Attachment 6

A. Environmental Management Plan

Table 1: Environmental Management Plan

Impact Field	Mitigation measures	Costs	Implementation responsibility	Monitoring responsibility
During Pre-Construction Phase				
<u>Clearances and adherence to Standards:</u> Not complying with the conditions and guidelines provided in contract conditions, including environmental clearances and approvals	• Scheduling, coordination, procurement, obtaining approvals and project implementation shall be expedited to the extent that is practicable. • Standard and good construction practices shall be followed at all times. • The possibility of deploying several gangs simultaneously shall be pursued, which will allow the work to be completed within the least possible duration.	Standard Construction Practices and Industry Norms	Contractor	DSC
<u>Site selection and suitability:</u> Especially in case of temporary storage of material, waste/debris, stacking and work camps, equipment/machinery yards	• The rehabilitation work Galagedara FHC is only within the existing building premises. Therefore, no extensions are envisaged, and no additional space is required for any of the sites. No site selection and suitability issues are envisaged. No mitigation measures are needed. • Having labour camps at any of the thirteen sites is not envisaged. Space may be needed only for storage of material and a hut for resting for labourers. • Temporary storage sites to be considered should result in the least damage to property and vegetation and the least disturbance to the neighbourhood, including the traffic. • Storage areas shall be located in areas to minimize	No cost involved	Contractor	DSC

	unauthorized access, as the movement of vehicle and workers inside HCF premises are restricted. • The contractor shall have plans for the storage of hazardous materials (paints, solvents, fuels, oils, and chemicals) and preparations for emergency procedures.			
<u>Planning for shifting of utilities:</u> Shifting of utilities before demolition/construction/ rehabilitation work	▪ There are some existing infrastructure and services (electricity lines, various pipelines – water supply and wastewater) within the parts of buildings earmarked for repairs/demolition. To mitigate the inconveniences caused to users of these buildings due to the interruption of the utilities, the contractor shall: • Identify and include locations of these utilities in the design documents to prevent unnecessary disruption of services during the construction phase; and • Require construction contractors to prepare a contingency plan to include actions in case of unintentional interruption of services.	Cost of temporary services, if needed, should be included in the Contractor's estimates	Contractor	MOH, PHI or PHM who is in charge of the Field Health Centre
Planning for interruption of traffic and people's movements	• Impacts due to interference with access to the facilities of the FHC should be avoided. The rehabilitation and repair work will interrupt the movement of patients, staff and visitors to the FHC facilities. These interruptions caused to the movements of people should be avoided: • Information on detours/diversions/bypasses should be communicated via proper signages. • The contractor should coordinate with the MOH, PHI or PHM who is in charge of the Field Health Centre staff on such interruptions	No costs involved	Contractor	DSC

	• Keep the interior/corridors of buildings and access roads free from all unnecessary obstructions. • Notify affected parties by providing signboards with information about the nature and duration of construction works and contact numbers for concerns/complaints • Any obstructions must be illuminated at night.			
<u>Establishment of procedures for chance finds</u> Social and cultural resources	• All articles which have a value of antiquity, structures, and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation. • The contractor shall take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such articles. • The PMU will seek direction from the Department of Archaeology of Sri Lanka and inform the PIU to follow the Chance Find Procedures set forth in the EARF prepared for the HSEP-AF.	No costs involved	Contractor	DSC to report to PIU - CP PIU - CP to report to Dept of Archaeology
During Construction Phase				
Demolition of (parts) of buildings/structures	• Plan waste minimization measures, and re-use as much demolition waste and material as much as possible • Asbestos sheets should be re-used rather than disposed of. Extra care should be exercised in removing and if needed when disposal of asbestos products.	Part of the contractor's cost	Contractor	DSC to report to PIU - CP

	• Find alternative beneficial uses for any unused building material, e.g., fills in other construction works; fixtures and fittings to be re-used. • Workers should be provided with appropriate safety wear, Worker Personal Protective Equipment (PPE) during demolition, and waste disposal.			
Impacts on Air Quality	• The louvres/openings, windows and other passageways to adjoining areas of health offices can be temporarily covered with tarpaulin/polythene sheets (or any other suitable material) until the demolition/rehabilitation/ construction work is over. • The sites should be cleaned daily, especially surfaces that are affected by demolished material and dust. • If needed, regular watering (at least twice a day during the mid-morning and mid-evening) should be carried out in areas which need demolition of walls, floors, ceilings, etc., for dust suppression. • Construction debris and waste that is temporarily stored on-site should be covered in a tarpaulin or other locally sourced suitable material to prevent dust particles from getting airborne. • Where possible, construction stockpiles and debris piles should be stored away from the functional areas of the field health centre or any other neighbouring facilities/offices. It has to be noted that the space is very limited at the FHC sites for the storage of such debris. Therefore, the immediate removal of such debris is recommended. • During transportation, trucks carrying construction debris and waste, spoil (if any), or construction material to and from the sites should be covered by a tarpaulin. Speed controls must be imposed on	This item has already been absorbed into the cost of the project.	Contractor	DSC to report to PIU – CP

	construction vehicles at all times.			
Elevated levels of noise and vibration	• The use of noisy machines should be restricted, and wherever possible noise-reducing means for construction machines should be used. • Maximum permissible noise levels[2] for construction activities must be less than or equal to 75 dB Leq T during daytime (06.00 – 21.00 hrs) and 50 dB Leq T during nighttime (21.00 – 06.00 hrs). • Noise-generating activities should be restricted to time periods when the FHCs are closed. Construction activities at each FHC should be carried out after hours (or on days when health services are not provided) to avoid discomfort caused by noise and vibration that for patients and the healthcare staff. • Nighttime work shall be allowed if needed. If certain nighttime construction activities are carried out, they should be only for low noise-generating activities such as painting, plastering, etc. • Manually mixed concrete will avoid the need to have concrete mixers operated at the site. Concrete mixers can generate high levels of continuous noise; Use of manually mixed concrete is feasible as concrete work that is proposed require small quantities of concrete. (Note: concrete mixing platforms should be cleaned thoroughly, and generation of wash water should be minimized to the extent that is practical. Any wash water should be directed to a catch pit for settlement of cement and grit before discharging to a nearby drain).	This item has already been absorbed into the cost of the project.	Contractor	DSC to report to PIU - CP

[2] National Environmental (Noise Control) Regulations No. 1, 1996

	• The use of pre-fabricated frames/fixtures will avoid the need to fabricate the structure on-site and avoid unnecessary noise (due to cutting, drilling, etc.). • Vehicles should be serviced properly before use, and noise generated from equipment used in construction work should meet CEA standards for noise and vibration in Sri Lanka. Equipment and machinery should be checked for their rated noise and vibration levels. • Any noisy construction machines/activities should be scheduled to coincide with non-clinic days/times as much as possible or on days that patient visits to the facility are minimum. • Liaising with the FHC staff regarding the work schedules is always advisable. Prior notices of noise-generating activities will avoid confusion among health officials and hospital authorities, and the contractor			
Storage and disposal of demolished material and debris, construction debris and waste, spoil, and muck	• Earth stockpiled on-site should be fully covered on all sides with a suitable material, and weight should be placed at the base to prevent the cover from getting displaced and exposing the earth to erosion. They should be stored away from site/road drainage paths. • The use of pre-fabricated structures will avoid the need to bring much of the construction material to be brought to the site (thus minimizing the vehicular movements within the site premises) and lessen the need for storage space on-site. This will also avoid the need to have structures fitted and/or fabricated on-site, which will prevent further disturbance to the peripheral areas and would not generate any construction waste.	This item has already been absorbed into the cost of the project.	Contractor	DSC to report to PIU - CP

	• Paints, solvents, oil, and lubricant waste should not be buried or burnt in the project site but collected and stored in proper oil cans and disposed of for re-use or LA-approved designated sites. • All other hazardous chemicals such as paint shall be stored in a safe place that is not subjected to unauthorized access or accidental spilling. Empty paint cans will be collected and removed to an authorized dumpsite. • Packing material, polyethene, wooden debris (e.g., used for shuttering/scaffolding work), etc., should be properly collected and stored, and the contractor should remove them from the site prior to handing over.			
Damages to ecological resources	No particular mitigation measures are needed.	-	-	-
Disruptions caused to existing infrastructure and facilities	• Prior stakeholder consultation is needed for planning for service interruptions during re-wiring, plumbing work, etc. • Adequate and clear notices should be provided to all the affected parties of the service interruptions. Indicate alternative provisions and the contingency measures that are planned. • Prepare a contingency plan to include actions to be done in case of unintentional interruption of services.	This item has already been absorbed into the cost of the project.	Contractor	DSC to report to the MOH, PHI or PHM who is in charge of the Field Health Centre
Alterations of the existing landscape and aesthetics	No particular mitigation measures are needed.	-	-	-
Impacts on occupational	• The contractor should employ workers who have adequate skills, experience, and training	This item has already been	Contractor	DSC

health and safety	• The workers, as well as the supervision staff, are expected to have a general awareness and regard for the day-to-day activities of the FHC premises • entry/exit rules of FHC premises and any other stipulated and general rules/conditions, especially those related to safety, should be strictly adhered to, without any exception • no alcohol/drugs on-site; no attempt should be made by any worker to enter the site premises if such worker is under the influence of alcohol/drugs • the workers should wear appropriate PPE while carrying out work that emanates high noise, vibration and/or dust • trespassing on adjoining areas of the HCF premises and private/commercial properties adjoining the site is forbidden • no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do, especially when work is involved heights, operation of electric appliances, and mechanical devices – which need specialized training • The contractor must make sure that the work behaviour and performance of construction workers adhere to and follow the points communicated to them during their safety toolbox meeting and induction.	absorbed into the cost of the project. This is the responsibility and obligation of the contractor		
Impacts on community health and safety; traffic hazards; pedestrian safety	• The construction site should be delineated from the rest of the facilities at the FHC, preferably using barricading tape or any other suitable material that separates the construction area from the rest of the premises physically • A safe pedestrian pathway to the other parts of the buildings should be provided if regular access along	This item has already been absorbed into the cost of the project.	Contractor	DSC to report to PIU - CP and MOH, PHI or PHM who is in-charge of the Field Health

	with the near corridors and the access roads are blocked. • The contractor's vehicles should be parked only at permitted parking lots at times other than loading/unloading • Delineation devices such as cones, lights, tubular markers, barricades tapes, warning signposts, etc., should be erected to inform FHC users about work zones. • Appropriate safety equipment, tools and protective clothing should be provided to workers, and the contractor must ensure those safe working methods are applied. • Machinery and equipment that could easily electrocute should be kept safely within site and always under the supervision of an experienced worker.			Centre
Impacts due to the storage of hazardous substances	• Any hazardous waste shall be stored at the designated place before disposal. The contractor shall ensure the material safety data sheets of chemicals are posted in conspicuous areas. • Hazardous material, including oil and grease, is to be collected in leak-proof, properly-labelled containers and stored appropriately. Proper signs should be displayed for hazardous waste) and should be handed over to authorized third parties • Bins and/or skips shall be emptied regularly, and waste shall be disposed of at designated sites.	This item has already been absorbed into the cost of the project.	Contractor	DSC to report PIU - CP
Supervision of work groups/gangs	• Labourers/workers should be given strict instructions to use sanitation facilities and receptacles for garbage collection at the site premises. • Domestic solid waste collected should be disposed of	This item has already been absorbed into the cost of the	Contractor	PIU - CP through the DSC

	daily at a site given to them.	project.		
Clean-up operations, restoration, and rehabilitation	• It has to be noted that there are sewerage lines and manholes located in the backyards of most of the site premises. Any work should not damage these. • All the sites and the peripheral areas should be cleaned by the contractor as part of the work and restored to their original condition. • A minimum of three native shade tree species shall be planted at suitable locations within the site.	This item has already been absorbed into the cost of the project.	Contractor	PIU - CP through the DSC
During Operational Stage				
General maintenance of facilities	• The FHC premises shall be supplied with uninterrupted electricity supply, and water supply facilities by the MOH	This item has already been absorbed into the cost of the project.	Contractor	MOH, PHI or PHM who is in-charge of the Field Health Centre
Health and safety due to generation, collection, storage, and disposal of waste	• A properly designed wastewater collection system is planned for all thirteen sites. It has to be ensured that all wastewater (black water and grey water) is connected to the existing septic/soakage systems properly	This item has already been absorbed into the cost of the project.	Contractor	MOH, PHI or PHM who is in-charge of the Field Health Centre, as the case may be

Health and safety due to generation, collection, storage, and disposal of healthcare waste	• Infectious waste should be collected separately and disinfected appropriately at the point of generation. Once disinfected, the waste should be properly stored, treated, and disposed of – and the methods should integrate into the overall HCW management of the MOH area • Containers for infectious waste should not be placed in public areas.	This item has already been absorbed into the cost of the project.	Contractor	MOH, PHI or PHM who is in-charge of the Field Health Centre

	• Waste bins should be located as close as possible to sinks and washing facilities. • Containers should be of similar size to overcome the observed tendency for staff to put waste in the largest receptacle.			
Occupational Health and safety of the staff of the health offices	• Frequently touched surfaces throughout the reception area and waiting areas should be cleaned and sanitized regularly • All health care staff who come into contact with persons who are suspected to be a patient with an infectious disease should wear appropriate PPE and perform hand hygiene after removing it • Uniforms should be changed daily - cleaning of work clothes and shoes minimizes the possibility of dispersing the virus in the air – make sure not to shake clothes – wash them at a temperature of at least 60 ° C with common detergents, add disinfectants if possible • Put a disposable set of gloves, on a daily basis, in direct contact with skin, before wearing the usual work gloves. • The healthcare staff should have separate toilets and bathrooms (which should never be used by infected persons). Ensure yellow bags are correctly closed and tied with an overhand balloon knot so that they are leak-proof before being moved. • Hazardous/contaminated waste should be collected in yellow bags and should be placed in a container with a secure lid. • All sharps containers should be fully closed and placed in a bag and then in a container. Preferably, single-use			

	disposable sharps containers should be used in place of reusable sharps containers. • Single-use gloves (nitrile or latex) and gowns should be discarded after each use and not re-used. • Each bag must be hand-tied by gathering and twisting the neck of the bag and using a tie or hand knot to secure the bag, and each container must be securely closed. • Bins used for disposing of infectious waste must be disinfected before re-use by any means effective for the infectious substance the container previously contained. • **Have proper plans in case of emergencies:** The HCF needs to have procedures in place for how staff should deal with accidents and emergencies. Generally, written procedures for first aid should be developed and made available to all staff so they know the first things to do and who to call or notify in case of minor cuts and bruises, major wounds, or skin contamination. • **General safety.** In establishing a safety management programme, it is essential to appoint a responsible supervisor. The health office should have a safety manual that establishes policy and describes standard procedures for handling safety and emergency issues. Personnel need to be trained in how to apply safety practices and techniques and to be aware of potential hazards.			

