

**DEFENCE INFRASTRUCTURE ORGANISATION (NEPAL)**

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| **BOOKLET 3****CONTRACT No: DIO(N)/CON/23/001****SPECIFICATION** **FOR THE****DIO OFFICE FACILITY PROJECT** **AT****BRITISH GURKHAS KATHMANDU** |
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**References**

1. The Health & Safety at Work Act 1974 (HASWA).
2. Construction (Design & Management) Regulations 2015 (CDM 2015).
3. The Latest Edition of the UK Building Regulations.
4. The Latest Applicable JSPs.
5. The Latest Applicable Defence Works Functional Standards Publications.
6. Electricity at Works Regulations 1989.
7. The Electricity Safety, Quality and Continuity Regulations 2002.
8. 18th Edition of BS 7671: Requirements for Electrical Installations.
9. Lighting should be in accordance with the Chartered Institute of Building Services Engineers (CIBSE) Code for Interior Lighting.
10. BS EN 1998-1:2013 – Eurocode 8: Design of Structures for earthquake resistance.

# The drawings attached to this document, are to be read in conjunction with this Performance Specification (PS) for the DIO Office Facility Project. It should be noted that these drawings are final designs, and the contractor is not required to produce any design drawings. Any temporary work design drawings required to be produced by the Contractor, Authority acceptance and approval must first be requested before works commences on site.

# **UK Building Regulations.** All works shall comply with the latest UK Building Regulations where possible. Should any variation be required, approval from the Authority shall be obtained in writing prior to the commencement of any works.

# **Health and Safety.**  All works shall be carried out in accordance with the Health & Safety at Work Act 1974 (HASWA). The Contractor shall submit a pre-construction H&S file to the Authority[[1]](#footnote-2) for approval, including all risk assessments, method statements, hazardous material procedures, etc. to comply fully with Construction (Design & Management) Regulations 2015 (CDM 2015).

# Upon project completion, the H&S file shall be presented to the Authority 10 days before the Board of Officers is convened and in compliance withCDM 2015.

# **Design Life.** The design life of all new civil and structural components and assemblies to first major overhaul, repair or replacement shall be a minimum of 10 years. The Contractor shall supply and install all components, elements and systems/structures to satisfy this requirement, and provide documentary evidence as per CDM 2015 and any additional Contractual requirements that may apply.

# **Existing Services.**  The Contractor is responsible for ensuring all services on or adjacent to the site that will be affected by the works are identified, located and appropriate action taken to prevent damage before work commences. The Contractor shall ensure that any existing services and concrete slabs are reinstated to a condition at least similar to existing, with the minimum of disruption to existing facilities and services during construction. All works that could possibly influence existing services may only commence with written approval from the Authority – this includes but is not limited to a Permit to Dig. The Authority must be informed immediately if any unknown services are discovered that will have an impact on the works.

# The Contractor shall ensure that any existing services and affecting works – including all connections and services tied into – are of an acceptable standard to ensure the required performance over the life of the facility. Should it be found that one or more of the services (including but not limited to existing water, sewerage, drainage and electrical reticulation) is not considered acceptable to the project requirements, the Contractor shall inform the Authority and obtain written approval/instruction prior to taking any actions to rectify or make good the pertinent unacceptable situation.

Scope of the Overall Project.

# **General.** This Performance Specification (PS) outlines the requirements for the construction of the DIO Office Facility Project.

# **The Authority.** The Project Manager (PM) has overall Authority on this project. For the purpose of this Performance / Prescriptive Specification, the PM is any person from within the Authority acting on behalf of the PM, the Superintending Officer (SO) in most cases.

# The site is situated at British Gurkhas Camp, Kathmandu. The specific site demarcations are shown in the drawing pack at Booklet 4. The Authority is to be approached for confirmation of when the site is to be clear of obstructions.

# **Use of the Site.** The site shall not be used for any purpose other than undertaking the specified works. The Contractor shall erect the site and storage compound in a location agreed with the Authority for no longer than is required to complete the Works. No storage of materials, parking of vehicles, temporary accommodation or any other use of areas beyond the boundaries shall be permitted. Under no circumstances shall it be permissible for the Contractor to cause an obstruction to normal pedestrian or vehicular movements within the vicinity of the sites. The site and site compounds are to be suitably fenced off.

# **Restrictions to the Works.**  The Works are to be undertaken without interfering with every day running of the Authority’s operations within the area. The demarcation of the site boundary is to be obvious and clearly marked to restrict access to the site whilst the Works are being undertaken.

Proposed Works

# The proposed works for the task is the construction of the DIO Office Facilities as per the issued design drawings and listed performance specifications.:

Management of the Works

# **Personnel.** The contractor is fully responsible for ensuring all personnel within the workforce are authorised to gain access to and work within UK Bases, British Gurkhas Nepal. The contractor is solely responsible for the submission and approval of passes and the Authority will not grant extensions to performance periods based on delays obtaining passes for access to the Base. The Contractor shall be responsible for the transportation of Contractor Personnel at all times both to and from the site. Contractor management staff shall ensure that all employees and sub-contract employees’ visas and passports shall remain current during the life of the contract. At no time shall contractor management staff permit personnel currently issued a pass to hold visa or passports that expire during the performance period.

# **Liaison with the Authority.** The Contractor shall designate one person from within his organisation who will be responsible for liaising with the PM or his representative (SO) on a day-to-day basis and as the need arises. The person so designated shall be responsible for communicating with the Authority regarding notification of intended work and explaining the effect that the works will or may have on the operation or systems within the building. The Liaison Officer will be responsible for responding to the Authority's enquiries and dealing with any issues or complaints. It is a requirement that the Contractor's Liaison Officer makes daily contact with the Authority such that an active rather than a responsive attitude to liaison is maintained. The Contractor's Liaison Officer is a key person in achieving the successful execution of this Contract.

# **Supervision.** The Contractor shall accept responsibility for construction, co-ordination, supervision and administration of the Works, including all subcontracts. They shall arrange and monitor a programme with each subcontractor, supplier, local Employer and any statutory undertaker, and obtain and supply information as necessary for co-ordination of the work. In addition to constant management and supervision of the Works provided by the Liaison Officer, all significant types of work must be under the close control of competent trade supervisors to ensure maintenance of satisfactory progress and quality.

# **Co-ordination of Engineering Services.** The site organisation staff must include one or more persons with appropriate knowledge and experience of mechanical and electrical engineering services to ensure compatibility between engineering services, one with another and each in relation to the Works generally.

# **Approvals.** Where products or work are specified to be approved or the PM instructs or requires that they are to be approved, the same must be supplied and executed to comply with all requirements.

# **Photographs.** No photographs shall be taken of the site without the express Authority of the PM.

# **Programme of Works.** Prior to the commencement of the works, the Contractor shall liaise with the Authority, in order to produce a detailed programme of works. This programme shall be agreed and approved and shall form the baseline programme for the project. Any deviations from the agreed programme shall be communicated to the Authority, with programme updates being produced if required and approved by the Superintending Officer. The programme must be daily resolution and show when stores equipment and plant deliveries will occur.

# **Programme Status.** The Contractor shall also show on this programme each state of both design and construction of the various elements of the works so as to illustrate the latest dates by which instructions requiring changes can be accommodated in each part of the Works without effecting the completion thereof. Thereafter, the Contractor shall amend and revise the programme as required by the Conditions of Contract and as required by the PM. The submission of a programme will not relieve the Contractor of his responsibility to apply in writing for instructions, drawings etc. in accordance with the Conditions of Contract.

# **Commissioning Period.** One month before the start of any commissioning period the Contractor shall submit a Works Commissioning Plan, setting out his commissioning proposals including the preparation of handover documentation.

# **Commencement of Work.** Inform the PM at least five days before the proposed date for commencement of work on site.

# **Monitoring.** Record progress on a copy of the programme kept on site. If any circumstances arise, this may affect the progress of the works, put forward proposals or take other action as appropriate to minimise any delay and to recover any lost time. A daily site diary in an appropriate format is to be kept by the contractor. The site diary is to include details of personnel and plant/equipment on site and is also to include delays and their reasons, visitors to site and works progress. Variation orders and both written and verbal site instructions are also to be included. This is to form the basis of the Weekly Progress Report that is to be submitted to the Authority weekly. A proposed format for the Weekly Progress Report can be obtained from the Authority.

# **Site Meetings.** The PM, or his representative, will hold regular site meetings to review progress and other matters arising from the administration of the Contract. It will be the Contractors responsibility to ensure the availability of accommodation and attend all such meetings.

# **Contractors Site Meetings.** The Contractor is to hold meetings with appropriate subcontractors and suppliers shortly before site meetings with the Authority to facilitate accurate reporting of progress.

# **Notice of Completion.** The Contractor is to provide the PM at least seven days’ notice of the anticipated dates of Practical Completion of the whole or parts of the Works.

# **Extension of Time.** When it is necessary to report a cause of a delay or likely delay in the progress of the Works this shall be given in the form of a written notice that must also be given of all other causes, which apply concurrently. The notice shall state the following details.

## Relevant particulars of the expected effects if appropriate related to the concurrent causes.

## An estimate of the extent, if any, of the expected delay in the completion of the Works beyond the Date of Completion.

## Any other relevant information required by the PM.

# **Quality Standards/Control.** The contractor will provide evidence to the PM of his quality standards and controls and will produce a plan detailing QC activities in order for the PM to plan for witnessing of critical activities.

## **General Quality of Products**. All products shall conform to the following subparagraphs:

### Products to be new unless otherwise specified by the Authority.

### For products specified to a BS or EN obtain certificates of compliance from manufacturers when requested.

### Where a choice of manufacturer or source is allowed for any particular product, the whole quantity required must be of the same type, manufacture and/or source unless otherwise approved. Produce written evidence of sources of supply when requested by PM.

### Ensure that the whole quantity of each product required to complete the work is of consistent kind, size, quality and overall appearance.

### Where consistency of appearance is desirable ensure consistency of supply from the same source. Do not use different colour batches where they can be seen together.

### If products are prone to deterioration or have a limited shelf life, order in suitable quantities to a programme and use in appropriate sequence. Do not use if there are any signs of deterioration, setting or other unsatisfactory condition.

