Project Employer's Requirements IN-PPV-0433

APMT PER#001 GENERAL

PART A GENERAL PROJECT CONSIDERATIONS

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01A.1 INTRODUCTION

01A.1.1 General

01A.1.1.1 These Employer's Requirements relate to the "*Pipavav – Upgrading Existing Liquid Jetty to Partially Loaded VLGC Compliance*" project.

01A.1.1.2 This document is one volume in the Employer's Requirements, and shall be read in conjunction with the full set of volumes as relevant for the project, as listed in Table 01A.1.

Table 01A.1 - Parts of the Employer's Requirements

Module	Part	Title
001 General	A	General Project Considerations
	B	Documents on Completion
002 Materials	A	Concrete and Reinforcement
	B	Structural Steel & Coatings
	J	Piling and Deep Foundations
005 Quay Design	B	Dolphins
	F	Bollards and Mooring Systems
007 Electrical, IT and Mechanical	A	General Electrical Requirements
	H	Lighting

01A.1.2 Purpose and Scope

01A.1.2.1 The Employer's Requirements define the minimum functional, quality and performance requirements which are required for the construction of the Works. They are not intended to replace national design codes, standards or statutory requirements.

01A.1.2.2 The Employer's overriding technical and engineering requirement is that the Works are suitable in all respects for safe, efficient, reliable, environmentally sustainable, low maintenance and continuous use under actual operational conditions.

01A.1.2.3 This document and other documents in the suite shall be read in conjunction with the Drawings and any other documents as defined in the Contract.

01A.1.3 Codes and Standards

01A.1.3.1 All Works, including all design, documentation, Materials and workmanship shall be undertaken in accordance with the Employer's Requirements and:

a) All statutory regulations

b) Indian Standards

c) Other standards and codes of practice as specified in the Employer's Requirements or which are relevant to the Works.

01A.1.3.2 The Contractor shall not mix and match clauses from different codes or standards pertaining to any particular aspect of design or construction.

01A.1.3.3 In the case of disagreement over any particular aspect, the Engineer's decision regarding the applicable code or standard shall be followed.

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01A.1.4 Conflicts and Omissions

01A.1.4.1 Should any conflicts or omission between the documents be identified, either within any document or between different documents (including the Employer's Requirements, Drawings or any relevant codes or standards), the Engineer shall be notified.

01A.1.4.2 The Engineer shall make its assessment on any such issued identified and its decision shall be binding on the Contractor.

01A.1.5 Definitions and Abbreviations

01A.1.5.1 A list of definitions and abbreviations can be found in the glossary in Appendix II "*Glossary*".

01A.1.6 Permits and Approvals

01A.1.6.1 The Contractor shall be responsible for obtaining all required permits, licences, consents and approvals for the Works in accordance with the Contract, except as defined below.

01A.1.6.2 The Contractor shall <u>not</u> be responsible for the following, which shall be obtained by the Employer:

a) Permit to Operate

b) Customs Authorisation

c) Project Environmental Approval

01A.2 SCOPE OF WORKS

01A.2.1.1 The Project

01A.2.1.1.1 The project is related to the upgrade of the existing liquid jetty at APM Terminals Pipavav (Gujarat Pipavav Port Ltd, GPPL), to handle VLGC vessels, partially loaded up to 32,000 DWT.

01A.2.1.2 The Works

01A.2.1.2.1 The Works include, but are not limited to, supply, construction, testing and commissioning of the following:

a) Two new mooring dolphins, one with concrete deck on new marine piles and one with new concrete deck constructed on top of existing piles

b) Extension of the existing mooring platform with a lightweight steel structure

c) Structural steel catwalk to the new mooring dolphin

d) New quick release hooks, and relocation of existing quick release hooks

e) Lighting on the new mooring dolphins and catwalk

01A.2.1.3 Contractor Proposed Alternatives

01A.2.1.3.1 Any deviations from the Employer's Requirements shall be approved in writing by the Employer prior to construction of the related element(s), via a "Request for Deviation" (RFD).

01A.3 HEALTH, SAFETY, SECURITY AND ENVIRONMENT (HSSE)

01A.3.1 General

01A.3.1.1 Health and safety is of critical importance to APM Terminals.

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01A.3.1.2 The Contractor shall take steps in all stages of the Works to minimise and, where possible, eliminate safety risks.

01A.3.1.3 The Contractor shall comply with the Employer's "*Project HSE Specification*", and any direction issued by the Employer's authorised personnel.

01A.3.1.4 The Contractor shall conduct all activities in a manner such that equipment, working conditions and methods are safe and free from any danger for the Contractor's Personnel and the Employer's Personnel as well as for other users of the Site and the Terminal.

01A.3.1.5 The Contractor shall provide a HSE Management Plan (HSEMP) in accordance with the requirements of the "*Project HSE Specification*". The HSEMP shall cover the scope of Works and duration of the Works, including pre-mobilisation, mobilisation, construction and demobilisation activities. The HSEMP shall describe the overall approach to the management of safety and health from the Contractor's perspective, as well as including specific requirements for Subcontractors, visitors to the Site, and integration with the Employer's existing operations. The Contractor shall ensure all of its activities are fully compliant with both legal requirements and the Employer's HSE policies, including applicable relevant regulatory codes of practice/standards/norms, through application of the procedures and processes described in the HSEMP. Hold Point

01A.3.1.6 Periodic reviews of the HSEMP shall be conducted by the Contractor's Representative and the Health and Safety Coordinator, with the involvement of the project management team. The reviews shall focus on both internal and external influences that impact safety and health.