B. Environmental Monitoring Plan

Table 2: Environmental Monitoring Plan

Impact/mitigation	Parameters to be monitored	Location	Measurement	Frequency	Responsibility
Pre-construction and Construction Stage					
Airborne particulate matter and air quality deterioration due to demolition, construction work, stockpiling, and movement of vehicles	Airborne particles in the air Dust collected at the windowsills of the nearby rooms, and buildings	Construction site Nearby rooms and buildings	Visual observation of dust in the air Feedback from healthcare staff of the FHC sites	Daily - Continuous Weekly	Contractor PIU - CP
Controlling noise and vibration levels due to excavation, construction work and movement of heavy vehicles	Noise and vibration levels	At the boundary of the site premises Outside the Health offices	Qualitative observation of Noise/Vibration level Feedback from healthcare staff of the FHC sites	Daily - Continuous Weekly	Contractor PIU - CP
Containment of contamination	Storage of potential contaminants and any spills	Storage areas	Inspection of the site for the adequacy of contamination control measures, the possibility of contamination	Daily	Contractor
Proper disposal of construction waste (non-hazardous)	Collection, storage and disposal of non-hazardous waste	Construction site, areas of waste storage	Inspection of the site for availability of waste collection bins, records of waste removed from the site, an inspection of disposal sites Events of open burning of waste	Daily	Contractor
Impacts due to labourers	Complaints from other staff at the FHC	Site premises	Inspection of the activities of labour gangs, feedback from staff of the FHC	Daily	Contractor

	Collection and disposal of MSW				
Occupational health and safety issues	Records of accidents	Site premises	Visual inspection of the site, adequacy of signage and delineation barriers, number of accidents and complaints registered in the GRM	Daily	Contractor
Complaints registered in the GRM	Records of complaints	-	Nature of complaint and providing a proper solution	Daily	PIU - CP
Operational stage					
Proper collection and disposal of wastewater	Leaking drains and pipelines, overflowing drains and manholes	Wastewater collection gulleys and sewer pipelines	Any signs of leaking drains and pipelines, overflowing drains and manholes	Daily	MOH, PHI or PHM who is in-charge of the Field Health Centre
	Microorganisms and chemical presence	Monitoring shallow wells located 20–25 m away from the soakage pit	Test the groundwater samples collected using the monitoring tube well	Semi-annual	MOH, PHI or PHM who is in-charge of the Field Health Centre
Proper collection, storage, and disposal of construction waste (hazardous)	Method of collection, sorting, storage, and disposal of HCW	FHC premises	Inappropriate methods or lapses in methods collection, sorting, storage, and disposal of HCW	Daily	MOH, PHI or PHM who is in-charge of the Field Health Centre

Occupational Health and Safety Issues	• Emergency procedures • Events of chemical spills • Events of biological spills • Events of other emergencies such as fires • General safety issues, including ventilation and tidiness	FHC premises Washrooms, waste storage areas and peripheral areas of the FHC	Regular review of emergency preparedness procedures Regular review of emergency response procedures Regular review of emergency events, log entries, and safety logs and reports Stocks of consumables needed to be used during emergencies and spill events, firefighting equipment, etc., checks for their expiry dates Indoor air quality Quality control procedures as outlined in Standard Practices	Continuous	MOH, PHI or PHM who is in-charge of the Field Health Centre

ORIGINAL

REQUEST FOR QUOTATIONS – WORKS

PROCUREMENT OF WORKS - CONSTRUCTION OF WAITING AREA & EXTERNAL TOILET FOR CENTRAL CLINIC AT GALAGEDARA IN KANDY DISTRICT

(GALAGEDARA CENTRAL CLINIC)

CONTRACT NO: HSEP(AF)/PIU(CP)/PRO/W-10/Kandy/2022/01/Lot H

October 2022

REQUEST FOR QUOTATION - WORKS (RFQW)

Project Title: **Construction of Waiting area & External Toilet for Central Clinic at Galagedara – Kandy District**

Source of Funding: Asian Development Bank - Loan 3727/G0618-SRI: Health System Enhancement Project

Contract Ref : HSEP(AF)/PIU(CP)/PRO/W-10/Kandy/2022/01/Lot H

Date of Issue of Request: 14/10/2022

To :
Sir/Madam:

1. The Deputy Project Director – Central Province - HSEP (Employer) hereby requests you to submit a quotation for the following works:

   Procurement of Works**-** Construction of Waiting area & External Toilet for Central Clinic at Galagedara – Kandy District

Lot No.	**Name of Health Institution**
Lot H	**Galagedara Central Clinic**

   To assist in the preparation of your price quotation, the necessary **Specifications**, **Activity Schedule** and **Drawings**, **Form of Quotation** and a draft **Contract Form** are enclosed. You are advised to visit the site of the works at your own expense, and obtain necessary information in order to prepare your quotation.

2. If you/your firm, however, falls under any of the following conditions, your proposal may not be considered:
   (a) you/your firm are/is not a citizen/national of an ADB member country, or
   (b) you/your firm have/has been associated with the firm that prepared the design, specifications, or engaged in the preparation of the Project or firm that will provide supervision of the Works, or
   (c) you/your firm are/is owned by the Employer, or
   (d) you/your firm are/is currently sanctioned or temporarily suspended by the Asian Development Bank for a violation of its Anticorruption Policy (1998, as amended to date), or
   (e) the contracting of services from your country or any payment to persons or entities in your country is prohibited in compliance with a decision of the United Nations Security Council under Chapter VII of the Charter of the United Nations.

3. To be qualified, you must:
   (a) have experience as a prime contractor in the construction of **at least one work over the last 3 years of the nature and complexity equivalent** to the works covered by this **Request for Quotation** as evidenced by a client's certificate of completion; and
   (b) provide evidence of availability of financial resources to successfully complete the works in the amounts given in the below table. You shall provide a Credit line from a reputable bank is acceptable evidence. Otherwise, you will not be considered further.

Lot No.	Name of Health Institution	Amount in LKR (for financial resources)
Lot H	Galagedara Central **Clinic**	11,776,000.00

4. Your quotation/(s) should be submitted in accordance with the following instructions, procedures, and the terms and conditions of the **Contract**.

Preparation of Quotations

(a) Your price quotation/(s) shall be for the whole works as described in attached documents and submitted only in the attached **Form of Quotation** with the priced **Activity Schedule**. The currency of quoted prices and payment shall be **Sri Lankan rupees**. The quotation shall include all duties, local taxes and other levies payable by the contractor in accordance with the local laws.

(b) You shall submit only one quotation. Your quotation must be typed or written in indelible ink and shall be signed by you or your authorized representative. Without a signature in your **Form of Quotation**, your quotation will not be considered further.

(c) You shall submit one original of the **Form of Quotation**, and clearly marked "Original". In addition, you shall also submit one copy marked as "COPY". In case of any discrepancy between the Original and Copy, the original shall prevail.

(d) Your quotation should be valid for a period of 30 days from deadline for submission of the quotation as indicated below. If you withdraw your quotation during the validity period and/or refuse to accept the award of a contract when and if awarded, then you will be excluded from the list of eligible contractors for the project for 2 years.

Submission and Opening

(e) Your **Form of Quotation** with the priced **Activity Schedule**, if applicable, should be submitted by 28/10/2022 on or before 10.00 a.m. with the required documents that should be signed, sealed in an envelope, and addressed to and delivered to the following address:

Employer's Address : Deputy Project Director
Health System Enhancement Project-CP,
No:106, Pallegama Road, Ampitiya,
Kandy

Telephone : 0813154700

[*Or*]

Your **Form of Quotation** with the required documents may be submitted electronically by e-mail to the following e-mail address:
E-mail : piucp.dpd@gmail.com

(f) Quotations shall be opened in public in the presence of participating contractors' representatives who choose to attend, on 28/10/2022 on or before 10.00 a.m. and at the following address.

Deputy Project Director
Health System Enhancement Project-CP,
No:106, Pallegama Road, Ampitiya, Kandy,

Evaluation and Comparison

(g) Quotations determined to be substantially responsive to the **Request for Quotation** will be evaluated by comparison of their offer prices. A quotation is not substantially responsive if it contains material deviations or reservations to the terms, conditions, and specifications in this Request for Quotation.

(h) In evaluating the quotations, the Employer shall adjust for any arithmetical errors as follows:

(i) where there is a discrepancy between amounts in figures and in words, the amount in words will govern; and

(ii) where is a discrepancy between the total price in the Priced **Activity Schedule** or the quoted amount indicated in the **Form of Quotation**, the total price in the Priced **Activity Schedule** shall govern. If you refuse to accept the correction, your quotation will be rejected.

Award of Contract

(i) The Employer shall award the contract to the contractor whose quotation has been determined to be substantially responsive to this Request for Quotation and who has offered the lowest price quotation.

(j) The contractor whose quotation has been accepted will be notified by the Employer within **14 days** from the date of submission of quotation through the return of a copy of the **Form of Quotation** with **Acceptance** signed by the authorized representative of the Employer.

(k) The successful contractor shall sign the **Contract** (attached) governed by the annexed **Contract Terms and Conditions**. In addition to the quoted price, the contract price shall include Value Added Tax (VAT) in Sri Lanka.

5. Further information can be obtained from:

Name	:	Project Procurement Officer
Address	:	Health System Enhancement Project No:106, Pallegama Road, Ampitiya, Kandy
Telephone	:	0813154700
E-mail	:	procurement.piucp@gmail.com

6. The Employer intends to apply funds from the **Asian Development Bank (ADB)** for eligible payments under the Contract resulting from this **Request for Quotation**.

7. Under **ADB's Anticorruption Policy** (1998, as amended to date), bidders shall observe the highest standard of ethics during the procurement and execution of such contracts. ADB may reject a proposal for award, and may impose sanctions or other remedial actions on parties involved, if it determines that the bidder recommended for award or any other party, directly or through an agent, has engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations in competing for, or in executing, the Contract. At the time of submission of your quotation, you should not be in ADB's sanctions list. A firm/individual shall not be eligible to participate in any procurement activities under an ADB-financed, -administered, or -supported project while under temporary suspension or debarment by ADB pursuant to its Anticorruption Policy, whether such debarment was directly imposed by ADB, or enforced by ADB pursuant to the Agreement for Mutual Enforcement of Debarment Decisions.

8. You/your firm, joint venture partners, associates, parent company, affiliates or subsidiaries, including any subcontractors or suppliers for any part of the Contract, are not, or have never been, temporarily suspended, debarred, declared ineligible, or blacklisted by the employer's country, any international organization, and other donor agency.

   If so debarred, declared ineligible, temporarily suspended, or blacklisted, please state details (as applicable to each joint venture partner, associate, parent company, affiliate, subsidiaries, subcontractors, and/or suppliers):[1]

   (a) Name of Institution: _____

   (b) Period of debarment, ineligibility, or blacklisting (start and end date): _____

   (c) Reason for the debarment, ineligibility, or blacklisting: _____

[1] Any such disclosure shall be forwarded by the Employer to ADB.

9. You/your firm's, joint venture partners', associates', parent company's affiliates' or subsidiaries', including any subcontractors' or suppliers', key officers and directors have not been [charged or convicted] of any criminal offense (including felonies and misdemeanors) or infractions/violations of ordinance which carry the penalty of imprisonment.

   If so charged or convicted, please state details:[2]

   (a) Nature of the offense/violation: _____

   (b) Court/Area of jurisdiction: _____

   (c) Resolution (i.e. dismissed; settled; convicted/duration of penalty): _____

   (d) Other relevant details:

10. You/your firm understands that it is your obligation to notify ADB should you/your firm, joint venture partners, associates, parent company, affiliates or subsidiaries, including any Subcontractors or Suppliers, be temporarily suspended, debarred or become ineligible to work with ADB or any other multilateral development banks, the employer's country, international organizations, and other donor agencies, or any of your key officers and directors be charged or convicted of any criminal offense or infractions/violations of ordinance which carry the penalty of imprisonment.

11. Any misrepresentation that knowingly or recklessly misleads or attempts to mislead may lead to the automatic rejection of the quotation/bid or cancellation of the contract, if awarded, and may result in remedial actions, in accordance with ADB's Anticorruption Policy (1998, as amended to date) and Integrity Principles and Guidelines (2015 as amended from time to time).

12. A bidder shall not have a conflict of interest. All bidders found to have a conflict of interest shall be disqualified.

13. Please confirm by fax/e-mail the receipt of this request and whether or not you will submit the price quotation(s).

Sincerely,

_____

Deputy Project Director,
Health System Enhancement Project-CP,
No:106, Pallegama Road, Ampitiya, Kandy

[2] Any such disclosure shall be forwarded by the Employer to ADB.