## **Products to be used**. All products shall be of the following specification:

### **Cement**. OPC cement shall be either of the following brands:

### **United**

### **Shivam**

### **Arghakhanchi**

###  **Note:** No PPC cement to be used for all structural and finishing works.

### **Reinforcement Bars**. All reinforcement bars shall be **Himal Steel** brand.

### **Metal tubes**. All metal hollow sections shall be **HIPCO Hulas steel** brand.

### **Stainless steel sections**. All stainless-steel section shall be a minimum of 1.8 mm thick and from either one of the following brands:

### **Jindal**

### **Bright range**

### **Bathroom fittings**. All tapes shall be Jaguar brand. Wash hand basin and water closet shall be Hindi wear brand. The rest of the accessories shall be Hindi wear.

### **Tiles**. All ablution wall and floor tiles shall be vitrified tiles (at least 8 mm thick, 600 x 600 mm) suitable for wall and floor tiles. The tiles shall be skid resistant, germ free and full body. Tile brand shall be from the Kajaria range vitrified tiles.

### **False Ceiling** – The false ceiling to be Armstrong mineral fibre triangular edges boards on T-bar. The size to be 600 x 600 mm, 16 mm thick. The proposed false ceiling to be asbestos free. The layout of false ceiling panels to be spaced equal on either side of ceiling and laid true horizontal level.

### **Aggregate**. All aggregate shall be natural crushed stone with maximum size of 20 mm and below.

### **Sand**. All sand shall be from crushed stone only. **No river sand shall be used on this project.**

### **Aluminium Partition**. Anodised aluminium fixed frame of size 100 x 25 mm, wall thickness at least 2 mm, cutting at 90o.

## **Proprietary Products**. All products shall conform to the following subparagraphs.

### Handle, store, prepare and use or fix each product in accordance with its manufacturer's current printed or written recommendations/ instructions. Inform PM if these recommendations/instructions conflict with any other specified requirement. Submit copies to PM when requested.

### The tender will be deemed to be based on the products specified and recommendations on their use given in the manufacturer’s literature current at the date of tender.

### Obtain confirmation from manufacturers that the products specified and recommendations on their use have not been changed since that time. Where such change has occurred inform PM and do not place orders for or use the affected products without further instructions.

## **Checking Compliance of Products.** The Contractor shall check all delivery tickets, labels, identification marks and where appropriate the products themselves to ensure that all products comply with the project documents. In particular, check that the products comply with the following sub-paragraphs.

### The sources, types, qualities, finishes and colours are correct, and match any approved samples.

### All accessories and fixings that should be supplied with the products have been supplied.

### Sizes are correct. Where tolerances are critical, measure a sufficient quantity to ensure compliance.

### The delivered quantities are correct, to ensure that shortages do not cause delays in the work.

### The products are clean, undamaged and otherwise in good condition.

### Any products with a limited shelf life are not out of date.

## **Protection of Products.** All products shall be protected to ensure that they remain in the condition they are required to be in. In particular the contractor is to ensure that products are to be prevented from overstressing, kept clean, protected from the elements and kept in original wrappings until required for the project.

# **Prohibited Products.** The Contractor shall not employ on or incorporate in the Works any of the following products and shall impose a like obligation upon all Sub-Contractors.

## Asbestos materials as described in the Asbestos Prohibitions Regulations 1985 and the Asbestos Products (Safety) Regulations 1985.

## Lead or any products containing lead for use in connection with drinking water and paints.

## Materials that are generally composed of mineral fibres either manmade or naturally occurring which have a diameter of 3 microns or less and a length of 200 microns or less or which contain any fibres not scaled or otherwise stabilised to ensure that fibre migration is prevented.

## Other products or substances generally known to be deleterious to health and safety at the time of use or to the durability of the property in the particular circumstances in which they are being used.

## Air conditioning refrigerants R12 & R22 (all refrigerants used must be Montreal Protocol compliant).

# **Setting Out.** The Authority will establish a local control point. A detailed setting out drawing will be issued to the Contractor. The Contractor is responsible for all setting out and shall check out the dimensions of the site against those shown on the drawings and record the results on a copy of the drawings. The Contractor shall inform the PM when overall setting out is complete and before commencing construction.

# **Record Drawings.** The Contractor shall record details of all grid lines, setting out stations, bench-marks and profiles on the site setting out drawing. Retain on site throughout the contract and hand to PM on Completion.

# **Service Runs.** The Contractor shall make adequate provision for services, including unobstructed routes and fixings. Wherever possible ducts, chases and holes are to be formed during construction rather than cut.

# **Access.** The Contractor shall provide at all reasonable times, access to the Works. The Contractor shall supply the PM or his representative with copies of any documentation and drawings, which may reasonably be required for the purposes of monitoring the work performed under this or any sub-contract. The PM is to be provided with three copies of all construction drawings prior to the commencement of the works. These drawings are to be updated as necessary by the Contractor during the works.

# **Defects in Existing Construction/Services.** This shall be reported to the PM without delay. Obtain instructions before proceeding with work which may be covered up or otherwise hinder access to the defective construction or be rendered abortive by the carrying out of remedial work. This is particularly relevant in relation to the expansion of the existing service runs.

# **Timing of Tests and Inspections.** The Contractor is to agree dates and times of tests and inspections with PM four days in advance, to enable the PM and other affected parties to be present. On the previous working day to each such test or inspection the Contractor is to confirm to the PM that the work or sample in question will be ready or, if not ready, agree a new date and time.

# **Test Certificates.** The Contractor is to submit a copy of each certificate to PM as soon as practicable and keep copies of all certificates on site. Copies should be included in the Health and Safety File on handover of the works.

# **Proposals for Rectification of Defective Work/Products.** As soon as possible after any part(s) of the work or any products are known to be not in accordance with the Contract, or appear that they may not be in accordance, the Contractor is to submit proposals to the PM for opening up, inspection, testing, making good, or removal and re-execution. Such proposals may be unacceptable to the PM and he may issue contrary instructions.

# **Quality Control.** The work shall conform to high standards of design and workmanship, shall be structurally sound and aesthetically pleasing.

# At the site, the Contractor shall arrange the materials, their stacking/storage in appropriate manner to ensure the quality. The Contractor shall provide all the necessary equipment and qualified manpower to test the quality of materials, assemblies etc., as directed by the Authority.

# The Authority shall have the right at all times to inspect all operations including the sources of materials, procurement, layout and storage of materials, all equipment including the concrete batching and mixing equipment, and the quality control system. Such an inspection shall be arranged, and the Authority approval obtained prior to starting of the particular item of work. This shall, however, not relieve the Contractor of his responsibilities. All materials which do not conform to these specifications shall be rejected and shall be removed from the site immediately.

# **Work at or after completion.** The Contractor is required to undertake the following works prior to handover.

## Make good all damage consequent upon the work.

## Remove all temporary markings, coverings and protective wrappings unless otherwise instructed.

## Clean the works thoroughly inside and out including all accessible ducts and voids; remove all splashes, deposits, efflorescence, rubbish and surplus materials consequent upon the execution of the work.

## Cleaning materials and methods to be as recommended by manufacturers of products being cleaned, and to be such that there is no damage or disfigurement to other materials.

## Obtain COSHH data sheets for all materials used for cleaning and ensure they are used only as recommended by their manufacturers.

## Touch up minor faults in newly painted/repainted work, carefully matching colours and brushing out edges. Repaint badly marked areas back to suitable breaks or junctions.

## Adjust, ease and lubricate moving parts as necessary to ensure easy and efficient operation, including doors, windows, drawers, ironmongery, appliances, valves and controls.

# **Security at Completion.** The Contractor is to leave the Works secure with all accesses locked. Account for and adequately label all keys and hand over to PM with itemised schedule, retaining duplicate schedule signed by PM as a receipt.

# **Making Good Defects.** The Contractor is to make arrangements with the PM and give reasonable notice of the precise dates for access to the various parts of the Works for purposes of making good defects. The PM is to be informed by the Contractor when remedial works to the various parts of the Works are completed and ready for approval.

# The signed and approved drawings shall be used as the construction drawings on site for all work purposes and to satisfy the requirements as specified by CDM 2015.

# **Construction and ‘As Built’ Drawings.** During the contract period and as directed by the Authority, the Contractor / Sub-Contractor shall use the signed and approved construction drawings indicating his intentions to comply with specified work and service installations. Any construction drawing on site must be approved by the Authority prior to commencement of any works, with any amendments required during the works clearly and timely communicated to the Authority for agreement and approval. ‘As Built’ drawings shall be submitted 28 days after completion of the works as directed by the Authority.

# **Site Diary.** The Contractor shall keep an up to date, daily, site diary. This document is to be used to record all decisions made on the site both verbal and written. The document is also to be used to record visits to site and note anything, which has a direct effect on the project in terms of cost and extensions to time, or any other occurrence that affects the project programme. All changes must have been agreed and authorised by the Authority. The site diary shall list in writing all issued variation orders and site instructions, including amended drawings, and verbal decisions made on site. All verbal decisions must be recorded in writing no less than 24hrs after they have been made and entered in the site diary. The Contractor shall on request make the site diary available for the Authority to inspect. This document will be used as the audit trail in light of any disputes, concerning the project.

General Conditions

# **Preparatory Works.** All local services are to be identified and adequate precautions taken to protect such services from damage for the duration of the works, or alternatively to relocate or disconnect with alternate provision, as per design and site requirements. The Authority shall be informed immediately if any unknown services are discovered that will have an impact on the works. All existing buildings and other facilities if any shall be identified, and precautions taken to mitigate the effects of works ongoing operations and facilities. This includes but is not limited to dust, noise, security, H&S, maintaining unobstructed access, establishment of clearly demarcated works and storage areas.

# The Contractor shall verify with the Authority which site features are to be removed and protected during construction works. All setting out shall be completed by the Contractor, as well as any and all ongoing monitoring of works to ensure accuracy, plumb and level.

# **Signage.** The Contractor shall supply and erect all applicable and appropriate signage to the site. This shall include as a minimum all H&S signage, directions and location of site office and emergency contact details of the Contractor’s representative on site. Temporary warning signs and careful demarcation of works areas must be undertaken with care to ensure compliance with any and all requirements.

