1 of Detailed Design Study	Stakeholder's assessment	EMPLOYER	NOT REQUIRED

KPI 4.1.1	Capacity of persons trained by the project by type of training	Percentage disaggregated by gender	BMKG's staff is autonomous and able to maintain operational capability of the system	To be agreed during Phase 1 of Detailed Design Study	No of successfully trained people /total no of trained people	EMPLOYER	ALL CONTRACTORS
KPI 4.1.2	Allocated budget for maintaining the system in operational conditions	IDR currency (yearly amount)	BMKG's staff is autonomous and able to maintain operational capability of the system	Will be defined during the project implementation	BMKG budget assessment	EMPLOYER	NOT REQUIRED
KPI 4.1.3	Allocated BMKG staff in charge of maintaining the system in operational conditions	Number disaggregated by gender	BMKG's staff is autonomous and able to maintain operational capability of the system	Will be defined during the project implementation	BMKG staff assessment	EMPLOYER	NOT REQUIRED
KPI 4.2.1	Ability of BMKG scientists to develop applications using big data/AI technics	YES/NO	BMKG's R&D staff ability to develop and improve new products	Project completion: YES	BMKG experts that were involved in the big data/AI use cases are autonomous for implementing a use case using big data/AI technics	CONTRACTOR Package 3 and EMPLOYER	NOT REQUIRED

KPI 4.2.2	Allocated BMKG staff able to develop new products for new stakeholders	Number disaggregated by gender	BMKG's staff is autonomous and able to maintain operational capability of the system	Project completion: 7 experts	BMKG staff assessment	EMPLOYER	NOT REQUIRED
Notes : The Key Performance Indicators (KPIs) must be further developed and agreed upon by both parties (The Contractor and The Employer) during the Final System Design Report (FSDR) stage and form part of the contract.							

Specific Technical Key Performace Index of the package 3 contractor

GOAL			OBJECTIVES	OUTCOMES		KPI
Lot 1	Provide BMKG An Operational And Integrated Capability To Observe Maritime Indonesia Using Coastal Buoy Observation System	1.1	Deploying the Coastal Buoy observation network in two (2) site in Indonesia's coastal waters.	1.1.1	Two site coastal buoys installed and transmitted data – SAT signed	% of sensor systems installed (target 100%)
				1.1.2	Data collected from two sites (> 95% SAT Lot 1 (Full System) signed	% of data collected from two (2) sites (target 95%)
		1.2	Integrate data to the extended data processing	1.2.1	The Coastal Buoy systems integrate data to the extended data processing	% integrated in the extended data processing (target 100%)
		1.3	Enhancement of BMKG existence in international scale, especially the maritime observation meteorological data exchange	1.3.1	Available for the modeling applications for WMO	Available on the Employer switching platform
Lot 2	Provide BMKG An Operational And Integrated Capability To Observe Maritime Indonesia Using Wave Enclosed and	2.1	Deploying the Wave Enclosed and Current Profiler observation network in eight (8) Indonesian waters	2.1.1	Eight (8) site wave enclosed and current profiler system installed and transmitted data – SAT signed	% of sensor systems installed (targeted 100%)
				2.1.2	Data collected from eight sites (> 95% SAT Lot 2 (Full System) signed	% of data collected from eight (8) sites (target 95%)

	Current Profiler Observation System	2.2	Integrate data to the extended data processing	2.2.1	The Wave Enclosed and Current Profiler systems integrate data into the extended data processing	% integrated in the extended data processing (target 100%)
		2.3	Enhancement of BMKG existence in international scale, especially the maritime observation meteorological data exchange	2.3.1	Available for the modeling applications for WMO	Number of end-users services using data
Lot 3	Provide BMKG An Operational And Integrated Capability To Deploy Remote Sensing System For Monitoring Atmospheric and Oceanic Conditions.	3.1	Deployment of remote sensing (satellite GK2A and GK2B) for atmospheric and oceanic data in the Indonesia region.	3.1.1	The receiving system of GK2A are installed and transmitted data – SAT signed	% of receiving system installed (target 100%)
				3.1.2	Data collected from reception system (> 95% SAT Lot 3 (Full System) signed	% of data collected from satellite GK2A (target 95%)
				3.1.3	The latency accepted is 72 hours – certificate signed if the system failure	Number hours of latency accepted (target 72 hours)
		3.2	Integrate data to the extended data processing	3.2.1	The Remote Sensing Products for Atmospheric and Ocean Systems integrate data to the extended data processing	% integrated in the extended data processing (95%)
		3.3	Produce remote sensing products for atmospheric and ocean system	3.3.1	Available data product for BMKG weather forecasting system	% all products could visualize on BMKG weather forecasting system (target 100%)
Lot 4	The First Big Data and AI Platform in BMKG	4.1	Deployment of Big Data and AI Platform infrastructure in BMKG	4.1.1	The Big Data and AI Platform are installed and operated in BMKG Headquarters – SAT signed	% of all hardware for Big Data and AI installed (target 100%)
		4.2	Deployment of marine climate system	4.2.1	Available data product in the data lake system	% integrated in data lake system (target 95%)
		4.3	Development of a forecasting system using AI-based algorithms	4.3.1	The implementation of Big data Use Case 1: Wave and Ocean Current Nowcasting using HF Radar	% Sustainable operations for 2 month (target 95%)

				4.3.2	The implementation of Big data Use Case 2: Development and Demonstration of an AI/ML Augmented National Digital Weather (NDF) for BMKG	% Sustainable operations for 2 month (target 95%)
Lot 5	Provide BMKG An Operational And Integrated Capability To Produce Regional Ensemble Forecasting System and Limited Area Model from Coupled Atmospheric-Ocean Model.	5.1	Develop and run Ensemble Forecasting System on MMS HPC Infrastructure	5.1.1.	Run Ensemble Forecasting System with at least 11 members	% of ensemble forecasting(target available up to 90 percent)
				5.1.3	The latency accepted is 3 baserun model failure – certificate signed if the system failure	Number of baserun model failure (target maximum 3 baserun)
				5.1.2	Produce probabilistic forecast for Indonesia	% minimum skill score (target 80%)
		5.2	Develop and run Limited Are Model on MMS HPC Infrastructure	5.2.1	Run Limited Area Model with 1 km spatial resolution at three (3) pilot domain	% of pilot domain executed (target 100%)
				5.2.2	The latency accepted is 3 baserun model failure – certificate signed if the system failure	Number of baserun model failure (target maximum 3 baserun)
				5.2.3	Produce high resolution forecast in Indonesia	% minimum skill score (target 80%)
Lot 6	Provide BMKG An Operational And Integrated Capability To Produce MMS HPC Infrastructure Upgrade	6.1	Increased Computing Capacity to Approximately 2 Pflops (Theoretically)	6.1.1	Computing Capacity increased to Approximately 2 Pflops	Number of computing capacity (target 2 Pflops)
		6.2	Added the storage capacity with total 3 PB (extend from the existing MMS1 storage)	6.2.1	Storage Capacity increased to 3 PB	Number of storage capacity (target 3 PB)
		6.3	Integrate data from MMS-2 Package 1 and MMS-2 Package 2 if the system operationally started and recorded during the MMS2 package 3 project time frame	6.3.1	The HF Radar Array and Weather Radar data is integrated to the extended data processing	% integrated in the extended data processing (100%)

		6.4	Develop and Install eleven (11) workstation of Tropical Cyclone Forecasting and Production System	6.4.1	Eleven of Tropical Cyclone Forecasting and Production System installed and ready to use – SAT signed	% of client workstation installed and operated (target 100%)
Lot 7	Enhancing Student Capabilities through the Development of STMKG Laboratories	7.1	Develop and Install two (2) workstation of Web-Based Weather Forecasting and Analysis tools in STMKG	7.1.1	Two workstation of Web-Based Weather Forecasting and Analysis tools installed and ready to use – SAT signed	% of client workstation installed and operated (target 100%)
		7.2	Develop and Install one (1) workstation of End User Production System in STMKG	7.2.1	One workstation of End User Production System installed and ready to use – SAT signed	% of client workstation installed and operated (target 100%)
		7.3	Availability of data through the existing API system at the BMKG Headquarters	7.3.1	All data in BMKG integrated to the workstation in STMKG	% of data existing in BMKG integrate to the system (target 100%)
Notes : The Key Performance Indicators (KPIs) must be further developed and agreed upon by both parties (The Contractor and The Employer) during the Final System Design Report (FSDR) stage and form part of the contract.						

6 Indicative Functional Requirements of Package 3

Implementation of the Maritime Observation

6.1. Lot 1 - Coastal Buoys

No	Coastal Buoys Requirements
6.1.1.	<p>The Contractor shall deploy coastal buoys in Indonesian waters. The coastal buoys quantities consist of two systems and have to be deployed around 10 km distance from the designated ports. Site locations are specified in</p> <ol style="list-style-type: none"> 1. Bawean 2. Bandaneira <p>The installation or deployment locations have to consider the exact location regarding insignificant observing, i.e. river discharge on the estuarine. Requires manufacture authorization and support for the activity implementation along the project time frame.</p>
Information	<p>The precise location of the coastal buoys will be commonly agreed during the detailed design taking in account the following criteria's:</p> <ol style="list-style-type: none"> 1. The vandalism risk mitigation. 2. Distance from a port with available facilities for deployment and maintenance. 3. The information necessary to support port operation from metocean information such as : wind, atmospheric pressure, rain rate, wave height, vertical profile of current velocity/current speed.
	Coastal Monitoring Buoy
6.1.2.	<p>General: The basic requirements for metocean surface buoy are suitable and able to satisfy for a long-term deployment in Indonesia's coastal waters. The metocean buoy design, equipment, and its sensors must be standardized, certified, and proven with successful records for a long-term deployment.</p>
6.1.3.	<p>Deployment depth range: The buoys are capable to satisfy the deployment requirement in the water depths up to 50 m using standard and common mooring technologies.</p>
6.1.4.	<p>Environmental design conditions: The buoy including its associated mooring line and hardware are designed to survive and continue to operate under extreme sea-state and environmental conditions.</p> <p>The following extreme design conditions are suggested for the purpose of preliminary mooring design:</p> <p>Able to operate in wind speeds up to Mean wind speed 70 mph (31 m/s), Wind Gust 90 mph (40 m/s), waves of up to 8m significant wave height (Hs), and simultaneous currents of up to 2 kt.</p>
6.1.5.	<p>Oceanographic and meteorological study: An oceanographic and meteorological study and assessment including potential site survey are required to specify such conditions, using prior studies, historical observations, model data, and other available information.</p>

6.1.6.	<p>Hull construction: The buoy is required to be unsinkable, anti-capsize, damage-resistant, and corrosion resistant.</p> <p>The entire buoy is non-magnetic which permits the utilization of the magnetic compasses in sensors attached to the buoy.</p> <p>The supplier is required to provide the details in its offer to satisfy these requirements.</p>
6.1.7.	<p>Hull size: Approximately 1.8m – 2.2m diameter; must be fit in standard freight container.</p>
6.1.8.	<p>Shape: The shape of the buoy hull must be suitable for directional wave measurements (i.e., the buoy must not have unusual dynamical response characteristics, such as excessive heave or pitch/roll due to resonant response in a severe wave environment).</p> <p>Spar or small-diameter cylindrical-shape buoys are not suitable.</p>
6.1.9.	<p>Stability: The buoy shall be designed to have absolute stability without a possibility of capsizing, even if detached from the mooring line.</p>
6.1.10.	<p>Net buoyancy (fully loaded): Typically, the displacement of a coastal buoy would be in the range of 1500 kg – 2000 kg. However, net buoyancy is required to be sufficient to avoid submergence under worst-case wind, wave, and current.</p> <p>Environmental Design Conditions in any selected water depth up to 50 m. Detailed mooring analysis shall be provided to justify the design.</p>
6.1.11.	<p>Mooring attachment method: The buoy is designed for single line mooring. Furthermore, it should also have fittings to allow attachment of 2, 3 or 4-line mooring arrangement.</p>
6.1.12.	<p>Mooring line: The mooring line is required to be designed to avoid possible acoustic signal interference with mooring hardware, such as chain, swivel, etc.</p>
6.1.13.	<p>Anchor (sinker): Deadweight type, any material, 1500kg – 2500kg (wet). The necessary anchor weight and shape will depend on mooring depth, expected environmental conditions, and bottom type.</p>
6.1.14.	<p>Corrosion protection: All submerged sections of the buoy must have zinc anodes securely affixed, ensuring optimal metal-to-metal connection. An engineering assessment must be presented to verify the adequacy of the zinc quantity, guaranteeing effective galvanic protection throughout the anticipated deployment periods.</p>
6.1.15.	<p>Anti-fouling protection: The coastal buoys is required to be equipped with anti-fouling protection</p>
6.1.16.	<p>Tower: The buoy is equipped with a tower of 2 - 3 meters of height supporting meteorological sensors, solar panels, and telemetry units. A modular and separately mounted tower is preferred for simplicity of shipping and maintenance. The tower is non-magnetic and should be constructed of non-corrodible materials.</p>

6.1.17.	Cables and connectors: All external cables (for example, the cable from a current profiler to the buoy's instrument well) shall be UV-resistant and securely fastened. Waterproof electrical connectors shall be used for all connections to the buoy
6.1.18.	Navigation warning devices: The buoy is equipped with a flashing navigation warning light that complies with local maritime safety regulations as to visibility range, color, and flash pattern. The buoy is also equipped with a passive radar reflector and an active radar transponder. An option to equip the buoy with AIS is also required
6.1.19.	Re-location devices: The buoy is equipped with a GPS/Iridium satellite beacon linked to a 24/7 position monitoring service to provide an alarm if the buoy moves outside its predefined watch-circle. The beacon is capable of transmitting re-location signals for at least 3 month to provide time for recovery of a buoy if it has been broken free of its anchor. This re-location-capability-beacon shall be independent of the onboard position/time sensor and the beacon has its own power supply.
6.1.20.	Solar power system: The buoy is powered with solar panels. It is capable of providing sufficient electrical power to support the expected amount of power consumption of the sensor payload, the Data and Telemetry Unit (DATU), and telemetry equipment after allowance for non-sunny days and possible solar panel degradation. The design must be justified with a detailed analysis of power consumption and power availability. Solar panels must be diode-protected, mechanically supported and backed up to prevent damage from waves, and waterproof electrical cables and connectors must be utilized.
6.1.21.	<p>Rechargeable battery system: The buoy must be powered with sufficient capacity of rechargeable batteries to support full operation (sensors, data acquisition, and telemetry) for at least 2 weeks from a fully charged state in the absence of charge from the solar panel system.</p> <p>The buoy must be powered with sufficient capacity of rechargeable batteries to support recovery operation (GPS position and recovery beacon) for at least 3 months from a fully charged state in the absence of charge from the solar panel system.</p> <p>The batteries on the power system have to be charged from the solar panels through a power supply-charge regulator that will prevent overcharging. Batteries are specifically designed and intended for long-duration, low-current uninterruptible power supply service.</p> <p>In the case of lead-acid batteries utilization, precautions are required to be taken to prevent potential damage (leakage, spillage, explosion, etc.), and the design of the batteries and battery housing have to be built to prevent accumulation of hydrogen gas, which can pose an explosion hazard. The batteries must be standard or common type and readily available. In case of lithium-based batteries utilization, the manufacturer's recommendations for charging safety have to be followed.</p>
6.1.22.	Solar/battery electrical power system: The autonomous stand-alone power system shall be 6 months at least to 12 months in the ideal way powers the observation system. The security systems have to be equipped with a security camera system .
	Doppler Current Profiler Sensor

6.1.23.	General: The buoy is equipped with an acoustic current profiler that measures and provides high resolution current vertical profiles, including current data measurement from the closest to the surface as possible.
6.1.24.	Sensor technology and configuration: An acoustic Doppler current profiler built with a minimum of 3 downward-looking acoustic beams has to be mounted underneath the buoy. Then, in such a way that its acoustic beams are not obstructed by any structural element of the buoy and by mooring hardware. The sensor measures and provides vertical current profile measurements from the closest to the surface as possible (1m to 2m), down to approximately 10% of the range to the sea floor. Broadband measurement technology is utilized to obtain sufficiently accurate ping-by-ping measurements.
6.1.25.	Acoustic frequency: The acoustic frequency is selected to provide the desired range, measurement cell size, and measurement accuracy. The acoustic profiler should operate in the range of frequency from 300 kHz to 600 kHz.
6.1.26.	Profiling range: The measurement range of the acoustic profiler shall be up to 100m
6.1.27.	Measurement cell size: The profiler provides selectable measurement cell sizes in the range of 0.5m to 5m. Typically, the cell size will be set to 1m – 4m in the interest of obtaining accurate measurements from a moving buoy.
6.1.28.	Number of measurement cells: The profiler shall provide a minimum of 50 measurement cells.
6.1.29.	Velocity range: The acoustic profiler measures current over the range of 0 – 5m/s (0 to 10kt), although a smaller range would be acceptable as currents in Indonesian coastal waters are not expected to exceed 2 m/s. Utilization of a wide velocity spectrum must be demonstrated not to downgrade the accuracy of the measurements.
6.1.30.	Ping rate: The sensor are capable of pinging faster than 1Hz
6.1.31.	Velocity measurement accuracy: Bidders demonstrate an understanding of the methods to obtain reasonably accurate current profile measurements from a buoy that moves and tilts in response to waves, asked to propose a suitable sampling and averaging strategy, adjustment, and estimate the accuracy of the resulting adjusted data.
6.1.32.	Velocity resolution and precision: Ping-by-ping resolution of the acoustic profiler should be at least 1cm/s e.g. a resolution of 0.5 cm/s or finer is preferred . The contractor are asked to give details on noise suppression and circumvent the noise from buoy movements
6.1.33.	Ensemble averaging interval: The acoustic profilers are programmable for ensemble averaging intervals of 1 min to 1 hour; typically, 20 minutes is used, and the bidder needs to demonstrate that the proposed sampling and averaging scheme will provide suitable accuracy over this interval.
6.1.34.	Tilt measurements: Tilt (pitch and roll) must be measured and recorded, preferable on a ping-by-ping basis; otherwise, these variables need to be recorded as ensemble-average values as well as standard deviations. The valid measurement range for pitch/roll should be at least +/- 15°, with a minimum

	accuracy/resolution of 0.5°/0.1°. Improvements beyond these specifications are encouraged, e.g., achieving finer resolutions down to 0.05° angle.
6.1.35.	Heading measurements (compass): The acoustic profiler must be equipped with an internal magnetic compass and programmed to use heading data to convert velocity component measurements to earth-coordinate measurements on a ping-by-ping basis. Compass data must be measured rapidly aiming for a measurement interval of 1 second or less, and averaged over the ensemble interval. The heading accuracy should be +/- 4 degrees, with a resolution of 0.5 degrees, striving for improvements where possible, e.g., achieving finer resolutions down to 0.1 degrees. Bidders need to demonstrate that the accuracy of the heading sensor is not degraded by buoy motion.
6.1.36.	Water temperature measurement: Water temperature should also be measured and recorded with an accuracy of +/- 0.1°C, resolution of 0.1°C or better e.g. an accuracy and resolution of +/- 0.05°C. Additionally if available, equipment could possibly provide the deviation of +/- 0.01°C e.g. a deviation of +/- 0.005°C or finer is preferred, so that deterioration of the sensor is perceivable.
6.1.37.	Current profile data output: The profiler provides output data in RS-232, RS-422 or other output format compatible with the DATU's input ports and should support either asynchronous or polled data transmission.
6.1.38.	Data storage: The profiler's on-board non-volatile memory units are capable of recording ensemble average data, and preferably pin-by-ping data, for longer (+30 %) than the planned deployment durations.
6.1.39.	Storage capacity: Storage capacity must be adequate for the planned deployment interval between maintenance operations.
6.1.40.	Electrical power: The acoustic profiler must be capable of being powered from the buoy's main solar/battery power supply. The bidder has to demonstrate the profiler's electrical power consumption with the proposed sampling and averaging scheme is supportable from the buoy's power supply.
	Wave Sensor
6.1.41.	General: The coastal buoy has to provide directional wave measurements over the full range of spectrum from wind-driven sea states to long-period swell. A proven and well-established technology of wave sensors are demanded to be utilized.
6.1.42.	Wave sensor: The wave sensor has to provide accurate measurements of wave height, independent of buoy motion. The preferred sensor technology is a 9-axis Micro Electromechanical System (MEMS), which measures accelerations along 3 orthogonal axes, rotations around the 3 axes, and 3 orthogonal components of the Earth's magnetic field. These parameters are sampled rapidly enough (typically 2Hz or faster) over a measurement burst (typically 20 minutes) to fully resolve the buoy's motion. From these raw data the properties of the wave field are calculated.
6.1.43.	Wave measurement range: 0 m to 10 m instantaneous maximum wave height.

6.1.44.	Wave measurement accuracy: Data output from the wave processor must provide accuracy of +/- 1 cm for Significant Wave Height, (Hs, the height of the 1/3 highest waves), +/- 1% of measured period, and better than +/- 0.3 degrees for wave direction, less than 2% of value for wave period.
6.1.45.	On-board wave processor: The on-board processor unit may come with two options. The first option is a modular, separated, and stand-alone electronic which is not embedded but must be a modular unit to anticipate a replacement during the future maintenance process. The second option is a board-level and embedded unit which is embedded and mounted inside the buoy's instrument as a whole platform system.
6.1.46.	Minimum system wave output: The wave sensor provides the measured significant wave height and average wave period estimates for wave periods in the range of 2 to 20 seconds (wind-driven local sea state).
6.1.47.	Directional wave system output: Significant wave height and average wave period, maximum wave height, peak wave period, non-directional wave spectrum, mean wave direction, and wave directional spread, or the first 5 wave Fourier coefficients. The wave processor has to be able to provide these mentioned parameters for both wind-driven seas (2 to 8 second periods) and swell (9 to 15 second periods).
6.1.48.	Wave data output frequency and format: Wave data have to be transmitted from the wave processor to the buoy's DATU following completion of on-board processing of each wave sampling burst. A standard data output format such as NMEA-0183 is demanded to be used.
6.1.49.	On-board wave data storage: The wave processor unit has to store all raw data as well as processed data in non-volatile memory post-processing.
	Conductivity Sensor
6.1.50.	General: The coastal buoy system shall measure water properties, including sea temperature and salinity (calculated from temperature, conductivity, and pressure or depth (CTD)) using sensors deployed either on the buoy or on the mooring line beneath the buoy. As this is a coastal zone sensor, extreme accuracy is not required but ruggedness, immunity from bio-fouling, and low power consumption are critically important.
6.1.51.	CTD immunity from bio-fouling: Sensors deployed in near-surface Indonesian waters will be subject to rapid growth of marine bio-fouling organisms, which can cause degradation of conductivity measurements. The sensor shall have proven immunity from bio-fouling induced errors, for example, through the use of a pumped sampling or equivalent technique.
6.1.52.	CTD temperature measurement range: -5 degree C to +40 degree C. The exact range is not critical, because extreme low and high temperatures will not be encountered in Indonesian waters. All commercially available CTD's will span the desired range.

6.1.53.	CTD temperature measurement accuracy: should be at least +/- 0.01 degree C e.g., a minimum accuracy of +/- 0.005 is preferred
6.1.54.	CTD conductivity measurement range: 0 – 70 mS/cm. As for temperature, the exact range is not critical since seawater conductivity in Indonesian coastal waters will be in the range of 30 – 36 mS/cm, although lower values may be encountered in regions where river outflow may be present.
6.1.55.	CTD conductivity measurement accuracy: +/- 0.01 mS/cm.
6.1.56.	Pressure (depth) measurement range: Approximately 0 – 70 decibar full scale (or otherwise depending on deployment depth). The full-scale range of the pressure sensor should be selected to accommodate the greatest depth at which the CTD may be deployed.
6.1.57.	Pressure accuracy: +/- 0.1% of full scale. A pressure sensor is not required for a CTD mounted on the buoy, but for ease of system maintenance all the CTDs in the program should be the same.
6.1.58.	Sampling and averaging: The CTD shall have the capability to sample at 10-minute intervals (or shorter) for a period of time longer than the planned mooring deployment duration. Averaging is not required.
6.1.59.	CTD output: RS-232, RS-422 or other output format compatible with DATA input ports.
6.1.60.	Electrical power: CTDs mounted directly to the surface buoy may be powered from the buoy's main solar/battery power supply. CTDs not mounted on the surface buoy (i.e., on the mooring line) may be powered from an internal battery.
	Weather Sensor
6.1.61.	General: The buoy system is equipped with weather sensors. Since data provided by the coastal buoys will enter the larger Indonesian automated weather network, it is necessary, important, and prioritized for the meteorological instrumentation to satisfy international standards for data quality and reliability.
6.1.62.	Weather sensor suite: The following instrumentation is required: <ol style="list-style-type: none"> 1. Wind speed and direction sensor (dual sensors are strongly preferred to provide backup and enhance confidence in data quality) 2. Air temperature 3. Relative Humidity (RH) 4. Barometric pressure 5. Rainfall
6.1.63.	Weather sensors must be acquired and sourced from manufacturers with a proven history of integration into national weather networks.
	Wind Speed And Direction Sensor
6.1.64.	Sensor type: The anemometer may be of any reliable and less-movement parts type (for example, bi-axial sonic type) that is accepted for providing valid data for national meteorological networks.

6.1.65.	Wind speed range: The instrument must be capable of measuring wind speeds from 0 to a minimum of 60 m/s, with capabilities beyond this range being desirable. For wind speed accuracy, the instrument should achieve $\pm 3\%$ accuracy for speeds up to 40 m/s, and $\pm 5\%$ accuracy for speeds up to 60 m/s. Instruments that exceed these minimum accuracy requirements are encouraged, e.g., offering tighter accuracy margins, such as $\pm 2\%$ up to 40 m/s, where possible.
6.1.66.	Wind direction sensor range: 0 – 360 °; wind direction accuracy $\pm 3^\circ$. This is not critical, as wind direction measurement errors due to buoy motion will dominate the overall accuracy.
6.1.67.	Sensor response time: The contractor has to provide the percentage of response to a step change in speed or direction that is faster than 1s.
6.1.68.	Heading sensor: The sensor or the buoy must be equipped with a heading sensor (compass) to refer the wind direction to the earth coordinates. The heading sensor have to be sampled at the same rate as the wind speed and direction to ensure valid vector averaging
6.1.69.	Each individual wind direction measurement has to be converted to earth reference before averaging.
6.1.70.	Averaging: Data have to be vector averaged either in the wind sensor or in the DATU over programmable averaging intervals, and wind gust calculations shall be made on programmable intervals (typically 3 seconds within each measurement interval).
6.1.71.	Data output: May be analog output to DATU, or serial digital format
	Air temperature sensor
6.1.72.	Sensor type: Stable, reliable, waterproof, high sampling rate sensor, and most updated technology of thermometer.
Information	Sensor range: Not critical, as air temperatures in Indonesian waters will never be extreme.
6.1.73.	Sensor accuracy: $\pm 0.3^\circ\text{C}$.
6.1.74.	Measurements Range: -40°C to 60°C
6.1.75.	Sensor Resolution: 0.1°C
6.1.76.	Sensor protection: Sensing elements have to be located within a well-ventilated solar radiation shield (Gill type). Natural aspiration is satisfactory.
6.1.77.	Sampling and averaging: The process have to be programmable, typically 1 - 5 readings/minute
6.1.78.	Data output: May be analog output to DATU, or serial digital format
	Air Humidity Sensor

6.1.79.	Measurements Range: 0 to 100%
6.1.80.	Sensor Resolution: 1%
6.1.81.	Sensor Accuracy: 2%
	Barometric Pressure Sensor
6.1.82.	Sensor type: absolute pressure
6.1.83.	Resolution: 0.1hPa
6.1.84.	Operating temperature: -40 °C to 55 °C
6.1.85.	Sensor range: 500hPa (mb) to 1100hPa.
6.1.86.	Sensor accuracy: +/- 0.2hPa
6.1.87.	Sensor protection: A pressure port shall be provided that provides compensation for Bernoulli effect (apparent pressure changes due to air speed) and prevents entry of rainwater. The pressure port shall be equipped with a suitable method for keeping liquid water out of the sensor's input.
6.1.88.	Sampling and averaging The process have to be programmable, typically 1 - 5 readings/minute; averaging not required on buoy.
6.1.89.	Data output: May be analog output to DATU, or serial digital format
	Rainfall sensor:
6.1.90.	Sensor type: The rainfall sensor shall be capable of rainfall rate measurement on a dynamically moving platform. Gravitationally operated tipping bucket sensors are not acceptable. The sensor may be a raindrop-impact counting type if sufficient accuracy can be demonstrated.
6.1.91.	Sensor range: Rainfall rates up to 20 cm/hr.
6.1.92.	Sensor accuracy: 3% of total rainfall accumulation
6.1.93.	Data output: analog if tipping-bucket sensor; digital count if raindrop-counting type.
	Solar Radiation Sensor
6.1.94.	General: The buoy shall be equipped with solar radiation sensor
6.1.95.	Radiation sensor power range: 0 – 2000W/m2

6.1.96.	Radiation sensor accuracy: +/- 1% of full-scale range (20 W/m ²)
6.1.97.	Wavelength range: 300 – 3000 nanometers (nm).
6.1.98.	Response time: < 10 seconds
6.1.99.	Data output: Analog signal to DATU
	Buoy Position and Time Synchronization Sensor
6.1.100.	General: The buoy position has to be measured using a GPS receiver, and GPS signals must be utilized to synchronize the clock of the DATU.
6.1.101.	GPS output: The GPS receiver provides streaming serial protocol (RS-232) output data in standard NMEA-0183 format at a 1Hz minimum rate; typically, such sensors provide data at up to 10 Hz.
6.1.102.	Sampling and averaging GPS positions have to be logged at a rapid rate (typically 1Hz) and averaged over the telemetry interval, together with the standard deviation of the east and north position components.
6.1.103.	Time synchronization: The GPS sensor has to provide timing pulses suitable for time clock synchronization with the DATU.
	Buoy Heading Sensor (Compass)
6.1.104.	General: The buoy has to be equipped with one or more magnetic compass units, which has to be capable of providing valid buoy orientation data in the presence of dynamic buoy acceleration and tilt.
6.1.105.	Heading sensor type: The compass should be a 3-axis magnetic heading sensor, capable of providing valid data from a moving buoy. The compass should be closely integrated with the wind speed and direction sensor, so as to allow conversion of raw (sensor coordinate frame) wind speed and direction to earth-referenced direction on a sample-by-sample basis). The bidder has to demonstrate understanding of how to obtain valid vector wind velocity averages on a buoy that may be rotating. If dual wind sensors are provided, dual compasses should be provided as well.
6.1.106.	Heading sensor accuracy: should be at least +/- 4° e.g., an accuracy of +/- 3° or finer is preferred .
6.1.107.	Data output: The sensor has to provide digital serial output.
	Data Acquisition and Telemetry Unit

6.1.108.	General: The buoy has to be equipped with a general-purpose Data Acquisition and Telemetry Unit (DATU) of proven capability. The DATU has to be flexible and programmable to accommodate a wide variety of sensors and telemetry equipment, and to allow for system evolution.
6.1.109.	Data channel types: The DATU has to be capable of bi-directional communication with multiple devices using serial, USB, or TCP/IP data formats. The system should be able to handle asynchronous data streams as well as polled sensors. Analog input ports may also be provided as needed.
6.1.110.	Data rates: The data rate for each data channel has to be independently programmable as required to support the proposed sensors.
6.1.111.	Data input channels: At a minimum, the DATU should have eight (8) RS-232 serial ports to receive incoming data, as most oceanographic sensors use this communication protocol. The DATU should also have the capability of collecting data over a network, such as Ethernet. To provide flexibility, the DATU should have a wide range of possible input types, number of channels, and sampling rates. The DATU's firmware has to have device-specific drivers to allow interfacing to the proposed sensors, including "smart" sensors, as required for the proposed sensor suite.
6.1.112.	System performance data: In addition to data from the metocean sensors, the DATU also has to collect, store, and transmit engineering data related to system performance. At a minimum, such data would include battery voltage(s), battery charging current from the solar panels, and the current drain of sensors and other power-consuming devices.
6.1.113.	Data processing: The DATU have the capability under program control to convert raw data to engineering units, perform averaging and data combinations, and apply quality screening functions as necessary to achieve performance goals for data quality and real-time telemetry. Depending on telemetry bandwidth, the DATU are able to compress data for telemetry.
6.1.114.	Data buffering: The DATU has data buffers to accumulate and transmit real time data.
6.1.115.	Data storage: The DATU must be equipped with on-board data recording capacity sufficient to store all raw and processed sensor and system performance data for longer than the planned deployment duration (+30%).
6.1.116.	Network interface: The DATU must have ethernet connectivity, which utilized for system configuration, monitoring, or telemetry interface
6.1.117.	Time synchronization: The DATU must have the capability to synchronize its clock with absolute time by utilizing time synchronization signals from standard GPS sensors.

6.1.118.	Power management: The DATU must have programmable capability to control DC electrical power to sensors and telemetry modems, in accordance with an overall power management scheme, to maximize sensor performance and real-time data throughput. Power control should be automatically adaptable in response to changes in available solar/battery power. In particular, the power control function of the DATU should have a fail-safe characteristic, in which power is reserved for DATU core functions and telemetry, as a last resort in the event of a serious power deficiency (that is, the DATU and its telemetry equipment should remain functional as long as possible, at the expense of sensors and other devices).
6.1.119.	Telemetry: The DATU must be interfaced to at least two or more telemetry modems. Primary telemetry utilizes 4G cellular technology. A backup telemetry system using Iridium-Satellite must be included. The DATU buffers data for telemetry and keeps track of records transmitted. The DATU and telemetry system must be capable of resending the remaining unsent observed data during data telemetry interruption for any reason at some point.
6.1.120.	Shore station: In the case of the client who does not have a 4G receiving station for the buoys, a dedicated shore-based computer system has to be provided to receive, process, archive, display and disseminate the data from all of the buoy systems. Robust software has to be provided to communicate with the buoys via the telemetry link, download new real-time data, perform preliminary processing and real-time quality assurance screening, archive all data in a database, provide web-based real-time displays, and provide a secure method of disseminating data to authorized users.
6.1.121.	Monitoring and trouble-shooting services: The system contractor must be prepared to provide real-time data quality monitoring and trouble-shooting services by professional engineers and scientists who are familiar with the system.
6.1.122.	Preventive maintenance: The preventive maintenance should be done by the contractor to prevent further damage of the whole observation system and the deterioration of each component i.e. sensors, power supply, power recharge, telecommunication system, and other equipment. The preventive maintenance has to be planned and executed for every 6 months during the project time plus one year addition. A certificate has to be released in every preventive maintenance activity afterward.
	Data Transmission
6.1.123.	All data have to be transmitted in real time through a main transmission channel and a backup transmission channel through: 1. Cellular as main transmission channel; 2. Satellite as backup transmission channel;
	Data Collection
6.1.124.	The format of collected data must comply with the international standards of JCOMM/GOOS/IOC-UNESCO/WMO (proven by a statement letter by the provider).

6.1.125.	All collected data must be able to be monitored into web based graphic information and saved in the Employer data center of the extended data processing.
6.1.126.	The metadata of the coastal buoys must be provided to the local WIGOS system in compliance with WIGOS Metadata Standard (WMO 1192). All parameters are able to be exchanged, except the vertical current profile due to the security restriction in Indonesia.
6.1.127.	The Coastal buoy systems send the observed data to the MMS Data Acquisition System of the extended data processing.
6.1.128.	The coastal buoys data shall be automatically transmitted to the BMKG's AMSS for data routing to: <ol style="list-style-type: none"> 1. BMKG CIPS data center 2. BMKG weather forecasting system server 3. MMS-2 Big Data and AI Platform
	International Program Capability
	Coastal buoy data (selected) should be included within the international Data Buoy Cooperation Panel (DBCP) program that is a component of the Global Ocean Observing System (GOOS). All parameters are able to be exchanged, except the vertical current profile due to the security restriction in Indonesia.
6.1.129.	Logistics and Deployment: All logistics and deployment costs have to be provided by the contractor.
6.1.130.	Operational Services: <ol style="list-style-type: none"> 1. All telecommunication costs have to be provided by the contractor until the End of System Wide Warranty or the Project Technical Completion plus one year. 2. Contractor has to provide one full system hot spares. 3. Contractor has to provide remote technical support and monitoring 24/7 service 4. Contractor has to provide the cost of spare parts required during the warranty period, which is the responsibility of the contractor. 5. Contractor has to provide all risk insurance
6.1.131.	<p>Output: The desirable output from this activity is to provide a comprehensive metocean (meteorology - oceanography) observation. The observation data availability has to be 95 percent on board. The observation data have to be integrated into the existing BMKG database system. The data has to be recorded by 95 percent of completion in a month, then the Employer tolerates 5 percent of incomplete data recording due to any component's failure with missing data as a consequence. The maximum period without data acquisition accepted is 72 hours (time can be adjust during PDS depend on distance of equipment) in terms of telemetry and software issues, which the Contractor has to solve the failure problems and recover the observation system. Furthermore, in terms of hardware problems which require on site works, maximum period without data acquisition accepted is 14 days.</p> <p>Outcome: The expected outcome from this activity is a next level of fulfilled gap of the extensive in situ metocean observation. The main goal of the activity is to provide marine secondary data as validation data and assimilation data input.</p>

6.1.132.	Warranty and Technical Support : Contractor has to provide warranty and support until the Project Technical Completion plus one year in terms of End of System Wide Warranty.																
	Capacity Building and Acceptances																
6.1.133.	<p>Training : After deployment of the MMS2 Marine observation equipment, the contractor shall iterate with the Employer in order to provide training on the delivered instruments as detailed in the table below (Summary of Trainings). Table 1. Summary of Trainings</p> <table><tr><th>Courses on Instrumentation</th><th>Location</th><th>Employer Staff</th><th>Indicative Duration Travel and weekend included</th></tr><tr><td>Coastal buoy factory technician training</td><td>Contractor premises</td><td>6</td><td>7 days</td></tr><tr><td>Coastal buoy site training (3 trainees per site)</td><td>Indonesia</td><td>6</td><td>5 days</td></tr><tr><td>On the job training (operators)</td><td>Indonesia</td><td>6</td><td>3 days</td></tr></table>	Courses on Instrumentation	Location	Employer Staff	Indicative Duration Travel and weekend included	Coastal buoy factory technician training	Contractor premises	6	7 days	Coastal buoy site training (3 trainees per site)	Indonesia	6	5 days	On the job training (operators)	Indonesia	6	3 days
Courses on Instrumentation	Location	Employer Staff	Indicative Duration Travel and weekend included														
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6.1.134.	<p>Those trainings shall be delivered according to a training plan accepted by the Employer</p> <p>The Course on Instrumentation shall include for each training</p> <ol style="list-style-type: none">1. Training Objective2. Trainee prerequisites3. Site prerequisites4. Site training location5. Maximum number of trainees6. Detailed agenda of each training7. Description of training materials <p>Training courses shall be offered at the factory and the field sites. Complexity and expected skill level of courses will increase over program term, as Employer personnel develop expertise. The training courses shall be a combination of experts, lectures and practical training.</p> <p>The Training Course covers at least specified topics as follows :</p> <ol style="list-style-type: none">1. The observation system components and mechanism2. The telemetry system workflow and flowchart3. The maintenance procedures4. Equipment components lifetime5. Observation system troubleshooting6. The system usage in daily operation7. The system usage in daily operation for technician8. The system features9. Guidance to utilize the system																

	The training output is a prepared observer to utilize the data and inspect the observation data to understand the equipment behavior and be aware of the deterioration.																			
6.1.135.	List of Acceptance Tests : Number of pax for FAT and OSAT shall be precised here or gathered in a specific FAT/OSAT section.																			
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Testing and Commissioning Requirements																				
6.1.136.	The Contractor shall submit a Testing and Commissioning Plan detailing and explaining how the Contractor will plan, perform, and document all inspections and tests that will be conducted to verify and validate the Works prior to delivery to the Site and to the final site acceptances.																			
6.1.137.	Contractor shall provide all equipment's, data and all that is required to conduct the testing.																			
6.1.138.	Logistic costs of the Employer staff for factory and site acceptance (local transport, transport out of Indonesia, International/National flights, accommodation, meals, and/or daily allowance) shall be covered by the contractor.																			
6.1.139.	The Factory test books shall be submitted to the Employer at least 2 weeks before the acceptance with a result report of tests internally conducted by the Contractor.																			
6.1.140.	The Site test books shall be submitted to the Employer before the acceptance with a result report of tests internally conducted by the Contractor.																			
6.1.141.	After completing the Site Acceptance Test, the commissioning activities must be carried out after 15 days of operations, presenting predefined outputs verified by a commissioning execution certificate.																			
6.1.142.	The anomaly reported shall be classified as follow: 1. Blocking: The problem leads to the impossibility to use in its totality or generates a safety risk for the users. 2. Major: Loss of major system functionality 3. Minor: The problem described does not block any important system functions or can be bypassed.																			

	<p>During the factory acceptance tests a system shall be accepted at the following conditions:</p> <ol style="list-style-type: none">1. No blocking anomaly2. Less than 3 major anomalies (the value of 3 will be proposed in the result report of tests internally conducted prior to the factory acceptance tests). <p>During the site acceptance tests a system shall be accepted at the following conditions:</p> <ol style="list-style-type: none">1. No blocking anomaly2. No major anomaly3. Less than 15 minor anomalies (the value of 15 will be proposed in the result report of tests internally conducted prior to the site acceptance tests) <p>The maximum number of each type of anomaly shall be specified in the last release of the PDS (Project Design Study)</p>
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6.2. Lot 2 - Wave Enclosed and Current Profiler System

No	Wave Enclosed and Current Profiler Requirements
Information	This activity is in replacement of the Single bottom-mounted ADCP system initially planned.
6.2.1.	<p>The Wave Enclosed and Current Profiler quantities and site locations are specified in :</p> <ol style="list-style-type: none"> 1. Merak – Banten; 2. Bakauheni – Lampung; 3. Tanjung Priok – Jakarta; 4. Tanjung Perak – Jawa Timur; 5. Padangbai – Bali; 6. Lembar – Nusa Tenggara Barat; 7. Kayangan – Nusa Tenggara Barat; 8. Poto Tano – Nusa Tenggara Barat. <p>The installation or deployment locations have to consider the exact location regarding insignificant observing, i.e. river discharge on the estuarine. Requires manufacture authorization and support for the activity implementation along the project time frame.</p>
6.2.2.	<p>The Wave Enclosed and Current Profiler shall provide the following information's at least every 30 minutes</p> <ol style="list-style-type: none"> 1. Current meter profiler (speed and direction) 2. Wave meter (height and direction) 3. Water temperature 4. GPS position <p>Product accuracy of each parameter shall be indicated in the proposal. The Wave Enclosed and Current Profiler should be installable within the port area, employing a floating buoy mounting configuration.</p>
6.2.3.	<p>The Wave Enclosed and Current Profiler shall provide the following facilities</p> <ol style="list-style-type: none"> 1. Integrated data logger 2. LED flashlight 3. Solar power system
6.2.4.	The batteries operational life have to be at least 12 months
6.2.5.	<p>Transmission: At least two transmission links are provided to be available (for example, Iridium-SBD, Iridium-internet, GSM-internet, HF link). GSM-internet will be prioritized during transmission, especially in areas where GSM signals are present. If not reachable, Iridium-SBD or Iridium-Internet will be used instead. The utilization of SBD Iridium during operational or commissioning is defined to be pay per use.</p>
6.2.6.	The Wave Enclosed and Current Profiler systems send the observed data to the MMS Data Acquisition System of the extended data processing.
6.2.7.	The supplier describes the maintenance procedures on a regular basis with specific details on cost and schedule maintenance operations until the project technical completion and during the System Wide warranty.

6.2.8.	The metadata of the coastal buoys must be provided to the local WIGOS system in compliance with WIGOS Metadata Standard (WMO 1192). All parameters are able to be exchanged, except the vertical current profile due to the security restriction in Indonesia.
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No.	Floating All-in-One Buoy Requirement
6.2.9.	General: The basic requirements for metocean surface buoy are suitable and able to satisfy for a long-term deployment in Indonesia's coastal waters. All the equipment, and all the sensors must be integrated into one single closed floating buoy to guarantee an easy and smooth deployment. All sensors must be certified, and proven with successful records for a long-term deployment.
6.2.10.	Deployment depth range: The buoys are capable to satisfy the deployment requirement in the water depths up to 50 m using standard and common mooring technologies.
6.2.11.	Environmental design conditions: The buoy including its associated mooring line and hardware are designed to survive and continue to operate under extreme sea-state and environmental conditions. The buoy shall be able to operate in wind speeds up to Mean wind speed 70 mph (31 m/s), Wind Gust 90 mph (40 m/s), wave of up to 8m significant wave height (Hs), and simultaneous currents of up to 2 kt.
6.2.12.	Oceanographic and meteorological study: An oceanographic and meteorological study and assessment including potential site survey are required to specify such conditions, using prior studies, historical observations, model data, and other available information.
6.2.13.	Hull construction: The buoy is required to be unsinkable, anti-capsize, damage-resistant, and corrosion resistant. The entire buoy is non-magnetic which permits the utilization of the magnetic compasses in sensors attached to the buoy. The supplier is required to provide the details in its offer to satisfy these requirements.
6.2.14.	Hull size: Approximately 1m diameter; and packaged in an effective way to allow easy handling.
6.2.15.	Shape: The shape of the buoy hull must be suitable for directional wave measurements (i.e., the buoy must not have unusual dynamical response characteristics, such as excessive heave or pitch/roll due to resonant response in a severe wave environment).
6.2.16.	Stability: The buoy shall be designed to have absolute stability without a possibility of capsizing, even if detached from the mooring line.
6.2.17.	Net buoyancy (fully loaded): Typically, the displacement of a coastal buoy would be in the range of 200 kg – 250 kg. However, net buoyancy is required to be sufficient to avoid submergence under worst-case wind, wave, and current. Environmental Design Conditions in any selected water depth up to 50 m. Detailed mooring analysis shall be provided to justify the design.

6.2.18.	Mooring attachment method: The buoy is designed for single line mooring. Furthermore, it should also have fittings to allow attachment of 2, 3 or 4-line mooring arrangement.
6.2.19.	Mooring line: The mooring line is required to be designed to avoid possible acoustic signal interference with mooring hardware, such as chain, swivel, etc.
6.2.20.	Anchor (sinker): Deadweight type, any material. The necessary anchor weight and shape will depend on mooring depth, expected environmental conditions, and bottom type and will be defined by the contractor.
6.2.21.	Corrosion protection: the structure must be constructed of marine grade stainless steel with sacrificial anode protection to mitigate corrosion on ferrous components such as the hull and mooring shackles.
6.2.22.	Navigation warning devices: The buoy is equipped with a flashing navigation warning light that complies with local maritime safety regulations as to visibility range, color, and flash pattern. The buoy should be equipped with an AIS transponder
6.2.23.	Re-location devices: The buoy is equipped with a GPS/Iridium satellite beacon linked to a 24/7 position monitoring service to provide an alarm if the buoy moves outside its predefined watch-circle. The beacon is capable of transmitting re-location signals for at least 3 month to provide time for recovery of a buoy if it has been broken free of its anchor. This re-location-capability-beacon shall be independent of the onboard position/time sensor and the beacon has its own power supply.
6.2.24.	Solar power system: The buoy is powered with solar panels. It is capable of providing sufficient electrical power to support the expected amount of power consumption of the sensor payload, the Data and Telemetry Unit (DATU), and telemetry equipment after allowance for non-sunny days and possible solar panel degradation. The design must be justified with a detailed analysis of power consumption and power availability. Solar panels must be diode-protected, mechanically supported and sealed within the dome of the buoy to prevent damage from waves. All electrical cables and connectors must be waterproof and contained inside the buoy dome.
6.2.25.	<p>Rechargeable battery system: The buoy must be powered with sufficient capacity of rechargeable batteries to support full operation (sensors, data acquisition, and telemetry) for at least 2 weeks from a fully charged state in the absence of charge from the solar panel system.</p> <p>The batteries on the power system, have to be charged from the solar panels through a power supply-charge regulator that will prevent overcharging. Batteries is specifically designed and intended for long-duration, low-current uninterruptible power supply service.</p> <p>In the case of lead-acid batteries utilization, precautions are required to be taken to prevent potential damage (leakage, spillage, explosion, etc.), and the design of the batteries and battery housing have to be built to prevent accumulation of hydrogen gas, which can pose an explosion hazard. The batteries must be standard or common type and readily available. In case of lithium-based batteries utilization, the manufacturer's recommendations for charging safety have to be followed.</p>

No.	Doppler Current Profiler Sensor Requirement
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6.2.26.	General: The buoy is equipped with an acoustic current profiler that measures and provides high resolution current vertical profiles, including current data measurement from the closest to the surface as possible.
6.2.27.	Sensor technology and configuration: An acoustic Doppler current profiler built with minimum of 3 downward-looking acoustic beams (4 acoustic beams is acceptable). The sensor measures and provides vertical current profile measurements from the closest to the surface as possible (1m to 2m), down to approximately 10% of the range to the sea floor. Broadband measurement technology is utilized to obtain sufficiently accurate ping-by-ping measurements.
6.2.28.	Acoustic frequency: The acoustic frequency is selected to provide the desired range, measurement cell size, and measurement accuracy. The acoustic profiler should operate either at the frequency of 400 kHz or at the frequency of 600 kHz.
6.2.29.	Profiling range: The measurement range of the acoustic profiler shall be up to 100m
6.2.30.	Measurement cell size: The profiler provides selectable measurement cell sizes in the range of 2 to 8m or 1m to 4m (depending on the frequency used). Typically, the cell size will be set to 1m – 4m in the interest of obtaining accurate measurements from a moving buoy.
6.2.31.	Number of measurement cells: The profiler shall provide a minimum of 50 measurement cells.
6.2.32.	Velocity range: The acoustic profiler measures current over the range of 0 – 5m/s (0 to 10kt), although a smaller range would be acceptable as currents in Indonesian coastal waters are not expected to exceed 2 m/s. Utilization of a wide velocity spectrum must be demonstrated not to downgrade the accuracy of the measurements.
6.2.33.	Ping rate: The sensor are pinging at 1Hz
6.2.34.	Velocity resolution and precision: Ping-by-ping resolution of the acoustic profiler should be at least 1 cm/s e.g a resolution of 0.5 cm/s or finer is preferred.
6.2.35.	Tilt measurements: The acoustic profiler must be equipped with a Tilt (pitch and roll) measurement and recording feature to correct the current data from the buoy motion in waves.
6.2.36.	Heading measurements (compass): The acoustic profiler must be equipped with an internal magnetic compass and programmed to use heading data to convert velocity component measurements to earth-coordinate measurements on a ping-by-ping basis.
6.2.37.	Water temperature measurement: Water temperature should also be measured and recorded with an accuracy of +/- 0.4° C and resolution of 0.1°C, e.g., +/- 0.2° C accuracy with a resolution of 0.05° C or finer, is preferred.
6.2.38.	Current profile data output: The profiler provides output data directly to the DATU for acquisition and transmission.
	Wave Sensor
6.2.39.	General: The coastal buoy has to provide directional wave measurements over the full range of spectrum from wind-driven sea states to long-period swell. A proven and well-established technology of wave sensors are demanded to be utilized.

6.2.40.	Wave sensor: The wave sensor has to provide accurate measurements of wave height, independent of buoy motion. The preferred sensor technology will rely on an International Measurement Unit to measure the buoy motion in three dimensions (six degrees of freedom. These will be sampled and processed in order to obtain the intended parameters on the waves characteristics.
6.2.41.	Wave measurement range: 0 m to 10 m instantaneous maximum wave height minimum.
6.2.42.	Wave measurement accuracy: Data output from the wave processor must provide accuracy of +/- 1% for Significant Wave Height, (Hs, the height of the 1/3 highest waves), +/- 1% of measured period, and better than +/- 2 degrees for wave direction, less than 2% of value for wave period.
6.2.43.	Minimum system wave output: The wave sensor provides the measured significant wave height and average wave period estimates for wave periods in the range of at least 2 to 20 seconds (wind-driven local sea state).
6.2.44.	Directional wave system output: Significant wave height, peak wave period, Wave zero crossing period and spectral energy.
	Data Acquisition and Telemetry Unit (DATU)
6.2.45.	General: The buoy has to be equipped with a general-purpose Data Acquisition and Telemetry Unit (DATU) of proven capability.
6.2.46.	System performance data: In addition to data from the ocean sensors, the DATU also has to collect, store, and transmit the critical engineering data related to system performance and operation. For example: power supply critical parameters, data storage parameters, parameters setting, ...
6.2.47.	Data buffering: The DATU has data buffers to accumulate and transmit real time data.
6.2.48.	Data storage: The DATU must be equipped with on-board data recording capacity sufficient to store all raw and processed sensor and system performance data for at least 24 months.
6.2.49.	Network interface: The DATU must have Wi-Fi connectivity, which utilized for system configuration, monitoring, or telemetry interface
6.2.50.	Time synchronization: The DATU must have the capability to synchronize its clock with absolute time by utilizing time synchronization signals from standard GPS sensors.
6.2.51.	Telemetry: The DATU must be interfaced to at least two or more telemetry modems. Primary telemetry utilizes 4G cellular technology. A backup telemetry system using Iridium-Satellite must be included. The DATU buffers data for telemetry and keeps track of records transmitted. The DATU and telemetry system must be capable of resending the remaining unsent observed data if data telemetry was interrupted for any reason at some point.
6.2.52.	Shore station: In the case of the client who does not have a 4G receiving station for the buoys, a dedicated shore-based computer system has to be provided to receive, process, archive, display and disseminate the data from all of the buoy systems.

	Robust software has to be provided to communicate with the buoys via the telemetry link, download new real-time data, perform preliminary processing and real-time quality assurance screening, archive all data in a database, provide web-based real-time displays, and provide a secure method of disseminating data to authorized users.
6.2.53.	Monitoring and trouble-shooting services: The system contractor must be prepared to provide real-time data quality monitoring and trouble-shooting services by professional engineers and scientists who are familiar with the system.
6.2.54.	<p>The DATU shall be automatically transmitted to the BMKG's AMSS for data routing to:</p> <ol style="list-style-type: none"> 1. BMKG CIPS data center 2. BMKG weather forecasting system server 3. MMS-2 Big Data and AI Platform <p>The list of products transmitted to BMKG's AMSS shall be submitted for approval by the Employer during the Detailed Design Study</p>
6.2.55.	Preventive maintenance: The preventive maintenance should be done by the contractor to prevent further damage of the whole observation system and the deterioration of each component i.e. sensors, power supply, power recharge, telecommunication system, and other equipment. The preventive maintenance has to be planned and executed for every 6 months during the project time plus one year addition until the end of the System Wide Warranty. A certificate has to be released in every preventive maintenance activity afterward.
	Data Transmission
6.2.56.	<p>All data have to be transmitted in real time through a main transmission channel and a backup transmission channel through:</p> <ol style="list-style-type: none"> 1. Cellular; 2. Satellite; 3. Radio (UHF or VHF)

Deployment and Operational Services

No.	Deployment and Operational Services Requirement
6.2.57.	Logistics and deployment: All logistics and deployment costs provided by the contractor.
6.2.58.	<p>Operational services:</p> <ol style="list-style-type: none"> 1. All telecommunication costs are provided by the contractor until the project technical completion plus one year addition. 2. Contractor provides remote technical support and monitoring 24/7 service 3. Contractor provides maintenance and warranty until project technical completion plus one year addition, the cost of spare parts required during the warranty period is the responsibility of the contractor. 4. Contractor provides all risk insurance.