FORM OF QUOTATION
(Works)

_____ [*Date*]

To: Deputy Project Director
Health System Enhancement Project-CP,
No:106, Pallegama Road, Ampitiya,
Kandy,

We, having examined the **Request for Quotation** and its attached documents, offer to execute the Procurement of Works- Construction of Waiting area & External Toilet for Central Clinic at Galagedara – Kandy District**- HSEP(AF)/PIU(CP)/PRO/W-10/Kandy/2022/01/LOT H** in accordance with the **Contract Terms and Conditions** and the priced **Activity Schedule** accompanying this Quotation for the Contract Price of …… …….. *(amount in words)* …… (*amount in numbers*) in Sri Lankan Rupees. We propose to complete the Works described in the Contract within a period of …… months from the Date of Signing of the Contract.

This Quotation and your acceptance will constitute a binding Contract between us. We understand that you are not bound to accept the lowest or any Quotation you receive.

We hereby confirm that this Quotation complies with the Validity of the Offer required by the proposal documents.

We: (a) are a national of an ADB member country; (b) have not been associated with the firm that prepared the design and specifications of the contract that is subject of this request for quotation; (c) are not owned by the Employer; (d) are not currently sanctioned or temporarily suspended by the Asian Development Bank; and (e) to the best of our knowledge, is not prohibited from being contracted in compliance with a decision of the United Nations Security Council.

Name of Contractor : _____

Authorized Signature : _____

Name of Signatory : _____

Title of Signatory : _____

Signature of Signatory : _____

Address : _____

: _____

Phone Number : _____

Fax Number, if any : _____

Email address (optional): _____

ACCEPTANCE

The Employer accepts the Contractor's offer to undertake the Works. Execution of the Works shall commence no later than the Start Date specified in the Contract.

Contract : Construction of Waiting area & External Toilet for Central Clinic at Galagedara – Kandy District
Contract No. : HSEP(AF)/PIU(CP)/PRO/W-10/Kandy/2022/01/Lot H

Contract Amount :

The Contractor shall provide a Performance Security for the due performance of the Works, within 7 days of receipt of this returned Form of Quotation, in the amount equivalent to 10% of the Contract Price.

The forms of acceptable Performance Security are: A bank guarantee issued by a reputable bank located in the Purchaser's country, acceptable to the Purchaser, in the format provided in Attachment 5 of the RFQ.

Name of Purchaser : Deputy Project Director – Central Province
Health System Enhancement Project

Authorized Signature : _____

Date : _____

CONTRACT

Name of Country: Sri Lanka

Project Name: Health System Enhancement Project

Name of Contract: Procurement of works – **Construction of Waiting area & External Toilet for Central Clinic at Galagedara – Kandy District**
Contract Number: HSEP(AF)/PIU(CP)/PRO/W-10/Kandy/2022/01/Lot H

This Contract is entered into this …… [*date*] day of …… [*month*], ……[*year*] between Deputy Project Director, Central Province, Health System Enhancement Project the one part (hereinafter called the Employer) and …… [*name of Contractor*] (hereinafter called the Contractor) on the other part.

Whereas the Employer has called for quotations for Construction of Waiting area & External Toilet for Central Clinic at Galagedara – Kandy District, HSEP(AF)/PIU(CP)/PRO/W-10/Kandy/2022/01/Lot H and the Contractor has submitted a quotation for the above work and the Employer has accepted the Contractor's Quotation dated …….. with the accepted contract amount of ……for the execution and completion of such works and the remedying of any defects therein.

The Employer and the Contractor agree as follows:

1. The following documents shall be deemed to form and be read and construed as part of this Contract, viz:
   a. Form of Quotation, with Specifications, Activity Schedule and Drawings; and
   b. Contract Terms and Conditions;
2. Taking into account payments to be made by the Employer to the Contractor as provided herein, the Contractor hereby enters into this **Contract** with the Employer to execute the works fully described in the **Request for Quotation** documents with the scope itemized in the **Activity Schedule**, and in a professional workmanship in accordance with the **Contract Terms and Conditions**, all of which documents constitute integral parts of this **Contract**.
3. The Employer agrees to pay the Contractor, in consideration of the execution and completion of the Works and remedying defects therein, the **Contract Price** as indicated and accepted in the **Form of Quotation**, under payment terms stipulated in the **Contract Terms and Conditions**.

4 .The **Start Date** of the execution of Works shall be no later than 7 days after signing contract agreement

In witness whereof the parties thereto have caused this Contract to be executed under the laws of Democratic Socialist Republic of Sri Lanka on the date indicated above.

Signature and seal of the Employer:	**Signature and seal of the Contractor**:
FOR AND BEHALF OF	FOR AND BEHALF OF
_____	_____
Name of Authorized Representative	Name of Authorized Representative

CONTRACT TERMS AND CONDITIONS

Project Name : Construction of Waiting area & External Toilet for Central Clinic at Galagedara – Kandy District,**.**

Employer : Deputy Project Director – Central Province - HSEP
Contract No : HSEP(AF)/PIU(CP)/PRO/W-10/Kandy/2022/01/Lot H

1. Definitions

1.1 The words and expressions defined shall have the following meanings assigned to them.

(a) The **Activity Schedule** is a schedule of the activities comprising the construction of the Works in a measure & pay contract. It includes a measure & pay price for each activity, which is used for valuations.

(b) The **Start Date** is the latest date when the Contractor shall commence execution of the Works, as specified in the Contract.

(c) **The Completion Date** is the date of completion of the Works as certified by the Project Manager.

(d) The **Contract** is the Contract between the Employer and the Contractor to execute, complete, and maintain the Works.

(e) The **Contractor** is the party whose offer to carry out the Works has been accepted by the Employer.

(f) The **Contract Price** is the accepted contract amount stated in the Letter of Acceptance and thereafter as adjusted in accordance with the Contract.

(g) A **Defect** is any part of the Works not completed in accordance with the Contract.

(h) The **Defects Liability Period** is the period calculated from the Completion Date where the Contractor remains responsible for remedying defects in accordance with Clause 19 [Correction of Defects].

(i) The **Employer** is the party who employs the Contractor to carry out the Works.

(j) Force Majeure means an exceptional event or circumstance which: is beyond a Party's control; which such Party could not reasonably have provided against before entering into Contract; which, having arisen, such Party could not reasonably have avoided or overcome; and, which is not substantially attributable to the other Party.

(k) **Party** means the Employer or the Contractor, as the context requires.

(l) **Project Manager** is the Project Engineer of Project Implementation Unit. The **Project Manager** is the person appointed by the Employer and notified to the Contractor, who is responsible for supervising the execution of the Works and administering the Contract.

(m) The **Site** is the area defined by the Employer where the Works are to be executed, and any other place specified in the Contract as forming part of the Site.

(n) **Specification** means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager.

(o) The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, including any Variation**.**

2. Interpretation

2.1 In interpreting these conditions, singular also means plural. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager shall provide instructions clarifying queries about these conditions.

2.2 The documents forming the Contract shall be interpreted in the following order of priority:

(a) Contract, including Contract Terms and Conditions

(b) Accepted Form of Quotation,

(c) Specifications,

(d) Drawings,

(e) Priced Activity Schedules, and BOQ

(f) any other document required to form part of the Contract.

3. Contract

3.1 The Parties shall enter into a Contract within 10 days after the Contractor receives notification of Acceptance.

4. Compliance with Laws

4.1 The Contractor shall, in performing the Contract, comply with applicable Laws of Government of Democratic Socialist Republic of Sri Lanka.

5. Fraud and Corruption

5.1 This Contract shall be covered by the provisions of ADB's Anticorruption Policy (1998, as amended to date) and Integrity Principles and Guidelines (2015, as amended from time to time) that requires Borrowers (including beneficiaries of ADB-financed activity), as well as Bidders and Contractors under ADB-financed contracts, to observe the highest standard of ethics during the procurement and execution of such contracts.

6. Project Manager's Decisions

6.1 Except where otherwise specifically stated, the Project Manager shall decide contractual matters between the Employer and the Contractor in the role representing the Employer.

7. Communications

7.1 Communications between parties that are referred to in the Conditions shall be effective only when in writing. A notice shall be effective only when it is delivered.

8. Employer's Risks

8.1 From the Start Date until the Completion Date, the following are Employer's risks:

(a) The risk of personal injury, death, or loss of or damage to property (excluding the Works, Plant, Materials, and Equipment), which are due to

(i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works, or

(ii) negligence, breach of statutory duty, or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor.

(b) The risk of damage to the Works, Materials, and Equipment to the extent that it is due to a fault of the Employer or in the Employer's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed.

9. Contractor's Risks

9.1 From the Starting Date until the Defects Liability Certificate has been issued, the risks of personal injury, death, and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Employer's risks, are Contractor's risks.

10. Insurance

10.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated for the following events, which are due to the Contractor's risks:

(a) for loss or damage to the Works, Plant and Materials:100% value of the Contract with maximum 25% deductibles.

(b) for loss or damage to Equipment: 100% value of the Equipment with 25% maximum deductibles.

(c) for loss or damage to property (except the Works, Plant, Materials, and Equipment) in connection with Contract LKR 1,250,000.00 with 25% maximum deductibles.

(d) for personal injury or death:

(i) of the Contractor's employees: LKR 2 million per occurrence without limitation to the number of occurrences per year, with 25% maximum deductibles.

(ii) of other people: LKR 2 million per occurrence without limitation to the number of occurrences per year, with 25% maximum deductibles.

10.2 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance, which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

11. Contractor to Construct the Works

11.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings for which the quotation was offered.

12. Works to Be Completed by the Completion Date

12.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the Program submitted by the Contractor, as updated with the approval of the Project Manager, and complete them by the Completion Date.

12.2 **The Intended Completion Date** for the Works shall be; 180 days

12.3 **Late Completion**

The amount to be paid by the contractor is 0.05% of Initial Contract Price per Day, subjected to maximum of 10% of Initial Contract Price.

13. Possession of the Site

13.1 The Employer shall give possession of all parts of the Site to the Contractor one day after signing the contract.

14. Access to the Site

14.1 The Contractor shall allow the Project Manager and any person authorized by the Project Manager access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.

15. Safety

15.1 The Contractor shall be responsible for the safety of all the activities on the Site.

16. Instructions, Inspections, and Audits

16.1 The Contractor shall carry out all instructions of the Project Manager, which comply with the applicable laws where the Site is located.

16.2 The Contractor shall permit ADB to inspect the Contractor's accounts, records, and other documents relating to the submission of bids and contract performance and to have them audited by auditors appointed by ADB. The Contractor shall maintain all documents and records related to the Contract for a period of 3 years after completion of the Works. The Contractor shall provide any documents necessary for the investigation of allegations of corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations and require its employees or agents with knowledge of the Contract to respond to questions from ADB.

17. Program

17.1 Within 7 days after the date of the Letter of Acceptance, the Contractor shall submit to the Project Manager for his no-objection and reference a Program showing the general methods, arrangements, order, and timing for all the activities in the Works. The activities in the Program shall be consistent with those in the Activity Schedule.

17.2 The Program shall indicate commencement of the Works on the Start Date and proceed without delay to comply with the Completion Date in the Contract.

18. Defects Liability Period

18.1 The works undertaken should be covered by contractor's warranty under the Defects Liability Period of 12 months from the date of completion. The Project Manager may instruct the Contractor to search for a Defect and to uncover and test any work that the Project Manager considers may have a Defect.

19. Correction of Defects

19.1 The Project Manager shall give notice to the Contractor of any defects before the end of the Defects Liability Period.

19.2 Every time notice of a Defect is given; the Contractor shall correct the notified Defect within 5 days from the Project Manager's notice

20. Uncorrected Defects

20.1 If the Contractor has not corrected a Defect within the time specified in the Project Manager's notice, the Project Manager shall assess the cost of having the Defect corrected, and the Contractor shall pay this amount. If Contractor is unable to correct the defect or pay the required amount imposed, the Contractor shall be disqualified from undertaking contracts for the Employer for a period of five years.

21. Contract Price

21.1 The Activity Schedule shall contain the priced activities for the Works to be performed by the Contractor. The Activity Schedule is used to monitor and control the performance of activities on which basis the Contractor will be paid.

22. Retention

22.1 The retention from each payment shall be **10%** of certified work done, as per the Interim Certificate. The maximum amount of retention shall be **5%** of Initial Contract Price.

23. Release of Retention

23.1 Upon the issue of a Certificate of Completion of the Works by the Project Manager, in accordance with 33.1 [Completion], half the total amount retained shall be repaid to the Contractor and half when the Defects Liability Period has passed and the Project Manager has certified that all Defects notified by the Project Manager to the Contractor before the end of this period have been corrected. The Contractor may substitute retention money with an "on demand" bank guarantee.

24. Advance Payment

24.1 An advance payment of 15% of the Contract Price (excluding Provisional Sum and Contingencies) will be paid upon an unconditional bank guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to the advance payment. The guarantee shall remain effective until the advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest shall not be charged on the advance payment.

24.2 The advance payment shall be repaid through deductions of 25% from each interim payment starting with the payment certificate where the value of work certified has exceeded 30% of the Contract Price, provided that the advance payment shall be completely repaid prior to the time when 90% of the Contract Price is certified for payment.

24.3 The Advance payment guarantee shall be in the form as specified in Attachment 4.

25. Performance Security

25.1 The Contractor shall provide a Performance Security for the due performance of the Contract, within 7 days of receipt of this returned **Form of Quotation**, in the amount equivalent to 10% of the Contract Price.
The forms of acceptable Performance Security are: A bank guarantee issued by a reputable bank located in the Contractor's country, acceptable to the employer.

25.2 The Performance Security shall be in the form as specified in Attachment 5.

26 Taxes and Duties

26.1 The Contractor is responsible for all taxes, duties, levies, etc. in accordance with the laws of the Government of Democratic Socialist Republic of Sri Lanka.