# **Workmanship.** Notwithstanding any clauses in the Conditions of Contract or elsewhere in the Specifications or Scope of Works, the Contractor shall be responsible for ensuring that all work-related activities shall be carried out in a neat and workmanlike manner, in accordance with accepted good practice. The Contractor shall pay full attention to quality control and adherence to the specifications. Particular care shall be taken in respect to Health and Safety matters, which shall include the provision of any relevant temporary warning signs and safety barriers. All working areas are to be kept clean and tidy on a daily basis. All redundant materials must be cleared to the requirements laid down in the Authorities Environmental Regulations.

# **Site Manager.** At all times the Contractor shall have a Site Manager present on site that has the capability of reading, writing, speaking and receiving instructions in the English Language, including being able to understand and interpret technical drawings and specifications. This Site Manager must be able to explain the work operations to persons performing the work in a language that those performing the work are capable of understanding. The PM shall have the right to determine, whether the proposed representative has sufficient technical and linguistic capabilities.

# **Dust Protection.** Where work is carried out in an occupied building/area containing personnel or equipment, or adjacent to sensitive areas/facilities (airfields, hospitals, etc.) the Contractor shall ensure that all necessary dust control measures are taken to protect the same. This may include the following, but not limited to: Mechanical protection to equipment and personnel, suppression of dust on roads.

# **Visit to Site.** The Contractor shall acquaint himself completely with the exact conditions relating to access and site environment, along with the layout, conditions and positions of existing services, the full extent of the works required, and the supply and conditions affecting labour, carriage, carting, unloading, storage, tools, scaffolding, etc., as well as any security and access constraints.

# **Existing Record Drawings.** The Contractor will upon request, be supplied with copies of all available and relevant existing record drawings. The Contractor during tender stages shall fully acquaint himself with the nature and extent of all existing services within the area of the contract works.

# **Permits to Work and Authorisations.** The contractor shall comply with the Client’s permit to work system and the JSP 375, Volume 3, (details of which are obtainable from the Authority SO), including the provision of method statements, risk assessments, switching/isolating safety programmes, permit to dig, etc.

# The responsibility remains with the Contractor to obtain all necessary authorisations including but not limited to a permit to dig, security and access to the camp and site, fencing/screens to isolate site, and other existing facilities from the works, etc. required to commence and complete the works.

# The Contractor shall at all times ensure that full coordination, cooperation and liaising with the Superintending Officer of the Client and Authorities is achieved and maintained.

# **Site Instructions.** Where there is a change in design or specification, which does not have a cost or time implication a Site Instruction shall be issued by the SO to authorise the proposed change at nil cost to the Authority. The site instruction shall also be used to authorise a change in a specified material/item/equipment as long as the replacement meets the standards required by the original specification and is authorised by the SO.

# **Variation Order.** Where there is a change in design or specification, which does have a cost or time implication a Variation Order shall be raised by the Superintending Officer to describe the proposed change, this will have a cost implication to the Authority. The Works Contract Officer will issue the Variation Order to the Contractor for pricing; the Contractor will price the variation and return it to the Works Contract Officer. All Variation Orders must be authorised by the Project Manager, Commercial Officer, Financial Officer and issued via the Works Contract Officer prior to the commencement of any works on site. All Variation Orders are incorporated into the Contract by the issue of a Contract Amendment.

# **Rejection of Work.** The Authority reserves the right to reject or condemn any area of the works that he considers to be below an acceptable standard and the Contractor shall replace or repair the said works within 7 days of being notified in writing of the rejection by means of a Non-Conformance Report.

# **Operations and Maintenance Documentation.** Upon completion of the works the Contractor shall forward all manufacturers’ details relating to equipment/materials used to the Authority for inclusion into the O&M Manual/H&S File. Refer also to CDM 2015, this documentation less ‘As Built Drawings’ is to be made available at the Pre-Board of Officers not less than 10 days before the due project handover date. A full list of snagging items shall be produced and presented to the Authority with a rectification programme at this very same board.

# **Regulations.** It is the Contractors duty to be fully conversant with all local/MOD regulations and requirements in respect of fire, safety, security and occupational health, etc. These are to be fully complied with throughout the contract period.

# **Inspection, Testing and Commissioning.** The any installations conducted by the Contractor shall be tested and inspected in accordance with but not limited to the current CIBSE Codes. Advance notice of tests shall be given (minimum of 7 days prior to notification). Test and inspection certificates are to be approved by the Authority; preferred document templates will be provided by the Authority on request. Test certificates shall serve as a record that the item referred to has been shown under test to meet the requirements of the specifications and of British Standards as applicable and shall be dated, numbered and clearly referenced to the item tested by means of serial, chassis or other manufactures reference number permanently marked in a conspicuous position. On completion, all original test and inspection certificates are to be provided to the Authority and included in the H&S file CDM 2015. All test instruments shall be provided by the Contractor. The calibration certificates for the testing of the equipment are to be available on request to be shown to the Authority for scrutiny. The Contractor shall ensure all calibrations are in date. The Authority reserves the right to have an independent electrician available during the test and inspection phase. Any defects of workmanship, materials or non-compliance with the specifications or other irregularities which become apparent during the tests shall be rectified by the Contractor, at his own expense, until the whole work is free from defects and in full working order to the complete satisfaction of the Superintending Officer.

# All materials used for construction of permanent works shall have suppliers’ specifications and/or testing certificates available. Where materials are used as part of a whole or in conjunction with other materials, and in any case where site testing is required by best practice, verification of quality and specifications should be allowed for the parts / items / products (suppliers’ specification) as well as the whole (site testing).

# **Defects Liability Period.** A defects liability period of 12 months shall apply for the works. The Contractor will be responsible for making good at his own expense defects in the works for a 12 month period from handover.

Construction Preliminaries

# **Location Plan.** The locations of the proposed works is at British Gurkhas Kathmandu (BGK) shown in the Drawing Pack within Booklet 4.

# **Existing Ground Conditions**. The Contractor is responsible for confirming the existing ground conditions, which are to be taken into account whilst designing and compiling the Pre-Construction Health and Safety Plan (PCHSP).

# **Obstructions.** As the proposed works are to be carried out in the existing compound and surrounding areas, there are obstructions in the form of fences, the contractor is to review the site before commencing works.

# **Provision of Information.** Unless otherwise specified the following is to be provided:

## Three copies of all information, including valid certification, in respect to work, goods and materials proposed by the Contractor, shall be supplied to the Authority. Where the original document is written in a language other than English, it shall be accompanied by an English translation.

## Information and certificates shall be supplied at least two weeks prior to the use of the work, goods or materials in the Works.

## Three copies of detailed working and fabrication drawings and calculations shall be submitted to the Authority for reference purposes. Such submittal shall in no way relieve the Contractor of his responsibilities for the work under the contract.

# **Health and Safety Restrictions, Precautions and Monitoring.** The Contractor shall implement the requirements described in the Health and Safety at Work Act 1974 (HASAW) to protect members of the public and persons visiting the site from risks arising from the use of equipment, materials or substances defined therein.

# **Control of Noise and Vibration.** The Contractor shall comply with the recommendations for practical measures to reduce noise set out in BS 5228: Parts 1, 2 and 4.

Preliminary Groundworks

# **Existing Ground Levels.** The Contractor shall identify all existing site levels required prior to any construction works.

# **Ground Water Level.** The ground water level has not been established but it is not expected to impact on any of the works. It is the Contractors responsibility to take into account the ground water levels when submitting technical and commercial proposals.

# **Survey.** The Contractor is to conduct a thorough survey of the site prior to Works commencing.

## **Setting out the site.** The Contractor is to establish a baseline from which the whole of the building can be set out. The position of this line must be clearly marked on site so that it can be re-established at any time.

## **Establishing the Datum level.** The Contractor is to establish a datum level from which all levels will be taken.

# **Demolition**

# **General.** The Contractor shall be fully responsible for ensuring safety in areas underlying and adjacent to the construction site. The Contractor will be responsible for any loss or damage caused as a result of his actions. The Contractor shall prevent movement, settlement or damage to adjacent structures, grades or portions of existing structures to remain. If the safety of the structure being removed, or adjacent structures or grades appear to be in danger, the Contractor shall cease operations and notify the DIO.

# **Complete Demolition**. The existing walk structures and perimeter wall shall be dismantled, and its foundations demolished and removed from site.

# **Reinforced Concrete**. The following shall be demolished and removed from site:

## Reinforced concrete substructure block walls.

## Reinforced concrete substructure foundation slab.

## Reinforced superstructure block wall.

# **Structural Steel Structural**. Steel components, including bearings and bolts, shall be demolished, removed, and disposed of in accordance with the Contractor disposal procedures.

# **Removal and Disposal of Demolished Materials.** Any debris that falls off the structures onto the underlying ground, paved surfaces or roadway shall be immediately cleaned up by the Contractor. The Contractor shall remove all demolished materials and debris from the site as soon as possible. All material shall be deemed non-salvable unless noted otherwise on the Drawings.

# **Quality Management.**  The Contractor shall allow the DIO unhindered access to the demolition areas and shall assist the DIO in carrying out inspections.

# **Soakaway pit**

# **Soakaway pit**. Contractor shall backfill 2 No. soakaway pits as following:

## Fill the soakaway pits with hardcore.

## Concrete the soakaway pit with C25 Concrete with a ratio of (1:1:2).

## Concrete thickness shall be 500mm as a minimum.

# **Excavations**

# **Excavations**. Excavation shall be carried out to the lines, levels and profiles shown on the Drawings at Booklet 4. The work shall be carried out by the Contractor in such a way as to avoid soil erosion, ground water pollution, accidents in habitational or frequented places, disturbance to the surrounding ground or structures, accident to workmen and any other untoward incident. Particular care shall be taken to maintain stability when excavating in close proximity to existing works.

# The work shall be carried out in a careful manner to ensure that the exposed surfaces are as sound as the nature of the material permits and that no point shall protrude inside the lines shown on the Drawings except as otherwise specified or agreed by the Authority.

# The Contractor shall dispose of all material arising from excavations off the site.

# The Contractor shall be responsible for keeping all excavations free from water from whatever cause arising and shall provide such pumping capacity and other measures as may be necessary for this purpose.