6.2.59.	<p>Output: The desirable output from this activity is to provide a comprehensive - oceanographic measurement around the port area. The observation data availability has to be 95 percent on board. The observation data have to be integrated into the existing BMKG database system. The data has to be recorded by 95 percent of completion in a month, then the Employer tolerates 5 percent of incomplete data recording due to any component's failure with missing data as a consequence. The maximum period without data acquisition accepted is 72 hours (time can be adjust during PDS depend on distance of equipment) in terms of telemetry and software issues, which the Contractor has to solve the failure problems and recover the observation system. Furthermore, in terms of hardware problems which require on site works, maximum period without data acquisition accepted is 14 days.</p> <p>Outcome: The expected outcome from this activity is a next level of fulfilled gap of an extensive in situ of oceanographic surface and vertical profile measurement. The main goal of the activity is to provide marine secondary data as validation data and assimilation data input.</p>																
6.2.60.	<p>Warranty and Technical Support : Contractor has to provide warranty and support until the Project Technical Completion plus one year in terms of End of System Wide Warranty.</p>																
	<p>Capacity Building and Acceptances</p>																
6.2.61.	<p>Training: After deployment of the MMS2 Marine observation equipment and their related trainings, the contractor shall iterate with the Employer in order to provide training on the delivered instruments as detailed in the table below (Summary of Trainings).</p> <p style="text-align: center;">Table 2. Summary of Trainings</p> <table><tr><th>Courses on Instrumentation</th><th>Location</th><th>Employer Staff</th><th>Indicative Duration Travel and weekend included</th></tr><tr><td>Wave Enclosed and Current Profiler factory technician training</td><td>Contractor premises</td><td>6</td><td>7 days</td></tr><tr><td>Wave Enclosed and Current Profiler site training (2 trainees per site)</td><td>Indonesia</td><td>16</td><td>5 days</td></tr><tr><td>On the job training in average 3 days per activity</td><td>Indonesia</td><td>6 Staff on duty</td><td>3 days</td></tr></table>	Courses on Instrumentation	Location	Employer Staff	Indicative Duration Travel and weekend included	Wave Enclosed and Current Profiler factory technician training	Contractor premises	6	7 days	Wave Enclosed and Current Profiler site training (2 trainees per site)	Indonesia	16	5 days	On the job training in average 3 days per activity	Indonesia	6 Staff on duty	3 days
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6.2.62.	<p>Those trainings shall be delivered according to a training plan accepted by the Employer</p> <p>The Course on Instrumentation shall include for each training</p> <ol style="list-style-type: none">1. Training Objective2. Trainee pre-requisites3. Site pre-requisites4. Site training location																

	<div>5. Maximum number of trainees</div> <div>6. Detailed agenda of each training</div> <div>7. Description of training materials</div> <div>The Training Course covers at least specified topics as follows:</div> <div>1. The observation system components and mechanism</div> <div>2. The telemetry system workflow and flowchart</div> <div>3. The maintenance procedures</div> <div>4. Equipment components lifetime</div> <div>5. Observation system troubleshooting</div> <div>6. The system usage in daily operation</div> <div>7. The system usage in daily operation for technician</div> <div>8. The system features</div> <div>9. Guidance to utilize the system</div> <div>The training output is a prepared observer to utilize the data and inspect the observation data to understand the equipment behavior and be aware of the deterioration.</div> <div>Training courses shall be offered at the factory and the field sites. Complexity and expected skill level of courses will increase over program term, as Employer personnel develop expertise. The training courses shall be a combination of experts, lectures and practical training.</div>																								
6.2.63.	The contractor shall ensure spare parts availability for a duration of 10 years after site acceptance.																								
6.2.64.	<div>List of Acceptance Tests :</div> <div>Precise number of FAT and OSAT staff</div> <table><tr><th>Acceptance</th><th>Location</th><th>Employer Staff</th><th>Indicative Duration Travel and weekend included</th></tr><tr><td>Wave Enclosed and Current Profiler factory acceptance tests</td><td>Contractor premises</td><td>3</td><td>7 days</td></tr><tr><td>Wave Enclosed and Current Profiler factory site acceptance tests Site #1</td><td>Indonesia</td><td>2</td><td>3 days</td></tr><tr><td>Wave Enclosed and Current Profiler factory site acceptance tests Site #2</td><td>Indonesia</td><td>2</td><td>3 days</td></tr><tr><td>Wave Enclosed and Current Profiler factory site acceptance tests Site #3</td><td>Indonesia</td><td>2</td><td>3 days</td></tr><tr><td>Wave Enclosed and Current Profiler factory site acceptance tests Site #4</td><td>Indonesia</td><td>2</td><td>3 days</td></tr></table>	Acceptance	Location	Employer Staff	Indicative Duration Travel and weekend included	Wave Enclosed and Current Profiler factory acceptance tests	Contractor premises	3	7 days	Wave Enclosed and Current Profiler factory site acceptance tests Site #1	Indonesia	2	3 days	Wave Enclosed and Current Profiler factory site acceptance tests Site #2	Indonesia	2	3 days	Wave Enclosed and Current Profiler factory site acceptance tests Site #3	Indonesia	2	3 days	Wave Enclosed and Current Profiler factory site acceptance tests Site #4	Indonesia	2	3 days
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	Wave Enclosed and Current Profiler factory site acceptance tests Site #8	Indonesia	2	3 days
Testing and Commissioning Requirements				
6.2.65.	The Contractor shall submit a Testing and Commissioning Plan detailing and explaining how the Contractor will plan, perform, and document all inspections and tests that will be conducted to verify and validate the Works prior to delivery to the Site and to the final site acceptances.			
6.2.66.	Contractor shall provide all equipment's, data and all that is required to conduct the testing.			
6.2.67.	Logistic costs of the Employer staff for factory and site acceptance (local transport, transport out of Indonesia, International/National flights, accommodation, meals, and/or daily allowance) shall be covered by the contractor.			
6.2.68.	The Factory test books shall be submitted to the Employer at least 2 weeks before the acceptance with a result report of tests internally conducted by the Contractor.			
6.2.69.	The Site test books shall be submitted to the Employer before the acceptance with a result report of tests internally conducted by the Contractor.			
6.2.70.	After completing the Site Acceptance Test, the commissioning activities must be carried out after 15 days of operations, presenting predefined outputs verified by a commissioning execution certificate.			
6.2.71.	<p>The anomaly reported shall be classified as follow:</p> <ol style="list-style-type: none"> 1. Blocking: The problem leads to the impossibility to use in its totality or generates a safety risk for the users. 2. Major: Loss of major system functionality 3. Minor: The problem described does not block any important system functions or can be bypassed. <p>During the factory acceptance tests a system shall be accepted at the following conditions:</p> <ol style="list-style-type: none"> 1. No blocking anomaly 			

	<p>2. Less than 3 major anomalies (the value of 3 will be proposed in the result report of tests internally conducted prior to the factory acceptance tests).</p> <p>During the site acceptance tests a system shall be accepted at the following conditions:</p> <ol style="list-style-type: none">1. No blocking anomaly2. No major anomaly3. Less than 15 minor anomalies (the value of 15 will be proposed in the result report of tests internally conducted prior to the site acceptance tests) <p>The maximum number of each type of anomaly shall be specified in the last release of the PDS (Project Design Study)</p>
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6.3. Lot 3 - Development of Remote Sensing Products for atmospheric and ocean System

Information	<p>Satellite information is crucial to provide physical information. The new geostationary satellite GK2 (GEO-KOMPSAT-2) is a Korean geostationary meteorological satellite developed by KARI (Korea Aerospace Research Institute) that will provide atmospheric and ocean data above Indonesia.</p> <p>The GEO-KOMPSAT-2 program is to develop two geostationary orbit satellites, the meteorological GEO-KOMPSAT-2A (GK2A) and the ocean monitoring GEO-KOMPSAT2B (GK2B) sharing the same satellite bus. The lifetime of both satellites will be no less than 10 years</p> <p>GEO-KOMPSAT-2A (GK2A) is for the meteorological mission and the space weather monitoring mission, so it is equipped with AMI (Advanced Meteorological Imager) and KSEM (Korean Space Environment Monitor) payloads. GEO-KOMPSAT-2A. The satellite stationed at 128.2° East</p> <p>GEO-KOMPSAT-2B (GK2B) is for the ocean monitoring mission and the environment monitoring mission, featuring the Airbus Space built GOCI-II (Geostationary Ocean Color Imager-II) and the Ball Aerospace built GEMS (Environmental monitoring sensor) payloads. GEO-KOMPSAT-2B. The satellite stationed at 128° East</p> <p>Regarding the needs within the project, it is necessary to consider the measurement provided by such a satellite.</p> <p>Requires manufacture authorization and support for the activity implementation along the project time frame.</p>
No	Met Ocean Remote Sensing System Requirements
	Reception and Data Acquisition
6.3.1.	Receiving System of GK2 Satellite Data GK 2A UHRIT shall be implemented.
6.3.2.	A GK-2A UHRIT Ground Station System shall be implemented at BMKG headquarter
6.3.3.	<p>The G2KA data received by the GK-2A UHRIT Ground Station System shall be collected and the relevant selection shall be transmitted to the BMKG's AMSS for data routing to:</p> <ol style="list-style-type: none"> 1. BMKG CIPS data center 2. BMKG weather forecasting system server after geotiff conversion by the UHRIT GK-2A system 3. MMS-2 Big Data and AI Platform <p>The list of products transmitted to BMKG's AMSS shall be submitted for approval by the Employer during the Detailed Design Study</p>
6.3.4.	<p>The contractor shall conduct a site survey prior to installation</p> <p>The satellite reception antenna will be deployed at a location such that received data has a direct access to the existing BMKG LAN.</p>
6.3.5.	UHRIT Data reception from the indigenous meteorological satellite GK-2A shall be the primary goal of this ground station. The meteorological products including Level-1 (L1), Level-2 (L2), Level-3 (L3), and if any also for Level-4 (L4) are available for continuous observation of meteorological conditions in the Indonesia region of domain.

6.3.6.	The GK-2A data reception shall be a complete customizable turnkey system for supporting the data reception, processing, analyzing, cataloguing and archiving both in terms of hardware and software respectively. It must be a proven product with a known track record that supports 7/24/365 operation not an experimental tool.
6.3.7.	The hardware equipment shall be composed of a minimum 4.7m plus geostationary satellite antenna, LNB, receiver and other components supporting the necessary installation. Further consideration regarding the ideal installation location to acquire or gain the strongest connection coverage from satellite.
6.3.8.	The supporting components, such as cables, should use coaxial cables for installation.
6.3.9.	GK-2A UHRIT antenna & feed specification Antenna diameter: minimum 4.7m plus RF frequency: 8,070 MHz Polarization: LHCP
6.3.10.	GK-2A UHRIT demodulation specification 1. Input Frequency: 950 MHz ~ 2,150 MHz 2. Bandwidth: 20 MHz 3. Coding: BCH+LDPC 2/3 of DVB-S2 Standard 4. Pulse shaping: Root-Raised Cosine with 0.25 of roll-off factor 5. Modulation: NRZ-L/8PSK 6. Length of one CADU: 2048 bytes
6.3.11.	The GK-2A reception server shall be installed in a computer room with UPS facilities
6.3.12.	Reception Server shall have the hereunder minimum capacities. 1. CPU: Intel Xeon 2.2GHz 10C/20T or higher 2. RAM: 32GB 3. HDD: 2TB 7.2K SATA x 2EA (RAID1) 4. NIC: 1Gbps, 40Gbps 5. Redundant Power supply
6.3.13.	GK-2A reception system Shall provide well-defined, user-friendly GUI.
6.3.14.	Supplier shall support registration process with NMSC of KMA and provide encryption key to receive GK-2A UHRIT satellite data reception.
6.3.15.	GK-2A reception system shall ensure a continuous services data collection in order to receive critical meteorological imagery without interruption.
6.3.16.	GK-2A reception shall support fully automated operation.
6.3.17.	The GK-2A reception system (GUI) shall use English as the primary language, with Bahasa proposed as an option.

6.3.18.	The contractor shall provide user manual, troubleshooting, installation, and configuration document
6.3.19.	The complete system shall be designed to receive, process and deliver all available high-level products in 10 minutes.
6.3.20.	Supplier must provide evidence of providing GK-2A Satellite reception system products. In addition, the supplier must provide evidence of at least two satellite reception system sales experience.
6.3.21.	System shall be back to operational mode without any human intervention, for example due to power outage
6.3.22.	The application software shall be remotely upgradable
Processing, Catalogue, and Data Management System	
6.3.23.	The generated products shall be archived in the MMS data center
6.3.24.	The remote sensing data and products delivered by the system shall have a format description enabling further processing by the Employer scientists to develop derived products
6.3.25.	The contractor shall discuss with the Employer a use case whereby such processing will be prototyped (e.g., within capacity building activities)
6.3.26.	The contractor shall ensure the integration of remote sensing product to the existing production and disseminations tools in BMKG (Processing, visualization on unified forecaster tools and dissemination with the production & dissemination system)
6.3.27.	Consider the availability of GK-2A UHRIT, the system, shall provide the following marine products: <ol style="list-style-type: none"> 1. Sea surface temperature & Anomaly at different depth 2. Sea surface current 3. Chlorophyll 4. Water quality 5. Turbidity
6.3.28.	Products shall be stored in the data center. It shall be part of the data retention policy in the MMS system for data archiving.
6.3.29.	BMKG remote sensing data center system shall have a cataloging system that supports standard functions related to searching and distributing satellite data in multiple formats.
6.3.30.	BMKG remote sensing data center system shall be fast and reliable managing both archive and real-time data efficiently.

6.3.31.	It shall include extended functions for manipulating satellite images and essential admin tools for user/role management, menu management and log management are effective for long term data reception.
6.3.32.	Open-source enterprise DBMS and Web/WAS shall be provided for convenient data maintenance and management.
6.3.33.	NetCDF or geotiff format shall be required for basic output data. The system shall be able to produce other formats such as PNG and JPEG.
6.3.34.	BMKG remote sensing data center (GUI) shall use English as the primary language, with Bahasa proposed as an option.
6.3.35.	The system shall work reliably for extended duration. Must not freeze in the middle of functional processing. Must provide warning, alarm
6.3.36.	The system performance and storage capacity shall be upgradable and extendable.
6.3.37.	System shall be back to operational mode without any human intervention, for example due to power outage
6.3.38.	It shall provide graphical monitoring function
6.3.39.	Data conversion function shall be implemented 1. HDF to geoTiff, netCDF, PNG and JPEG. 2. geoTiff to HDF, netCDF, PNG and JPEG. 3. netCDF to geoTiff, HDF, PNG and JPEG.
6.3.40.	BMKG remote sensing data center shall provide capability that automatically catalogue data for easy searching with enhanced performance capability. Must work reliably for extended duration
6.3.41.	The processes shall not freeze in the middle of functional processing. Must provide warning, alarms. A test shall be performed during SAT to demonstrate that this specification is taken into account
6.3.42.	The processing and archiving tasks shall work independently without slowing down other systems
6.3.43.	System shall be back to operational mode without any human intervention, for example due to power outage
6.3.44.	Technical solutions related to marine products from GK2A, and GK2B (if available) can be included and tailored accordingly during proposal submission.
	Analysis, Forecasting, and Dissemination

6.3.45.	The system shall Compute meteorological satellite channel data
6.3.46.	The system shall efficiently produce RGB synthesis image
6.3.47.	The system shall be able extracting certain range of data by using threshold filter for the data over the desired range displayed
6.3.48.	It shall provide align direction to change map projection methods to display meteorological satellite image data in multiple ways
6.3.49.	It shall provide layer management tool that allows overlaying multiple images
6.3.50.	It shall support user-created color table which enables effective analysis of images
6.3.51.	The analysis system shall Convert NetCDF, geotiff to PNG, JPEG format
6.3.52.	The analysis system shall work reliably for extended duration. It shall not freeze in the middle of functional processing. It shall provide warning, alarms
6.3.53.	The system shall be Upgradable (e.g. new software release, reception server, etc.)
6.3.54.	It shall work independently without slowing down other systems
6.3.55.	System shall be back to operational mode without any human intervention, for example due to power outage
6.3.56.	Remote products dissemination shall be performed by MMS Production and dissemination systems
6.3.57.	<p>The visualized GK2 products on BMKG weather forecasting system shall include at least</p> <ol style="list-style-type: none"> 1. Cloud 2. Rainfall 3. Fog 4. Sea Surface Temperature (SST) 5. Land Surface Temperature (LST) 6. Cloud detection 7. Cloud analysis 8. Cloud temperature and height 9. Upper tropospheric humidity
6.3.58.	The analysis system (GUI) shall use English as the primary language, with Bahasa proposed as an option.
	Monitoring and Visualisation Equipment

6.3.59.	The supplier shall deliver 4 workstations to let the remote sensing teamwork of the acquisition, processing, visualization and production of remote sensing products, with the following characteristics or equivalent or better: 1. CPU: Intel Xeon series 2. RAM: 256 GB minimum 3. SSD: 512GB minimum 4. HDD: 4TB 7.2K SATA 5. NIC: 1Gbps 6. Monitor: 4K 32-inch LED * 2E
	GK-2A LRIT Shipboard Reception System
6.3.60.	The contractor shall deliver a mobile GK-2A LRIT reception platform in order to organize local support on remote locations
6.3.61.	It shall be small enough to be installed on a small ship. It must be able to receive GK2A LRIT broadcast data reliably on a moving platform.
6.3.62.	Its reception shall cover areas specified by GK-2A LRIT broadcast
6.3.63.	The available GK-2A LRIT broadcast is utilized to deliver BMKG's products to several stakeholders in the Indonesian domain. It aims to (marine) weather information dissemination capability. The Contractor may carry out the following activities if it meets the authorization requirement of the Republic of Korea's authority.
6.3.64.	It shall use SDR (Software Defined Radio) technology for small overall system size
6.3.65.	The system shall support mobile device via WIFI Mobile app (Android and iOS) with WIFI connection shall be provided for visualization
6.3.66.	Supplier shall provide encryption key and registration process with NMSC to reliably receive GK-2A LRIT transmission data
6.3.67.	The quantity shall be at minimum 20 shipboard reception system
6.3.68.	The shipboard reception system shall be able to reliably track GK-2A satellite on a moving platform
6.3.69.	It shall be able to receive & process GK-2A LRIT signals and produce all transmitted data such as Level 1B, forecast, Typhoon information, Prognostic Sea Surface Temperature, Wave chart, Upper Air Chart, etc. The complete list of products will be indicated by the Employer
6.3.70.	It shall have the capability to decrypt GK2A LRIT
6.3.71.	It shall support HDMI output interface for display

6.3.72.	The shipboard reception system (GUI) shall use English as the primary language, with Bahasa proposed as an option.
6.3.73.	The system shall not freeze in the middle of functional processing
6.3.74.	It shall provide warning, alarms
6.3.75.	The system shall be RF/EMF protected
6.3.76.	The system shall be Waterproof, salt spray, temperature rated for marine environment
6.3.77.	The Contractor or its sub-contractor shall provide evidence of providing GK-2A shipboard reception system products
6.3.78.	GK-2A LRIT Shipboard tracking antenna: <ol style="list-style-type: none"> 1. Antenna diameter: 60 cm minimum 2. Stabilized Type: 2-Axis or 3-Axis Step motor
6.3.79.	GK-2A LRIT Shipboard demodulator: <ol style="list-style-type: none"> 1. Bandwidth: 1MHz 2. Coding: Reed-Solomon (255/223, 4) and Convolution coding (1/2, K=7) 3. Modulation: NRZ-L/BPSK 4. Length of one CADU: 1024 bytes 5. Power 12-24 DCV or 100 ~ 220VAC 50/60Hz 50W Max
6.3.80.	The system shall be capable of displaying GK-2A LRIT imagery data on the mobile device through an application or on a TV/monitor through a HDMI port.
6.3.81.	<p>Output: The desirable output from this activity is to provide an extended comprehensive metocean (meteorology - oceanography) remote sensing observation. The remote sensing observation data availability has to be 95 percent. The remote sensing data has to be integrated into the existing BMKG database system. The data has to be recorded by 95 percent of completion in a month, then the Employer tolerates 5 percent of incomplete data recording due to any components failure and latency. Furthermore, the broadcast</p> <p>The maximum period without data acquisition accepted is 72 hours, which the Contractor has to solve the failure problems and recover the remote sensing system.</p> <p>Outcome: The expected outcome from this activity is a next level of remote sensing observation system complementing the existing remote sensing observation, Himawari. The main goal of the activity is to provide meteorology and oceanography spatial observation to support the forecasting operational and provide better understanding for the Employer Forecasting Officer.</p>
6.3.82.	Warranty and Technical Support : Contractor has to provide warranty and support until the Project Technical Completion plus one year in terms of End of System Wide Warranty.

	Capacity Building and Acceptances																
6.3.83.	<p>Training : After deployment of the MMS2 Marine observation equipment and their related trainings, the contractor shall iterate with the Employer in order to provide training on the delivered instruments as detailed in the table below (Summary of Trainings).</p> <p>Table 1. Summary of Trainings</p> <table><tr><th>Courses on Instrumentation</th><th>Location</th><th>Employer Staff</th><th>Indicative Duration Travel and weekend included</th></tr><tr><td>Met Ocean Remote Sensing Factory Training</td><td>Contractor premises</td><td>3</td><td>7 days</td></tr><tr><td>Met Ocean Remote Sensing Site Training</td><td>BMKG HQ</td><td>6</td><td>10 days</td></tr><tr><td>On the job training in average 3 days per activity</td><td>Indonesia</td><td>6 Staff on duty</td><td>3 days</td></tr></table>	Courses on Instrumentation	Location	Employer Staff	Indicative Duration Travel and weekend included	Met Ocean Remote Sensing Factory Training	Contractor premises	3	7 days	Met Ocean Remote Sensing Site Training	BMKG HQ	6	10 days	On the job training in average 3 days per activity	Indonesia	6 Staff on duty	3 days
Courses on Instrumentation	Location	Employer Staff	Indicative Duration Travel and weekend included														
Met Ocean Remote Sensing Factory Training	Contractor premises	3	7 days														
Met Ocean Remote Sensing Site Training	BMKG HQ	6	10 days														
On the job training in average 3 days per activity	Indonesia	6 Staff on duty	3 days														
6.3.84.	<p>Those trainings shall be delivered according to a training plan accepted by the Employer</p> <p>The Course on Instrumentation shall include for each training</p> <ol style="list-style-type: none">1. Training Objective2. Trainee pre-requisites3. Site pre-requisites4. Site training location5. Maximum number of trainees6. Detailed agenda of each training7. Description of training materials <p>Training courses shall be offered at the factory and the field sites. Complexity and expected skill level of courses will increase over program term, as Employer personnel develop expertise. The training courses shall be a combination of experts, lectures and practical training.</p> <p>The Training Course covers at least specified topics as follows:</p> <ol style="list-style-type: none">1. The system workflow and flowchart2. The system usage in daily operation3. The system features4. Guidance to utilize the system5. Guidance to overcome the troubling system. <p>The training output is a prepared remote sensing operator with a team to provide remote sensing operator in daily operation.</p>																
6.3.85.	The training shall include LRIT maintenance and operations																

6.3.86.	<div>List of Acceptance Tests :</div> <table><tr><th>Courses on Instrumentation</th><th>Location</th><th>Employer Staff</th><th>Indicative Duration Travel and weekend included</th></tr><tr><td>Met Ocean Remote Sensing Factory Acceptance Tests</td><td>Contractor premises</td><td>2</td><td>5 days</td></tr><tr><td>Met Ocean Remote Sensing Site Acceptance Test</td><td>BMKG HQ</td><td>2</td><td>3 days</td></tr></table>	Courses on Instrumentation	Location	Employer Staff	Indicative Duration Travel and weekend included	Met Ocean Remote Sensing Factory Acceptance Tests	Contractor premises	2	5 days	Met Ocean Remote Sensing Site Acceptance Test	BMKG HQ	2	3 days
Courses on Instrumentation	Location	Employer Staff	Indicative Duration Travel and weekend included										
Met Ocean Remote Sensing Factory Acceptance Tests	Contractor premises	2	5 days										
Met Ocean Remote Sensing Site Acceptance Test	BMKG HQ	2	3 days										
	Testing and Commissioning Requirements												
6.3.87.	The Contractor shall submit a Testing and Commissioning Plan detailing and explaining how the Contractor will plan, perform, and document all inspections and tests that will be conducted to verify and validate the Works prior to delivery to the Site and to the final site acceptances.												
6.3.88.	Contractor shall provide all equipment's, data and all that is required to conduct the testing.												
6.3.89.	Logistic costs of the Employer staff for factory and site acceptance (local transport, transport out of Indonesia, International/National flights, accommodation, meals, and/or daily allowance) shall be covered by the contractor.												
6.3.90.	The Factory test books shall be submitted to the Employer at least 2 weeks before the acceptance with a result report of tests internally conducted by the Contractor.												
6.3.91.	The Site test books shall be submitted to the Employer before the acceptance with a result report of tests internally conducted by the Contractor.												
6.3.92.	After completing the Site Acceptance Test, the commissioning activities must be carried out after 15 days of operations, presenting predefined outputs verified by a commissioning execution certificate.												
6.3.93.	<div>The anomaly reported shall be classified as follow:</div> <div><div>1. Blocking: The problem leads to the impossibility to use in its totality or generates a safety risk for the users.</div><div>2. Major: Loss of major system functionality</div><div>3. Minor: The problem described does not block any important system functions or can be bypassed.</div></div> <div>During the factory acceptance tests a system shall be accepted at the following conditions:</div> <div><div>1. No blocking anomaly</div><div>2. Less than 3 major anomalies (the value of 3 will be proposed in the result report of tests internally conducted prior to the factory acceptance tests).</div></div>												

	<p>During the site acceptance tests a system shall be accepted at the following conditions:</p> <ol style="list-style-type: none">1. No blocking anomaly2. No major anomaly3. Less than 15 minor anomalies (the value of 15 will be proposed in the result report of tests internally conducted prior to the site acceptance tests) <p>The maximum number of each type of anomaly shall be specified in the last release of the PDS (Project Design Study).</p>
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DATA PROCESSING AND MODELLING SYSTEM

6.4. Lot 4 - Big Data & AI Platform

Big Data and AI Platform Requirements

No	Big Data and AI Platform Requirements
	Big Data Architecture (Operation and Analytics)
6.4.1.	The contractor must install the big data AI platform at the Employer headquarters.
6.4.2.	Specific AI algorithms will be developed to benefit from this Big Data platform
6.4.3.	Big data platforms will integrate all kinds of data sources. This platform will be used for all meteorological, climatological, geophysics and any other type of supporting data such as observation instruments, general data (structured and unstructured data). The minimum requirements for the types of data shall be: <ol style="list-style-type: none"> 1. Numerical Weather Prediction Output 2. Atmospheric radar data. 3. Marine radar data 4. Satellite data. 5. Ocean and atmosphere Observation data 6. Image data 7. Text, from social media, news, etc.
6.4.4.	Two Big data streams: The Big Data architecture shall be composed of two data streams: <ol style="list-style-type: none"> 1. The first data stream shall be dedicated to the real-time data handling, processing, and storage, and 2. The second data stream shall be dedicated to bulk ingestion, retrieval and processing.
6.4.5.	Data sources categories: Data sources shall be split in four categories: <ol style="list-style-type: none"> 1. Observation systems 2. Numerical models Other data from social media, crowdsources, or external organizations
6.4.6.	If validated by the Employer, the R&D AI applications shall be deployed on the operational environment.
6.4.7.	The contractor shall set up data analytics environments, applications, software and pipelines to process the data. The Data analytics environment shall use state of the art system and software to qualify the available datasets and provide a clear quality measure about the datasets and their uncertainties.
Information	Deep learning and AI software will be used to make data production models more efficient.
6.4.8.	The contractor shall propose data preparation and analysis software modules including data cleansing, reformatting, aggregation, sub-setting, co-registration and cross correlation functions (i.e., Exploratory Data Analysis).
6.4.9.	API Interface on Big Data / AI system: In the frame of the use cases validation, the Big Data / AI system shall provide an API dedicated for research and operational purpose.
	Technology
6.4.10.	<ol style="list-style-type: none"> 1. Data Lake is used to store (Distributed and centralized Data Storage) of the whole MMS system data for Big Data and AI activity. 2. All scientific data shall be converted to get better querying performance (e.g

	<p>CSV data converted to Parquet or zcollection and NETCDF, HDF5, GRIB (Grib2) converted to zcollection)</p> <ol style="list-style-type: none"> The data lake has to effortlessly accommodate future needs of expanding data lake in a scalable scaled out. It is not only designed to store MMS project data. The protocol, architecture, and technology should use S3 compatible object storage. Data lake shall be easily integrated to AI Platform (e.g TensorFlow, Pytorch, Keras, Scikit-learn) by using standard AWS S3 SDK. Big Data Geoscience Architecture can refer to https://pangeo.io All dataset on Big Data Geoscience must be easy to cast/convert in memory to ML tensor (e.g., NumPy array to tensor) <p>The above requirements will be discussed and adapted during Project Design Study.</p>
6.4.11.	Dedicated HPC clusters (Management nodes, Development nodes, GPU nodes, Storage nodes) are demanded to be deployed with high throughput interconnection. It should have interface for Data science and Machine Learning activity accessible by user (e.g., JupyterHub)
6.4.12.	System access: The architecture must enable to create specific environments according to user needs (e.g, Natural Language Processing, Geoscience etc)
6.4.13.	Resource manager: The big data/AI architecture must contain an efficient Infrastructure resource manager (Orchestrator) that is capable of managing jobs and system workload based on user cases. resource manager shall capable to provide different resource utilization configuration base on user cases
6.4.14.	Service oriented architecture: The big data system shall be based on a service-oriented architecture
6.4.15.	Container based resource deployment and management: The big data / AI system shall include a container based (i.e. Docker, Podman, Kubernetes) resource deployment and management
6.4.16.	AI applications: The supplier must provide the following AI applications using Deep Learning and/or Machine Learning For more details, please refer to the user cases
6.4.17.	Dedicated HPC infrastructure for the big data / AI system: The supplier must provide a dedicated a GPU-based Supercomputer for running AI algorithms
6.4.18.	Storage Strategy: The MMS2 contractor must clearly present the adopted storage strategy and how it is expected to lead to a better performance with failover capability including a backup for production node storage.
6.4.19.	Storage Capacity: The data lake system must provide storage capacity that is capable of storing at least 10 years of continuous data for observations and analysis. The capacity of the data lake must be at least 500 TB of usable storage.
6.4.20.	<p>The minimum configuration for data lake purposes shall be:</p> <ol style="list-style-type: none"> Data lake must be accessible from AI nodes and Big Data nodes. Data lake must have at least 500 TerraBytes of usable storage capacity (including MMS1 Data lake). <p>The minimum AI node configuration consists of one node with the specified setting:</p> <ol style="list-style-type: none"> AI nodes shall have at least 2 CPU with 64 cores @3.1 GHz – 360 W. AI nodes shall have DDR5 memory, with at least 1536 GigaBytes. AI nodes with a global amount of at least 4 AI accelerators with the minimum performance at least 756 TFlops (single precision) per accelerator device. AI nodes must have at least 2 x 1.92TB SSD storage.

	<p>The minimum configuration for Big Data node purposes shall be:</p> <ol style="list-style-type: none"> 1. The Big Data nodes and AI nodes are managed in a single manager. 2. Big Data nodes distributed on at least 2 modules, with each module containing at least 4 CPUs sharing 3TB of DDR5 memory (3TB memory per module) 3. Big Data nodes must have at least 2x 1.92TB SSD storage 4. AI and Big Data workloads on the same infrastructure 5. The computing capacity shall be sufficient to develop AI models for all specified use cases.
6.4.21.	The AI Accelerators (i.e, GPU) must be the latest generation. The contractor shall not offer any stop production/obsolete/retired/End-of-Life Notice products.
6.4.22.	The big data and AI platform, should pass the testing and evaluation at the factory prior to installation at the Employer premises. The platform should have international warranty and should be fully supported worldwide.
6.4.23.	The AI toolbox shall provide tools to analyze the numerous forecasts computed on MMS HPC facilities and saved on Big Data capacities.
6.4.24.	Development of a forecasting system using AI based algorithms (with a combination of structured and unstructured data) shall be undertaken.
6.4.25.	Using its dedicated Super-Computing system accessing Big Data, the dedicated and improved algorithms of the AI shall enable the Employer: <ol style="list-style-type: none"> 1. to analyze the whole sets of ocean and weather data 2. to improve the forecast (through AI techniques).
6.4.26.	The Contractor shall provide a data catalog for all data in MMS
6.4.27.	<ol style="list-style-type: none"> 1. Full stack applications and services should be deployed using automatic scripts. 2. The contractor shall put in place an automated upgrade and rollback of each software package of the full stack applications.
6.4.28.	Data access with Data Catalog to browse the data, access them for post processing, display and use the data in applications.
6.4.29.	<p>Data acquisition and ingestion:</p> <ol style="list-style-type: none"> 1. The big data/AI shall provide a dedicated data acquisition system to collect, parse and reformat data from all MMS Observation for storage in the data lake and further usage within the Big Data AI platform from BMKG internal data switching and external resources as necessary 2. All data from the acquisition system shall be stored to datalake. 3. The MMS2 contractor shall provide the hardware that is sufficient to host all the functions above (point 1, 2 and 3). This item is hosted in Big Data/AI hardware.
6.4.30.	<p>User's interactions: The Contractor shall specify how the users will interact with the available assets, probably through a dedicated interface, in order to easily use existing modules/docker images, to create/test and deploy new service pipelines. The Contractor shall provide multiple web IDE (e.g., code-server, jupyter-lab) that configured for parallel computing (e.g., dask-cluster) via container instances</p>
6.4.31.	<p>Interface with the extended data processing</p> <p>The big data / AI system shall be able to access data of MMS system data centers through web services.</p>

	Compatibility and Interoperability
6.4.32.	MMS2 data lake shall be fully integrated with MMS1 data lake (MANDALA).
6.4.33.	The contractor shall avoid any vendor lock-in for the Big Data and AI modules by systematically adopting open-source solutions.
6.4.34.	The project shall benefit from a dedicated Big Data platform. The platform should be fully integrated with existing applications and ensure the sustainability of systems development.
6.4.35.	The contractor shall avoid any vendor lock-in for the Big Data and AI modules by systematically adopting open-source solutions.
	Supporting System
6.4.36.	Factory and site trainings shall be provided as detailed in the tables below (capacity building target)
6.4.37.	Factory acceptance tests shall be conducted before equipment shipment. It shall be conducted as detailed in the table below
6.4.38.	The technical proposal shall describe the site preparation at the Employer premises by the contractor and the prerequisites.
6.4.39.	The documentation must include at least the maintenance procedures, administration, and operation manuals.
6.4.40.	The site acceptance tests (2 sessions) shall be conducted as detailed in the table below
6.4.41.	The contractor must organize a site visit dedicated to technical support during the warranty period
6.4.42.	Training datasets and tools: The contractor shall precisely highlight the process of creation of training datasets, and the tools that will be put in place in order to facilitate the data annotation. The contractor shall support the Employer to create the training datasets
6.4.43.	The documentation shall include at least the maintenance procedures, administration, and operation manuals.
6.4.44.	The site acceptance tests (2 sessions) shall be conducted as detailed in the table below
6.4.45.	The site acceptance tests (2 sessions) shall include the use cases validation
6.4.46.	Each use case validation activity shall cover the following: <ol style="list-style-type: none"> 1. The input data that was selected for the use case with its different versions 2. The data split and strategy between training, validation and testing datasets 3. Developed algorithms and associated software 4. A jupyter notebook providing a walkthrough the use case from connection to data repositories to output 5. Documentation presenting the rationale and explaining the developed algorithms (this can be part of the jupyter notebook) 6. Evaluation metrics: Root Mean Square, Pearson's correlation, factor of 2, False alarm ratio, probability of detection, diagnostic odd ratio, intersection over union
6.4.47.	The utilization license of all delivered software shall be included and without time nor number of users limit

6.4.48.	The contractor shall organize a site visit dedicated to technical support during the warranty period
6.4.49.	<p>Output: The desirable output from this activity is to provide the first big data and AI platform in BMKG available for implementing big data and AI use case and marine climatological system at a rate 95 percent of completion in a month,. The maximum period of unavailability of the system shall be 72 hours, during which the Contractor shall solve the failure problems and recover an operational status of the big data and AI platform.</p> <p>Outcome: The expected outcome from this activity is a next level of forecasting system complementing the existing numerical modeling simulation and upcoming ensemble modeling and forecasting system. The main goal of the activity is to provide inclining meteorology and oceanography spatial forecast to support the forecasting operational and provide better understanding for the Employer Forecasting Officer.</p>

Big Data & AI Use Cases

No.	Big Data & AI Application
6.4.50.	The Employer users will specify use cases for the big data/AI platform. These use cases shall be co-developed with the MMS2 contractor. The scope of work will cover the development of data collecting, data preparation, AI modeling, API for data exchange and visualizations in applications.
6.4.51.	The contractor shall co-develop 2 use cases for big data AI. below is the use cases: Wave and Ocean Current Nowcasting using HF Radar Development and Demonstration of an AI/ML Augmented National Digital Weather (NDF) for BMKG
6.4.52.	Wave and Ocean Current Nowcasting using HF Radar
6.4.53.	Target output : develop the Big Data and AI by using historical HF-Radar data to predict wave and ocean current then correlate to in situ data (water level)
6.4.54.	Method : will be detailed / discussed during PDS either using LSTM or a better method proposed
6.4.55.	Training dataset : in situ data and HF-Radar
6.4.56.	Development and Demonstration of an AI/ML Augmented National Digital Weather (NDF) for BMKG
Information	The objective of the Development and Demonstration of an AI/ML Augmented National Digital Weather Forecast (NDF) for BMKG is to improve operational weather forecast initially for three pilot areas in Indonesia, including Jakarta, Banten, and West Java , and later on to other high-priority regions identified by BMKG.
6.4.57.	An AI/ML augmented system should integrate various sources of big data, including Lightning Detector (LD), Automatic Weather Station (AWS), Himawari-9 meteorological satellite data, and ground-based weather radar data. Additionally, it should employ an efficient AI/ML post-processing ensemble model.

6.4.58.	The contractor should provide four key areas of the proposed effort, including: Weather and environment big data collection and processing; AI/ML algorithms development and implementation; Augmented weather forecast demonstration for the targeted area; and Training of BMKG scientists, engineers, forecasters, and decision-makers.
6.4.59.	The contractor will be responsible for gathering most of the necessary Big Data from the employer, encompassing satellite, lighting, radar, in-situ, and BMKG's historical regional NWP forecast data.
6.4.60.	<p>This use case is designed in three execution phases with a seamless interface for a typical AI/ML-based technological infrastructure development.</p> <p>1. Data Collection and Preparation</p> <ul style="list-style-type: none"> ● The contractor should integrate with “Big Data” for data preparation to capture the critical hyper-local weather and environmental information of the prioritized areas identified by Indonesia’s official weather forecasting agency, BMKG. ● The other dataset should be collected includes the complex remote sensing data provided by the international Low Earth Orbit (LEO) and Geostationary Earth Orbit (GEO) weather satellite constellation deployed by the governments of the U.S., European Union, China, Japan, and S. Korea. These state-of-the-art weather observations provide constant measurements of clouds, precipitation, wind, temperature, water vapor, floods, fire, dust, visibility, and other trace gases <p>2. AI/ML algorithms selection, testing, processing, and evaluation</p> <ul style="list-style-type: none"> ● Upon the successful completion of preparation, the contractor has to leverage the proven approach and know how to develop a unique set of algorithms optimized to harness the combined information content of big data along with the BMKG existing forecast data stream. ● Each AI/ML algorithm will be selected from the previous successful study including but not limited to: <ul style="list-style-type: none"> 2.1. Artificial Neural Networks, 2.2. Support Vector Regression, 2.3. Gradient Boosting Regression, 2.4. Ridge Regression, 2.5. Lasso Regression, 2.6. Elastic Net, and 2.7. K-nearest neighbors ● The AI/ML augmented weather forecast either from any single or ensemble forecast shall be quantitatively evaluated using the statistical definition of Mean Square Error, Mean Absolute Error, and Mean percent error ● The contractor has to provide evidence of using various AI/ML algorithms with each providing additional forecast enhancement. ● The contractor ensures a smooth transition from demonstration to operation and integration with BMKG's NDF infrastructure.
6.4.61.	Training : The contractor should provide comprehensive training to BMKG to ensure the developed AI/ML Augmented NDF can be handed over for efficient and long-term operation and easily adapted for broader usage.

Marine Climate System

No	Marine Climatology System and User-Specified Products
6.4.62.	The implementation of the Marine Climatology System and User-Specified Products will be done on the new computational resources to be housed at BMKG headquarters. It will consist of software supplies.
6.4.63.	The Marine Climatology System and User-Specified Products shall provide users with a one-stop-shop, gathering a wide range of coastal/ocean management services built on the core products (satellite observation, in-situ observation, model outputs) stemming from the MMS infrastructure.
6.4.64.	As part of the MMS2 project, the Contractor shall initiate the Marine Climatology System and User-Specified Products by implementing Coastal flood early warning system and co-development of the production of climatological analysis data set from reanalysis coupling model run.
6.4.65.	The Contractor shall implement an early warning service (EWS) for coastal floods caused by marine submersions.
6.4.66.	As inputs, the EWS shall use: <ul style="list-style-type: none"> ● The sea-level (tide) outputs, rainfall from the CAWO model ● Digital Elevation Models (dems) publicly available and/or provided by the Employer along the coastlines ● A dedicated hydrodynamic inundation model (to be provided by the Contractor)
6.4.67.	As an output, the EWS shall provide a mapping of risk levels on a user-friendly web graphical interface, along the national coastal areas
6.4.68.	The risk mapping shall be updated at the pace of the CAWO model outputs
6.4.69.	The service shall provide estimation of flood extents, water depth and velocity
6.4.70.	Triggering thresholds and typical situations of submersion shall be determined based on a statistical analysis over a long-time period, add case study for simulations and verifications
6.4.71.	The Contractor solution has to be deployed in an operational context.
6.4.72.	Co-development of the production of climatological analysis data set from reanalysis coupling model run will done by employer with assistance by contractor, the detail design must be provided during project design study phase.
6.4.73.	Warranty and Technical Support : Contractor has to provide warranty and support until the Project Technical Completion plus one year in terms of End of System Wide Warranty.
6.4.74.	Capacity Building and Acceptances
6.4.75.	Training The Supplier must provide Factory and Local training sessions to BMKG staff, based on its generic training plan. These trainings shall target autonomous operations and first-level of maintenance.

6.4.76.	Capacity Building Skill Targets			
	Advance Python Programming in parallel computing	Data engineer, Data Scientist, Meteorologist	Big data/AI training	
	Geoscience data exploration using conventional tools and big data geoscience platform	Data engineer , Data Scientist, Meteorologist	Big data/AI training	
	Designing and building architecture specifically for big data geoscience and AI, using cloud and premises cluster	Data engineer	IT Training	
	Operational Big Data and AI Supercomputer infrastructure management	System engineer, system administrator, IT Support, DevOps	IT Training	
	AI Modeling with various technique that usable for geoscience use case	Data engineer, Data Scientist, Meteorologist	Big data/AI training	
	Problem Solving technique using Big Data and AI based on codevelopment use case (How to understanding the problem , the requirement and define state the art to give most effective solution to achieve expected output)	Data engineer , Data Scientist, Meteorologist	Big data/AI training	
	Course on Big Data and AI			
6.4.77.	After systems deployment and related IT trainings, the contractor shall iterate with the Employer in order to provide training on the delivered IT systems			
	Course on Big Data, AI Platform	Location	Employer Staff	Indicative Duration Travel and weekend included
	Big data / AI and Use cases Factory training	Contractor premises	5	14 days
	Operational Service Factory Training	Contractor premises	5	14 days
	Big data / AI and Use cases Site Training	BMKG HQ	8	10 days
	Operational Service Site Training	BMKG HQ	6	10 days
	On the job training during warranty session #1	BMKG HQ	8 Staff on duty	10 days
	On the job training during warranty session #2	BMKG HQ	8 Staff on duty	10 days
	On the job training during warranty session #3	BMKG HQ	8 Staff on duty	10 days

6.4.78.	<p>Those trainings shall be delivered according to a training plan accepted by the Employer</p> <p>The IT training shall contain the following items:</p> <ol style="list-style-type: none">1. Training Objective2. Trainee prerequisites3. Site prerequisites4. Site training location5. Maximum number of trainees6. Detailed agenda of each training7. Description of training materials <p>The Training Course covers at least specified topics as follows:</p> <ol style="list-style-type: none">1. The system workflow and flowchart2. The system usage in daily operation3. The system usage in daily operation for administrator4. The system features5. Guidance to utilize the system6. Guidance to overcome the troubling system.7. Administrator training <p>The training output is a prepared IT and HPC administrator with a team to self-develop Big Data and AI platforms in the future. Furthermore, to initiate the co-development process the employer have to be enriched in the knowledge of marine climatological product.</p>																				
6.4.79.	<p>Acceptance :</p> <p>The Supplier must organize an Onsite Acceptance Tests sessions (OSAT), based on its generic approach for the use-cases acceptance testing.</p>																				
6.4.80.	<p>List of Acceptance Tests :</p> <table><tr><th>Acceptance Test</th><th>Location</th><th>Employer Staff</th><th>Indicative Duration (days) Travel and weekend included</th></tr><tr><td>Big Data & AI Platform System Factory Acceptance Tests</td><td>Contractor premises</td><td>3</td><td>7</td></tr><tr><td>Big Data & AI Platform System Site Acceptance Tests</td><td>BMKG HQ</td><td>2</td><td>3</td></tr><tr><td>Big Data & AI Operational Service Site Acceptance Tests</td><td>BMKG HQ</td><td>2</td><td>3</td></tr><tr><td>Big Data & AI Use Cases Site Acceptance Tests</td><td>BMKG HQ</td><td>2</td><td>3</td></tr></table>	Acceptance Test	Location	Employer Staff	Indicative Duration (days) Travel and weekend included	Big Data & AI Platform System Factory Acceptance Tests	Contractor premises	3	7	Big Data & AI Platform System Site Acceptance Tests	BMKG HQ	2	3	Big Data & AI Operational Service Site Acceptance Tests	BMKG HQ	2	3	Big Data & AI Use Cases Site Acceptance Tests	BMKG HQ	2	3
Acceptance Test	Location	Employer Staff	Indicative Duration (days) Travel and weekend included																		
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Big Data & AI Platform System Site Acceptance Tests	BMKG HQ	2	3																		
Big Data & AI Operational Service Site Acceptance Tests	BMKG HQ	2	3																		
Big Data & AI Use Cases Site Acceptance Tests	BMKG HQ	2	3																		
	<p>Testing and Commissioning Requirements</p>																				
6.4.81.	<p>The Contractor shall submit a Testing and Commissioning Plan detailing and explaining how the Contractor will plan, perform, and document all inspections and tests that will be conducted to verify and validate the Works prior to delivery to the Site and to the final site acceptances.</p>																				
6.4.82.	<p>Contractor shall provide all equipment's, data and all that is required to conduct the testing.</p>																				

6.4.83.	Logistic costs of the Employer staff for factory and site acceptance (local transport, transport out of Indonesia, International/National flights, accommodation, meals, and/or daily allowance) shall be covered by the contractor.
6.4.84.	The Factory test books shall be submitted to the Employer at least 2 weeks before the acceptance with a result report of tests internally conducted by the Contractor.
6.4.85.	The Site test books shall be submitted to the Employer before the acceptance with a result report of tests internally conducted by the Contractor.
6.4.86.	After completing the Site Acceptance Test, the commissioning activities must be carried out after 30 days of operations, presenting predefined outputs verified by a commissioning execution certificate.
6.4.87.	<p>The anomaly reported shall be classified as follow:</p> <ol style="list-style-type: none"> 1. Blocking: The problem leads to the impossibility to use in its totality or generates a safety risk for the users. 2. Major: Loss of major system functionality 3. Minor: The problem described does not block any important system functions or can be bypassed. <p>During the factory acceptance tests a system shall be accepted at the following conditions:</p> <ol style="list-style-type: none"> 1. No blocking anomaly 2. Less than 3 major anomalies (the value of 3 will be proposed in the result report of tests internally conducted prior to the factory acceptance tests). <p>During the site acceptance tests a system shall be accepted at the following conditions:</p> <ol style="list-style-type: none"> 1. No blocking anomaly 2. No major anomaly 3. Less than 15 minor anomalies (the value of 15 will be proposed in the result report of tests internally conducted prior to the site acceptance tests). <p>The maximum number of each type of anomaly shall be specified in the last release of the PDS (Project Design Study).</p>

6.5. Lot 5 – Ensemble Forecasting System

Ensemble Forecasting

No	Ensemble Forecasting System - Requirements
Information	The purpose of this activity is to provide a regional ensemble forecast system to generate reliable probabilistic forecasts in real time. This will also provide the Employer's scientists with a basis for further research implementation
	System Testing, Evaluation, and Verification
6.5.1.	The multi-model forecast system shall be designed to incorporate the Employer's own forecast models.
6.5.2.	The ensemble forecast model should be integrated with existing ensemble product data available in BMKG
6.5.3.	The minimum skill score of the model 80% in average
6.5.4.	The Contractor shall deliver tools to configure different model initializations in the frame of R&D ensemble forecasting
6.5.5.	The Contractor should provide tools and technical environment enabling to implement and operate the concurrent run of R&D ensemble forecasting Ability to produce clean restart procedure for each model (results independent of the restart procedure) Supervision tools for ensemble forecasting Computing Benchmarking framework for ensemble forecasting
6.5.6.	The contractor shall deliver a set of scoring procedures to assess and monitor the forecast quality of ensemble forecasting
6.5.7.	Scoring techniques shall be adapted to ensemble forecasting including reliability, consistency, skill score, ensemble spread and bias.
	Ensemble Model Specification and Configuration
6.5.8.	The contractor shall provide an ensemble forecast system based on the regional model configuration.
6.5.9.	The ensemble target should be: <ul style="list-style-type: none"> • The ensemble forecasting system generated from at least 11 members with the same time initial and different physical configuration. • 168 hours forecasts • Hourly outputs • 2 Runs per Day (Latency time <12 hours) • Model Domain: 15 N - 15 S, 90E - 145 E. • Model Resolution: 3 KM The above parameters shall be adapted to the available computation capacity of the MMS HPC.
6.5.10.	The primary member for the Ensemble Forecasting System shall be based on a version of the existing coupled WRF/SWAN/Ocean-dynamics modeling system implemented during MMS1 with an operational Data Assimilation capacity.
6.5.11.	The technical proposal has to describe the Data Assimilation methodology. The data assimilation has to involve radar data, satellite data, and AWS data.

	Weather radar 3D reflectivity will be utilized for WRF data assimilation, while marine observation data, including TS profiles from floats, surface current from HF radar, and satellite data (SST and SSH), will be used for ROMS data assimilation.
6.5.12.	In order to obtain a suitable ensemble, spread, the members shall be composed of varying parameters in both underlying physics and initial ocean conditions
	Model Output Specification
6.5.13.	The contractor shall provide the tools to assess the ensemble spread and the probability statistics
6.5.14.	Ability to quickly/fast visualize the modelling result. (i.e Grads, NCL, Paraview, Python, and/or Julia codes and not in MATLAB).
6.5.15.	Ability to visualize modelling result in *kml/*kmz format and/or in 3D view.
	Compatibility and Interoperability
6.5.16.	Appropriate scoring techniques shall be implemented based on the MMS1 and MMS2 observation network
6.5.17.	The contractor(s) should provide post-processing codes/tools or visualizations codes/tools in that is written based on GPU (i.e Python, Julia) or parallel/multicores processing (i.e Paraview).
6.5.18.	The systems build here have no library conflict with HPC in MMS1 or MMS2 contractor(s) need to provide a right/correct Fortran and C++ compilers and also netcdf library for many compilers (i.e netcdf-gfortran, netcdf-ifort, mpi-gfortran, mpi-ifort, mpi-gcc, mpi-icc, openmp).
6.5.19.	<p>In case of python, any most updated libraries, which is widely used nowadays, are welcomed to be utilized. For example : cartopy, matplotlib, numpy, geos, dask, xarray, pandas, pyarrow, jupyter-notebook are necessary for oceanography and meteorology.</p> <p>They may be set in one certain/different environment (that is different from the system). This python environment should be prepared by contractor(s).</p>

Development of Limited Area Model

No	Development of Limited Area Model
Information	Marine services in port and small straits need high resolution for temporal and spatial modeling. This modeling provides parameters in specific locations around the Indonesian area.
	System Testing, Evaluation, and Verification
6.5.20.	The provider shall give details on the computing performances of the coastal models.
6.5.21.	<p>The technical proposal shall detail:</p> <ul style="list-style-type: none"> ● The design of the coastal models configuration ● The coastal model scoring that will be implemented

6.5.22.	The provider should give details on a first set of evaluation of the physics produced by the model. He will then propose a set of scores for all important sea state variables with respect to the observational network.
6.5.23.	The minimum skill score of the model is 80% on average. The range of observation data at least 1 year. Required parameters should be scored are wind, precipitation, SST, temperature, relative humidity.
	Limited Area Model Specification and Configuration
Information	The Regional Processing and Information System is a high-resolution domain nested within the three-way coupled ocean-wave-atmosphere model.
6.5.24.	The limited area models shall be implemented on several domains: <ol style="list-style-type: none"> 1. Selat Sunda 2. DKI Jakarta (covered Jakarta bay) 3. Ibu Kota Nusantara (IKN)
6.5.25.	This system shall use SWAN and ocean-dynamics models to refine the resolution of the ocean grid substantially, especially to support the information waves, currents and tides around the harbor and nearshore.
6.5.26.	The surface-wave and ocean dynamics modeling system shall have the capability to nest down to 1 km spatial and hourly temporal resolution.
6.5.27.	The atmosphere, surface wave and ocean dynamics models has to be coupled in a three-way coupled model.
6.5.28.	The system shall use WRF to refine the resolution of the atmospheric grid down to 1 km.
6.5.29.	The coastal models shall provide 3 days forecast with an hourly temporal resolution
6.5.30.	The highest resolution and up to date bathymetry shall be used. The employer will provide information on the used bathymetric sources and the contractor on how to process it including to modify.
6.5.31.	The different steps (initialization, computation, post processing, etc.) of the high-resolution models shall be included in an operational timeline clearly.
6.5.32.	The high-resolution model parameters should be: <ul style="list-style-type: none"> 72 hours forecasts (3 days) Temporal resolution: 1 hour 2 Runs per Day (Latency time <12hours) Spatial resolution: 1 km The above parameters shall be adapted to the computation capacity of the MMS HPC.
6.5.33.	Final configuration of limited area model must be provided during the project design study.
	Model Output Specification
6.5.34.	The high-resolution models' outputs may be linked to existing or experimental BMKG estuary and streamflow models to assess the potential for coastal

	inundation. The consideration of topography primary input will be discuss during the PDS		
6.5.35.	The models output shall be at least : <ul style="list-style-type: none">• Wave• Current• Wind• Precipitation• SST• Salinity• Temperature• Relative Humidity		
6.5.36.	Ability to quickly/fast visualize the modelling result. (i.e Grads, NCL, and Python).		
6.5.37.	Ability to visualize modelling result in *kml, *kmz, *geojson, *json format and/or in 3D view.		
	Compatibility and Interoperability		
6.5.38.	The following implemented model shall be ported on MMS HPC environment. This python environment should be prepared by contractor(s).		
6.5.39.	<p>Output: The desirable output from this activity is to provide an ensemble forecasting system and specific limited area model. Additionally, the ensemble forecasting system provide an inclining forecasting scope to better forecast accuracy and probabilistic information. The ensemble forecasting system and limited area model output has to be recorded by 95 percent of completion in a month, then the Employer tolerates 5 percent of incomplete data run due to any components failure and latency. The maximum period without ensemble model output (based on 11 members model run) accepted is 72 hours, which the Contractor has to solve the failure problems and recover the observation system. The maximum period without model output accepted of Limited Area Model is 3 cycles of the baserun model failure which has to be recovered afterward.</p> <p>Outcome: The expected outcome from this activity is a better accuracy of BMKG forecast including marine and land forecast. The outcome is achieved by the better understanding of metocean dynamics within Indonesian region domain and surrounding area for the Employer Forecasting Officer.</p>		
6.5.40.	The Contractor provide the a well-tailored scope of training courses on the limited area models and nesting in accordance to the expectation of the Employer modeling team capacity to develops and deploys nested high-resolution grids in other areas of Indonesia		
6.5.41.	Warranty and Technical Support : Contractor has to provide warranty and support until the Project Technical Completion plus one year in terms of End of System Wide Warranty.		
	Capacity Building and Acceptances		
6.5.42.	Capacity Building Skill Targets		
	Marine Forecasting	Engineer modeller (computer scientist)	Course on Numerical Model

	<table><tr><td></td><td>Modeller manager Marine forecaster</td><td></td></tr><tr><td>Modeling</td><td>Modeller scientist (researcher), Modeller manager</td><td>Course on Numerical Model</td></tr><tr><td>Data assimilation</td><td>Data Scientist, modeller scientist (researcher), modeller manager</td><td>Course on Numerical Model Long Term Training</td></tr><tr><td>Model scoring</td><td>Data Scientist, computer scientist), modeller scientist (researcher), modeller manager</td><td>Course on Numerical Model Long Term Training</td></tr></table> <div>(i)</div>		Modeller manager Marine forecaster		Modeling	Modeller scientist (researcher), Modeller manager	Course on Numerical Model	Data assimilation	Data Scientist, modeller scientist (researcher), modeller manager	Course on Numerical Model Long Term Training	Model scoring	Data Scientist, computer scientist), modeller scientist (researcher), modeller manager	Course on Numerical Model Long Term Training												
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	Course on Numerical Model Requirements																								
6.5.43.	<p>After deployment of the operational models on the MMS infrastructure and their related trainings, the contractor shall iterate with the Employer in order to provide training to the Employer scientists and IT experts in charge of maintenance and tuning of the operational marine and oceanographic models.</p> <table><tr><th>Course on Numerical Model</th><th>Location</th><th>Employer Staff</th><th>Indicative Duration Travel and weekend included</th></tr><tr><td>Ensemble forecasting Factory training #1</td><td>Contractor premises</td><td>3</td><td>14 days</td></tr><tr><td>Ensemble forecasting Factory training #2</td><td>Contractor premises</td><td>3</td><td>14 days</td></tr><tr><td>Ensemble forecasting Site training #1</td><td>BMKG HQ</td><td>6</td><td>10 days</td></tr><tr><td>Ensemble forecasting Site training #2</td><td>BMKG HQ</td><td>6</td><td>10 days</td></tr><tr><td>On the job training for model's supervision</td><td>BMKG HQ</td><td>6</td><td>10 days</td></tr></table> <p>Those trainings shall be delivered according to a training plan accepted by the Employer</p>	Course on Numerical Model	Location	Employer Staff	Indicative Duration Travel and weekend included	Ensemble forecasting Factory training #1	Contractor premises	3	14 days	Ensemble forecasting Factory training #2	Contractor premises	3	14 days	Ensemble forecasting Site training #1	BMKG HQ	6	10 days	Ensemble forecasting Site training #2	BMKG HQ	6	10 days	On the job training for model's supervision	BMKG HQ	6	10 days
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Ensemble forecasting Site training #2	BMKG HQ	6	10 days																						
On the job training for model's supervision	BMKG HQ	6	10 days																						
6.5.44.	<p>The Course on Numerical Models shall include for each training</p> <ol style="list-style-type: none">1. Training Objective2. Trainee pre-requisites3. Site pre-requisites4. Site training location (BMKG HQ)5. Maximum number of trainees																								

	<div><div><div>6. Detailed agenda of each training</div><div>7. Description of training materials</div></div><div>The Training Course covers at least specified topics as follows:<div><div>1. The modeling system workflow and flowchart</div><div>2. The modeling system usage in daily operation</div><div>3. The modeling system development for metocean developer for future developments</div><div>4. The system features</div><div>5. Guidance to utilize the system</div><div>6. Guidance to overcome the troubling system.</div><div>7. Modeling administrator training</div></div><div>The training output is a prepared modelling expert with a team to provide ensemble forecasting system operator and administrator in daily operation.</div></div></div>								
	<div>Acceptances</div>								
6.5.45.	<div><div>List of Acceptance Tests :</div><table><tr><th>Acceptance Test</th><th>Location</th><th>Employer Staff</th><th>Indicative Duration (days) Travel and weekend included</th></tr><tr><td>Ensemble Forecasting System Site Acceptance Tests</td><td>BMKG HQ</td><td>2</td><td>5</td></tr></table></div>	Acceptance Test	Location	Employer Staff	Indicative Duration (days) Travel and weekend included	Ensemble Forecasting System Site Acceptance Tests	BMKG HQ	2	5
Acceptance Test	Location	Employer Staff	Indicative Duration (days) Travel and weekend included						
Ensemble Forecasting System Site Acceptance Tests	BMKG HQ	2	5						
	<div>Testing and Commissioning Requirements</div>								
6.5.46.	<div>The Contractor shall submit a Testing and Commissioning Plan detailing and explaining how the Contractor will plan, perform, and document all inspections and tests that will be conducted to verify and validate the Works prior to delivery to the Site and to the final site acceptances.</div>								
6.5.47.	<div>Contractor shall provide all equipment's, data and all that is required to conduct the testing.</div>								
6.5.48.	<div>Logistic costs of the Employer staff for factory and site acceptance (local transport, transport out of Indonesia, International/National flights, accommodation, meals, and/or daily allowance) shall be covered by the contractor.</div>								
6.5.49.	<div>The Factory test books shall be submitted to the Employer at least 2 weeks before the acceptance with a result report of tests internally conducted by the Contractor.</div>								
6.5.50.	<div>The Site test books shall be submitted to the Employer before the acceptance with a result report of tests internally conducted by the Contractor.</div>								
6.5.51.	<div>After completing the Site Acceptance Test, the commissioning activities must be carried out after 30 days of operations, presenting predefined outputs verified by a commissioning execution certificate.</div>								
6.5.52.	<div><div>The anomaly reported shall be classified as follow:</div><div><div>1. Blocking: The problem leads to the impossibility to use in its totality or generates a safety risk for the users.</div><div>2. Major: Loss of major system functionality</div></div></div>								

	<p>3. Minor: The problem described does not block any important system functions or can be bypassed.</p> <p>During the factory acceptance tests a system shall be accepted at the following conditions:</p> <ol style="list-style-type: none">1. No blocking anomaly2. Less than 3 major anomalies (the value of 3 will be proposed in the result report of tests internally conducted prior to the factory acceptance tests). <p>During the site acceptance tests a system shall be accepted at the following conditions:</p> <ol style="list-style-type: none">1. No blocking anomaly2. No major anomaly3. Less than 15 minor anomalies (the value of 15 will be proposed in the result report of tests internally conducted prior to the site acceptance tests) <p>The maximum number of each type of anomaly shall be specified in the last release of the PDS (Project Design Study).</p>
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IT INFRASTRUCTURE**6.6. Lot 6 - MMS HPC and Infrastructure Upgrade****Additional CPU nodes for the existing MMS1 HPC**

No.	Additional HPC CPU nodes
Information	<p>Within the framework of MMS1, a super computer (HPC – CPU nodes) has been deployed at BMKG. This HPC is used to run the InaCAWO model 4 times a day. Within the framework of MMS2, in order to be able to run more models, the Employer intends to extend the capacity of this HPC. The objective is to add computing capacity (at least an additional 650 Tflops, bringing the total capacity about to 2 Pflops.</p> <p>The Contractor have to provide integrated solution with the existing BMKG super computer solution under MMS1 framework. The blades are located in a DLC (Direct Liquid Cooling). Each rack can contain 32 blades. Each blade hosts 3 nodes. With its 4 DLC racks, the current MMS1 HPC contains 124 blades / 372 nodes and offers slightly above 1,3 Pflops.</p>
6.6.1.	<p>The Contractor shall coordinate with the Employer to ensure that the proposed solution is compatible with the existing MMS1 HPC.</p> <p>Requires manufacture authorization and support for the activity implementation along the project time frame..</p>
6.6.2.	<p>The Contractor shall upgrade the Rack Design and allotment, Cabling, racks, in the MMS computer room at BMKG headquarters</p>
6.6.3.	<p>The Contractor shall add compute nodes compatible with the existing HPC, relying on BMKG super computer solution under MMS1 framework</p>
6.6.4.	<p>The solution proposed must provide an extension of the current environment, delivering a total of 558 nodes within the same container.</p>
6.6.5.	<p>The additional racks will use the existing management nodes and low latency storage (Lustre : 2 PB legacy storage).</p>
6.6.6.	<p>The capacity provided by the additional racks will use the same compilers and managing resources already provided with the MMS1 HPC.</p>
6.6.7.	<p>The Contractor shall provide an additional 3 PB of legacy storage to extend the existing MMS1 storage.</p>
6.6.8.	<p>At the project technical completion, the stored MMS2 data shall not exceed 60% of the total storage capacity.</p>
6.6.9.	<p>In its design, the Contractor must take into account all the installation requirements and interfaces:</p> <ol style="list-style-type: none"> 1. Access to the site and the MMS computer room for a proper installation 2. Strength of the raised floor under the additional racks 3. Proper electric supply (power, number and type of plugs) 4. Connection to the water cooling system and characteristics of the cooling system

No.	Additional HPC CPU nodes
6.6.10.	The targeted improvement by this activity is the performance and capability, which is constrained in a high resolution additional three-way-coupled simulation and ensemble probabilistic forecast simulation as described in Lot 5.
6.6.11.	The HPC infrastructure upgrade should increase the computing capability needed to execute the Ensemble Forecasting System, supporting a minimum of 11 members with the same initial time but with different physical configurations. Additionally, it should be able to run limited area model with 1 km spatial and hourly temporal resolution (As detailed and mentioned in Lot 5)

Virtualization System Requirements

No.	Virtualization System Requirements
6.6.12.	The implementation of virtualization system should be located at Bali as Disaster Recovery Center
6.6.13.	<p>The project shall benefit from a dedicated Virtualization system with :</p> <ul style="list-style-type: none"> ● Minimum 520 cores of CPU ● Minimum memory is 1.2 TB of DDR5 ● Minimum disk of 250 TB (110 TB useable for full redundancy), combined between SSD and HDD using inline ● Using low latency switch capabilities ● Redundant Architecture ● Include hypervisor software for virtualization

Upgrade MMS infrastructure Requirements

No	Infrastructure and Installation requirements
Information	<p>Please note that the following infrastructure upgrade works in MMS super computer room at BMKG headquarters will be borne by the Contractor as part of integrated solution of the MMS HPC and infrastructure upgrade :</p> <ol style="list-style-type: none"> 1. Mechanical Electrical. 2. A/C Precision Air Conditioning System. 3. Uninterruptible Power System (UPS) and Power grid connection. 4. Upgrade Environment Monitoring and security system. 5. Grounding system. 6. Raised floor consolidation due to heavy load of HPC racks. 7. Fire extinguishing Aerosol systems 8. Rack Design and allotment 9. Cabling 10. Racks 11. Cold containment <p>The bidder shall provide detailed technical specification for the infrastructure upgrade attached to bidding document</p>

	Civil works (infrastructure rooms upgrade)
6.6.14.	The contractor shall deliver a Construction Design Package for activities that require civil works.
6.6.15.	All construction phase drawings and documents shall be revised, upgraded, detailed and integrated in the Construction Design Package.
6.6.16.	The Contractor shall fully verify and endorse all Drawings and documents.
6.6.17.	The Construction Phase for the whole or a part of the Works shall commence immediately upon the issue by the Engineer of a 'Notice of No Objection' in respect of the relevant Detailed Design Submission, subject to the availability of the Site in accordance with the agreed Program for site hand over by the Employer. Construction shall not be commenced until the appropriate Construction Reference Drawings and other documents forming the Construction Design Package have been endorsed as "Request for Construction" through the Contractor's Internal Authorizing and Quality Assurance Process.
6.6.18.	The Construction stage drawings shall be coherent and complete set of Document in line with the preliminary Design Document as received Notice of No Objection and shall carry Preliminary design and detailed design reference.
6.6.19.	Detailed Design Drawings shall form part of the Drawings to be used for installation purposes and construction shall be strictly in accordance with the relevant Design Stage.
6.6.20.	The Construction Phase shall include the completion and submission of the Construction/Installation Design and the As-Built Documents.
6.6.21.	The design of the permanent and temporary works of this contract shall be carried out in accordance with the Contractor's Quality Assurance Plan in compliance with the Employer's Requirements.
6.6.22.	<p>The Contractor shall produce the respective Construction Design Package which shall include, but not limited to;</p> <ol style="list-style-type: none"> 1. The 'Good for Construction Drawings'. 2. Updated construction stage related Project Management Plans. 3. The updated Works & Material Specifications. 4. Updated Technical Drawings. 5. Updated detailed design Report. 6. Method Statements/ work procedures/ construction sequences. 7. The Interface Drawings related to the other Construct Contracts if any. 8. Field change Drawing & Design if any.
6.6.23.	The Good for Construction Drawings and Construction Reference documents shall include site sketches, dimensioned drawing, fabrication and shop drawings, erection plan and sequences, etc.