27 Payment Certificates

27.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously.

27.2 The value of work executed shall be determined by the Project Manager and certify the amount to be paid to the Contractor.

27.3 The value of work executed shall comprise the value of completed activities in the Activity Schedule.

27.4 The Project Manager may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

28 Payments

28.1 Payments shall be adjusted for deductions for advance payments, if any. The Employer shall pay the Contractor the amounts certified by the Project Manager within 14 days of the date of each certificate.

29 Variations

29.1 The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the quotation, which shall be given within seven (7) days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.

29.2 Variations shall be valued as follows**,**
(a) At a lump sum price agreed between the Engineer and the Contractor.
(b) If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25%, provided the change exceeds 1% of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change.

29.3 In the absence of appropriate rates, the rates in the Contract shall be used as the basis for valuation, or failing which at appropriate new rates, as may be agreed or which the Engineer considers appropriate.

29.4 If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

30 Cost of Repairs

30.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Liability Period shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

31 Notice and Consequences of Force Majeure

31.1 If a Party is or will be prevented from performing its obligations under the Contract by Force majeure, it shall give notice to the other Party of the circumstances of Force Majeure within 10 days after the Party becomes aware of them.

31.2 The Party shall, having given notice, be excused from performance of obligations for so long as Force Majeure persists. However, each Party shall at all times use all reasonable endeavors to minimize any delay in the performance of the Contract as a result of Force Majeure.

31.3 A Party shall give notice to the other Party when it ceases to be affected by the Force Majeure.

31.4 If contractor is prevented from performing its obligations due to Force Majeure of which notice has been given, and suffers delay due to such Force Majeure, the contractor shall be entitled to (a) an extension of time if completion will be delayed, and (b) payment of costs, including rectification or replacement of works or goods damaged, when such costs arises from the defined events or circumstances of Force Majeure to the extent they are not indemnified through the insurance policy.

32 Release from Performance

32.1 Notwithstanding any other provision of this Clause, if any event or circumstance outside the control of the Parties (including, but not limited to, Force Majeure) arises, which makes it impossible or unlawful for either or both Parties to fulfill its or their contractual obligations or which, under the law governing the Contract, entitles the Parties to be released from further performance of the Contract, then upon notice by either Party to the other Party of such event or circumstance.

32.1.1 the Parties shall be discharged from further performance, without prejudice to the rights of either Party in respect of any previous breach of the Contract; and

32.1.2 the sum payable by the Employer to the Contractor shall be the same as would have been payable under Clause 37 [Payment Upon Termination].

33 **Completion**

33.1 The Contractor shall request the Project Manager to issue a certificate of Completion of the Works, and the Project Manager shall do so upon deciding that the work is completed.

34 **Taking Over**

34.1 The Employer shall take over the Site and the Works within 7 days of the Project Manager's issuing a certificate of Completion.

35 Final Account

35.1 The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 28 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 28 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide on the amount payable to the Contractor and issue a payment certificate.

36 Termination

36.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

36.2 Fundamental breaches of Contract shall include, but shall not be limited to, the following:

36.2.1 the Contractor stops work for 28 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Project Manager;

36.2.2 the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 28 days;

36.2.3 the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;

36.2.4 a payment certified by the Project Manager is not paid by the Employer to the Contractor within 56 days of the date of the Project Manager's certificate;

36.2.5 the Project Manager gives Notice that failure to correct a particular defect prior to completion is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager;

36.2.6 the Project Manager gives two consecutive Notices to update the Program and accelerate the works, and the Contractor fails to update the Program and demonstrate acceleration of the works within a reasonable period of time determined by the Project Manager;

36.2.7 the Contractor does not maintain a Performance Security, which is required;

36.2.8 the Contractor has delayed the completion of the Works by more than 56 days; and

36.2.9 if the Contractor, in the judgment of the Employer has engaged in integrity violations in accordance with Clause 5 [Fraud and Corruption], in competing for or in executing the Contract.

37 Payment upon Termination

37.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the work done and Materials ordered less advance payments received up to the date of the issue of the certificate and less the percentage to apply to the value of the work not completed**.** If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.

37.2 If the Contract is terminated for the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Project Manager shall issue a certificate for the value of the work done, materials ordered, the reasonable cost of removal of equipment, and the Contractor's costs of protecting and securing the Works, and less advance payments received up to the date of the certificate.

38 Resolution of Disputes

38.1 The Employer and the Contractor shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute between them under or in connection with the Contract. In the case of a dispute between the unresolved dispute between the Employer and the Contractor, the dispute shall be settled in accordance with the provisions of the **Arbitration Act No.11 of 1995** in Sri Lanka.

39 Suspension of ADB Loan or Credit

39.1 In the event that ADB suspends the Loan or Credit to the Employer, from which part of the payments to the Contractor are being made,

39.1.1 the Employer is obligated to notify the Contractor, with copy to the Project Manager, of such suspension within 7 days of having received ADB's suspension notice.

39.1.2 if the Contractor has not received sums due it within the 28 days for payment provided for in Clause 26 [Payments], the Contractor may immediately issue a 14-day termination notice.

ATTACHMENT 1 - SPECIFICATIONS

Refer the following publications for specifications unless or otherwise specified in the given activity schedule.

1. **Specifications for Building Works (Vol. I) – [3rd Edition (Revised) – July 2004]**
2. **SPECIFICATIONS FOR BUILDING WORKS (VOL. II) – [2ND EDITION (REVISED) – OCTOBER 2001] [2ND EDITION – JUNE 2009]**
3. **Particular Specifications (Attached herewith)**

ATTACHMENT 1-3 - PARTICULAR SPECIFICATIONS

3.0 ALUMINIUM WINDOWS, DOORS AND PARTITIONS

3.1.1 General

The Aluminium windows, doors and partitions will be designed, fabricated, supplied and installed by the Contractor, and the work shall be carried out under the direction of the Engineer.

3.1.2 Design

The Contractor shall be responsible for doors and partitions based on the outline drawings and details prepared by the Engineer, and shall submit, sufficiently in advance design for the entire aluminium windows, doors clearly indicating all major dimensions and illustrating key sections etc., for the approval of the Engineer.
In addition, the Contractor will be required to prepare shop drawings when instructed by the Engineer during the course of the works.
The shop drawings, samples etc., shall be submitted to the Engineer for approval before the Contractor is allowed to proceed with the fabrication. However, the approval of the drawings by the Engineer shall not absolve the Contractor from all responsibilities and liabilities as to the performance and the efficacy of the aluminium works.
The following specification contains comprehensive technical requirements for the Contract works, and the Contractor in submitting the tender for the works will be deemed to have included against the entire contents of these specifications as a minimum requirement.
Any additional requirements in respect of the Contractor's design as aforesaid which may subsequently be found or deemed necessary the Engineer will be deemed to be included in the Contract Sum.
The Contractor shall be responsible for the design of all components of the windows and doors installation, including (but not be way of limitation) frame sections and sizes, catches, locks, rating gear, weather stripping and gaskets, to meet all performance requirements, and shall be subject to the approval of the Engineer.

3.1.3 Doors and Windows

Aluminium windows and doors shall be constructed from framing which complies with the Specification and the drawings, including sub-frames for glass panels if required.

The Contractor will be entirely responsible for ensuring that the windows and doors installation is entirely watertight to the structure and the contract sum will be deemed to include all bedding and fixing materials including all necessary flashing, weather stripping, insulation etc.

All windows, doors, etc., shall be designed in accordance with British Standard 4315 and air infiltration shall not exceed 12 m^3/h per meter length of opening joint at test pressures of 300 N/m^2, 20mm Hg.

3.1.3.1 Glass

The contractor shall submit samples of all glass to the engineer in time to obtain approval before ordering the glass.

Glass shall be either tinted float glass, clear float glass, wired glass or translucent glass used on these drawings shall have minimum thickness of 5mm and glass shall conform to the relevant British Standard including following;

BS 952 of 1964 – The classification of glass for glazing and terminology for work.
BS 952 Part 1 of 1978.

Tinted float glass shall meet the following conditions
Light transmission 50%
Solar radian heat transmission 60%

Wired glass shall satisfy following specification

Wired glass shall be clear polished square pattern wired glass "Georgian wired" having minimum thickness of 6mm, the wire shall be extending to the edges of the glass and free from dust.

3.1.4 Pivoted Ventilators

Pivoted ventilators shall be provided as required and shall be of the type operated individually.

The ventilators shall close on independent mullions as part of the window frame.

Sashes shall not be removable from outside when locked.

Pivot pins or pivot cups shall be made of stainless steel or anodized aluminium.

3.1.5 Materials

The Aluminium sections for mullions, frames transoms, heads and sills all other aluminium metalwork shall comply with the following British Standards.

BS 1161: 1972 Specification for aluminium alloy sections for structural purposes.

BS 1470: 1972 Wrought Aluminium and aluminium alloys - plate, sheet and strips.

BS 1474: 1987 - Ditto - bars, extruded round tube and sections. On wrought aluminium for external architectural applications.

3.1.6 Colour Matching

The completed work shall present a substantially uniform appearance in regard to colour and texture and shall be a satisfactory match with identical samples or colour patches held by the Engineer.

3.1.7 Rejection

Any materials finish or workmanship which is found not to comply with this Specification will be rejected by the Engineer and any such rejected items will be removed immediately and replaced to the entire satisfaction of the Engineer entirely at the Contractor's expense.

3.1.8 Delivery and Packing

The Contractor shall ensure that all components are suitably packed to ensure protection against handling or other damage during delivery to the site. All aluminium components shall be covered by special protective coatings comprising `Fablon' `Sellotape 214' or other equal suitable material fixed with non-damaging and non-reactive adhesive. The Contractor shall state in his tender the type of protection proposed, complete with samples and reference to previous uses.

3.1.9 Assembly

As far as possible, all aluminium shall be formed, fabricated, cut, drilled, tapped, fitted or otherwise in the Contractor's workshops. Where it is not practicable to deliver fully assembled components, the windows and doors shall be delivered ready for assembly to the extent practical for field erection and in a secure and workman like manner to meet the requirements of his specification and to ensure a neat weather tight construction.

The design of windows should permit free movement of air from exterior environment to the immediate spaces between the window frame and ventilator to achieve pressure equalisation. The windows should have snap on reusable extruded aluminium glazing beads and easily removable bottom rails.
The glazing beads should not extend underneath the glass. The design of windows should permit reglazing without disassembly all ventilator extrusions from the frame.

All openable window sash corners should be metered angle reinforced or mechanically staked and Epoxy painted. If framed with incompatible extrusions are used, then these extrusions should be mortised and tenoned. A permanent water tight joint should be made to the junctions of the side frame members with all horizontal members. Window panels must be provided with minimum three weep holes, one at the centre and one each between the jamb and the setting block. Fixing of aluminium units to concrete shall be done with high quality Roll Plugs with stainless steel sections and other approved fixing devices. Weather friction stays are used the shop drawings shall clearly indicate the size of such stays. The joint between window frames, external door frames and concrete of masonry work shall be adequately caulked with a suitable caulking compound. Polysulphide or Silicon sealants may be used for this purpose. The Contractor shall furnish all literature and instructions published by the manufacture of the sealant along when requesting for approval of sealant. Only caulking compound approved by the Engineer in writing shall be used.

Transport and store structural members and small components etc. in a manner that will prevent mechanical damage, damp conditions or contact with other metals or incompatible materials (e.g., Cement, damp timber)

Anodized and other decorative or protective finishes shall be protected by suitably removable coatings or coverings.

Do not use any marking material that could contaminate welds. Make allowance for temperature variations when marking out.

Cut by machining, sheering or arc-cutting. Ensure cutting tools are not contaminated by other metals, particularly copper or its alloys. Remove all burrs.

Requirements or holing are:
(a) Punch holes in sheet
(b) Drill or ream holes other than in sheets
(c) Ream holes for close fitting bolts to exact size
(d) Align matching holes so that fixings can pass through at right angles to faces of contact
(e) Remove burrs from holes before assembly except those parts clamped and drilled together need not be separated for this purpose.

3.1.10 Deflection and Loading

All frames shall be designed to withstand wind loading in accordance with the requirements of British Standard Institute Code of Practice for the design of Buildings. Chapter V Loading Part 2, wind loads B.S.C. P3: Chapter V: Part 2 1972. Wind load requirements for the design and testing shall be a basic wind speed of 35 m/s.

Members shall be designed so that deflection arising from wind and static loads shall not adversely affect the strength or appearance of the member or affect the adjacent finishing materials.

3.1.11 Corner Joints

All operable windows sash corners, shall be metered, angle reinforced, mechanically staked and epoxy bonded. Frames with compatible extrusions, shall be metered, angle reinforced,

mechanically stacked and epoxy bonded. Frames with incompatible extrusions shall be mortised and tenoned.

A permanent water tight shall be made to the junction of the side frame members with all horizontal members.

Joints shall be made by welding or by concealed mechanical connectors. No corner fastening devices such as pins, screws, bolts or pressure indentation shall be visible on vertical exposed faces of sash, members, when the windows are in place. Water tight joints shall be made at the junction of the sill and side frame members.

Windows design shall be such that water will not be trapped on the window sill on the exterior or interior of any frame, except where special provision is made for the removal of condensate.

3.1.12 Strength of Joints

All joints in aluminium components shall be designed and proportioned in such a way that these adequately transmit the stresses set up in adjacent components under the expected operating conditions. If necessary, joints shall be suitably sleeved or reinforced so that this requirement shall be met.

3.1.13 Welding

Visible welds in aluminium components shall be dressed and treated so that these conform in appearance to the surface finish applied to the component.

In all cases, welds shall be mechanically sound, providing adequate penetration, and the weld bead shall be uniform and well formed. The dimensions and strength of the weld shall be such as to provide adequate strength to the component concerned to enable fulfilment of normal service function.