# The Contractor shall properly support the sides of excavations and shall be responsible for their safety. In case of any slips or blows in the excavation, the same shall be cleared by the Contractor at his own cost.

# The Contractor shall notify the Authority without delay of any permeable strata, joints, faults, fissures or unusual ground conditions encountered during excavation.

# **Excavation of Structure.** Open excavation to lay a foundation for a structure shall be carried out to the lines and dimensions necessary to permit the proper construction of the structure.

# Where a structure is to be founded on soft ground, the excavation shall be taken down until the required suitable soil formation is exposed and prepared to the satisfaction of the Authority.

# If required, before any concrete for a foundation is placed, the bottom of the excavation shall be re-compacted to achieve a dense smooth and level surface both longitudinally and transversely or stepped. Subject to the satisfaction of the Authority, sand layers not exceeding 150 mm thick shall be placed and compacted to minimum 95% of the maximum dry density over the same.

# **Trench Excavation.** Trench excavation shall be performed by the use of suitable hand tools or mechanical equipment, in such manner as to minimise disturbance of the sides and bottom of the excavation.

# Trenches for pipes shall be excavated to a sufficient depth and width to enable the pipe and the specified joint, bedding, haunching and surrounding to be accommodated.

# **Trenches.** The Contractor shall carry out excavation in a safe manner such that the sides of the trench are adequately supported and stable till the completion of work.

# The Contractor shall leave a clear adequate space between the edge of the excavation and the inner toes of the spoil banks.

# Trenches shall be excavated to the lines and levels shown on the Drawings details at Booklet 4.

# Trenches shall not be excavated too far in advance of pipe laying and shall be sufficiently wide to allow proper and efficient jointing to be carried out in clean and dry conditions.

# The bottoms of all trenches shall be trimmed to grade and level and compacted before any bedding is placed or pipes are laid.

# **Fill.** Prior to commencement of filling, the Contractor shall submit in writing to the Authority for ‘Notice of No Objection’ his proposals for carrying out the work such that the optimum use may be made of excavated material. Filling shall not commence until the ‘Notice of No Objection’ proposals and the material intended to be used are put up for review by the Authority and finally his observations are carried out.

# **Backfill to Structures**. The Contractor shall not backfill around structures until the structural elements have attained adequate strength and the consent of the Authority to proceed for type of fill material has been obtained.

# **Buried Services.** Prior to carrying out any excavation work the Contractor must:

## Obtain a Permit to Dig (Statement of Known Services) and all drawings relating to existing services that may interfere with the proposed works. A copy of the Permit to Dig must be given to the Authority prior to any works commencing.

## Identify all local services and take adequate precautions to protect such services from damage for the duration of the works.

## Inform the Authority immediately if any unknown services are discovered that will impact on the works.

# **Hazardous, Aggressive or Unstable Materials.** The Contractor is not to import or use fill materials which would either in themselves or in combination with other material or ground water, give rise to health hazards, damage buildings or structures. The construction materials should not include any finishes that may lead to shedding of particles.

# **Placing Fill.** The Contractor shall ensure that excavations and areas to be filled with earth in 150 mm layers under floors includes watering to achieve optimum moisture content, ramming, consolidation and dressing complete. The earth should be free from grass, roots, and any other deleterious materials. This shall be done with good excavated or borrowed earth in 150 mm layers, each layer being watered to optimum moisture content and thoroughly rammed by mechanical vibrator. The contractor shall test the proctor density of the filling compacted earth at site, if desired by DIO (N) or its representative.

**Site and Temporary Works**

# **Site works and setting out.** The Site shall be maintained in a clean and tidy condition. Materials, including materials required for Temporary Works, shall be stored in an orderly manner. The measures to be taken shall include but not limited to the following:

##  Promptly remove all debris and litter on the site including those dumped into the site from outside by the public.

## Promptly remove debris and litter not within the site if the debris and litter are in connection with the Works or disposal of by the persons working on the site.

## Keep passageways clear and free of greasy dirt, waste and timber

## **Prevention of dust**. Works shall be carried out in such a manner that avoidable dust is not generated.

# **Materials.** Materials for inclusion in the permanent works shall be new or other material as stated in the Contract or approved by the Authority.

## Certificates of tests by manufacturers that are submitted to the Authority shall relate to the material delivered to the Site. Certified true copies of certificates may be submitted if the original certificates cannot be obtained from the manufacturer. A letter from the supplier stating that the certificates relate to the material delivered to the Site shall be submitted with the certificates.

## Samples of materials submitted to the Authority for information or approval shall be kept on the Site and shall not be returned to the Contractor or used in the permanent works unless permitted by the Authority.

# **Batches, samples and specimens**. A batch of material is a specified quantity of the material, which satisfies specified conditions such that it may be assumed that all of the material in the batch is of consistent type and quality. If one of the specified conditions is that the material is delivered to the Site at the same time, material delivered to the Site over a period not exceeding 7 days may be considered as part of the same batch if in the opinion of the Authority there is sufficient evidence that the other specified conditions applying to the batch apply to all the materials delivered over the period.

# **Compliance of a batch**. Unless otherwise stated in the Contract, the results of tests on samples or specimens shall be considered as representing the whole of the batch from which the sample was taken.

# **Site Clearance and Clean up**

# The contractor shall, from time to time clear away all debris and excess materials accumulated at the site.

# After the equipment and appliances have been installed and commissioned, contractor shall clear-up the same and remove all plaster, paint stains, stickers and other foreign matter leaving the construction site in neat and clean condition for ready use.

# On completion of all works, contractor shall demolish all the temporary structures, remove all surplus materials and leave the site in a neat and clean condition, failing which the same shall be done at contractor's cost.

# **Obstructions.** There are no known obstructions in the area. However, if any obstructions are discovered before or during construction the Contractor is to break out old foundations, beds, drains, as directed by the appointed SO and remove off site. Seal off any drain ends and remove contaminated earth and backfill as specified.

# **Compaction.** All compaction operations are to be carried out with suitable compaction methods and equipment to ensure that the compacted layer facilitates all the upper layers.

**Workmanship**

# **Workmanship.** Workmanship shall comply with best trade practice and with relevant standards.

**Construction Specification**

**Mortars**

# Proportions of all mortars for brickwork and blockwork shall be gauged by volume and comply with the appropriate grade specified on the Engineer's drawings and in Table 1 of this Specification and shall be one of the following types:

## Cement : Lime : Sand

## Cement: Ready Mixed Sand and Lime

## Masonry Cement: Sand

# The Contractor shall carry out a preliminary Laboratory Mortar mix test on each type of mortar he is proposing to use on site. The materials that he uses for the test mix shall be representative of those that he is proposing to use on site. Three cubes are to be tested at 7 days and 3 cubes at 28 days; the 6 cubes being cured hydraulically and tested for compressive strength in accordance with the procedures given in BS 4551.

# The Contractor shall confirm to the Authority in writing prior to use on site, the source of all the materials, the type of mortar, the preliminary laboratory test results and the method of mixing to be used on site for the various types and grades of mortar. Recent grading analyse for the sand (in accordance with BS EN 13139) shall also be included.

# Samples of materials shall be taken as and when directed by the Authority who may subject them to any test he should require.

**Mortar mix table**

# Mix proportions are by volume.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Mortar Grade** | **Cement : Lime : Sand mix** | **Masonry : Cement Sand mix** | **Cement :****Ready Mixed****Lime & Sand** | **Prelim Lab Cube****Strengths****7 Days 28 Days** | **Works Cube Strengths****7 Days 28 Days** |
| 1 | 1:0-1/4:3 | ---- | ---- | 10.7 | 16.0 | 7.3 | 11.0 |
| 2 | 1:0.5:4-4.5 | 1:1.5 | 1:4 | 4:3 | 6.5 | 3.0 | 4.5 |
| 3 | 1:1:4-5 | 1:3.5 | 1:5-6 | 2.4 | 3.6 | 1.7 | 2.5 |

**Concrete**

# All structural concrete of foundation to be grade C25. The compressive cube characteristic strength to be at least 25 N/sq mm. The concrete to have 20 mm down stone aggregate with proper compaction, perfect in line, level and finishing including curing. The concrete shall be thoroughly compacted as the depositing proceeds using a suitable type of vibrator. During compaction needle vibrators should not come in contact with reinforcements in order to prevent damage to the bond between concrete and reinforcement.

## **Cement.** All cements are to be ordinary Portland cement packed in bags of 50 kg net weight. The contractor shall test its compressive strength, setting and quality at the time of delivery to site before use in work. Only approved quality cement shall be used in work.

## **Coarse aggregate.** Aggregate shall be sized as per the specification and tender drawing. They shall be hard, strong, dense, durable, clean and free from quarry refuse and adherent coatings. It shall be free from soft pebbles, thin, elongated or laminated pieces and shall be roughly cubical in shape. It shall be clear and free from dirt and any other deleterious matter. The coarse aggregate to be used for concrete work shall be approved by DIO(N).

## **Fine aggregate.** Fine aggregate or sand for the entire project shall be obtained from the same source where practically possible. Fine aggregate shall be coarse-grained pit or river sand with not more than 4% silt content determined by a sedimentation test. It shall be hard, durable, clean and free from adherent colouring and organic matter. The contractor shall submit sample to DIO(N) for approval before delivery at site.

## **Coarse aggregate.** Coarse aggregate shall be obtained from sources such as crushed stone from approved quarries. Aggregate shall be chips size and uniform grading of approved quality. They shall be hard, strong, dense, durable, clean and free from quarry refuse and adherent coatings. It shall be free from soft pebbles, thin, elongated or laminated pieces and shall be roughly cubical in shape. It shall be clear and free from dirt and any other deleterious matter. The coarse aggregate to be used for concrete work shall be approved by DIO (N). They shall be screened and washed before mixing for concrete. The contractor shall submit sample for its grading and sizes to DIO (N) prior to delivery to site. The materials shall be inspected and approved by DIO (N) or his representative before use in work. Aggregate shall not be dumped on loam, mud or grass so that, on handling dirt and rubbish are not included in the concrete mix. Coarse aggregate shall be supplied in the following sizes. Nominal Size shall be 8 mm to 12 mm particularly for jacketing and continuous bands.