01A.3.1.7 The Contractor shall provide site safety inductions for all personnel working or visiting the Site. The Contractor shall maintain a register of persons undertaking such inductions. No persons shall be allowed to work on the Site until they have undertaken the safety induction. All visitors must be escorted at all times. The induction shall include the Employer's induction requirements as specified in the "*Project HSE Specification*", in addition to any project-specific or site-specific requirements and the Contractor's own procedures.

01A.3.1.8 The Contractor's HSSE responsibilities extend to all personnel working within the parts of the Site which are under its control. This includes the Contractor's Personnel and the Employer's Personnel, and any other contractors that may be appointed by the Employer to work in the same area.

01A.3.1.9 The Contractor shall not obstruct access or disrupt works being carried out by others appointed by the Employer, except where this endangers the safety or security of any personnel on the Site, in which case the Employer and Engineer shall immediately be notified of any issues.

01A.3.1.10 The Contractor shall co-operate with the Employer's Personnel and any other contractors who have been appointed by the Employer to work in the same or adjacent areas, to ensure a safe and productive environment for all.

01A.3.1.11 The Contractor shall undertake a review of HSSE compliance on the project and provide an assurance report to the Employer each month, in accordance with the "*Project HSE Specification*".

01A.3.2 Health

01A.3.2.1 Site Facilities

01A.3.2.1.1 The following are the minimum requirements which are to be provided and maintained by the Contractor for all of its personnel on Site:

a) Supply of potable water to all workers

b) Toilets, showers and hygiene facilities

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c) Canteen and appropriate meals for all workers

d) First aid facility (container or dedicated room), first aid kits, and first aid trained personnel

e) Arrangements for quick transport and access to professional medical facilities and hospitals in the case of emergency

f) Shaded areas for rest / break periods

01A.3.2.2 Labour Camps

01A.3.2.2.1 The following are the minimum requirements which are to be provided and maintained by the Contractor at any labour camps which it establishes and/or occupies for the purpose of the Works:

a) All areas shall be adequately drained, and the drainage shall not endanger any domestic or public water supply

b) All areas, including the grounds and open areas as well as internal areas, shall be maintained in a clean and sanitary condition free from rubbish, debris, wastepaper, garbage, or other refuse

c) All buildings, fixtures and fittings shall be maintained in good repair. Each room used for sleeping purposes shall contain at least 4.6 m^2 (50 square feet) of floor space for each occupant; at least a 2.1m (7-foot) ceiling height shall be provided.

d) Temporary camp buildings and doors shall be of either non-combustible construction or of combustible construction having a fire resistance of not less than 1 hour

e) Bunk beds shall be fitted with ladders and protective rails; triple-deck bunks are prohibited

f) All living quarters shall be provided with windows, as well as suitable heating, cooling and/or ventilation to suit the climate

g) All heating, cooking, and water heating equipment shall be installed in accordance with applicable/local ordinances, codes, and regulations governing such installations

h) Daily inspections shall be performed and recorded to ensure hygiene, maintenance, and safety requirements are maintained; bedding shall be maintained in good condition and cleaned/changed at least weekly

i) An adequate and convenient potable water supply, approved by the appropriate health authority, shall be provided in each camp for drinking, cooking, bathing, and laundry purposes

j) Toilet facilities adequate for the capacity of the camp shall be provided; No fixture, water closet, chemical toilet, or urinal shall be in a room used for other than toilet purposes

k) Fly-tight, rodent-tight, impervious, covered waste containers located in all residential areas, work sites, and food service premises shall be lined with plastic bags, and shall be emptied when full but not less than twice per week

l) A properly constructed kitchen and dining hall, adequate in size, separate from the sleeping quarters of any of the workers or their families, shall be provided in connection with all food handling facilities

m) All kitchen workers whose duties include the handling of food (either in preparation or in serving) shall be required to wear latex or plastic gloves. Hairnets and other such protective measures shall also be utilized. Proper sanitary precautions shall be followed by all workers involved in preparation and/or serving of food or cleaning of the kitchen and dining facilities

n) Effective measures shall be taken to prevent infestation by animals, insects or pests; all chemical compounds used for insect and rodent control (e.g., insecticides, rodenticides, etc.) shall be approved for use

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o) All waste and chemicals shall be disposed of in a manner that does not pose a threat to human health or the environment

p) Adequate first aid facilities approved by a health authority shall be maintained and made available in every labour camp for the emergency treatment of injured persons

q) It shall be the duty of the camp superintendent to report immediately to the local health officer the name and address of any individual in the camp known to have or suspected of having a communicable disease

01A.3.3 Safety

01A.3.3.1 Construction and Site Safety

01A.3.3.1.1 The Contractor shall follow industry best practice, as well as conform to requirements of all applicable codes, standards and statutory legislation with regard to safe working practices and construction methodology.

01A.3.3.1.2 The Contractor shall provide all PPE as appropriate for the Works and in accordance with the Terminal's minimum requirements. The HSEMP shall stipulate all task-specific PPE requirements for the Site.