6.6.24.	The Construction Design and Construction Technical Drawings including updated Works Specifications / Method Statements etc. shall be derived directly from the Detailed Design as approved by the Engineer including the incorporated changes as commented by the Engineer attached to the Notice of No Objection.
6.6.25.	The Working/ Fabrication Drawings and the Construction Practicing Documents shall be prepared to facilitate construction to meet the required workmanship as well as technical requirements.
6.6.26.	Upon the Internal Authorization Process, the Contractor shall submit the Construction Design Package as the "Request for Construction" to the Engineer for consent and issue of a Notice of No Objection. Upon receipt of the "Notice of No Objection" or "Notice of No Objection with Comments", the Contractor shall endorse the original paper drawings in respect of the Working Drawings as "Good for Construction" as per the Internal Authorization Process and issue.
6.6.27.	The "Good for Construction Drawings" and the Working Drawings shall be used for construction purposes and only those drawings and documents that have been endorsed and certified through the procedure and have received "Notice of No Objection" as above or those that the Engineer has expressly stated as not requiring his endorsement shall be issued to the Site.
6.6.28.	The Construction execution shall be strictly in accordance with the Construction Design Package, for which "Notice of No Objection" has been issued by the Engineer and "Good for Construction" drawings has been issued as per the authorization process detailed as above.
6.6.29.	In the eventuality of a required additional particular work, the Contractor shall submit the Construction Design and Drawings for this particular work to the Engineer at least 5 days prior to the planned / scheduled date of commencement of that particular work.
	Electrical works, cabling
6.6.30.	The Employer provides basic electricity, The Contractor shall lay all additional electrical, network and/or telecommunication cables required for the System.
6.6.31.	All electrical works shall comply with all necessary regulations of the relevant authorities and if required, shall be endorsed, and approved by the relevant personnel and authorities (e.g., endorsement of electrical single line diagram by licensed electrical worker) at the cost of the Contractor. All costs associated with the testing shall be borne by the Contractor including the services of any specialized personnel or independent assessors.
	Computer's environment
6.6.32.	The Contractor shall supply and install the necessary server rack(s), including cable management arm and accessories equipped with rack mountable KVM switch and LCD monitor, keyboard, and mouse, to house all computer servers, network and other computer peripherals supplied.
6.6.33.	The Contractor shall ensure that the MMS server rooms shall be equipped with potential additional electric capacity and cooling hardware.

6.6.34.	All servers/equipment supplied shall be able to receive power supply from two (2) power sources (e.g., having 2 power supplies in the equipment, provision of automatic power transfer switch for single power inlet devices).
6.6.35.	The servers shall be equipped with software tool to monitor operating status of critical IT Infrastructure (e.g., computing systems, storage devices, power supplies) and critical system processes/services/engines. The software tool shall also be capable to send fault notification to a global supervision user interface.
6.6.36.	The rack(s) shall each be equipped with at least two (2) units of distribution unit (PDU) to receive two (2) independent power sources for redundancy purpose.
6.6.37.	As an integrator, the Contractor shall be responsible of any component of the delivered systems, including the Operating systems and middleware's used by the applications.
	Installation
6.6.38.	The Contractor shall carry out site surveys to ensure sufficient knowledge of the Site before submitting the relevant installation drawings and installation related submissions to the Engineer for review.
6.6.39.	The Contractor shall provide all necessary and sufficient resources such as tools, test instruments, spares, and equipment, manpower and communication facilities to complete all the installation activities.
6.6.40.	The Contractor shall take every precaution to protect existing equipment and facilities on Site from damage and shall make good any damage caused. Care shall also be taken not to interfere with the operation of existing equipment(s).
6.6.41.	The activity has to support the existing recovery solution implemented in DRC activity of MMS-1.
6.6.42.	The Contractor shall submit Installation Program (schedule installation, Pre-requisites, share of Work with Engineer and external entities, installation methods statements) for each type of installation activities before the commencement of the activity to the Engineer for review. The deadline for giving this document shall be submitted during the Detailed Design Specifications period.
6.6.43.	Any installation activity shall commence only after the related Installation Program has been reviewed without objection by the Engineer.
6.6.44.	The Contractor shall ensure that his staff are competent and possess all the necessary skills to carry out the installation in a proper and safe manner.
6.6.45.	The Contractor shall assign competent site supervisors for each work site to be responsible for all site-related matters.

6.6.46.	The Installation Program shall show, through suitable charts, how the Contractor proposes to organize and carry out the Installation. If needed, the Contractor shall coordinate with other contractors to agree with the date of access to the physical areas to carry out installation activities.
6.6.47.	The Contractor shall develop the Installation Program taking into account: <ol style="list-style-type: none"> 1. The installation schedule and milestones. 2. The site prerequisites including site access. 3. The responsibilities of each party.
	Interfacing with relevant 'Other Contractors'
6.6.48.	The Contractor shall highlight in his Installation Program any item, material, equipment, resource and support required from the 'Other Contractors with dates, duration and locations.
6.6.49.	The Contractor shall also bring to the notice of the Engineer all relevant constraints which may affect the Installation Program.
6.6.50.	The Contractor shall include dependencies between relevant activities in the Installation Program.
6.6.51.	Any subsequent changes in the reviewed Installation Program shall be submitted to the Engineer for review.
6.6.52.	Upon noticing or being advised of any inconsistencies between the installation drawings and documentation and the installed equipment, the Contractor shall notify his acknowledgement to the Engineer and correct such errors.
	Computer room environment upgrade
Information	As detailed in the paragraph above, a part of the infrastructure upgrade works in MMS computer room at BMKG headquarters will be borne by the Employer.
6.6.53.	The Contractor shall perform the necessary works to prepare the space, the raised floor and power source in order to adapt the MMS computer room to the additional equipment delivered in MMS2.
6.6.54.	The Contractor shall coordinate with the Employer to ensure that the MMS server room infrastructure has no single point failure (e.g. UPS redundancy, cooling systems, etc.). The contractor shall provide at least 1 additional chiller (along with an automated system switching between pumps for redundancy purpose).
6.6.55.	The Contractor shall upgrade the Rack Design and allotment, Cabling, racks, cold containment in the MMS computer room at BMKG headquarters

Extended Data Processing

No	Extended Data Processing Requirements
Information	<p>Extended data processing was initiated at the beginning of MMS1 project. Its main purpose is to avoid redundancies between current and future projects.</p> <p>The extended data processing is based on the following items, shared between terrestrial and marine meteorology systems:</p> <ol style="list-style-type: none"> 1. BMKG's AMSS = Automatic Message Switching System (STR1, STR 2 : SUS and MMS). 2. CIPS Data Centre and API (one instance on SUS, upgraded in MMS). 3. CIPS Task Centre (one instance on SUS, upgraded in-MMS). 4. BMKG weather forecasting system (SUS and MMS1 and MMS2). 5. BMKG end user production system (STR1, SUS, MMS1). 6. BMKG end user specific services 7. WMO Catalogue of observation system <p>An update of the existing system is to be carried out as part of MMS2. This will involve the integration of new observation and model data.</p>
6.6.56.	<p>Due to additional observation data in MMS2, the contractor needs to configure the data integration (Delivered in MMS-1).</p>
6.6.57.	<p>The contractor shall ensure the integration of following data</p> <ol style="list-style-type: none"> 1. Coastal Buoys 2. Wave Enclosed And Current Profiler System. 3. Met Ocean Remote Sensing System 4. Big Data and AI Platform 5. Ensemble Forecasting System 6. Existing NWP available in BMKG (at least ECMWF, UM, GFS, Access G3, AROME, InaNWP, InaCAWO, InaWave, HYCOM) <p>The contractor shall ensure the integration of following data if the system operationally started, the data is sustainably recorded and stored during the MMS2 package 3 project time frame</p> <ol style="list-style-type: none"> 1. HF Radar Array 2. Weather Radar S Band 3. Weather Radar C Band <p>The Contractors delivering these systems within MMS-2 Package 1 (Weather Radar S-Band and C-Band) and MMS-2 Package 2 (HF Radar Array) will comply with formats and standards to be agreed between package 3 contractor and the Employer.</p>
6.6.58.	<p>The contractor shall ensure the integration of remote sensing product to the existing production and disseminations tools in BMKG (Processing on CIPS, visualization on unified forecaster tools and dissemination with the production & dissemination system)</p>
6.6.59.	<p>The Contractor shall configure and upgrade the MMS system in order to archive additional MMS2 data</p>
6.6.60.	<p>The supplier shall provide a clear transition plan explaining how CIPS reconfiguration will be possible with minimum interruption of ongoing services.</p>

6.6.61.	The Contractor shall use the BMKG's AMSS as the AMSS component of the extended data processing
6.6.62.	The system shall comply with the WMO standards in particular: <ol style="list-style-type: none"> 1. Manual on the global Telecommunication System WMO-386 2. Use of TCP/IP on GTS Revised 3. Format for the text of addressed messages
6.6.63.	The Contractor shall configure AMSS to accommodate data exchange from MMS 2 observations equipment.
6.6.64.	The Contractor shall configure and/or upgrade the MMS SynergieWeb and MeteoFactory servers (MMS1 delivery) in order to integrate additional MMS2 data for marine forecasters.

Tropical Cyclone Forecasting and Production System

No.	Tropical Cyclone Forecasting and Production System Requirement
Information	The contractor will design and deploy a system allowing the Enhanced Generation of Marine Meteorological products at BMKG Headquarters. It will be accessed locally for 5 users and remotely by the 5 regional offices of the BMKG.
	Tropical Cyclone Forecasting and Production System at BMKG Headquarter
Information	The Tropical Cyclone Forecasting and Production workstations installed at BMKG Headquarter (4 client workstation), at regions (5 client workstation) and STMKG (2 client workstation) will propose the complete set of Tropical Cyclone Forecasting and Production features.
	Hardware
6.6.65.	Server : 1 unit Technical Specification: <ul style="list-style-type: none"> • AMD EPYC 7543P 2.8GHz, 32C/64T, 256M Cache (225W) DDR4-3200 • 4 x 16GB RDIMM, 3200MT/s, Dual Rank • 2 x 480GB SSD SATA Mix Use 6Gbps 512 2.5in Hot-plug AG Drive, 3.5in HYB CARR, 3 DWPD • 4 x 800GB SSD SAS ISE, MU, up to 24Gbps 512e 2.5in with 3.5in HYB CARR, AG Drive
6.6.66.	Data Hub Workstation : 1 unit Technical Specification: <ul style="list-style-type: none"> • Intel Xeon-W Family 3.0GHz 16 Cores (or higher) • 128 GB DDR5 4800 Memory • NVIDIA Geforce RTX 4070 Ti • 2TB SSD Storage • Windows 11 • 2 x LED Monitor 1920 x 1080 Resolution
6.6.67.	TC Forecating and Production Workstation : 11 unit Technical Specification: <ul style="list-style-type: none"> • Intel Xeon-W Family 3.0GHz 16 Cores (or higher) • 128 GB DDR5 4800 Memory

	<ul style="list-style-type: none"> • NVIDIA Geforce RTX 4070 Ti • 2TB SSD Storage • Windows 11 • 2 x LED Monitor 1920 x 1080 Resolution <p>Estimated location : HQ (4 Workstation (2 Public Weather Services & 2 TCWC) RO (5 Workstation (RO I – VI) STMKG (2 Workstation)</p>
6.6.68.	<p>Network Switch : 1 unit</p> <p>Technical specification:</p> <ul style="list-style-type: none"> • 4x1/2.5/5G RJ-45 with 802.3bt Type-4 (90W) PoE, 4x1G RJ-45 with 802.3bt Type-4 (90W) ports • 10G Uplinks to aggrega-on • 802.11ax and 802.11ac Wave2 WLAN deployments and 802.3bt Type-3
6.6.69.	<p>Uninterruptible Power Supply (UPS): 12 unit</p> <p>Technical specification:</p> <ul style="list-style-type: none"> • Power: 1.6kWa\s / 2.0kVA • Input & Output Voltage: 220V / 240V • Efficiency at Full Load 88% • Output Voltage Distor-on 3% • Sine waveform type • 3:1 Load Crest Factor • 600Joules surge energy ra-ng
6.6.70.	Tropical Cyclone Forecasting and Production System will offer a user-friendly interface to display many of the products generated by the MMS program.
6.6.71.	Data, analysis results and weather modeling can be selected to make weather prediction by the users/forecasters at BMKG HQ.
6.6.72.	Additionally, it shall allow for the creation of concise animations for effective dissemination to end-users. It shall enable the generation of images and video files and export them to websites or social media platforms such as Facebook and Twitter, or downstream distribution via email.
6.6.73.	The Contractor shall provide specific server and supporting IT infrastructure to run the Tropical Cyclone Forecasting and Production System include necessary computation for pre and postprocessing, this system must be installed in BMKG Headquarter
6.6.74.	The Contractor shall provide a complete set of client workstations for the Tropical Cyclone Forecasting and Production System Distribution including monitor, UPS, standing bracket and any necessary equipment.
6.6.75.	Furthermore, the system shall include an integration preprocessing for the data collected within the framework of the MMS program for use in Tropical Cyclone Forecasting and Production workstation.
6.6.76.	This tool shall be capable of ingesting available and accessible data through the existing API system at the BMKG Headquarters or ingesting data pushed through protocols such as FTP, RSYNC, etc. The data can be preprocessed to ensure fast and reliable access to the data for creating and displaying products.
6.6.77.	The data composition functionality shall also enable the creation of national or regional composite views, presenting integrated data related to the MMS program as overlaid layers.
6.6.78.	The user shall have the option to select the desired data source for weather events variations analysis.

6.6.79.	To enhance usability, the display systems used for data composition shall be configured with customized software designed to be intuitive, user-friendly, and adaptable in presenting weather results in different formats.
6.6.80.	The system must be able to work within a studio environment which will enable the recording of weather content for use with social media, websites, or broadcast applications. Studio facility and related equipment is the responsibility of the user.
6.6.81.	This tool shall be capable of ingesting available and accessible data through the existing API system at the BMKG Headquarters or ingesting data pushed through protocols such as FTP, RSYNC, etc. The data can be pre-processed to ensure fast and reliable access to the data for creating and displaying products.
6.6.82.	The data composition functionality shall also enable the creation of national or regional composite views, presenting integrated data related to the MMS program as overlaid layers.
6.6.83.	The contractor shall provide Tropical Cyclone Forecasting and Production system for BMKG HQ that facilitates the design, configuration, and production of weather and marine products in a timely manner to meet the needs of all users.
6.6.84.	The system must integrate special tools for pre-processing of data collected within the framework of the MMS program, and integration of CAWO model tropical output, JTWC data subscription included, JTWC Tropical Cyclone Current and Forecast Data, ASCAT data, and observation data include satellite and radar.
6.6.85.	The contractor shall provide a user-friendly interface to display all products produced by the MMS program and Tropical Cyclone analysis results in the monitoring and responsibility area of TCWC Jakarta.
6.6.86.	Additionally, it allows the creation of concise animations to be effectively disseminated to end users. It will allow creating PDFs, GIFs, MP4s, and publishing them on websites or social media platforms like Facebook, Twitter, WhatsApp, or distributing them via email.
	Software
6.6.87.	<p>Tropical Cyclone Forecasting and Production System</p> <ul style="list-style-type: none"> ● This tool must be able to absorb data that is available and can be accessed via the API system at the BMKG Head Office or absorb data sent via protocols such as FTP, RSYNC, etc. The data can be pre-processed to ensure fast and reliable data access for manufacturing and displaying products. ● The data composition function should also allow the creation of national or regional composite views, presenting all available data related to the MMS program as overlaid layers ● Users will have the option to select the desired data source for weather events variation analysis. ● To improve usability, the display system used for data composition should be configured with special software designed to be intuitive, easy to use, and adaptable in presenting weather results in different formats.

6.6.88.	<p>Strengthening of TCWC</p> <p>a. <u>Tropical Cyclone Forecasting and Production System</u> Complete display (2D/3D) and analysis of all weather, observation data, satellite product (include ASCAT data) and radar products. Includes both hardware and software license. Includes the following core features:</p> <ul style="list-style-type: none"> ● Automated display and analysis of CAWO and JTWC forecast data ● Application GUI supports the English language ● Metric support ● Global mapping ● Support for GIS mapping layers ● Standard map tools and functions, to include query, distance calculator, telestration ● Product animation ● Ability to create a web cast ● Ability to export images for web view/social media ● Meteogram support ● City name and administrative boundary line ● Custom additional product ● Ability to create a consensus from multiple TC forecast data ● Automate calculation for TC category by maximum wind
6.6.89.	<p>b. <u>Custom NWP Data Integration</u> Integration of CAWO model tropical output</p> <p>Atmosphere</p> <ul style="list-style-type: none"> ● 10-m wind-velocity ● 10-m gust-velocity ● 2-m air temperature ● 2-m dewpoint temperature ● 2-m relative humidity ● 2-m air pressure ● Mean-sea-level pressure (MSLP) ● Variables at 850mb, 700mb, 500mb, 300mb <ul style="list-style-type: none"> ▪ Wind Velocity, Geopotential Heights, Absolute Vorticity, Relative Humidity, Mixing Ratio, Temperature, Vertical Wind Speed ● 1000-500mb Thickness ● Max AGL Reflectivity ● Rainfall Rate ● Accumulated Rainfall ● Model Terrain Height ● Equivalent Potential Temperature 700mb ● Column-Integrated Water Vapor ● Cloud Ceiling Based on Vertical Light Extinction ● Max Height of 18dBZ Reflectivity ● Total Lightning Flash-Rate per Hour ● Wind-Shear 0-2000 feet

	<ul style="list-style-type: none"> ● Freezing Level Above Mean Sea-Level ● Low-cloud Fractional Coverage <p>Wave:</p> <ul style="list-style-type: none"> ● Significant wave height ● Mean wave direction ● Peak wave direction ● Mean wave length ● Peak wave length ● Peak wave period <p>Ocean:</p> <ul style="list-style-type: none"> ● Ocean-surface current velocity ● Ocean-surface temperature (SST) ● Sea-Surface Height (anomaly from mean-sea-level) ● Net ocean surface latent heat flux ● Net ocean surface freshwater flux (EminusP) <p>c. Tropical Cyclone Current and Forecast (JTWC) data Subscription Included</p> <p>d. Advanced processing of tropical cyclone track forecasts from the JTWC in the monitoring and responsibility area of TCWC Jakarta (0°S 090°E, 10°S 090°E, 10°S 120°E, 11°S 120°E, 11°S 128°E, 09°S 128°E, 09°S 141°E, and 0°S 141°E).</p> <p>e. Processing of categorical reference data for tropical cyclone detection based on medium-range forecasts within the Area of Responsibility of TCWC Jakarta</p> <p>f. Processing of categorical reference data for tropical cyclone detection based on extended range forecasts within the Area of Responsibility of TCWC Jakarta</p> <p>g. Processing of categorical reference data for tropical cyclone detection based on long range forecasts within the Area of Responsibility of TCWC Jakarta</p> <p>h. Tropical Cyclone model output integration based on InaCAWO forecast model, 4x per day, including categorical reference data Processing of categorical reference data for tropical cyclone detection based on not more than two additional mesoscale models within the Area of Responsibility of TCWC Jakarta</p> <p>i. Processing of categorical reference data for tropical cyclone detection based on not more than two additional mesoscale models within the Area of Responsibility of TCWC Jakarta</p> <p>j. Development of an integrated platform tool for the analysis of tropical cyclones in the area of responsibility for TCWC Jakarta.</p> <p>k. The system shall generate and display automated storm tracks based on radar data input</p> <p>l. The system shall provide a functionality enabling the forecaster draw manual storm tracks by selecting a point and then drawing a line from this point depicting speed and direction.</p> <p>m. Each storm track shall automatically calculate the time of arrival of the tracked feature for cities/places in the path of the tracked feature</p> <p>n. Each storm track shall display storm attribute information for the selected storm</p>
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	<p>o. The tropical Storm track forecasts shall be automatically displayed as new information</p> <p>p. The system shall be able to generate and disseminate products such as images and movies to remote sites (web site, mobile apps, TV systems, etc).</p> <p>q. The Contractor shall support the Employer to configure the system in this regard</p>
6.6.90.	<p>Output: The desirable output from this activity is to provide an extension capacity and performance of MMS HPC as planned. The capacity and performance upgrade is achieved by the increase of capacity storage (by the 3 PB) and increase of processing power in total MMS HPC (MMS-1 and MMS-2, theoretically 2 Pflops). Additionally, the activity provide better understanding to release tropical cyclone forecast by the tropical cyclone forecasting system.</p> <p>The upgrade has to consider only one system failure tolerance in a semester. The failure system has to be recovered within 72 hours, which the Contractor has to solve the failure problems and recover the system.</p> <p>The entire system built within the MMS-2 Package 3 are integrated and proven in one integration report approved by employer</p> <p>Outcome: The expected outcome from this activity is a better performance and capacity to work on the extending task of numerical modeling production system.</p>
6.6.91.	<p>Warranty and Technical Support : Contractor has to provide warranty and support until the Project Technical Completion plus one year in terms of End of System Wide Warranty.</p>

Capacity Building Skill Targets and Acceptances

No.	Capacity Building Skill Targets		
6.6.92.			
	Skill	Related Profile	Related type of trainings
	Remote sensing	Data scientist	IT training
	HPC utilization	Data Manager, Data Engineer, Data Scientist.	IT training
	Network & Telecommunications (maintenance)	IT support	IT training
	Network & telecommunications (architecture)	Data Manager, Data Engineer, Network and security administrator	IT training
	Network & Telecommunications (Security)	Data Manager Network and security administrator	IT training
	Operating systems (Linux) + Middleware + backups/Restore level1 (utilization)	IT support	IT training

	Operating systems (Linux) level 2 (administration & maintenance)	Data Engineer, Network and security administrator	IT training	
	Database administration	Network and security administrator	IT training	
	Website maintenance trouble-shooting	Webmaster	IT training	
	HPC administration	Engineer modeller (computer scientist) Modeller manager	IT training	
	Summary of Training :			
	Course on MMS HPC and Infrastructure and Upgrade	Location	Employer Staff	Indicative Duration Travel and weekend included
	Factory Training for MMS HPC and Infrastructure Upgrade	Contractor premises	5	7 days
	Factory Training for Extended Data Processing	Contractor premises	5	14 days
	Factory Training for TC Forecasting and Production System	Contractor premises	11	7 days
	Site Training for MMS HPC and Infrastructure Upgrade	BMKG HQ	5	10 days
Site Training for Extended Data Processing	BMKG HQ	10	10 days	
Site Training for Tropical Cyclone Forecasting and Production System	BMKG HQ	10	10 days	
On the job training during warranty	BMKG HQ	6 Staff on duty	5 days	
	Course on IT			
	Course on IT Requirements			
6.6.93.	After systems deployment and related IT trainings, the contractor shall iterate with the Employer in order to provide training on the delivered IT systems. Those trainings shall be delivered according to a training plan accepted by the Employer			
6.6.94.	The IT training shall contain the following items: 1. Training Objective			

	<ol style="list-style-type: none"> 2. Trainee pre-requisites 3. Site pre-requisites 4. Site training location 5. Maximum number of trainees 6. Detailed agenda of each training 7. Description of training materials <p>The Training Course covers at least specified topics as follows :</p> <ol style="list-style-type: none"> 1. The system workflow and flowchart 2. The system usage in daily operation 3. The system usage in daily operation for administrator 4. The system features 5. Guidance to utilize the system 6. Guidance to overcome the troubling system. 7. Administrator training <p>The training output is a prepared IT and HPC administrator with a team to provide HPC administration in daily operation.</p>
	Course on Extended Data Processing Requirements
6.6.95.	<p>After deploying the systems, the contractor shall iterate with the Employer in order to provide training on the delivered Extended Data Processing.</p> <p>Those trainings shall be delivered according to a training plan accepted by the Employer</p> <p>The Extended Data Processing training shall contain the following items:</p> <ol style="list-style-type: none"> 1. Training Objective 2. Trainee pre-requisites 3. Site pre-requisites 4. Site training location 5. Maximum number of trainees 6. Detailed agenda of each training 7. Description of training materials <p>The Training Course covers at least specified topics as follows:</p> <ol style="list-style-type: none"> 1. Data List and Data Acquisition 2. Datafetch / Datahub / Requeteur systems 3. Data flow / Demonstration of a complete flow <p>The training output is a prepared Dataflow administrator with a team to provide Dataflow administration in daily operation.</p>
	Course on TC Forecasting and Production System Requirements
6.6.96.	<p>After deploying the systems, the contractor shall iterate with the Employer in order to provide training on the delivered TC Forecasting and Production System</p> <p>Those trainings shall be delivered according to a training plan accepted by the Employer</p> <p>The TC Forecasting and Production System training shall contain the following items:</p> <ol style="list-style-type: none"> 1. Training Objective 2. Trainee pre-requisites 3. Site pre-requisites 4. Site training location 5. Maximum number of trainees 6. Detailed agenda of each training

	<p>7. Description of training materials</p> <p>The Training Course covers at least specified topics as follows:</p> <ol style="list-style-type: none">1. The system workflow and flowchart2. The system usage in daily operation3. The system usage in daily operation for administrator4. The system features5. Guidance to utilize the system6. Guidance to overcome the troubling system.7. Administrator training <p>The training output is a prepared Forecaster of tropical cycone to use the TC Forecasting and Productio System in daily operation.</p>																								
	Acceptances																								
6.6.97.	<p>List of Acceptance Tests :</p> <table><tr><th>Acceptance Test</th><th>Location</th><th>Employer Staff</th><th>Indicative Duration (days) Travel and weekend included</th></tr><tr><td>HPC and IT Infrastructure Upgrade Factory Acceptance Tests</td><td>Contractor premises</td><td>3</td><td>7 days</td></tr><tr><td>Tropical Cyclone Forecasting and Productions System Factory Acceptance Tests</td><td>Contractor premises</td><td>3</td><td>7 days</td></tr><tr><td>HPC and IT Infrastructure Upgrade Site Acceptance Tests</td><td>BMKG HQ</td><td>2</td><td>3 days</td></tr><tr><td>Data Integration Site Acceptance Tests</td><td>BMKG HQ</td><td>2</td><td>3 days</td></tr><tr><td>Tropical Cyclone Forecasting and Productions System Site Acceptance Tests</td><td>BMKG HQ</td><td>18</td><td>3 days</td></tr></table>	Acceptance Test	Location	Employer Staff	Indicative Duration (days) Travel and weekend included	HPC and IT Infrastructure Upgrade Factory Acceptance Tests	Contractor premises	3	7 days	Tropical Cyclone Forecasting and Productions System Factory Acceptance Tests	Contractor premises	3	7 days	HPC and IT Infrastructure Upgrade Site Acceptance Tests	BMKG HQ	2	3 days	Data Integration Site Acceptance Tests	BMKG HQ	2	3 days	Tropical Cyclone Forecasting and Productions System Site Acceptance Tests	BMKG HQ	18	3 days
Acceptance Test	Location	Employer Staff	Indicative Duration (days) Travel and weekend included																						
HPC and IT Infrastructure Upgrade Factory Acceptance Tests	Contractor premises	3	7 days																						
Tropical Cyclone Forecasting and Productions System Factory Acceptance Tests	Contractor premises	3	7 days																						
HPC and IT Infrastructure Upgrade Site Acceptance Tests	BMKG HQ	2	3 days																						
Data Integration Site Acceptance Tests	BMKG HQ	2	3 days																						
Tropical Cyclone Forecasting and Productions System Site Acceptance Tests	BMKG HQ	18	3 days																						
	Testing and Commissioning Requirements																								

6.6.98.	The Contractor shall submit a Testing and Commissioning Plan detailing and explaining how the Contractor will plan, perform, and document all inspections and tests that will be conducted to verify and validate the Works prior to delivery to the Site and to the final site acceptances.
6.6.99.	Contractor shall provide all equipment, data and all that is required to conduct the testing.
6.6.100.	Logistic costs of the Employer staff for factory and site acceptance (local transport, transport out of Indonesia, International/National flights, accommodation, meals, and/or daily allowance) shall be covered by the contractor.
6.6.101.	The Factory test books shall be submitted to the Employer at least 2 weeks before the acceptance with a result report of tests internally conducted by the Contractor.
6.6.102.	The Site test books shall be submitted to the Employer before the acceptance with a result report of tests internally conducted by the Contractor.
6.6.103.	After completing the Site Acceptance Test, the commissioning activities must be carried out after 30 days of operations, presenting predefined outputs verified by a commissioning execution certificate.
6.6.104.	<p>The anomaly reported shall be classified as follow:</p> <ol style="list-style-type: none"> 1. Blocking: The problem leads to the impossibility to use in its totality or generates a safety risk for the users. 2. Major: Loss of major system functionality 3. Minor: The problem described does not block any important system functions or can be bypassed. <p>During the factory acceptance tests a system shall be accepted at the following conditions:</p> <ol style="list-style-type: none"> 1. No blocking anomaly 2. Less than 3 major anomalies (the value of 3 will be proposed in the result report of tests internally conducted prior to the factory acceptance tests). <p>During the site acceptance tests a system shall be accepted at the following conditions:</p> <ol style="list-style-type: none"> 1. No blocking anomaly 2. No major anomaly <p>Less than 15 minor anomalies (the value of 15 will be proposed in the result report of tests internally conducted prior to the site acceptance tests).</p> <p>The maximum number of each type of anomaly shall be specified in the last release of the PDS (Project Design Study).</p>

TRANSVERSAL SERVICES**6.7. Lot 7 – Development of STMKG Laboratory****Development of STMKG Laboratory Requirements**

No	Development of STMKG Laboratory Requirements
Information	The contractor must provide two (2) pack of Web-Based Weather Forecasting and Analysis tools and one (1) pack End User Production System client workstation that facilitates the design, configuration, and production of weather and marine products in a timely manner to meet the needs of STMKG students. These workstations will offer an easy-to-use interface to display all the products generated by the MMS program. These workstations will be placed at the STMKG Lab facility. The solutions provided must be inline with existing system at BMKG.
6.7.1.	The contractor must provide: 1. Two (2) pack of Web-Based Weather Forecasting and Analysis tools client workstation 2. One (1) pack of End User Production System client workstation These workstations will offer an easy-to-use interface to display all the products generated by the MMS program, connecting to MMS system hosted at the BMKG Headquarters.
6.7.2.	Data, analysis results and weather modeling can be selected for advance learning by STMKG students/ instructors.
6.7.3.	In addition, this will allow the creation of concise animations to be visualized as effective learning materials for STMKG students/ instructors regarding upcoming weather conditions/ forecasting.
6.7.4.	To increase usability, the display system used for data composition must be configured with special software designed to be intuitive, easy to use, and adaptable to display weather results in different formats.
6.7.5.	This tool shall be capable of ingesting available and accessible data through the existing API system at the BMKG Headquarters or ingesting data pushed through protocols such as FTP, RSYNC, etc. Data can be pre-processed to ensure fast and reliable access to data for building and displaying products.
6.7.6.	The user/student should have the option to select the desired data source for weather events variations analysis.
6.7.7.	The Contractor shall prepare and submit an Operation & Maintenance Plan. The Plan shall include all the aspects related with the Monitoring, Control & Operation of the system / subsystem/ equipment and Maintenance thereof
6.7.8.	Output: The desirable output from this activity is to provide an extension of hands-on learning capability specified for STMKG Laboratory. The STMKG students will have an early experience before entering a real-life experience as a BMKG officer. Outcome: The expected outcome from this activity is a better forecaster of generation.
6.7.9.	Warranty and Technical Support : Contractor has to provide warranty and support until the Project Technical Completion plus one year in terms of End of System Wide Warranty.

Capacity Building Skill Targets and Acceptances

	Capacity Building Skill Targets															
6.7.10.	<table><tr><th>Skill</th><th>Related Profile</th><th>Related type of trainings</th></tr><tr><td>Production for end-users</td><td>Marine forecaster</td><td>Course on Analysis and Description</td></tr><tr><td>Data Visualization</td><td>Data scientist, marine forecaster</td><td>Course on Analysis and Description</td></tr><tr><td>Products dissemination</td><td>Marine forecaster</td><td>Course on Analysis and Description</td></tr></table>				Skill	Related Profile	Related type of trainings	Production for end-users	Marine forecaster	Course on Analysis and Description	Data Visualization	Data scientist, marine forecaster	Course on Analysis and Description	Products dissemination	Marine forecaster	Course on Analysis and Description
Skill	Related Profile	Related type of trainings														
Production for end-users	Marine forecaster	Course on Analysis and Description														
Data Visualization	Data scientist, marine forecaster	Course on Analysis and Description														
Products dissemination	Marine forecaster	Course on Analysis and Description														
	Course on Analysis and Description															
	Course on Analysis and Description Requirements															
6.7.11.	After deployment of the MMS2 production and dissemination tools, the contractor shall iterate with the Employer in order to provide training on DATA INTEGRATION, production, and dissemination systems, as detailed in paragraph 6.6.2 Those trainings shall be delivered according to a training plan accepted by the Employer															
6.7.12.	<p>The Course on Analysis and Description shall contain the following items:</p> <ol style="list-style-type: none">1. Training Objective2. Trainee pre-requisites3. Site pre-requisites4. Site training location5. Maximum number of trainees6. Detailed agenda of each training7. Description of training materials <p>The Training Course covers at least specified topics as follows:</p> <ol style="list-style-type: none">1. The system workflow and flowchart2. The system usage in daily operation3. The system features4. Guidance to utilize the system5. Guidance to overcome the troubling system. <p>The training output is a prepared instructor to provide instruction and learning process for STMKG students.</p>															
6.7.13.	<table><tr><th>Course on Analysis and Description</th><th>Location</th><th>Employer Staff</th><th>Indicative Duration Travel and weekend included</th></tr><tr><td></td><td></td><td></td><td></td></tr></table>				Course on Analysis and Description	Location	Employer Staff	Indicative Duration Travel and weekend included								
Course on Analysis and Description	Location	Employer Staff	Indicative Duration Travel and weekend included													

	<table><tr><td>STMKG Lab site training to STMKG trainers</td><td>STMKG</td><td>10</td><td>10 days</td></tr></table>	STMKG Lab site training to STMKG trainers	STMKG	10	10 days				
STMKG Lab site training to STMKG trainers	STMKG	10	10 days						
6.7.14.	List of Acceptance Tests								
6.7.15.	<table><tr><th>Acceptance Test</th><th>Location</th><th>Employer Staff</th><th>Indicative Duration (days) Travel and weekend included</th></tr><tr><td>STMKG Site acceptance Tests</td><td>STMKG</td><td>2</td><td>5</td></tr></table>	Acceptance Test	Location	Employer Staff	Indicative Duration (days) Travel and weekend included	STMKG Site acceptance Tests	STMKG	2	5
Acceptance Test	Location	Employer Staff	Indicative Duration (days) Travel and weekend included						
STMKG Site acceptance Tests	STMKG	2	5						
	Testing and Commissioning Requirements								
6.7.16.	The Contractor shall submit a Testing and Commissioning Plan detailing and explaining how the Contractor will plan, perform, and document all inspections and tests that will be conducted to verify and validate the Works prior to delivery to the Site and to the final site acceptances.								
6.7.17.	Contractor shall provide all equipment, data and all that is required to conduct the testing.								
6.7.18.	Logistic costs of the Employer staff for factory and site acceptance (local transport, transport out of Indonesia, International/National flights, accommodation, meals, and/or daily allowance) shall be covered by the contractor.								
6.7.19.	The Factory test books shall be submitted to the Employer at least 2 weeks before the acceptance with a result report of tests internally conducted by the Contractor.								
6.7.20.	The Site test books shall be submitted to the Employer before the acceptance with a result report of tests internally conducted by the Contractor.								
6.7.21.	After completing the Site Acceptance Test, the commissioning activities must be carried out after 15 days of operations, presenting predefined outputs verified by a commissioning execution certificate.								
6.7.22.	<p>The anomaly reported shall be classified as follow:</p> <ol style="list-style-type: none">1. Blocking: The problem leads to the impossibility to use in its totality or generates a safety risk for the users.2. Major: Loss of major system functionality3. Minor: The problem described does not block any important system functions or can be bypassed. <p>During the factory acceptance tests a system shall be accepted at the following conditions:</p> <ol style="list-style-type: none">1. No blocking anomaly2. Less than 3 major anomalies (the value of 3 will be proposed in the result report of tests internally conducted prior to the factory acceptance tests).								

	<p>During the site acceptance tests a system shall be accepted at the following conditions:</p> <ol style="list-style-type: none">1. No blocking anomaly2. No major anomaly <p>Less than 15 minor anomalies (the value of 15 will be proposed in the result report of tests internally conducted prior to the site acceptance tests).</p> <p>The maximum number of each type of anomaly shall be specified in the last release of the PDS (Project Design Study).</p>
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6.8. Lot 8 – Transversal Activities

6.8.1 Functional Specification

No	Functional Specification
Information	Provide assistance to transition subproject all along the project duration
	Time Specification
Time of work execution	The execution of this activity will be implemented from the time of the contract is signed until 1095 days.
	Performance Specification
6.8.1.1.	The contractor's shall provide assistance to transition subproject all along the project duration through regular organizational meeting involving BMKG and contractor's managers
6.8.1.2.	The involvement should take place at the initial step to the project with systematic visits and presentation of the project through regular support to BMKG management during project life, on specific thematic subjects (to be agreed between the contractor's and BMKG)
6.8.1.3.	The contractor's shall provide consultancy service and project design study report
6.8.1.4.	In the frame of this project, BMKG expects from the contractor's the following support: Project Coordination Steering committee Organization Consultancy (Project Design Study) Report
6.8.1.5.	Project Coordination : Project coordination is to effectively facilitate communication, collaboration and problem-solving between BMKG and the contractor project management Project coordination participants consisted of project management unit from BMKG and the contractor's officials Project coordination meetings will be organized twice a year (at least) in Indonesia and France during the whole duration of the project to prepare progress reports for the steering committee members
6.8.1.6.	Steering Committee Organization : Steering committee is established to supervise the proper implementation of the project in terms of technical, operational, administrative, and financial aspects Steering board composed of BMKG and the contractor's high rank's officials Steering Committee meetings will be organized twice a year (at least) in Indonesia and France during the whole duration of the project
	Technical Specification

6.8.1.7.	<p>Project coordination meeting in Indonesia</p> <p>Title : Project coordination meeting Number of participants : Two persons from the Contractors Two persons from employer Number of meeting : One per year during three years Duration for each meeting : Five working days Place of meeting : Bali, Indonesia</p> <p>Project coordination meeting in supplier premises Title : Project coordination meeting Number of participants : Two persons from employer Two persons from the contractor Number of meeting : One per year during three years Duration for each meeting : Five working days Place of meeting : Toulouse, France</p>
6.8.1.8.	<p>Steering Committee Organization</p> <p>Steering committee meeting in Indonesia</p> <p>Title : Steering committee meeting Number of participants : Four persons from the Contractors Four persons of employer's Steering Committee Members Number of meeting : One per year during three years Duration for each meeting : Five working days Place of meeting : Bali, Indonesia</p> <p>Steering committee meeting in supplier premises Title : Steering committee meeting Number of participants : Four persons from the Contractors Four persons of employer's Steering Committee Members Number of meeting : One per year during three years Duration for each meeting : Five working days Place of meeting : Toulouse, France</p>
6.8.1.9.	<p>Consultancy Project Design Study (PDS)</p> <p>Initial System Design Report Final System Design Report</p>
6.8.1.10.	<p>The PDS is a mandatory two-phase activity initiated after submitting your technical proposal in the Bidding Document. The PDS outcomes will be refined and presented in two key documents: the Initial Design Report (IDR) and the Final System Design Report (FDSR), accompanied by their respective reports.</p> <p>Both the IDR and FDSR carry legal weight as integral parts of the contract. Therefore, their completion must be achieved within eight months of contract signing, upon mutual agreement between the employer and contractor.</p> <p>The PDS is a critical step in guaranteeing the successful execution of MMS2 Package 3. Failure to complete the PDS on time and to specification may result in legal consequences and project delays. Contractors are strongly encouraged to grasp the project's complexity and fully commit to delivering a high-quality PDS.</p>

6.8.1.11.	<p>Consultancy (Project Design Study)</p> <p>Initial System Design Review in Indonesia Title : Initial System Design Review</p> <p>Number of participants : Two persons from the Contractors ; Ten persons from employer</p> <p>Duration of meeting : Five working days Place of meeting : Jakarta, Indonesia Output : Two sets of report</p> <p>Final System Design Review in Indonesia Title : Final System Design Review</p> <p>Number of participants : Two persons from the Contractors ; Ten persons from employer</p> <p>Duration of meeting : Five working days Place of meeting : Bali, Indonesia Output : Five sets of report</p>
6.8.1.12.	Technical Support : Contractor has to provide fully technical support until the end of the Project Technical Completion plus one year in terms of End of System Wide Warranty.
6.8.1.13.	The entire system build within MMS-2 Package 3 are integrated and delivered in one integration matrix table.
6.8.1.14.	<p>The Contractor has to submit a 15-year maintenance plan detailing:</p> <p>Scheduled tasks: Regular inspections, lubrication, and adjustments to prevent failures.</p> <p>Predictive maintenance: Utilizing monitoring and diagnostics to identify and address potential issues before they occur.</p> <p>Repairs and replacements: Procedures for fixing or replacing failed components to maintain optimal performance.</p> <p>Submit detailed Mean Time Before Failure (MTBF) estimates supported by industry data or similar project experience. Accurate MTBF is crucial for optimal maintenance planning and minimizing downtime. Deep understanding of MTBF for critical components is mandatory. The maintenance plan and MTBF details has to be submitted during SAT period</p>
6.8.1.15.	All costs outlined in the project calculation are fixed for the employer and are non-negotiable for bidders, except for a potential higher offer. This condition applies to all lots of the work package (including training and acceptance test activities). Furthermore, this condition applies to PCM, SCM, and Consultancy PDS as well.

	Monitoring System
6.8.1.16.	The Contractor shall supply an end-to-end monitoring solution of all the systems
6.8.1.17.	The Contractor shall prepare and submit an Operation & Maintenance Plan. The Plan shall include all the aspects related with the Monitoring, Control & Operation of the system / subsystem/ equipment and Maintenance thereof.

6.8.1.18.	The solution shall be accessible and fully functioning using commodity web browsers. System level checks desired include: up/down, CPU usage, RAM usage, disk usage
6.8.1.19.	The computing environment web portal shall provide Operation Center focused dashboards, and customizable dashboards/views allowing for global, or per user/group needs.
6.8.1.20.	A frequently updated color-coded model product status board must be available on a web page giving a summary of the overall product delivery status and the associated runs. The board must flag any products that are delayed or missing for follow-up action. Status displays of selected components will be updated within a minute from completion of component executions.
6.8.1.21.	The Contractor shall provide an operational team description to manage the operational monitoring system (with dedicated human resources).

6.8.2 Contractor's Documents

No	Contractor's document Requirements
6.8.2.1.	In order to ensure compliance with the Requirement of Contract and satisfactory Programed execution of the works within specified targets, and quality in design, manufacturing and execution of work, a series of Management Plans shall be developed
6.8.2.2.	The Plans and Documents shall be coordinated with each other and shall collectively define, describe and encompass the Contractor's proposed methods, procedures, processes, organization, sequencing of activities, etc. and shall show how these combine together to assure that the Works truly meet the requirements of the Specification in respect of the mentioned subjects.
6.8.2.3.	All plans and documents shall be submitted as detailed below: As required in accordance with the Works Program. Whenever the development of the Contractor's designs or planning allows the plan to be developed further. In response to comments made by the Employer's Personnel/Engineer Whenever any change occurs that invalidates the information contained in the previously submitted and reviewed document, within 28 days of the occurrence of such change.
6.8.2.4.	During the project implementation the contractor shall deliver the following documents for approval by The Employer <ul style="list-style-type: none"> • Project Management plan as described in paragraph 6.8.3 • Quality assurance plan as described in the paragraph 6.8.5 • Site Safety Plan during implementation • Monthly progress report made of <ul style="list-style-type: none"> ○ Implementation progress for each activity ○ Current issues ○ Project updated schedule. ○ Detailed schedule for next semester ○ updated risks ○ updated Documentation status • Minutes of meetings

	<ul style="list-style-type: none"> • Site survey reports • Detailed Design Study (functional and technical) • Construction Design Package for activities with civil works if it is applicable • Installation Program prior to a site installation (schedule installation, Pre-requisites, share of Work with Engineer and external entities, installation methods statements) • Worksite ESMP (Environmental and Social Management Plan) • Acceptance books (submitted 4 weeks before the test session with the employer) • Factory acceptance report (preFAT report) submitted 2 weeks before the FAT. • Site acceptance report (preSAT report) submitted one working day before the SAT (PreSAT report) • Training plans • Training materials • Data catalogue • Interface Control Documents • Operation & Maintenance Plan including Standard Technical Procedures (backups/restore, switch to DRC, etc.) and Business Continuity Plan. • The Operating and Maintenance Manual for each activity/sub activity • Initial Standard Operational Procedures to be approved and maintained by the Employer operational staff. • Network architecture (annual update) • Functional and Technical as-built documents as final Detailed Design Study • Project Technical Completion report.
6.8.2.5.	To ensure efficient and streamlined review by the Employer, please strive to submit documents in editable formats (e.g., .docx, .xlsx) whenever feasible
6.8.2.6.	<p>The contractor shall maintain a shared a list of</p> <ul style="list-style-type: none"> ● Pending documents ● Documents under review ● Approved documents
6.8.2.7.	The Contractor shall provide a Document Management storage area that enables The Employer to access to the last release of each approved document.
6.8.2.8.	The Contractor shall also deliver one hard copy of all approved documents at the Project Technical Completion. If necessary, the hard copy of the modified documents shall be delivered again at the end of the System Wide Warranty
6.8.2.9.	<p>The project technical completion shall be issued after all activities and systems have been delivered, commissioned through unitary SATs, and are operational in a context to be agreed by both parties (Contractor and Employer).</p> <p>The Contractor shall deliver a project technical completion report for approval by the Employer.</p>

6.8.3 Project Management

No.	Project Management Requirements
6.8.3.1.	The contractor shall comply with practice Standards & Framework as defined in the PMBOK® Guide or equivalent

6.8.3.2.	The Contractor shall develop in detail, a logical method of executing the Works taking into account their complex nature and different phases and shall provide a Project Management Plan which reflect the detailed planning undertaken for implementation of the project.
6.8.3.3.	The Project Management Plan (PMP) shall provide a clear over- view of the Contractor's organization, the management system and methods to be used for completion of the Works
6.8.3.4.	<p>The contractor shall deliver a project management plan describing</p> <ul style="list-style-type: none"> ● MMS2-package 3 project organization, workflow, including reporting and coordination with the Employer ● The general project schedule and milestones ● The risks management ● The support for KPI's measurements if it is applicable for Package 3 ● Documentation list and control
6.8.3.5.	<p>Project organization</p> <p>The Project Management Plan shall include a diagram showing the organizational structure for the management of the Contract, with locations, names and position titles of the Contractor's personnel and their line of control, staff relationship clearly showing the principal organizational interfaces both within the Contractor's own organization (including sub-contractors of every tier if necessary) and with Other Contractors if necessary and Relevant Authorities, defining how each of these interfaces is to be managed and controlled.</p> <p>The diagram shall include associate organizations and sub-contractors to be engaged in the Execution of the Works and it shall clearly show the individuals and lines of responsibility linking the various groups. It shall also identify the persons designated as a point of contact for the Employer.</p>
6.8.3.6.	<p>General project schedule and milestones</p> <p>Milestones shall be an integral part of all Programs and all activities. Sequencing and interrelationships required to achieve each completion obligation shall be shown.</p>
6.8.3.7.	The Project Management Plan shall describe the documentation list and the procedure for documentation control.
6.8.3.8.	The Project Management Plan submitted by the Contractor shall be reviewed by the Employer, who will have the right to seek amendments as deemed necessary.

6.8.3.9.	<p>Project requirements management</p> <p>In order to facilitate the requirements traceability, the contractor shall provide and regularly update a Web-based software for tracking MMS2 requirements</p> <p>Each requirement description should contain the following information (or equivalent):</p> <ul style="list-style-type: none"> • Tender/Scope/WBS reference • Project activity/sub-activity • Name • Description • Importance (mandatory, important, or minor) • Type of requirement <ul style="list-style-type: none"> ▪ Specified in the contract ▪ Not specified in the contract and commonly agreed ▪ Not specified and not agreed by supplier ▪ Bogue not related to an existing requirement • Associated tests • Status <ul style="list-style-type: none"> ▪ NEW: not yet reviewed by the supplier ▪ CANCELLED: after mutual decision ▪ TO BE DONE ▪ ON HOLD (supplier waiting for the Employer clarifications) ▪ TO BE VALIDATED: delivered and to be tested by the Employer ▪ VALIDATED: successfully tested by the Employer • Delivery Version (concerns software requirement) • Delivery date or target date of delivery • Attached files if needed • Discussion threads <p>The Contractor shall share the above information (at least in read-only mode) with the Employer.</p>
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6.8.4 Contractor's Team

No	Contractor's Team Requirements
6.8.4.1.	<p>The Technical Proposal shall describe the mobilized team with at least the following roles during the supply and installation activities under the Contract. Below are the details of the personnel requirements that were mentioned in the Section III :</p> <ol style="list-style-type: none"> 1. Project director - holding project management certification (e.g. Project Management Professional) or more than ten (10) years of relevant experiences including international, described in the resume or portfolio. 2. Project managers of the project activities - holding project management qualifications/certification (e.g. Project Management Professional) or more than five (5) years of relevant experiences including international experience, described in the resume or portfolio. 3. Computer Science / IT Expert, has a computer science/IT certification/degree or equivalent with minimum 3 (three) years experience, including international experience, in handling HPC related work in a similar scope of work, described in the resume or portfolio. 4. Information Systems Security Specialist – senior profile holding an IT degree and minimum 5 (five) years experiences in IT Security, evidence relevant past

No	Contractor's Team Requirements
	<p>experience in this activity, including international experience, described in the resume or portfolio.</p> <ol style="list-style-type: none"> 5. System Integrator, has at least 3 (three) years of experience in the IT system integration, described in the resume or portfolio. International experience is an asset. 6. Expert for Metocean Numerical Modelling, with at least 5 (five) years of experience, including international experience, running and maintaining numerical modeling operational in HPC system or senior expert in running of coupled complex numerical model in HPC system, described in the resume or portfolio. 7. Big Data expert – Data Science Expert holding related degree with minimum 3 (three) years experience, described in the resume or portfolio. International experience is an asset. 8. Scientific experts on meteorology and oceanography with at least 3 (three) years of relevant experience matters proven by resume or portfolio related to meteorology and oceanography projects/researches. International experience is an asset. 9. Technical/Mechanical/Electrical Engineer, has at least 3 (three) years experience in a similar scope of work responsible in the field of electrical, civil, or mechanical engineering (installation process, function test, and transfer of knowledge), described in the resume or portfolio. International experience is an asset. 10. Local team in Indonesia: <ul style="list-style-type: none"> • Local Project Coordinator - with at least three (3) years of relevant experience to the project needs in Indonesia proven by relevant resume or portfolio. • Local Technical Experts - with at least two (2) years of relevant experience to the project needs in Indonesia proven by relevant resume or portfolio. 11. Training manager - with at least three (3) years of relevant experience related to training program management proven by relevant resume or portfolio. International experience is an asset. 12. Quality Assurance/Quality Control Manager - has at least three (3) years of experiences related to quality management and assurance for significant international projects proven by resume or portfolio. <p>These roles are designed to ensure comprehensive coverage of all project aspects while ensuring the team's qualifications are attainable and not overly restrictive, thus ensuring a broad pool of eligible candidates.</p>
6.8.4.2.	The skills and experience of each member of the Contractor's team shall be described in the proposal.