## **Additives.** Concrete shall be mixed from cement, fine and coarse aggregate and water only. The use of any additive or admixture shall not be permitted except with the prior written consent of the Authority.

# **Unreinforced concrete**. All foundation trenches will consist of 100 mm thick layer of unreinforced concrete mixed to 1:1.5:3.

# **Mass Concrete C25**. Provision of laying **Mass Concrete C25 (1:1.5:3)**: As detailed by Authority Design; laying, Including Excavation, Formwork, Membrane, Curing Methods and Construction joints as per specification.

# **Reinforcement Bar.** Is to be placed by the contractor with a minimum 50mm end-cover from formwork prior to the concrete being poured then inspected by the Authority.

# **Concrete Materials and Mix Designs.** The contractor shall submit to the Authority the proposed concrete mix design for any concrete works, including in-situ and pre-cast concrete. The size of the aggregate used is not to exceed the nominal 20 mm. The contractor is to notify the Authority representative minimum 24 hours prior to pouring of concrete, to allow a Construction Material Technician to take cube samples. Cubes are to be taken from structural concrete with 7 and 28 day crushing results passed to the Authority.

# **Concrete Practice.** The Contractor shall ensure that suitable consideration is given to the placing of concrete in hot and cold weather and appropriate precautionary/avoidance measures are to be undertaken in order to minimise shrinkage and cracking. Concrete is not to be laid if the temperature is below -5°C or above 30°C.

# At the time of placing concrete the Contractor shall ensure that all surfaces on which concrete shall be placed are clean, with no debris, organic material or free water. The concrete shall be placed while sufficiently plastic for full compaction. Do not add water or re-temper mixes. The temperature of the concrete at time of placing must not be less than 5°C. Fully compact to full depth (until bubbles cease to appear on the top surface) especially around cast-in accessories, into corners of formwork and at joints. Vibration of the concrete shall be by means of mechanical vibration only, with care taken in the mix design and compaction to minimise segregation. A spare mechanical vibration unit should be at hand in the event of break down during the concrete pour.

# At the time of placing concrete, the reinforcement shall be clean and free of corrosive pitting, loose mill scale, loose rust, and any substance which may adversely affect the reinforcement, concrete, or bond between the two.

# **Floor joints**. Construction, isolation and contraction joints must be carefully configured to minimize cracking due to concrete drying shrinkage and loading. Contraction joints are commonly sawcut into slab on grade floors at predetermined locations to direct drying shrinkage in an orderly manner. Contraction joints should be spaced at approximately 25 times the slab thickness to no more than 4.5 metres centre to centre.

# **Compaction.** Internal vibrators shall be used for compaction of concrete in foundations, columns, buttresses section, slabs etc, and if required surface vibrators shall also be used. Depending on the thickness of layer to be compacted, 25 mm, 40 mm, 60 mm and 75 mm diameter internal vibrators will be used. The concrete shall be compacted by use of appropriate diameter vibrator by holding the vibrator in position until:

## Air bubbles cease to come to surface.

## Resumption of steady frequency of vibrator after the initial short period of drop in the frequency, when the vibrator is first inserted.

# **Concrete Finish.**  Carry out all finishing operations at optimum times in relation to the setting and hardening of the concrete. Do not wet surfaces of concrete to assist surface working. Do not sprinkle cement on to the surface. Use a hand or skip float to give an even surface with no ridges or steps, when the concrete is suitably stiff apply a brush finish to produce a friction surface and resume specified curing without delay. Brush marks are to be made in the same direction at right angles to the direction of travel on each pad after eliminating surface blemishes by scraping straight edges and before the commencement of curing operations. The surface of the concrete shall receive no special treatment other than finishing operations required to produce the specified degree of accuracy of the surface level. The edges are to have a 5 mm bullnose edge applied. Any exposed concrete edges are to have a 25 x 25 mm chamfered finish applied to prevent damage when striking formwork.

# **Curing**. The Contractor shall prevent surface evaporation from the surfaces during the curing process. It is the Contractor’s responsibility to ensure the concrete is cured correctly. With the exception of plant and equipment for cutting contraction grooves the fresh concrete shall not be subjected to the weight of any traffic or equipment for a period of 7 days after the pour.

# **Cracks**. If cracks, which in the opinion of the Authority may be detrimental to the strength of the construction, develop in concrete construction, the Contractor at his own expense shall test the structure as specified in “Loading Tests” of these Specifications. If under such test loads the cracks develop further, the Contractor shall dismantle the construction, carry away the debris, replace the construction and carry out all consequential work thereto.

# **Defective Concrete**. Should any concrete be found honeycombed or in any way defective, such concrete shall be cut out partially or wholly by the Contractor and made good at his own expense.

# **Concrete for flooring**. Concrete for flooring on grade shall be placed in alternate bays not exceedingly more than 4m x 6m or as specified in the drawings including forming the joints or adjacent bays. The stiff mix shall be thoroughly vibrated and finished to receive the floor finish.

# **Damp Proof Membrane**

# The 1000 Gauge DPM membranes shall be laid either under the concrete slab, floors or on top of it to prevent moisture transmission. Ordinarily a bed of hardcore on the ground then either a blinded surface and a DPM before a layer of concrete slab is poured.

# **DPMs overlap.** There shall be sufficient overlap of sheets by at least 150 mm should more than one sheet is required. The join should be then taped to ensure a watertight seal is established.

# The DPM (1000 g) polythene sheet is laid between sand blinding and base concrete to prevent moisture transmission. Care must be taken to ensure that there are no holes or tears in the sheet that could allow water penetration.

# **DPC for Walls**. DPC shall be used and will be continuous with the damp proof course in the walls. 2 layers of bituminous felt as damp-proof course to all Kathmandu stone and blockwork walls, 200 mm above floor level. The damp proof course slotted over vertical blockwork reinforcing bars.

# **Construction of Formwork**

# The formwork is the responsibility of the Contractor but should comply with the following:

## Formwork shall be sufficiently rigid and tight to prevent loss of mortar matrix from the concrete, and to maintain the correct position, shape and dimensions of the finished work. Formwork shall be so constructed as to be removable from the cast concrete without shock or damage.

## Construct accurately and robustly to produce finished concrete to the required dimensions. Formed surfaces must be free from twist and bow, all intersections, lines and angles being square, plumb and true.

## Forms are to be laid to line and level, adequately braced during placing operations to withstand, without springing or settlement, the impact and vibration of the spreading, compacting and finishing operations.

## The interiors of all forms shall be thoroughly cleaned out before any concrete is placed. The faces of the forms in contact with the concrete shall be clean and treated with a suitable release agent, where applicable.

## Constructed (including joints between forms and completed work), to prevent loss of grout, using seals when necessary. Secure tight against adjacent concrete to prevent formation of steps.

## The depth of forms shall be adequate to fully support the nominal thickness of the slab. The thickness of packing below the forms shall not exceed the irregularity of the surface permitted by this specification, specifically +/- 3 mm over a 3 m straight edge.

## Forms are to be coated in mould release oil to aid in striking.

# **Surface Accuracy.** The concrete is to be placed with a surface tolerance of +/- 3 mm over a 3 m straight edge.

# **Results.** The Contractor is to carry out 7 and 28 day cube testing of every batch of concrete during the Construction. The results must be submitted daily by the Contractor to the Authority and will be compared against the Authorities independent test results. Any concrete not forecast to meet the requirement of the 28 days strength at the 7 day cube test will be replaced at expense to the Contractor. The Authority is to be notified 24 hrs prior to the Contractor pouring concrete.

Steel Reinforcement

# **General.** Reinforcement shall comply with the following standards and be in prefabricated sheets or cages, or bars assembled on site and shall be free from oil, dirt, loose rust and scale:

## Carbon steel bars for the reinforcement of concrete to BS 4449.

## Cold-reduced steel wire for the reinforcement of concrete to BS 4482.

## Steel fabric for the reinforcement of concrete to BS 4483.

# When deformed bars are used they shall conform to Type 2 bond classification of BS 4449.

# Spacing of bars shall not be less than twice the maximum size of aggregate used. Laps in longitudinal bars shall be not less than 35 bar diameters or 450 mm whichever is greater.

# Laps in any transverse reinforcement shall be a minimum of 300 mm.

# **Reinforcement.** Laps in mesh reinforcement shall be not less than 250 mm. Laps in bar reinforcement shall be not less than 40 times the bar diameter or 300 mm whichever is the greater. At no instant should the reinforcement steel have less than 50 mm of concrete cover measured in any direction.

# Fix reinforcement before the concrete is placed, providing suitable spacers at not more than 1 m centres or closer spacing as necessary to support in position and maintain the specified cover. Fix adequately (at every reinforcement crossing) using tying wire, which must not intrude into the concrete cover.

# The use of wire mesh is allowable in principle. The Contractor shall inform the Authority of reinforcement scheduled for use; where wire mesh shall be used in load bearing and/or critical elements, normal bar reinforcement should be provided along the outside perimeter as well as other critical perimeters, and securely tied to the mesh.

# Concrete shall not be placed until reinforcement is free from any substance which might adversely affect the steel or concrete chemically or reduce the bond.

Hollow Concrete Block Wall

# **Hollow Concrete Block wall**. Shall be class “A” quality, machine made concrete bock with good compressive strength of Prefab Concrete Industries or equivalent quality, as approved by the Authority. The size of the block shall be of standard size of 400 x 200 x 200 mm or 400 x 200 x 150 mm or as shown in the drawings. Half blocks shall be used of size 200 x 200 x 200 mm or 200 x 200 x 150 mm. The contractor shall submit a detailed manufacturer’s catalogue for any blocks to the Authority for approval. Each lot of the delivered blocks shall be tested for compressive strength if so desired by the Authority. Such tests shall be done prior to execution and in the presence of the Authority. If the test result does not comply with the standard code, the contractor shall change the source unless directed by the Authority. For openings, reinforced concrete lintels shall be used as mentioned in the design drawing.