01A.3.3.1.3 The Contractor shall take all precautions necessary to protect the health and safety of persons where works may expose Contractor's Personnel and other persons on, or within the vicinity of the Site, to conditions which are dangerous or potentially dangerous to health, including the noxious effects of dust, fumes, liquids, infection, fire, explosion, radiation, or other hazards.

01A.3.3.1.4 All Goods, Materials, Plant and Contractor's Equipment that are purchased, hired, etc. for use on or in the Works shall be fit for purpose, used in a safe manner, and (where appropriate) maintained in a serviceable condition.

a) Where appropriate to the scope of Works, the Contractor and its Subcontractors shall be required to demonstrate that they have implemented and are maintaining a system that:

(i) considers the safety and suitability of Contractor's Equipment / Plant / substances when purchasing and/or hiring goods; and

(ii) maintains all Contractor's Equipment in serviceable conditions, with maintenance records.

b) Where appropriate, third party equipment being brought onto the Site shall be subject to following general inspection requirements:

(i) Mobile/powered plant – Pre-acceptance (prior to operation) and Prestart as per OEM or manufacturer's instructions

(ii) Periodically inspected in accordance with relevant risk assessment, OEM requirements, and project inspection schedules.

c) Where it is identified that any Contractor's Equipment is in an unsatisfactory condition, it shall be stood-down immediately and removed from the Site as soon as practicable, and replaced or repaired as applicable.

01A.3.3.1.5 The Contractor shall maintain the Site in a neat and tidy condition during the progress of the Works, to the satisfaction of the Engineer.

01A.3.3.1.6 Lift plans shall be prepared for all overhead lifting activities. Preparation and review of the lift plans shall include assessment of the ground stability (including any nearby slopes or retaining structures) as well as adjacent operations or activities by the Contractor or others.

01A.3.3.2 Risk Management

01A.3.3.2.1 A project risk register shall be developed by the Contractor and approved by the Employer prior to mobilisation and commencement of work on Site. The Contractor shall ensure that project hazards and risks have been considered and analysed prior to the

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project entering the construction phase. The risk management process shall cover all project-specific activities, including but not limited to mobilisation, construction, demobilisation and identification of hazards associated with these activities including public safety, as well as hazards associated with project operations, products and services. Hold Point

01A.3.3.2.2 Task based risk assessments and method statements (RAMS) shall be developed and submitted for all work activities, as defined in the *"Project HSE Specification"* in Appendix V. The RAMS shall identify associated hazards that have previously been risk assessed and controlled through the project risk assessment process, or if the RAMS development process identifies new hazards these must be risk assessed and controlled. Review Point

01A.3.3.2.3 The Contractor shall be responsible for risk assessing all potential emergency situations, including those requiring specialised rescue for site personnel, and ensure that the emergency plan addresses these. This will include first aid requirements, risk assessment, and assessment of the suitability, location and accessibility of paths of travel, location of emergency equipment and signage. The emergency response plan shall be developed and submitted prior to commencement of works on Site. Hold Point

01A.3.3.3 Incident Reporting

01A.3.3.3.1 Incident reporting shall be in accordance with the "Project HSE Specification" in Appendix V *"APM Terminals Policies and Guidelines"*.

01A.3.3.4 Safety Boat

01A.3.3.4.1 The Contractor shall provide a safety boat which shall be crewed and operational on Site whenever works are taking place in or over water.

01A.3.3.4.2 Unless otherwise agreed by the Engineer, the safety boat shall:

a) Be in good working condition

b) Be capable of achieving a minimum speed of six (6) knots

c) Be large enough to allow one person on a stretcher to be attended by four personnel.

d) Be fitted with:

(i) Grab lines around the hull

(ii) Boat hook

(iii) Two life belts, one with a buoyant line

(iv) Over-side portable access ladder

(v) First aid kit including a survival blanket

(vi) VHF radio for communications with the local maritime authority and Contractor's shore staff

(vii) Serviced fire extinguisher

(viii) Search light

(ix) Man basket or suitable equivalent for the transportation of injured persons by boat or crane

(x) Two (2) spare lifejackets

(xi) Any other safety device required by the local maritime authority.

01A.3.3.4.3 The Contractor shall be responsible for gaining all necessary maritime clearances and permits for the safety boat and for any other floating craft required for the Works.

01A.3.3.4.4 The Contractor shall comply with the Port Authority's requirements relating to access, communication and notification for all maritime works.

01A.3.4 Security

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01A.3.4.1 Site Security

01A.3.4.1.1 The Contractor shall be solely responsible for the security of the Site, including control of all access for Contractor's Equipment, Plant, Materials and all personnel. This shall include marine access, if relevant.

01A.3.4.1.2 The Contractor shall erect and maintain temporary hoarding, fencing and gates around the perimeter of the Site or any part of the Site under its possession. Access points shall be clearly identified and manned. The exact location of any hoarding on the existing mooring platform or other working areas shall be approved by the Employer, to ensure no disruption to ongoing operations.

01A.3.4.1.3 Signage shall be provided around the hoarding/fencing and at all access points to clearly identify the Contractor.

01A.3.4.1.4 The Contractor shall be responsible for the after-hours security of the Site.