6.8.5 Quality Assurance

No	Quality Assurance Requirements
6.8.5.1.	The Contractor shall establish and implement a Quality Management System for the Design, Build and Operation of the project as described below, The Quality Management System shall be applied without prejudice to, or without in any way limiting, any Quality System that the Contractor already maintains

No	Quality Assurance Requirements
6.8.5.2.	The Contractor shall submit the Quality Assurance and Management Plan for approval of the Engineer.
6.8.5.3.	The Contractor's quality management system shall be tailored specifically to the Contract and the Works in accordance with S 9001 – Quality Management System, the latest edition of the International Standard ISO 9001, and the Contractor shall submit his quality management system titled as the Project Quality Assurance Plan for the Engineer review
	General Assurance
6.8.5.4.	<p>The Quality Management System documentation shall comply with include, but shall not be limited to the following:</p> <ol style="list-style-type: none"> 1. Project Quality Plan. 2. Quality Procedures, Works Instructions and Standard Forms. 3. Documentation 4. Supply, construction 5. Installation 6. Manufacturing 7. Inspection testing.
6.8.5.5.	The Contractor shall plan, perform and record all quality control activities to ensure that all work is performed in accordance with the requirements of the Contract and is detailed in the quality plans which are required under this section. Such activities shall include, without limitation, the inspections and/or test expressly or implicitly required by the Contract.
6.8.5.6.	Quality audits shall be conducted to verify the Contractor's implementation and compliance with the quality management system as specified herein
	Submission of Quality Documentation
6.8.5.7.	A quality policy statement signed by the Chief Executive Officer (CEO) of the Contractor (or other senior management of the Contractor) declaring that the Contractor shall ensure that Quality Management is given the highest practicable priority by the Contractor in executing the Works. In the event that the Contractor is a consortium, partnership or joint venture, statements signed by the Chief Executive Officer (or other senior management of the Contractor) of each of the companies comprising the consortium partnership or joint venture shall be submitted
6.8.5.8.	Quality system documents to be submitted shall embrace all activities of the Contractor and his Sub-Contractors including his suppliers, for the execution of the Works.
6.8.5.9.	<p>Within 90 days after the Commencement Date, the Contractor shall submit the following documents for review:</p> <ol style="list-style-type: none"> (i) Project Quality Plan (ii) Project Quality Procedures
	Format of Quality System
6.8.5.10.	The delivered documents shall have a standardized format and show clearly on the document:

No	Quality Assurance Requirements
	<ul style="list-style-type: none"> (1) The document title, the document number (if any) and the page number on each page. (2) Approval page. (3) The revision status, with the amendments identified within the revised documents
	Project Quality Plan
6.8.5.11.	<p>The Project Quality Plan shall describe the Contractor's management structure and the quality management system for the execution of the Works and shall, without limitation, be defined as follows:</p> <ul style="list-style-type: none"> (1) The organization of the Contractor's managerial staff with particular reference to any member of a partnership, consortium or Joint venture, and the main Sub-Contractors. Organization charts shall be produced to illustrate the sub-division of the Works into elements for effective technical and managerial control, the reporting structure and the interface relationship between all parties involved. (2) The appointment of a Quality Manager (3) The specific allocations of responsibility and authority given to managerial and technical staff with particular reference to the design and site supervision of the Works. (4) The Contract specific quality procedures, works instructions and/or standard forms, if applicable (5) A full list of quality procedures works instructions, and/or standard forms, including any contract specific documents, to be applied to the Contract.
	Quality Manager
6.8.5.12.	<p>The Contractor shall appoint a suitably qualified and experienced full-time person as the Quality Manager to be responsible for the task of establishing the documented quality management system and ensuring that the quality management system is implemented and maintained effectively</p>
6.8.5.13.	<p>The Quality Manager shall be directly responsible to the senior level of management and is able to discharge his duties without hindrance or constraint. In addition, the Contractor shall make available any such resources that are necessary to ensure the effective implementation of the quality management system</p>
6.8.5.14.	<p>The Quality Manager's responsibilities shall include:</p> <ul style="list-style-type: none"> 1) On and off-site quality review 2) Monitoring and reporting 3) Reviewing all Quality documentation; Quality Plan, Works Procedures, Inspection and Test Plans, etc.
6.8.5.15.	<p>The Contractor shall submit for review by the Employer details of qualifications, experience, authority, and responsibility of the proposed Quality Manager, as part of the Project Quality Plan.</p>
	Quality Audits and Controls
6.8.5.16.	<p>The Contractor shall precise in its proposal its quality certification and the frequency of quality audits.</p>

No	Quality Assurance Requirements
6.8.5.17.	The Contractor shall be precise in its proposal how quality non-conformities are processed.
6.8.5.18.	The Contractor shall continuously monitor the performance of its quality management system and shall yearly report its status including the related findings, in order the Engineer can verify that all the quality records as objective evidence of the Implementation of the Contractor's quality management system are properly indexed, filed, maintained and updated.

6.8.6 Design, Development and Deployment Strategy

No	Design, Development and Deployment Strategy Requirements
Information	Software, configuration, and integration will be important activities on MMS2. Therefore, the best strategy to implement MMS2 facilities should be considered.
6.8.12.1.	<p>The technical proposal shall describe its development cycle (configuration and integration) strategy on the project. A proposed iterative approach will be favorably evaluated.</p> <p>The foreseen frequency of iterations for Detailed Design Study is the following:</p> <ul style="list-style-type: none"> ● Bi-annual during the first year of the project ● Annual from the second year of the project
6.8.12.2.	The Detailed Design Study shall be updated after each iteration for Design Study
6.8.12.3.	The preliminary design stage, as a minimum, shall identify the function of each system, sub-system, equipment or other element and specify the relationships and interfaces between each element of the system including the systems of the interfacing elements of other Contractors.
6.8.12.4.	The DevOps approach for development and deployment shall be adopted. The technical proposal shall clearly describe the tools that will be put in place to guarantee the iterative process of building services.
6.8.12.5.	<p>The contractor shall propose a design study in parallel with early phases of the project implementation. This design study shall be initiated at the early stage of the project and shall be improved during the project implementation through bi-annual or annual reviews.</p> <p>Between each bi-annual or annual review a development cycle (configuration and integration) shall be implemented</p>
6.8.12.6.	The project implementation shall refer to detail design study
6.8.12.7.	<p>The detailed design study shall:</p> <ol style="list-style-type: none"> 1. Integrate with MMS1 in the framework of fully integrated single platform 2. Ensure the adoption of the latest technology 3. Be open to further development by BMKG 4. Avoid technology locking and vendor locking

6.8.7 Telecommunication & Network Requirements

No.	Telecommunication & Network Requirements
Information	This paragraph includes specifications for ensuring that the STR2 network will be consistent, adapted to the project needs, easy to operate and maintain.
6.8.13.1.	The Internet Access will be provided by the Employer
6.8.13.2.	<p>The STR2 (SUS, MMS1, and MMS2) WAN/LAN network will be made of two separated networks:</p> <ol style="list-style-type: none"> 1. SUS network. 2. MMS1 and MMS2 network. <p>In its WAN/LAN network architecture design, the Contractor shall document how the two above networks will be interfaced.</p>
6.8.13.3.	<p>The MMS (MMS1 and MMS2) network architecture design shall cover at least:</p> <ol style="list-style-type: none"> 1. Present situation assessment. 2. Network interoperability between STR2 components including DRC, STR1 and legacy network systems. 3. Data flows and data volumes 4. Interconnection with legacy systems. 5. Network security. 6. Network administration, supervision. 7. Network trouble-shooting solution. 8. International and national connections. 9. Internet access assessment and recommendations (Bandwidth, Internet operators, Service Level Agreement). 10. Network architecture of the Disaster Recovery center. 11. Connection between National center and the Disaster Recovery Center. 12. MMS Network implementation roadmap. 13. Description of the Network as-built document.
6.8.13.4.	A Network Site survey during the project shall be performed.
6.8.13.5.	The accepted MMS network architecture shall be guaranteed by the Contractor (network equipment delivery, installation, and configuration).
6.8.13.6.	The MMS network shall be delivered with documented monitoring and trouble-shooting tools.
6.8.13.7.	The Systems shall automatically synchronize with the BMKG Time Server (NTS) - or any other reliable NTS source - periodically to maintain an accurate system time.
6.8.13.8.	Supervision, administration, and trouble-shooting training on the implemented network, shall be delivered to the Employer technical staff.
6.8.13.9.	A network as-built document shall be delivered before the end of the project

6.8.13.10.	The MMS network implementation shall be validated through acceptance tests submitted to the Employer
6.8.13.11.	The Contractor shall be able to remotely connect to MMS systems for maintenance purpose

6.8.8 Specifications for Systems Interfaces, Data Integration Support and Services

No	Extended data processing support and services Requirements
Information	This paragraph includes specifications for ensuring that MMS data and products are consistent and that they can be used to develop services for any stakeholder.
6.8.14.1.	The system shall rely on extended data processing.
6.8.14.2.	As part of data integration upgrade, the supplier shall provide extended data processing services during the project duration, in order to contribute to products consistency within all MMS systems.
6.8.14.3.	In coordination with the Employer, the Contractor shall contribute to consistency between all the STR2 expertise and production systems.
6.8.14.4.	<p>Data catalogue</p> <p>During the Detailed Design the supplier shall conduct a survey in order to establish a data catalog according to the Employer priorities and storage volume constraints. Each entry of the catalogue shall contain:</p> <ol style="list-style-type: none"> 1. Data family name. 2. Data originator (system). 3. Data destinations (systems). 4. Volume estimation. 5. Data archiving policy. 6. Data location and access. <p>This data catalogue shall be maintained until the project technical completion.</p>
6.8.14.5.	<p>Interface Control Documents</p> <p>For each system interface between two systems, the Contractor shall deliver the Interface Control Document (ICD) describing this interface (used protocol, connection parameters, etc.)</p> <p>These interface Control documents shall be maintained until the project technical completion.</p>

6.8.14.6.	End to end approach of the macro data catalogue A documentation and validation of each entry of the macro data catalogue shall be proposed based an end-to-end approach. Each macro data catalogue entry should be documented with at least the following information's: <ol style="list-style-type: none"> 1. Synoptic drawing. 2. Used ICD's. 3. Dataflow supervision / Extended data processing Checklist.
6.8.14.7.	MMS Global Authentication The supplier shall implement an MMS consolidated user account database that will be updated on-demand with export/import facilities. This database shall be the reference for a central authentication system that support LDAP standard protocol.
6.8.14.8.	MMS Global Supervision The Contractor shall deliver the supervision of all critical MMS systems. This supervision shall at least warn the Employer technicians in case of failure of a system or data availability issue.
6.8.14.9.	Data Flow Monitoring The contractor shall provide live supervision interface that monitors MMS data flow. Data flow issues shall be notified thanks to graphical alarm panels.

Telecommunication Costs

Activity	Type of telecommunication	Telecommunication costs borne by
Coastal buoy for meteorological-oceanographic data	Iridium or cellular	Contractor until Project technical completion
Wave enclosed and current profilers.	Iridium or cellular	Contractor until Project technical completion
Remote sensing	Internet at Headquarters	Employer
Marine Observation Data acquisition (MMS1)	Internet at Headquarters	Employer
AMSS	Internet at Headquarters	Employer
Big Data & AI Platform System (with an AI dedicated HPC, operational services and use cases	Internet at BMKG HQ	Employer
Ensemble Forecasting System for weather and sea state forecast including data assimilation on CAWO	Internet at Headquarters	Employer
Development of Limited Area Model System, includes high res. bathymetry	Internet at Headquarters	Employer

(NWP, Wave, Surface Current, Sea Level-up to 250 m		
Upgrade MMS infrastructure and HPC	Internet at Headquarters	Employer
Development STMKG Lab. Training & development equipment	Internet at STMKG	Employer

6.8.9 Specific Equipment

No.	Specific Equipment Requirements
6.8.15.1.	Required equipment for calibration of observation equipment shall be delivered with associated training if it is necessary.
6.8.15.2.	The technical proposal shall detail the proposed spare parts.

6.8.10 Warehouse Facilities

No	Existing Facilities Requirements
6.8.16.1.	During the implementation, the Contractor shall be responsible to provide the warehouse for storing the equipment's as needed.
6.8.16.2.	The Contractor shall be responsible to bear all costs for the warehouse.
6.8.16.3.	The Contractor shall be responsible to deliver all the equipment to the location site

6.9. Indicative Quantity Specification

No	Descriptions	Volume	Unit
I	OBSERVATION SYSTEM		
I.1	Lot 1 - Coastal Buoy		
I.1.1	Hardware		
I.1.1.1.	Data Buoy	2	Package(s)
	Buoy Position and Time Synchronization Sensor		
	Buoy Heading Sensor (Compass)		
	Sensor	2	Package(s)
	Doppler Current Profiler Sensor		
	Wave Sensor		
	Conductivity Sensor		
	Weather Sensor		
	Wind Speed And Direction Sensor		
	Air temperature sensor		
	Air Humidity Sensor		
	Barometric Pressure Sensor		
	Rainfall Sensor		
	Solar Radiation Sensor		
I.1.1.2	Transmitting system	2	Package(s)
	Data Acquisition and Telemetry Unit		
I.1.1.3	Sistem spares (one full system as hot swap)	1	Package(s)
I.1.2	Software and Services		
I.1.2.1	Equipment Integration	2	Package(s)
	A. Configuration		
	B. Customization		
I.1.2.2	Preliminary survey	2	Package(s)
	Preliminary survey report	1	Report
	System engineering and customization	1	Set(s)
I.1.2.3	Factory Acceptance Tests	1	Package(s)
I.1.2.4	Installation and Commissioning	2	Site(s)
	Deployment vessel fleet	2	Site(s)
	Deployment mobilization	1	Package(s)
I.1.2.5	Factory Training	1	Package(s)
I.1.2.6	Site Training	2	Package(s)
I.1.2.7	On the job training #Jakarta	1	Package(s)
I.1.2.8	Site Acceptance Tests	2	Package(s)
I.1.2.9	Remuneration	1	Package
I.1.2.10	Telecommunications (3 years)	6	Unit(s)
I.1.2.11	Warranty with two yearly visits per site	1	Package(s)
I.1.2.12	Transportation to final site include warehouse	2	Package(s)
I.2	Lot 2 - Wave enclosed and Current Profiler System		
I.2.1	Hardware		

No	Descriptions	Volume	Unit
I.2.1.1	Equipment Integration	8	Package(s)
	A. Sensor	8	Package(s)
	Doppler Current Profiler Sensor Requirement		
	Wave Sensor		
	B. Transmitting system	8	Package(s)
	Data Acquisition and Telemetry Unit (DATU)		
	C. Mooring	8	Package(s)
I.2.1.2	Spare	1	Package(s)
I.2.2	Software and Services		
I.2.2.1	Equipment Integration	1	Unit(s)
	A. Configuration	1	Unit(s)
	B. Customization	1	Unit(s)
I.2.2.2	Preliminary survey	8	Package(s)
	Preliminary survey report	1	Report(s)
	System engineering and customization	8	Set(s)
I.2.2.3	Factory Acceptance Tests	1	Package(s)
I.2.2.4	Installation and Commissioning	8	Package(s)
	Deployment vessel fleet	8	Site(s)
	Deployment mobilization	1	Package(s)
I.2.2.5	Factory Training for Technicians	1	Package(s)
I.2.2.6	Site Training for Operators	8	Package(s)
I.2.2.7	On the job training #Jakarta	1	Package(s)
I.2.2.8	Site Acceptance Tests	8	Package(s)
I.2.2.9	Personnel (Remuneration)	1	Package
I.2.2.10	Warranty	8	Package(s)
I.2.2.11	Telecommunication	24	Package(s)
I.2.2.12	Maintenance	1	Package(s)
I.2.2.13	Transportation to final site include warehouse	8	Package(s)
I.3	Lot 3 - Met Ocean Remote Sensing		
I.3.1	Hardware		
I.3.1.1	UHRIT Reception Subsystem	1	Package(s)
	UHRIT Antenna & Feed		
	UHRIT Demodulation		
	Reception Server		
I.3.1.2	Local Electrical/Civil engineering/construction and installation work	1	Package(s)
I.3.1.3	Shipboard GK2A LRIT Reception System	20	Package(s)
	LRIT Shipboard tracking antenna		
	LRIT Shipboard demodulator		
I.3.1.4	Monitoring & Visualization Workstation	4	Unit(s)
I.3.1.5	RACK & UPS (Reception System)	1	Package(s)
I.3.2	Software and Services		
I.3.2.1	L2 Processing Subsystem	1	Package(s)
I.3.2.2	Catalogue Subsystem	1	Package(s)

No	Descriptions	Volume	Unit
I.3.2.3	Analysis Subsystem	1	Package(s)
I.3.2.4	Data Management Subsystem	1	Package(s)
I.3.2.5	System engineering and customization	1	Package(s)
I.3.2.6	Factory Acceptance Tests	1	Package(s)
I.3.2.7	Installation and Commissioning	1	Package(s)
I.3.2.8	Factory Training	1	Package(s)
I.3.2.9	Site Training for Operators	1	Package(s)
I.3.2.10	On the job training	1	Package(s)
I.3.2.11	Site Acceptance Tests	1	Package(s)
I.3.2.12	Personnel (Remuneration)	1	Package
I.3.2.13	Warranty	2	years
I.3.2.14	Telecommunication	2	years
I.3.2.15	Transportation to final site include warehouse	1	Package(s)
II	METEOROLOGY AND OCEANOGRAPHIC MODELLING SYSTEM		
II.4	Lot 4 - Big Data and AI Platform		
II.4.1	Hardware		
II.4.1.1	Main Component	1	Set(s)
II.4.1.1.1	Server for AI nodes	1	Set(s)
II.4.1.1.2	Server for Big data nodes	2	Set(s)
II.4.1.1.3	Data Lake	1	Package(s)
II.4.1.2	Supporting Component	1	Package(s)
II.4.2	Software and Services		
II.4.2.1	Main Lisence	1	Package(s)
II.4.2.2	Case Study	2	Package(s)
II.4.2.3	System engineering and customization		
	Installation and Commissioning	1	Package(s)
	Maintenance and warranty	1	Package(s)
II.4.2.4	Factory Acceptance Tests	1	Package(s)
II.4.2.5	Installation and Commissioning	1	Package(s)
II.4.2.6	Factory Training		
II.4.2.6.1	Factory Training for Big Data and AI and use cases	1	Package
II.4.2.6.2	Factory Training for Operational Service	1	Package
II.4.2.7	Site Training		
II.4.2.7.1	Site Training for Big Data /AI and use case	1	Package
II.4.2.7.2	Site Training for Operators	1	Package
II.4.2.8	On the job training		
II.4.2.8.1	On the job training warranty session #1	1	Package
II.4.2.8.2	On the job training warranty session #2	1	Package
II.4.2.8.3	On the job training warranty session #3	1	Package
II.4.2.9	Site Acceptance Tests	3	Package(s)
II.4.2.10	Personnel (Remuneration)	1	Package
II.4.2.10	Warranty	1	Year

No	Descriptions	Volume	Unit
II.4.2.11	Transportation to final site include warehouse		
	Premises - Jakarta	1	Package
II.5	Lot 5 - Ensemble Forecasting System (LAM included)		
II.5.1	Hardware		
II.5.2	Software and Services		
II.5.2.1	Software for Ensemble Forecasting System	1	Package
	Ensemble forecast system		
	Post Processing Ensemble		
	Quick Model Visualization		
II.5.2.2	Software for Limited Area Model	1	Package
II.5.2.3	System engineering and customization	1	Set
II.5.2.4	Installation and Commissioning	1	Set
II.5.2.5	Factory Training	2	Package(s)
II.5.2.6	Site Training		
II.5.2.6.1	Site Training for Operators #1	1	Package
II.5.2.6.2	Site Training for Operators #2	1	Package
II.5.2.7	On the job training	1	Package
II.5.2.8	Site Acceptance Tests	1	Package
II.5.2.9	Personnel (Remuneration)	1	Package
II.5.2.10	Warranty	1	year
III	PRODUCTION AND DISSEMINATION		
III.6	Lot 6 - MMS HPC and Infrastructure Upgrade		
III.6.1	Hardware		
III.6.1.1	Additional CPU nodes for the existing MMS1 HPC	1	Package
	Upgrade of servers, storage, virtualisation environment, including monitoring system for data integration		
III.6.1.2	Upgrade of servers, storage, virtualisation environment, including monitoring system at HQ and DRC Balai III Bali	1	Package
	- All necessary accessories (cables, rack, etc)		
III.6.1.3	Tropical Cyclone Forecasting and Productions System		
III.6.1.3.1	Server	1	Unit
III.6.1.3.2	Data Hub Workstation	1	Unit
III.6.1.3.3	TC Forecasting and Production Workstation	11	Unit(s)
III.6.1.3.4	Network Switch	1	Unit
III.6.1.3.5	UPS	12	Unit(s)
III.6.1.3.6	Infrastructure upgrade works in MMS super computer room	1	Package
III.6.2	Software and Services		

No	Descriptions	Volume	Unit
III.6.2.1	Software for MMS HPC and Infrastructure Upgrade	1	Package
III.6.2.1.1	Main Lisence	1	Package
III.6.2.1.2	Additional Lisence	1	Package
III.6.2.2	Extended Data Processing	1	Package
III.6.2.3	Tropical Cyclone Forecasting and Productions Tools Main Server	1	Package
III.6.2.4	License for Client	11	Package(s)
III.6.2.5	System engineering and customization for Extended Data Processing	1	Package
III.6.2.6	Factory Acceptance Tests		
III.6.2.6.1	Factory Acceptance Tests for MMS HPC and Infrastructure Upgrade	1	Package
III.6.2.6.2	Factory Acceptance Tests for TC Forecasting and Production System	1	Package
III.6.2.7	Installation and Commisioning		
	Installation for MMS HPC and Infrastructure Upgrade	1	Package
	Installation at BMKG HQ Jakarta (4), STMKG Jakarta (2), and Regional Office (5).	1	Package
III.6.2.8	Data configuration & integration TC Forecasting and Production System	1	Package
III.6.2.9	Factory Training		
III.6.2.9.1	Factory Training for MMS HPC and Infrastructure Upgrade	1	Package
III.6.2.9.2	Factory Training for Extended Data Processing	1	Package
III.6.2.9.3	Factory Training for TC Forecasting and Production System	1	Package
III.6.2.10	Site Training		
III.6.2.10.1	Site Training for MMS HPC and Infrastructure Upgrade	1	Package
III.6.2.10.2	Site Training for Extended Data Processing	1	Package
III.6.2.10.3	Site Training for Tropical Cyclone Forecasting and Production System	1	Package
III.6.2.11	On the job training for HPC & IT Infrastructure	1	Package
III.6.2.12	Site Acceptance Tests		
III.6.2.12.1	Site Acceptance Tests for HPC & IT Infrastructure	1	Package
III.6.2.12.2	Site Acceptance Tests for Extended Data Processing	1	Package
III.6.2.12.3	Site Acceptance Tests for TC forecasting and production tools	1	Package
III.6.2.13	Personnel (Remuneration)	1	Package
III.6.2.14	Warranty		
	MMS HPC and infrastructure upgrade	1	Year
	Extended data processing	1	Year
	TC Production and production system	1	Year
III.6.2.15	Transportation to final site include warehouse		
	Premises - Jakarta	1	Package
IV	TRANSVERSAL SERVICES		

No	Descriptions	Volume	Unit
IV.7	Lot 7 - Development of STMKG Laboratory		
IV.7.1	Hardware		
IV.7.1.1	Workstations for BMKG weather forecasting system	2	sets
IV.7.1.2	Workstation for BMKG end user production system	1	set
IV.7.2	Software and Services		
IV.7.2.1	Lisence for BMKG weather forecasting system	2	License(s)
IV.7.2.2	Lisence for BMKG end user production system	1	License(s)
IV.7.2.3	Preliminary survey	1	Package
	Preliminary survey report	1	Report
IV.7.2.4	System engineering and customization	1	Set
IV.7.2.5	Installation and Commissioning	1	Package
IV.7.2.6	Site Training	1	Package
IV.7.2.7	Site Acceptance Tests	1	Package
IV.7.2.8	Personnel (Remuneration)	1	Package
IV.7.2.9	Warranty	1	Year
IV.7.2.10	Transportation to final site include warehouse	1	Package
IV.8	Lot 8 - Transversal Services		
IV.8.1	Hardware		
IV.8.2	Software and Services		
IV.8.2.1	Personnel (Remuneration)	1	Package
IV.8.2.2	Non Personnel (Direct Reimbursement Cost)		
	- Transportation:		
	- Fiscal/Visa fee	70	Package
IV.8.2.3	Integration Documents		
	- Integration Matrix	1	Package
	- Integration Reports	1	Package
IV.8.2.4	Technical Support from Supplier's Team		
IV.8.2.4.1	Project Coordination Meeting (PCM)	6	Package(s)
IV.8.2.4.2	Steering Commitee Organization	6	Package(s)
IV.8.2.4.3	Consultancy (Project Design Study) Report		
	1. Initial System Design Report	1	Package
	2. Final System Design Report	1	Package

7 Packaging, Shipment and Storage of Material

No	Shipment Requirements
	Packaging
7.1.	Each case, crate or package shall be of robust construction and suitable for the intended purpose. Packaging material that are likely to suffer deterioration in quality as a result of exposure to environmental conditions likely to be met during transit from the factory of origin to the Site shall not be used.
7.2.	Where applicable, the contents of each case, crate or package shall be protected against the harmful effects of ingress of moisture / water by enclosing within a heavy-duty waterproof membrane.
7.3.	Each case, crate or package shall be legibly and indelibly marked in large letters with the address, Contract number, 'right way up', opening points and other markings like "fragile", "keep dry", "handle with care" etc. along with visual display of internationally accepted symbols as necessary to permit material to be readily identified and handled during transit and when received at site.
7.4.	Each case, crate or package shall contain a comprehensive packing list showing the number, mark, size, weight.
7.5.	Care shall be taken to prevent movement of equipment within containers by the provision of bracing, straps and securing bolts as necessary.
7.6.	Spare parts shall be suitably packed for storage over a long period (e.g project duration) without deterioration and shall be clearly identified showing full name and part number without any need to unwrap packaging.
	Shipment
7.7.	All shipments shall be adequately protected to preclude damage during shipment. The Contractor's quality control personnel shall verify the inspection and preparation for shipment.
7.8.	After successful factory acceptance, the equipment shall be delivered on their final destination according to DAP incoterms.
7.9.	For each shipment, the contractor shall deliver the following documents <ul style="list-style-type: none"> ● Shipping invoices with equipment description, quantity, unit prices and total amount price ● Packing list ● Certificate of origins
	Handling, Storage and Delivery
7.10.	Handling procedures shall include the use of special crates, boxes, containers, transportation vehicles, equipment and facilities for material handling.
7.11.	The Contractor shall ensure or get confirmation from the Employer that the Site is ready and in good conditions for delivery.
7.12.	No dangerous goods shall be delivered to the Site.

8 Technical Support

8.1 Technical support requirements

No	Technical Support Requirements
8.1.1.	The Contractor shall prepare and submit for review by the Employer an Operation & Maintenance Plan. The Plan shall include all the aspects related with the Monitoring, Control & Operation of the system / subsystem/ equipment and Maintenance thereof.
8.1.2.	Each unit/site of any activity shall benefit from standard warranty and extended warranty/technical support without extra cost until the project technical completion as indicated in paragraph 5 Phasing.
8.1.3.	After the project technical completion, the system wide warranty period shall start. This period shall have a duration of one year.
8.1.4.	The financial offer shall include as an option an additional year of maintenance and operational support for all systems.
8.1.5.	<p>The technical proposal shall include an operation and maintenance plan with at least:</p> <ul style="list-style-type: none"> • The Contractor's support team description. • The Contractor's technical support organization with the different levels of support and associated workflow. • The proposed Service Level Agreement for each type of system (please refer to next paragraph). • The description of the different support actions including preventive actions • The preventive tests and maintenance actions during the warranty and technical support periods. • Describe how documentation will be updated.
8.1.6.	The contractor shall propose a password management solution at the project technical completion and all administration accounts and passwords shall be recorded in the password management system.
8.1.7.	The technical proposal shall detail the cost of maintenance and spare parts.
8.1.8.	<p>Where applicable, the contractor shall have the capability to test the backup & restore procedures to establish if the data can be recovered when needed. These capabilities shall be tested at regular intervals and reported to the Employer. Where possible these tests shall be performed in presence of relevant Employer staff members.</p>
8.1.9.	The end of Wide System Warranty shall also be extended until resolution of any blocking or major issue if any (the level of issue is described in each of Commissioning and Testing activities paragraph).

No	Technical Support Requirements
8.1.10.	<p>Technical support management In order to facilitate the technical support traceability, the contractor shall use and update a Web-based software for tracking MMS2 support tickets Each ticket should contain the following information (or equivalent):</p> <ul style="list-style-type: none"> • Name • Description • Importance (mandatory, important, or optional) • Type of issue • Concerned system or sub-activity • Supplier contact • BMKG contact • Status <ul style="list-style-type: none"> ○ NEW: not yet reviewed by the supplier ○ CANCELLED: after mutual decision ○ TO BE DONE ○ ON HOLD (supplier waiting for BMKG clarifications) ○ TO BE VALIDATED: delivered and to be tested by BMKG ○ VALIDATED: successfully tested by BMKG • Delivery version (concerns software requirement) • Delivery date if applicable • Attached files if applicable
8.1.11.	<p>Tracking discussions for each ticket For each ticket a discussion thread tracking the exchanges between the intervener's (supplier, BMKG) shall be possible on the MMS ticket tracking web interface.</p>
8.1.12.	<p>Employer Account for the ticket tracking web application An Employer account shall be created enabling the Employer authorized experts/managers to follow-up the status of the tickets and to update the status of each ticket.</p>
8.1.13.	<p>Tickets reporting The tickets tracking tool shall allow the display of tickets with filtering feature.</p>
8.1.14.	<p>Required equipment for observation systems maintenance shall be delivered with associated training when needed.</p>
8.1.15.	<p>The Operation and Maintenance manuals shall include the details of each system, subsystem, equipment / components.</p>
8.1.16.	<p>During the Warranty, technical support and maintenance periods, the as-built and Operation & Maintenance manuals shall be maintained by the Contractor</p>
8.1.17.	<p>The systems/data operational availability shall comply with the table of next paragraph (paragraph 8.2) Operational Availability Level = [Operating Hours - System Downtime] x 100% / [Operating Hours] Excluding planned maintenance, upgrade or downtime caused by event beyond Contractor responsibility (e.g., Force Majeure, vandalism) For offshore equipment's, system downtime will not include travel for accessing the equipment.</p>
8.1.18.	<p>The Contractor shall provide tools to calculate and report (tables and graphics) the systems/data availability for each type of activity (monthly frequency)</p>

8.2 Summary of Systems and Data availability during Technical Support

Activity	Type	Period of calculation	Minimum Required availability value
Coastal Buoys	Data availability in MMS Data center Excluding the risk of loss of buoys.	Last year	95%
Wave Enclosed and Current Profiler System	Data availability in MMS Data center Excluding the risk of loss of waves and current profilers.	Last year	95%
Automatic Message Switching	System availability	Last year	95%
Ensemble forecasting	System availability	Last year	95%
Remote Sensing Products for atmospheric and ocean System	Data availability in MMS Data center	Last year	95%

9 Environment, Social, Health and Safety (ESHS) Requirements

No	Environment, Social, Health and Safety (ESHS) Requirements
9.1.	The Contractor shall not provide materials or services originated by any sub-contractor from a country under embargo by the United Nations, the European Union or France
9.2.	<p>The contractor shall confirm that its status is not one of the hereunder listed below:</p> <ul style="list-style-type: none"> • Bankrupt/wound up, is having its affairs administered by the courts, is the subject of safeguard proceedings, has ceased trading, or is in any analogous situation arising from proceedings of a similar nature. • Has been convicted within the last 5 (five) years by a judgment that has the force of res judicata in the country where the project is being carried out of fraud, corruption or any offence committed in connection with the award or performance of a contract, subject to any additional information that bidders may deem useful to provide as part of the declaration of integrity and eligibility (form attached to the Bid), which will make it possible to consider that such conviction is not relevant to the project financed by the Agency. • Appears on the lists of financial sanctions adopted by the United Nations, the European Union and/or France, in particular to combat the financing of terrorism and breaches of international peace and security. • In professional matters, has been guilty of serious misconduct within the last five years in connection with the award or performance of a contract, established by any means that the Employer can justify. • Has not fulfilled their obligations relating to the payment of social security contributions or their obligations relating to the payment of taxes in accordance with the legal provisions of the country in which they are established or those of the country of the Employer. • Has been convicted within the last five years by a judgment having the force of res judicata for fraud, corruption or any offence committed in connection with the award or performance of a contract financed by the Agency. • Is subject to an exclusion decision issued by the World Bank, as of May 30, 2012, and as such appears on the list published at http://www.worldbank.org/debarr , subject to additional information that bidders will deem useful to transmit as part of the declaration of integrity and eligibility (form appended to the Bid), which will make it possible to consider that this exclusion decision is not relevant in the context of the project financed by the Agency. • Is guilty of misrepresentation in providing the information required by the Employer as part of the procurement process.
9.3.	Public establishments and enterprises are eligible to participate on condition that they can establish (i) that they enjoy legal and financial autonomy, (ii) that they are governed by the rules of commercial law. To this end, public establishments and enterprises must provide any document (including their articles of association) enabling them to establish to the Agency's satisfaction (i) that they have a legal personality distinct from that of their State, (ii) that they do not receive any public subsidy or significant budgetary aid, (iii) that they are governed by the provisions of commercial law and that, in particular, they are not obliged to transfer their financial

No	Environment, Social, Health and Safety (ESHS) Requirements
	surpluses to their State, that they may acquire rights and obligations, borrow funds, are liable for repayment of their debts and may be subject to bankruptcy proceedings.
9.4.	In order to promote sustainable development, the Contractor and its sub-contractors shall comply with internationally recognized environmental and social standards.
9.5.	The Contractor shall respect and ensure respect by all its subcontractors, in accordance with the laws and regulations applicable in the country where the project is carried out, of the environmental and social standards recognized by the international community, including the fundamental conventions of the International Labour Organization (ILO) and international conventions for the protection of the environment.
9.6.	The Contractor shall implement environmental and social risk mitigation measures as defined in the environmental and social management plan or, where applicable, in the environmental and social impact statement provided by the Employer.

10 APPENDIX 3 – Template of a Site Description

<Specific to Each Package>

A. GENERAL INFORMATION		
Location		
Site ID		
Site Name (following the naming convention)		
GPS Surveyed Latitude	S Deg	x° x' x''
GPS Surveyed Longitude	E Deg	x° x' x''
GPS Datum		
Site Address		
B. MAP LOCATION		

C. SITE PICTURE LOCATION		TAKING DATE; DD-MM-YYYY	
DIRECTION TO 0°		DIRECTION TO 45°	
DIRECTION TO 90°		DIRECTION TO 135°	
DIRECTION TO 180°		DIRECTION TO 225°	
DIRECTION TO 270°		DIRECTION TO 315°	

ROAD TO LOCATION	JETTY TO LOCATION
BOAT TO LOCATION	OTHER
OTHER	OTHER

OTHER	OTHER

D. SITE CONDITION**D.1. CLIMATIC CONDITION**

Temperature (last 10 years , 2010-2019)	Min = x°	Max = y°	Av = z°
Rainfall (last 10 years , 2010-2019)	Min = x mm	Max = y mm	Av = z mm
Wind Speed (last 10 years , 2010-2019)	Min = x m/s (x knot)	Min = y m/s (y knot)	Av = z m/s (z knot)
Relative Humidity (last 10 years , 2010-2019)	Min = x %	Max = y %	Av = z %
Wave (last 10 years , 2010-2019)	Min = x m	Max = y m	Av = z m
Tidal (last 10 years , 2010-2019)	Min = x m	Max = y m	Av = z m

D.2. TOPOGRAPHIC AND GEOGRAPHIC CONDITION

Ground Elevation / MSL	(+/-) x.x msl
Depth of sea (if build on ocean)	x m
Surrounding Site Location	<input type="checkbox"/> Ocean <input type="checkbox"/> Residential Area. <input type="checkbox"/> Rock / Stone <input type="checkbox"/> Coastal / Beach <input type="checkbox"/> Commercial Area <input type="checkbox"/> Swamp <input type="checkbox"/> Forest <input type="checkbox"/> Industrial Area. <input type="checkbox"/> Roadside <input type="checkbox"/> Mangrove Agricultural Area. <input type="checkbox"/> Others: <input type="checkbox"/> Mountain <input type="checkbox"/> Airport / Harbour

Disaster Risk	<input type="checkbox"/> Typhoon <input type="checkbox"/> Flood <input type="checkbox"/> Landslide <input type="checkbox"/> Volcano	<input type="checkbox"/> Earthquake <input type="checkbox"/> Tsunami <input type="checkbox"/> Liquefaction <input type="checkbox"/> Forest fires	<input type="checkbox"/> Extreme Lightning <input type="checkbox"/> Storm <input type="checkbox"/> Others:
Earthquake Zone (Seismic Hazard Maps of Indonesian 2017)			
Level of difficulties for construction or equipment installation	<input type="checkbox"/> Easy	<input type="checkbox"/> Normal	<input checked="" type="checkbox"/> Hard
Other Information:			

11 APPENDIX 4 – Example of Interface Control Document

This example is based on FTP protocol in “push” mode.

11.1. Purpose of the document

This document is to specify the data exchange from <system 1> to <system 2>

<If relevant, insert a figure representing the dataflow between the two systems>

11.2. Summary of the exchanged data

<fill hereunder table>

Data name	Description	Used Format	Used Protocol
<name 1>	<quick description>	<Refer to the relevant sub-paragraph of data format paragraph>	<Refer to the relevant sub-paragraph of protocol paragraph>
<name 2>	<quick description>	<Refer to the relevant sub-paragraph of data format paragraph>	<Refer to the relevant sub-paragraph of protocol paragraph>

11.3. Data formats description

11.3.1. <Format 1>

<insert here a very detailed data format description>

11.3.2. <Format 2>

<insert here a very detailed data format description>

11.4. Protocols description

<Protocol 1>

<insert here a very detailed data format description. Hereunder an example with FTP protocol>

Common rules

- A FTP connection to <system 2> is regularly initiated by <system 1>. o IP connection:
222.252.25.130:2121
 - Login = <To be defined>
 - Password =<To be defined>
- Deposit directory = <data type> (There is a deposit directory specific to each type of data)
- The files are “pushed” by <system 1> with a temporary name
- When the transfer is completed, the file is renamed with a final name
- Then the connection is closed by <system 1>

Rules for <name 1>

- Deposit Directory = <name 1>
- Temporary File name = **DataLocation_YYMMddHHmm.tmp**
- Final File name = **SystemLocation_YYMMddHHmm**

Where **SystemLocation** = unique identifier (for example Latitude-longitude of the system, or location name) and **YYMMddHHmm** = timestamp

PART 3 – Conditions of Contract and Contract Forms

Section VIII – General Conditions of Contract (GCC)

Section VIII – General Conditions of Contract (GCC)

The Conditions of Contract are the "General Conditions" which form part of the *Conditions of Contract for Design, Build and Operate Projects first edition 2008* published by the Fédération Internationale Des Ingénieurs-Conseils (FIDIC) and the following "Particular Conditions" which include amendments and addition to such General Conditions.

For the 2008 Gold Book:

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The Conditions of Contract are the "General Conditions" which form part of the "Conditions of Contract for Design, Build and Operate Projects first edition 2008" published by the Fédération Internationale Des Ingénieurs – Conseils (FIDIC) and the following "Particular Conditions" which comprise of AFD's amendments and additions to such General Conditions.

An original copy of the above FIDIC publication i.e. "Conditions of Contract for Design, Build and Operate Projects" must be obtained from FIDIC.

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**Appendix –
General Conditions of Dispute Adjudication Agreement is replaced with the
following:**

**APPENDIX A –
General Conditions of Dispute Board Agreement**

- 1 Definition** Each "Dispute Board Agreement" is a tripartite agreement by and between:
- a) The "Employer";
 - b) The "Contractor"; and
 - c) The "Member" who is defined in the Dispute Board Agreement as being:
 - (i) The sole member of the DB ("Dispute Board") or the Operation Service DB (as appropriate), and, where this is the case, all references to the "Other Members" do not apply, or
 - (ii) One of the three persons who are jointly called the "DB" and, where this is the case, the other two persons are called the Other Members".
- The Employer and the Contractor have entered (or intend to enter) into a contract, which is called the "Contract" and is defined in the Dispute Board Agreement, which incorporates this Appendix. In the Dispute Board Agreement, words and expressions which are not otherwise defined shall have the meanings assigned to them in the Contract.
- 2 General Provision** Unless otherwise stated in the Dispute Board Agreement, it shall take effect on the latest of the following dates:
- a) The Commencement Date defined in the Contract;
 - b) When the Employer, the Contractor and the Member have each signed the Dispute Board Agreement; or
 - c) When the Employer, the Contractor and each of the Other Members (if any) have respectively each signed a Dispute Board Agreement.
- This employment of the Member is a personal appointment. At any time, the Member may give not less than 70-days' Notice of resignation to the Employer and to the Contractor, and the Dispute Board Agreement shall terminate upon the expiry of this period.
- The language to be used in all communications, reports, decisions and during all meetings and hearings relating to the business of either the DB or the Operation Service DB shall be the language for communications stated in the Contract Data.
- 3 Warranties** The Member warrants and agrees that he/she is and shall be impartial and independent of the Employer, the Contractor and the Employer's Representative. The Member shall promptly disclose, to each of them and to the Other Members (if any), any fact or circumstance which might appear inconsistent with his/her warranty and agreement of impartiality and independence.
- When appointing the Member, the Employer and the Contractor relied upon the Member's representations that he/she is:
- a) Experienced in the work which the Contractor is to carry out under the Contract;

- b) Experienced in the interpretation of contract documentation; and
- c) Fluent in the language for communications defined in the Contract.

If there is a challenge of a DB Member by either Party or, in the case of a three-person DB, jointly by the Other Members, for lack of independence, notwithstanding any disclosure made or not made by that Member under Clause 4 *[General Obligations of the Member]* of these General Conditions of Dispute Board Agreement, the challenging Party or Members (as the case may be) may refer the alleged lack of independence to the appointing entity named in the Contract Data under Sub-Clause 20.4 *[Failure to Agree Dispute Board]* of the General Conditions of Contract. If the appointing entity considers it to be prudent or necessary, it may refer the matter to an independent professional person or body (such as the International Chamber of Commerce) to review and assess the challenge. If such person or body is of the opinion that the Member in question is no longer independent as required by the terms of the Dispute Board Agreement, the Member shall be removed from the DB and the appointing entity shall, without delay, appoint a new Member. Any costs or fees due to the independent person or body shall be shared equally between the Parties.

4 General Obligations of the Member

The Member shall:

- a) Have no interest financial or otherwise in the Employer, the Contractor or Employer's Representative, nor any financial interest in the Contract except for payment under the Dispute Board Agreement;
- b) Not previously have been employed as a consultant or otherwise by the Employer, the Contractor or the Employer's Representative, except in such circumstances as were disclosed in writing to the Employer and the Contractor before they signed the Dispute Board Agreement;
- c) Have disclosed in writing to the Employer, the Contractor and the Other Members (if any), before entering into the Dispute Board Agreement and to his/her best knowledge and recollection, any professional or personal relationships with any director, officer or employee of the Employer, the Contractor or the Employer's Representative, and any previous involvement in the overall project of which the Contract forms part;
- d) Not, for the duration of the Dispute Board Agreement, be employed as a consultant or otherwise by the Employer, the Contractor or the Employer's Representative, except as may be agreed in writing by the Employer, the Contractor and the Other Members (if any);
- e) Comply with the annexed "Procedural Rules for Dispute Board Members" ("Rules") and with Sub-Clause 20.5 *[Avoidance of Disputes]* of the General Conditions of Contract;
- f) Not give advice to the Employer, the Contractor, the Employer's Personnel or the Contractor's Personnel concerning the conduct of the Contract, other than in accordance with the annexed procedural Rules;
- g) Not while a Member enter into discussions or make any agreement with the Employer, the Contractor or the Employer's Representative regarding employment by any of them, whether as a consultant or otherwise, after ceasing to act under the Dispute Board Agreement;
- h) Ensure his/her availability for all Site visits and hearings as are necessary;
- i) Become conversant with the Contract and with the progress of the Works (and of any other parts of the project of which the Contract

forms part) by studying all documents received which shall be maintained in a current working file;

- j) Treat the details of the Contract and all the DB's activities and hearings as private and confidential, and not publish or disclose them without the prior written consent of the Employer, the Contractor and the Other Members (if any); and
- k) Be available to give advice and opinions, on any matter relevant to the Contract when requested by both the Employer and the Contractor, subject to the agreement of the Other Members (if any).

5 General Obligations of the Employers and the Contractor

The Employer, the Contractor, the Employer's Personnel and the Contractor's Personnel shall not request advice from or consultation with the Member regarding the Contract, otherwise than in the normal course of the DB's activities under the Contract and the Dispute Board Agreement. The Employer and the Contractor shall be responsible for compliance with this provision, by the Employer's Personnel and the Contractor's Personnel respectively.

The Employer and the Contractor undertake to each other and to the Member that the Member shall not, except as otherwise agreed in writing by the Employer, the Contractor, the Member and the Other Members (if any):

- a) Be appointed as an arbitrator in any arbitration under the Contract;
- b) Be called as a witness to give evidence concerning any Dispute before arbitrator(s) appointed for any arbitration under the Contract; or
- c) Be liable for any claims for anything done or omitted in the discharge or purported discharge of the Member's functions, unless the act or omission is shown to have been in bad faith.

The Employer and the Contractor hereby jointly and severally indemnify and hold the Member harmless against and from claims from which he is relieved from liability under the preceding paragraph.

Whenever the Employer or the Contractor refers a Dispute to the DB or the Operation Service DB under Sub-Clause 20.6 [*Obtaining Dispute Board's Decision*] or Sub-Clause 20.10 [*Disputes Arising during the Operation Service Period*] of the General Conditions of Contract, which will require the Member to make a Site visit and attend a hearing, the referring Party shall provide appropriate security for a sum equivalent to the reasonable expenses to be incurred by the Member. No account shall be taken of any other payments due or paid to the Member.

6 Payment

The Member shall be paid as follows, in the currency named in the Dispute Board Agreement:

- a) A retainer fee per calendar month, which shall be considered as payment in full for:
 - (i) Being available on 28 days' notice for all Site visits and hearings;
 - (ii) Becoming and remaining conversant with all project developments and maintaining relevant files, in accordance with sub-paragraph (i) of Clause 4 hereof [*General Obligations of the Member*];
 - (iii) (All office and overhead expenses including secretarial services, photocopying and office supplies incurred in connection with his duties; and
 - (iv) All services performed hereunder except those referred to in sub-paragraphs (b) and (c) of this Clause.

The retainer fee shall be paid with effect from the last day of the calendar month in which the Dispute Board Agreement becomes effective; until the last day of the calendar month in which the Commissioning Certificate is issued for the whole of the Works.

During the periods when the Operation Service DB is acting, the retainer fee shall be paid monthly until the end of the month in which the appointment expires or is otherwise terminated, or the Member resigns.

- b) A daily fee which shall be considered as payment in full for:
 - (i) Each day or part of a day up to a maximum of two days' travel time in each direction for the journey between the Member's home and the Site, or another location of a meeting with the Other Members (if any);
 - (ii) Each working day on Site visits, hearings or preparing decisions; and
 - (iii) Each day spent reading submissions in preparation for a hearing;
- c) All reasonable expenses including necessary travel expenses (air fare in less than first class, hotel and subsistence and other direct travel expenses, including visa charges) incurred in connection with the Member's duties, as well as the cost of telephone calls, courier charges and faxes: a receipt shall be required for each item in excess of five percent (5%) of the daily fee referred to in sub-paragraph (b) of this Clause;
- d) Any taxes properly levied in the Country on payments made to the Member (unless a national or permanent resident of the Country) under this Clause 6.

The retainer and daily fees shall be as specified in the Dispute Board Agreement. Unless it specifies otherwise, these fees shall remain fixed for the first 24 calendar months, and shall thereafter be adjusted by agreement between the Employer, the Contractor and the Member, at each anniversary of the date on which the Dispute Board Agreement became effective.

If the parties fail to agree on the retainer fee or the daily fee, the appointing entity or official named in the Contract Data shall determine the amount of the fees to be used.

The Member shall submit invoices for payment of the monthly retainer and air fares quarterly in advance. Invoices for other expenses and for daily fees shall be submitted following the conclusion of a Site visit or hearing. All invoices shall be accompanied by a brief description of activities performed during the relevant period and shall be addressed to the Contractor.

The Contractor shall pay each of the Member's invoices in full within 56 calendar days after receiving each invoice and shall apply to the Employer (in the Statements under the Contract) for reimbursement of one-half of the amounts of these invoices. The Employer shall then pay the Contractor in accordance with the Contract.

If the Contractor fails to pay to the Member the amount to which he/she is entitled under the Dispute Board Agreement, the Employer shall pay the amount due to the Member and any other amount which may be required to maintain the operation of the DB; and without prejudice to the Employer's rights or remedies. In addition to all other rights arising from this default, the Employer shall be entitled to reimbursement of all sums paid in excess of one-half of these payments, plus all costs of recovering these sums and financing charges calculated at the rate specified in Sub-Clause 14.9 *[Delayed Payment]* of the Conditions of Contract.

If the Member does not receive payment of the amount due within 70 days after submitting a valid invoice, the Member may (i) suspend his/her services (without Notice) until the payment is received, and/or (ii) resign his/her appointment by giving notice under Clause 7 hereof.

7 Default and Termination

At any time: (i) the Employer and the Contractor may jointly terminate the Dispute Board Agreement by giving 42 days' Notice to the Member; or (ii) the Member may resign as provided for in Clause 2.

If the Member fails to comply with the Dispute Board Agreement, the Employer and the Contractor may, without prejudice to their other rights, terminate it by Notice to the Member. The Notice shall take effect when received by the Member.

If the Employer or the Contractor fails to comply with the Dispute Board Agreement, the Member may, without prejudice to his other rights, terminate it by Notice to the Employer and the Contractor. The Notice shall take effect when received by them both.

Any such Notice, resignation and termination shall be final and binding on the Employer, the Contractor and the Member. However, a Notice by the Employer or the Contractor, but not by both, shall be of no effect.

If the Member fails to comply with any of his obligations under Clause 4 (a) - (d) above, he shall not be entitled to any fees or expenses hereunder and shall, without prejudice to their other rights, reimburse each of the Employer and the Contractor for any fees and expenses received by the Member and the Other Members (if any), for proceedings or decisions (if any) of the DB or the Operation Service DB which are rendered void or ineffective by the said failure to comply.

If the Member fails to comply with any of his obligations under Clause 4 (e) - (k) above, he shall not be entitled to any fees or expenses hereunder from the date and to the extent of the non-compliance and shall, without prejudice to their other rights, reimburse each of the Employer and the Contractor for any fees and expenses already received by the Member, for proceedings or decisions (if any) of the DB which are rendered void or ineffective by the said failure to comply.

8 Disputes

Any Dispute or claim arising out of or in connection with this Dispute Board Agreement, or the breach, termination or invalidity thereof, shall be finally settled by institutional arbitration. If no other arbitration institute is agreed, the arbitration shall be conducted under the Rules of Arbitration of the International Chamber of Commerce by one arbitrator appointed in accordance with these Rules of Arbitration.

PROCEDURAL RULES FOR DISPUTE BOARD MEMBERS

1. Unless otherwise agreed by the Employer and the Contractor, the DB shall visit the Site at intervals of not more than 140 days, including times of critical construction events, at the request of either the Employer or the Contractor. Unless otherwise agreed by the Employer, the Contractor and the DB, the period between consecutive visits shall not be less than 70 days, except as required to convene a hearing as described below.
2. The timing of and agenda for each Site visit shall be as agreed jointly by the DB, the Employer and the Contractor, or in the absence of agreement, shall be decided by the DB. The purpose of Site visits is to enable the DB to become and remain acquainted with the progress of the Works and of any actual or potential problems or claims, and, as far as reasonable, to endeavour to prevent potential problems or claims from becoming Disputes.
3. Site visits shall be attended by the Employer, the Contractor and the Employer's Representative and shall be co-ordinated by the Employer in co-operation with the Contractor. The Employer shall ensure the provision of appropriate conference facilities and secretarial and copying services. At the conclusion of each Site visit and before leaving the Site, the DB shall prepare a report on its activities during the visit and shall send copies to the Employer and the Contractor.
4. The Employer and the Contractor shall furnish to the DB one copy of all documents which the DB may request, including Contract documents, progress reports, variation instructions, certificates and other documents pertinent to the performance of the Contract. All communications between the DB and the Employer or the Contractor shall be copied to the other Party. If the DB comprises three persons, the Employer and the Contractor shall send copies of these requested documents and these communications to each of these persons.
5. If any Dispute is referred to the DB in accordance with Sub-Clause 20.6 [Obtaining Dispute Board's Decision] or Sub-Clause 20.10 [*Disputes Arising during the Operation Service Period*] of the General Conditions of Contract, the DB shall proceed in accordance with the said Sub-Clauses 20.6 and 20.10, and these Rules, or as otherwise agreed by the Employer and the Contractor in writing. Subject to the time allowed to give Notice of a decision and other relevant factors, the DB shall:
 - a) Act fairly and impartially as between the Employer and the Contractor, giving each of them a reasonable opportunity of putting his case and responding to the other's case; and
 - b) Adopt procedures suitable to the Dispute, avoiding unnecessary delay or expense.
6. The DB may conduct a hearing on the Dispute, in which event it will decide on the date and place for the hearing and may request that written documentation and arguments from the Employer and the Contractor be presented to it prior to or at the hearing.
7. If, within 14 days after giving its decision, the members of the DB find and agree that such decision contained errors of fact or principle, the Chairman of the DB (or the sole Member if applicable) shall advise the Employer and the Contractor of the error and issue an addendum to its decision in writing to both Parties.
8. If, within 14 days of receiving a decision from the DB, either Party believes that such decision contains an ambiguity, that Party may seek clarification from the DB in writing with a copy of such request to the other Party. Within 14 days of receiving such a request, the DB shall respond with a copy to the other Party, and if the DB is of the opinion that the decision did contain an error or ambiguity, it may correct its decision by issuing an addendum to its original decision.
9. Except as otherwise agreed in writing by the Employer and the Contractor, the DB shall have power to adopt an inquisitorial procedure, to refuse admission to hearings or audience at hearings to any persons other than representatives of the Employer, the Contractor and the Employer's Representative, and to proceed in the absence of any party who the DB is satisfied received Notice of the hearing; but shall have discretion to decide whether and to what extent this power may be exercised.

10. The Employer and the Contractor empower the DB, among other things, to:
 - a) Establish the procedure to be applied in deciding a Dispute;
 - b) Decide upon the DB's own jurisdiction, and as to the scope of any Dispute referred to it;
 - c) Conduct any hearing as it thinks fit, not being bound by any rules or procedures other than those contained in the Contract and these Rules;
 - d) Take the initiative in ascertaining the facts and matters required for a decision;
 - e) Make use of its own specialist knowledge, if any;
 - f) Decide upon the payment of financing charges in accordance with the Contract;
 - g) Decide upon any provisional relief such as interim or conservatory measures; and
 - h) Open up, review and revise any certificate, decision, determination, instruction, opinion or valuation of the Employer's Representative, relevant to the Dispute.
11. The DB shall not express any opinions during any hearing concerning the merits of any arguments advanced by the Parties. Thereafter, the DB shall make and give its decision in accordance with Sub-Clause 20.6 [*Obtaining Dispute Board's Decision*], or as otherwise agreed by the Employer and the Contractor in writing. If the DB comprises three persons:
 - a) It shall convene in private after a hearing, in order to have discussions and prepare its decision;
 - b) It shall endeavour to reach a unanimous decision: if this proves impossible the applicable decision shall be made by a majority of the Members, who may require the minority Member to prepare a written report for submission to the Employer and the Contractor; and
 - c) If a Member fails to attend a meeting or hearing, or to fulfil any required function, the other two Members may nevertheless proceed to make a decision; unless:
 - (i) Either the Employer or the Contractor does not agree that they do so; or
 - (ii) The absent Member is the chairman and he/she instructs the other Members not to make a decision.

APPENDIX B – Corrupt and Fraudulent Practices Policy – Social and Environmental Responsibility

1. Corrupt and Fraudulent Practices

The Contracting Authority and the suppliers, contractors, subcontractors, consultants or subconsultants must observe the highest standard of ethics during the procurement process and performance of the contract. The Contracting Authority means the Purchaser, the Employer, the Client, as the case may be, for the procurement of goods, works, plants, consulting services or non-consulting services.

By signing the Statement of Integrity the suppliers, contractors, subcontractors, consultants or subconsultants declare that (i) “it did not engage in any practice likely to influence the contract award process to the Contracting Authority’s detriment, and that it did not and will not get involved in any anti-competitive practice”, and that (ii) “the procurement process and the performance of the contract did not and shall not give rise to any act of corruption or fraud”.

Moreover, AFD requires including in the Procurement Documents and AFD-financed contracts a provision requiring that suppliers, contractors, subcontractors, consultants or subconsultants will permit AFD to inspect their accounts and records relating to the procurement process and performance of the AFD-financed contract, and to have them audited by auditors appointed by AFD.

AFD reserves the right to take any action it deems appropriate to check that these ethics rules are observed and reserves, in particular, the rights to:

- a) Reject a proposal for a contract award if it is established that during the selection process the bidder or consultant that is recommended for the award has been convicted of corruption, directly or by means of an agent, or has engaged in fraud or anti-competitive practices in view of being awarded the Contract;
- b) Declare misprocurement when it is established that, at any time, the Contracting Authority, the suppliers, contractors, subcontractors, consultants or subconsultants their representatives have engaged in acts of corruption, fraud or anti-competitive practices during the procurement process or performance of the contract without the Contracting Authority having taken appropriate action in due time satisfactory to AFD to remedy the situation, including by failing to inform AFD at the time they knew of such practices.

AFD defines, for the purposes of this provision, the terms set forth below as follows:

- a) Corruption of a Public Officer means:
 - The act of promising, offering or giving to a Public Officer, directly or indirectly, an undue advantage of any kind for himself or for another Person¹ or entity, for such Public Officer to act or refrain from acting in his official capacity; or
 - The act by which a Public Officer solicits or accepts, directly or indirectly, an undue advantage of any kind for himself or for another Person or entity, for such Public Officer to act or refrain from acting in his official capacity.
- b) A Public Officer shall be construed as meaning:
 - Any person who holds a legislative, executive, administrative or judicial mandate (within the country of the Contracting Authority) regardless of whether that natural Person was nominated or elected, regardless of the permanent or temporary, paid or unpaid nature of the position and regardless of the hierarchical level the natural Person occupies;
 - Any other natural Person who performs a public function, including for a State institution or a State-owned company, or who provides a public service;

¹ Means any Person whether natural or legal, firm, company, corporation, government, state or state agency or any association, or group of two or more of the foregoing (whether or not having separate legal status).

- Any other natural Person defined as a Public Officer by the national laws of the country of the Contracting Authority.
- c) Corruption of a Private Person² means:
- The act of promising, offering or giving to any Private Person, directly or indirectly, an undue advantage of any kind for himself or for another Person or entity, for such Private Person to perform or refrain from performing any act in breach of its legal, contractual or professional obligations; or;
 - The act by which any Private Person solicits or accepts, directly or indirectly, an undue advantage of any kind for himself or for another Person or entity, for such Private Person to perform or refrain from performing any act in breach of its legal, contractual or professional obligations.
- d) Fraud means any dishonest conduct (act or omission), whether or not it constitutes a criminal offence, deliberately intended to deceive others, to intentionally conceal items, to violate or vitiate consent, to circumvent legal or regulatory requirements and/or to violate internal rules in order to obtain illegitimate profit.
- e) Anti-competitive practices mean:
- Any concerted or implied practices which have as their object or effect the prevention, restriction or distortion of competition within a marketplace, especially where they (i) limit access to the marketplace or free exercise of competition by other undertakings, (ii) prevent free, competition-driven price determination by artificially causing price increases or decreases, (iii) restrict or control production, markets, investments or technical progress; or (iv) divide up market shares or sources of supply;
 - Any abuse by one undertaking or a group of undertakings which hold a dominant position on an internal market or on a substantial part of it;
 - Any practice whereby prices are quoted or set unreasonably low, the object of which is to eliminate an undertaking or any of its products from a market or to prevent it from entering the market.

2. Environmental and Social Responsibility

In order to promote sustainable development, AFD seeks to ensure that internationally recognised environmental and social standards are complied with. Suppliers, contractors, subcontractors, consultants or subconsultants for AFD-financed contracts shall consequently undertake in the Statement of Integrity to:

- a) Comply with and ensure that all their subcontractors or subconsultants comply with international environmental and labour standards, consistent with applicable law and regulations in the country of implementation of the contract, including the fundamental conventions of the International Labour Organisation (ILO) and international environmental treaties;
- b) Implement environmental and social risks mitigation measures when specified in the environmental and social management plan (ESMP) provided by the Contracting Authority.

² Means any natural Person other than a Public Officer.