Welding shall not be applied to visible surfaces to which a surface finish such as anodizing has previously been applied, nor shall any weld be applied which may affect the appearance of a surface finish.

3.1.14 Weather seals, Weatherproofing, Thermal Break and Soundproofing

The weather stripping shall be vinyl or other plastic materials which are dimensionally stable and are resistant to Ultra Violet rays, water absorption and are suitable to be used in marine atmosphere.

All screws, nuts, washers, bolts, rivets and other fastening devices should be of stainless steel. Aluminium alloy fasteners may be used in lieu of stainless-steel fasteners with the written approval of the Engineer. The rate shall include for stainless steel screws roll plugs, neoprene gasket, aluminium and rubber beadings bar hinges fabrications and installation etc.

3.1.15 Fixings

Frames shall be fixed in structural openings using appropriate fixing lugs, properly bolted to the structure and to the frames, as required.

3.1.16 Fixing Procedure

The Contractor will be responsible for checking on site all dimensional properties relating to the structural openings.
The Contractor shall only proceed with the fabrication of the aluminium sections when he is completely satisfied that the structural openings are within the permissible tolerances acceptable for the installation of the aluminium framing.

3.1.17 Tolerances

The tolerance for windows on overall dimensions shall not be greater than +1.5mm.

The tolerances for the location of centre lines of mullions and transoms etc. shall be +1.5mm except where transoms or mullion from part of a continuous strip where the tolerance shall not be greater than +0.4mm.

3.1.18 Expansion and Contraction

The design of the windows shall be such that expansion and contraction take place freely in the plane or the member or frame, and under no circumstances shall provision for expansion be allowed by making use of slotted fixing holes in brackets to allow sliding movement between the brackets and the building structure.

Provision shall be made for horizontal and vertical expansion joints to be made independent of one from the other unless specially noted to the contrary. Provision is also to be made to prevent water penetration and air infiltration at such joints.

3.1.19 Dissimilar Materials

Where aluminium surfaces may come in contact with other metals, water absorbent or porous materials, or incompatible materials, such surfaces shall be kept from direct contact with these materials.

3.1.20 Ironmongery

All ironmongery shall satisfactorily perform the functions for which intended and shall be securely attached to windows, panels and/or units. Such components should be of aluminium, die-cast alloy or other non-corrosive materials compatible with aluminium. Plated or coated materials not compatible with aluminium and which could cause electrolytic action are not acceptable. The finish shall be either anodizing or based on bronze finish.

Provision shall be made for hinges, locks, catches, handles, latches, opening devices, stays, pulls, lifts, required for efficient use and operation. All hinges shall be aluminium or stainless steel.

There shall be no aluminium to aluminium contact between ironmongery or unit members which are required to move relative to one another and at the same time remain in contract.

3.1.21 Keys & Locks

(i) *Hardware*

(1) Keying System - before locks are delivered to job site, submit complete laying system for approval by the Engineer.

(2) All locks - 03 keys for each lock. Keys of any on set shall not operate locks of any other set.

(3) Locks - Locks shall be Mortice Lock Sets manufactured by 'Yale' or West European to be approved by the Engineer.

3.1.22 Cleanliness

The Contractor shall ensure that marks or other blemishes, for which he is responsible, are removed from the installed units as the work proceeds, so that stains do not set.

3.1.23 Powder Coating

The colour powder coated products shall comply with the following standards. However, the minimum Powder Coating thickness shall be 60 - 80 microns.

BS 6496 of 1984
BS 3900
ASTM B 1117

The colour of powder coated products should be RAL and BS shades.

The Contractor shall be required to submit a certificate from the manufacturer or supplier of the aluminium sections that the powder coating finish complies with the requirements of the above standards.
The Contractor will be required to submit a ten-year guarantee for the powder coating finish.

The Contractor will be required to submit, samples of the proposed powder coating finish, in a range of colours to the Engineer for selection and approval, before the commencement of the works. All subsequent work shall be equal to the approved samples.

For temporary protection during construction, a coating of clear, high gloss, non-yellowing, methacrylate lacquer may be applied over the powder coating to a thickness of 0.5 mil, but not over 0.7 mil.

3.1.24 Protection

The Contractor shall ensure that aluminium and glazing work is protected at all times from damage or from handling marks.

If disfiguring damage is apparent on aluminium surfaces, or parts thereof, it shall be the responsibility of the Contractor to make good or replace such damage to the satisfaction of the Engineer.
Aluminium windows shall not be used as means of access or for supporting staging's, trestles or other load bearing equipment.

On completion the protective film shall be removed from the aluminium members and the whole cleaned to the satisfaction of the Engineer.

3.1.25 Guarantees

The Contractor shall rectify any faults in aluminium and glazing work which may arise during the defects liability period and shall make good any such defects at his own expense.

Colours shall be guaranteed to last for a minimum period of ten (10) years.

Notwithstanding maintenance requirements of the work the Contractor shall further be required to provide a written guarantee against the workmanship, materials, installation, operation for a period of five (5) years from the date of completion of the Contract. This guarantee shall also include for a guarantee against water penetration between the window and the structure.

All guarantees shall be lodged with the Engineer before commencement of the work.

3.1.26 Sample for Testing

The Contractor shall, provide and arrange for the supply and delivery of a sample of a typical window unit, full height, but half width, to an independent testing authority for testing. The unit shall be in all respects similar to windows to be installed on the works, and the sample shall be installed in a structure provided by others in exact, the manner that windows will be installed in

the works. The Contractor shall allow for all necessary adjustments during the course of the testing.
Such further testing as required in this specification shall be carried out, if required by the Engineer by an approved recognized testing authority, in the presence of the testing officer, and the Engineer or in the presence of their authorized representatives and any work subsequently carried out under this Contract shall be in accordance with the samples so tested, and approved by the Engineer.

If the Contractor has had similar components to those mentioned in this specification, tested and passed by a competent authority as mentioned above, he may re-submit the results of such previous testing of manufacturing a sample for testing purposes. The Engineer reserves the right to reject or approve such previous testing and shall, if he deems necessary, order for an additional test.

Samples units submitted for testing shall be accompanied by properly identified drawings relating directly to the sample.

3.1.27 Control Sample

Sample window and door units, as required shall be lodged with the Engineer as control standards, before 7 weeks of commencement of work, on aluminium doors, windows and partitions.

3.1.28 Testing

The following tests may be required at the discretion of the Engineer.

(a) Coating Thickness

The coating thickness shall be measured using an eddy current instrument as specified in BS 3978: 1966, or ASTM B244 of the Aluminium Association of America's Method for 'Measuring, Thickness of Coating of Aluminium.

(b) Coating Weight
As ASTM B 157.

(c) Staining

The Aluminium Association of America's 'Stain Test for Anodic Coatings of Aluminium'.

(d) Hardness

Hardness tests shall comply to testing with an `Eagle Turquoise' pencil, grade 2H, pushing forward about 6mm at an angle of 45 using pressure, without breaking the lead; if the hardness of the film is satisfactory, the film will not rupture.

(e) Resistance to sulphur dioxide

The film shall comply to BS 1615:1961: the finish shall show no blistering, softening or lack of adhesion and there shall be no corrosion creep under the coating.

(f) Accelerated Exposure

The surface finish shall comply to BS 3900: 1966 Part F, under the effects of the Erickson apparatus exposed for 2000 hours in a weather meter.

The allowable defects shall be very slight chalking and change of colour, together with the

normal water and carbon are dust staining.

(g) Air Infiltration
As BS 4315.

(h) Leakage Tests

The window installation including all glazing shall be capable of withstanding conditions of test pressures 300 N/mm^2, 30mm Hg.

Under these conditions when the outside surface of the window is completely covered with a film of water, there shall be no leakage of water whatsoever from the outside to the inside of the window; and the installation as a whole shall be completely waterproof.

The Contractor shall provide details on how to provide such tests as to prove that the fixed and pivoted windows are watertight.

3.1.29 Air and Water Infiltration

The Contractor shall submit test certificates from the manufacturer of aluminium extrusions guaranteeing that the products comply with standards applicable to the country of origin of these materials.

Fabrication and installation of aluminium units shall be thoroughly water tight.

The degree of resistance to air leakage shall be Grade A (Superior resistance) recommended for air-conditioned buildings.

The thickness of the extrusions shall not be less than 1.10mm

All accessories shall be non-magnetic materials that screws, hinges, push plates, locks, door closers etc.

Thickness of ply board shall not be less than 6mm including PVC laminations on both sides.

Rate shall include for chipping off the existing reveals and repair the reveals with 1:1:5 lime cement sand mix complete to suit for fixing of aluminium doors.

3.1.30 Wind Loading

The fabricated aluminium doors and windows shall be capable of withstanding a wind pressure load not less than 1500 Pascal (75 M.P.H.).

3.1.31 Shop Drawings

Shop drawings must be approved by the Engineer before any of the required units are manufactured or assembled; in programming the works, the Contractor shall allow adequate time for the Engineer to inspect and approve these drawings.

The type and positioning of all fixing devices shall be shown, the work to be done by the other trades shall be indicated, and the size, type and thickness of glass and all infill panels, doors, hatches etc. shall be shown.

3.2 SPECIFICATION FOR CERAMIC FLOOR TILES

3.2.1 General

All floor tiles shall be locally produced ceramic tiles and shall agree in colour, dimensions, tolerances, finishes, and quality with samples provided by the Engineer. All tiles to be true to shape, uniform in size and colour and free from blemishes.

The recommendations of C.P. 202 and BS 5385: Part 3, shall be complied with, subject to any qualifications hereunder.

3.2.2 Preparation

The sub-floors to be cleaned of cement film, mortar spills, paint and other impurities, oil spots to be chiselled. The sub-floor to be well wetted with water.

Everything necessary shall be done to obtain a satisfactory bond between concrete, screeds, beddings and finishes.

The cleaned sub-floor shall be grouted with a 1:1 cement/water mixture by broom application, prior to placing the mortar bed.

3.3 Setting–out

Correct floor levels shall be established and finished levels of tiling controlled by a series of spot levels.

Movement joints in sub floors and screeds shall be carried up into tiling.

Generally, the tiles shall be divided symmetrically over the areas, so that pieces smaller than half a tile will not occur; the layout of the tilling and width of joints to be determined with the Engineer.

The tiling to be laid to falls, towards floor gullies as shown on the drawings, and /or in co-ordination with the Engineer.

At joints to walls, skirtings, pits, passages etc., the tiles to be cut, sawn or ground to size.

3.4 Bedding of tiles

Care shall be taken that tiles are well soaked in clean water and are free of dust before laying.

A mortar bed of 1 part cement to 3 parts sand, of thickness as specified in the Bill of Quantity to be spread by means of a float in beds of a width of approx. 700 and allowed to stiffen. Acid proof mortar for acid-proof tiles is to be applied in accordance with the manufacturer’s instructions.

The back of the tiles shall be buttered with a coat of cement slurry and the tiles laid with straight joints 3mm wide, on the mortar bed.

Grouting shall take place at any time after tiles are firmly fixed but before any dirt or contamination can enter the joints.

Dampen the joints and grout with cement: fine sand (1:1). Do not use more water than necessary to avoid subsequent joint shrinkage Work the grout well into the joints until flush, and remove surplus grout. At the discretion of the Engineer, tinted grout shall be used. Grouting for acid-proof tiles are to be applied in accordance with manufacturer’s instructions.

If a depression or bump in surface level in excess of 6mm in any 2 metre length is found, then the floor shall be taken up and re-laid, at the Contractor's expense, to the satisfaction of the Engineer.

The installed tile work shall give a full sound when tested with hammer.

3.5 Protection

Finished tiled floors are to be completely covered with sheets of hardboard; the walls and skirting to be washed with soap and water, the floor to be similarly treated after removal of temporary floor coverings.

3.6 SPECIFICATION FOR TIMBER WORKS

3.6.1 General

All timber work shall be done with Class I timber listed below unless otherwise specified in the relevant BoQ item. Approval for timber to be used shall be taken before purchasing. Timber species for specific works shall be highly suitable category as given in the CIDA building specification.

Class 1 Timber:
Dambu, Etatimbiri, Del or Bedi Del, Helamba, Hedawaka, Ketakela, Kirihambiliya, Kon, Liyan, Madan, Mee, Munamal, Naa, Neralu, Pihimbiya, Tawwanna, Ubberiya, Urukanu or Uruhonda, Wanamee, Wewarana
Balaw, Kandis, Thulan

3.7 SPECIFICATION FOR ELECTRICAL SYSTEM

13.1 GENERAL

3.7.1 INTRODUCTION

The works described by this specification covers the supply, installation, testing, commissioning of Electrical services installation of the building in accordance with this specification and associated drawings, and without abrogating the more extensive details described elsewhere in the specifications and drawings including the followings.

3.7.2 SCOPE OF WORK

The scope of work for the electrical installations covered by this specification is described as follows:

- Supply and installation of Earthing and Lightning protection system including equipotential bonding and other accessories.
- Coordinating of the Power Receiving system with the power authority (CEB).
- Supply and installation of Low Voltage Power Distribution System. (Low voltage (LV) Main Distribution Board (MDB) with Automatic Transfer Switch (ATS), Sub Distribution Boards (SDBs), Final Distribution Boards (DBA).

- Supply and installation of cable management system including cable trays, cable ladders, cable, trunking etc, cable ties, cable markers and other accessories.
- Supply and wiring of final circuits for lighting, general power outlets, equipment power supply, etc.
- Supply and installation of lighting fixtures of appropriate type as per the drawings & Small power system.
- Testing commissioning and proper hands-on training of all the above systems.

3.7.3 APPLICABLE PUBLICATIONS AND STANDARDS

Standards and Publications of the following organizations form part of this Specification to the extent indicated by the references thereto unless superseded by Detailed Technical Specifications.