01A.3.4.2 Terminal Security

01A.3.4.2.1 The security arrangements of all existing terminal facilities shall not be affected or disrupted at any time, except where strictly necessary to complete the Works and only with the written permission of the Employer.

01A.3.4.2.2 The security arrangements of any existing neighbouring terminals or facilities shall not be affected or disrupted at any time, except where strictly necessary to complete the Works and only with the written permission of the owners of said facilities, and with the knowledge and cooperation of the Employer.

01A.3.4.2.3 Where the Contractor's Personnel and/or equipment are required to access the existing terminal facilities, they shall follow all permit and access control provisions as required by the Employer and/or Port Authority.

01A.3.5 Sustainability and the Environment

01A.3.5.1 General

01A.3.5.1.1 The construction shall, as a minimum, comply with the relevant local, national and international environmental regulations.

01A.3.5.1.2 Where applicable, all design and construction requirements committed to by the Employer in the project Environmental Clearance shall be adhered to.

01A.3.5.1.3 All waste material taken shall only be disposed of off-site at official and certified disposal sites, and evidence of the same shall be submitted to the Engineer.

01A.3.5.1.4 Floating debris and sunken material arising from any source which is attributable to the Contractor, shall be collected and disposed of by the Contractor at regular intervals and as required by the Engineer. Floating debris shall be prevented from dispersing outside the Site.

01A.3.5.1.5 Waste material, rubbish and debris shall not be allowed to enter the waterways.

01A.3.5.2 Environmental Control and Monitoring during Construction

01A.3.5.2.1 The Contractor shall plan and implement the Works to avoid (or minimise, where unavoidable) all unnecessary adverse environmental effects due to its activities, including but not limited to:

a) Prevention of any pollution of the sea, waterways, groundwater or land areas due to oil, debris, contaminated run-off, etc.

b) Monitoring and testing of environmental parameters related to air quality, air pollution, water quality, water pollution and suspended sediments.

c) Minimisation and control of noise pollution.

d) Minimisation and control of dust, including during transport of Materials to and from the Site.

e) Control of on-site waste and disposal to approved disposal sites

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f) Availability of equipment for responding to environmental incidents, e.g. spill kits

g) Other provisions as defined in the "*Project HSE Specification*"

01A.3.5.2.2 The Contractor shall prepare a Construction Environmental Management Plan (CEMP) in accordance with section 01A.3.5.3, and shall ensure that the plan is followed and enforced on Site. The CEMP shall be integrated into the Contractor's HSEMP, as defined in the "*Project HSE Specification*".

01A.3.5.2.3 The Contractor shall ensure that any thresholds and limits are not exceeded at any time, including but not limited to air quality, water quality and noise pollution.

01A.3.5.2.4 In the event that any accident occurs or any thresholds/limits are exceeded, the Contractor shall immediately take measures to rectify the situation, and to prevent reoccurrence.

01A.3.5.2.5 Monitoring, reporting and remedial actions shall be in accordance with the requirements of the "*Project HSE Specification*".

01A.3.5.2.6 If the Contractor proposes appointing an environmental consultant to assist with the development of the CEMP, and/or for on-site monitoring, the Contractor shall provide details of its proposed environmental consultant to the Engineer for review.

01A.3.5.3 Construction Environmental Management Plan (CEMP)

01A.3.5.3.1 The CEMP shall include, as a minimum:

a) A description of the scope of works and the duration.

b) Ecological and environmental assessment.

c) Site layout plan, identifying any storage and disposal areas, fuelling facilities, washing areas, concrete batching plants, etc.

d) Description of the main excavation and construction requirements, including the major plant and equipment, particularly those that pose a risk of pollution.

e) Details of the pollution prevention measures to be adopted, including dust control and noise control.

f) Details of the emergency spill procedures and other emergency response provisions.

g) Contact details of the relevant Contractor's Personnel, and also any external bodies that must be contacted in the event of an emergency or otherwise.

h) Definition of the testing regimes, including frequency, thresholds and limits.

i) Reporting procedures.

01A.3.5.3.2 The CEMP shall be prepared, maintained and updated by the Contractor throughout the duration of the project. The CEMP shall be submitted to the Engineer for review whenever it is updated, with updates clearly marked.

01A.3.5.4 Reinstatement

01A.3.5.4.1 The Contractor shall be responsible for reinstating any areas of the Site used for temporary storage, access, or similar to their original condition or better to the satisfaction of the Engineer.

01A.3.6 Traffic Management

01A.3.6.1 The Contractor shall implement a traffic management plan (TMP) to control the safe flow of traffic around the Site. The TMP shall be kept up-to-date throughout the Works, and copies of each revision shall be promptly submitted to the Engineer for review and also for the Employer's specific approval.

01A.3.6.2 Pedestrian and vehicular traffic shall be clearly marked and segregated by physical barriers to the maximum practical extents. Traffic flow and crossing points shall be

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clearly signposted.

01A.3.6.3 The Contractor shall ensure that the Employer's operational traffic flow and access is maintained at all times, including marine traffic where relevant.

01A.3.6.4 Where traffic is required to cross or otherwise interface with the Terminal's operational traffic, the TMP shall integrate and comply with the Terminal's existing TMP, including clear definition of internal movements, priority / junction control and exclusion zones.