APPENDIX C – Eligibility Criteria

Eligibility in AFD-Financed Procurement

1. Financing allocated by AFD to a Contracting Authority has been entirely untied since 1st January 2002. To the exception of any equipment or any sector which is subject to an embargo by the United Nations, the European Union or France, all goods, works, plants, consulting services and non-consulting services are eligible for AFD financing regardless of the country of origin of the supplier, contractor, subcontractor, consultant or subconsultant inputs or resources used in the implementation processes. The Contracting Authority means the Purchaser, the Employer, the Client, as the case may be, for the procurement of goods, works, plants, consulting services or non-consulting services.
2. Natural or legal Persons¹ (including all members of a joint venture or any of their suppliers, contractors, subcontractors, consultants or subconsultants) shall not be awarded an AFD-financed contract if, on the date of submission of an application, a bid or a proposal, or on the date of award of a contract, they:
 - 2.1 Are bankrupt or being wound up or ceasing their activities, are having their activities administered by the courts, have entered into receivership, or are in any analogous situation arising from a similar procedure;
 - 2.2 Have been:
 - d) convicted, within the past five years by a court decision, which has the force of res judicata in the country where the contract is implemented, of fraud, corruption or of any other offense committed during a procurement process or performance of a contract, unless they provide supporting information together with their Statement of Integrity (Form available as Appendix to the Application, Bid or Proposal Submission Form) which shows that this conviction is not relevant in the context of the Contract;
 - e) subject to an administrative sanction within the past five years by the European Union or by the competent authorities of the country where they are constituted, for fraud, corruption or for any other offense committed during a procurement process or performance of a contract, unless they provide supporting information together with their Statement of Integrity (Form available as Appendix to the Application, Bid or Proposal Submission Form) which shows that this sanction is not relevant in the context of the Contract;
 - f) convicted, within the past five years by a court decision, which has the force of res judicata, of fraud, corruption or of any other offense committed during the procurement process or performance of an AFD-financed contract;
 - 2.3 Are listed for financial sanctions by the United Nations, the European Union and/or France for the purposes of fight-against-terrorist financing or threat to international peace and security;
 - 2.4 Have been subject within the past five years to a contract termination fully settled against them for significant or persistent failure to comply with their contractual obligations during contract performance, unless this termination was challenged and dispute resolution is still pending or has not confirmed a full settlement against them;
 - 2.5 Have not fulfilled their fiscal obligations regarding payments of taxes in accordance with the legal provisions of either the country where they are constituted or the Contracting Authority's country;

¹ Means any Person whether natural or legal, firm, company, corporation, government, state or state agency or any association, or group of two or more of the foregoing (whether or not having separate legal status).

- 2.6 Are subject to an exclusion decision of the World Bank and are listed on the website <http://www.worldbank.org/debar>, unless they provide supporting information together with their Statement of Integrity (Form available as Appendix to the Application, Bid or Proposal Submission Form) which shows that this exclusion is not relevant in the context of the Contract;
 - 2.7 Have created false documents or committed misrepresentation in documentation requested by the Contracting Authority as part of the procurement process of the Contract.
3. State-owned entities may compete only if they can establish that they (i) are legally and financially autonomous, and (ii) operate under commercial law. To be eligible, a state-owned entity shall establish to AFD's satisfaction, through all relevant documents, including its Charter and other information AFD may request, that it: (i) is a legal entity separate from their state (ii) does not currently receive substantial subsidies or budget support; (iii) operates like any commercial enterprise, and, inter alia, is not obliged to pass on its surplus to their state, can acquire rights and liabilities, borrow funds and be liable for repayment of its debts, and can be declared bankrupt.

Section IX – Particular Conditions of Contract (PCC)

Section IX – Particular Conditions of Contract (PCC)

INTRODUCTION

The **Conditions of Contract** comprise the "**General Conditions**", which form part of the "Conditions of Contract for Design, Build and Operate Projects First Edition 2008" published by the Fédération Internationale des Ingénieurs-Conseils (FIDIC), "**Particular Conditions Part A - Contract Data**" and "**Particular Conditions Part B – Special Provisions**", which include amendments and additions to the General Conditions.

The provisions in the Particular Conditions Part B – Special Provisions take precedence over the equivalent provisions under the same Sub-Clause number(s) in the General Conditions, and the provisions of the Particular Conditions Part A – Contract Data take precedence over the Particular Conditions Part B – Special Provisions. Any other parts of the General Conditions not referred to in the following Particular Conditions Part B – Special Provisions, shall remain unchanged and valid for the application of the Contract.

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Part A – Contract Data

Conditions	Sub-Clause	Data
Contract name and identification	N/A	Development of Maritime Meteorological Information System in Indonesia (MMS)-2 : Procurement of the Modelling System with Big Data and Artificial Intelligence (including maritime observation, equipment, remote sensing, and system integration)
Contractor's Key Personnel names and contact details:	1.1.21 & 6.9	
Cut-Off Date (number of days after the Time for Completion of Design-Build):	1.1.26	182 days
Employer's name and address:	1.1.32	BMKG (Badan Meteorologi, Klimatologi, dan Geofisika) Jl. Angkasa I No.2, Kemayoran, Jakarta Pusat 10610
Employer's Representative's (/The Engineer's) name and address: – For the Design Build Period: – For the Operation Service Period:	1.1.35	Bambang Setiyo Prayitno as Pejabat Pembuat Komitmen ("PPK") STR II – MMS- Package 3 BMKG (Badan Meteorologi, Klimatologi, dan Geofisika) Jl. Angkasa I No.2, Kemayoran, Jakarta Pusat 10610 The Employer is acting as the Employer's Representative. PPK STR II – MMS-2 PPK STR II – MMS-2
Parts of the Works that shall be designated a Section for the purposes of the Contract:	1.1.70	Referring to Part 3 (Phasing) of SECTION VII – Employer's Requirements
Time for Completion of Design-Build:	1.1.78 & 9.2	1095 days
Time for completion of each Section:	1.1.78 & 9.2	Referring to Part 3 (Phasing) of SECTION VII – Employer's Requirements
ESHS Specifications:	1.1.88	ESHS Specifications are applicable: <div style="text-align: right;">Yes <input checked="" type="checkbox"/> / No <input type="checkbox"/></div>

Agreed systems of electronic transmission:	1.3	E-mails, and any electronic document management system to be proposed by the Contractor and approved by the Employer.
Employer's Representative (/The Engineer's) contact details for communications: – For the Design-Build Period:	1.3	PPK MMS-2 Paket 3 Email : mms2.package3@bmkg.go.id Address : BMKG (Badan Meteorologi, Klimatologi, dan Geofisika), Jl. Angkasa I No.2, Kemayoran, Jakarta Pusat 10610 Telephone number : +62 21 4246321, +628128565374
– For the Operation Service Period:		PPK MMS-2 Paket 3 Email : mms2.package3@bmkg.go.id Address : BMKG (Badan Meteorologi, Klimatologi, dan Geofisika), Jl. Angkasa I No.2, Kemayoran, Jakarta Pusat 10610 Telephone number : +62 21 4246321, +628128565374
Contractor's name and address for communications:	1.3	
Governing Law:	1.4	Indonesian Law
Ruling Language:	1.4	Indonesian and English (English language will prevail in case of non-consistency)
Language for communications:	1.4	Indonesian and English
Time for access to the Site:	2.1	Referring to § 1.5.3 (Access to site during installation) of SECTION VII – Employer's Requirements
Employer's Representative's Duties and Authority:	3.1	The Employer's Representative has the authority to: <input checked="" type="checkbox"/> Issue any instruction resulting in substantial changes to the Works, or an increase of the Contract Price and/or an extension of the Time for Completion; <input checked="" type="checkbox"/> Proceed to Determination under Sub-Clause 3.5; <input checked="" type="checkbox"/> Issue Interim Payment Certificate under Sub-Clause 14.7; <input checked="" type="checkbox"/> Issuance of a Commissioning Certificate under Clause 10; <input checked="" type="checkbox"/> Instruct a Variation under Sub-Clause 13.1, and/or approving a proposal for Variation under Sub-Clause 13.3 submitted by the Contractor in accordance with Sub-Clause 13.1 or 13.2; <input checked="" type="checkbox"/> Specify the amount payable in each of the applicable currencies under Sub-clause 13.4; <input checked="" type="checkbox"/> Act under Sub-Clause 10.4; <input checked="" type="checkbox"/> Instruction for use of Provisional Sums under Sub-Clause 13.5.
Performance Security:	4.2	The Performance Security will be in the form of a demand guarantee in the amount(s) of 5% percent of the Accepted Contract Amount for the Design Build and in the same currency(ies) of the Accepted Contract Amount.
Subcontractors:	4.4	Direct Payment of Sub-contractors is not allowed
Period for notification of errors, faults, and other defects in the Employer's Requirements:	5.1	30 (thirty) days after the Commencement Date

Contractor's Documents requiring approval.	5.2	In addition to the documents listed in the Employer's Requirements, the Contractor shall provide the following documents as part of the Contract: a) Shop drawings to be approved by the Employer's Representative prior to starting the Works; b) As-built drawings to be approved by the Employer's Representative prior to completion of the Works; and c) Operation and maintenance manuals.
Normal working hours on the Site:	6.5	According to Indonesian regulations.
Locally recognized days of rest	6.5	According to Indonesian regulations.
Operation Service Period:	8.2	1095 days + 365 days = 1460 days
Extension of Time for Completion of Design-Build / Exceptionally adverse climatic conditions	9.3	(1 years X 365 days) = 365 days The following climate conditions are considered as exceptionally adverse for the purpose of an extension of the Time for Completion: - When conditions pose threats due to rain, wind, tropical cyclones, and forest fires, leading to flooding, flash floods, land slides, or other consequences of climate disasters, and these events are officially classified as a national disaster or declared a state of emergency by the Indonesian government, they thereby qualify as a force majeure situation.
Amount of delay damages	9.6	- 1/1000 of the Accepted Contract Amount for Design-Build.
Maximum amount of delay damages:	9.6	10% of the Accepted Contract Amount for Design-Build-Operate.
Commencement of Operation Service:	10.2	The Commencement of the Operation Service shall be since contract sign until project handover (certificate of project completion)
Maximum amount of compensation payable by Contractor:	10.6(a)	100% of the Accepted Contract Amount.
Maximum amount of compensation payable by Employer:	10.6(b)	100% of the Accepted Contract Amount.
Contract Price and Rates and Prices to be adjusted for changes in cost as further detailed in the Schedule of Payments: a) Design-Build b) Operation Service	13.8	 <input type="checkbox"/> Yes / <input type="checkbox"/> No <input type="checkbox"/> Yes / <input type="checkbox"/> No

The Contract Price:	14.1	<p>The following taxes, duties and fees exemptions apply to the Contract refer to AFD Agreement No CID 1080 01 D, Credit Facility Agreement (CFA), 9.4 Taxes and duties.</p> <p>Contractor and the employer shall not be held responsible for any taxes, stamp duty fees, import entry fees, and other tax provisions in Indonesia.</p> <p>Employer shall not be held responsible for any taxes, stamp duty fees, import entry fees, and other tax provisions occurring outside Indonesia whether directly or indirectly. "Therefore, those are the responsibility of the contractor"</p>
Amount of Advance Payment (percent of Accepted Contract Amount for the Design-Build):	14.2	15% of the accepted contract amount.
Percentage deductions for the repayment of the Advance Payment:	14.2	To be defined with the selected contractor (..... %).
Requirements for submission of Statements if different from the GCC and PCC:	14.3	1 (one) original and 5 (five) copies, and 1 (one) digital copy.
Minimum Amount of Interim Payment Certificate applicable for the Design-Build:	14.7(b)	2% of the accepted contract amount.
Currencies, Proportions and Rates of Exchange of Contract Price:	14.17	Euro
Currencies of Payment of damages shall be: <ul style="list-style-type: none"> - During the Design-Build - During the Operation Service: 	14.17	<ul style="list-style-type: none"> - During the Design-Build: Euro - During the Operation Service: Euro
Maximum total liability of the Contractor shall not exceed:	17.8	100% of the accepted contract amount.
Insurance for the Works - Permitted deductible limits:	19.2(a)(i)	To be negotiated, depending on Contract Amount.
Insurance for the Works – Employer's Risks:	19.2(a)(4)	To be negotiated, depending on Contract Amount.
Insurance for the Works – Exceptional Risks:	19.2(a)(5)	To be negotiated, depending on Contract Amount.
Insurance of Contractor's Equipment (minimum amount required):	19.2(b)	To be negotiated, depending on Contract Amount.
Minimum amount of professional liability insurance required during the Design- Build Period:	19.2(c)	To be negotiated, depending on Contract Amount.
Period for which professional liability insurance required during the Design-Build Period:	19.2(c)	To be negotiated, depending on Contract Amount.

Minimum amount of insurance required for injury to persons and damage to property:	19.2(d)	To be negotiated, depending on Contract Amount.
Other insurances required by Law and by local practice from the Contractor during Design- Build Period:	19.2(f)	Contractor is responsible to provide marine and cargo insurance with a coverage for 100% of the value of goods.
Minimum amount of fire extended cover insurance required:	19.3(a)	To be negotiated, depending on Contract Amount.
Minimum amount of insurance required to cover injury to any person and damage to property	19.3(b)	To be negotiated, depending on Contract Amount.
Other insurances required by Law and by local practice from the Contractor during the Operation Service Period:	19.3(d)	To be negotiated, depending on Contract Amount.
Minimum amount of professional liability insurance required during the Operation Service Period:	19.3(f)	To be negotiated, depending on Contract Amount.
Period for which professional liability insurance required during the Operation Service Period:	19.3(f)	To be negotiated, depending on Contract Amount.
Date of appointment of the Dispute Board (or DB):	20.3	28 days after the Commencement Date.
The DB shall be comprised of:	20.3	Three Members
Appointing entity (official) for DB members, if not agreed between Parties:	20.4	The President of FIDIC, or a person appointed by him/her.
Institution and rules administering the arbitration	20.8(a)	Arbitration institution: Singapore International Arbitration Center Arbitration Rules: SIAC Rules 2016
The place of arbitration:	20.8(a)	Singapore
Language of Arbitration	20.8(c)	English

Part B – Specific Provisions

CLAUSE 1: GENERAL PROVISIONS	
Sub-Clause 1.1 - Definitions	
Sub-Clause 1.1.1: Accepted Contract Amount	"Accepted Contract Amount" means the amount accepted in the Letter of Acceptance for the Design-Build of the Works and the provision of the Operation Service, including the amount of the Asset Replacement Fund.
Sub-Clause 1.1.2: Asset Replacement Fund	"Asset Replacement Fund" means the fund provided for under Sub- Clause 14.18 [Asset Replacement Fund].
Sub-Clause 1.1.3: Asset Replacement Schedule	"Asset Replacement Schedule" means the schedule referred to in Sub-Clause 14.5 [Asset Replacement Schedule] prepared by the Contractor covering the identification and timing of asset replacements.
Sub-Clause 1.1.4: Auditing Body	"Auditing Body" means the independent and impartial body appointed to conduct the Independent Compliance Audit in accordance with Sub- Clause 10.3 [Independent Compliance Audit].
Sub-Clause 1.1.5: Base Date	"Base Date" means the date 28 days prior to the latest date for submission of the Tender.
Sub-Clause 1.1.6: Commencement Date	"Commencement Date" means the date notified under Sub-Clause 8.1 [Commencement Date].
Sub-Clause 1.1.7: Commercial Risk	"Commercial Risk" means a risk which results in financial loss and/or time loss for either of the Parties, where insurance is not generally or commercially available.
Sub-Clause 1.1.8: Commissioning Certificate	"Commissioning Certificate" means the certificate issued by the Employer's Representative to the Contractor under Sub-Clause 11.7 [Commissioning Certificate] marking the end of the Design-Build Period under Sub-Clause 9.12 [Completion of Design-Build] and the commencement of the Operation Service Period.
Sub-Clause 1.1.9: Commissioning Period	"Commissioning Period" means that period of time when commissioning tests are being carried out.
Sub-Clause 1.1.10: Contract	"Contract" means the Contract Agreement, the Letter of Acceptance, the Letter of Tender, these Conditions, the Employer's Requirements, the Schedules, the Contractor's Proposal, the Operating License, and the further documents (if any) which are listed in the Contract Agreement or in the Letter of Acceptance
Sub-Clause 1.1.11: Contract Agreement	"Contract Agreement" means the Contract Agreement [if any) referred to in Sub-Clause 1.6 [Contract Agreement].
Sub-Clause 1.1.12: Contract Completion Certificate	"Contract Completion Certificate" means the certificate issued by the Employer's Representative under Sub-Clause 8.6 [Contract Completion Certificate].
Sub-Clause 1.1.13: Contract Completion Date	"Contract Completion Date" means the date contained in the Contract Completion Certificate as being the date on which the Operation Service has been completed.
Sub-Clause 1.1.14: Contract Data	"Contract Data" means the pages completed by the Employer entitled Contract Data which constitute Part A of the Particular Conditions
Sub-Clause 1.1.15: Contract Period	"Contract Period" means the Design-Build Period plus the Operation Service Period.

Sub-Clause 1.1.16: Contract Price	"Contract Price" means the price defined in Sub-Clause 14.1 [The Contract Price] and includes adjustments in accordance with the Contract.
Sub-Clause 1.1.17: Contractor	"Contractor" means the person named as Contractor in the Letter of Tender accepted by the Employer and the legal successors in title to this person.
Sub-Clause 1.1.18: Contractor's Equipment	"Contractor's Equipment" means all apparatus, machinery, vehicles and other things required for the execution and completion of the Works and the remedying of any defects. However, Contractor's Equipment excludes Temporary Works, Employer's Equipment (if any), Plant, Materials and any other things intended to form or forming part of the works.
Sub-Clause 1.1.19: Contractor's Documents	"Contractor's Documents" means the calculations, computer programs and other software, drawings, manuals, models, and other documents of a technical nature supplied by the Contractor under the Contract; as described in Sub-Clause 5.2 [Contractor's Documents].
Sub-Clause 1.1.20: Contractor's Proposal	"Contractor's Proposal" means the document entitled proposal, which the Contractor submitted with the Letter of Tender, as included in the Contract.
Sub-Clause 1.1.21: Contractor's Personnel	"Contractor's Personnel" means the Contractor's Representative and all personnel whom the Contractor utilizes on Site, including the staff, labour and other employees of the Contractor and of each Subcontractor, and any other personnel assisting the Contractor in the execution of the Works and provision of the Operation Service
Sub-Clause 1.1.22: Contractor's Representative	"Contractor's Representative" means the person named as such by the Contractor in the Contract or appointed from time to time by the Contractor under Sub-Clause 4.3 [Contractor's Representative] who acts on behalf of the Contractor.
Sub-Clause 1.1.23: Cost	"Cost" means all expenditure reasonably incurred (or to be incurred) by the Contractor, whether on or off the Site, including overhead and similar charges, but does not include profit.
Sub-Clause 1.1.24: Cost Plus Profit	"Cost Plus Profit" means Cost plus the applicable percentage agreed and stated in the Contract Data. Such percentage shall only be added where the Sub-Clause states that the Contractor is entitled to Cost Plus Profit.
Sub-Clause 1.1.25: Country	"Country" means the country in which the Site (or most of it) is located, where the Permanent Works are to be executed.
Sub-Clause 1.1.26: Cut-Off Date	"Cut-Off Date" means the date, at the end of a specified period stated in the Contract Data, after the Time for Completion of the Design-Build or any extension thereto granted under Sub-Clause 9.3 [Extension of Time for Completion of Design-Build].
Sub-Clause 1.1.51: Maintenance Retention Fund and Maintenance Retention Guarantee	"Maintenance Retention Fund" and "Maintenance Retention Guarantee" mean the fund and guarantee respectively provided for under Sub-Clause 14.19 [Maintenance Retention Fund].
Sub-Clause 1.1.62: Plant	"Plant" means the apparatus, machinery and vehicles intended to form or forming part of the Permanent Works including vehicles purchased for the Employer and relating to the construction or operation of the Works."
Sub-Clause 1.1.66: Retention Period	"Retention Period" means the period of 1 year after the date stated in the Commissioning Certificate for the completion of outstanding work.
Sub-Clause 1.1.72: Site	"Site" means the places where the Permanent Works are to be executed including storage and working areas and to which Plant and Materials are

	to be delivered, and where the Operation Service is to be provided, and any other places as may be specified in the Contract as forming part of the Site.
Sub-Clause 1.1.84: Accepted Contract Amount for the Design Build	"Accepted Contract Amount for the Design Build" means the amount accepted in the Letter of Acceptance for the Design-Build of the Works;"
Sub-Clause 1.1.85: Accepted Contract Amount for the Operation Service	"Accepted Contract Amount for the Operation Service" means the amount accepted in the Letter of Acceptance for the provision of the Operation Service;"
Sub-Clause 1.1.86: AFD	"AFD" means Agence Française de Développement, being specified that, according to French laws and regulations, AFD is not a bank but a Specialized Financial Institution ("Institution Financière Spécialisée").
Sub-Clause 1.1.87: EPP	"EPP" stands for Environmental Protection Plan, and has the meaning defined in the ESHS Specifications."
Sub-Clause 1.1.88: ESHS Specifications	"ESHS Specifications" means the document entitled environmental, social, health and safety specifications, as included in the Employer's Requirements, and any additions and modifications to it in accordance with the Contract. Such document specifies the environmental, social, health and safety obligations of the Contractor."
Sub-Clause 1.1.89: Existing Facilities	"Existing Facilities" means the existing plant, equipment, buildings and other assets at the Site to be taken over and operated by the Contractor as further described in the Employer's Requirements."
Sub-Clause 1.1.93: Performance Guarantees	"Performance Guarantees" means the standards to be achieved by the Contractor during the Operation Service Period and includes the standards specified in the Schedule of Performance Guarantees."
Sub-Clause 1.1.94: Project Area	"Project Area" has the meaning defined in the ESHS Specifications."
Sub-Clause 1.1.95: Schedule of Performance Guarantees	"Schedule of Performance Guarantees" means the schedule set out in Appendix 2 to the Contract Agreement specifying the core Performance Guarantees to be met by the Works and achieved by the Contractor at commissioning and throughout the whole Operation Service Period;"
Sub-Clause 1.1.96: Worksite - ESMP	"Worksite - ESMP" stands for Worksite Environmental and Social Management Plan, and has the meaning defined in the ESHS Specifications."
Sub-Clause 1.2: Interpretation	<p>"Unless inconsistent with any provision of the Contract, the meaning of any trade term and the rights and obligations of the Parties thereunder shall be prescribed by Incoterms. Incoterms means international rules for interpreting trade terms published by the International Chamber of Commerce (latest edition), 38 Cours Albert 1^{er}, 75008 Paris, France".</p> <ul style="list-style-type: none"> (a) Words indicating one gender include all genders; (b) words indicating the singular also include the plural and words indicating the plural also include the singular; (c) provisions including the word "agree", "agreed" or "agreement" require the agreement to be recorded in writing; (d) "written" or "in writing" means hand-written, type-written, printed, or electronically made, and resulting in a permanent record; (e) "shall" means that the Party or person referred to has an obligation under the Contract to perform the duty referred to; and (f) "may" means that the Party or person referred to has the choice of whether to act or not in the matter referred to.

	<ul style="list-style-type: none"> (g) "the word "Tender" is synonymous with "Bid" and "Tenderer" with "Bidder" and the words "Tender Documents" with "Bidding Documents"; (h) the words "Schedule of Guarantees" are synonymous with "Schedule of Performance Guarantees" under the Contract; (i) the words "Contractor's Proposal" are synonymous with "Contractor's Technical Bid".
Sub-Clause 1.3: Notices and Other Communications	<p>Wherever these Conditions provide for the giving or issuing of a Notice or other communication including approvals, certificates, consents, determinations, instructions, requests and discharges, such Notice or communication shall be:</p> <ul style="list-style-type: none"> (a) where it is a Notice, identified as a Notice and include reference to the Clause under which it is issued; (b) where it is another form of communication, identified as such, and include reference to the Clause under which it is issued where appropriate; (c) in writing and delivered by hand (against receipt), sent by mail or courier, or transmitted by using any of the agreed systems of electronic transmission as stated in the Contract Data. In case of electronic transmission, these communications shall be in the form of an un-editable record attached to an electronic mail, such as a PDF document for instance, and any other communication transmitted in a different manner, such as the email body text, shall not be construed as communication under the Contract; and (d) delivered, sent or transmitted to the address for the recipient's communications as stated in the Contract Data. However: <ul style="list-style-type: none"> (i) if the recipient gives Notice of another address, communications and Notices shall thereafter be delivered accordingly, and (ii) if the recipient has not stated otherwise when requesting an approval or consent, it may be sent to the address from which the request was issued. <p>Delivery of communications, by any authorized method of transmission, shall be made against receipt. Notices and other communications shall not be unreasonably withheld or delayed. When a certificate is issued to a Party, the certifier shall send a copy to the other Party. When a Notice is issued to a Party, by the other Party or the Employer's Representative, a copy shall be sent to the Employer's Representative or the other Party, as the case may be.</p>
Sub-Clause 1.5: Priority of Documents	<p>The documents forming the Contract are to be taken as mutually explanatory of one another. For the purposes of interpretation, the priority of the documents shall be in accordance with the following sequence:</p> <ul style="list-style-type: none"> (a) the Contract Agreement, (b) the Letter of Acceptance, (c) the Letter of Tender, (d) the Particular Conditions Part A – Contract Data, (e) the Particular Conditions Part B – Special Provisions, (f) these General Conditions, (g) the Employer's Requirements, (h) the Schedules, and (i) the Contractor's Proposal and any other documents forming part of the Contract.

	If an ambiguity or discrepancy is found in the documents, the Employer's Representative shall issue any necessary clarification or instruction.
Sub-Clause 1.6: Contract Agreement	The Parties shall enter into a Contract Agreement within 28 days after the Contractor receives the Letter of Acceptance unless Particular Conditions establish otherwise. The Contract Agreement shall be based upon the sample form included in the tender documents. The costs of stamp duties and similar charges (if any) imposed by law in connection with entry into the Contract Agreement shall be borne by the Employer
Sub-Clause 1.7: Operating License	<p>"In consideration of the Contractor's performance of the Operation Service, from the date of commencement of the Operation Service the Employer grants to the Contractor for the Operation Service Period, the exclusive right, license, and authority to occupy, use and enjoy the Site free of charge for the purposes of carrying the Operation Services.</p> <p>Together with the Letter of Acceptance, the Employer shall, where necessary, issue, or cause to be issued, to the Contractor the Operating License or equivalent legal authorization to enable the Contractor to operate and maintain the Works during the Operation Service Period."</p> <p>This Operating License shall come into full force and effect upon the issue of the Commissioning Certificate required under Clause 11.7 and shall remain in force during the Operation Service Period."</p> <p>The Operating License shall only extend to those parts of the Site which it is required to occupy for the purposes of carrying out the Works and Operation Service as set out in the Contract. The Operating License granted pursuant to this Sub-Clause shall not operate nor be deemed to operate as a tenement or a demise of the Site or any part thereof. The Contractor shall not have or be entitled to any estate right, title, or interest in the Site. The license will immediately terminate upon the termination of this Contract for whatever reason.</p>
Sub-Clause 1.8: Assignment	<p>(a) Except as provided in (b) and (c) below, neither Party shall assign the whole or any part of the Contract or any benefit or interest in or under the Contract without the consent of the other Party.</p> <p>(b) The Contractor may as security in favor of a bank or financial institution, assign its right to any monies due, or to become due, under the Contract.</p> <p>(c) During the Operation Service Period, the Employer may assign the whole of the Contract to any third party, subject to the following:</p> <p>(i) The Employer shall provide at least 90 days' written Notice to the Contractor of its intention to assign the Contract. Such Notice shall specify the financial arrangements that have been made for payment of the Contract Price to the Contractor.</p> <p>(ii) The Employer shall not assign the Contract until reasonable evidence has been provided to the Contractor that financial arrangements have been made, and will be maintained, which will enable the third party to pay the Contract Price at the times and in the manner prescribed by the Contract.</p>
Sub-Clause 1.9: Care and Supply of Documents	Each of the Contractor's Documents shall be in the custody and care of the Contractor, unless and until taken over by the Employer. The Contractor shall supply to the Employer's Representative / the Engineers each of the Contractor's Documents in one (1) soft (digital) copy and two (2) hard (paper) copies.

	<p>The Contractor shall keep on the Site, a copy of the Contract, publications named in the Particular Conditions of Contract, the Contractor's Documents, and Variations, and other communications given under the Contract. The Employer's Personnel shall have the right of access to all these documents at all reasonable times.</p> <p>If a Party becomes aware of an error or defect in a document which was prepared for use in executing the Works, the Party shall promptly give Notice to the other Party of such error or defect.</p>
Sub-Clause 1.11: Employer's Use of Contractor's Documents	<p>As between the Parties, the Contractor shall retain the copyright and other intellectual property rights in the Contractor's Documents and other design documents made by (or on behalf of) the Contractor.</p> <p>The Contractor shall be deemed (by signing the Contract) to give to the Employer a non-terminable transferable non-exclusive royalty-free license to copy, use and communicate the Contractor's Documents, including making and using modifications of them. This license shall:</p> <ul style="list-style-type: none"> (a) apply throughout the actual or intended working life (whichever is longer) of the relevant part of the Works. (b) entitle any person in proper possession of the relevant part of the Works to copy, use and communicate the Contractor's Documents for the purposes of completing, operating, maintaining, altering, adjusting, repairing, and demolishing the Works; (c) in the case of Contractor's Documents which are in the form of computer programs and other software, permit their use on any computer on the Site and other places as envisaged by the Contract, including replacements of any computers supplied by the Contractor; and (d) enable the Employer to relet the Contract as provided for under Sub-Clause 15.2 [Termination for Contractor's Default]. <p>The Contractor's Documents and other design documents made by (or on behalf of) the Contractor shall not, without the Contractor's consent, be used, copied, or communicated to a third party by (or on behalf of) the Employer for purposes other than those permitted under this Sub-Clause.</p>
Sub-Clause 1.13: Confidential Details	<p>The Contractor's Personnel and the Employer's Personnel shall disclose all such confidential and other information as may be reasonably required in order to verify compliance with the Contract and allow its proper implementation.</p> <p>Each of them shall treat the details of the Contract as private and confidential, except to the extent necessary to carry out their respective obligations under the Contract or to comply with applicable Laws. Each of them shall not publish or disclose any particulars of the Works prepared by the other Party without the previous agreement of the other Party. However:</p> <ul style="list-style-type: none"> (a) The Contractor shall be permitted to disclose any publicly available information, or information otherwise required to establish his qualifications to compete for other projects; (b) The Employer shall be permitted to disclose any detail that the Contractor has not classified as confidential; and (c) Such restrictions shall not relate to the Employer when exercising his rights under Sub-Clause 15.2 [Termination for Contractor's Default]."
Sub-Clause 1.14: Compliance with Laws	<p>The Contractor shall, in performing the Contract, comply with applicable Laws. Unless otherwise stated in the Employer's Requirements:</p>

	<p>(a) the Employer shall have obtained (or shall obtain) the planning, zoning, building permit, or similar permission for the Permanent Works and for the Operation Service, and any other permissions described in the Employer's Requirements as having been (or being) obtained by the Employer; and the Employer shall indemnify and hold the Contractor harmless against and from the consequences of any failure to do so;</p> <p>(b) the Contractor shall give all notices, pay all taxes, duties, and fees, and obtain all further permits, licenses, and approvals, as required by the Laws, in relation to the design, execution, and completion of the Works and Operation Service and the remedying of any defects; unless the Contractor is impeded to accomplish these actions and shows evidence of its diligence; and</p> <p>(c) the Contractor shall at all times and in all respects comply with, give all notices under, and pay all fees required by any license obtained by the Employer in respect of the Site or the Works or Operation Service, whether relating to the Works or Operation Service on or off the Site.</p>
Sub-Clause 1.15: Joint and Several Liability	<p>If the Contractor constitutes (under applicable Laws) a joint venture, consortium, or other unincorporated grouping of two or more persons:</p> <p>(a) these persons shall be deemed to be jointly and severally liable to the Employer for the performance of the Contract;</p> <p>(b) these persons shall notify the Employer of their leader who shall have authority to bind the Contractor and each of these persons; and</p> <p>(c) the Contractor shall not alter his composition or legal status without the prior consent of the Employer.</p>
Sub-Clause 1.16: Inspections and Audit by AFD	<p>Pursuant to paragraph 2.2 e. of Appendix B to the General Conditions, the Contractor shall permit and shall cause its Subcontractors and subconsultants to permit, AFD and/or persons appointed by AFD to inspect the Site and/or the accounts and records relating to the procurement process, selection and/or Contract execution, and to have such accounts and records audited by auditors appointed by AFD if requested by AFD."</p>
Sub-Clause 1.17: Non-Waiver	<p>Except as otherwise specifically provided for in the Contract, no failure or delay by either Party in exercising any right or remedy provided by the Laws or pursuant to the Contract will impair such right or remedy or operate or be construed as a waiver or variation of it or preclude its exercise at any subsequent time and no single or partial exercise of any such right or remedy will preclude any other or further exercise of it or the exercise of any other right or remedy."</p>
Sub-Clause 1.18: Survival of Obligations	<p>Obligations under the Contract, which by their nature would continue beyond the termination or expiration hereof, including, by way of illustration only and not limitation, those in Clause 1 [General Provisions], Clause 12 [Defects], Clause 17 [Risk Allocation], Clause 19 [Insurance], and Clause 20 [Claims and Disputes] shall survive the termination or expiration of the Contract."</p>
Sub-Clause 1.19: Severability	<p>The Parties expressly declare that each section, clause or paragraph of this Contract will be considered separate in terms of its validity and enforceability. Therefore, if, for any reason, any provision of this Contract is declared null and void, or if a ruling states that any part of it runs contrary to governing law, said declaration will in no way affect the validity and enforceability of the other stipulations, which may be construed, understood, and executed independently of the portion declared null and void. Thus, every part of this Contract not declared null and void in any way will be valid, enforceable, and binding on the Parties.</p> <p>Likewise, if any provision of this Contract or its application to any individual or company or in a given circumstance is declared null and void, or if its</p>

	<p>enforceability is in any way limited, the other provisions herein, as well as also the application of the doubtful provision to other people or in other circumstances, will not be affected thereby, and they will be applied to the extent permitted by governing law.</p> <p>Notwithstanding the above, the Parties undertake to negotiate in good faith the terms of a mutually satisfactory provision to replace any clause that may be declared null and void or whose enforceability is in any way restricted."</p>
Sub-Clause 1.20: No Partnership or Agency	Nothing contained in this Contract shall be construed to either constitute a partnership or constitute either Party an agent or employee of the other Party."
Sub-Clause 1.21: Amendment	This Contract may not be altered, varied, changed, supplemented, or amended except by a written instrument duly signed and executed by the Parties and expressly stated to be an amendment to this Contract. For the sake of clarity, any Variation under Clause 13 [Variations and Adjustments] which is leading to a substantial change to the Works, an increase of the Contract Price and/or to an extension of the Time for Completion shall be reflected in an amendment to this Contract."
CLAUSE 2: THE EMPLOYER	
Sub-Clause 2.1: Right of Access to the Site	<p>The Employer shall give the Contractor right of access to, and possession of, all or part of the Site within the time (or times) stated in the Contract Data. The right and possession may not be exclusive to the Contractor. If, under the Contract, the Employer is required to give the Contractor possession of any foundation, structure, plant or means of access, the Employer shall do so in the time and manner stated in the Particular Conditions of Contract. However, the Employer may withhold any such right or possession until the Performance Security has been received. If no such time is stated in the Contract Data, the Employer shall give the Contractor right of access to, and possession of, the Site within such times as may be required to enable the Contractor to proceed in accordance with the program submitted under Sub- Clause 8.3 [Programme].</p> <p>If the Contractor suffers delay and/or incurs cost as a result of a failure by the Employer to give any such right or possession within such time, the Contractor shall give Notice to the Employer's Representative and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:</p> <ul style="list-style-type: none"> (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 9.3 [Extension of Time for Completion of Design-Build]; and (b) payment of any such Cost-Plus Profit, which shall be included in the Contract Price. <p>After receiving this Notice, the Employer's Representative shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.</p> <p>However, if and to the extent that the Employer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the Contractor's Documents, the Contractor shall not be entitled to such extension of time or Cost-Plus Profit.</p>
Sub-Clause 2.3: Employer's Personnel	<p>The Employer shall be responsible for ensuring that the Employer's Personnel and the Employer's other contractors on the Site:</p> <ul style="list-style-type: none"> (a) co-operate with the Contractor's efforts under Sub-Clause 4.6 [Co-operation]; and

	(b) take actions similar to those which the Contractor is required to take under sub-paragraphs (a), (b) and (c) of Sub-Clause 4.8 [Safety Procedures] and under Sub-Clause 4.18 [Protection of the Environment].
Sub-Clause 2.4: Employer's Financial Arrangements	<p>The Employer shall submit, before the Commencement Date and thereafter within 28 days after receiving any request from the Contractor, reasonable evidence that financial arrangements have been made and are being maintained which will enable the Employer to pay the Contract Price (as estimated at that time) in accordance with Clause 14 [Contract Price and Payment]. Before the Employer makes any material change to his financial arrangements, the Employer shall give Notice to the Contractor with detailed particulars.</p> <p>In addition, if AFD has notified to the Employer that AFD has suspended disbursements under its loan, which finances in whole or in part the execution of the Works, the Employer shall give Notice of such suspension to the Contractor with detailed particulars, including the date of such notification, with a copy to the Employer's Representative, within 7 days of the Employer having received the suspension notification from AFD. If alternative funds will be available in appropriate currencies to the Employer to continue making payments to the Contractor beyond a date 60 days after the date of AFD's notification of the suspension, the Employer shall provide reasonable evidence in his Notice of the extent to which such funds will be available."</p>
CLAUSE 3: THE EMPLOYER'S REPRESENTATIVE (THE ENGINEERS)	
Sub-Clause 3.1: Employer's Representative's (the Engineers) Duties and Authority	<p>The Employer shall appoint the Employer's Representative prior to the signing of the Contract, who shall be suitably qualified and experienced and who shall carry out the duties assigned to him in the Contract. The Employer's Representative's staff shall include suitably qualified engineers and other professionals who are competent to carry out these duties.</p> <p>The Employer's Representative shall have no authority to amend the Contract.</p> <p>The Employer's Representative may exercise the authority attributable to the Employer's Representative as specified in or necessarily to be implied from the Contract.</p> <p>The Employer shall promptly inform the Contractor of any change to the authority attributed to the Employer's Representative.</p> <p>However, whenever the Employer's Representative exercises a specified authority for which the Employer's approval is required, then (for the purposes of the Contract) the Employer shall be deemed to have given approval.</p> <p>Except as otherwise stated in these Conditions:</p> <ul style="list-style-type: none"> (a) whenever carrying out duties or exercising authority, specified in or implied by the Contract, the Employer's Representative shall be deemed to act for the Employer; (b) the Employer's Representative has no authority to relieve either Party of any duties, obligations or responsibilities under the Contract; (c) any approval, check, certificate, consent, examination, inspection, instruction, Notice, proposal, request, test or similar act by the Employer's Representative (including absence of disapproval) shall (d) not relieve the Contractor from any responsibility he has under the

	<p>Contract, including responsibility for errors, omissions, discrepancies and non-compliances; and</p> <p>(e) any act by the Employer's Representative in response to a Contractor's request except as otherwise expressly specified shall be notified in writing to the Contractor within twenty-eight (28) days of receipt.</p> <p>Notwithstanding the obligation, as set out above, to obtain approval, if, in the opinion of the Employer's Representative, an emergency occurs affecting the safety of life or of the Works or of adjoining property, he may, without relieving the Contractor of any of his duties and responsibility under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Employer's Representative, be necessary to abate or reduce the risk. The Contractor shall forthwith comply, despite the absence of approval of the Employer, with any such instruction of the Employer's Representative. As the case may be, the Employer's Representative shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 13 and shall notify the Contractor accordingly, with a copy to the Employer.</p>
Sub-Clause 3.2: Delegation by the Employer's Representative (the Engineers)	<p>The Employer's Representative may from time to time assign duties and delegate authority to assistants and may also revoke such assignment or delegation. These assistants may include independent inspectors appointed to inspect and/or test items of Plant and/or Materials and/or workmanship or monitor the provision of the Operation Service. The assignment, delegation or revocation shall be in writing and shall not take effect until copies have been received by both Parties. However, unless otherwise agreed by both Parties, the Employer's Representative shall not delegate the authority to determine any matter in accordance with Sub-Clause 3.5 [Determinations].</p> <p>Assistants shall be suitably qualified persons, who are competent to carry out these duties and exercise this authority, and who are fluent in the language for communications defined in Sub-Clause 1.4 [Law and Language].</p> <p>Each assistant, to whom duties have been assigned or authority has been delegated, shall only be authorized to issue instructions to the Contractor to the extent defined by the delegation. Any approval, check, certificate, consent, examination, inspection, instruction, Notice, proposal, request, test or similar act by an assistant, in accordance with the delegation, shall have the same effect as though the act had been an act of the Employer's Representative. However:</p> <p>(a) any failure to disapprove any work, Plant, Materials, or any part of the Operation Service shall not constitute approval, and shall therefore not prejudice the right of the Employer's Representative to reject the work, Plant, Materials or any part of the Operation Service; and</p> <p>(b) if the Contractor questions any determination or instruction of an assistant, the Contractor may refer the matter to the Employer's Representative, who shall promptly confirm, reverse, or vary the determination or instruction.</p>
Sub-Clause 3.3: Instructions of the Employer's Representative (the Engineers)	<p>The Employer's Representative may issue to the Contractor (at any time) instructions which may be necessary for the execution of the Works and the remedying of any defects, all in accordance with the Contract. The Contractor shall only take instructions from the Employer's Representative, or from an assistant to whom the appropriate authority has been delegated under this Clause. If an instruction constitutes a Variation, Clause 13 [Variations and Adjustments] shall apply.</p>

	<p>The Contractor shall comply with the instructions given by the Employer's Representative or delegated assistant on any matter related to the Contract. Whenever practicable, their instructions shall be given in writing. If the Employer's Representative or a delegated assistant:</p> <ul style="list-style-type: none"> (a) gives an oral instruction, (b) receives a written confirmation of the instruction, from (or on behalf of) the Contractor, within two working days after giving the instruction, and (c) does not reply by issuing a written rejection and/or instruction within two working days after receiving the confirmation, <p>then the confirmation shall constitute the written instruction of the Employer's Representative or delegated assistant (as the case may be).</p> <p>If the Contractor considers that any instruction of the Employer's Representative does not comply with applicable Laws or is technically impossible, he shall immediately notify the Employer's Representative in writing. The Employer's Representative shall then either confirm or amend such instruction.</p>
Sub-Clause 3.4: Replacement of the Employer's Representative (the Engineers)	<p>If the Employer intends to replace the Employer's Representative, the Employer shall, not less than 21 days before the intended date of replacement, give Notice to the Contractor of the name, address and relevant experience of the intended replacement Employer's Representative. If the Contractor considers the intended replacement Employer's representative to be unsuitable, he has the right to raise an objection against him by Notice to the Employer, with supporting particulars, and the Employer shall give full and fair consideration to this objection.</p>
Sub-Clause 3.5: Determinations	<p>Whenever these Conditions provide that the Employer's Representative shall proceed in accordance with this Sub-Clause to agree or determine any matter, the Employer's Representative shall consult with each Party in an endeavour to reach agreement. If agreement is not achieved, the Employer's Representative shall make a fair determination in accordance with the Contract, taking due regard of all relevant circumstances.</p> <p>The Employer's Representative shall give Notice to both Parties of each agreement or determination, with supporting particulars, within twenty- eight (28) days from the receipt of the corresponding claim or request except when otherwise specified. Each Party shall give effect to each agreement or determination unless and until revised under Clause 20 [Claims, Disputes and Arbitration].</p>
CLAUSE 4: THE CONTRACTOR	
Sub-Clause 4.1: Contractor's General Obligations	<p>The Contractor shall design, execute and complete the Works and provide the Operation Service in accordance with the Contract and shall remedy any defects in the Works. When completed, the Works shall be fit for the purposes for which the Works are intended as defined in the Contract, and the Contractor shall be responsible for ensuring that the Works remain fit for such purposes during the Operation Service Period.</p> <p>The Contractor shall provide the Plant and Contractor's Documents specified in the Contract, and all Contractor's Personnel, Goods, consumables and other things and services, whether of a temporary or permanent nature, required to meet the Contractor's obligations under the Contract. The Contractor commits to meet the AFD's eligibility criteria as listed under Appendix C to the General Conditions.</p> <p>The Works shall include any work which is necessary to satisfy the Employer's Requirements, Contractor's Proposal and Schedules, or is implied by the Contract, and all works which (although not mentioned in the Contract) are</p>

	<p>necessary for stability or for the completion, or safe and proper operation, of the Works.</p> <p>The Contractor shall be responsible for the adequacy, stability and safety of all Site operations, of all methods of construction and of all the Works during both the Design Build Period and the Operation Service Period.</p> <p>The Contractor shall, whenever required by the Employer's Representative, submit details of the arrangements and methods which the Contractor proposes to adopt for the execution of the Works. The Contractor shall not commence any Works, including mobilization and/or pre-construction activities (e.g., limited clearance for haul roads, site accesses and work site establishment, geotechnical investigations or investigations to select ancillary features such as quarries and borrow pits), unless the Employer's Representative is satisfied that appropriate measures are in place to address environmental, social, health and safety risks and impacts. As defined in the ESHS Specifications (if any), the Contractor shall submit, on a continuing basis, for the Employer's Representative's prior approval, a Contractor's Worksite Environmental and Social Management Plan (Worksite - ESMP) to manage the ESHS risks and impacts of the Works on any Project Area. The Worksite - ESMP and the annexed Environmental Protection Plan (EPP) corresponding to a Project Area shall be approved prior to the commencement of construction activities (e.g., excavation, earth works, bridge and structure works, stream, and road diversions, quarrying or extraction of materials, concrete batching and asphalt manufacture). The approved Worksite - ESMP shall be reviewed, periodically (but not less than every 6 months), and updated in a timely manner, as required, by the Contractor to ensure that it contains measures appropriate to the Works activities to be undertaken. The updated Worksite - ESMP shall be subject to prior approval by the Employer's Representative. No significant alteration to these arrangements and methods shall be made without this having previously been notified to the Employer's Representative.</p> <p>The Contractor shall attend all meetings as reasonably required by the Employer or the Employer's Representative.</p>
<p>Sub-Clause 4.2: Performance Security</p>	<p>The Contractor shall obtain at his cost the Performance Security for proper performance of the Contract, in the amounts and currencies set out in the Contract Data. If no amount is stated in the Contract Data, this Sub-Clause shall not apply.</p> <p>The Contractor becomes entitled to a reduction of the amount of the Performance Security, as stated in the Contract Data:</p> <ul style="list-style-type: none"> (a) after the Employer's Representative certified, that the Contractor has carried out all minor outstanding work and defects as referred to under Sub-Clause 11.5 (i), or (b) on the last day of the period referred under the last paragraph of Sub-Clause 11.5 in case the Commissioning Certificate is deemed to have been issued. <p>The Contractor shall deliver the Performance Security to the Employer within 28 days after receiving the Letter of Acceptance and shall send a copy to the Employer's Representative. The Performance Security shall be issued by a reputable bank or financial institution selected by the Contractor and from within a country (or other jurisdiction) approved by the Employer and shall be based on the sample form included in the tender documents, or in another form approved by the Employer.</p> <p>The Contractor shall ensure that the Performance Security is valid and enforceable until the issue of the Contract Completion Certificate. If the</p>

	<p>terms of the Performance Security specify its expiry date, and the Contractor has not become entitled to receive the Contract Completion Certificate by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the Performance Security until the Works and the Operation Service have been completed (or alternatively, until the Contractor has been entitled to receive the Contract Completion Certificate). Failure by the Contractor to maintain the validity of the Performance Security shall be grounds for termination in accordance with Sub-Clause 15.2 [Termination for Contractor's Default].</p> <p>The Employer shall not make a claim under the Performance Security except for amounts to which the Employer is entitled under the Contract in the event of:</p> <ul style="list-style-type: none"> (a) failure by the Contractor to extend the validity of the Performance Security as described in the preceding paragraph, in which event the Employer may claim the full, the reduced amount of the Performance Security; (b) failure by the Contractor to pay the Employer an amount due, as either agreed by the Contractor or determined under Sub-Clause 3.5 [Determinations] or Clause 20 [Claims, Disputes and Arbitration], within 42 days after this agreement or determination; (c) failure by the Contractor to remedy a default within 42 days after receiving the Employer's Notice requiring the default to be remedied; or (d) circumstances which entitle the Employer to terminate under Sub-Clause 15.2 [Termination for Contractor's Default], irrespective of whether Notice of termination has been given. <p>The Employer shall indemnify and hold the Contractor harmless against and from all damages, losses, and expenses (including legal fees and expenses) resulting from a claim under the Performance Security which the Employer was not entitled to make.</p> <p>The Employer shall return the Performance Security to the Contractor within 21 days after receiving a copy of the Contract Completion Certificate.</p> <p>Without limitation to the provisions of the rest of this Sub-Clause, whenever the Employer's Representative determines an addition or a reduction to the Contract Price as a result of a change in cost and/or legislation, or as a result of a Variation, amounting to more than twenty five percent (25%) of the portion of the Contract Price payable in a specific currency, the Contractor shall at the Employer's Representative's request promptly increase, or may decrease, as the case may be, the value of the Performance Security in that currency by an equal percentage.</p>
<p>Sub-Clause 4.3: Contractor's Representative</p>	<p>The Contractor shall appoint the Contractor's Representative and shall give him all authority necessary to act on the Contractor's behalf under the Contract.</p> <p>Unless the Contractor's Representative is named in the Contract, the Contractor shall, prior to the Commencement Date, submit to the Employer's Representative for consent the name and particulars of the person the Contractor proposes to appoint as Contractor's Representative. If consent is withheld or subsequently revoked, or if the appointed person fails to act as Contractor's Representative, the Contractor shall similarly submit the name and particulars of another suitable person for such appointment.</p> <p>The Contractor shall not, without the prior consent of the Employer's Representative, revoke the appointment of the Contractor's Representative or appoint a replacement.</p>

	<p>The whole time of the Contractor's Representative shall be given to directing the Contractor's performance of the Contract. If the Contractor's Representative is to be temporarily absent from the Site during the execution of the Works or provision of the Operation Service, a suitable replacement person shall be appointed, subject to the Employer's Representative's prior consent, and the Employer's Representative shall be notified accordingly.</p> <p>The Contractor's Representative shall, on behalf of the Contractor, receive instructions under Sub-Clause 3.3 [Instructions of the Employer's Representative].</p> <p>The Contractor's Representative may delegate any powers, functions, and authority to any competent person, and may at any time revoke the delegation. Any delegation or revocation shall not take effect until the Employer's Representative has received prior Notice signed by the Contractor's Representative, naming the person, and specifying the powers, functions and authority being delegated or revoked.</p> <p>The Contractor's Representative and all these persons shall be fluent in the language for communications defined in Sub-Clause 1.4 [Law and Language].</p> <p>If the Contractor's Representative's delegates are not fluent in the said language, the Contractor shall make competent interpreters available during all working hours in a number deemed sufficient by the Employer's Representative.</p>
<p>Sub-Clause 4.4: Subcontractors</p>	<p>The Contractor shall only employ Subcontractors meeting the AFD's eligibility criteria as listed under Appendix C to the General Conditions.</p> <p>In case of failure by the Contractor to comply with this requirement, and irrespective of whether the Employer's Representative has given prior consent under this Sub-Clause, the Contractor shall forthwith cease any business dealing with any ineligible Subcontractor and replace such Subcontractor by an eligible one, all at the Contractor's risk and cost. Otherwise, the Employer shall be entitled to terminate the Contract in accordance with Sub-Clause 15.2 [Termination by Employer]."</p> <p>The Contractor shall not subcontract the whole of the Works. Unless otherwise agreed, the Contractor shall not subcontract the provision of the Operation Service.</p> <p>The Contractor shall be responsible for the acts or defaults of any Subcontractor, his agents or employees, as if they were the acts or defaults of the Contractor. Unless otherwise stated in the Particular Conditions:</p> <ul style="list-style-type: none"> (a) the Contractor shall not be required to obtain consent to suppliers solely of Materials, or to a subcontract for which the Subcontractor is named in the Contract; (b) the prior consent of the Employer's Representative shall be obtained to other proposed Subcontractors; and (c) the Contractor shall give Notice to the Employer's Representative not less than 28 days prior to the intended date of the commencement of each Subcontractor's work, and of the commencement of such work on the Site. <p>If any Subcontractor is entitled under any contract or agreement relating to the Works to relief from any risk on terms additional to or broader than those specified in the Contract, such additional or broader events or circumstances shall not excuse the Contractor's non-performance or entitle him to relief under the Contract.</p> <p>The Contractor shall ensure that the requirements imposed on the Contractor by Sub-Clause 1.13 [Confidential Details] apply equally to each</p>

	Subcontractor. Where practicable, the Contractor shall give fair and reasonable opportunity for contractors from the Country to be appointed as Subcontractors.
Sub-Clause 4.5: Nominated Subcontractors	In this Sub-Clause, "nominated Subcontractor" means a Subcontractor named as such in the Employer's Requirements or whom the Employer's Representative, under Clause 13 [Variations and Adjustments], instructs the Contractor to employ as a Subcontractor. The Contractor shall not be under any obligation to employ a nominated Subcontractor against whom the Contractor raises reasonable objection by Notice to the Employer's Representative as soon as practicable, with supporting particulars.
Sub-Clause 4.6: Co-operation	<p>The Contractor shall, as specified in the Contract or as instructed by the Employer's Representative, allow appropriate opportunities for carrying out work to:</p> <ul style="list-style-type: none"> (a) the Employer's Personnel; (b) any other contractors employed by the Employer; and (c) the personnel of any legally constituted public authorities; <p>who may be employed in the execution on or near the Site of any work not included in the Contract.</p> <p>Any such instruction shall constitute a Variation if and to the extent that it causes the Contractor to suffer Unforeseeable delays and/or to incur Unforeseeable cost. Services for these personnel and other contractors may include the use of Contractor's Equipment, Temporary Works or access arrangements which are the responsibility of the Contractor.</p> <p>The Contractor shall be responsible for his construction and operation activities on the Site, and shall coordinate his own activities with those of other contractors to the extent (if any) specified in the Employer's Requirements.</p> <p>If, under the Contract, the Employer is required to give to the Contractor possession of any foundation, structure, plant or means of access in accordance with Contractor's Documents, the Contractor shall submit such documents to the Employer's Representative in the time and manner stated in the Employer's Requirements.</p>
Sub-Clause 4.8: Safety Procedures	<p>The Contractor shall:</p> <ul style="list-style-type: none"> (a) comply with all applicable safety regulations; (b) take care for the safety of all persons entitled to be on the Site; (c) use reasonable efforts to keep the Site and Works clear of unnecessary obstruction so as to avoid danger to these persons; (d) provide fencing, lighting, guarding, and watching of the Works until the issue of the Contract Completion Certificate; and (e) provide any Temporary Works (including roadways, footways, guards, and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent <p>These provisions are complemented by those listed under the ESHS Specifications which the Contractor must ensure full compliance with.</p>
Sub-Clause 4.12: Unforeseeable Physical Conditions	In this Sub Clause, "physical conditions" means natural physical conditions and man-made and other physical obstructions and pollutants, which the Contractor encounters at the Site when executing the Works, including sub-surface and hydrological conditions but excluding climatic conditions.