# **Lateral Supports**. The limiting, horizontal distance shall be 24 times the nominal thickness of wall. The limiting vertical distance shall be 18 times the nominal thickness of wall; the storey height permitted for a 20 cm wall will therefore be 3.6m or less. The lateral supports may be obtained horizontally by:

## Cross Walls

## Pilaster or Buttresses Steel reinforcements and vertically by:

## Floors or Roofs

## Steel reinforcement

# **Compressive Strength -** All bricks and blocks shall have the required minimum compressive strengths as specified on the drawings. The Contractor shall satisfy himself throughout the period of delivery, that batches of bricks and blocks used have the required minimum crushing strength as shown on the drawings. The Contractor shall obtain reports or certificates of such test carried out by the brick or block suppliers and produce evidence to show that a regular, efficient method of quality control as referred to in BS 3921 is in use. The category of manufacturing control, i.e. Normal or Special as defined in BS 5628: Part 1, shall be obtained from the manufacturer.

# **Reinforcement –** The vertical and horizontal tie reinforcement where required in block work to be as per design drawings provided.

Brickwork

Bricks

# The bricks shall be chimney made local bricks of first-class quality. These shall be of quality approved by the Authority and shall be free from grit and other impurities such as lime, iron and other deleterious salts. These shall be well-burnt, sound, and hard with sharp edges and shall omit a ringing sound when struck with a mallet. These shall be of uniform size.

Mortar

# Cement mortar shall be of proportion as indicated. The ingredients shall be accurately gauged by measure and shall be well and evenly mixed together in a mechanical pan mixer, too much water shall not be used. River sand shall be used unless otherwise specified. If hand mixing is allowed, then it shall be done in brick tanks. The gauged materials shall be put in the tank and mixed dry. Water will then be added and the whole mixed again until it is homogeneous and of uniform colour.

# **Wall Ties and Anchors** - Ties and anchors between brickwork and concrete shall be stainless steel butterfly type cast into concrete as work proceeds, at specified spacing to suit brick / Block and Stone coursing.

Workmanship

# All the bricks shall be thoroughly soaked in water before use till the bubbles cease. The bricks shall be laid in cement mortar bed in proper bond. When bonding, the brickwork must be set back in every course. The vertical toothing shall not be accepted. The course shall be truly horizontal and the work strictly in plumb. The mortar joints shall not exceed 10 mm and minimum 6 mm in thickness. The joints shall be broken vertically. All the joints shall be raked out to a depth of 6 mm to receive setting beds render and/or for pointing work where required.

# The walls are to be carried up in a uniform manner with level courses and true vertical, no one portion being built up more than 14 single course per day. The top of the walls shall be well wetted before the work recommences.

# All the works shall be done as per the specification and drawings. Scaffolding of required nature shall be provided as necessary.

Hardcore

# **Hardcore**. All foundation trenches will consist of a layer of well compacted hardcore stone soling of 100 mm thick in accordance with specifications detailed in the drawing pack at Booklet 4.

Sand blinding

# **General**. Provision of certain layer of fine sand as base for concrete floor and DPM for all concrete floors.

# **Specification.** Sand blinding is a base layer of that is laid above a hardcore to provide a clean, level and dry working surface. A thin layer of either 50 mm, 100mm or 200mm thick fine sand is poured over the hardcore sealing in the underlying material and levelling off the surface.

Cladding

# **External fair faced brick cladding** – The external **fair faced bricks** are to be **machine made (Chinese)** with high standard finish on its surfaces.

## **Brick face finish**. The facing bricks shall have a consistent and uniform finished texture.

## **Mortar Joint Profiles**. The mortar joints are to be tooled to leave a concave, rounded joint as shown below.

##

## **Mortar size**. The mortar size shall be 10mm thick with a mix ration ratio of 1:2-8 cement: sand with plasticizer.

## **Size**. The facing bricks will be 230mm x 60mm x 110mm.

## Samples are to be approved prior to incorporation. The Contractor's attention is drawn to the fact that a high standard of workmanship will be required for facing work generally and particular care must be taken to keep such work free from mortar droppings and other staining.

Wall Partition

# **Specification.** Walling partition works are to be in accordance with the specification below. This specification applies to following type of walls.

* 1. Block walling partition
	2. Glass walling partition

# **Scope of work for block walling partition**. Construction of blockwork and mortar walls, with tie in bars and joint support where necessary:

1. Reinforcement concrete block wall 200 mm thick – Load bearing wall.
2. Reinforcement concrete block wall 100 mm thick – Non load bearing wall.

# **Hollow Concrete Block –** Generally all hollow concrete blocks are to be the best of their respective kinds, hard, square cornered and sound.

# **Compressive Strength -** All blocks shall have the required minimum compressive strengths as specified on the drawings. The Contractor shall satisfy himself throughout the period of delivery, that batches of bricks and blocks used have the required minimum crushing strength as shown on the drawings. The Contractor shall obtain reports or certificates of such test carried out by the brick or block suppliers and produce evidence to show that a regular, efficient method of quality control as referred to in BS 3921 is in use. The category of manufacturing control, i.e. Normal or Special as defined in BS 5628 : Part 1, shall be obtained from the manufacturer.

# **Reinforcement –** The vertical and horizontal tie reinforcement where required in block work to be as per design drawings provided.

# **Mortar** - Mortar made on site must be mixed by machine, which must be cleaned before use to avoid contamination and must be cleaned out before changing mixes, and at the end of every working period. All materials must be measured accurately by volume or weight, and not shovels. Powdered plasticizer must be dissolved in part of the mixing water before use. Mortar should be used within 2 hours of the mixing of the cement and water, and any mortar not then used must be discarded and not re-tempered. This period of time may require reducing due to temperature and weather conditions.

# **Wall Ties & Anchors -** Ties and anchors between brickwork and concrete shall be stainless steel butterfly type cast into concrete as work proceeds, at specified spacing to suit brick / Block coursing.

# **Framed Fixed Glass Panel Partition**

# **General.** Framed glass panel partition shall be anodised aluminium fixed frame of size 100 x 25 mm, wall thickness of at least 2 mm, cutting at 900. The glass to be fixed to frame with 20 x 20 mm aluminium cleats on either side with rubber seal. Glazing to be 12 mm thick toughened glass. Apply anti shatter film clear Mylar (sticker) to all glazed panels. The aluminium metal shall be satin finish without any irregularities on the surface of the metal.

# **Specification**. The following will be the specification.

1. **Toughened Glass**. Also known as tempered glass and safety glass will be used for both partitions and door. Both must have an anti-shatter film applied to it to prevent spreading of the broken glass.
2. **Anti-shatter film**. The anti-shatter film shall be clear Mylar brand and 4 mil thick.
3. **Glazing area and surfaces**. The following factors to be considered during glass installation:
	* Number of glass T-junctions
	* ​Angled glass corners
	* ​​Joints - dry joints
	* ​​​​Deflection head track - used counteract building movement
	* ​Ironmongery - these include locks, handles, door rails, hinges, etc.
4. **Frame Material**. The frame material will be Aluminium ASTM B221 with strength and durability characteristics of not less that Alloy 6063-T5.

# **Scope of work for Framed Glass partition**. The Framed glass partitions with swinging doors will be installed to provide the aesthetic advantages of glass walls with additional structural and acoustical performance of full framing. Aluminium channels at the floor, ceiling, and walls will effectively dampen sound transmission and provided add structural definition without impeding sightlines. Full framing will accommodate uneven existing floors.

# **Partition Installation**

1. General. Comply with glass panel partition manufacturer's written installation instructions and approved shop drawings.
2. Install glass panel partitions after other finishing operations have been completed.
3. Set units level, plumb, and true to line, with uniform joints.
4. Fasten glass panel partition track and sill to building structure and supports as indicated on approved shop drawings, utilizing approved fasteners and spacing.
5. Set, seal, and grout floor closer cases.

# **Adjusting**

1. Adjust doors and hardware to produce smooth operation and tight, uniform fit.
2. Adjust door closers to required timing and force.
3. Adjust latches and locks for smooth operation.
4. Test and adjust hardware linked to access control system.
5. Replace damaged panels and accessories.

# **Cleaning**

1. Clean glass panels in accordance with glass manufacturer's written instructions. Do not use cleaning agents or methods not approved by glass manufacturer.
2. Clean exposed metal surfaces to factory new appearance.

**Submission for Authority’s approval**

# The following are to be submitted for Authority’s approval prior to installation:

1. Proposed layout plan if required.
2. All other data deemed appropriate by the Authority.
3. All materials should be presented for approval before being used.

Roof

# **Scope of Specification.** The **Authority** will supply all the Decra roof and its accessories and the **Contractor** will install the identified Decra roof. The roof works are to be in accordance with the specification below and design drawing provided. This specification applies to following.

## **Steel structure.** Unframed steel framework to include all necessary welds, site welds, cleats, plates and sundry fixings, priming with red lead graphite primer, painting all exposed steelwork with 2 coats of zinc paint, delivered to site and fixing in position. Materials and workmanship shall conform to the requirements of B.S. 449. Bolts shall project at least two threads through nuts.

## **Timber structure**. All timber battens to be treated pressure impregnated and free from borer beetle or insect attack and seasoned to moisture content not more than 22%. All joints to be bolted and where nails are used, they should be used together with metallic connect plates.

## **Decra roofing tiles**. Roof shall be covered with **Authority supplied** Decra roofing tiles and its accessories.

### The colour of Decra tiles to be used is Terracotta.

### The roofing system includes the roofing accessories such as Decra vent, ‘D’ ridge, left-hand and right-hand box barge covers.

### A standard underlay, Guofoil or approved brand to be used, lay below all roofing surfaces.

### The standard of installation of the Decra Classic and Decra Plus Tiles should comply with the requirements of BS 8000-6: 1990.

### The roof construction must be adequate to resist the loadings detailed in BS EN 1991-1-1: 2002 and BS EN 1991-1-4: 2005 and their National Annexes, or BS 6399-1: 1996 and BS 6399-2: 1997.

### The roof construction should be in accordance with the relevant requirements of BS 5534: 2003. The minimum batten sizes permitted depend on the rafter spacing, as detailed in Table 1 below.