01A.3.6.5 The TMP shall include external traffic on public roads. In particular, it shall identify preferred routes and procedures in case of high frequency of heavy duty traffic, large quantities of bulk material, or any over-sized vehicles / loads (if relevant to the Works). Relevant sections of the TMP shall be submitted to and approved by the local authority.

01A.3.6.6 It is the Contractor's responsibility to obtain any permits or approvals that may be required from the local authority or other third party for any external traffic on public roads.

01A.3.6.7 Inductions shall be provided by the Contractor to all drivers entering the Site.

01A.3.7 Fire and Explosives

01A.3.7.1 Hot work permits shall be obtained from the Employer where necessary for oxy-equipment or welding equipment. Use of such equipment shall be restricted to approved and designated locations.

01A.3.7.2 Under no circumstances will any fires or naked flames be permitted on Site.

01A.3.7.3 The use of explosives is prohibited on Site.

01A.4 DOCUMENTATION

01A.4.1 Contractor's Documents

01A.4.1.1 Documents Required

01A.4.1.1.1 All Contractor's Documents shall be prepared by the Contractor and submitted to the Engineer for review in accordance with the Contract and with the procedures outlined herein.

01A.4.1.1.2 The Contractor shall submit the following documents as a minimum:

a) Construction Stage Project Risk Register, which shall be applicable for the whole of the Works, and shall identify any significant risks to the project related to health and safety, design, construction, programme, commercial, residual risks for operations and/or maintenance, etc. The register shall identify the risks, the measures which have been taken during the design and planning to eliminate or mitigate the risk, and any residual risk and further mitigation measures which should be taken by the Employer or others. The Risk Register is a 'live' document which may be updated and reissued as relevant throughout the duration of the Works.

b) Programme

c) Risk Assessments and Method Statements (RAMS) for each element of the Works

d) Inspection and Testing Plan (ITP) for each element of the Works

e) Construction Quality Management Plan

f) HSE Management Plan

g) Construction Environmental Management Plan

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h) Traffic Management Plan

i) Any other documents reasonably required by the Engineer

01A.4.1.1.3 The Contractor may prepare and submit relevant documents (including shop drawings, material specifications, RAMS and ITP) in stages for various elements and/or Sections of the Works to suit the programme and construction sequence, if this will optimise the document review process and overall progress of the Works. For the avoidance of doubt, the Contractor may proceed with physical works (fabrication, construction, etc.) related to submissions which have been reviewed by the Engineer in accordance with section 01A.4.2.2, whilst subsequent submissions are still under preparation and/or review.

01A.4.1.2 Timing and Sequence of Submissions

01A.4.1.2.1 It is the Contractor's responsibility to submit documents in a timely fashion and with sufficient detail and quality to minimise iterations and to ensure the Works are completed in accordance with the programme.

01A.4.1.2.2 The timing of submissions shall include allowance for the review periods specified in the Contract and the Employer's Requirements for the Engineer and any third parties, including addressing any comments raised in those reviews.

01A.4.1.2.3 The Contractor shall to submit documents as early as possible, and shall prioritise documents appropriately to suit the construction sequence, the programme and the Time(s) for Completion.

01A.4.1.2.4 The Contractor shall provide, within 14 days of the Commencement Date, a schedule of the planned documents and expected submission/review timing (including a breakdown by element where relevant).

01A.4.2 Document Review

01A.4.2.1 General

01A.4.2.1.1 Any review of the Contractor's Documents assumes that there are no accepted deviations from the Employer's Requirements unless a Request for Deviation has been submitted by the Contractor and signed by the Employer. Any failure by the Engineer to acknowledge or comment upon a deviation which is included in a Contractor's Document (whether explicit or implicit), shall not be considered to be acceptance of the deviation.

01A.4.2.2 Engineer's Review

01A.4.2.2.1 The Contractor's Documents shall be submitted to the Engineer for review prior to commencing the related physical works on Site.

01A.4.2.2.2 The Engineer shall undertake reviews of the Contractor's Documents in accordance with the Contract.

01A.4.2.2.3 After reviewing each revision of each document, the Engineer shall reply to the Contractor with a classification as listed in Table 01A.2, along with any comments.

Table 01A.2 - Document Review Classification

Classification Category	Definition	Action by the Contractor
ANC	Acceptable with No Comments	The Contractor may proceed with construction. The Contractor shall submit the Contractor's Document for further review if any changes are made to the Contractor's Document.
AWC	Approved With Comments (Minor changes and clarifications required)	The Contractor shall make the changes requested prior to commencement of construction.

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Classification Category	Definition	Action by the Contractor
NAC	Not Accepted / major Comments	Construction work shall not commence. The Contractor shall revise the document and re-submit to the Engineer for further review.
NR	Engineer's review not required *(This relates to submissions made for information only. e.g. bar bending schedules which are solely the Contractor's responsibility.)*	The Contractor may proceed with construction.

01A.4.3 Format of Deliverables

01A.4.3.1 All documentation submitted by the Contractor shall be clear and legible.

01A.4.3.2 All documents shall include revision numbering and issue dates.

01A.4.3.3 All correspondence shall be numbered using a system to be agreed with the Employer.

01A.4.3.4 The documents are required to be submitted in English.

01A.4.3.5 All documents shall be prepared using SI units.

01A.4.3.6 Documents shall typically be submitted in soft copy only, except where hard copies may be required for certification or permits, or for records which must be signed and/or stamped.