	<p>If the Contractor encounters adverse physical conditions which he considers to have been Unforeseeable, the Contractor shall give Notice to the Employer's Representative as soon as practicable.</p> <p>This Notice shall describe the physical conditions, so that they can be inspected by the Employer's Representative and shall set out the reasons why the Contractor considers them to be Unforeseeable. The Contractor shall continue executing the Works, using such proper and reasonable measures as are appropriate for the physical conditions, and shall comply with any instructions which the Employer's Representative may give. If an instruction constitutes a Variation, Clause 13 [Variations and Adjustments] shall apply.</p> <p>If and to the extent that the Contractor encounters physical conditions which are Unforeseeable, gives such a Notice, and suffers delay and/or incurs cost due to these conditions, the Contractor shall be entitled subject to Sub- Clause 20.1 [Contractor's Claims] to:</p> <ul style="list-style-type: none"> (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 9.3 [Extension of Time for Completion of Design-Build]; and (b) payment of any such Cost, which shall be included in the Contract Price. <p>After receiving such Notice and inspecting and/or investigating these physical conditions, the Employer's Representative shall proceed in accordance with Sub Clause 3.5 [Determinations] to agree or determine (i) whether and (if so) to what extent these physical conditions were Unforeseeable, and (ii) the matters described in sub paragraphs (a) and (b) above.</p> <p>However, before additional Cost is finally agreed or determined under (ii), the Employer's Representative may also review whether other physical conditions in similar parts of the Works (if any) were more favorable than could reasonably have been foreseen when the Contractor submitted the Tender. If and to the extent that these more favorable conditions were encountered, the Employer's Representative may proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine the reductions in Cost which were due to these conditions, which may be included (as deductions) in the Contract Price and payment certificates. However, the net effect of all adjustments under subparagraph (b) and all these reductions, for all the physical conditions encountered in similar parts of the Works, shall not result in a net reduction in the Contract Price.</p> <p>The Employer's Representative may take account of any evidence of the physical conditions foreseen by the Contractor when submitting the Tender, which may be made available by the Contractor, but shall not be bound by any such evidence.</p> <p>The Employer's Representative shall take account of any evidence of the physical conditions foreseen by the Contractor when submitting the Tender, which shall be made available by the Contractor, but shall not be bound by the Contractor's interpretation of any such evidence.</p>
Sub-Clause 4.15: Access Route	<p>The Contractor shall be deemed to have been satisfied as to the suitability and availability of access routes to the Site. The Contractor shall use reasonable efforts to prevent any road or bridge from being damaged by the Contractor's traffic or by the Contractor's Personnel. These efforts shall include the proper use of appropriate vehicles and routes.</p> <p>Except as otherwise stated in these Conditions:</p>

	<p>(a) the Contractor shall (as between the Parties) be responsible for any maintenance which may be required as a result of his use of access routes;</p> <p>(b) the Contractor shall provide all necessary signs or directions along access routes, and shall obtain any permission which may be required from the relevant authorities for his use of routes, signs and directions;</p> <p>(c) the Employer shall not be responsible for any claims which may arise from the use or otherwise of any access route;</p> <p>(d) the Employer does not guarantee the suitability or availability of particular access routes; and</p> <p>(e) Costs due to non-suitability or non-availability, for the use required by the Contractor, of access routes shall be borne by the Contractor.</p>
Sub-Clause 4.18: Protection of the Environment	<p>The Contractor shall take all reasonable steps to protect the environment (both on and off the Site) and to limit damage and nuisance to people and property resulting from pollution, noise, and other results of his operations.</p> <p>The Contractor shall ensure that emissions, surface discharges and effluent from the Contractor's activities shall not exceed the values indicated in the Employer's Requirements and shall not exceed the values prescribed by applicable Laws.</p> <p>These provisions are complemented by those listed under the ESHS Specifications, Section-10 Employer's Requirement Document which the Contractor must ensure full compliance with.</p>
Sub-Clause 4.20: Employer's Equipment and Free-Issue Materials	<p>The Employer shall make the Employer's Equipment (if any) available for the use of the Contractor in the execution of the Works in accordance with the details, arrangements and prices stated in the Employer's Requirements. Unless otherwise stated in the Employer's Requirements:</p> <p>(a) the Employer shall be responsible for the Employer's Equipment, except that</p> <p>(b) the Contractor shall be responsible for each item of Employer's Equipment whilst any of the Contractor's Personnel is operating it, driving it, directing it or in possession or control of it.</p> <p>The appropriate quantities and the amounts due (at such stated prices) for the use of Employer's Equipment shall be agreed or determined by the Employer's Representative in accordance with Sub-Clause 20.2 [Employer's Claims] and Sub-Clause 3.5 [Determinations]. The Contractor shall pay these amounts to the Employer.</p> <p>The Employer shall supply, free of charge, the "free-issue materials" (if any) in accordance with the details stated in the Employer's Requirements. The Employer shall, at his risk and cost, provide these materials at the time and place specified in the Contract. The Contractor shall then visually inspect them and shall promptly give Notice to the Employer's Representative of any shortage, defect, or default in these materials. Unless otherwise agreed by both Parties, the Employer shall immediately rectify the notified shortage, defect, or default.</p> <p>After this visual inspection, the free-issue materials shall come under the care, custody, and control of the Contractor. The Contractor's obligations of inspection, care, custody, and control shall not relieve the Employer of liability for any shortage, defect, or default not apparent from a visual inspection.</p>
Sub-Clause 4.21: Progress Reports	<p>During the Design-Build Period, monthly progress reports, in a format agreed with the Employer's Representative shall be prepared by the Contractor and submitted to the Employer's Representative in one original and five copies, unless otherwise stated in the Employer's Requirements. The first report shall cover the period up to the end of the first calendar month following the</p>

	<p>Commencement Date. Reports shall be submitted monthly thereafter, each within 7 days after the last day of the period to which it relates. Reporting on progress shall continue until the Contractor has received the Contract Completion Certificate. Details of the content of the progress reports for the Design-Build Period and the Operation Service Period shall be as specified in the Employer's Requirements.</p> <p>Unless otherwise stated or agreed, each progress report shall include:</p> <ul style="list-style-type: none"> (a) charts and detailed descriptions of progress, including each stage of design, Contractor's Documents, procurement, manufacture, delivery to Site, construction or replacement, erection, testing, commissioning, trial operation and provision of Operation Service; (b) photographs showing the status of manufacture or replacement and of progress on the Site; (c) for the manufacture or replacement of each main item of Plant and Materials, the name of the manufacturer, manufacture location, percentage progress, and the actual or expected dates of: <ul style="list-style-type: none"> i. commencement of manufacture, ii. Contractor's inspections, iii. tests, and iv. shipment and arrival at the Site; (d) the details described in Sub-Clause 6.10 [Records of Contractor's Personnel and Equipment. (e) copies of quality assurance documents, test results and certificates of Materials; (f) list of Variations, Notices given under Sub-Clause 20.1 [Contractor's Claims] and Notices given under Sub-Clause 20.2 [Employer's Claims]; (g) safety statistics, including details of any hazardous incidents and activities relating to environmental aspects and public relations; and (h) comparisons of actual and planned progress, with details of any events or circumstances which may jeopardies the completion in accordance with the Contract, and the measures being (or to be) adopted to overcome delays. <p>The particular reporting requirements during the Operation Service Period shall be as specified in the Employer's Requirements.</p>
Sub-Clause 4.22 Security of the Site	<p>The Contractor shall be responsible for the security of the Site. Unless otherwise stated in the Particular Conditions:</p> <ul style="list-style-type: none"> (a) the Contractor shall be responsible for keeping unauthorized persons off the Site; and (b) authorized persons shall be limited to the Contractor's Personnel and the Employer's Personnel, and to any other personnel notified to the Contractor, by the Employer or the Employer's Representative, as authorized personnel of the Employer's other contractors on the Site.
Sub-Clause 4.23 Contractor's Operations on Site	<p>The Contractor shall confine his operations to the Site, and to any additional areas which may be obtained by the Contractor and agreed by the Employer's Representative as working areas. The Contractor shall take all necessary precautions to keep Contractor's Equipment and Contractor's Personnel within the Site and these additional areas, and to keep them off adjacent land. At all times the Contractor shall keep the Site free from all unnecessary obstruction and shall store or dispose of any Contractor's Equipment or surplus materials. The Contractor shall promptly clear away and remove from the Site any surplus material, wreckage, rubbish, and Temporary Works which are no longer required.</p>

	<p>Upon the issue of a Commissioning Certificate, the Contractor shall clear away and remove, from that part of the Site and Works to which the Commissioning Certificate refers, all Contractor's Equipment, surplus material, wreckage, rubbish, and Temporary Works. The Contractor shall leave that part of the Site and the Works in a clean and safe condition.</p> <p>The Contract Completion Certificate shall not be issued until the Contractor has removed any remaining Contractor's Equipment, surplus material, wreckage, rubbish, and Temporary Works from the Site which are not required. The Contractor shall leave the Site and the Works in a clean and safe condition.</p>
Sub-Clause 4.24 Fossils	<p>All fossils, coins, articles of value or antiquity, and structures and other remains or items of geological or archaeological interest found on the Site shall be placed under the care and authority of the Employer. The Contractor shall take reasonable precautions to prevent Contractor's Personnel or other persons from removing or</p> <p>damaging any of these findings. The Contractor shall, upon discovery of any such finding, promptly give Notice to the Employer's Representative, who shall issue instructions for dealing with it. If the Contractor suffers delay and/or incurs cost from complying with the instructions, the Contractor shall give a further Notice to the Employer's Representative and shall be entitled, subject to Sub-Clause 20.1 [Contractor's Claims], to:</p> <ul style="list-style-type: none"> (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 9.3 [Extension of Time for Completion of Design-Build]; and (b) payment of any such Cost, which shall be included in the Contract Price. After receiving this further Notice, the Employer's Representative shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.
Sub-Clause 4.25 Changes in the Contractor's Financial Situation	<p>If the Contractor becomes aware of any change in the Contractor's financial situation which will or could adversely affect his ability to complete and fulfil all his obligations under the Contract, he shall immediately give Notice to the Employer with detailed particulars. Within 28 days of receiving such Notice, the Employer shall advise the Contractor of what action he intends to take and/or what action the Employer requires the Contractor to take.</p> <p>In any event, the Contractor shall provide the Employer annually with his audited financial statements and reports.</p>
Sub-Clause 4.26: Demolition	<p>The Contractor shall not demolish any building or structure except where specified in the Employer's Requirements, or with the prior written approval of the Employer's Representative.</p> <p>The conditions for the re-use, sale and disposal of demolished materials shall be as specified in the Employer's Requirements.</p>
Sub-Clause 4.27: Existing Facilities	<p>The Contractor shall take over, rehabilitate, upgrade, operate and maintain the Existing Facilities to the extent specified in the Employer's Requirements.</p> <p>Unless stated otherwise in the Employer's Requirements, the Contractor shall provide, and pay for, all labour, equipment, materials (including spare parts and consumables), and electricity necessary to operate and maintain the Existing Facilities.</p> <p>Throughout the Contract Period,</p> <ul style="list-style-type: none"> (a) the Contractor shall use all reasonable endeavors to meet the standards of performance specified for the Existing Facilities in the Employer's Requirements;

	<p>(b) The Employer shall indemnify and hold harmless the Contractor against any and all claims made against it in respect of the operation of the Existing Facilities to the extent that the Unforeseeable condition of the Existing Facilities renders them unable to meet the applicable Performance Guarantees."</p> <p>As at the date of commencement of the Operation Service the Existing Facilities, unless specified otherwise in the Employer's Requirements, will be deemed to form part of the Works, and all references in the Contract to Works, Permanent Works, Plant and Site etc. shall be deemed to include the Existing Facilities.</p>
Sub-Clause 4.28: On-Site Logbook	<p>The Contractor shall maintain on Site a logbook, in a form approved by the Employer's Representative and which shall integrate the fields required in the Employer's Requirements. It will be used to record the Contractor's activities on a daily basis, and any instruction from the Employer's Representative given on Site. The Employer's Personnel shall have the right of access to this document at all times, and one copy of each daily record shall be promptly provided by the Contractor to the Employer's Representative.</p>
CLAUSE 5: DESIGN	
Sub-Clause 5.1: General Design Obligations	<p>The Contractor shall carry out, and be responsible for, the design of the Works. Design shall be prepared by qualified designers who are engineers or other professionals who comply with the criteria (if any) stated in the Employer's Requirements. Unless otherwise stated in the Contract, the Contractor shall submit to the Employer's Representative for consent the name and particulars of each proposed designer and design Subcontractor.</p> <p>The Contractor warrants that he, his designers, and design Subcontractors have the experience and capability necessary for the design. The Contractor undertakes that the designers shall be available to attend discussions with the Employer's Representative at all reasonable times.</p> <p>Upon receiving Notice under Sub-Clause 8.1 [Commencement Date], the Contractor shall scrutinize the Employer's Requirements (including design criteria and calculations, if any) and the items of reference mentioned in Sub-Clause 4.7 [Setting Out]. Within the period stated in the Contract Data, calculated from the Commencement Date, the Contractor shall give Notice to the Employer's Representative of any error, fault or other defect found in the Employer's Requirements or these items of reference.</p> <p>After receiving this Notice, the Employer's Representative shall determine whether Clause 13 [Variations and Adjustments] shall be applied and shall give Notice to the Contractor accordingly. If and to the extent that (taking account of cost and time) an experienced contractor exercising due care would have discovered the error, fault or other defect when examining the Site and the Employer's Requirements before submitting the Tender, the Time for Completion shall not be extended, and the Contract Price shall not be adjusted.</p> <p>If the Contractor finds any error, fault, or other defect in the Employer's Requirements after the period stated in the Contract Data, then Sub-Clause 1.10 [Errors in the Employer's Requirements] shall be applicable.</p>
Sub-Clause 5.2 Contractor's Documents	<p>The Contractor's Documents shall comprise the technical documents specified in the Employer's Requirements, documents required to satisfy all regulatory approvals, and the documents described in Sub-Clause 5.5 [As-Built Documents] and Sub-Clause 5.6 [Operation and Maintenance Manuals]. Unless otherwise stated in the Employer's Requirements, the Contractor's</p>

	<p>Documents shall be written in the language for communications defined in Sub-Clause 1.4 [Law and Language].</p> <p>The Contractor shall prepare all Contractor's Documents and shall also prepare any other documents necessary to instruct the Contractor's Personnel. The Employer's Personnel shall have the right to inspect the preparation of all these documents, wherever they are being prepared.</p> <p>If the Employer's Requirements describe the Contractor's Documents which are to be submitted to the Employer's Representative for review leading to consent and/or for approval, they shall be submitted accordingly, together with a Notice as described below. The Employer's Representative gives his consent to a document when he is satisfied that the Contractor's Documents conform to the Employer's Requirements.</p> <p>In the following provisions of this Sub-Clause, (i) "review period" means the period required by the Employer's Representative for review leading to consent and (if so specified) for approval, and (ii) "Contractor's Documents" exclude any documents which are not specified as being required to be submitted for review leading to consent and/or for approval. The Contractor's Documents which require approval from the Employer's Representative shall be as listed in the Contract Data.</p> <p>Unless otherwise stated in the Employer's Requirements or agreed with the Employer's Representative, each review period shall not exceed 21 days, calculated from the date on which the Employer's Representative receives a Contractor's Document and the Contractor's Notice. This Notice shall state that the Contractor's Document is considered ready for review leading to either approval (if so specified) or consent with regard to conformity with the Employer's Requirements, in accordance with this Sub-Clause and for use. The Notice shall also state that the Contractor's Document complies with the Contract, or the extent to which it does not comply.</p> <p>The Employer's Representative may, within the review period, give Notice to the Contractor that a Contractor's Document fails (to the extent stated) to conform with the Contract. If a Contractor's Document fails to conform, it shall be rectified, resubmitted, and reviewed (and, if specified, approved) in accordance with this Sub-Clause, at the Contractor's cost. If such re-submission and review causes the Employer to incur additional costs, the Contractor shall, subject to Sub-Clause 20.2 [Employer's Claims], pay these costs to the Employer.</p> <p>For each part of the Works, and except to the extent that the prior approval or consent of the Employer's Representative shall have been obtained:</p> <p>(a) in the case of a Contractor's Document which has (as specified) been submitted for the Employer's Representative's approval or consent:</p> <ul style="list-style-type: none"> (i) the Employer's Representative shall give Notice to the Contractor that the Employer's Representative gives his consent that the Contractor's Document conforms with the Employer's Requirements or is approved, or that it does not (to the extent stated) comply with the Contract; (ii) execution of such part of the Works shall not commence until the Employer's Representative has either approved or given his consent to the Contractor's Document; and (iii) the Employer's Representative shall be deemed to have approved the Contractor's Documents or given his consent that the Contractor's Documents conform to the Employer's Requirements upon the expiry of the review periods for all the Contractor's Documents which are relevant to the design and execution of such part, unless the Employer's Representative has
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	<p>previously notified otherwise in accordance with sub-paragraph (i);</p> <p>(b) execution of such part of the Works shall not commence prior to the expiry of the review periods for all the Contractor's Documents which are relevant to its design and execution;</p> <p>(c) execution of such part of the Works shall be in accordance with those Contractor's Documents for which the Employer's Representative has given his consent as to the conformity with the Employer's Requirements, (and, if specified, approved); and</p> <p>(d) if the Contractor wishes to modify any design or document which has previously been submitted for review (and, if specified, approval), the Contractor shall immediately give Notice to the Employer's Representative, accompanied by a written explanation of the need for such modification.</p> <p>Thereafter, the Contractor shall submit revised documents to the Employer's Representative in accordance with the above procedure. Any such consent and/or approval (where specified) (under this Sub-Clause or otherwise) shall not relieve the Contractor from any obligation or responsibility.</p>
Sub-Clause 5.3: Contractor's Undertaking	<p>If the Employer's Representative reasonably instructs that further Contractor's Documents are required, the Contractor shall prepare them promptly at his own cost.</p> <p>The Contractor undertakes that the design, the Contractor's Documents, the execution, and the completed Works will be in accordance with:</p> <p>(a) the Laws of the Country; and</p> <p>(b) the documents forming the Contract, as altered or modified by Variations.</p>
Sub-Clause 5.4: Technical Standards and Regulations	<p>Unless otherwise stated, the design, the Contractor's Documents, the execution and the completed Works shall comply with the Country's technical standards, building, construction and environmental Laws, Laws applicable to the product being produced from the Works, and other standards specified in the Employer's Requirements, applicable to the Works, or defined by the applicable Laws.</p> <p>All these Laws shall, in respect of the Works and each Section, be those prevailing when the Commissioning Certificate is issued in accordance with Sub-Clause 11.7 [Commissioning Certificate]. References in the Contract to published standards shall be understood to be references to the edition applicable on the Base Date, unless stated otherwise.</p> <p>If changed or new applicable standards come into force in the Country after the Base Date, the Contractor shall give Notice to the Employer's Representative and (if appropriate) submit proposals for compliance. In the event that:</p> <p>(a) the Employer's Representative determines that compliance is required; and</p> <p>(b) the proposals for compliance constitute a variation, then the Employer's Representative shall initiate a Variation in accordance with Clause 13 [Variations and Adjustments].</p>
Sub-Clause 5.5: As-Built Documents	<p>The Contractor shall prepare, and keep up to date, a complete set of "as-built" records of the execution of the Works, showing the exact as-built locations, sizes and details of the work as executed. These records shall be kept on the Site and shall be used exclusively for the purposes of this Sub-Clause. At least two copies shall be supplied to the Employer's</p>

	<p>Representative prior to the commencement of the Tests on Completion of Design-Build.</p> <p>In addition, the Contractor shall supply to the Employer's Representative as-built drawings of the Works, showing all Works as executed, and submit them to the Employer's Representative for review under Sub-Clause 5.2 [Contractor's Documents]. The Contractor shall obtain the consent of the Employer's Representative as to their size, the referencing system, and other relevant details.</p> <p>Prior to the issue of the Commissioning Certificate, the Contractor shall supply to the Employer's Representative the specified numbers and types of copies of the relevant as-built drawings, in accordance with the Employer's Requirements. The relevant work shall not be considered to be completed for the purposes of issuing the Commissioning Certificate under Sub-Clause 11.7 [Commissioning Certificate] until the Employer's Representative has received these documents.</p>
Sub-Clause 5.6: Operation and Maintenance Manuals	<p>Prior to the commencement of the Commissioning Period, the Contractor shall supply to the Employer's Representative two copies of all operation and maintenance manuals in sufficient detail for the Employer to operate, maintain, dismantle, reassemble, adjust and repair the Plant and the Works. The Contractor shall supply the balance of the required operation and maintenance manuals prior to the issue of the Commissioning Certificate.</p> <p>The Works or any Section shall not be considered to be completed for the purposes of issuing the Commissioning Certificate under Sub-Clause 11.7 [Commissioning Certificate] until the Employer's Representative has received these documents.</p>
Sub-Clause 5.7: Design Error	<p>If errors, omissions, ambiguities, inconsistencies, inadequacies, or other defects are found in the Contractor's Documents, they and the Works shall be corrected at the Contractor's cost, notwithstanding any consent or approval under this Clause.</p>
CLAUSE 6: STAFF AND LABOUR	
Sub-Clause 6.1: Engagement of Staff and Labour	<p>Except as otherwise stated in the Employer's Requirements, the Contractor shall make arrangements for the engagement of all staff and labour, local or otherwise, and for their payment, housing, feeding and transport.</p> <p>The Contractor shall, to the extent practicable and reasonable, employ staff and labour with appropriate qualifications and experience from sources within the Country</p>
Sub-Clause 6.2: Rates of Wages and Conditions of Employment	<p>The Contractor shall pay rates of wages and observe conditions of labour which are not lower than those established for the trade or industry where the work is carried out. If no established rates or conditions are applicable, the Contractor shall pay rates of wages and observe conditions which are not lower than the general level of wages and conditions 5.5 observed locally by employers whose trade or industry is similar to that of the Contractor.</p>
Sub-Clause 6.3: Persons in the Service of Employer	<p>The Contractor shall not recruit, or attempt to recruit, staff and labour from amongst the Employer's Personnel.</p>
Sub-Clause 6.4: Labour Laws	<p>The Contractor shall comply with all the relevant labour Laws applicable to the Contractor's Personnel, including Laws relating to their employment, health, safety, welfare, immigration, and emigration, and shall allow them all their legal rights.</p> <p>The Contractor shall require the Contractor's Personnel to obey all applicable Laws, including those concerning safety at work.</p>
Sub-Clause 6.5: Working Hours	<p>No work shall be carried out on the Site on locally recognized days of rest or outside the normal working hours stated in the Contract Data, unless:</p> <ul style="list-style-type: none"> (a) otherwise stated in the Contract; (b) the Employer's Representative gives consent;

	<p>(c) the work is unavoidable, or necessary for the protection of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Employer's Representative; or</p> <p>(d) required for the proper fulfilment of the requirements of the Operation Service Period.</p>
Sub-Clause 6.6: Facilities for Staff and Labour	<p>Except as otherwise stated in the Employer's Requirements, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. The Contractor shall also provide facilities for the Employer's Personnel as stated in the Employer's Requirements.</p> <p>The Contractor shall not permit any of the Contractor's Personnel to maintain any temporary or permanent living quarters within the Site of the Works, save where the Employer has given the Contractor permission in writing.</p>
Sub-Clause 6.7: Health and Safety	<p>The Contractor shall at all times during the Contract Period take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the</p> <p>Site and at any accommodation for Contractor's and Employer's Personnel, and those suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.</p> <p>The Contractor shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the execution and operation of the Works, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority.</p> <p>The Contractor shall send details of any accident to the Employer's Representative as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the Employer's Representative may reasonably require.</p>
Sub-Clause 6.8: Contractor's Superintendence	<p>For the complete Contract Period, the Contractor shall provide all necessary superintendence to plan, arrange, direct, manage, inspect, test and monitor the design and execution of the Works and the provision of the Operation Service in accordance with his obligations under the Contract.</p> <p>Superintendence shall be given by a sufficient number of persons having adequate knowledge of the language for communications (defined in Sub-Clause 1.4 [Law and Language]) and of the operations to be carried out (including the methods and techniques required, the hazards likely to be encountered and methods of preventing accidents), for the satisfactory and safe execution of the Works and the provision of the Operation Service.</p>
Sub-Clause 6.9: Contractor's Personnel	<p>The Contractor's Personnel shall be appropriately qualified, skilled, and experienced in their respective trades or occupations. The Employer's Representative may require the Contractor to remove (or cause to be removed) any person employed on the Site or Works, including the Contractor's Representative if applicable, who:</p> <p>(a) persists in any misconduct or lack of care;</p> <p>(b) carries out duties incompetently or negligently;</p> <p>(c) fails to conform with any provisions of the Contract; or</p>

	<p>(d) persists in any conduct which is prejudicial to safety, health, or the protection of the environment.</p> <p>If appropriate, the Contractor shall then appoint (or cause to be appointed) a suitable replacement person.</p>
Sub-Clause 6.10: Records of Contractor's Personnel and Equipment	<p>During the Design-Build Period, the Contractor shall submit, to the Employer's Representative, details showing the number of each class of Contractor's Personnel and of each type of Contractor's Equipment on the Site. Any changes to the Personnel or Equipment shall be notified at the end of each calendar month to the Employer's Representative.</p> <p>During the Operation Service Period, any changes to the Personnel or Equipment shall be notified at the end of each calendar month to the Employer's Representative.</p>
Sub-Clause 6.11: Disorderly Conduct	<p>The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst the Contractor's Personnel, and to preserve peace and protection of persons and property on and near the Site.</p>
Sub-Clause 6.12: Foreign Personnel	<p>The Contractor may bring into the Country any foreign personnel who are necessary for the execution of the Works to the extent allowed by the applicable Laws. The Contractor shall ensure that these personnel are provided with the required residence visas and work permits. The Employer will, if requested by the Contractor, use his best endeavours in a timely and expeditious manner to assist the Contractor in obtaining any local, state, and national or government permission required for bringing in the Contractor's personnel.</p> <p>The Contractor shall be responsible for the return of these personnel to the place where they were recruited or to their domicile. In the event of the death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.</p>
Sub-Clause 6.13: Supply of Foodstuffs	<p>The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Employer's Requirements at reasonable prices for the Contractor's Personnel for the purposes of or in connection with the Contract.</p>
Sub-Clause 6.14: Supply of Water	<p>The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor's Personnel.</p>
Sub-Clause 6.15: Measures against Insect and Pest Nuisance	<p>The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce the danger to their health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.</p>
Sub-Clause 6.16: Alcoholic Liquor or Drugs	<p>The Contractor shall not, otherwise than in accordance with the Laws of the Country, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift, barter or disposal thereof by Contractor's Personnel.</p>
Sub-Clause 6.17: Arms and Ammunition	<p>The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.</p>
Sub-Clause 6.18: Festivals and Religious Customs	<p>The Contractor shall respect the Country's recognized festivals, days of rest and religious or other customs.</p>

Sub-Clause 6.19: Funeral Arrangements	The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of his local employees who may die while engaged upon the Works.
Sub-Clause 6.20: Prohibition of Forced or Compulsory Labour	The Contractor shall not employ forced labour, which consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labour, such as indentured labour, bonded labour or similar labour- contracting arrangements.
Sub-Clause 6.21: Prohibition of Harmful Child Labour	The Contractor shall not employ children in a manner that is economically exploitative, or is likely to be hazardous, or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development. Where the relevant labour laws of the Country have provisions for employment of minors, the Contractor shall follow those laws applicable to the Contractor. Children below the age of 18 years shall not be employed in dangerous work.
Sub-Clause 6.22: Employment Records of Workers	The Contractor shall keep complete and accurate records of the employment of labour at the Site. The records shall include the names, ages, genders, hours worked and wages paid to all workers. These records shall be summarized on a monthly basis and submitted to the Employer's Representative. These records shall be included in the details to be submitted by the Contractor under Sub-Clause 6.10 [Records of Contractor's Personnel and Equipment].
Sub-Clause 6.23: Workers' Organisations	In countries where the relevant labour laws recognise workers' rights to form and to join workers' organisations of their choosing without interference and to bargain collectively, the Contractor shall comply with such laws. Where the relevant labour laws substantially restrict workers' organisations, the Contractor shall enable alternative means for the Contractor's Personnel to express their grievances and protect their rights regarding working conditions and terms of employment. In either case described above, and where the relevant labour laws are silent, the Contractor shall not discourage the Contractor's Personnel from forming or joining workers' organisations of their choosing or from bargaining collectively and shall not discriminate or retaliate against the Contractor's Personnel who participate, or seek to participate, in such organizations and bargain collectively. The Contractor shall engage with such workers' representatives. Workers' organisations are expected to fairly represent the workers in the workforce.
Sub-Clause 6.24: Non-Discrimination and Equal Opportunity	The Contractor shall not make employment decisions on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment relationship on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, promotion, termination of employment or retirement, and discipline. In countries where the relevant labour laws provide for non-discrimination in employment, the Contractor shall comply with such laws. When the relevant labour laws are silent on non- discrimination in employment, the Contractor shall meet this Sub-Clause's requirements. Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination.

CLAUSE 7: PLANT, MATERIALS, AND WORKMANSHIP	
Sub-Clause 7.1: Manner of Execution	<p>The Contractor shall carry out the manufacture and/or replacement and/or repair of Plant, the production and manufacture of Materials, and all other activities during the execution of the Works and provision of the Operation Service:</p> <ul style="list-style-type: none"> (a) in accordance with the applicable Laws in the manner (if any) specified in the Contract; (b) in a proper workmanlike and careful manner, in accordance with recognized good practice; and (c) with properly equipped facilities and non-hazardous Materials, except as otherwise specified in the Contract.
Sub-Clause 7.2: Samples	<p>The Contractor shall submit the following samples of Materials, and relevant information, to the Employer's Representative for review in accordance with the procedures for Contractor's Documents described in Sub-Clause 5.2 [Contractor's Documents]:</p> <ul style="list-style-type: none"> (a) manufacturer's standard samples of Materials and samples specified in the Contract, all at the Contractor's cost; and (b) additional samples instructed by the Employer's Representative as a Variation. <p>Each sample shall be labelled as to origin and intended use in the Works.</p>
Sub-Clause 7.3: Inspection	<p>The Employer's Personnel and other persons authorized by the Employer shall at all reasonable times:</p> <ul style="list-style-type: none"> (a) have full access to all parts of the Site and to all places from which natural Materials are being obtained; (b) during production, manufacture, and construction (at the Site and elsewhere), operation and maintenance, be entitled to examine, inspect, measure and test the Materials and workmanship, and to check the progress of manufacture of Plant and production and manufacture of Materials; and (c) carry out other authorized duties and inspections. <p>The Contractor shall give the Employer's Personnel and other persons authorized by the Employer full opportunity to carry out these activities, including providing access, facilities, permissions and safety equipment. No such activity shall relieve the Contractor from any obligation or responsibility.</p> <p>The Contractor shall give Notice to the Employer's Representative whenever any work is ready and before it is covered up, put out of sight, or packaged for storage or transport. The Employer's Representative shall then either carry out the examination, inspection, measurement or testing without unreasonable delay, or promptly give Notice to the Contractor that the Employer's Representative does not require to do so. If the Contractor fails to give the Notice, he shall, if and when required by the Employer's Representative, uncover the work, and thereafter reinstate and make good, all at the Contractor's cost.</p>

Sub-Clause 7.4: Testing	<p>This Sub-Clause shall apply to all tests on Plant, Materials and workmanship specified in the Contract.</p> <p>The Contractor shall provide all apparatus, assistance, documents and other information, electricity, equipment, fuel, consumables, instruments, labour, materials, and suitably qualified and experienced staff, as are necessary to carry out the specified tests efficiently. The Contractor shall agree, with the Employer's Representative, the time and place for the specified testing of any Plant, Materials, and other parts of the Works.</p> <p>The Employer's Representative may, under Clause 13 [Variations and Adjustments], vary the location or details of specified tests, or instruct the Contractor to carry out additional tests. If these varied or additional tests show that the tested Plant, Materials, or workmanship is not in accordance with the Contract, the cost of carrying out this Variation shall be borne by the Contractor, notwithstanding other provisions of the Contract.</p> <p>The Employer's Representative shall give Notice to the Contractor not less than 24 hours prior to the tests, of the Employer's Representative's intention to attend the tests. If the Employer's Representative does not attend at the time and place agreed, the Contractor may proceed with the tests, unless otherwise instructed by the Employer's Representative, and the tests shall then be deemed to have been made in the Employer's Representative's presence.</p> <p>If the Contractor suffers delay in carrying out the tests and/or incurs cost from complying with these instructions or as a result of a delay for which the Employer is responsible, the Contractor shall give Notice to the Employer's Representative and shall be entitled, subject to Sub-Clause 20.1 [Contractor's Claims], to:</p> <ul style="list-style-type: none"> (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 9.3 [Extension of Time for Completion of Design-Build]; and (b) payment of any such Cost-Plus Profit, which shall be included in the Contract Price. <p>After receiving this Notice, the Employer's Representative shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.</p> <p>The Contractor shall promptly forward to the Employer's Representative duly certified reports of the tests. When the specified tests have been passed, the Employer's Representative shall endorse the Contractor's test certificate, or issue a certificate to him, to that effect. If the Employer's Representative has not attended the tests, he shall be deemed to have accepted the readings as accurate.</p>
Sub-Clause 7.5: Rejection	<p>If, as a result of an examination, inspection, measurement or testing, any Plant, Materials, or workmanship is found to be defective or otherwise not in accordance with the Contract, the Employer's Representative may reject the Plant, Materials, design or workmanship by giving Notice to the Contractor, with reasons. The Contractor shall then promptly make good the defect at the Contractor's cost and ensure that the rejected item complies with the Contract.</p> <p>If the Employer's Representative requires this Plant, Materials, or workmanship to be retested, the tests shall be repeated under the same terms and conditions. If the rejection and retesting cause the Employer to incur additional costs, the Contractor shall, subject to Sub-Clause 20.2 [Employer's Claims], pay these costs to the Employer.</p>

Sub-Clause 7.6: Remedial Work	<p>At any time during the Contract Period, notwithstanding any previous test or certification, the Employer's Representative may instruct the Contractor to:</p> <ul style="list-style-type: none"> (a) repair, remove from the Site and replace, any Plant or Materials which is not in accordance with the Contract; (b) remove and re-execute any other work which is not in accordance with the Contract; and (c) execute any work which is urgently required for the safety of the Works or the provision of the Operation Service, whether because of an accident, unforeseeable event or otherwise. <p>The Contractor shall comply with the instruction within a reasonable time, which shall be the time (if any) specified in the instruction, or immediately if urgency is specified under subparagraph (c).</p> <p>Except to the extent that the Contractor may be entitled to payment for the work required under subparagraph (c), the Contractor shall bear the cost of such remedial work.</p> <p>If the Contractor fails to comply with the instruction, the Employer shall be entitled to employ and pay other persons to carry out the work. Except to the extent that the Contractor would have been entitled to payment for the work, the Contractor shall, subject to Sub-Clause 20.2 [Employer's Claims], pay to the Employer all costs arising from this failure.</p>
Sub-Clause 7.7: Ownership of Plant and Materials	<p>Each item of Plant and Materials shall, to the extent consistent with the Laws of the Country, become the property of the Employer at whichever is the earlier of the following times, free from liens and other encumbrances:</p> <ul style="list-style-type: none"> (a) when it is delivered to the Site; (b) when the Contractor is paid the value of the Plant and Materials under Sub-Clause 9.9 [Payment for Plant and Materials in Event of Suspension]; and (c) when the Contractor is paid the value of the Plant and Materials under Sub-Clause 14.6 [Payment for Plant and Materials intended for the Works].
Sub-Clause 7.8: Royalties	<p>Unless otherwise stated in the Particular Conditions of Contract, the Contractor shall pay all royalties, rents, and other payments for</p> <ul style="list-style-type: none"> (a) natural Materials obtained from outside the Site; and (b) the disposal of material from demolitions and excavations and of other surplus material (whether natural or man-made), except to the extent that disposal areas within the Site are specified in the Contract.
CLAUSE 8: COMMENCEMENT DATE, COMPLETION AND PROGRAMME	
Sub-Clause 8.1: Commencement Date	<p>The Employer's Representative shall give Notice stating the Commencement Date to the Contractor not less than 14 days prior to the Commencement Date. Unless otherwise stated in the Particular Conditions, the Commencement Date shall be within 42 days after the Contractor receives the Letter of Acceptance</p>
Sub-Clause 8.2: Time for Completion	<p>The Contractor shall complete the whole of the Design-Build and each Section (if any), in accordance with Sub-Clause 9.2 [Time for Completion of Design-Build], or as extended under Sub-Clause 9.3 [Extension of Time for Completion of Design-Build], and shall provide the Operation Service for the period stated in the Contract Data</p>
Sub-Clause 8.3: Programme	<p>The Contractor shall submit a detailed time programme to the Employer's Representative within 28 days after receiving the Notice under Sub-Clause 8.1 [Commencement Date]. The Contractor shall also submit a revised</p>

	<p>programme whenever the previous programme is inconsistent with actual progress or with the Contractor's obligations. Each programme shall include:</p> <ul style="list-style-type: none"> (a) the order in which the Contractor intends to carry out the Works, including the anticipated timing of each stage of design, Contractor's Documents, procurement, manufacture, inspection, delivery to Site, construction, erection, testing, commissioning and trial operation; (b) the period of Operation Service; (c) the periods for reviews under Sub-Clause 5.2 [Contractor's Documents] and for any other submissions, including the supply of samples in accordance with Sub-Clause 7.2 [Samples], approvals and consents specified in the Employer's Requirements; (d) the sequence and timing of inspections and tests specified in the Contract, and (e) a supporting report which includes: <ul style="list-style-type: none"> (i) a general description of the methods which the Contractor intends to adopt for both the Design-Build and the Operation Service; (ii) details showing the Contractor's reasonable estimate of the number of each class of Contractor's Personnel and of each type of Contractor's Equipment, required on the Site for each major stage; and (iii) the Contractor's proposed manning schedule for the Operation Service. <p>Unless the Employer's Representative, within 21 days after receiving a programme, gives Notice to the Contractor stating the extent to which it does not comply with the Contract, the Contractor shall proceed in accordance with the programme, subject to his other obligations under the Contract. The Employer's Personnel shall be entitled to rely upon the programme when planning their activities.</p> <p>If, at any time, the Employer's Representative gives Notice to the Contractor that a programme fails (to the extent stated) to comply with the Contract or to be consistent with actual progress and the Contractor's stated intentions, the Contractor shall submit, within 14 days, a revised programme to the Employer's Representative in accordance with this Sub-Clause.</p>
Sub-Clause 8.4: Advance Warning	<p>Each Party shall endeavour to advise the other Party in advance of any known or probable future events or circumstances which may adversely affect the work, increase the Contract Price, or delay the execution of the Works or the Operation Service. The Employer's Representative may require the Contractor to submit an estimate of the anticipated effect of the future events or circumstances, and/or a proposal under Sub-Clause 13.3 [Variation Procedure]</p>
Sub-Clause 8.5: Delay Damages	<p>If the Contractor fails to complete the Design-Build in accordance with the requirements of Sub-Clause 9.2 [Time for Completion of Design-Build], he shall pay delay damages as detailed in Sub-Clause 9.6 [Delay Damages relating to Design-Build].</p> <p>If the Contractor fails or is unable to provide the Operation Service for the complete period specified in the Contract, or parts of the Operation Service, and such failure is:</p> <ul style="list-style-type: none"> (a) due to a cause for which the Contractor is responsible; and (b) results in the Employer losing revenue or income which the Employer would normally have expected to receive during the Operation Service Period; or

	(c) results in the Employer suffering any other loss which he would not have suffered but for such failure, then the Contractor shall pay to the Employer compensation in accordance with Sub-Clause 10.6 [Delays and Interruptions during the Operation Service].
Sub-Clause 8.6: Contract Completion Certificate	<p>Performance of the Contractor's obligations in respect of the Contract shall not be considered to have been completed until the Contract Completion Certificate has been signed by the Employer's Representative and issued to the Contractor, stating the date on which the Contractor completed his obligations in respect of both the Design-Build and the Operation Service (Contract Completion Date).</p> <p>The Employer's Representative shall, subject to Sub-Clause 11.8 [Joint Inspection Prior to Contract Completion], Sub-Clause 10.8 [Completion of Operation Service] and Sub-Clause 4.23 [Contractor's Operations on Site], issue the Contract Completion Certificate to the Contractor, with a copy to the Employer, within 21 days after the last day of the Contract Period. No extension of the Operation Service Period shall be allowed except by written agreement between the Parties.</p> <p>Only the Contract Completion Certificate shall be deemed to constitute the Employer's acceptance of the Contractor's completion of his obligations under the Contract. Following the issue of the Contract Completion Certificate the Employer shall be fully responsible for the care, safety, operation, servicing, and maintenance of the Works.</p>
Sub-Clause 8.7: Handback Requirements	The Contractor shall ensure that the Works comply with the handback requirements specified in the Employer's Requirements prior to the issue of the Contract Completion Certificate.
Sub-Clause 8.8: Unfulfilled Obligations	After the Contract Completion Certificate has been issued, each Party shall remain liable for the fulfilment of any obligation under the Contract which remains unperformed at that time. For the purposes of determining the nature and extent of unperformed obligations, the Contract shall be deemed to remain in force.
CLAUSE 9: DESIGN-BUILD	
Sub-Clause 9.1: Commencement of Design- Build	The Contractor shall commence the design and execution of the Works within 28 days of the Commencement Date and shall then proceed with the Design-Build with due expedition and without delay.
Sub-Clause 9.2: Time for Completion of Design-Build	<p>The Contractor shall complete the whole of the Design-Build of the Works, and each Section (if any), within the Time for Completion of Design-Build of the Works or Section (as the case may be) as set out in the Contract Data, including:</p> <ul style="list-style-type: none"> (a) passing the Tests on Completion under Sub-Clause 11.1 [Testing of the Works]; (b) completing all work which is stated in the Contract as being required under Sub-Clause 11.5 [Completion of the Works and Sections]; and (c) preparation and delivery to the Employer's Representative of Contractor's Documents required under Sub-Clause 5.2 [Contractor's Documents].
Sub-Clause 9.3: Extension of Time for Completion of Design- Build	The Contractor shall be entitled, subject to Sub-Clause 20.1 [Contractor's Claims], to an extension of the Time for Completion of Design-Build if and to the extent that completion for the purposes of Sub-Clause 11.5 [Completion of the Works and Sections] is or will be delayed by any of the following causes:

	<p>(a) a Variation (unless an adjustment to the Time for Completion of Design-Build has been agreed under Sub-Clause 13.3 [Variation Procedure]);</p> <p>(b) a cause of delay giving an entitlement to extension of time under a Sub-Clause of these Conditions;</p> <p>(c) exceptionally adverse climatic conditions;</p> <p>(d) unforeseeable shortages in the availability of personnel or Goods caused by epidemic or governmental actions; or</p> <p>(e) any delay, impediment or prevention caused by or attributable to the Employer, the Employer's Personnel, or the Employer's other contractors on the Site.</p> <p>If the Contractor considers himself to be entitled to an extension of the Time for Completion of Design-Build, the Contractor shall give Notice to the Employer's Representative in accordance with Sub-Clause 20.1 [Contractor's Claims]. When determining each extension of time, the Employer's Representative shall review previous determinations and may increase, but shall not decrease, the total extension of time.</p> <p>If a Dispute regarding an extension of time has been referred to the DAB, the Contractor shall be immediately entitled to any extension of the Time for Completion of Design-Build which is decided by the DAB under Sub-Clause 20.6 [Obtaining Dispute Adjudication Board's Decision].</p>
Sub-Clause 9.3: Delays Caused by Authorities	<p>If the following conditions apply during the Design-Build Period, namely:</p> <p>(a) the Contractor has diligently followed the procedures laid down by the relevant legally constituted public and/or local authorities in the Country;</p> <p>(b) these authorities delay or disrupt the Contractor's work; and</p> <p>(c) the delay or disruption was Unforeseeable,</p> <p>then this delay or disruption will be considered as a cause of delay under subparagraph (b) of Sub-Clause 9.3 [Extension of Time for Completion of Design-Build].</p>
Sub-Clause 9.5: Rate of Progress	<p>If, in the opinion of the Employer's Representative, at any time during the Design-Build Period:</p> <p>(a) actual progress is too slow to complete within the Time for Completion of Design-Build; and/or</p> <p>(b) progress has fallen (or will fall) behind the current programme under Sub-Clause 8.3 [Programme], other than as a result of a cause listed in Sub-Clause 9.3 [Extension of Time for Completion of Design-Build], then the Employer's Representative may instruct the Contractor to submit, under Sub-Clause 8.3 [Programme], a revised programme and supporting report describing the revised methods which the Contractor proposes to adopt in order to expedite progress and complete within the Time for Completion of Design-Build.</p> <p>Unless the Employer's Representative notifies otherwise, the Contractor shall adopt these revised methods, which may require increases in the working hours and/or in the numbers of Contractor's Personnel and/or Goods, at the risk and cost of the Contractor. If these revised methods cause the Employer to incur additional costs, the Contractor shall, subject to Sub-Clause 20.2 [Employer's Claims], pay these costs to the Employer, in addition to delay damages (if any) under Sub-Clause 9.6 [Delay Damages relating to Design-Build] below.</p>
Sub-Clause 9.6: Delay Damages relating to Design-Build	<p>If the Contractor fails to comply with Sub-Clause 9.2 [Time for Completion of Design-Build], the Contractor shall, subject to Sub-Clause 20.2 [Employer's Claims], pay delay damages to the Employer for this default. These delay</p>

	<p>damages shall be the amount stated in the Contract Data, which shall be paid for every day which shall elapse between the relevant Time for Completion and the date stated in the Commissioning Certificate. However, the total amount due under this Sub-Clause shall not exceed the maximum amount of delay damages (if any) stated in the Contract Data.</p> <p>These delay damages shall be the only damages due from the Contractor for such default, other than in the event of termination under Clause 15 [Termination by Employer] prior to completion of the Works. These damages shall not relieve the Contractor from his obligation to complete the Design-Build and the Operation Service, or from any other duties, obligations or responsibilities which he may have under the Contract.</p>
Sub-Clause 9.7: Suspension of Work	<p>The Employer's Representative may at any time instruct the Contractor to suspend progress of part or all of the Works. During such suspension, the Contractor shall protect, store, secure and maintain such part or the Works against any deterioration, loss, or damage.</p> <p>The Employer's Representative shall also notify the cause for the suspension. If and to the extent that the cause is the responsibility of the Contractor, the following Sub- Clauses 9.8, 9.9 and 9.10 shall not apply.</p>
Sub-Clause 9.8: Consequences of Suspension	<p>If, during the Design-Build Period, the Contractor suffers delay and/or incurs cost from complying with the Employer's Representative's instructions under Sub-Clause 9.7 [Suspension of Work] and/or from resuming the work, the Contractor shall give Notice to the Employer's Representative and shall be entitled, subject to Sub-Clause 20.1 [Contractor's Claims], to:</p> <ul style="list-style-type: none"> (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 9.3 [Extension of Time for Completion of Design-Build]; and (b) payment of any such Cost, which shall be included in the Contract Price. <p>After receiving this Notice, the Employer's Representative shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.</p> <p>The Contractor shall not be entitled to an extension of time for, or to payment of the Cost incurred in, making good the consequences of the Contractor's faulty design, workmanship, or materials, or of the Contractor's failure to protect, store or secure in accordance with Sub-Clause 9.7 [Suspension of Work].</p>
Sub-Clause 9.9: Payment for Plant and Materials in Event of Suspension	<p>The Contractor shall be entitled to payment of the value (as at the date of suspension) of Plant and/or Materials which have not been delivered to Site, if:</p> <ul style="list-style-type: none"> (a) the work on Plant or delivery of Plant and/or Materials has been suspended for more than 28 days; and (b) the Contractor has marked the Plant and/or Materials as the Employer's property in accordance with the Employer's Representative's instructions. <p>Payment for Plant and/or Materials made pursuant to this Sub-Clause shall, if requested by the Employer's Representative, be subject to the production of satisfactory evidence by the Contractor that the said Plant and/or Materials are fully owned by the Contractor and are not subject to any retention of title by the supplier.</p>
Sub-Clause 9.10: Prolonged of Suspension	<p>If the suspension under Sub-Clause 9.7 [Suspension of Work] has continued for more than 84 days, the Contractor may request the Employer's Representative's permission to proceed. If the Employer's Representative</p>

	does not give permission within 28 days after being requested to do so, the Contractor may, by giving Notice to the Employer's Representative, treat the suspension as an omission under Clause 13 [Variations and Adjustments] of the affected part of the Works. If the suspension affects the whole of the Works, the Contractor may give Notice of termination under Sub-Clause 16.2 [Termination by Contractor].
Sub-Clause 9.11: Resumption of Work	After the permission or instruction to proceed is given, the Contractor and the Employer's Representative shall jointly examine the Works and the Plant and Materials affected by the suspension. The Contractor shall make good any deterioration or defect in or loss of the Works or Plant or Materials, which has occurred during the suspension. The Employer's Representative shall make a written record of all making good required to be carried out by the Contractor.
Sub-Clause 9.12: Completion of Design-Build	<p>The Design-Build shall not be considered as complete until all of the following are achieved:</p> <ul style="list-style-type: none"> (a) the Works have been fully designed and executed in accordance with the Employer's Requirements and other relevant provisions of the Contract; (b) the Works have passed the Tests on Completion of Design-Build in accordance with Sub-Clause 11.1 [Testing of the Works]; (c) Contractor's Documents in accordance with Sub-Clause 5.5 [As-Built Documents] and Sub-Clause 5.6 [Operation and Maintenance Manuals] have been supplied and approved by the Employer's Representative; and (d) the Commissioning Certificate required under Sub-Clause 11.7 [Commissioning Certificate] has been issued stating the date upon which the Design-Build has been completed and the Operation Service shall commence.
Sub-Clause 9.13: Failure to Complete	<p>Should the Contractor fail to complete the Design-Build prior to the Cut-Off Date, the Employer may, at his sole option, either:</p> <ul style="list-style-type: none"> (a) permit the Contractor to continue the Design-Build for a further named period, with an absolute right to re-apply this Sub-Clause in the event that the Contractor fails to complete the Design-Build within the extended period; or (b) terminate the Contract in accordance with Sub-Clause 15.2 [Termination for Contractor's Default] and, if he so chooses, complete the work, and subsequently execute the Operation Service himself or by engaging others. <p>In either case, the Employer will be entitled to recover from the Contractor any direct loss incurred, including any loss resulting from the delayed operation of the Works, subject to the limitations contained in Sub-Clause 9.6 [Delay Damages Relating to Design-Build] and Sub-Clause 17.8 [Limitation of Liability].</p>
CLAUSE 10: OPERATION SERVICE	
Sub-Clause 10.1: General Requirements	<p>The Contractor shall comply with the Operation Management Requirements as provided for in the Contract and any revisions thereof which are agreed during the Contract Period.</p> <p>The Contractor shall follow the requirements of the Operation and Maintenance Plan and the operation and maintenance manuals. No significant alteration to such arrangements and methods shall be made without the prior approval of the Employer's Representative.</p>

	<p>During the Operation Service, the Contractor shall be responsible for ensuring that the Works remain fit for the purposes for which they are intended.</p> <p>The operators and maintenance personnel for the Works, including Plant operators, shall have the appropriate experience and qualifications to perform the Operation Service. The names, with details of their qualifications and experience, of all operation and maintenance personnel shall be submitted to the Employer for approval, and no such personnel shall be engaged prior to receiving such approval.</p>
Sub-Clause 10.2: Commencement of Operation Service	<p>Unless otherwise stated in the Employer's Requirements, the commencement of the Operation Service shall be from the date stated in the Commissioning Certificate issued under Sub-Clause 11.7 [Commissioning Certificate].</p> <p>The Operation Service shall not commence until the Design-Build of the Works, or any Sections has been completed in accordance with Sub-Clause 9.12 [Completion of Design-Build].</p> <p>Should the Commissioning Certificate, or any Notice attached or pertaining thereto, contain requirements or restrictions over and above those in the Contract, the Contractor shall comply with such requirements and/or restrictions, and, to the extent that the Contractor suffers additional Cost as a result, and subject to the provisions of Sub-Clause 20.1 [Contractor's Claims], he shall be reimbursed by the Employer unless such requirements or restrictions were as a result of a fault or failure of the Contractor.</p> <p>The Contractor shall thereafter provide the Operation Service in compliance with the Operation Management Requirements and in accordance with Sub-Clause 5.5 [As- Built Documents] and Sub-Clause 5.6 [Operation and Maintenance Manuals].</p> <p>If the Contractor wishes to modify a document which has previously been submitted and approved, the Contractor shall immediately notify the Employer's Representative, and shall subsequently submit revised document(s) to the Employer's Representative for review accompanied by a written explanation of the need for such modification.</p> <p>The Contractor shall not implement any proposed modification in accordance with subparagraph (d) of Sub-Clause 5.2 [Contractor's Documents] until such modification has been reviewed by the Employer's Representative, and consent to proceed has been given in writing. However, any such approval or consent, or any review (under this Sub-Clause or otherwise), shall not relieve the Contractor from any obligation or responsibility.</p>
Sub-Clause 10.3: Independent Compliance Audit	<p>At least 182 days prior to the commencement of the Operation Service, the Employer and the Contractor shall jointly appoint the Auditing Body to carry out an independent and impartial audit during the Operation Service. The terms of appointment of the Auditing Body shall be included in the Employer's Requirements, and the purpose will be to audit and monitor the performance of both the Employer and the Contractor during the Operation Service in compliance with the Operation Management Requirements. If the Parties cannot agree on the appointment of the Auditing Body, the matter shall be referred to the DAB by the Parties. The DAB shall make the appointment and notify the Parties accordingly.</p> <p>The Auditing Body shall commence its duties on the same date as the Operation Service commences.</p>

	<p>Payment of the Auditing Body shall be made from the Provisional Sum included in the Contract for that purpose.</p> <p>Both Parties shall cooperate with the Auditing Body and give due regard to the matters raised in each report issued by the Auditing Body.</p>
Sub-Clause 10.4: Delivery of Raw Materials	<p>The Employer shall be responsible for the free issue and supply and delivery to the Site (or other designated place) of the raw materials, fuels, consumables, and other such items specified in the Employer's Requirements. The Employer shall be responsible that all such items are fit for purpose and comply with the requirements of the Contract in respect of quality, purpose, and function.</p> <p>In the event that any such item or product is not delivered in accordance with the agreed delivery programme or deviates from the specified quality, and such delay or deviation causes the Contractor to suffer additional cost, the Contractor shall be entitled to give due notice to the Employer of the nature of the costs which he has incurred and, subject to Sub-Clause 20.1 [Contractor's Claims], be entitled to recover his Cost Plus Profit.</p> <p>The provisions of this Sub-Clause shall not apply in cases where delays are due to:</p> <ul style="list-style-type: none"> (a) breakdown, maintenance, repair, replacement, or other operational failure under the responsibility of the Contractor; (b) health, safety, and environmental risks carried by the Contractor; or (c) any act or omission of the Contractor under the Contract.
Sub-Clause 10.5: Training	<p>The Contractor shall carry out the training of Employer's Personnel in the operation and maintenance of the Works to the extent specified in the Employer's Requirements.</p> <p>The programme and scheduling of the training shall be agreed with the Employer, and the Contractor shall provide experienced training staff, and all training materials as stated in the Employer's Requirements. The Employer shall be responsible for providing the training facilities and nominating and selecting suitable personnel for training.</p>
Sub-Clause 10.6: Delays and Interruptions during the Operation Services	<p>Delays and interruptions during the Operation Service shall be agreed and determined as follows:</p> <ul style="list-style-type: none"> (a) Delays or Interruptions caused by the Contractor If there are any delays or interruptions during the Operation Service which are caused by the Contractor or by a cause for which the Contractor is responsible, the Contractor shall compensate the Employer for any losses including loss of revenue, loss of profit and overhead losses. The amount of compensation due shall be agreed or determined according to Sub-Clause 3.5 [Determinations], and the Employer shall be entitled to recover the amount due by making a corresponding deduction from the next payment due to the Contractor. However, the total amount of compensation payable by the Contractor to the Employer shall not exceed the amount stated in the Contract Data. There will be no extension of the period of the Operation Service as a result of any such delay or interruption. (b) Delays or Interruptions caused by the Employer If there are any delays or interruptions during the Operation Service which are caused by the Employer or by a cause for which the Employer is responsible, the Employer shall compensate the Contractor for any cost and losses including loss of revenue and loss of profit. The amount of compensation due shall be agreed or determined according to Sub-Clause 3.5 [Determinations], and the Employer shall pay the amount due by making a corresponding adjustment to the next payment due to the

	<p>Contractor. In any event other than in the case of election by the Employer to terminate for his convenience pursuant to Sub-Clause 15.5 [Termination for Employer's Convenience], the total amount of compensation payable by the Employer to the Contractor shall not exceed the amount stated in the Contract Data. There will be no extension of the period of the Operation Service as a result of any such delay or interruption.</p> <p>(c) Suspension by the Employer</p> <p>The Employer's Representative may at any time during the Operation Service instruct the Contractor to suspend progress of the Operation Service. During such suspension, the Contractor shall protect, store, secure and maintain the Plant against any deterioration, loss, or damage. If the need to suspend the Operation Service by the Employer is due to any failure of the Contractor or circumstances for which the Contractor is responsible under the Contract, the provisions of paragraph (a) of this Sub-Clause shall apply.</p> <p>If the need to suspend the Operation Service is a result neither of any failure by the Contractor nor of circumstances for which the Contractor is responsible under the Contract, the provisions of paragraph (b) of this Sub-Clause shall apply.</p> <p>If a suspension, which is due neither to any failure by the Contractor nor to circumstances for which the Contractor is responsible under the Contract, has continued for more than 84 days, the Contractor may request the Employer's Representative's permission to proceed. If the Employer's Representative does not give permission within 28 days after being requested to do so, the Contractor may give Notice of termination under Sub-Clause 16.2 [Termination by Contractor].</p> <p>After the permission or instruction to proceed is given, the Contractor and the Employer's Representative shall jointly examine the Works. The Contractor shall make good any deterioration or defect in the Plant and the Employer's Representative shall make a written record of all making good required to be carried out by the Contractor. If the suspension is due neither to any failure by the Contractor nor to circumstances for which the Contractor is responsible under the Contract, the Contractor shall be entitled to be paid the Cost-Plus Profit of making good the Works prior to re-commencing the Operation Service.</p>
<p>Sub-Clause 10.7: Failure to Reach Productions Outputs</p>	<p>In the event that the Contractor fails to achieve the production outputs required under the Contract, the Parties shall jointly establish the cause of such failure.</p> <p>(a) If the cause of the failure lies with the Employer or any of his servants or agents, then, after consultation with the Contractor, the Employer shall give written instruction to the Contractor of the measures which the Employer requires the Contractor to take.</p> <p>If the Contractor suffers any additional cost as a result of the failure or the measures instructed by the Employer, the Employer, subject to Sub-Clause 3.5 [Determinations] and Sub-Clause 20.1 [Contractor's CIBJins], shall pay the Contractor his Cost-Plus Profit.</p> <p>(b) If the cause of the failure lies with the Contractor then, after due consultation with the Employer, the Contractor shall take all steps necessary to restore the output to the levels required under the Contract. If the Employer suffers any loss as a result of the failure or the measures taken by the Contractor, the Contractor, subject to Sub-Clause 3.5 [Determinations], shall pay the Employer the performance damages specified in the Contract Data. Unless otherwise stated in the Contract Data, if the failure continues for a period of more than 84 days and the</p>

	<p>Contractor is unable to achieve the required production output, the Employer may either:</p> <ul style="list-style-type: none"> (i) continue with the Operation Service at a reduced level of compensation determined in accordance with Sub-Clause 3.5 [Determinations]; or, (ii) if the production outputs fail to reach the minimum values required in the Contract Data, give Notice to the Contractor not less than 56 days prior to terminating the Contract, in accordance with Sub-Clause 15.2 [Termination for Contractor's Default]. In such an event, the Employer shall be free to continue the Operation Service himself or by others.
Sub-Clause 10.8: Completion of Operation Service	<p>Unless the Parties have mutually agreed to prolong the Operation Service, the obligation of the Contractor to operate and maintain the Plant under the Operation Service shall cease at the end of the period stated in the Contract as the Operation Service Period.</p> <p>Notwithstanding the foregoing, other services to be performed by the Contractor must be completed before the Contractor will be entitled to receive the Contract Completion Certificate in accordance with Sub-Clause 8.6 [Contract Completion Certificate].</p> <p>Pre-conditions which must be fulfilled by the Contractor before the Contract Completion Certificate will be issued are:</p> <ul style="list-style-type: none"> (a) Inspection in accordance with Sub-Clause 11.8 [Joint Inspection Prior to Contract Completion]; (b) Testing in accordance with Sub-Clause 11.9 [Procedure for Tests Prior to Contract Completion]; (c) Updating Operation and Maintenance manuals providing performance records and data in accordance with Sub-Clause 5.6 [Operation and Maintenance Manuals]; and (d) Remedying defects found during inspection in accordance with Sub-Clause 11.8 [Joint Inspection Prior to Contract Completion].
Sub-Clause 10.9: Ownership of Output and Revenue	<p>During the Operation Service, any production output and revenue shall be the exclusive property of the Employer.</p>
CLAUSE 11: TESTING	
Sub-Clause 11.1: Testing of the Works	<p>The Contractor shall carry out the Tests on Completion of Design-Build in accordance with this Clause and Sub-Clause 7.4 [Testing], after providing the documents in accordance with Sub-Clause 5.5 [As-Built Documents] and Sub-Clause 5.6 [Operation and Maintenance Manuals].</p> <p>The Contractor shall give Notice to the Employer's Representative not less than 21 days prior to the date after which the Contractor will be ready to carry out each of the Tests on Completion of Design-Build. Unless otherwise agreed, Tests on Completion of Design-Build shall be carried out within 14 days after this date, on such day or days as the Employer's Representative shall instruct.</p> <p>Unless otherwise stated in the Particular Conditions, the Tests on Completion of Design-Build shall be carried out in the following sequence and are further detailed in the Employer's Requirements:</p> <ul style="list-style-type: none"> (a) pre-commissioning tests, which shall include the appropriate inspections and ("dry" or "cold") functional tests to demonstrate that each item of Plant can safely undertake the next stage, (b); (b) commissioning tests, which shall include the specified operational tests to demonstrate that the Works or Section can be operated safely and as specified, under all available operating conditions; and