1	BS 7671	- The IEEE Wiring Regulations for electrical Installation works (17a Edition:2008July)
2	BS CP 1003 3.	- Earthing
3	BS 6004, 1984 BS 5467	- Cables
4	BS 7846	- Cable Trays, Cable Trunking
5	BS 4678 Part 1 & 2	- FR Cables
6	BS 4568 Part 1 & 2	- Steel Conduits
7	IEC 60439-1	- Switch Boards
8	BS 5486 Part 12 & 13	- Distribution Boards
9	IEC 60947-1 to 7	- Circuit Breakers
10	BS 1363	- Switch Socket outlets
11	BS 3676	- Lighting Switches
12	IEC 1008	- Residual Current Circuit Breaker
13	BS 5839	- Fire Detection & Alarm System
14	BS62305 BS6651	- Lightning Protection System

3.7.4 CLIMATIC CONDITIONS

All electrical equipment, accessories and fittings to be used in electrical installations shall appropriate for climatic conditions of Sri Lanka having the following features:

Maximum ambient temperature: 35°C
Average ambient temperature: 30°C
Maximum relative humidity: 85%

All electrical equipment and cables shall be rated for continuous operation at an ambient temperature of 30°C. In plant and machine rooms an ambient temperature of 35°C shall be assumed. Directly buried cables shall be rated for ground temperature of 20°C and soil thermal

resistivity of 2° C m/w.

Unless otherwise mentioned, due allowance has been made in the design of the electrical installations described in the specifications and drawings for the prevailing climatic conditions and all equipment, cables, switches, etc., specified shall be satisfactorily selected accordingly.

3.7.5 SERVICE CONDITIONS

All electrical equipment, apparatus, accessories and fittings shall be so designed and manufactured to operate continuously in the electricity supply system having following characteristics:

Voltage:	400 volts ±5%, 3 Phase, 4 wire
Frequency:	50 Hz ± 1 %
Neutral:	Solidly earthed

3.7.6 DRAWINGS

The electrical drawings issued with the specification, indicate general arrangements of electrical equipment cable trays and cable routes, location of panels, cable schedules, wiring/schematic diagrams. Drawings will also indicate any other relevant details relating to this particular project the information given on the drawings is indicative and as accurate as surveys and planning can determine. Field conditions should be checked and electrical work shall be properly carried out, for maximum efficiency and to avoid any conflict with structures/civil and any other work. Each item shall be verified for proper action before final connections are made.

3.7.7 SUBMISSION FOR APPROVAL

The Contractor shall submit to the Engineer the required documents to establish compliance with the specification. Submittal shall include at least the following documents

- Equipment shop drawings.
- Equipment data.
- Test-reports.
- Test Certificate.
- Operation and maintenance manual.

3.7.8 EQUIPMENT SHOP DRAWINGS

The Contractor shall submit three [3] copies of A3 size shop drawings. The Contractor shall check catalogues and shop drawings for accuracy and contract requirements prior to submittal. Shop drawings shall be stamped with the date checked and a statement indicating that the shop drawings conform to the Specifications and Design drawings. This statement shall also list all exceptions to the Specifications and Design drawings.

All dimensions shall be field verified at the site and coordinated with the work of all other trades.

The Shop Drawings shall show the position, dimensions, schematic, arrangement and fixing of all electrical equipment.

Equipment shall not be ordered or shipped until the shop drawings have been approved by the Engineer. No material shall be ordered or installation work started if shop drawings are marked as "APPROVED AS NOTED - CONFIRM", "APPROVED AS NOTED - RESUBMIT"

3.7.9 WORKING DRAWINGS

In addition to manufacturer's equipment shop drawings, the Contractor shall submit three (3) sets of the following installation working drawings. The Contractor shall prepare the electrical installation drawings to a scale agreed on with the Engineer and shall issue them in accordance with the requirements of the Contract having due regard to the time required for approval procedures.

The system installation drawings shall show the position, dimensions, scheme arrangements and fixing of all electrical equipment. The drawings shall comprise, but shall not limit to the following:

1. Dimensioned drawing of raceway systems showing layout of raceways and fittings, any space relationships to associated equipment and adjoining raceways, if any.
2. Dimensioned drawings of cable routing showing accurately layouts of cables installations and their spatial relationship to associated equipment and details of installation.
3. Dimensioned drawings showing accurately scaled layouts of the location of the equipment and their spatial relationship to associated equipment.
4. Dimensioned drawings showing layout of the exact routing of all main earth/earth loops, {details of connectors, earth/ground pits and spatial relationship to associated equipment.
5. Dimensioned drawing of lighting system showing reflected ceiling and lighting layout.
6. Wiring diagram schematic including all cables, cables sizes, switches etc.

3.7.10 CO-ORDINATION

The LV installation work must be coordinated with the building work and work of other services. The drawings and specifications shall be carefully examined and information regarding building materials and equipment supplied by others obtained. from the respective source to determine the extent, type and location of all wiring required. All holes and openings in slab and walls which may be required for the passage of electrical conduits, trunkings and cables must be determined and information regarding them passed on to building contractors so that they may be provided for at the time of pouring of concrete or construction of walls, breaking of concrete, cutting and patching of the structure shall be limited to a minimum and carried out only after securing the consent of the supervising Engineer. All cables and conduits passing holes must be made good by fire resistant incombustible material. Further protection of cables and conduits shall be given as instructed by the Engineer.

3.7.11 INSTALLATION

Any work not installed according to the Drawings and this Section shall be subject to change as directed by the Engineer. No extra compensation will be allowed for making these changes.

Electrical equipment shall be protected at all times against mechanical damage or damage by water. Electrical equipment shall not be stored outdoors. Electrical equipment shall be stored in dry permanent shelters. Electrical equipment shall not be installed in its permanent location until structures/civil work is completed. If any apparatus has been subject to possible damage by water, it shall be thoroughly checked and tested as directed by the Engineer, or shall be replaced at no additional cost at the Engineer's discretion.

Equipment that has been damaged shall be replaced or repaired by the equipment manufacturer, at the Engineer's discretion.

3.7.12 TESTING & COMMISSIONING

The Contractor shall be responsible for satisfying himself as to the correctness of the electrical System connections to all work supplied and installed by him under the Contract before such work is put into operation.

After the connection of power supply to the installations, the Contractor shall commission all sections of the electrical installations and demonstrate to the Engineer or his Representative that the entire electrical installations are in perfect working order. Where equipment of a specialized nature is involved, the Contractor shall, if necessary or requested by the Engineer seek and obtain at his own cost the services of specialist and/or commissioning engineers from the suppliers/manufacturers. A test certificate should be provided by a chartered Electrical Engineer for the entire electrical installation.

3.7.13 AS BUILT DRAWINGS

All drawings prepared or amended by the Contractor to show the works as constructed shall be known as “As Built" Drawings. All such drawings shall be prepared using SI Units and shall have the size of the Contract Drawings. Not more than 4 weeks after the date of the completion of the inspections or such other period of time as may be agreed with the Engineer, the Contractor will submit for the Engineer's approval two paper prints of each of the drawings. After checking the prints of "As Built" Drawings submitted by the Contractor the Engineer will return to the Contractor one copy marked to show his signed approval or comments.

The “As Built" Drawings shall accurately show the installed conditions of,

1. All equipment, conduits, trunkings, lighting fixture, receptacle and switch outlet locations etc.
2. Circuit lists for each distribution board and such lists shall agree with lists fixed within distribution board doors.

3. Positions and nature of all earth electrodes installed and the route of the connecting copper conductors.
4. Complete electrical circuit details including lighting and power points suitably referenced to indicate type of fittings, manufacture's name, catalogue number, lamp size and type.
5. Schematic diagrams, single line diagram, control wiring diagram and lighting fixture Schedule distribution board schedules, cable schedules, switchgear.
6. Legends which shall detail the symbols used.

3.7.16 GUARANTEES

Contractor shall provide guarantees for one (1) year or for more period as specified elsewhere in the specification or BOQ, for the electrical work furnished under this Contract. However, such guarantees shall be besides and not in lieu of all other liabilities which manufacturers and the Contractor may have by law or by other provisions of the Contract.

All materials, items of equipment and workmanship furnished under this Contract shall carry standard warranty against all defects in materials and workmanship. Any fault due to defective or improper material, equipment, workmanship or Contractor's design that may develop shall be made good, forthwith, by and at the expense of the Contactor, including all other damage done to areas, materials and other systems resulting from this failure.

Guarantee that all elements of the systems are of sufficient capacity to meet the specified performance requirements as set forth herein or as indicated.

3.8 INSTALLATIONS

3.8.1 EARTHING SYSTEM

This section specifies the detailed requirements of the supply, delivery, installation, testing, commissioning and maintenance during the defects liability period of the earthing system.

3.8.2 SYSTEM DESCRIPTION

The earthing system shall be proposed for the electrical distribution. Earth bar of the Main Switch Board, Bodies of the Generators will be taken to an earth panel and panel will be earthed solidly. Testing point shall be provided inside the earth panel. Neutral point of the generators and the transformer will be separately earthed.

All metal works associated with the electrical installation, but not forming part of a live conductor, including exposed conductive parts, shall be solidly and effectively bonded and earthed in accordance with the latest edition of IEEE Wiring Regulations

3.8.3 EQUIPMENT SPECIFICATIONS

I. A solid copper main earthing terminal shall be provided at a position near the MSB room for the connection of the circuit protective conductors, the main equipotential bonding conductors and the earthing conductors to create the equipotential zone. The main earthing terminal shall be connected to earth via an earthing conductor to an earth electrode or a group of electrodes.

II. Earth electrodes shall be of mild steel inner core with a bonded hard drawn copper sleeve of an approved type. The overall diameter of the rod shall not be less than 12.7mm and the thickness of the copper sleeve shall not be less than 2.0mm. The minimum length shall be 2.4m. Additional lengths, whenever required, shall each be of 1.2m, connected together by a coupling. The penetrating end of the rod electrode shall be a hardened steel point. Electrodes shall be driven into the ground within an earth pit. Only approved tools, e.g., electric hammer or pneumatic hammer, shall be used for their installation.

III. In case the earthing resistance achieved by one rod is not sufficiently low for the purpose required, additional length or additional rods shall be installed.

IV. The connection shall be contained within a concrete earth pit with a substantial removable cover to ensure accessibility and maintainability. Earth Resistance shall be less than 10 ohms for electrical system.

3.8.4 POWER RECEIVING SYSTEM

Electrical contractor shall coordinate all the works related to authority power supply to the premise after applying the requirement by the client. Electrical cable shall be as per the specifications described below and drawing shown. Cable shall be installed as per the details mention in the drawing and the best installation practices.

3.8.5 LOW VOLTAGE DISTRIBUTION SYSTEM

This section specifies the detailed requirements of supply, delivery, installation, testing, commissioning and maintenance during the defects liability period of the low voltage power distribution system.

The extent of work includes basically however not limited to the following,

I. Supply and Installation of low power distribution panels.

II. Supply and Installation of low voltage power cables.

III. Supp1y and Instal1ation of cable management system.

3.8.6 SYSTEM DESCRIPTION

Low Voltage Power distribution system starts from the Main Switch Board (MSB). Feeder network shall be laid in the office premise to distribute power from the MSB. Sub distribution, Final distribution and motor control panels will be located as per the drawings to have flexible power distribution within the building.

3.8.7 EQUIPMENT DESCRIPTION

(A) LOW VOLTAGE POWER DISTRIBUTION PANELS

(a) MAIN SWITCH BOARD

I. MSB shall fully comply with BS EN standards and the segregation amongst the components of the switchboard shall be of Form 3b for all sections.

II. The bus bar system of the MSB shall be capable to withstand the electrical and mechanical stresses and temperature rise produced by a fault with a magnitude of 35kA for 3 seconds.

III. The construction of the indoor type MSB shall be designed to have the degree of protection of 1P42 or higher in accordance with the standard requirement of IEC 60529.

IV. The construction of the MSB shall be modular construction metal enclosure by electro galvanized steel skeets not less than 2mm thick or epoxy power coated to BS 4800 to provide resistance to corrosion. The panel shall be built up on substantial framing with all necessary stiffeners and supports with no cross struts. The entire panel shall be vermin proof.

V. Front access doors shall be provided and with hinges and lockable handles to facilitate inspection and maintenance. Removable gland plates shall be provided at the top and at the bottom of the switchboard with knockouts or blanked off openings for incoming and outgoing circuit cables.

VI. All doors shall have concealed hints and where necessary, shall be interlocked with the switch mechanism. All doors shall be provided with dust excluding gasket of neoprene or other equal and approved material.

VII. Screened ventilating louvers of approved types shall be provided on the sides and rear panels

VOLTMETERS

I. Voltmeter shall be of accuracy class I and have expanded scale of l00mm in total length. The range shall be 300V to 500V and the zero shall be marked. Voltmeters shall be connected to the incoming side of the power supply through fuses and links. Mechanical zero adjustment shall be provided.

II. The voltmeter selector switch shall be mounted on the front of the panel and shall be of the rotary type with break -before make contacts for selection to measure red-yellow, yellow-blue, blue-red and red, yellow, blue phase voltages with RY, YB, BR, R-Y-B marked clearly on the switch.

AMMETERS

I. Ammeter shall be of accuracy class 1 B.S. 89 and be capable of carrying their full load current without undue heating and shall not be damaged by the {maximum fault level of the switchgear. All ammeters shall have a continuous overload capability of 120% of the upper limit of the scale for two hours. All ammeters are to be l00mm dial square flush pattern with quadrant scale.

II. Mechanical zeros adjustment shall be provided and accessible from the front without dismantling.

III. The ammeter selector switch shall be mounted on the front of the panel and shall be of the rotary type with make-before-break contacts for selection to read red-yellow-blue-neutral currents with R-Y-B-N marked clearly on the switch.