01A.4.4 Construction Drawings

01A.4.4.1 The Contractor shall maintain a full set of full-scale, current and up-to-date "Approved for Construction" drawings on Site at all times. These shall be available at all times for reference by the Engineer and Employer. Superseded drawings shall be clearly marked.

01A.4.4.2 The Contractor shall maintain, alongside the latest drawings, a current and up-to-date drawing register listing the latest revision of each individual drawing. A copy of the register shall be issued to the Engineer and Employer at least weekly.

01A.4.5 Documents on Completion

01A.4.5.1 As built drawings, operation and maintenance manuals, and other relevant documents shall be submitted in accordance with the Contract and with the requirements of PER#001 Part B "*Documents on Completion*".

01A.5 AVAILABLE SITE DATA

01A.5.1.1 The Contractor shall consider the results of the following studies, surveys and investigations in its construction methodology:

a) Geotechnical Investigation

b) Bathymetric Survey

c) Metocean Study / Hydraulic Assessment

d) Wind data

e) Weather station data

f) Wave buoy data

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g) Tide gauge data

01A.6 SITE ENVIRONMENTAL DATA

01A.6.1 Introduction

01A.6.1.1 The criteria related to water levels, tidal data and environmental data shall apply equally to the design of any Temporary Works and construction planning.

01A.6.1.2 All parameters which are not explicitly specified in Appendix I "*Design Criteria*" shall be determined by the Contractor based on review of site-specific data (including but not limited to that specified in section 01A.4.4) and relevant local / national codes and standards.

01A.6.1.3 In the absence of local codes for assessing the required parameters, they shall be assessed in accordance with the codes identified in section 01A.1.3.

01A.6.2 Tidal Data

01A.6.2.1 General

01A.6.2.1.1 Unless specified otherwise in Appendix I "*Design Criteria*", tide levels to be considered in the design shall be based on all known historical data from local and international Metocean sources dating back for a minimum ten (10) year period.

01A.6.3 Waves

01A.6.3.1 Unless defined in Appendix I "*Design Criteria*", wave conditions for the terminal location for various return periods shall be assessed based on the available site data, considering the return periods defined in Appendix I "*Design Criteria*".

01A.6.3.2 Appropriate wave roses showing wave height and wave periods shall be used for the Site.

01A.6.4 Currents

01A.6.4.1 Unless defined in Appendix I "*Design Criteria*", currents to be considered in the design shall be determined by means of a site-specific numerical study, in accordance with relevant Indian or European Standards, combined with site measurements as applicable.

01A.6.5 Wind

01A.6.5.1 Structures shall be designed to the minimum wind speeds as defined in Appendix I "*Design Criteria*", or as specified in relevant local standards (whichever is more onerous).

01A.6.5.2 Design methods shall be appropriate for the structure under consideration.

01A.6.5.3 Wind blown waves and tidal impacts shall be considered in the design.

01A.7 SETTING OUT

01A.7.1.1 All global coordinates, levels and depths shall be defined with respect to the coordinate system and level datum specified in Appendix I "*Design Criteria*".

01A.7.1.1.1 The adopted coordinate system and datum level shall be clearly defined and referenced on all relevant construction drawings to be prepared by the Contractor.

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01A.7.1.2 The Contractor shall establish any temporary survey marks on the Site that it requires to complete the Works. It shall carefully protect and preserve all temporary marks, site nails, pegs and other things used in setting out the Works from being disturbed or damaged.

01A.8 SUPPLY OF MATERIALS AND PLANT

01A.8.1 General

01A.8.1.1 The Contractor shall submit the names of proposed suppliers of all key Materials and Plant for the Engineer's review, prior to procurement of the related Materials or Plant and allowing time for the Engineer's review in accordance with the Contract.

01A.8.1.2 Where more than one supplier / manufacturer is able to supply any particular Material, the whole quantity of the Material required for the Works shall be provided from one single supplier / manufacturer unless specifically approved otherwise in writing by the Engineer.

01A.8.1.3 All Materials and Plant shall be transported, stored and used in accordance with the manufacturer's recommendations and directions, and in such a manner to avoid damage or deterioration of the Materials and Plant. This includes but is not limited to use of protective wrapping, packers between components, Materials stored off the ground on timber planks, etc.

01A.8.2 Sampling and Inspections

01A.8.2.1 The Contractor shall sample and test all Materials to demonstrate compliance with the Employer's Requirements, and the requirements of the Contractor's design.

01A.8.2.2 Materials shall be sampled and tested in accordance with the relevant national codes and standards, and the relevant parts of the Employer's Requirements.

01A.8.2.3 The Contractor shall ensure that each supplier / manufacturer will admit the Engineer, on request, to its premises during ordinary working hours for the purpose of witnessing, inspecting the manufacture, fabrication, sampling or testing of any Plant or Materials to be incorporated into the Works.

01A.8.3 Proprietary Items and Named Suppliers

01A.8.3.1 A proprietary item shall be any item specified by naming one or more of the following:

a) Manufacturer
b) Supplier
c) Installer
d) Trade name
e) Brand name
f) Catalogue/reference number

01A.8.3.2 The specification of a proprietary item anywhere in the Employer's Requirements or Drawings shall not necessarily indicate exclusive preference for the item so identified, but shall be deemed to indicate the required properties of the item, such as type, quality, appearance, durability, finish, method of construction, performance, etc.