	<p>(c) trial operation, which shall demonstrate that the Works or Section perform reliably and in accordance with the Contract.</p> <p>The Employer shall be the sole beneficiary of any revenue or benefit resulting from the Tests on Completion of Design-Build.</p> <p>During trial operation, when the Works are operating under stable conditions, the Contractor shall give Notice to the Employer's Representative that the Works are ready for any other Tests on Completion of Design-Build, including performance tests to demonstrate whether the Works conform with criteria specified in the Employer's Requirements and with the Schedule of Guarantees.</p> <p>Trial operation shall not constitute a commencement of the Operation Service under Sub-Clause 10.2 [Commencement of Operation Service].</p> <p>In considering the results of the Tests on Completion of Design-Build, the Employer's Representative shall make allowances for the effect of any use of the Works by the Employer on the performance or other characteristics of the Works. As soon as the Works, or a Section, have passed each of the Tests on Completion of Design-Build described in sub-paragraph (a), (b) or (c) above, the Contractor shall submit a report certified by the Contractor of the results of these Tests to the Employer's Representative.</p>
Sub-Clause 11.2: Delayed Tests on Completion of Design-Build	<p>If the Tests on Completion of Design-Build are being unduly delayed by the Employer, Sub-Clause 7.4 [Testing] (fifth paragraph) shall be applicable.</p> <p>If the Tests on Completion of Design-Build are being unduly delayed by the Contractor, the Employer's Representative may by Notice require the Contractor to carry out such Tests within 21 days after receiving the Notice. The Contractor shall carry out such Tests on the day or days within that period as the Contractor may fix and of which he shall give Notice to the Employer's Representative.</p> <p>If the Contractor fails to carry out the Tests on Completion of Design-Build within the period of 21 days, the Employer's Personnel may proceed with the Tests at the risk and cost of the Contractor. The Tests on Completion shall then be deemed to have been carried out in the presence of the Contractor and the results of the Tests shall be accepted as accurate.</p>
Sub-Clause 11.3: Retesting of the Works	<p>If the Works, or a Section, fail to pass the Tests on Completion of Design-Build, Sub-Clause 7.5 [Rejection] shall apply, and the Employer's Representative or the Contractor may require the failed Tests, and Tests on Completion of Design-Build on any related work, to be repeated under the same terms and conditions.</p>
Sub-clause 11.4: Failure to Pass Tests on Completion of Design- Build	<p>If the Works, or a Section, fail to pass the Tests on Completion of Design-Build repeated under Sub-Clause 11.3 [Retesting of the Works] the Employer's Representative shall be entitled to:</p> <ul style="list-style-type: none"> (a) order further repetition of Tests on Completion of Design-Build under Sub-Clause 11.3 [Retesting of the Works]; or (b) (b) issue a Notice under Sub-Clause 15.1 [Notice to Correct].
Sub-Clause 11.5: Completion of the Works and Sections	<p>Except as stated in Sub-Clause 11.11 [Failure to Pass Tests Prior to Contract Completion], the Works shall be deemed by the Employer to be completed when:</p> <ul style="list-style-type: none"> (a) the Works have been completed in accordance with the Contract, including the matters described in Sub-Clause 9.2 [Time for Completion of Design-Build] and Sub-Clause 5.6 [Operation and Maintenance Manuals] and except as allowed in sub-paragraph (i) below; and

	<p>(b) a Commissioning Certificate has been issued, or is deemed to have been issued, in accordance with this Sub-Clause.</p> <p>The Contractor may apply by Notice to the Employer's Representative for a Commissioning Certificate not earlier than 14 days before the Works will, in the Contractor's opinion, be complete and ready for commencement of the Operation Service Period. If the Works are divided into Sections, the Contractor may similarly apply for a Commissioning Certificate for each Section.</p> <p>The Employer's Representative shall, within 28 days after receiving the Contractor's application:</p> <ul style="list-style-type: none"> (i) issue the Commissioning Certificate to the Contractor, stating the date on which the Works or Section were completed in accordance with the Contract, except for any minor outstanding work and defects which will not substantially affect the use of the Works or Section for their intended purpose (listing such outstanding work and defects which are to be remedied); or (ii) reject the application, giving reasons and specifying the work required to be done by the Contractor to enable the Commissioning Certificate to be issued. <p>The Contractor shall then complete the work referred to in sub-paragraph (ii) above before issuing a further Notice under this Sub-Clause.</p> <p>If the Employer's Representative either fails to issue the Commissioning Certificate or reject the Contractor's application within the period of 28 days, and if the Works or Section (as the case may be) are substantially in accordance with the Contract, the Commissioning Certificate shall be deemed to have been issued on the last day of that period.</p>
Sub-Clause 11.6: Commissioning of Parts of the Works	<p>The Employer's Representative may, at the request of the Contractor, issue a Section Commissioning Certificate for any part of the Permanent Works.</p> <p>If a Section Commissioning Certificate has been issued for a part of the Works, the delay damages thereafter for completion of the remainder of the Works shall be reduced. Similarly, the delay damages for the remainder of the Section (if any) in which this part is included shall also be reduced. For any period of delay after the date stated in this Section Commissioning Certificate, the proportional reduction in these delay damages shall be calculated as the proportion which the value of the part so certified</p> <p>bears to the value of the Works or Section (as the case may be) as a whole. The Employer's Representative shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these proportions. The provisions of this paragraph shall only apply to the daily rate of delay damages under Sub-Clause 9.6 [Delay Damages relating to Design-Build], and shall not affect the maximum amount of these damages (if any).</p>
Sub-Clause 11.7: Commissioning Certificate	<p>Performance of the Contractor's Design-Build obligations, including care of the Works, shall not be considered to have been completed until the Commissioning Certificate has been signed by the Employer's Representative and delivered to the Contractor, stating the date on which the Contractor, in the opinion of the Employer's Representative, completed all such obligations in accordance with the Contract (subject to the outstanding works and defects listed in accordance with Sub-Clause 11.5 [Completion of the Works and Sections]).</p> <p>The Employer's Representative shall issue the Commissioning Certificate to the Contractor within 28 days after the application by the Contractor for the</p>

	<p>Commissioning Certificate subject to the provisions of Sub-Clause 11.5 [Completion of the Works and Sections].</p> <p>Only the Commissioning Certificate shall be deemed to constitute acceptance of the Works.</p>
Sub-Clause 11.8: Joint Inspection Prior to Contract Completion	<p>Not less than two years prior to the expiry date of the Operation Service Period, the Employer's Representative and the Contractor shall carry out a joint inspection of the Works and, within 28 days of the completion of the joint inspection, the Contractor shall submit a report on the condition of the Works identifying maintenance works (excluding routine maintenance works and the correction of defects), replacements and other works required to be carried out to satisfy the requirements of the Operation and Maintenance Plan after the Contract Completion Date.</p> <p>The Contractor shall submit a programme for carrying out such works over the remainder of the Operation Service Period.</p> <p>Following receipt of the Contractor's report, the Employer's Representative may, throughout the remainder of the Operation Service Period, instruct the Contractor to carry out all or part of the works identified in the Contractor's report. The quoted sums from the Asset Replacement Fund will be added to the monthly payments upon replacement of items of Plant in accordance with the Schedule of replacement prepared at Tender stage and the provisions of Sub-Clause 14.18 [Asset Replacement Fund]. Other works shall be carried out at the Contractor's cost.</p> <p>Upon satisfactory completion of the items identified in this Sub-Clause the Employer shall instruct the Contractor to commence the Tests Prior to Contract Completion in accordance with Sub-Clause 11.9 [Procedure for Tests Prior to Contract Completion].</p>
Sub-Clause 11.9: Procedure for Tests Prior to Contract Completion	<p>The Tests Prior to Contract Completion ("Tests") are to be carried out by the Contractor who shall provide all necessary labour, materials, electricity, fuel and water, other than items identified as being the responsibility of the Employer under Sub-Clause 10.4 [Delivery of Raw Materials], and undertake any required remedial works as may be required.</p> <p>The Tests are to be carried out in accordance with the Employer's Requirements. The Tests shall be carried out towards the end of the Operation Service Period. The Employer shall give Notice to the Contractor not less than 21 days prior to the date after which the Tests shall be carried out. Unless otherwise agreed, such Tests shall be commenced within 14 days after this date, on the day or days determined by the Employer's Representative.</p> <p>The results of the Tests shall be compiled and evaluated by the Employer's Representative and the Contractor. The Contractor shall make the results of any tests, inspections or monitoring available to the Employer's Representative within 7 days of their receipt. Any effect on the results of the Tests which can reasonably be shown to be due to prior use of the Works by the Contractor during the Operation Service Period shall be taken into account in assessing such results.</p> <p>As soon as the Contractor has completed the Tests, the Contractor shall notify the Employer's Representative that the Works are complete and ready for final inspection. Upon the Employer's Representative being satisfied that the Contractor has satisfied the requirements of the Tests regarding such final inspection, the Employer's Representative shall notify the Employer and the Contractor prior to the issue of the Contract Completion Certificate.</p>

Sub-Clause 11.10: Delayed Tests Prior to Contract Completion	<p>If the Employer incurs cost as a result of any unreasonable delay by the Contractor in carrying out the Tests Prior to Contract Completion ("Tests"), the Employer shall be entitled, subject to Sub-Clause 20.2 [Employer's Claims], to payment of any such cost which shall be recoverable from the Contractor by the Employer and may be deducted by the Employer from any monies due, or to become due, to the Contractor.</p> <p>If the Contractor fails to commence the Tests on the day or days determined under Sub-Clause 11.9 [Procedure for Tests Prior to Contract Completion], the Employer's Representative shall give Notice to the Contractor that unless the Tests are commenced within 14 days of this Notice the Employer's Representative may order that the Tests be undertaken by others on behalf of the Employer. In such event, the Contractor shall be bound by the results of such Tests as being accurate and the Employer shall be entitled to deduct the costs associated with the undertaking of the Tests by others from any monies due, or to become due, to the Contractor.</p> <p>If, for reasons not attributable to the Contractor, the Tests Prior to Contract Completion of the Works, or any Section, cannot be completed during the Contract Period (or any other period agreed upon by both Parties), then the Works or Section shall be deemed to have passed the Tests.</p>
Sub-Clause 11.11: Failure to Pass Tests Prior to Contract Completion	<p>If the Works or a Section thereof, fails to pass the Tests Prior to Contract Completion ("Tests") under Sub-Clause 11.9 [Procedure for Tests Prior to Contract Completion], the Employer's Representative shall be entitled to:</p> <ul style="list-style-type: none"> (a) order further repetition of Tests under Sub-Clause 11.12 [Retesting Prior to Contract Completion]; (b) reject the Works or a Section thereof (as the case may be), in which event the Employer shall have the same remedies against the Contractor as provided under Clause 15 [Termination by Employer]; or (c) issue a Contract Completion Certificate if the Employer so requires. The Contract Price shall then be reduced by such an amount as may be agreed by (d) the Employer and the Contractor (in full satisfaction of such failure only), <p>and the Contractor shall then proceed in accordance with his other obligations under the Contract.</p> <p>In the event of (c) above, if the Works, or a Section, fail to pass any of the Tests and the Contractor proposes to make adjustments or modifications to the Works or such Section, the Contractor may be instructed by (or on behalf of) the Employer that right of access to the Works or Section cannot be given until a time that is convenient to the Employer. The Contractor shall then remain liable to carry out the adjustments or modifications and to satisfy this Test, within a reasonable period of receiving Notice by (or on behalf of) the Employer of the time that is convenient to the Employer. However, if the Contractor does not receive this Notice during the relevant Contract Period, the Contractor shall be relieved of this obligation and the Works or Section (as the case may be) shall be deemed to have passed the Tests.</p> <p>If the Contractor incurs additional cost as a result of any unreasonable delay by the Employer in permitting access to the Works or Plant by the Contractor after issue of the Contract Completion Certificate, either to investigate the causes of a failure to pass any of the Tests or to carry out any adjustments or modifications, the Contractor shall be paid the additional Cost Plus Profit, as determined or agreed in accordance with Sub-Clause 3.5 [Determinations], caused by such a delay.</p>
Sub-Clause 11.12: Retesting Prior to Contract Completion	<p>If the Works, or a Section, fail to pass the Tests Prior to Contract Completion:</p>

	<p>(a) sub-paragraph (b) of Sub-Clause 12.1 [Completion of Outstanding Work and Remedying Defects] shall apply; and</p> <p>(b) the Employer may require the failed Tests, and the Tests Prior to Contract Completion on any related work, to be repeated under the same terms and conditions.</p> <p>If such failure and retesting results from a default of the Contractor and causes the Employer to incur additional costs, such costs shall be recoverable from the Contractor by the Employer, subject to Sub-Clause 20.2 [Employer's Claims], and may be deducted by the Employer from any monies due, or to become due, to the Contractor.</p> <p>The Employer's Representative may carry out such additional tests, inspections and monitoring as he deems necessary. The costs of such tests, except where such tests are carried out for the purpose of remedying any damage, defect, or failure to meet standards that are the responsibility of the Contractor under the Contract, shall be borne by the Employer.</p>
CLAUSE 12: DEFECTS	
Sub-Clause 12.1: Completion of Outstanding Work and Remedying Defects	<p>The requirements regarding the completion of outstanding work and the remedying of defects are as follows:</p> <p>(a) Design-Build Period: In order that the Works and Contractor's Documents, and each Section, shall be in the condition required by the Contract, the Contractor shall:</p> <ul style="list-style-type: none"> (i) complete any work which is outstanding on the date stated in the Commissioning Certificate as soon as practicable after such date, and not later than one year after such date; and (ii) execute all work required to remedy defects or damage, as may be notified by (or on behalf of) the Employer. <p>Final payment for the Design-Build Period, in accordance with Clause 14 [Contract Price and Payment], will not be certified until the above requirements have, in the opinion of the Employer's Representative, been met.</p> <p>If a defect appears or damage occurs, the Contractor shall be notified accordingly, by (or on behalf of) the Employer.</p> <p>(b) Operation Service Period: The Contractor shall be responsible for repairing and making good any damage or defect occurring during the Operation Service Period, whether such defect or damage is notified by the Employer or his Representative or observed by the Contractor himself.</p> <p>The Contract Completion Certificate issued under Sub-Clause 8.6 [Contract Completion Certificate] will not be issued until all defects and damage and all outstanding work, including all such items identified during the joint inspection made in accordance with Sub-Clause 11.8 [Joint Inspection Prior to Contract Completion], have been completed.</p>
Sub-Clause 12.2: Cost of Remedying Defects	<p>All work required to repair defects or damage shall be executed at the risk and cost of the Contractor, except:</p> <ul style="list-style-type: none"> (a) where it is attributable to any act by the Employer or the Employer's Personnel or agents; or (b) where it is as a result of an event that is covered under Clause 18 [Exceptional Risks]. <p>Where the Contractor is required to remedy a defect or damage to the Works under sub-paragraphs (a) or (b) of this Sub-Clause, the Contractor shall notify</p>

	the Employer's Representative and shall be entitled to a Variation under Clause 13 [Variations and Adjustments].
Sub-Clause 12.3: Failure to Remedy Defects	<p>If the Contractor fails to remedy any defect or damage arising during either the Design- Build Period or the Operation Service Period within a reasonable time, a date may be fixed by (or on behalf of) the Employer's Representative, on or by which the defect or damage is to be remedied. The Contractor shall be given reasonable Notice of this.</p> <p>If the Contractor fails to remedy the defect or damage by such date and the necessity for such work is due to the Contractor subject to Sub-Clause 12.2 [Cost of Remedying Defects], the Employer may (at his sole discretion):</p> <ul style="list-style-type: none"> (a) require the Employer's Representative to determine and certify a reasonable reduction in the Contract Price or the Rates and Prices submitted for the Operation Service Period in accordance with Sub-Clause 3.5 [Determinations]; or (b) if the defect or damage is such that the Contractor has been unable to commission the Works or continue providing the Operation Service and the Employer has been deprived of substantially the whole of the benefit of the Works or parts of the Works, the Employer shall be entitled to terminate the Contract in respect of such parts of the Works as cannot be put to the intended use in accordance with the provisions of Clause 15 [Termination by Employer]. <p>In the event of (b) above occurring, the Employer shall, notwithstanding the provisions of Sub-Clause 15.4 [Payment after Termination for Contractor's Default]:</p> <ul style="list-style-type: none"> (i) during the Design-Build Period, be entitled to recover from the Contractor all sums paid for such parts of the Works plus financing costs together with the cost of dismantling the same, clearing the Site and returning Plant and Materials to the Contractor; or, if the Employer chooses to complete the Works himself or by engaging others, the Employer shall be entitled to recover the extra costs, if any, of completing the Works after allowing for any sum due to the Contractor under Sub-Clause 15.3 [Valuation at Date of Termination for Contractor's Default]. If there are no such extra costs, the Employer shall pay any balance to the Contractor; and (ii) during the Operation Service Period, not be liable to make any further payments to the Contractor until the costs of operation and maintenance, completion and remedying of any defects and all other costs incurred and to be incurred by the Employer have been established.
Sub-Clause 12.4: Further Tests	<p>If the work of remedying any defect or damage may affect the performance of the Works, the Employer's Representative may require the repetition of any of the tests described in the Contract. The requirement shall be made by Notice within 28 days after the defect or damage is remedied.</p> <p>These tests shall be carried out in accordance with the terms applicable to the previous tests, except that they shall be carried out at the risk and cost of the Party liable, under Sub-Clause 12.2 [Cost of Remedying Defects], for the cost of the remedial work.</p>
Sub-Clause 12.5: Removal of Defective Work	<p>If the defect or damage cannot be remedied expeditiously on the Site and the Employer gives consent, the Contractor may remove from the Site for the purposes of repair such items of Plant as are defective or damaged. This consent may require the Contractor to increase the amount of the Performance Security by the full replacement cost of these items, or to provide other appropriate security.</p>

Sub-Clause 12.6: Contractor to Search	The Contractor shall, if required by the Employer's Representative, search for the cause of any defect, under the direction of the Employer's Representative. Unless the defect is to be remedied at the cost of the Contractor under Sub-Clause 12.2 [Cost of Remedying Defects], the Cost-Plus Profit of the search shall be agreed or determined by the Employer's Representative in accordance with Sub-Clause 3.5 [Determinations] and shall be included in the Contract Price.
CLAUSE 13: VARIATIONS AND ADJUSTMENTS	
Sub-Clause 13.1: Right to Vary	<p>Variations may be initiated by the Employer's Representative at any time prior to issuing the Commissioning Certificate, either by an instruction to the Contractor by the Employer's Representative or by a request for the Contractor to submit a proposal. A Variation shall not comprise the omission of any work which is to be carried out by others.</p> <p>The Contractor shall execute and be bound by each Variation; unless the Contractor promptly gives Notice to the Employer's Representative stating (with supporting particulars) that</p> <ul style="list-style-type: none"> (i) the Contractor cannot readily obtain the Goods required for the Variation, (ii) it will reduce the safety or suitability of the Works for the purposes for which they were intended under the Contract; (iii) it will have an adverse impact on the achievement of the Schedule of guarantees; or (iv) it will have an adverse effect on the provision of the Operation Service under the Contract. Upon receiving this Notice, the Employer's Representative shall cancel, confirm, or vary the instruction and the Contractor shall execute and be bound by it. <p>If the Employer or the Employer's Representative wishes to instruct a Variation during the Operation Service Period, he shall give the Contractor written details of his requirements. The Contractor shall then proceed in accordance with Sub-Clause 13.3 [Variation Procedure] sub-paragraphs (a), (b) and (c). However, the Contractor shall not be obliged to proceed with the Variation until the matters covered in Sub-Clause 13.3 [Variation Procedure] sub-paragraphs (a), (b) and (c) have been agreed between the Employer and the Contractor.</p>
Sub-Clause 13.2: Value Engineering	<p>The Contractor may, at any time, submit to the Employer's Representative a written proposal, which (in the Contractor's opinion) will, if adopted:</p> <ul style="list-style-type: none"> (a) accelerate completion of the Works; (b) reduce the cost to the Employer of executing, maintaining or operating the Works; (c) improve the efficiency or value to the Employer of the completed Works; (d) improve the efficiency of the Operation Service being provided; or (e) otherwise be of benefit to the Employer. <p>The proposal shall be prepared at the cost of the Contractor and shall include the items listed in Sub-Clause 13.3 [Variation Procedure].</p>
Sub-Clause 13.3: Variation Procedure	<p>If the Employer's Representative requests a proposal, prior to instructing a Variation, the Contractor shall respond in writing as soon as practicable, either by giving reasons why he cannot comply (if this is the case) or by submitting:</p> <ul style="list-style-type: none"> (a) a description of the proposed design and/or work to be performed and a programme for its execution;

	<p>(b) the Contractor's proposal for any necessary modifications to the programme according to Sub-Clause 8.3 [Programme] and to the Time for Completion; and</p> <p>(c) the Contractor's proposal for adjustment to the Contract Price.</p> <p>The Employer's Representative shall, as soon as practicable after receiving such proposal (under Sub-Clause 13.2 [Value Engineering] or otherwise), respond with approval, disapproval or comments. The Contractor shall not delay any work whilst awaiting a response.</p> <p>Each instruction to execute a Variation, with any requirements for the recording of costs, shall be issued by the Employer's Representative to the Contractor, who shall acknowledge receipt.</p> <p>Upon instructing or approving a Variation, the Employer's Representative shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine adjustments to the Contract Price and the Schedule of Payments. These adjustments, except adjustments made under Sub-Clause 13.6 [Adjustments for Changes in Legislation] and Sub-Clause 13.7 [Adjustments for Changes in Technology], shall include reasonable profit, and shall take account of the Contractor's submissions under Sub-Clause 13.2 [Value Engineering] if applicable.</p>
Sub-Clause 13.4: Payment in Applicable Currencies	<p>If the Contract provides for payment of the Contract Price in more than one currency, then whenever an adjustment is agreed, approved, or determined as stated above, the amount payable in each of the applicable currencies shall be specified. For this purpose, reference shall be made to the actual or expected currency proportions of the cost of the varied work, and to the proportions of various currencies specified for payment of the Contract Price.</p>
Sub-Clause 13.5: Provisional Sums	<p>Provisional Sums may be required for parts of the Works which are not required to be priced at the risk of the Contractor. For example, a Provisional Sum may be necessary to cover goods which the Employer wants to select, or to deal with a major uncertainty regarding subsurface conditions. It is essential to define the scope of each Provisional Sum (possibly in a Schedule prepared by the Employer), since the defined scope will then be excluded from the other elements of the Accepted Contract Amount.</p>
Sub-Clause 13.6: Adjustments for Change in Legislation	<p>Adjustments to the execution of the Works or provision of the Operation Service necessitated by a change in Law shall be dealt with as a Variation and as provided for under Clause 13 [Variations and Adjustments]. Either Party may, by written Notice to the other, require that adjustments shall be made to the provision of the Contract as are necessary to enable the Contractor to comply with changes in Law.</p> <p>The Contract Price and programme for design, execution and operation of the Works shall be adjusted to take account of any increase or decrease in cost resulting from a change in the Laws of the Country (including the introduction of new Laws and the repeal or modification of existing Laws) or in the judicial or official governmental interpretation of such Laws or changes to technical standards and regulations in accordance with Sub-Clause 5.4 [Technical Standards and Regulations], made after the Base Date, which affect the Contractor in the performance of obligations under the Contract.</p> <p>If the Contractor suffers (or will suffer) delay and/or incurs (or will incur) additional cost as a result of these changes in the Laws or in such interpretations, made after the Base Date, the Contractor shall give Notice to the Employer's Representative providing evidence supporting any adjustment, an indication of the nature of change in cost and how the Contractor proposes to implement the necessary change.</p>

	<p>The Contractor shall be entitled, subject to Sub-Clause 20.1 [Contractor's Claims], to:</p> <ul style="list-style-type: none"> (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 9.3 [Extension of Time for Completion of Design-Build]; and (b) payment of any such additional Cost, which shall be included in the Contract Price. <p>After receiving this Notice, the Employer's Representative shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.</p>
Sub-Clause 13.7: Adjustments for Changes in Technology	<p>The Contract Price and programme for design, execution and operation of the Works shall be adjusted to take into account any increase or decrease in cost resulting from any changes in technology, new materials or products which the Contractor is obliged to adopt, either:</p> <ul style="list-style-type: none"> (a) where a proposal from the Contractor under Sub-Clause 13.2 [Value Engineering] is accepted by the Employer's Representative; (b) where the Employer's Representative instructs the Contractor to use new technology or new materials or products; or (c) there is a statutory requirement for the Contractor to use new technology or new materials or products. <p>In any such case, the Contractor shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:</p> <ul style="list-style-type: none"> (i) an extension of time for any such delay, if the events delay the completion of the Design-Build; and (ii) any additional Cost, subject to an adjustment for any operational or other savings which the Contractor may make as a result of the introduction of such new technology, materials or products. <p>After receiving a Notice of claim, the Employer's Representative shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters. Where appropriate, the Employer's Representative shall issue a Variation to the Contractor with details of the required changes.</p>
Sub-Clause 13.8: Adjustments for Changes in Technology	<p>The Contract Price and the Rates and Prices shall be adjusted in accordance with the Schedules of cost indexation as contained in the Schedule of Payments. If there are no such Schedules of cost indexation included in the Contract, this Sub-Clause shall not apply.</p>
CLAUSE 14: CONTRACT PRICE AND PAYMENT	
Sub-Clause 14.1: The Contract Price	<p>"The Contract Price shall be the amount or amounts submitted by the Contractor for the Design-Build and the Operation Service including the Asset Replacement Fund, priced at the Base Date, and due to be paid to the Contractor in accordance with the Contract together with any adjustments as provided for under Clause 13 [Variations and Adjustments] or arising as a result of claims under Clause 20 [Claims, Disputes and Arbitration].</p> <p>The Contractor shall pay all taxes, duties and fees required to be paid by him under the Contract and the Contract Price shall not be adjusted for changes in any of these costs, except as provided for in Sub-Clause 13.6 [Adjustments for Changes in Legislation] and to the extent allowed for under Clause 20 [Claims, Disputes and Arbitration].</p>
Sub-Clause 14.2: Advance Payment	<p>The Employer shall make an advance payment, as an interest-free loan for mobilization and design, when the Contractor submits a guarantee in accordance with this Sub-Clause that shall be based on the sample form included in the tender documents or in another form acceptable to the</p>

	<p>Employer. The amount of the advance payment and the applicable currencies shall be as stated in the Contract Data.</p> <p>Unless and until the Employer receives this guarantee, or if no advance payment is stated in the Contract Data, this Sub-Clause shall not apply.</p> <p>The Employer's Representative shall issue an Interim Payment Certificate for the advance payment under Sub-Clause 14.7 [Issue of Advance and Interim Payment Certificates] after receiving an application under Sub-Clause 14.3 [Application for Advance and Interim Payment Certificates] and after the Employer receives (i) the Performance Security in accordance with Sub-Clause 4.2 [Performance Security] and (ii) a guarantee in amounts and currencies equal to the advance payment. This guarantee shall be issued by an entity and from within a country (or other jurisdiction) approved by the Employer and shall be based on the sample form included in the tender documents or in another form approved by the Employer.</p> <p>The Contractor shall ensure that the guarantee is valid and enforceable until the advance payment has been repaid, but its amount may be progressively reduced by the amount repaid by the Contractor as indicated in the Interim Payment Certificates. If the terms of the guarantee specify its expiry date, and the advance payment has not been repaid by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the guarantee until the advance payment has been repaid.</p> <p>The advance payment shall be repaid through percentage deductions in Interim Payment Certificates. Unless other percentages are stated in the Contract Data:</p> <ul style="list-style-type: none"> (a) deductions shall commence in the Interim Payment Certificate in which the total of all certified interim payments (excluding the advance payment and deductions and repayments of retention) exceeds ten percent (10%) of the Accepted Contract Amount for the Design-Build less Provisional Sums; and (b) deductions shall be made at the amortization rate of one-quarter (25%) of the amount of each Interim Payment Certificate (excluding the advance payment and deductions and repayments of retention) issued during the Design-Build Period. <p>If the advance payment has not been repaid prior to the issue of the Commissioning Certificate or prior to termination under Clause 15 [Termination by Employer], Clause 16 [Suspension and Termination by Contractor] or Clause 18 [Exceptional Risks] (as the case may be), the whole of the balance then outstanding shall immediately become due and payable by the Contractor to the Employer.</p>
<p>Sub-Clause 14.3: Application for Advance and Interim Payment Certificates</p>	<p>When submitting the advance payment guarantee required under Sub-Clause 14.2 [Advance Payment], the Contractor shall include his application for the advance payment.</p> <p>The Contractor shall thereafter submit a Statement in one original and five copies to the Employer's Representative after the end of each month (unless otherwise stated in the Contract), in a form approved by the Employer's Representative, showing in detail the amounts to which the Contractor considers himself to be entitled, together with supporting documents.</p> <p>The Statement shall include the following items, as applicable, which shall be expressed in the various currencies in which the Contract Price is payable:</p>

	<ul style="list-style-type: none"> (a) the estimated contract value of the Works executed, and the Contractor's Documents produced up to the end of the month (including Variations but excluding items described in sub-paragraphs (b) to (j) below); (b) any amounts to be added and deducted for changes in legislation, changes in cost and changes in technology, in accordance with Sub-Clause 13.6 [Adjustments for Changes in Legislation], Sub-Clause 13.7 [Adjustments for Changes in Technology] and Sub-Clause 13.8 [Adjustments for Changes in Cost]; (c) any amount to be deducted for retention, calculated by applying the percentage of retention stated in the Contract Data to the total of the above amounts, until the amount so retained by the Employer's Representative reaches the limit of Retention Money (if any) stated in the Contract Data; (d) any amounts to be added and deducted for the advance payment and repayments in accordance with Sub-Clause 14.2 [Advance Payment]; (e) any amounts to be added and deducted for Plant and Materials in accordance with Sub-Clause 14.6 [Payment for Plant and Materials intended for the Works]; (f) any amounts due for Plant, Materials or services purchased by the Contractor under Sub-Clause 13.5 [Provisional Sums]; (g) amounts due for the Operation Service; (h) amounts due from the Asset Replacement Fund; (i) adjustments due for the Maintenance Retention Fund; (j) any other additions or deductions which may have become due under the Contract or otherwise, including those under Clause 20 [Claims, Disputes and Arbitration]; and (k) the deduction of amounts certified in all previous Interim Payment Certificates.
Sub-clause 14.4: Schedule of Payments	<p>If the Contract includes a Schedule of Payments for the Design-Build Period and/or the Operation Service Period specifying the instalments in which the Contract Price and/or the Rates and Prices will be paid, then, unless otherwise stated in this Schedule:</p> <ul style="list-style-type: none"> (a) the instalments quoted in the Schedule of Payments shall be the estimated values for the purposes of Sub-Clause 14.3 [Application for Advance and Interim Payment Certificates]; (b) Sub-Clause 14.6 [Payment for Plant and Materials intended for the Works] shall not apply; and (c) if these instalments are not defined by reference to the actual progress achieved in executing the Works, and if actual progress is found to differ from that on which the Schedule of Payments was based, then the Employer's Representative may proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine revised instalments which shall take account of the extent to which progress differs from that on which the instalments were previously based. <p>If the Contract does not include a Schedule of Payments for the Design-Build Period and/or the Operation Service Period, the Contractor shall submit non-binding estimates of the payments which he expects to become due during each quarterly period. The first estimate shall be submitted within 42 days after the Commencement Date. Revised estimates shall be submitted at quarterly intervals until the Contract Completion Certificate has been issued.</p>
Sub-clause 14.5: Asset Replacement Schedule	<p>Payments from the Asset Replacement Fund shall be made in accordance with the provisions of Sub-Clause 14.18 [Asset Replacement Fund].</p>

	<p>On no account will payments be made for assets replaced which are not identified in the Asset Replacement Schedule unless they have been instructed as a Variation under Clause 13 [Variations and Adjustments].</p> <p>If Assets are replaced in advance of the date given in the Asset Replacement Schedule, payment will not be released until the date stated in the Schedule has been reached.</p> <p>If Assets are not replaced on or before the scheduled date, payment will not be released until such replacements have been affected.</p> <p>Any monies remaining in the Asset Replacement Fund at the time of issue of the Contract Completion Certificate will be disbursed between the Parties as described in Sub-Clause 14.18 [Asset Replacement Fund].</p>
Sub-Clause 14.6: Payment for Plant and Materials intended for the Works	<p>If this Sub-Clause applies, Interim Payment Certificates shall include, under sub- paragraph (e) of Sub-Clause 14.3 [Application for Advance and Interim Payment Certificates], (i) an amount for Plant and Materials which have been sent to the Site for incorporation in the Permanent Works, and (ii) a reduction when the contract value of such Plant and Materials is included as part of the Permanent Works under sub- paragraph (a) of Sub-Clause 14.3.</p> <p>If the lists referred to in sub-paragraphs (b)(i) or (c)(i) below are not included in the Contract Data, this Sub-Clause shall not apply.</p> <p>The Employer's Representative shall determine and certify each addition if the following conditions are satisfied:</p> <p>(a) the Contractor has:</p> <ul style="list-style-type: none"> (i) kept satisfactory records (including the orders, receipts, costs and use of Plant and Materials) which are available for inspection; and (ii) submitted a statement of the cost of acquiring and delivering the Plant and Materials to the Site, supported by satisfactory evidence; and either: <p>(b) the relevant Plant and Materials:</p> <ul style="list-style-type: none"> (i) are those listed in the Contract Data for payment when shipped; (ii) have been shipped to the Country, en-route to the Site, in accordance with the Contract; and (iii) are described in a clean shipped bill of lading or other evidence of shipment, which has been submitted to the Employer's Representative together with evidence of payment of freight and insurance, any other documents reasonably required, and a bank guarantee in a form and issued by an entity approved by the Employer in amounts and currencies equal to the amount due under this Sub-Clause. This guarantee may be in a similar form to the form referred to in Sub- Clause 14.2 [Advance Payment] and shall be valid until the Plant and Materials are properly stored on Site and protected against loss, damage or deterioration; or <p>(c) the relevant Plant and Materials:</p> <ul style="list-style-type: none"> (i) are those listed in the Contract Data for payment when delivered to the Site; and (ii) have been delivered to and are properly stored on the Site, are protected against loss, damage or deterioration, and appear to be in accordance with the Contract. <p>The additional amount to be certified shall be the equivalent of eighty percent (80%) of the Employer's Representative determination of the cost of the Plant and Materials (including delivery to Site), taking account of the</p>

	<p>documents mentioned in this Sub- Clause and of the contract value of the Plant and Materials.</p> <p>The currencies for this additional amount shall be the same as those in which payment will become due when the contract value is included under subparagraph (a) of Sub- Clause 14.3 [Application for Advance and Interim Payment Certificates]. At that time, the Interim Payment Certificate shall include the applicable reduction which shall be equivalent to, and in the same currencies and proportions as, this additional amount for the relevant Plant and Materials.</p>
Sub-Clause 14.7: Issue of Advance and Interim Payment Certificates	<p>No amount will be certified or paid until the Employer has received and approved the Performance Security provided for in Sub-Clause 4.2 [Performance Security]. Upon receipt of the Contractor's application for the advance payment, the Employer's Representative shall, within 14 days of receiving the application, issue to the Employer an Interim Payment Certificate in respect of such payment, with a copy to the Contractor. Thereafter, in respect of interim payment applications the Employer's Representative shall, within 28 days after receiving a Statement and supporting documents, issue to the Employer an Interim Payment Certificate which shall state the amount which the Employer's Representative fairly determines to be due, with supporting particulars, and shall include any amounts due to or from the Contractor in accordance with a decision by the DAB made under Sub-Clause 20.6 [Obtaining Dispute Adjudication Board's Decision]. However, prior to issuing the Commissioning Certificate, the Employer's Representative shall not be bound to issue an Interim Payment Certificate in an amount which would (after retention and other deductions) be less than the minimum amount of Interim Payment Certificates (if any) stated in the Contract Data. In this event, the Employer's Representative shall give Notice to the Contractor accordingly.</p> <p>An Interim Payment Certificate shall not be withheld for any other reason, although:</p> <ul style="list-style-type: none"> (a) if any thing supplied or work done by the Contractor is not in accordance with the Contract, the cost of rectification or replacement may be withheld until rectification or replacement has been completed; and/or (b) if the Contractor was or is failing to perform any work or obligation in accordance with the Contract, and had been so notified by the Employer's Representative, the value of this work or obligation may be withheld until the work or obligation has been performed. <p>The Employer's Representative may in any Payment Certificate make any correction or modification that should properly be made to any previous Payment Certificate. An Interim Payment Certificate shall not be deemed to indicate the Employer's Representative's acceptance, approval, consent or satisfaction of the Works.</p>
Sub-Clause 14.8: Payment	<p>The Employer shall pay to the Contractor:</p> <ul style="list-style-type: none"> (a) the advance payment within 21 days after receiving the documents in accordance with Sub-Clause 4.2 [Performance Security] and Sub-Clause 14.2 [Advance Payment] and the Payment Certificate for the advance payment issued in accordance with Sub-Clause 14.7 [Issue of Advance and Interim Payment Certificates]; (b) the amount certified in each Interim Payment Certificate within 56 days after the Employer's Representative receives the corresponding Statement and supporting documents, including any amounts due in accordance with a decision by the DAB which have been included in the Interim Payment Certificate; and

	<p>(c) the amounts certified in the Final Payment Certificate Design-Build and the Final Payment Certificate Operation Service within 56 days after the Employer receives each such Final Payment Certificate, including any amounts due in accordance with a decision by the DAB which have been included in the Final Payment Certificate.</p> <p>Payment of the amount due in each currency shall be made into the bank account, nominated by the Contractor, in the payment country (for this currency) specified in the Contract.</p>
Sub-Clause 14.9: Delayed Payment	<p>If the Contractor does not receive payment in accordance with Sub-Clause 14.8 [Payment], the Contractor shall be entitled to receive financing charges compounded monthly on the amount unpaid during the period of delay. This period shall be deemed to commence on the date for payment specified in Sub-Clause 14.8 [Payment], irrespective (in the case of its sub-paragraph (b)) of the date on which any Interim Payment Certificate is issued.</p> <p>Unless otherwise stated in the Contract Data, these financing charges shall be calculated at the annual rate of three percentage points above the discount rate of the central bank in the country of the currency (or currencies if more than one) of payment and shall be paid in such currencies.</p> <p>The Contractor shall be entitled to this payment without formal Notice or certification, and without prejudice to any other right or remedy.</p>
Sub-Clause 14.10: Payment of Retention Money	<p>When the Commissioning Certificate has been issued, the first half of the Retention Money shall be certified by the Employer's Representative for payment to the Contractor. If a Section Commissioning Certificate is issued for a Section, the relevant percentage of the first half of the Retention Money shall be certified and paid to the Contractor. Such amount shall be included for payment in the next Interim Payment Certificate following the issue of the Commissioning Certificate.</p> <p>The Contractor shall be entitled to include the second half of the Retention Money in the Final Statement Design-Build.</p>
Sub-Clause 14.11: Application for Final Payment Certificate Design-Build	<p>Within 28 days after the end of the Retention Period, the Contractor shall submit to the Employer's Representative one original and five copies of the Final Statement Design-Build with supporting documents showing:</p> <ul style="list-style-type: none"> (a) the value of all work done in respect of the Design-Build; and (b) any further sums which the Contractor considers to be due to him under the Contract in respect of the Design-Build. <p>Together with the Final Statement Design-Build, the Contractor shall submit a written undertaking that the Statement is in full and final settlement of all matters under or in connection with the Contract relating to the Design-Build.</p> <p>If the Employer's Representative disagrees with or cannot verify any part of the Final Statement Design-Build, the Employer's Representative and the Contractor shall attempt to agree such matters, and the Contractor shall re-submit his Final Statement based on the agreement with the Employer's Representative. The Employer's Representative shall then issue a Final Payment Certificate Design-Build under Sub-Clause 14.12 [Issue of Final Payment Certificate Design-Build] for the agreed amount. If the Parties cannot agree on such matters, or if the Contractor has failed to submit his application for payment within the said 28 days, the Employer's Representative shall issue an Interim Payment Certificate under Sub-Clause 14.7 [Issue of Advance and Interim Payment Certificates] for the amount which he considers to be due to the Contractor. If the Contractor is dissatisfied with the amount certified, he may refer the matter to the DAB</p>

	for a decision in accordance with Clause 20.6 [Obtaining Dispute Adjudication Board's Decision].
Sub-Clause 14.12: Issue of Final Payment Certificate Design- Build	<p>Within 28 days of receiving the Final Statement Design-Build, or the resubmitted Final Statement (as the case may be), and the written undertaking from the Contractor in accordance with Sub-Clause 14.11 [Application for Final Payment Certificate Design-Build], the Employer's Representative shall issue to the Employer, with a copy to the Contractor, the Final Payment Certificate Design-Build stating:</p> <ul style="list-style-type: none"> (a) the amount which is finally due for the Design-Build; and (b) after giving credit to the Employer for all amounts previously paid by the Employer and all sums to which the Employer is entitled in respect of the Design-Build, the balance (if any) due from the Employer to the Contractor or from the Contractor to the Employer, as the case may be. <p>Upon receipt of the Final Payment Certificate Design-Build, the Employer shall pay the Contractor the amount, if any, due in accordance with the provisions of Sub-Clause 14.8 [Payment].</p>
Sub-Clause 14.13: Application for Final Payment Certificate Operation Service	<p>Within 56 days after receiving the Contract Completion Certificate, the Contractor shall submit to the Employer's Representative one original and five copies of the Final Statement Operation Service with supporting documents showing:</p> <ul style="list-style-type: none"> (a) the value of all work done in respect of the Operation Service including authorized expenditure from the Asset Replacement Fund; and (b) any further sums which the Contractor considers to be due to him under the Contract including any unused monies from the Maintenance Retention Fund. <p>Together with the Final Statement Operation Service, the Contractor shall submit a written discharge according to the requirements of Sub-Clause 14.14 [Discharge].</p>
Sub-Clause 14.14: Discharge	<p>When submitting the Final Statement Operation Service, the Contractor shall submit a written discharge which confirms that the total of the Final Statement Operation Service, together with the Final Statement Design-Build submitted according to Sub-Clause 14.11 [Application for Final Payment Certificate Design-Build] represents full and final settlement of all monies due to the Contractor under or in connection with the Contract. This discharge may state that it becomes effective only after payment due under the Final Payment Certificate Operation Service has been made and the Performance Security referred to in Sub-Clause 4.2 [Performance Security] has been returned to the Contractor.</p>

Sub-Clause 14.15: Issue of Final Payment Certificate Operation Service	<p>Within 28 days of receiving the Final Statement Operation Service and the written discharge from the Contractor in accordance with Sub-Clause 14.13 [Application for Final Payment Certificate Operation Service] and Sub-Clause 14.14 [Discharge] respectively, the Employer's Representative shall issue to the Employer, with a copy to the Contractor, the Final Payment Certificate Operation Service stating:</p> <ul style="list-style-type: none"> (a) the amount which is finally due for the Operation Service; and (b) the amount which is finally due for the Contract; and (c) after giving credit to the Employer for all amounts previously paid by the Employer and all sums to which the Employer is entitled in respect of the Contract, the balance (if any) due from the Employer to the Contractor or from the Contractor to the Employer, as the case may be. <p>If the Employer's Representative disagrees with or cannot verify any part of the Final Statement Operation Service, the Employer's Representative and the Contractor shall attempt to agree such matters, and the Employer's Representative shall issue a Final Payment Certificate Operation Service for the agreed amount. If the Parties cannot agree on such matters, the Employer's Representative shall issue a Final Payment Certificate Operation Service for the amount which he considers to be due to the Contractor. If the Contractor is dissatisfied with the amount certified, he may refer the matter to the DAB for a decision in accordance with Clause 20.6 [Obtaining Dispute Adjudication Board's Decision]. Upon receipt of the Final Payment Certificate Operation Service, the Employer shall pay the Contractor in accordance with the provisions of Sub-Clause 14.8 [Payment].</p>
Sub-Clause 14.16: Cessation of Employer's Liability	<p>The Employer shall not be liable to the Contractor for any matter or thing under or in connection with the Contract or execution of the Works, except to the extent that the Contractor shall have included an amount expressly for it in the Final Statement Design-Build or the Final Statement Operation Service.</p> <p>However, this Sub-Clause shall not limit the Employer's liability under his indemnification obligations, or the Employer's liability in any case of fraud, deliberate default, or reckless misconduct by the Employer.</p> <p>Furthermore, if the Contractor has not submitted any matter to the Dispute Adjudication Board under Sub-Clause 20.6 [Obtaining Dispute Arbitration Board's Decision] within 56 days of receiving notification from the Employer's Representative of the amounts included for payment in either the Final Certificate Design-Build or the Final Certificate Operation Service, then he will be deemed to have accepted the amounts so certified, and the Employer shall be deemed to have no further liability to the Contractor, subject only to that payment due under the Final Payment Certificate Operation Service has been made and that the Performance Security referred to in Sub-Clause 4.2 [Performance Security] has been returned to the Contractor.</p>
Sub-Clause 14.17: Currencies of Payment	<p>The Contract Price shall be paid in the currency or currencies named in the Contract Data. Unless otherwise stated in the Particular Conditions, if more than one currency is so named, payments shall be made as follows:</p> <ul style="list-style-type: none"> (a) if the Accepted Contract Amount was expressed in Local Currency only: <ul style="list-style-type: none"> (i) the proportions or amounts of the Local and Foreign Currencies, and the fixed rates of exchange to be used for calculating the payments, shall be as stated in the Contract Data, except as otherwise agreed by both Parties; (ii) payments and deductions under Sub-Clause 13.5 [Provisional Sums] and Sub-Clause 13.6 [Adjustments for Changes in Legislation] shall be made in the applicable currencies and proportions; and

	<p>(iii) other payments and deductions under sub-paragraphs (a) to (d) of Sub-Clause 14.3 [Application for Advance and Interim Payment Certificates] shall be made in the currencies and proportions specified in subparagraph (a)(i) above;</p> <p>(b) payment of the damages specified in the Contract Data shall be made in the currencies and proportions specified in the Contract Data;</p> <p>(c) other payments to the Employer by the Contractor shall be made in the currency in which the sum was expended by the Employer, or in such currency as may be agreed by both Parties;</p> <p>(d) if any amount payable by the Contractor to the Employer in a particular currency exceeds the sum payable by the Employer to the Contractor in that currency, the Employer may recover the balance of this amount from the sums otherwise payable to the Contractor in other currencies; and</p> <p>(e) if no rates of exchange are stated in the Contract Data, they shall be those prevailing on the Base Date and determined by the central bank of the Country.</p>
Sub-clause 14.18: Asset Replacement Fund	<p>The Asset Replacement Fund is to provide the necessary funding for the replacement of items of Plant identified in the Asset Replacement Schedule as required for the continued efficient operation of the Works for the duration of the Operation Service Period.</p> <p>In each application for an Interim Payment Certificate during the Operation Service Period made in accordance with Sub-Clause 14.3 [Application for Advance and Interim Payment Certificates], the Contractor shall be entitled to include any monies from the Asset Replacement Fund which, according to the Asset Replacement Schedule, have become due following the replacement of the scheduled items by the Contractor. Under no circumstances will the amount payable from the Asset Replacement Fund be increased from the amount due according to the Asset Replacement Schedule, irrespective of the value or amount of replacements which have been made. For any items which have not been replaced by the date or other operational milestone identified in the Asset Replacement Schedule, payment will not be released until such replacement has been effected.</p> <p>In the event that there is money remaining in the Asset Replacement Fund upon completion of the Contract due to planned replacements, which by mutual agreement of the Parties, are not required or used, such amount shall be shared equally between the Parties, and the Contractor shall be entitled to include his share of such amount in his Application for Final Payment Certificate Operation Service made in accordance with Sub-Clause 14.13 [Application for Final Payment Certificate Operation Service].</p> <p>The Asset Replacement Fund shall not cover the cost of:</p> <p>(a) routine maintenance items associated with the correction of defects;</p> <p>(b) replacement of Plant and Material which have a life expectancy of less than five years;</p> <p>(c) providing spares between scheduled dates for major plant replacement; or</p> <p>(d) the replacement of Plant and Materials which are not identified in the Asset Replacement Schedule.</p> <p>The cost of meeting the requirements of sub-paragraphs (a) to (d) above shall be borne by the Contractor and be deemed to be included in the Contract Price.</p>

	<p>The Contractor shall give Notice to the Employer's Representative at least 28 days prior to his intention to replace any item of Plant identified in the Asset Replacement Schedule.</p> <p>The Employer shall authorize release of funds from the Asset Replacement Fund in accordance with the amounts certified by the Employer's Representative in each applicable Interim Payment Certificate. Funds will only be disbursed from the Asset Replacement Fund to the values and in accordance with the time scales for replacement identified in the Asset Replacement Schedule.</p> <p>Where items of Plant require replacement at times earlier than the scheduled replacement times given in the Asset Replacement Schedule, the appropriate funds shall not be released until the scheduled replacement date has been reached.</p> <p>If the Contract Price is subject to adjustments for changes in cost according to Sub- Clause 13.8 [Adjustments for Changes in Cost], the amounts due from the Asset Replacement Fund shall be adjusted on the same basis as other costs.</p> <p>In the event of a termination of the Contract under Clause 15 [Termination by Employer], or Clause 16 [Suspension and Termination by Contractor], any amount remaining in the Asset Replacement Fund, including any accrued interest, shall be deemed to be to the account of the Employer and shall not be disbursed to the Contractor.</p>
<p>Sub-Clause 14.19: Maintenance Retention Fund</p>	<p>During the Operation Service Period, a Maintenance Retention Fund shall be created by deducting five percent (5%) from the value of each interim payment, determined by the Employer's Representative in accordance with Sub-Clause 14.7 [Issue of Advance and Interim Payment Certificates], due to the Contractor, commencing with the first payment following the issue of the Commissioning Certificate, and continuing until the last Interim Payment Certificate is issued or until the amount in the Maintenance</p> <p>Retention Fund has reached the value (if any) stated in the Contract Data, whichever is the earlier. If the Contractor so chooses, the Maintenance Retention Fund may be replaced by a Maintenance Retention Guarantee in a form and with an entity approved by the Employer. However, the value of the Guarantee shall not exceed the maximum amount of the Maintenance Retention Fund stated in the Contract Data. The Contractor shall ensure that the Maintenance Retention Guarantee remains valid and in force until the issue of the Contract Completion Certificate. If the maintenance required under the Contract has not been carried out, the Employer may, after giving due Notice to the Contractor, carry out such maintenance himself and apply any amounts standing to the credit of the Maintenance Retention</p> <p>Fund in so doing. Where such amounts are insufficient to cover the Employer's whole costs of carrying out the maintenance, the unrecovered costs shall be set off against any payment due to the Contractor under the Contract, or to the extent that no such payment is due, shall become a debt due by the Contractor to the Employer.</p> <p>Following the issue of the Contract Completion Certificate under Sub-Clause 8.6 [Contract Completion Certificate], all funds remaining in the Maintenance Retention Fund shall be included in the Final Payment Certificate Operation Service and paid to the Contractor with the final payment.</p>

CLAUSE 15: TERMINATION BY EMPLOYER	
Sub-Clause 15.1: Notice to Correct	If the Contractor fails to carry out any obligation under the Contract, the Employer's Representative shall by Notice require the Contractor to make good the failure and to remedy it within the time specified in the said Notice.
Sub-Clause 15.2: Termination for Contractor's Default	<p>The Employer shall be entitled to terminate the Contract if the Contractor:</p> <ul style="list-style-type: none"> (a) fails to comply with Sub-Clause 4.2 [Performance Security] or with a Notice under Sub-Clause 15.1 [Notice to Correct], (b) abandons the Works or otherwise plainly demonstrates the intention not to continue performance of his obligations under the Contract, (c) without reasonable excuse fails: <ul style="list-style-type: none"> (i) to proceed with the Works in accordance with Sub-Clause 9.1 [Commencement of Design-Build] or Sub-Clause 10.2 [Commencement of Operation Service]; or (ii) to comply with a Notice issued under Sub-Clause 7.5 [Rejection] or Sub-Clause 7.6 [Remedial Work], within 28 days after receiving it; (iii) subcontracts the whole of the Works or assigns the Contract without the required agreement or subcontracts the Operation Service or any parts of the Works in breach of Sub-Clause 4.4 [Subcontractors]; (d) either gives Notice to the Employer under Sub-Clause 4.25 [Changes in the Contractor's Financial Situation] from which the Employer reasonably concludes that the Contractor will be unable to complete or fulfil his obligations under the Contract or, if the Contractor fails to give such a Notice, but the Employer in any event reasonably concludes that the Contractor will be unable to complete or fulfil his obligations under the Contract due to the Contractor's financial situation; (e) becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events; (f) gives or offers to give (directly or indirectly, either before or during the currency of the Contract) to any person any bribe, gift, gratuity, commission or other thing of value, as an inducement or reward: <ul style="list-style-type: none"> (i) for doing or forbearing to do any action in relation to the Contract; or (ii) for showing or forbearing to show favour or disfavour to any person in relation to the Contract; or if any of the Contractor's Personnel, agents or Subcontractors gives or offers to give (directly or indirectly) to any person any such inducement or reward as is described in this sub-paragraph (g). However, lawful inducements and rewards to Contractor's Personnel shall not give a right to termination; (g) fails to complete the Design-Build by the Cut-Off Date stated in the Contract Data or, if no such date is given, then a period of 182 days after the Time for Completion of Design-Build. (h) based on reasonable evidence, has engaged in Corrupt or Fraudulent Practices as defined in the Appendix B to these General Conditions, in competing for or in executing the Contract; (i) substantially fails to comply with the ESHS Specifications;

	<p>(j) in breach of Sub-Clause 4.4 <i>[Subcontractors]</i>, subcontracts any work to any ineligible person as defined by AFD's criteria set out in Appendix C to the General Conditions</p> <p>In any of these events or circumstances, the Employer may, not less than 14 days after giving Notice to the Contractor, terminate the Contract and expel the Contractor from the Site unless the Contractor cures the event or</p>
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	<p>circumstance within the said 14 days. However, in the case of sub-paragraph (f) or (g), the Employer may by Notice terminate the Contract immediately.</p> <p>The Employer's election to terminate the Contract shall not prejudice any other rights of the Employer, under the Contract or otherwise.</p> <p>The Contractor shall then leave the Site and deliver any required Goods, all Contractor's Documents, and other design documents made by or for him, to the Employer's Representative. However, the Contractor shall use his best efforts to comply immediately with any reasonable instructions included in the Notice (i) for the assignment of any subcontract, and (ii) for the protection of life or property or for the safety of the Works.</p> <p>After termination, the Employer may complete the Works and/or arrange for any other entities to do so. The Employer and these entities may then use any Goods, Contractor's Documents and other design documents made by or on behalf of the Contractor.</p> <p>The Employer shall then give Notice that the Contractor's Equipment and Temporary Works will be released to the Contractor at or near the Site. The Contractor shall promptly arrange their removal, at the risk and cost of the Contractor. However, if by this time the Contractor has failed to make a payment due to the Employer, these items may be sold by the Employer in order to recover this payment. Any balance of the proceeds shall then be paid to the Contractor.</p>
Sub-Clause 15.3: Valuation at Date of Termination for Contractor's Default	<p>As soon as practicable after a Notice of termination under Sub-Clause 15.2 [Termination for Contractor's Default] has taken effect, the Employer's Representative shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine the value of the Works, Goods and Contractor's Documents, and any other sums due to the Contractor for work executed in accordance with the Contract.</p>
Sub-Clause 15.4: Payment after Termination for Contractor's Default	<p>After a Notice of termination under Sub-Clause 15.2 [Termination for Contractor's Default] has taken effect, the Employer may:</p> <ul style="list-style-type: none"> (a) proceed in accordance with Sub-Clause 20.2 [Employer's Claims]; (b) withhold further payments to the Contractor until the costs of design, execution, completion and remedying of any defects, damages for delay in completion (if any), and all other costs incurred by the Employer, have been established; and/or (c) recover from the Contractor any losses and damages incurred by the Employer and any extra costs of completing the Works, after allowing for any sum due to the Contractor under Sub-Clause 15.3 [Valuation at Date of Termination for Contractor's Default]. After recovering any such losses, damages and extra costs, the Employer shall pay any balance to the Contractor.
Sub-Clause 15.5: Termination for Employer's Convenience	<p>If at any time the Employer elects to terminate the Contract for reasons other than those specified in Sub-Clause 15.2 [Termination for Contractor's Default], and subject to the applicable Law of the Contract, he shall notify the Contractor in writing, with a copy to the Employer's Representative. Such termination shall be deemed to be termination for the convenience of the Employer.</p> <p>Upon issuing a Notice to terminate under this Sub-Clause, the Employer shall immediately make arrangements to return the Performance Security to the Contractor, and the termination shall take effect 28 days after the date the Contractor receives the Notice, or 28 days after he receives the Performance Security, whichever is the later.</p>

	<p>Upon issuing the Notice, the Employer shall immediately cease to have any right of use of any of the Contractor's Documents and shall forthwith return all and any such Contractor's Documents to the Contractor.</p> <p>The Employer shall not terminate the Contract under this Sub-Clause in order to execute or operate the Works (or any part thereof) himself or arrange for the Works (or any part thereof) to be executed by another contractor.</p>
Sub-Clause 15.6: Valuation at Date of Termination for Employer's Convenience	As soon as practicable after a Notice of termination under Sub-Clause 15.5 [Termination for Employer's Convenience] has taken effect, the Employer's Representative shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine the value of the Works, Goods and Contractor's Documents, and any other sums due to the Contractor for work executed in accordance with the Contract.
Sub-Clause 15.7: Payment after Termination for Employer's Convenience	After termination for the Employer's convenience under Sub-Clause 15.5 [Termination for Employer's Convenience], the Contractor shall proceed in accordance with Sub-Clause 16.3 [Cessation of Work and Removal of Contractor's Equipment] and shall be paid in accordance with Sub-Clause 16.4 [Payment on Termination].
CLAUSE 16: SUSPENSION AND TERMINATION BY CONTRACTOR	
Sub-Clause 16.1: Contractor's Entitlement to Suspend Work	<p>If the Employer's Representative fails to certify in accordance with Sub-Clause 14.7 [Issue of Advance and Interim Payment Certificates], or the Employer fails to comply with Sub-Clause 2.4 [Employer's Financial Arrangements] or Sub-Clause 14.8 [Payment], the Contractor may, not less than 21 days after giving Notice to the Employer, suspend work (or reduce the rate of work) unless and until the Contractor has received the Interim Payment Certificate, reasonable evidence or payment, as the case may be and as described in the Notice.</p> <p>The Contractor's action shall not prejudice his entitlements to financing charges under Sub-Clause 14.9 [Delayed Payment] and to termination under Sub-Clause 16.2 [Termination by Contractor].</p> <p>If the Contractor subsequently receives such Interim Payment Certificate, evidence, or payment (as described in the relevant Sub-Clause and in the above Notice) before giving a Notice of termination, the Contractor shall resume normal working as soon as is reasonably practicable.</p> <p>If the Contractor suffers delay and/or incurs cost as a result of suspending work (or reducing the rate of work) in accordance with this Sub-Clause, the Contractor shall give Notice to the Employer's Representative and shall be entitled, subject to Sub-Clause 20.1 [Contractor's Claims], to:</p> <ul style="list-style-type: none"> (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 9.3 [Extension of Time for Completion of Design-Build]; and (b) payment of any such Cost Plus Profit, which shall be included in the Contract Price. <p>After receiving this Notice, the Employer's Representative shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.</p>
Sub-Clause 16.2: Termination by Contractor	<p>The Contractor shall be entitled to terminate the Contract if:</p> <ul style="list-style-type: none"> (a) the Contractor does not receive the reasonable evidence within 42 days after giving Notice under Sub-Clause 16.1 [Contractor's Entitlement to Suspend Work] in respect of a failure to comply with Sub-Clause 2.4 [Employer's Financial Arrangements];