SURGE PROTECTION

I. Surge protection device shall be suitable for application in electrical installation operating at 400V, 3-Phase/ 230Y l-phase and at frequency 50Hz.

II. The operation of surge protection device shall base on the use of metal oxide varistor or other similar technique to effectively limit over voltage under surge conditions and to safely divert the excessive surge energy to ground.

III. Surge protection device shall be manufactured by a reputable manufacturer which is continuously manufacturing surge protection products preferably for at least 5 years and the manufacturer shall have a local agent to provide frill technical support and after sales services.

IV. Surge protection device shall be shunt or series connected to the concerned electrical installation to achieve maximum protection as recommended by the manufacturer. It shall be installed in strict compliance with manufacturer's installation instruction and relevant safety standards and regulations.

V. The device shall be able to give protective performance in all modes, including phase and neutral, phase and Earth, and neutral and earth.

VI. Surge protection device shall be able to withstand repeated electrical surges appeared in the electrical system without undue degradation of its surge protection performance under healthy condition.

(b) SUB AND FINAL SWITCH BOARD

CONSTRUCTION OF THE SWITCHBOARD

I. The panel bid shall be type of wall mounting or floor standing type constructed to Form 3 requirement. It shall be constructed minimum 1.6 mm thick electro-galvanized steel coated with high solid enamel polyester electrostatic spray and oven baked. The colour shall be RAL 7032 and degree of protection minimum IP 42.

II. Bus bars shall be HDHC copper and rated for continues operation. The phase bar, neutral bar AND earth bar shall be identified by approved colour code. The neutral bar cross section should be same as phase bar. All circuit breakers, metering and bus bar shall be as per the approved load list.

RESIDUAL CURRENT CIRCUIT BREAKER (RCCB)

I. Residual Current Circuit Breakers (RCCB's) shall comply with IEC 1008. They should be of the inherent current type and be independent of the line voltage.

II. An integral test device shall be provided on the front of the RCCB to enable the operation of the RCCB to be tested. Operation of this test device shall create out-of-balance conditions simulating an earth fault.

III. The main distribution board shall have the instruments shown on the drawings.

MINIATURE CIRCUIT BREAKER (MCB)

I. Single pole or triple pole miniature circuit breakers (MCB) are to be used for sub-circuit protection.

II. All MCB's shall conform to BS EN 60947-2. The body and base of the units are to be moulded Bakelite or similar material and the units are to be sealed after assembly.

III. The load handling contacts are to be silver I tungsten, and the contacts and operating mechanism are so designed as to give a wiping action both at make and break.

IV. The breaker operating mechanism is to be the trip free type. A thermal magnetic time tripping mechanism is to be included for circuit protection against overload and short circuit.

V. Short circuit level of MCB shall not be less than 6kA.

VI. On three phase circuits, triple pole circuit breakers shall be used and shall be used and shall Interlocked so that an over load or fault on anyone phase will trip all phases of the breakers simultaneously. All breakers shall be calibrated at 40 degrees C.

(B) LOW VOLTAGE POWER CABLES

The Power Cables and Conductors scope of work covers all electrical cabling and wiring required for the project. In general, the wiring requirements are to the British Standards.

All low voltage feeder and sub-feeder cables will be copper conductor cables, multi- core XLPE/PVC cables laid on cable trays or ladders, or directly clipped to ceilings or wafts in electrical shafts, or can be Single core, non-armoured XLPE / PVC insulated running in heavy gauge uPVC conduits.

In general, sub-circuit wiring will be by means of single core PVC insulated copper conductors with earth continuity conductors' rim in conduits and protected by miniature circuit-breakers.

All circuits for both lighting and power applications will be loaded to not more than 75% of the actual net rated capacity of the protection circuit breaker.

Fire pumps/ Fire lift will be supplied through a separate fire rated feeder directly from the MSB.

XLPE/PVC CABLE

I. XLPE insulated PVC sheathed copper cables (XLPE/PVC) shall be of single core or multi-core with full neutral and shall be 600/1000Y grade complying with BS 5467:1989. The cores of these cables shall be high annealed copper conductors complying with BS 6360:1991. Multi core conductors above l6mm2 shall be shaped to reduce overall dimension and to give a smother profile.

II. The PVC insulated comes shall be colour coded and sheathed with an extruded layer of two or more tapes of PYC bedding. The cables shall be over sheathed with an ended black PVC layer embossed with the voltage designation and the manufacturer's identification.

III. The XLPE insulation shall be able to operate continuously at a conductor temperature of 90^{o}C.

IV. The minimum bending radius shall be not less than eight times the overall cable diameter.

PVC/PVC CABLE

I. PVC insulated PVC sheathed copper cables (PVC & PVC) shall be of single core or multi-core with frill neutral and earth cable and shall be 600V/1000V grade complying to B.S. 6364:1969. The cores of these cables shall be high annealed copper conductors complying with B.S. 6360:1969.

II. The PVC insulated cores shall be colour coded and shall be sheathed with PVC.

III. The minimum bending radius shall be not less than eight times the overall cable diameter.

IV. The cable shall be properly supported on cable trays for horizontal and vertical runs. The exact installation method shall suit the site condition and subject to approve by the Engineer.

V. Brass cable gland complies with BS6I21 shall be provided for terminating the cables.

PVC INSULATED CABLE

I. The cables shall consist of copper conductors insulated with PVC complying with B.8. 6004:1969. Cables for three phase and single-phase circuits shall be 450V/750V grade.

II. The current carrying capacity of each circuit shall be in accordance with I.E.E. Regulations and latest amendments and shah be limited to the specified voltage drop.

III. All wiring shall be carried out by the loop-in system and the wiring shall be enclosed in conduits or in metal trunking. Joints or connectors shall not be allowed in any such cable length, except that connectors may be used in accessible positions within fittings.

IV. The maximum number of cables that may be accommodated in a given size of conduit is not to exceed the limits given in the I.E.E Wiring Regulations.

V. For copper cables sizes 6mm2 and above, compression type cable connectors/lugs shall be used for all cable terminations. Connections to fixed equipment shall be by means of PVC cables in conduits; with the final connection being made by PVC covered pliable conduit, and suitable adaptor. A separate earth continuity copper earth in accordance with I.E.E. Regulations and B.S. 6004 of not less than 2.5mm2 shall be provided outside the flexible tube and solidly connected at each tube termination.

FLEXIBLE CORDS

I. Flexible cords shall be PVC insulated; PVC sheathed with copper conductors of 300V/500V grade to B.S. 6500 minimum size of cord shall be 1.5mm2.

FIRE RESISTANT CABLES

II. The fire-resistant cable shall be of low smoke halogen flee type which, has been approved by the Fire Services Department for the appropriate application.

III. The fire-resistant cable shall have been flame tested by a recognized independent authority to BS 6387 Categories C, W and Z.

(C) CABLE MANAGEMENT SYSTEM

The cable support & duct systems scope of work covers all electrical installation required for the project. In general, the requirements are for installation to British Standards.

Separate PVC conduits and accessories will be used for lighting circuits, power circuits and low current systems wiring.

PVC conduits accessories will be used for concealed and embedded installations. Galvanized steel conduits shall be used for exposed installations in machine rooms and car parks where mechanical damages can occur. Galvanized flexible conduits will be used for terminating all connections to motors and vibrating equipment.

Cable trays will be of powder coated sheet steel supported from ceilings or wall.

All conduits for branch-circuit wiring will be either embedded in concrete, concealed in walls and under door tiles or exposed under the slab or simply exposed in mechanical and electrical rooms.

(D) CONDUCTING SYSTEM

PVC CONDUITING

I. PVC conduits shall generally be used for all areas.

II. The minimum size of conduit used in the electrical & ELV installation shall be 20mm diameter.

III. Before any work on the installation is started, the Contractor shall prepare drawings of proposed conduit runs showing the number, size and circuit reference of all conductors to the satisfaction of Engineer prior to the commencement of works. The Engineer's endorsement shall not relieve the Contractor from liability in respect to the provision of an adequate number of and/or sizes of conduits for the installation.

IV. Rigid plain PVC conduits and conduit fittings shall comply with B.S. 4607: Part 1 and B.S. 6099: Section 2-2. Conduits shall be type "a", i.e., they shall be suitable for installation, storage or transport at temperatures not normally below minus 5^{o}C. (Couplets shall be of the slip-type).

V. Adaptable boxes and boxes for the enclosure of electrical accessories shall be made from insulation materials and shall comply with B.S. 4662. the dimensions of the plastic boxes shall be such that they can be interchangeable with steel boxes. The minimum wall thickness of boxes shall be 2mm.

VI. Boxes for the suspension of luminaires or other equipment, where considerable heat will be produced, shall be fitted with steel insert clips. Plastic boxes shall not be used in situations

where the temperature of the box is likely to exceed 60°C or where the mass suspended from the box exceeds 3 Kg.

VII. Conduit bends shall have an internal radius of at least 4 times the outside diameter of the conduit.

VIII. The method of carrying out the conduit bends, conduit joints, fixing conduits to boxes without spouts, and the tools and materials to be used shall be as recommended by the manufacturer of the conduits.

IX. All empty conduits shall be provided with draw wire.

METAL CABLE LADDER

I. Cable ladder shall consist of hot-dipped galvanized to BS 729 mild steel to BS 1447 profiles riveted together having horizontal spacing between two rungs not exceeding 300 mm. The flanges shall not be less than 100 mm.

II. All accessories associated with the cable tray systems, including supporting rods, channels, shall be quick-fixing type to the Engineer's approval.

METAL CABLE TRAY

I. Cable trays are to be of perforated pattern 1.6mm minimum mild steel with returned edges and shall be electroplated with zinc or cadmium to BS3382: Part 1 and 2 with minimum plating thickness of 25pm. The colour of the paint shall be agreed by the Engineer.

II. Trays shall be supported from the soffit of structural slabs and beams by rods not less than 8mm dia. and/or angle iron brackets fixed on wall. The rods and brackets shall have two layers of primer and enamel paint finish, the bolts and nuts for fixing shall be electroplated with zinc or cadmium to B53382: Part 1 and 2 with minimum plating thickness of 25p i. The colour of the paint shall be agreed by the Engineer.

III. Tray supports small be spaced according to the number and size of cables being carried on the tray, but nowhere shall they be at greater than 1.2m intervals.

IV. Cables mounted on the trays shall be laid after installation of the tray and spaced in accordance with the I.E.E Regulations to avoid de-rating of the cables. Cables shall be grouped in circuits and individually clipped, cleated or tied at intervals of not less than 2m lengths on horizontal runs and l m lengths on vertical runs.

V. Notwithstanding the minimum gauge of metalwork specified, gauges shall be of sufficient strength to prevent sagging between supports.

VI. Cables leaving cable trays shall be installed properly without damage to cables by cutting of trays and rubber pads shall be inserted to underside of cables.

VII. Trays shall not be bent for change in direction of run. Proper bends or straight trays meeting at angle shall be employed at change of direction. Cable trays shall be supported at either sides of junction.

VIII. Where trays are exposed to the weather, they shall be coated with epoxy resin before painting. PVC coating is not acceptable.

METAL TRUNKING

I. Trunking and fitting shall be compatible to the requirements laid down in BS4678: Part 1 and shall be fabricated with metal enclosure by electro galvanized steel sheet or epoxy powder coated to BS 4800 to provide resistance to corrosion h8Ying a nominal thickness indicated hereunder:

Nominal Size (mm)		Nominal Thickness (mm)	
From	Up to	Body	Cover
-	50 x 37.5	1.0	1.0
50 x 50	100 x 75	1.2	1.2
100 x 100	150 x 100	1.4	1.2
150 x 150 and above		16	1.4

II. Steel hug shall be of square or rectangular cross section and no projection from screw or other sharp object will be allowed inside.

III. Manufacturer's standard flags such as tee or angle pieces, connectors etc. shall be used throughout unless prior endorsement bas been obtained from the Engineer.

IV. Connection between adjacent lengths of trunking, tee or angle pieces, accessories, etc. shall be made by means of butt joints. The two adjacent ends of trunking shall be fixed so that no relative movement can occur between them.

V. Electrical continuity shall be achieved by means of connecting a tinned copper tape of adequate size across the two adjacent ends of the trunking.

VI. Trunking and fittings shall have removable covers extending over the entire length. The covers shall be of the same material and finish as those of the trunking body.

VII. Removable covers shall be held in position on the trunking either by the quick-fix pattern with centre captive screw or spring-on type.

VIII. Bends, tee junctions, etc. shall also be fitted with removable covers.

IX. Connection between trunking and apparatus shall be by a screwed coupler and brass male bush, or a standard flange coupling or an adaptor neck, fabricated or casted. Direct attachment of trunking to apparatus will only be permitted if cable entries are provided with smooth bore bushes or grommets and the return edge of the lid of the trunking is left intact.

X. Where connection is made between trunking and a distribution board, the cable entry or entries shall be sized to accept all cables from ai1 used and 'spare' ways. No cable tray shall be allowed to connect trusting.

XI. Trunking shall be adequately supported through its length. Trunking support shall be fixed at regular intervals with maximum spacing as follows:

Trunking Size	Maximum Distance Between Fixings
Up to 50mm x 50mm	900mm
Up to 75mm x 75mm	1200mm
Up to l50mm x l50mm	1500mm
Up to 225mm x l50mm	1800mm

XII. Overhead trunking shall be suitably supported by means of hangers, brackets or other approved devices, so that no visible sag is observed when loaded with cables. All hangers, brackets or other approved devices shall apply two layers of primer and two layers of enamel paint with blot and nuts electroplated with zinc or cadmium, the painting and electroplated standards shall be as described.