01A.8.3.3 The Contractor is permitted to propose equivalent alternative items matching the required properties of the specified items. The Engineer may in its absolute discretion approve or reject the alternative. No claim shall arise from any rejections.

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01A.8.3.4 All proprietary Material and Plant to be incorporated into the Works, whether or not it is named or specified in the Employer's Requirements or drawings, shall satisfy the following requirements:

a) The supplier shall have an established supply chain in the Country

b) The supplier shall have an established customer support system in the Country, including the option for attendance at Site if required in the future

c) Spare / replacement parts shall be available within the Country, or shall be easily available for import without delay or excessive expense to the Employer

01A.8.3.5 In case the above requirements cannot be met by any specified product or named supplier, the Contractor shall :

a) Notify the Engineer

b) Advise any limitations / restrictions on future maintenance or repair of the products if the specified product / names supplier is adopted in the Works

c) Identify the closest equivalent product / supplier that is available within the Country and satisfies the above requirements

d) Wait for the Engineer's advice before proceeding with procurement

01A.8.3.6 The Contractor shall submit documents, including data sheets, written statements from the supplier, etc. to demonstrate that the proposed products are suitable for the proposed location and purpose, satisfy the Employer's Requirements, (including performance parameters, design life, maintenance period, availability of guarantees and warranties, etc.) and including the customer support contact details. Such documentation shall be submitted to the Engineer for review prior to procurement.

01A.8.4 Spare Parts

01A.8.4.1 The Contractor shall provide all spare parts, consumables and special tools necessary for the commissioning, maintenance and operation of any Plant or for any specialist Goods used in the Works, as may be required for the duration of the Defects Notification Period and/or have a procurement time of more than seven (7) days.

01A.8.4.2 Spare parts recommended by the manufacturers shall be available as an ex stock item through local distributors with little or no lead time.

01A.8.4.3 The number and condition of spare parts shall be jointly reviewed and inspected by the Contractor and Engineer at the time of handing over. Any damage or otherwise defective elements shall be repaired or replaced as required by the Engineer.

01A.8.4.4 Lists of spare parts and contact information for suppliers/agents shall be provided within the Project Data Book, as specified in PER#001 Part B "*Documents on Completion*".

01A.9 QUALITY ASSURANCE AND QUALITY CONTROL

01A.9.1 Quality Assurance

01A.9.1.1 The Works shall be executed under the control of an approved quality management system which satisfies the requirements of ISO 9001 (or equivalent).

01A.9.1.2 The Contractor shall prepare and submit a project quality management plan (PQP) which defines the planned arrangements for achieving all of the requirements of the Contract.

01A.9.2 Testing and Inspections

01A.9.2.1 General

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01A.9.2.1.1 All Materials used in the Works shall be tested in accordance with relevant codes and standards, and the Employer's Requirements.

01A.9.2.1.2 All test results shall be reported to the Engineer within 48 hours of completion of the test.

01A.9.2.1.3 Any Material not meeting the Employer's Requirements or the requirements of the relevant code or standard shall be rejected and shall not be allowed to be used in the Works. All rejected Material shall be immediately removed from Site.

01A.9.2.2 Inspection and Test Plan

01A.9.2.2.1 The Contractor shall prepare and submit an Inspection and Test Plan (ITP) for each aspect of the Works in advance of the related works commencing on Site.

01A.9.2.2.2 Each ITP shall be project-specific and site-specific, and relevant to the activities required for that aspect of the Works.

01A.9.2.2.3 The format for the ITP shall be in accordance with the Contractor's established quality control procedures, and shall be submitted to the Engineer for review in advance of any construction works commencing. In the event that the Contractor does not have its own established procedures, a template is provided in Appendix VII *"Inspection and Test Plan Template"* to show the minimum expected level of detail.

01A.9.2.2.4 As a minimum, each ITP shall identify hold points, inspection points and review points, as defined below and as identified throughout the Employer's Requirements using the following notation at the end of relevant clauses:

a) Hold Point – Work cannot proceed further without inspection and approval from both the Contractor's QA personnel and the Engineer.

b) Inspection Point – The Engineer shall be given the opportunity to review, witness or inspect the activity, however the activity may proceed without the Engineer's specific approval. All work shall be subject to the Contractor's own QC/QC procedures, regardless of the Engineer's review or otherwise.

c) Review Point – Materials, samples, documentation or similar shall be submitted to the Engineer for review.

01A.9.2.2.5 The Engineer shall be notified at least 24 hours in advance of any Hold Point or Inspection Point activity (via an Inspection Request or other agreed procedure).

01A.9.2.2.6 The Contractor shall maintain a written record of all approvals to proceed beyond any Hold Points, and of which Inspection Points were witnessed by the Engineer. This record shall be immediately available for review at any time at the request of the Engineer or the Employer.

01A.9.3 Field Laboratory

01A.9.3.1 The Contractor shall establish a field laboratory on the Site to allow the inspection of the Materials and to undertake the testing required for the Works.

01A.9.3.2 All equipment in the field laboratory shall be in good working condition and shall be calibrated by an independent and reputable testing agency. Equipment shall be regularly re-calibrated to maintain the validity of the calibration certificates. Calibration of all equipment shall be on a 6 month basis as a minimum, or more frequent if required by the relevant standards or recommended by the testing agency. Copies of all calibration certificates shall be submitted to the Engineer for review.