	<p>(b) the Employer's Representative fails, within 56 days after receiving a Statement and supporting documents, to issue the relevant Payment Certificate;</p> <p>(c) the Contractor does not receive the amount due under an Interim Payment Certificate within 42 days after the expiry of the time stated in Sub-Clause 14.8 [Payment] within which payment is to be made (except for deductions in accordance with Sub-Clause 20.2 [Employer's Claims]);</p> <p>(d) the Employer substantially fails to perform his obligations under the Contract,</p> <p>(e) the Employer fails to comply with Sub-Clause 1.6 [Contract Agreement] or Sub-Clause 1.8 [Assignment];</p> <p>(f) a prolonged suspension affects the whole of the Works as described in Sub-Clause 9.10 [Prolonged Suspension]; or</p> <p>(g) the Employer becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events.</p> <p>(h) In any of these events or circumstances, the Contractor may, not less than 14 days after giving Notice to the Employer, terminate the Contract unless the Employer cures the event or circumstance within the said 14 days. However, in the case of subparagraph (f) or (g), the Contractor may by Notice terminate the Contract immediately.</p> <p>The Contractor's election to terminate the Contract shall not prejudice any other rights of the Contractor, under the Contract or otherwise.</p>
Sub-Clause 16.3: Cessation of Work and Removal of Contractor's Equipment	<p>After a Notice of termination under Sub-Clause 16.2 [Termination by Contractor] or Sub-Clause 18.5 [Optional Termination, Payment and Release] has taken effect, the Contractor shall, unless the Employer cured the event or circumstance within the 14- days' Notice period, promptly:</p> <p>(a) cease all further work, except for such work as may have been instructed by the Employer's Representative for the protection of life or property or for the safety of the Works or protection of the environment. For all such instructed work, the Contractor shall be entitled to be paid Cost Plus Profit and shall be relieved of further liabilities under Sub-Clauses 4.8 [Safety Procedures] and 4.18 [Protection of the Environment];</p> <p>(b) hand over to the Employer the Contractor's Documents, Plant, Materials and other work, for which the Contractor has received payment; and</p> <p>(c) remove all other Goods from the Site, except as necessary for safety, and leave the Site.</p>
Sub-Clause 16.4: Payment on Termination	<p>After a Notice of termination under Sub-Clause 16.2 [Termination by Contractor] has taken effect, the Employer shall promptly:</p> <p>(a) return the Performance Security to the Contractor;</p> <p>(b) pay the Contractor in accordance with Sub-Clause 18.6 [Optional Termination, Payment and Release]; and</p> <p>(c) pay to the Contractor the amount of any loss of profit or other loss or damage sustained by the Contractor as a result of this termination.</p>
CLAUSE 17: RISK ALLOCATION	
Sub-Clause 17.8: Limitation of Liability	<p>Neither Party shall be liable to the other Party for loss of use of any Works, loss of profit, loss of any contract or for any indirect or consequential loss or damage which may be suffered by the other Party in connection with the Contract, other than as specifically provided in Sub-Clause 9.6 [Delay</p>

	<p>Damages relating to Design Build], Sub-Clause 10.6 [Delays and Interruption during the Operation Service], Sub-Clause 10.7 [Failure to Reach Production Outputs], Sub-Clause 15.4 [Payment after Termination for Contractor's Default], Sub-Clause 16.4 [Payment on Termination], Sub-Clause 17.9 [Indemnities by the Contractor], Sub-Clause 17.10 [Indemnities by the Employer] and Sub-Clause 17.12 [Risk of Infringement of Intellectual and Industrial Property Rights].</p> <p>The total liability of the Contractor to the Employer, under or in connection with the Contract other than under Sub-Clause 4.19 [Electricity, Water and Gas], Sub-Clause 4.20 [Employer's Equipment and Free-Issue Materials], Sub-Clause 17.9 [Indemnities by the Contractor], Sub-Clause 17.10 [Indemnities by the Employer] and Sub-Clause 17.12 [Risk of Infringement of Intellectual and Industrial Property Rights], shall not exceed the sum stated in the Contract Data or (if a sum is not so stated) the Accepted Contract Amount.</p> <p>This Sub-Clause shall not limit liability in any case of fraud, deliberate default or reckless misconduct by the defaulting Party.</p>
Sub-Clause 17.9: Indemnities by the Contractor	<p>The Contractor shall indemnify and hold harmless the Employer, the Employer's Personnel, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses) in respect of:</p> <ul style="list-style-type: none"> (a) bodily injury, sickness, disease or death, of any person whatsoever arising out of or in the course of or by reason of the Contractor's design, execution, completion or operation and maintenance of the Works, unless attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, or any of their respective agents; and (b) damage to or loss of any property, real or personal (other than the Works), to the extent that such damage or loss; <ul style="list-style-type: none"> (i) arises out of or in the course of or by reason of the Contractor's design, execution and completion or operation and maintenance of the Works, or (ii) is attributable to any negligence, wilful act or breach of the Contract by the Contractor, the Contractor's Personnel, their respective agents, or anyone directly or indirectly employed by any of them. <p>The Contractor shall also indemnify the Employer against all errors in the Contractor's design of the Works and other professional services which result in the Works not being fit for purpose or result in any loss and/or damage for the Employer.</p>
Sub-clause 17.13: Use of Employer's Accommodation/Facilities	<p>The Contractor shall take full responsibility for the care of the Employer provided accommodation and facilities, if any, as detailed in the Employer's Requirements, from the respective dates of hand-over to the Contractor until cessation of occupation (where hand-over or cessation of occupation may take place after the date stated in the Commissioning Certificate for the Works).</p> <p>If any loss or damage happens to any of the above items while the Contractor is responsible for their care arising from any cause whatsoever other than those for which the Employer is liable, the Contractor shall, at his own cost, rectify the loss or damage to the satisfaction of the Employer's Representative.</p>
CLAUSE 18: EXCEPTIONAL RISKS	

Sub-Clause 18.1: Exceptional Risks	<p>An exceptional risk is a risk arising from an Exceptional Event which includes, but is not limited to:</p> <ul style="list-style-type: none"> (a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies; (b) rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war, within the Country; (c) riot, commotion or disorder within the Country by persons other than the Contractor's Personnel and other employees of the Contractor and Subcontractors; (d) strike or lockout not solely involving the Contractor's Personnel and other employees of the Contractor and Subcontractors; (e) munitions of war, explosive materials, ionising radiation or contamination by radio-activity, within the Country, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity; and (f) natural catastrophes such as earthquake, hurricane, typhoon or volcanic activity which are Unforeseeable or against which an experienced contractor could not reasonably have been expected to have taken adequate preventative precautions. <p>If a Party is or will be prevented from performing any of its obligations under the Contract due to an Exceptional Event, then it shall give Notice to the other Party of such event or circumstance and shall specify the obligations, the performance of which is or will be prevented. The Notice shall be given within 14 days after the Party became aware, or should have become aware, of the event or circumstance constituting an Exceptional Event.</p> <p>The Party shall, having given Notice, be excused performance of such obligations for so long as such Exceptional Event prevents it from performing them.</p> <p>Notwithstanding any other provision of this Clause, the obligations of either Party to make payments to the other Party under the Contract shall not be excused by an Exceptional Event.</p>
Sub-Clause 18.4: Consequences of an Exceptional Event	<p>If the Contractor is prevented from performing any of his obligations under the Contract due to an Exceptional Event of which Notice has been given under Subclause 18.2 [Notice of an Exceptional Event] and suffers delay and/or incurs cost by reason of such Exceptional Event, the Contractor shall be entitled, subject to Subclause 20.1 [Contractor's Claims], to:</p> <ul style="list-style-type: none"> (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 9.3 [Extension of Time for Completion of Design-Build]; and (b) if the event or circumstance is of the kind described in sub-paragraphs (a) to (e) of Sub-Clause 18.1 [Exceptional Risks] and, in the case of sub-paragraphs (b) to (e), occurs in the Country, payment of any such Cost. <p>If the Exceptional Event occurs during the Operation Service Period, sub-paragraph (a) of this Sub-Clause 18.4 will not apply.</p> <p>After receiving this Notice, the Employer's Representative shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.</p>
Sub-Clause 18.5: Optional Termination, Payment and Release	<p>If the execution of substantially all the Works in progress is prevented for a continuous period of 84 days by reason of an Exceptional Event of which Notice has been given under Sub-Clause 18.2 [Notice of an Exceptional Event], or for multiple periods which total more than 140 days due to the same notified Exceptional Event, then either Party may give to the other Party a Notice of termination of the Contract. In this event, the termination shall take effect 7 days after the Notice is given, and the Contractor shall</p>

	<p>proceed in accordance with Sub-Clause 16.3 [Cessation of Work and Removal of Contractor's Equipment].</p> <p>Upon such termination, the Employer's Representative shall determine the value of the work done and issue a payment certificate which shall include:</p> <ul style="list-style-type: none"> (a) the amounts payable for any work carried out for which a price is stated in the Contract; (b) the Cost of Plant and Materials ordered for the Works which have been delivered to the Contractor, or of which the Contractor is liable to accept delivery. This Plant and Materials shall become the property of (and be at the risk of) the Employer when paid for by the Employer, and the Contractor shall place the same at the Employer's disposal; (c) any other Cost or liability which in the circumstances was reasonably incurred by the Contractor in the expectation of completing the Works; (d) the Cost of removal of Temporary Works and Contractor's Equipment from the Site and the return of these items to the Contractor's works in his country (or to any other destination at no greater cost); and (e) the Cost of repatriation of the Contractor's staff and labour employed wholly in connection with the Works at the date of termination.
<p>Sub-Clause 18.7: Suspension or termination on the grounds of the Security of the Contractor's Personnel</p>	<p>If it believes, acting reasonably, that the physical integrity of its Personnel is seriously and imminently threatened by a danger in the performance of the Contract, the Contractor may decide, without prior notice:</p> <ul style="list-style-type: none"> (a) to demobilise its Personnel and Equipment from the area affected by the danger; and (b) immediately suspend the performance of all or part of its obligations under the Contract that the demobilisation referred to in sub-paragraph (a) above prevents it from performing. <p>The Contractor shall notify its decision to the Employer, within a maximum period of seven (7) days therefrom, furnish proof thereof and inform the Employer of the foreseeable impact of its decision on the Contract Price and the Completion of the Works, as well as the reasonable measures proposed to mitigate these impacts.</p> <p>The Contractor shall take all reasonable steps to minimise any delay in the performance of the Contract and any Cost resulting from its decision.</p> <p>The Contractor shall continue to perform its contractual obligations that the danger does not reasonably prevent it from performing.</p> <p>If the Contractor suffers delays and/or incurs Costs as a result of its decision, the Contractor shall be entitled to obtain, in accordance with the provisions of Sub-Clause 20.1 [Contractor's Claims]:</p> <ul style="list-style-type: none"> (i) an extension of time for such delay, if completion is or will be delayed, in accordance with Sub-Clause 9.3 [Extension of Time for Completion of Design-Build]; and (ii) the payment of such Costs, including the costs of repairing and replacing Works and/or Goods damaged or destroyed by the danger, provided they are not covered by the insurance policy referred to in Sub-Clause 19.2 [Insurances to be provided by the Contractor during the Design-Build Period]. <p>After receiving this notification, the Employer's Representative shall proceed in accordance with Sub-Clause 3.5 [Determinations] to reach an agreement or determine (1) if and (if applicable) to what extent the Contractor's decision was justified by the circumstances, and (2) the matters described in sub-paragraphs (i) and (ii) above in due proportion.</p>

	<p>If, due to a danger notified in accordance with the provisions of this Sub-clause, the completion of most of the Works is prevented for a continuous period of eighty-four (84) days or for multiple periods exceeding one hundred and forty (140) days, each Party may notify the other Party of the termination of the Contract in accordance with Sub-Clause 18.5 [Optional termination, payment, and release].</p>
CLAUSE 19: INSURANCE	
Sub-Clause 19.1: General Requirements	<p>Without limiting his or the Employer's obligations or responsibilities under the Contract, the Contractor shall effect and maintain all insurances for which he is responsible with insurers and in terms, both of which shall be subject to approval by the Employer, such approval shall not be unreasonably withheld or delayed.</p> <p>The insurances required to be provided herein are the minimum required by the Employer, and the Contractor may, at his own cost, add such other insurances that he may deem prudent.</p> <p>Whenever required by the Employer, the Contractor shall produce the insurance policies which he is required to effect under the Contract. As each premium is paid, the Contractor shall send a copy of each receipt of payment to the Employer.</p> <p>If the Contractor fails to effect and keep in force any of the insurances required under Sub-Clause 19.2 [Insurances to be provided by the Contractor during the Design-Build Period], or fails to provide the policies or receipts as aforementioned, then, and in any such case, the Employer may effect and keep in force such insurances and pay any premium as may be necessary and recover the same from the Contractor from time to time by deducting the amount(s) so paid from any monies due to the Contractor or otherwise recover the same as a debt from the Contractor.</p> <p>If either the Contractor or the Employer fails to comply with the conditions attaching to the insurances effected pursuant to the Contract, the Party so failing to comply as aforesaid shall indemnify the other Party against all losses and claims arising from such failure.</p> <p>The Contractor shall also be responsible for the following:</p> <ul style="list-style-type: none"> (a) notifying the insurers of any changes in the nature, extent or programme for the execution of the Works; (b) notifying the insurers of any changes in the nature, extent or programme for the provision of the Operation Service; and (c) the adequacy and validity of the insurances in accordance with the Contract at all times during the performance of the Contract. <p>The permitted deductible limits allowed in any policy shall not exceed the amounts stated in the Contract Data.</p> <p>Where there is a shared liability, the loss shall be borne by each Party in proportion to its liability under Clause 17 [Risk Allocation] or Clause 18 [Exceptional Risks], provided the non-recovery from insurers has not been caused by a breach of this Clause by the Contractor. In the event that non-recovery from insurers has been caused by such a breach of contract by the Contractor, the Contractor shall bear the loss suffered.</p>

<p>Sub-Clause 19.2: Insurances to be provided by the Contractor during the Design-Build Period</p>	<p>The Contractor shall provide the following insurances during the Design-Build Period:</p> <p>(a) The Works</p> <p>The Contractor shall ensure and keep insured in the joint names of the Contractor and the Employer from the Commencement Date until the date of issue of the Commissioning Certificate:</p> <ul style="list-style-type: none"> (i) the Works, together with Materials and Plant for incorporation therein, for their full replacement value with deductible limits not exceeding those stated in the Contract Data. The insurance cover shall extend to include loss and damage of any part of the Works as a consequence of failure elements defectively designed or constructed with defective material or workmanship; and (ii) an additional sum of fifteen percent (15%) of such replacement value (or such sum as may be specified in the Contract Data) to cover any additional costs incidental to the rectification of loss or damage, including professional fees and the cost of demolition and removal of debris. <p>The insurance cover shall cover the Employer and the Contractor against all loss or damage from whatever cause arising until the Commissioning Certificate is issued. Thereafter, the insurance shall continue until the date of issue of the Final Payment Certificate Design-Build in respect of any incomplete work for loss or damage arising from any cause occurring prior to the date of the Commissioning Certificate, and for any loss or damage occasioned by the Contractor in the course of any operation carried out by him for the purpose of complying with his obligations under Clause 12 [Defects].</p> <p>The insurance cover provided by the Contractor for the Works may exclude any of the following:</p> <ul style="list-style-type: none"> (1) the cost of making good any part of the Works which is defective (including defective material and workmanship) or otherwise does not comply with the Contract, provided that it does not exclude the cost of License making good any loss or damage to any other part of the Works attributable to such defect or non-compliance. (2) indirect or consequential loss or damage including any reductions in the Contract Price for delay. (3) wear and tear, shortages, and pilferages. (4) the Employer's Risks set out in Sub-Clause 17.1 [Employer's Risks during the Design-Build Period] unless otherwise stated in the Contract Data regarding the risks in sub-paragraph (b)(iii) thereof. (5) the Exceptional Risks set out in Sub-Clause 18.1 [Exceptional Risks] unless, otherwise stated in the Contract Data regarding the risks in subparagraph (f) thereof. <p>(b) Contractor's Equipment</p> <p>The Contractor shall insure in the joint names of the Employer and the Contractor the Contractor's Equipment and other things brought onto Site by the Contractor to the extent specified in the Contract Data.</p> <p>(c) Liability for breach of professional duty</p> <p>The Contractor shall insure the legal liability of the Contractor arising out of the negligent fault, defect, error or omission of the Contractor or any person for whom the Contractor is responsible in the carrying out their professional duties in an amount not less than that stated in the Contract Data. Such insurance shall contain an extension indemnifying the</p>
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	<p>Contractor for his liability arising out of negligent fault, defect, error or omission in the carrying out his professional duties which result in the Works not being fit for the purpose specified in the Contract and resulting in any loss and/or damage to the Employer. The Contractor shall maintain this insurance for the period specified in the Contract Data.</p> <p>(d) Injury to persons and damage to property</p> <p>The Contractor shall insure, in the joint names of the Contractor and the Employer, against liabilities for death or injury to any person, or loss of or damage to any property (other than the Works) arising out of the performance of the Contract and occurring before the issue of the Final Payment Certificate Design-Build, other than loss or damage caused by any event covered under Sub-Clause 17.1 [Employer's Risks during the Design-Build Period] or Subclause 18.1 [Exceptional Risks]. The insurance policy shall include a cross liability clause such that the insurance shall apply to the Contractor and the Employer as separate insureds. Such insurance shall be effected before the Contractor begins any work on the Site and shall remain in force until the issue of the Final Payment Certificate Design Build and shall be for not less than the amount specified in the Contract Data.</p> <p>(e) Injury to employees</p> <p>The Contractor shall effect and maintain insurance against liability for claims, damages, losses and expenses (including legal fees and expenses) arising from injury, sickness, disease or death of any person employed by the Contractor or any other of the Contractor's Personnel.</p> <p>The Employer and the Employer's Representative shall also be indemnified under the policy of insurance, except that this insurance may exclude losses and claims to the extent that they arise from any act or neglect of the Employer or of the Employer's Personnel.</p> <p>The insurance shall be maintained in full force and effect during the whole time that the Contractor's Personnel are assisting in the execution of the Works. For any person employed by a Subcontractor, the insurance may be effected by the Subcontractor, but the Contractor shall be responsible for the Subcontractor's compliance with this Sub-Clause.</p> <p>(f) Other insurances required by Law and by local practice</p> <p>Other insurances required by Law and by local practice (if any) shall be detailed in the Contract Data and the Contractor shall provide such other insurances in compliance with the details given, at his own cost. For those insurances required under this Sub-Clause to be in the joint names of the Parties, the Parties shall be jointly entitled to receive payments from the insurers, payments being held or allocated to the Party actually bearing the costs of rectifying the loss or damage.</p>
<p>Sub-Clause 19.3: Insurances to be provided by the Contractor during the Operation Service Period</p>	<p>Unless otherwise stated in the Contract Data, the Contractor shall provide the following insurances during the Operation Services Period</p> <p>(a) Fire extended cover for the Works</p> <p>The contractor shall provide, in the joint names of the Employer and the Contractor, fire extended cover insurance for the Works as specified in the Contract Data for the Operation Service Period. Notwithstanding any other provision in the Contract, the Operation Service shall not commence until the fire extended cover insurance is effected and the terms and details have been approved by the Employer.</p>

	<p>The terms of the policy shall be submitted to the Employer for his approval no later than 28 days before the date upon which the Commissioning Certificate is due to be issued, and shall come into force on the date stated in the Commissioning Certificate.</p> <p>(a) Injury to any person and damage to property The Contractor shall ensure that an insurance as required under Sub-Clause 19.2 (d) [Injury to persons and damage to property] be effected prior to the issue of the Commissioning Certificate and maintained until the issue of the Contract Completion Certificate. Such insurance shall be for an amount and in terms as specified in the Contract Data.</p> <p>(b) Injury to employees The Contractor shall ensure that an insurance as required under Sub-Clause 19.2(e) [Injury to employees] be effected prior to the issue of the Commissioning Certificate and maintained until the issue of the Contract Completion Certificate, or the last of his or any of his Subcontractors' employees have left the Site, whichever is the later.</p> <p>(c) Other insurances required by Law and by local practice Other insurances required by Law and by local practice (if any) shall be detailed in the Contract Data and the Contractor shall provide such insurances in compliance with the details given, at his own cost.</p> <p>(d) Other optional operational insurances Other optional insurances required (if any) shall be detailed in the Contract Data and the Contractor shall provide such other insurances in compliance with the details given, at his own cost.</p> <p>(e) Liability for breach of professional duty The Contractor shall insure the legal liability of the Contractor arising out of the negligent fault, defect, error or omission of the Contractor or any person for whom the Contractor is responsible in carrying out their professional duties in an amount not less than that stated in the Contract Data. Such insurance shall contain an extension indemnifying the Contractor for his liability arising out of negligent fault, defect, error, or omission in the carrying out his professional duties which result in the Works not being fit for the purpose specified in the Contract and resulting in any loss and/or damage to the Employer. The Contractor shall maintain this insurance for the period specified in the Contract Data.</p> <p>For those insurances required under this Sub-Clause to be in the joint names of the Parties, the Parties shall be jointly entitled to receive payments from the insurers, payments being held or allocated to the Party actually bearing the costs of rectifying the loss or damage.</p>
CLAUSE 20: CLAIMS, DISPUTES AND ARBITRATION	
<p>Sub-Clause 20.1: Contractor's Claims</p>	<p>If the Contractor considers himself to be entitled to any extension of the Time for Completion of Design-Build and/or any additional payment, under any Clause of these Conditions or otherwise in connection with the Contract, he must comply with the following procedures:</p> <p>(a) Notices The Contractor shall give Notice to the Employer's Representative, describing the event or circumstance giving rise to the claim as soon as practicable, and not later than 28 days after the Contractor became aware, or should have become aware, of the event or circumstance. The Notice shall state that it is given under this Sub-Clause. If the Contractor fails to give Notice of a claim within such a period of 28 days, the Time for Completion of Design-Build shall not be extended, the Contractor shall not be entitled to additional payment, and the</p>

	<p>Employer shall be discharged from all liability in connection with the claim. However, if the Contractor considers there are circumstances which justify the late submission, he may submit the details to the DAB for a ruling. If the DAB considers that, in all the circumstances, it is fair and reasonable that the late submission be accepted, the DAB shall have the authority to overrule the relevant 28-day limit and, if it so decides, it shall advise the Parties accordingly.</p> <p>If the Contractor has submitted his Notice of claim within the 28-day limit or the DAB has ruled that the late Notice was acceptable, then the Contractor shall proceed in accordance with the provisions of this Sub-Clause.</p> <p>(b) Contemporary records</p> <p>Following the giving of Notice, the Contractor shall keep such contemporary records as may be necessary to substantiate any claim. Contemporary records shall be kept on Site unless agreed otherwise with the Employer's Representative. Without admitting the Employer's liability, the Employer's Representative may, after receiving any Notice under this Sub-Clause, monitor the record-keeping and/or instruct the Contractor to keep additional contemporary records. The Contractor shall permit the Employer's Representative to inspect all these records and shall (if instructed) submit copies to the Employer's Representative.</p> <p>(c) Details and particulars</p> <p>Within 42 days after the Contractor became aware (or should have become aware) of the event or circumstance giving rise to the claim, or within such other period as may be allowed by the DAB under paragraph (a) above, or proposed by the Contractor and approved by the Employer's Representative, the Contractor shall send to the Employer's Representative a fully detailed claim which includes full supporting particulars of the contractual or other basis of the claim and of the extension of time and/or additional payment claimed. The Contractor shall also provide the Employer's Representative with any additional particulars which the Employer's Representative may reasonably require. If the Contractor fails to provide the contractual or other basis of the claim within the said 42 days or other time allowed or approved, the Notice given under paragraph (a) above shall be deemed to have lapsed and shall no longer be considered as a valid Notice. If the Contractor considers there are circumstances which justify a late submission, he may submit the details to the DAB for a ruling. If the DAB considers that, in all the circumstances, it is fair and reasonable that the late submission be accepted, the DAB shall have the authority to overrule the given 42-day limit and, if it so decides, it shall advise the Parties accordingly.</p> <p>If the event or circumstance giving rise to the claim has a continuing effect:</p> <ul style="list-style-type: none"> (i) the fully detailed claim shall be considered as interim ; (ii) the Contractor shall send further interim claims at 28-day intervals, giving the accumulated delay and/or amount claimed, and such additional particulars as the Employer's Representative may reasonably require; and (iii) The Contractor shall send a final claim within 28 days after the end of the effects resulting from the event or circumstance, or within such other period as may be proposed by the Contractor and approved by the Employer's Representative. <p>(d) Employer's Representative's response</p> <p>Within 42 days after receiving a fully detailed claim or any further particulars requested by the Employer's Representative, or within such other period as may be agreed by the Employer's Representative and</p>
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	<p>the Contractor, the Employer's Representative shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine (i) the extension (if any) of the Time for Completion of Design-Build (before or after its expiry) in accordance with Sub-Clause 9.3 [Extension of Time for Completion for Design-Build], and/or (ii) the additional payment (if any) to which the Contractor is entitled under the Contract with detailed comments. He may also request any necessary additional particulars but shall nevertheless give his response on the contractual or other aspects of the claim within the 42 days after receiving the fully detailed claim from the Contractor. If the Employer's Representative does not respond in accordance with the foregoing procedures and timetable, either Party may consider that the claim has been rejected by the Employer's Representative, and either Party may refer the matter to the DAB in accordance with Sub-Clause 20.6 [Obtaining Dispute Adjudication Board's Decision].</p> <p>Each Payment Certificate shall include such amounts for any claim as have been reasonably substantiated as due under the relevant provision of the Contract. Unless and until the particulars supplied are sufficient to substantiate the whole of the claim, the Contractor shall only be entitled to payment for such part of the claim as he has been able to substantiate. If either Party is dissatisfied with the determination of the Employer's Representative, either Party may, within 28 days after receiving the determination, issue to the Employer's Representative and the other Party, a Notice of dissatisfaction, and thereafter proceed in accordance with Sub-Clause 20.6 [Obtaining Dispute Adjudication Board's Decision]. If no Notice of dissatisfaction is issued by either Party within the said 28 days, the determination of the Employer's Representative shall be deemed to have been accepted by both Parties. The requirements of this Sub-Clause are in addition to those of any other Sub[1]Clause which may apply to a claim. If the Contractor fails to comply with this or another Sub-Clause in relation to any claim, any extension of time and/or additional payment shall take account of the extent (if any) to which the failure has prevented or prejudiced proper investigation of the claim, unless the claim is excluded under the paragraph (a) of this Sub-Clause.</p>
<p>Sub-clause 20.2: Employer's Claims</p>	<p>If the Employer considers himself to be entitled to any payment under any Clause of these Conditions or otherwise in connection with the Contract, the Employer or the Employer's Representative shall give Notice and particulars to the Contractor.</p> <p>The Notice shall be given as soon as practicable and no longer than 28 days after the Employer became aware, or should have become aware, of the event or circumstances giving rise to the claim.</p> <p>The particulars shall specify the Clause or other basis of the claim, and shall include substantiation of the amount to which the Employer considers himself to be entitled in connection with the Contract. The Employer's Representative shall then proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine the amount (if any) which the Employer is entitled to be paid by the Contractor.</p> <p>If either Party is dissatisfied with the determination of the Employer's Representative, either Party may, within 28 days after receiving the determination, issue to the Employer's Representative and the other Party, a Notice of dissatisfaction, and thereafter proceed in accordance with Sub-Clause 20.6 [Obtaining Dispute Adjudication Board's Decision]. If no Notice of dissatisfaction is issued by either Party within the said 28 days, the</p>

	<p>determination of the Employer's Representative shall be deemed to have been accepted by both Parties.</p> <p>The amount determined by the DAB may be included as a deduction in the Contract Price and Payment Certificates. The Employer shall only be entitled to set off against or make any deduction from an amount certified in a Payment Certificate, or to otherwise claim against the Contractor, in accordance with this Sub-Clause.</p>
Sub-Clause 20.3: Appointment of the Dispute Board	<p>Disputes arising during the Design-Build Period shall be adjudicated by a DAB in accordance with Sub-Clause 20.6 [Obtaining Dispute Adjudication Board's Decision]. The Parties shall jointly appoint a DAB by the date stated in the Contract Data.</p> <p>The DAB shall comprise, as stated in the Contract Data, either one or three suitably qualified persons ("the members"). If the number is not so stated and the Parties do not agree otherwise, the DAB shall comprise three persons.</p> <p>If the DAB is to comprise three persons, each Party shall nominate one member for the approval of the other Party. The Parties shall consult both these members and shall agree upon the third member, who shall be appointed to act as chairman.</p> <p>However, if a list of potential members is included in the Contract, the members shall be selected from those on the list, subject to their being able and willing to accept appointment to the DAB.</p> <p>The agreement between the Parties and either the sole member ("adjudicator") or each of the three members shall incorporate by reference the General Conditions of Dispute Adjudication Agreement in these General Conditions, with such amendments as are agreed between them.</p> <p>The terms of the remuneration of either the sole member, including the remuneration of any expert whom the DB consults, or each of the three members shall be mutually agreed upon by the Parties when agreeing the terms of appointment. Each Party shall be responsible for paying one-half of this remuneration.</p> <p>If at any time the Parties so agree, they may appoint a suitably qualified person or persons to replace any one or more members of the DAB. Unless the Parties agree otherwise, the appointment will come into effect if a member declines to act or is unable to act as a result of death, disability, resignation or termination of appointment. The replacement shall be appointed in the same manner as the replaced person was required to have been nominated or agreed upon, as described in this Sub-Clause.</p> <p>However the appointment of any member may only be terminated by mutual agreement of both Parties, and not by the Employer or the Contractor acting alone.</p> <p>Unless otherwise agreed by both Parties, the appointment of the DAB (including each member) shall expire upon the issue of the Commissioning Certificate under Sub Clause 9.12 [Completion of Design-Build] or 28 days after the DAB has given its decision to a Dispute under Sub-Clause 20.6 [Obtaining Dispute Adjudication Board's Decision], whichever is the later.</p>
Sub-Clause 20.4: Failure to Agree Dispute Adjudication Board	<p>If any of the following conditions apply, namely:</p> <ul style="list-style-type: none"> (a) either Party fails to nominate a member (for approval by the other Party), or fails to approve a member nominated by the other Party, of a DAB of three persons by such date; (b) the Parties fail to agree upon the appointment of the third member (to act as chairman) of the DAB by such date, or

	<p>(c) the Parties fail to agree upon the appointment of a replacement person within 42 days after the date on which the sole member or one of the three members declines to act or is unable to act as a result of death, disability, resignation or termination of appointment,</p> <p>then the appointing entity or official named in the Contract Data shall, upon the request of either or both of the Parties and after due consultation with both Parties, appoint this member of the DAB. This appointment shall be final and conclusive. Each Party shall be responsible for paying one-half of the remuneration of the appointing entity or official.</p>
Sub-Clause 20.5: Avoidance of Disputes	<p>If at any time the Parties so agree, they may jointly refer a matter to the DAB in writing with a request to provide assistance and/or informally discuss and attempt to resolve any disagreement that may have arisen between the Parties during the performance of the Contract. Such informal assistance may take place during any meeting, Site visit or otherwise. However, unless the Parties agree otherwise, both Parties must be present at such discussions. The Parties are not bound to act upon any advice given during such informal meetings, and the DAB shall not be bound in any future Dispute resolution process and decision by any views given during the informal assistance process, whether provided orally or in writing.</p> <p>The DB shall act, as far as reasonable and practicable, in the spirit of preventing potential problems or claims in between the Parties from becoming Disputes. The DB shall take reasonable and relevant initiatives in this respect, including, but not necessarily limited to, suggesting the Parties to refer a matter to the DB in accordance with this Sub-Clause. The DB shall however not act in a way which may be inconsistent with its obligations under the agreement referred to in Sub-Clause 20.3 [Appointment of the Dispute Board] and under Sub-Clause 20.6 [Obtaining Dispute Board's Decision], and which may render any of its decision unenforceable for breach of natural justice or any other procedural shortcoming or matter. In particular, when acting under this Sub-Clause 20.5, the DB shall accordingly always meet the Parties jointly, and shall not meet a Party in the absence of the other Party.</p> <p>If a Dispute of any kind whatsoever arises between the Parties, whether or not any informal discussions have been held under this Sub-Clause, either Party may refer the Dispute in writing to the DAB according to the provisions of Sub-Clause 20.6 [Obtaining Dispute Adjudication Board's Decision].</p>
Sub-Clause 20.6: Obtaining Dispute Board's Decision	<p>If a Dispute (of any kind whatsoever) arises between the Parties in connection with, or arising out of, the Contract or the execution of the Works during the Design-Build Period, including any Dispute as to any certificate, determination, instruction, opinion or valuation of the Employer's Representative, either Party may refer the Dispute in writing to the DB for its decision, with copies to the other Party and the Employer's Representative. Such reference shall state that it is given under this Sub-Clause. The other Party shall then have 21 days to send a response to the DB with copies to the referring Party and the Employer's Representative</p> <p>For a DAB of three persons, the DAB shall be deemed to have received such submissions on the date when they are received by the chairman of the DAB.</p> <p>Both Parties shall promptly make available to the DAB all information, access to the Site, and appropriate facilities, as the DAB may require for the purposes of making a decision on such Dispute. The DAB shall not act as arbitrator(s).</p> <p>Within 84 days after receiving the other Party's response or, if no such response is received, within 105 days after receiving the reference, or within</p>

	<p>such other period as may be proposed by the DAB and approved by both Parties, the DAB shall give its decision in writing to both Parties and the Employer's Representative, which shall be reasoned and shall state that it is given under this Sub-Clause. The decision shall be binding on both Parties and the Employer's Representative, who shall promptly comply with it notwithstanding that a Party gives a Notice of dissatisfaction with such decision as described below. Unless the Contract has already been abandoned, repudiated or terminated, the Contractor shall continue to proceed with the Works in accordance with the Contract.</p> <p>If either Party is dissatisfied with the DAB's decision, then either Party may, within 28 days after receiving the decision, give Notice to the other Party of its dissatisfaction. If the DAB fails to give its decision within the period prescribed in this Sub-Clause, then either Party may, within 28 days after this period has expired, give Notice to the other Party of its dissatisfaction. In either case, the dissatisfied Party shall send a copy of the Notice to the chairman of the DAB.</p> <p>In either event, this Notice of dissatisfaction shall state that it is given under this SubClause, and shall set out the matter in Dispute and the reason(s) for dissatisfaction. Except as stated in Sub-Clause 20.9 [Failure to Comply with Dispute Adjudication Board's Decision], neither Party shall be entitled to commence arbitration of a Dispute unless a Notice of dissatisfaction with respect to that Dispute has been given in accordance with this Sub-Clause.</p> <p>If the decision of the DAB requires a payment by one Party to the other Party, the DAB may require the payee to provide an appropriate security in respect of such payment.</p> <p>If the DAB has given its decision as to a matter in Dispute to both Parties, and no Notice of dissatisfaction has been given by either Party within 28 days after it received the DAB's decision, then the decision shall become final and binding upon both Parties.</p>
<p>Sub-Clause 20.8: Arbitration</p>	<p>Any dispute between the Parties arising out of or in connection with the Contract not settled amicably in accordance with Sub-Clause 20.7 above and in respect of which the DB's decision (if any) has not become final and binding shall be finally settled by arbitration. Arbitration shall be conducted as follows:</p> <ul style="list-style-type: none"> (a) if the contract is with foreign contractors, unless otherwise specified in the Contract Data, international arbitration in accordance with proceedings administered by the International Chamber of Commerce (ICC) and conducted under the ICC Rules of Arbitration; by one or more arbitrators appointed in accordance with said arbitration rules. The place of arbitration shall be the neutral location specified in the Contract Data; and the arbitration shall be conducted in the language for communications defined in Sub-Clause 1.4 [Law and Language]. (b) if the Contract is with domestic contractors, arbitration with proceedings conducted in accordance with the laws of the Employer's country." <p>The arbitrator(s) shall have full power to open up, review and revise any certificate, determination, instruction, opinion or valuation of the Employer's Representative, and any decision of the DAB, relevant to the Dispute. Nothing shall disqualify the Employer's Representative from being called as a witness and giving evidence before the arbitrator(s) on any matter whatsoever relevant to the Dispute.</p>

	<p>Neither Party shall be limited in the proceedings before the arbitrator(s) to the evidence or arguments previously put before the DAB to obtain its decision, or to the reasons for dissatisfaction given in its Notice of dissatisfaction. Any decision of the DAB shall be admissible in evidence in the arbitration.</p> <p>Arbitration may be commenced prior to or after completion of the Works. The obligations of the Parties, the Employer's Representative and the DAB shall not be altered by reason of any arbitration being conducted during the progress of the Works.</p>
Sub-Clause 20.10: Disputes Arising during the Operation Service Period	<p>Disputes arising during the Operation Service Period which cannot be resolved between the Parties shall be settled by a one-person DAB ("Operation Service DAB"). Such person shall be jointly agreed and appointed by the Parties at the time of issue of the Commissioning Certificate and shall serve as the DB during the entire Operation Service Period. The appointment of the DB shall expire when the discharge referred to in Sub- Clause 14.14 [Discharge] shall have become effective.</p> <p>If the Parties cannot agree on the person who shall be the Operation Service DAB, then the person shall be appointed according to the provisions of Sub-Clause 20.4 [Failure to Agree Dispute Adjudication Board].</p> <p>Such person shall be appointed for a term of five years. At the end of each five-year period, a new Operation Service DAB shall be agreed and appointed. If both Parties and the previously appointed person agree, the same Operation Service DAB may be re-appointed for a second (or third or fourth, as the case may be) five-year term.</p> <p>The agreement between the Parties and the Operation Service DAB shall incorporate by reference the General Conditions of Dispute Adjudication Agreement contained in these General Conditions, with such amendments as are agreed between them.</p> <p>The terms of remuneration of the Operation Service DAB shall be mutually agreed upon by the Parties when agreeing the terms of appointment. Each Party shall be responsible for paying one-half of this remuneration.</p> <p>If either Party is dissatisfied with the decision of the Operation Service DAB, the provisions of Sub-Clauses 20.6 [Obtaining Dispute Adjudication Board's Decision], 20.7 [Amicable Settlement], 20.8 [Arbitration] and 20.9 [Failure to Comply with Dispute Adjudication Board's Decision] shall apply.</p>

Section X – Contract Forms

Section X – Contract Forms

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Notification of Award – Letter of Acceptance

[letterhead paper of the Employer]

[Insert date]

To: *[insert name and address of the Contractor]*

This is to notify you that your Bid dated *[insert date]* for execution of the *[insert name of the Contract and identification number, as given in the Contract Data]* for the Accepted Contract Amount *[insert amount in figures and letters] [insert name of currency]*, as corrected and modified in accordance with the Instructions to Bidders, is hereby accepted by our Agency.

The amount is made up of the following components:

The Accepted Contract Amount for the
Design-Build of:

[currency and amount in figures]

The Accepted Contract Amount for the
Operation Service of:

[currency and amount in figures]

You are requested to furnish the Performance Security within 28 days in accordance with the Conditions of Contract, using for that purpose the Performance Security Form included in Section X, Contract Forms of the Bidding Documents.

Authorized *Signature*:

Name and *Title* of Signatory:

Name of *Agency*:

Attachment: Contract Agreement

Contract Agreement

THIS AGREEMENT made the _____ day of _____, _____, between Badan Meteorologi, Klimatologi dan Geofisika of Jalan Angkasa I No. 2, Kemayoran, Jakarta (hereinafter "**the Employer**"), of the one part, and _____ of _____ (hereinafter "**the Contractor**"), of the other part:

WHEREAS the Employer desires that the Works known as Development of Maritime Meteorological Information System in Indonesia (MMS)-2 : Procurement of the Modelling System with Big Data and Artificial Intelligence (including maritime observation equipment, remote sensing, and system integration) should be designed and executed by the Contractor, and has accepted a Bid by the Contractor for the design, execution and completion of these Works and the remedying of any defects therein,

The Employer and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other these following documents.
 - (i) the Letter of Acceptance;
 - (ii) the Letter of Technical Bid and the Letter of Financial Bid (including the signed Statement of Integrity);
 - (iii) the addenda Nos _____ (if any);
 - (iv) the Particular Conditions;
 - (v) the General Conditions;
 - (vi) the Employer's Requirements;
 - (vii) the completed Schedules; and
 - (viii) The Contractor's Bid and any other documents forming part of the Contract.
3. In consideration of the payments to be made by the Employer to the Contractor as specified in the Contract, the Contractor hereby covenants with the Employer to design, execute and complete the Works and remedy defects therein in conformity in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor in consideration of the design, execution and completion of the Works and the remedying of defects therein, the Contract Price, or such other sum as may become payable under the provisions of the Contract, at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of _____ on the day, month and year specified above.

Signed by _____ PPK MMS-2 Paket 3 _____ (for the Employer)

Signed by _____ (for the Contractor)

Appendices to the Contract Agreement:

- Appendix 1: Schedule of Payments
- Appendix 2: Schedule of Performance Guarantees
- Appendix 3: Schedule of Performance Damages

Appendix 1 – Schedule of Payments

[Note: The following terms and procedures of payment are given as guidance. If additional price schedules are introduced, suitable terms of payment in respect of such additional schedules must be added.]

In accordance with the provisions of:

- GCC Sub-Clause 6.0 *[Payment]*,
- PCC Sub-Clause 14.2 *[Advance Payment]*,
- PCC Sub-Clause 14.3 *[Application for Advance and Interim Payment Certificate]*, and

the Employer shall pay the Contractor as per the following instalments, based on the Contract Price breakdown given, and the currencies stated, in the Price Schedules.

The instalments provided below for Schedules No.1 to No.4 serve the purpose of providing values according to sub-paragraph (a) of GCC Sub-Clause 14.3.

For the avoidance of doubt, other items of GCC Sub-Clause 14.3 shall also apply and be used by the Contractor when preparing his Statements, and by the Engineer when preparing his Payment Certificates.

For example, Retention Money under sub-paragraph (c) shall accordingly apply to these instalments.

(A) PAYMENT INSTALMENTS

Price Schedule No. 1 - Design Services

In respect of design services for both the foreign currency and the local currency portions, the following payments shall be made:

- Hundred percent (100%) of the total or pro rata design services amount upon consent and/or approval of design by the Engineer in accordance with the provisions of Sub-Clause 5.2 *[Contractor's Documents]*.

Price Schedule No. 2 – Equipment, Materials, Tools and mandatory Spare Parts supplied from abroad

In respect of equipment, Materials, tools and mandatory spare parts supplied from abroad, the following payments shall be made:

- Ninety percent (90%) of the total or pro rata CIP amount upon delivery to the Site.
- Ten percent (10%) of the total or pro rata CIP amount upon issue of the Taking-Over Certificate.

Price Schedule No. 3 – Equipment, Materials, Tools and mandatory Spare Parts supplied from within the Employer's country

In respect of equipment, Materials, tools and mandatory spare parts supplied from within the Employer's country, the following payments shall be made:

- Ninety percent (90%) of the total or pro rata CIP upon delivery to the Site.
- Ten percent (10%) of the total or pro rata CIP amount upon issue of the Taking-Over Certificate.

Price Schedule No. 4 – Construction Works and Installation Services

In respect of installation and other services during the Design-Build Period for both the foreign and local currency portions, the following payments shall be made:

- Ninety percent (90%) of the measured value of work performed by the Contractor as certified by the Employer's Representative in accordance with the provisions of GCC Sub-Clause 14.7 *[Issue of Advance and Interim Payment Certificates]*.

- Ten percent (10%) of the total installation and other services amount, except for Provisional Sums, during the Design-Build Period upon issue of the Commissioning Certificate.
- Provisional Sums shall be certified and paid as and when used in accordance with Sub-Clause 13.5 [Provisional Sums].

Payments during the Operation Service Period

Price Schedule No. 5 – Works Operation Service

In respect of the Operation Service, for both the foreign and local currency portions, the following payments shall be made:

- No advance payment applies.
- Each monthly instalment is the sum of:
 - 1/12th of the Annual Fixed Fee per month introduced under Price Schedule 5.1,
 - Contractor's Variable Fee (CVF) introduced under Price Schedule 5.2 multiplied by the monthly volume of production recorded as per the measurement methodology defined in the Employer's Requirements, and
 - Unless electricity bills are paid by the Employer, the amount of the monthly electricity consumption paid by the Contractor to the local power supplier, but only up to a maximum amount which is the price which would be paid for the Guaranteed Maximum Energy Consumption.
- The monthly Guaranteed Maximum Energy Consumption introduced above is defined as the multiplication of:
 - The Contractor's Guaranteed Maximum Energy Consumption Rate, in kWh per m³ of production, as stated by the Contractor in the Schedule of Performance Guarantees, by
 - The monthly volume of production recorded as per the measurement methodology defined in the Employer's Requirements.

In furtherance to the above, there shall be no payment to the Contractor for any electricity consumption in excess of the monthly Guaranteed Maximum Energy Consumption, and the Contractor shall solely bear the risk of such excess.

If electricity bills are paid by the Employer, any excess shall be deducted from payments to the Contractor.

At the end of every year after the commencement of the Operation Service Period, if the annual electricity consumption of the plant over the elapsed year is lower than the annual Guaranteed Maximum Energy Consumption, calculated under the same mechanism as above but over a year and not over a month, the Employer's Representative shall fairly determine the savings generated to the Employer due to this lower consumption than anticipated. Savings shall be the additional amount that the Employer would have had to pay to the Contractor, in case the annual electricity consumption had equated the annual Guaranteed Maximum Energy Consumption.

The savings shall be equally split in between the Parties, and the Contractor's share be included by the Contractor in the next Contractor's Statement in accordance with Sub-Clause 14.3 *[Application for Advance and Interim Payment Certificates]*.

[The Employer may wish to apply the same payment principles, as the ones applied for electricity, to chemicals. In such case this Appendix 1 should be amended accordingly. For further information, refer to the Guidance Note under the Price Schedule 5.3 in Section IV of this Standard Bidding Document.]

(B) PAYMENT PROCEDURES

When applying for certification and making payments, the procedures shall be as follows: *[Insert appropriate procedures]*

(C) COST INDEXATION

[Cost indexation shall be carried out in accordance with Appendix 1 to Financial Bid – Schedule of Cost Indexation]

Appendix 2 – Schedule of Performance Guarantees

***[Insert Schedule of Performance Guarantees as completed by the Bidder in his Bid
(Section IV – Bidding Forms and Schedules)]***

Appendix 3 – Performance damages

1) Introduction and scope of application of performance damages

This Appendix defines the performance damages which are to be paid by the Contractor in case the Contractor does not comply, during the Operation Service Period, with the Performance Guarantees defined under the Schedule of Performance Guarantees of Section IV – Bidding Forms and Schedules.

Such performance damages apply in furtherance to the provisions contained in:

- a) PCC Sub-Clause 10.7 [Failure to Reach Production Outputs]; and
- b) PCC Sub Clause 11.11 [Failure to pass tests Prior to Contract Completion].

These performance damages shall be the only damages due from the Contractor for such default, other than in the event of termination under Clause 15 *[Termination by Employer]*.

The payment of such performance damages shall not relieve the Contractor of any duties, obligations or responsibilities he has under the Contract, including, for the avoidance of doubt, the obligation to ensure that the Works remain in accordance with the Contract during the Operation Service Period.

2) Failure to meet Performance Guarantees during the Operation Service Period:

The performance damages referred to under PCC Sub-Clause 10.7, due by the Contractor to the Employer, shall be as follows:

LOT	KPI DESCRIPTION	KPI BREACH	PERFORMANCE DAMAGES
Lot 1	Two site coastal buoys installed and transmitted data – SAT signed	% of sensor systems installed (target 100%)	
	Data collected from two sites (> 95% SAT Lot 1 (Full System) signed	% of data collected from two (2) sites (target 95%)	
	The Coastal Buoy systems integrate data to the extended data processing	% integrated in the extended data processing (target 100%)	
	Available for the modeling applications for WMO	Number of end-users services using data	
Lot 2	Eight (8) site wave enclosed and current profiler system installed and transmitted data – SAT signed	% of sensor systems installed (targeted 100%)	
	Data collected from eight sites (> 95% SAT Lot 2 (Full System) signed	% of data collected from eight (8) sites (target 95%)	
	The Wave Enclosed and Current Profiler systems integrate data into the extended data processing	% integrated in the extended data processing (target 100%)	
	Available for the modeling applications for WMO	Number of end-users services using data	
Lot 3	The receiving system of GK2A are installed and transmitted data – SAT signed	% of receiving system installed (target 100%)	
	Data collected from reception system (> 95% SAT Lot 3 (Full System) signed	% of data collected from satellite GK2A (target 95%)	
	The maximum period without data acquisition accepted is 72 hours – certificate signed if the system failure	Period without data acquisition	
	The Remote Sensing Products for Atmospheric and Ocean Systems integrate data to the extended data processing	% integrated in the extended data processing (100%)	

	Available data product for BMKG weather forecasting system	% all products could visualize on BMKG weather forecasting system (target 100%)	
Lot 4	The Big Data and AI Platform are installed and operated in BMKG Headquarters – SAT signed	% integrated in data lake system (target 95%)	
	Available data product in the data lake system	% Sustainable operations for 2 month (target 95%)	
	The implementation of Big data Use Case 1: Wave and Ocean Current Nowcasting using HF Radar	% Sustainable operations for 2 month (target 95%)	
	The implementation of Big data Use Case 2: Development and Demonstration of an AI/ML Augmented National Digital Weather (NDF) for BMKG	% integrated in data lake system (target 95%)	
Lot 5	Run Ensemble Forecasting System with at least 11 members	% of ensemble forecasting member (target available up to 90 percent)	
	The latency accepted is 3 baserun model failure – certificate signed if the system failure	Number of baserun model failure (target maximum 3 baserun)	
	Produce probabilistic forecast for Indonesia	% minimum skill score (target 80%)	
	Run Limited Area Model with 1 km spatial resolution at three (3) pilot domain	% of pilot domain executed (target 100%)	
	The latency accepted is 3 baserun model failure – certificate signed if the system failure	Number of baserun model failure (target maximum 3 baserun)	
	Produce high resolution forecast in Indonesia	% minimum skill score (target 80%)	
Lot 6	Computing Capacity increased to Approximately 2 Pflops	Number of computing capacity (target 2 Pflops)	
	Storage Capacity increased to 3 PB	Number of storage capacity (target 3 PB)	
	The HF Radar Array and Weather Radar data is integrated to the extended data processing	% integrated in the extended data processing (100%)	
	Eleven of Tropical Cyclone Forecasting and Production System installed and ready to use – SAT signed	% of client workstation installed and operated (target 100%)	
Lot 7	Two workstation of Web-Based Weather Forecasting and Analysis tools installed and ready to use – SAT signed	% of client workstation installed and operated (target 100%)	
	One workstation of End User Production System installed and ready to use – SAT signed	% of client workstation installed and operated (target 100%)	
	All data in BMKG integrated to the workstation in STMKG	% of data existing in BMKG integrate to the system (target 100%)	

[The above can be adjust with final KPI]

The Employer shall define performance damages which represent a genuine pre- estimate of the Employer's foreseeable losses in case the Contractor breaches a Performance Guarantee, so that the performance damages set herein are meant to cover such loss.

Loss for the Employer can be of different kinds, with non-exhaustive examples being given as follows:

- *Fines for breach of statutory duties,*
- *Loss of revenue,*
- *Loss of reputation,*
- *Etc.*

There is no need to define here performance damages for input-based KPIs, such as energy or chemicals consumption, since the breach of such kind of KPIs is directly covered by payment deductions during the Operation Service Period – see Appendix 1 to the Contract Agreement.]

3) **Failure to pass Tests Prior to Contract Completion:**

The performance damages below correspond to the amount to be paid by the Contractor to the Employer for failure to pass the Tests Prior to Contract Completion, as laid down under sub-paragraph (c) of PCC Sub-Clause 11.11.

Formulae for performance damages under item 1:

$$PD = (AECR - (GMECR \times 1,05)) \times V \times LE \times CE \times I$$

Where:

PD =	Performance damages in currency
AECR =	Actual Energy Consumption Rate (in kWh per m ³ of water production)
GMECR =	Guaranteed Maximum Energy Consumption Rate (in kWh per m ³ of water production) as defined in the Schedule of Performance Guarantees
V =	Production Volume (in m ³ /year)
LE =	Life Expectancy of the facility, being the life span expectancy of the facility, as defined in the Schedule of Performance Guarantees
CE =	Cost of Electricity, in currency per kWh
I =	Inflation rate over the LE, in percentage

Formulae for performance damages under item 2:

$$PD = [((GMDSC \times 0,95) - SDSC) / SDSC] \times AR \times COD \times LE \times CSD \times I$$

Where:

PD =	Performance damages in currency
SDSC =	Actual Sludge Dry Solids Contents (in percentage)
GMDSC =	Guaranteed Minimum Dry Solids Contents (in percentage) as defined in the Schedule of Performance Guarantees
AR =	Average sludge production Ratio (in kg of Dry Solids per kg of COD at the inlet of the wastewater treatment plant)
COD =	Cumulated COD per year (in kg)
LE =	Life Expectancy of the facility, being the life span expectancy of the facility, as defined in the Schedule of Performance Guarantees
CSD =	Cost of Sludge Disposal, in currency per kg of Dry Solids
I =	Inflation rate over the LE, in percentage

Formulae for performance damages under item 3:

$$PD = (ACCR - (GMCCR \times 1,05)) \times V \times LE \times CC \times I$$

Where:

PD =	Performance damages in currency
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ACCR =	Actual Chemical Consumption Rate (in kg per m ³ of water production)
GMCCR =	Guaranteed Maximum Chemicals Consumption Rate (in kg per m ³ of water production) as defined in the Schedule of Performance Guarantees
V =	Production Volume (in m ³ /year)
LE =	Life Expectancy of the facility, being the life span expectancy of the facility, as defined in the Schedule of Performance Guarantees
CC =	Cost of Chemical, in currency per kg
I =	Inflation rate over the LE, in percentage

The performance damages are meant to cover the likely losses of the Employer, over the life span of the facility.

Accordingly, if the Tests (on or after) Completion reveal that, for example, the consumption of energy or of chemicals is still higher than the Contractor's Performance Guarantees in the Schedule of Performance Guarantees, this means that the Employer will suffer from the consequences of such breach of Contract once the Employer takes over the facility from the Contractor and until the end of the life span of the facility.

The performance damages shall be set to remedy such breach, by providing adequate compensation to the Employer.

Performance Security

Demand Guarantee

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: Badan Meteorologi Klimatologi dan Geofisika, having domicile on Jalan Angkasa I No. 2 Kemayoran, Central Jakarta *[insert name and address of Employer]*

Date: _____ *[insert date of issue]*

PERFORMANCE GUARANTEE No.: _____ *[insert guarantee reference number]*

Guarantor: _____
[insert name and address of place of issue, unless indicated in the letterhead]

We have been informed that _____ *[insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture]* (hereinafter called "**the Applicant**") has entered into Contract No. _____ *[insert reference number of the Contract]* dated _____ with the Beneficiary, for the execution of _____ *[insert name of contract and brief description of Works]* (hereinafter called "**the Contract**").

Furthermore, we understand that, according to the conditions of the Contract, a Performance Security is required.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of _____ *[insert the amount in figures and letters]*¹, such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its obligation(s) under the Contract, without the Beneficiary needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than the _____ day of _____ 2____², and any demand for payment under it must be received by us at this office indicated above on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

_____ *[Signature(s)]*

[Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.]

¹ The Guarantor shall insert an amount representing the percentage stated in the Contract Data of the Accepted Contract Amount specified in the Letter of Acceptance, less provisional sums, if any, and denominated either in the currency(cies) of the Contract or a freely convertible currency acceptable to the Beneficiary.

² Insert the date twenty-eight days after the expected date of issue of the Performance Certificate as described in GCC Sub-Clause 11.9. The Employer should note that in the event of an extension of this date for completion of the Contract, the Contractor would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed *[six months]* *[one year]*, in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."

Advance Payment Security

Demand Guarantee

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: Badan Meteorologi Klimatologi dan Geofisika, having domicile on Jalan Angkasa I No. 2 Kemayoran, Central Jakarta *[insert name and address of Employer]*

Date: _____ *[insert date of issue]*

ADVANCE PAYMENT GUARANTEE No.: _____ *[insert guarantee reference number]*

Guarantor: _____
[insert name and address of place of issue, unless indicated in the letterhead]

We have been informed that _____ *[insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture]* (hereinafter called "**the Applicant**") has entered into Contract No. _____ *[insert reference number of the Contract]* dated _____ with the Beneficiary, for the execution of Development of Maritime Meteorological Information System in Indonesia (MMS)-2 : Procurement of the Modelling System with Big Data and Artificial Intelligence (including maritime observation equipment, remote sensing, and system integration) *[insert name of contract and brief description of Works]* (hereinafter called "**the Contract**").

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum _____ *[indicate the amount in figures and letters]* is to be made against an advance payment guarantee.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of _____ *[insert the amount in figures and letters]*¹, upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant:

- a) has used the advance payment for purposes other than the costs of mobilization in respect of the Works; or
- b) has failed to repay the advance payment in accordance with the Contract conditions, specifying the amount which the Applicant has failed to repay.

A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Beneficiary's bank stating that the advance payment referred to above has been credited to the Applicant on its account number _____ at _____ *[insert name and address of Applicant's bank]*.

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Applicant as specified in copies of interim statements or Payment Certificates which shall be presented to us.

This guarantee shall expire, at the latest, upon our receipt of a copy of the Interim Payment Certificate indicating that ninety (90) percent of the Accepted Contract Amount, less provisional sums, has been certified for payment, or on the _____ day of _____ 2², whichever is earlier. Consequently,

¹ The Guarantor shall insert an amount representing the amount of the advance payment and denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the Employer.

² Insert the expected expiration date of the Time for Completion. The Employer should note that in the event of an extension of the Time for Completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate

any demand for payment under this guarantee must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758.

_____ [signature(s)]

[Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.]

paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed *[six months] [one year]*, in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."

Retention Money Security

Demand Guarantee

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: _____ *[insert name and address of Employer]*

Date: _____ *[insert date of issue]*

RETENTION MONEY GUARANTEE No.: _____ *[insert guarantee reference number]*

Guarantor: _____
[insert name and address of place of issue, unless indicated in the letterhead]

We have been informed that _____ *[insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture]* (hereinafter called "**the Applicant**") has entered into Contract No. _____ *[insert reference number of the Contract]* dated _____ with the Beneficiary, for the execution of _____ *[insert name of contract and brief description of Works]* (hereinafter called "**the Contract**").

Furthermore, we understand that, according to the conditions of the Contract, the Beneficiary retains moneys up to the limit set forth in the Contract ("**the Retention Money**"), and that when the Taking-Over Certificate has been issued under the Contract and the first half of the Retention Money has been certified for payment, payment of the second half of the Retention Money is to be made against a Retention Money guarantee.

At the request of the Applicant, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of _____ *[insert amount in figures and letters]*¹ upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its obligation(s) under the Contract, without your needing to prove or show grounds for your demand or the sum specified therein.

A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Beneficiary's bank stating that the second half of the Retention Money as referred to above has been credited to the Applicant on its account number _____ at _____ *[insert name and address of Applicant's bank]*.

This guarantee shall expire no later than the _____ day of _____ 2____², and any demand for payment under it must be received by us at the office indicated above on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

_____ *[signature(s)]*

[Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.]

¹ The Guarantor shall insert an amount representing half of the Retention Money and denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the Employer.

² Insert the same expiry date as set forth in the Performance Security, representing the date twenty-eight days after the expected date of issue of the Performance Certificate as described in GCC Sub-Clause 11.9. The Employer should note that in the event of an extension of this date for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed *[six months] [one year]*, in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."