XIII. Cables penetrating through trunking shall be protected by conduits except for PVC insulated and sheathed cables if such cables from part of a surface wiring system. Hi such case, the holes in the trekking through which such cables penetrate, shall be fitted with suitable rubber grommets to BS 1767 or insulated bushes.

XIV. Whenever trunking passes through a fire-resistant structural element, such as floor and wall, designated as fire barrier, the opening thus formed shall be sealed with approved type of fire resisting material according to the appropriate degree of fire protection required. In addition, suitable integral (fire barriers shall also be provided to prevent the spread of fire or smoke through the trunking.

XV. In vertical trekking installations, internal fire barriers shall be provided between floors or at intervals of 5m apart, whichever is the less.

XVI. Every entry to the trunking shall be so placed as to present and/or to be protected against the ingress of water.

XVII. Holes in trunking shall be drilled, punched or cut by ring saw. After cutting, burrs and sharp edges on the trunking shall be removed and painted b galvanized paint to prevent abrasion of cables and misting.

XVIII. Trunking, which is installed in such a position that the cables would fall out when. the cover is. removed shall be fitted with cable retaining bars or other suitable devices to prevent the cables from falling out.

XIX. Trunking installed in a vertical plane shall contain sufficient supporting devices within the trunking to prevent strain on the cables due to the weight of the cables, and to prevent vertical movement of the cables.

XX. The number of cables put into a trunking shall be such that no damage is caused to the cables or the trunking. In determining the size of the trunking required for a particular installation, the method recommended by the IEEE Wiring Regulations shall be adopted.

XXI. Where a common trunking is used to accommodate cables for different circuit categories, they shall be effectually segregated by means of partitions or dividers. The partitions or dividers shall be adequately secured to the body of the trunking.

3.8.8 FINAL CIRCUIT WIRING

This section specifies the detailed requirements of the supply, delivery, installation, testing, commissioning and maintenance during the defects liability period of the all related items in final circuit wirings.

The extent of wiring included basically however not limited to the following,

(i) Supply and installation of wiring system.

(ii) Supply and Installation of lighting fixtures.

(iii) Supply and Installation of lighting control system.

(iv) Supply and Installation of Switches, Socket Outlets and isolators.

(v) Supply and Installation of cable management system.

3.8.9 SYSTEM DESCRIPTION

Final circuit wiring consists of switches, socket outlet fighting fixtures, lighting control system and cable management system for final circuits.

3.8.10 EQUIPMENT SPECIFICATIONS

(A) WIRING SYSTEM

Concealed conduit wiring system shall be considered where concrete slab or brick wall are present. Within the machine room and services area as indicated in drawing, surface conduit wiring shall be used. The specification of conduit installation is the same as that stipulated in above mentioned relevant clauses of this specification.

ln general, lighting circuits shall be wired from 1.5mm2 PVC insulated wires with separate protective earth wire of 2.5mm2. All circuits will be protected individually by l0A circuit breakers. 100mA sensitive Residual Current Circuit Breakers (RCCB) will also be provided for earth leakage protection.

All the 13A socket outlet circuits shall be Radial or Ring circuit arrangements. Both arrangements

shall be wired with 2.5 mm2 PVC insulated wires with protective earth of same size. All radial/ring final circuits will be protected individually by 20A circuit breakers while ring circuits. 30mA sensitive Residual Current Circuit Breakers (RCCB) will also be provided for each circuit or group of circuits as appropriate.

(B) LIGHTING FITTINGS

GENERAL

I. All the lighting fixtures of the building shall be supplied by the contractor. The Contractor shall supply and install cable and wiring for the fixtures.

II. Light fittings supplied under this contract by the contactor shall be manufactured by a reputable lighting manufacturer and shall bear the registered trade mark.

III. Fittings by alternative manufacturers may be considered provided that the performance and quality are the same or higher than the specified ones and shall be 'subject to the acceptance by the Engineer and shall comply with the following.

IV. Luminaries shall be well constructed and shall comply with the requirements of BS4533 and be chosen to suit the conditions under which it will operate. They shall be suitable for operation on 230 volts, single phase 50Hz supply.

OUTDOOR LUMINARIES

I. Outdoor luminaires shall be IP65 or otherwise specified and able to withstand weather. Metal work should be protected against correction, and luminaire parts which have to be removed for access to the interior should be properly gasket to restrict the entrance of moisture and dirt. Stir-up mounting and similar parts shall be heavily galvanized, and bolts shall either be made of stainless steel or be galvanized and bolts shall either be made of stainless steel or be galvanized.

II. The adjustment nuts and bolts of the luminaires that will be mounted high on buildings or columns shall be captive to prevent loss or accident during servicing.

III. Safety device shall be provided to prevent luminaire mounted at high position dropping, the luminaires installed in such locations that are within hand reach shall be strongly constructed, fitted with an impact - resistant transparent or diffusing cover, and shall have secret key fixings for the cover to the body of the luminaires. Where necessary, wire guards shall be fitted over the cover to give extra protection.

IV. The termination of wiring to the fixture shall be done inside a weather-proof box of 1P65

EMERGENCY, EXIT AND FIRE EXIT LIGHTS

The emergency lights shall be maintained or non-maintained type as mention in the drawings and fire exit lights shall be of the surface mounted type. Each unit shall be equipped with the following:

All the maintained type emergency lights shall provide with additional fire rated wire from the relevant circuit breaker in order to satisfy the installation requirement.

- Seal-lead acid battery, l2V DC for minimum back-up time of 2 hour.
- Solid state charger.
- Low and high voltage cut-off.
- Overload and short circuit protection.
- Status indicating lamp for "Power On", 'Tully Charged" & "Short Circuit".
- Corrosive-proof housing.
- The housing of luminaire shall be steel and diffuser shall be glass diffuser.
- The low voltage cut-off shall be set at 1.6 volts per cell.

INSTALLATION OF LIGHTING FITTINGS

I. Installation Method

Luminaries shall be surface mounted, pendant type or recessed type as indicated on the drawings. Outdoor security fixtures shall be pole mounted or wall mounted depend on the final position as approved by the Architect or Engineer.

II. Cable in Enclosed Luminaries

Cables within as enclosed type luminary shall be properly protected against damage due to the excessive heats generated by the lamp within the luminaries.

III. Protection small be by means of slewing the insulation of the cables with fiberglass or other equivalent heat resistant insulating materials. The sleeves shall be provided for all cables within the luminaire and shall extend to a distance of l50mm outside the luminaire.

IV. Alternatively, protection shall be by means of using heat resisting cables selected in accordance with the I.E.E. Wiring Regulations.

V. Joints and Connections in Light Fittings

No joint or connection shall be made within a light fitting, except in space incorporated therein for the purpose. Any cables used for wiring within a light fitting shall be of any type suitable for use at the operating temperature within the fitting.

(C) SWITCHES, SOCKET OUTLETS AND ISOLATORS

GENERAL

Electrical accessories other than the switches provided under the lighting control system for office areas shall be generally in white colour, complying with BS. The wiring accessories inside the machine room area shall be metal clad type as approved by the Engineer.

I. Socket Outlet

Socket outlet shall be 3 pin 13A as shown on drawings. All socket outlets shall be switched,

shuttered type complying with B.S. 1363 and 546 respectively.
Weatherproof type shall comply with BS 4343 provided with a push or cap and retaining ring or a screw-on cap with rubber gasket.

II. Fuse Connection Unit

Fuse connector unit shall be in comply with BS 1363 and provided with 2A to 13A cartridge fuse link having earthing facilities for connection to the metal work of current appliances being fed.

III. Lighting Switches

Switches for controlling lighting circuits shall be rocker operated to B.S. 3676 and rated at 10 amps. AC circuit load shall not exceed 8 amps for tungsten type lighting fittings and 6 amps for fluorescent type lighting fittings. The switches shall be of polished metallic finish. The switch boxes shall be provided with earthing terminal to connect to the earthing system of the premises.

IV. Outdoor Switches

Switches mounted outdoors, or in positions where they may be exposed to rain or water, shall have watertight enclosures with IP54 in accordance with BS5490. Alternatively, they may be mounted inside watertight enclosures but shall be subject to the satisfaction of Engineer.
(End of electrical specifications)

3.9. SPECIFICATION FOR ROOF WORK

3.9.1 Zink alum roofing sheets

Thickness	:	Base metal thickness (bmt) shall be 0.42 mm Total metal thickness (tmt) shall be not less than 0.47mm for C3 environment.
Tensile strength	:	shall be not less than 550 MPa (AS 1397 / ASTM A 653 M-03)
Protection coating	:	shall be Metallic Hot Dip Coated with Aluminium-Zinc Alloy (55% Aluminium, 43.5% Zinc) As Per Standard, As 1397 - Zincalume Az150 or equivalent
Colour coating	:	Hot dipped Colorbond as per AS/NZS 2728 Class 3 or equivalent
Profile	:	Trimdek optima trapezoidal type profile or equivalent
Fastener	:	Self-drilling screws as per AS 3566 – 2002 Class 3

3.9.2 High tensile steel purlins

Material Description	:	Hot Dipped, Zinc Coated Structural Grade, High Tensile Steel with Regular Spangled Surface and Guaranteed Minimum Yield Strength of 450 MPa, Chromate Passivated, Suitable for Roll Forming. Material to Be Consistent Quality in Respect of Surface Conditions, Edge Conditions, Shape and Mechanical Properties
Material Standard	:	AS 1397 / ASTM A 653 M-03
Base Metal	:	High Strength Steel
Tensile strength	:	450 MPa min. Ys= 450 MPa, elongation-10%
Zinc Coating	:	Hot Dipped, Z275 (G90) (Min. 275 Gm/m2 Total Mass on Both Surface
Total coated thickness (TCT)	:	2mm or as specified in the drawings
Welds	:	Not Allowed

ATTACHMENT 2 - ACTIVITY SCHEDULE(AS PER BOQ)

CONSTRUCTION OF WAITING AREA & EXTERNAL TOILET FOR CENTRAL CLINIC AT GALAGEDARA IN KANDY DISTRICT

ITEM	DESCRIPTION	AMOUNT/ Rs.
A	BILL NO - 1 Preliminaries	
B	BILL NO -2 Construction of External Waiting area	
C	BILL NO -3 Construction of Toilet Block	
D	Sewerage Disposal System	
	Sub Total 1	
	Less	
	Provisional Sums	
	Sub Total 2	
	Less	
	Discount if any	
	Sub Total 3	
	Add	
	Provisional Sums	
	Contingencies 10% (From Sub Total 3)	
	Day works	
	Sub Total 4	
	Add	
	VAT 15% (From Sub Total 4)	
	Grand Total	

ATTACHMENT 4 – FORM OF ADVANCE PAYMENT SECURITY

Advance Payment Security

[*Bank's name, and address of issuing branch or office*]

Beneficiary: Deputy Project Director – Central Province – HSEP, Sri Lanka.

Advance Payment Guarantee No.: .....

We have been informed that [*name of the contractor*] (hereinafter called "the Contractor") has entered into Contract No. [*reference number of the contract*] dated [*date*] with you, for the execution of [*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 [*name of the currency and amount in words*][3] [*amount in figures*] is to be made against an advance payment guarantee.

At the request of the Contractor, we [*name of the bank*] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [*name of the currency and amount in words*][4] [*amount in figures*] upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor:

(a) used the advance payment for purposes other than the costs of mobilization and cash flow support in respect of the Works; or

(b) has failed to repay the advance payment when it has become due and payable in accordance with the conditions of the Contract, specifying the amount payable by the Contractor.

It is a condition for any claim and payment under this guarantee to be made that the advance payment referred to above must have been received by the Contractor on its account number [*contractor's account number*] at [*name and address of the bank*].

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Contractor as indicated 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 eighty percent (80%) of the Contract Price has been certified for payment, or on the [*date*] day of [*month*], [*year*][5], whichever is earlier. Consequently, 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, ICC Publication No. 458 (*or ICC Publication No. 758 as applicable*).

. . . . . .

[*Signature(s) and seal of bank (where appropriate)*]

If the institution issuing the advance payment security is located outside the country of the Employer, it shall have a correspondent financial institution located in the country of the Employer to make it enforceable.

---

[3] The guarantor shall insert an amount representing the amount of the advance payment 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.

[4] Footnote 1.

[5] 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 paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [6 months] [1 year], in response to the Employer's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."

ATTACHMENT 5 – FORM OF PERFORMANCE SECURITY

Performance Security

[*Bank's name, and address of issuing branch or office*]

Beneficiary: Deputy Project Director
Health System Enhancement Project-CP,
No:106, Pallegama Road, Ampitiya,
Kandy,
Sri Lanka.

Performance Guarantee No.: .....

We have been informed that [*name of the contractor*] (hereinafter called "the Contractor") has entered into Contract No. [*reference number of the contract*] dated [*date*] with you, for the execution of [*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 guarantee is required.

At the request of the Contractor, we [*name of the bank*] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of [*name of the currency and amount in words*][6] [*amount in figures*] such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than the [*date*] day of [*month*], [*year*][7], and any demand for payment under it must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458, except that subparagraph (ii) of Sub-article 20(a) is hereby excluded. [8]

. . . . . .

[*Signature(s) and seal of bank (where appropriate)*]

-- Note to Bidder --

If the institution issuing the performance security is located outside the country of the Employer, it shall have a correspondent financial institution located in the country of the Employer to make it enforceable.

---

[6] The guarantor shall insert an amount representing the percentage of the contract price specified in the contract and denominated either in the currency(ies) of the contract or a freely convertible currency acceptable to the Employer. If the bank issuing the performance security is located outside the country of the employer, it shall have a correspondent financial institution located in the country of the Eemployer.

[7] Insert the date 28 days after the expected completion date. 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 paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [6 months][1 year], in response to the Employer's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."

[8] Or the same or similar to this clause specified in the Uniform Rules for Demand Guarantees, ICC Publication No. 758 where applicable.