01A.9.3.3 The frequency and methodology for carrying out all tests shall be in accordance with relevant codes and standards, and in no case less than specified in the relevant parts of the Employer's Requirements. The procedures shall be reviewed by an independent testing agency and the Engineer.

01A.9.3.4 The Employer reserves the right at any time to audit the facilities and testing procedures.

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01A.10 CONDITION SURVEYS

01A.10.1.1 Initial condition surveys shall be undertaken whenever the Contractor is given access to any part of the Site, or given possession of any Materials by the Employer.

01A.10.1.2 Final condition surveys shall be undertaken in accordance with the taking-over procedure defined in PER#001 Part B "*Documents on Completion*".

01A.10.1.3 The condition survey shall be arranged by the Contractor and carried out jointly between the Contractor and the Engineer. Where necessary, the Contractor shall coordinate with the owners of adjoining properties/areas (including the Employer where relevant) to arrange safe access and attendance as required.

01A.10.1.4 The Contractor shall take detailed photographic records and prepare detailed written records for these surveys, to record the condition of all existing structures, areas or properties, with particular focus on any pre-existing damage or defects. The records shall include a drawing(s) of the area to indicate the location of any photos and any pre-existing damage that may be identified.

01A.10.1.5 The Contractor shall provide a copy of the survey records to the Engineer and to the Employer.

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APPENDIX I

DESIGN CRITERIA

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01A.DC.1 DESIGN CRITERIA

01A.DC.1.1 Setting Out Information

Table 01A.DC.1 - Setting Out Parameters

Parameter	Value
Local Level Datum	*Chart Datum*
Coordinate System	WGS 84, UTM zone 42Q
Reference Benchmarks	*+6.984 w r t CD (NIOT report dated Oct 2002)*

01A.DC.1.2 Site Environmental Data

Table 01A.DC.2 - Environmental Parameters

Type	Parameter	Value
Tide Levels	Highest High Water Springs (HHWS) Mean Highest High Water (MHHW) Mean Sea Level (MSL) Mean Lowest Low Water (MLLW) Lowest Low Water Spring (LLWS)	+3.92 m +3.19 m +1.76 m +0.50 m -0.01 m
Waves	Significant Wave Height (m)	1 yr return period: 1.28 m 100 yr return period: 2.9 m
	Significant Wave Period (s)	1 yr return period: 12 s 100 yr return period: 16 s
Current	Maximum design current (m/s)	Flood: 1.5 m/s Eb: 0.79 m/s
Wind	Maximum design wind speed (m/s)	To be assessed based on site data/codes to suit the Permanent Works and Temporary Works design respectively
Temperature	Minimum temperature Maximum temperature	15 °C 44 °C
Seismic	Seismic Zone Importance Factor	Zone III 1.5

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APPENDIX II

GLOSSARY

Classification: Internal

DEFINITIONS

"Other contractors" means other contractors appointed by the Employer working on or adjacent to the Site

"Project" means the design and construction of all aspects of the project, which may include additional elements by others in addition to the Works included in the Contract.

"Third Party Approvals" or **"TPA"** means all permits, licences and approvals, as required by the Laws in relation to the design, execution and completion of the Works

ABBREVIATIONS

Abbreviation	Definition
AC	Alternating Current/ Air Conditioning
ASR	Alkali-Silica Reaction
ASTM	American Society for Testing and Materials
BS	British Standard
°C	Degrees Centigrade
CAPWAP	Case Pile Wave Analysis Programme
CD	Chart Datum
COSHH	Control Of Substances Hazardous to Health
DC	Direct Current
DWG	AutoCAD Drawing
EN	Euro Norm (Denotes Eurocode)
HAT	Highest Astronomical Tide
HDPE	High Density Polyethylene
HSSE	Health Safety Security and Environment
HWS	High Water Springs
IEC	International Electrotechnical Commission
IEE	Institution of Electrical Engineers
IFC	Issued for Construction
ILE	Institute of Lighting Engineers
ISO	International Standards Organization
LCM	Lighting Control Module
LED	Light Emitting Diode
LLW	Lower Low Water
LV	Low Voltage
LWS	Low Water Springs
MCB	Miniature Circuit Breaker
MCCB	Moulded Case Circuit Breaker

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Abbreviation	Definition
MHWN	Mean High Water Neap
MHWS	Mean High Water Springs
MLLW	Mean Lower Low Water
MLWN	Mean Low Water Neap
MLWS	Mean Low Water Springs
MSL	Mean Sea Level
N/C	Normally Closed
N/O	Normally Open
NCR	Non Conformance Report
O&M	Operations & Maintenance
PDU	Power Distribution Unit
PVC	Polyvinyl Chloride
RAMS	Risk Assessment and Method Statement
RCC	Reinforced Concrete
RCD	Residual Current Device
RFI	Request for Information
RMU	Ring Main Unit
TPA	Third Party Approval
UDL	Uniformly Distributed Load
uPVC	Unplasticised Polyvinyl Chloride

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APPENDIX III

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APPENDIX VII

INSPECTION AND TEST PLAN TEMPLATE

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APPENDIX VIII

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