**Table 1 Batten sizes and rafter or roof truss centres**

|  |  |
| --- | --- |
| **Minimum Batten size (in mm)** | **Rafter spacing (in mm)** |
| 38 x 25 | 450 |
| 50 x 25 | 600 |
| 50 x 38 | 900 |
| 50 x 50 | 1200 |
| 50 x 65 | 1500 |

### The roof space and batten space must be adequately ventilated in accordance with BS 5250: 2011. Where timber boarding is laid on the rafters, a timber counter batten should be installed in accordance with BS 5534: 2003.

## **All Rafter, Battens and fixings shall be supplied by contractor.**

## **Installation**. Installation shall be conducted as follows:

### Rafters must be securely tied to the building structure where the rafters/trusses are spaced at 900 mm, 1200 mm or 1500 mm centres. Polypropylene or nylon tape is nailed across the rafters to support the underlay.

### Battens are secured over the underlay and roof trusses and fixed at the spacing of 370 mm.

### The tiles are laid onto the battens with the front flange of the upper tile overlapping the rear upstand of the lower tile. Adjacent tiles are overlapped with side laps of 64 mm (one corrugation).

### Fixing is achieved by nailing through the front downturned flange into the side of the batten using Decra nails at the rate of four per tile.

## **Galvanised work**. All steel members used on the roof and hot water plant cage shall be hot dip galvanised and shall confirm to the requirement of BS 729:1971. Hot-dip galvanizing is defined as a coating of zinc-iron alloy layers, obtained by dipping prepared iron or steel articles in molten zinc. Under no circumstance shall steel members be had or spray painted unless if the joint section requires welding. is conducted

## **Fabrication**. Care shall be taken to avoid fabrication methods which could cause distortions or embrittlement of the iron and steel articles. Unsuitable marking paints, grease, oil and other deleterious materials shall be removed prior to fabrication of steel and iron articles.

## **Surface finish**. The galvanised coating shall be continuous, adherent, as smooth and evenly distributed as possible, and free from any defects or imperfections that is detrimental to the usage of the coated article.

## **Coating Reinstatement**. Small areas that are uncoated and/or small areas of galvanised coating damaged by welding, cutting or by excessively rough treatment during transit and erection low many be reinstated either by the use of low melt zinc alloy repair roads or powers made specifically for this purpose or by the use of at least two costs of good quality zinc-rich paint. Sufficient materials should be applied to provide a zinc coating at least equal in thickness of the galvanised layer.

## **Fabrication**. The works shall be carried in accordance with Indian standard IS 800:2007, IS 1030 or IS 2708.

## **Qualification of Welders.** Only skilled welders shall be used.

## **Supervision of Welding.** Welding shall be carried out only under the direction of an experienced and competent supervisor.

##  **Welding.** Unless otherwise described in the Contract, metal-arc welding shall comply with IS 800:2007. Electrodes and fluxes shall be used in accordance with manufacturer’s instructions.

## Where galvanised steel is to be welded, adequate ventilation shall be provided. Grinding of edges prior to welding may be permitted to reduce zinc oxide fumes formed during welding and eliminate weld porosity which may occur.

## Unless otherwise described in the Contract, all butt welds shall be complete penetrations welds made between prepared fusion faces. In the fabrication of build-up assemblies, all butt welds in each component part shall be completed, whenever possible, before the final assembly.

## The position of welds required for temporary attachments shall be agreed by the Authority before the work commences.

## Handling and Transportation to site

## **Handling**. Fabrication parts shall be handled and stacked in such a way that permanent damaged is not caused to the components. Means shall be provided to minimise damage to the protective treatment on the steelwork and any damage which does occur shall be made good.

## **Transportation to site**. All works shall be protected from damage in transit. Particular care shall be taken to stiffen free ends and prevent permanent distortion and adequately protect all galvanised surfaces. All bolts, nuts, washers, screws, small plates and small articles generally shall be suitably packed and identified.

# **Erection**. Erection procedure shall be in accordance with the design proposals submitted by the Authority to the Contractor, and no divergence from the approved procedure will be permitted except if agreed to in writing by the Authority.

# The Contractor shall inform the **Authority when fabricated sections are ready for inspection prior to erection**. No erection shall the be permitted until the Authority approves fabrication.

# During erection, care shall be taken to avoid any shock, dynamic or vibrationary loading of the members.

# No members in the works shall be finally bolted, welded or otherwise joined until the whole of a major section is approved by the Authority. **Connection shall be made as soon as possible after the Authority’s written approval is received**. Care shall be exercised to avoid interference with members already in place.

# **Plant Room**

# The Contractor will fabricate and install the plant room as per the design specifications drawings in Booklet 4. Specification will be as detailed at para 177.

# **Rainwater Goods**

# **Rainwater Gutters**. Rainwater goods works are to be in accordance with the specification and design drawing provided.

# Rainwater gutters shall be fabricated out of 3.15 mm thick galvanized M.S. Sheets. All arrangements for incorporating outlets for rainwater down take pipes shall be incorporated in the fabrication, as per design drawings in Booklet 4.

# Steel gutters and down pipes to include all necessary welds, site welds, cleats, plates and sundry fixings, priming with red lead graphite primer, painting all exposed steelwork with 2 coats gloss oil paint, gutters to be painted with bituminous paint to the inside and delivered to site and fixing in position.

# Gutters shall be hot dip galvanized and painted as per painting specifications of structural steel work. Thickness of galvanized coating shall not be less than 50 microns. Connections between each section shall be made water-tight by site seal welding.

# Materials and workmanship shall conform to the requirements of B.S. 449. Bolts shall project at least two threads through nuts. Gutters should be lapped minimum of 150mm and support brackets introduced between the laps.

# **Glazed Windows**

# **External Windows**

# **General**. Supply and installation window, works are to be in accordance with the specification below and design drawing provided at Booklet 4. This specification applies to:

## UPVC windows.

## Extra over for frosted glass

# **Specification**. The following shall be the window specification:

## **Composition**. The Un-plasticized PVC (Polyvinyl Chloride) meeting the requirement of ASTM D 1748 / BS 7413/ EN 12608 shall be used. No reworked material is to be used in any profile, whether used internally or externally.

## **Durability**. The Systems shall be resistant to chemicals and be fungal and vermin proof. The profiles must be colourfast, being able to withstand weather and light resistance test of 4000 hours on xenon and weathering apparatus.

## **Colour**. The Systems colour should be uniform and consistent.

## **Profile** Construction. The profile depth should be minimum of 58mm and width to be 112mm with a nominal wall thickness, internally and externally of 2.8mm. The sash to be 66mm x 42mm for glazing and mosquito net with heavy steel black coated 0.5 mm thick mosquito net. The profile shall have a minimum of two sealed chambers for transoms and mullions and 3 sealed chambers for frames and sashes. **Use Prominance UPVC Window System only, no other brand shall be accepted.** The double glazing shall be **SHYAM TUFF brand.**

## **Strength and Safety of moving parts**. The moving parts of the Windows must have sufficient strength and robustness to withstand accidental Static and Dynamic loads in use, without any permanent deflection or breakage.

## **Glazing**. Windows double glazed with 6 mm toughened glass. All glazing shall be internally beaded. The windows shall be constructed in such a manner that the glazing or deglazing can take place without the removal of the sash or frame. The window should have a permanent fixed vent with mosquito net. The openable pane should have a mosquito net to the inside fixed permanently.

## **Hardware general**. All hardware shall be manufactured from corrosion resistant material and be approved by the profile Systems supplier.

## All ferrous screws, nuts, bolts and other fastening or fixing **shall be of stainless grade or of a suitable coated steel** recommended for use in the fabrication of UPVC windows. Metal that are in contact with each other shall be compatible so as to prevent galvanic corrosion of dissimilar metals by electrolytic action. All hardware should ideally be fixed by attachments through the UPVC to the reinforcement; alternatively, it should be fixed in purpose designed screw ports or at least two thickness of UPVC.

## Hardware with provision for adjustment shall be accessible for adjusting after the window has been installed. Hardware used to open and close the window shall be replaceable without removing the outer frame from the structure.

## Supplement to the above specification, the glazing is to be replaced with frosted glass of a similar strength and thickness.

# **Scope of works**. The windows are to be constructed in a way to prevent the ingress of water through the panes and with a cill to allow water to run off onto the ground. The uPVC frame is to be completely sealed to prevent water ingress to the inner structure. The glazing is clear with glass, and free from scratches and cracks. It is also to be of a sufficient thickness to prevent accidental damage in accordance with Building Regulations Doc A.

# The window is to be of the correct size as per the design drawings at Booklet 4. The window is to be installed as per the design specifications at Booklet 4. Any space around the frame is to be cleanly filled with expanding foam and covered with beading to match the colour and construction of the window frame. All sides are then to be sealed with suitable coloured mastic to match.

# **Submission for Authority’s approval**. The following are to be submitted for Authority’s approval prior to installation:

## Material sample.

## Proposed layout plan if required.

## All other data deemed appropriate by the Authority.

# **Testing and inspection**. All works must be carried out by the qualified and competent person. Sample of window material used must be provided to the authority for approval.

# **Doors, door frames and linings**

# **General**. Supply and installation of solid timber doors and glass doors. Works are to be in accordance with the manufacturer’s specification and design drawing provided at Booklet 4. This specification applies to following type of doors supplied by the Contractor:

## Solid Timber doors.

## Glass doors.

# **Specification for solid timber door**.

# **General**. The Contractor will supply and install all external and internal doors complete with door accessories and works are to be in accordance with the manufacturer’s specification and design drawing provided at Booklet 4. This specification applies to following type of doors supplied by the Authority:

## Internal doors.

## External doors.

## Plant room door.

# **Specification**. The External and internal doors are to be solid core timber panel, finished with 1 coat primer and 3 coats white gloss, including the top and bottom of the door. The door is to be fitted with a bronze-coloured handle complete with backing plate, latch and 5-lever mortice lock. It is to be fixed to the frame with 3No bronze coloured 100mm long butt hinges, with the door opening internally. The door is also to be fitted with toe to prevent the ingress of water.

# Plantroom doors are to be fabricated and installed as per the design specifications at Booklet 4.

# **Scope of works**. The doorframes are to be fixed as wall is being constructed and is to match the width of the wall, finished with an architrave and painted to match the door. It is to be fixed to the wall with appropriate fixings at 600mm c/c and to be fitted to leave no gaps.

# **An appropriate lintel is to be installed supported by a minimum of 150mm on** either side of the opening. For fire resistant doors, the frame is to be recessed and fitted with an intumescent strip and the door fitted with round, blue fire door signs on either side.

# **Specification for Glass doors**.

# **General**. All edgework, drilling or surface decoration must be carried out prior to the toughening process as the glass cannot be altered or reworked once treatment is completed.

# **Design Specification.** The cover profile dimensions, glass type and other useful information include:

# **Frameless glass doors (Hinge and pivot doors).** Frameless glass doors will be bottom and top hinged.

## **Maximum Panel Heights**. Up to 2.6m high, subject to overall product design.

## **Glass.** 12mm Toughened Glass Polished all-round. Sound proofing effect of approximately 70%.

## **To open and close doors.**  The locking mechanism shall be stainless steel lock.

# **Door Hardware and Fittings.**

## **Door Hardware.** Door hardware units in types, sizes, quantities, and mounting locations recommended by manufacturer for door types, sizes, and operation. For exposed components, match metal and finish of exposed partition fittings unless otherwise noted.

## **Locking mechanism**. As per door manufacturer’s recommendation.

## **Pulls and Handles**. Back-to-back handles, minimum 34 mm diameter.

## **Concealed Floor Closers and Top Pivots**. Provide housings, bottom insert, top walking beam pivots, mounting plates, and accessories.

## **Automatic Overhead door closer**. The robust overhead door closer for the glass doors in frames, requires 2 holes in the glass for the bolt through fixings The finish shall be Satin Stainless steel. Installation as per manufacturer’s recommendation.

# **Quality Standards Toughened Glass**. Manufactured in accordance with the latest standard ‘Glass in building – thermal toughened safety glass BS EN 12150.

## **Privacy.** Privacy within meeting rooms and offices will be achieved without loss of light or change of partition design, by using over cover as approved by the Authority.

## **Identity**. DIO logos will be included within door film designs to provide identity within the office environment. Logos will be etched on the glass door as directed by the Authority.

## **Blast film**. This will be designed to be used on toughened glass to eliminate glass shards being scattered following an explosion or breakage.

# **Toilet doors, door frames and linings**

# **Toilet Aluminium partition wall**.Provision of 2.1 m high aluminium framed cubicles on Male and Female ablutions.

# **General**. The aluminium framed cubicles are made of extruded aluminium sections and shall conform to relevant standards and codes. The aluminium sections used in **frames and shutters (toilet door) shall be 16 microns** thick and powder coated in approved colour manufactured by **INDAL.** All members shall be designed for recessed (slush) aluminium boards without use of applied stops unless otherwise specified. The frame and the rebate shall be a monolithic unit.

# All members shall be free of stains and any damage. If any damage or defects during delivery or after fitting in position are found, the defects shall be rectified immediately. The contractor shall attach all necessary product and quality specification along with the tender return. All the frames and shutters shall be of the same colour. Exposed fastenings shall not be used except where specifically detailed and /or approved.

# **Hardware and accessories**. All hardware shall conform to the brand name listed below.

## Gasket – Indian EPDM marine quality

## Locks – Japanese reliance hook locks

## Silicon – Wacker and Quilosa brand

## Screws – Nickel coated pan screw

## Rawl plugs – Plastic ferruled grips 8 mm dia

## Shims – Neoprene plastic shims

## Composite panel – ACP composite panel 4 mm thick Alstrong brand

## Aluminium sections – 90 mm series sections 1.2 mm thick

# **Fabrication.** Fabrication shall be according to best practices and all cutting, and shaping shall be made with properly functioning machinery manufactured for the purpose of fabricating aluminium products. Hand cutting, shaping and slot cutting by hand will not be accepted.

# Joints shall be mitred or coped and shall be provided with extruded corner reinforcement. All joints shall be tight fitting, flush with adjoining members, neat and sealed.

# The contractor is to arrange the preparation of complete workshop drawings of all fabricated aluminium works and submit to the authority prior to incorporation at site.

# **Finishes**

# **Wall finishing work.** All mortar for plastering shall be prepared by mixing in mechanical mixers as previously described above for concrete mixing, using ratios of 1:4 and 1:3 unless otherwise specified. The joints in all new masonry work shall be raked out to a depth of 10 mm minimum and the surface watered and cleaned of all dust and dirt. All cracks, blisters and other defects must be cut out and made good and the whole of the area left in a perfect condition on completion. The finished plaster shall be cured for 7 days and protected against damage. The workmanship shall be to the satisfaction of the Authority.

# **Wall internal plastering.** The application of the coating is to be conducted firmly and in one continuous operation between angles and joints to achieve good adhesion. The following is to be observed:

## **Appearance.** The appearance of finished surfaces are to be even and consistent, free from rippling, hollows, ridges, cracks and crazing. The accuracy of the finish is to be true plane, to correct line and level, with angles and corners to a right angle unless specified otherwise, and with walls and reveals plumb and square. Prevent excessively rapid or localized drying out.

## **Flatness/surface regularity.** Sudden irregularities and not permitted not permitted. Deviation of plaster surface is to be assessed by measuring from underside of a straight edge placed anywhere on surface; the permissible deviation (maximum) for plaster not less than 13 mm thick is 3 mm in any consecutive length of 1800 mm.

## **Dubbing out.** Correct substrate inaccuracies with new smooth, dense concrete and similar surfaces. Dubbing out prohibited unless total plaster thickness is within range recommended by plaster manufacturer.

## **Undercoats.**  Undercoat is to be ruled to an even surface and then cross scratch to provide a key for the next coat. Undercoats on metal lathing are to be worked well into interstices to obtain maximum key. Undercoats gauged with Portland cement should not have next coat applied until drying shrinkage is substantially complete.

## **Application**. Thickness of any one coat (maximum) is 10 mm. Mix to be as per manufactures recommendations for undercoat. Application is to achieve a firm bond. Allow each coat to set sufficiently before the next is applied. Cross scratch surface of each coat.

## **Smooth finish.**  Appearance should be a tight, matt, smooth surface with no hollows, abrupt changes of level or trowel marks. Avoid water brush, excessive trowelling and over polishing.

## **Wood float finish.** Appearance should be an even overall texture. Finish with a dry wood float as soon as wet sheen has disappeared.

# **Painting work**. All painting and stain works are to, where suitable match that of the surrounding buildings. The following are to be observed for all painting works:

# **Matt washable emulsion paint to walls.** All Internal plaster finished masonry walls are to be painted with matt emulsion (colour to be approved by the Authority). All are to have a single thinned coat to paint manufacturer’s recommendations, finishing with a minimum of two full coats.

# **Gloss paint to joinery**. All new joinery including doors, door frames/linings, architraves, skirting’s are to be painted with gloss paint (colour to be approved by the Authority) so to match the original finish. Joinery is to have one coat of primer before fixing (existing joinery is to be spot primed as required), one coat of undercoat; finishing with one full coat of gloss paint.

# **Gloss paint to internal metal work.** All new internal metal are to be painted with gloss paint (colour to be approved by the Authority). Metal work is to have one coat of primer, one coat of undercoat; finishing with one full coat of gloss paint.

# **Galvanizing paint to external metal work.** All new external metal work is to be painted with gloss paint (colour to be approved by the Authority) so to match the original finish. Metal work is to have two coats of red oxide primer prior to delivery to site. After erection of the structure re-clean and paint a further two coats of red oxide primer. Finishing to metal surfaces are to be with two coats of galvanizing paint.

# **Decorative wood stain to joinery.** All new joinery including doors and posts are to be stained with a weather shield opaque stain (colour to be approved by the Authority) so to match the original finish. Decorative wood stain is to be applied in 2 full coats.

# **Protection**. ‘Wet paint’ signs and barriers are to be provided where necessary to protect other tradesmen/visitors; and to prevent damage to freshly applied coatings. The contractor is to arrange sufficient plastic/tarpaulin sheets to cover from dust and make the site clean and tidy every day.

# **Preparation for painting works.** All surfaces to be painted/stained are to be sufficiently dry in depth to suit the coating and have all efflorescence salts, dirt, grease, oil, surface irregularities, dust, particles and residues from preparation removed. The following are to be observed:

## **Fixtures and fittings.** Before commencing work remove all surface mounted fixtures and fittings. Refurbish as necessary or replace with similar and refit when coating is dry.

## **Ironmongery.** Before commencing work remove ironmongery from surfaces to be coated. Do not remove hinges. Refurbish as necessary (Remove old coating marks. Clean and polish) or replace with similar and refit when coating is dry.

## **Purlins.** Finishing to roof purlins are to be applied prior to laying of roof covering.

# **Floor finishes**

# **Concrete screeding floor.** The floor finish will be a wearing screed (formerly known as “high strength concrete toppings”) which be installed once the space is enclosed, unlike a structural floor slab. This will serve as a floor finish and will require care and expertise to execute correctly.

# **Specification**. Floor screeds shall be suitable for their intended use. Items to be taken into account include:

## **Background.** Background surfaces for bonded screeds should provide an adequate mechanical key. If necessary, cement grouting or a bonding agent should be specified to provide adequate adhesion.

## **Moisture Protection**. The floor design should ensure that moisture from the ground does not enter the structure.

##  **Screed mix**. Cement and sand screeds shall be a mix of 1 : 3. Screeds more than 40mm thick may be of concrete.

## **Screed thickness**. Cement and sand screeds should be not less than 12 mm when laid monolithically and 25 mm thick when laid on reinforcement.

##  **Curing**. A curing period should be allowed until the screed achieves sufficient strength to resist shrinkage stresses and other damage.

## **Tile**. All floor tiles shall be tiled as per specification.

# **Wall/Floor Tiles**

# **Specification**.The contractor is to Supply and install tiles to the following specification:

## The Contractor is to ensure that all materials confirm to current standards and have not been subject to deterioration. Once the Contractor has fixed the material, he is deemed to have accepted the quality of the material. The tile colour and size are to be pre-approved by the authority.

## Any damage caused to fixtures/fittings in the execution of the work will be charged to the Contractor. The Contractor must not remove protective coverings.

## Where pattern tiles are requested, they shall form no more than 5% of the area to be tiled unless otherwise specified by the sales department.

## Plastic finish tile bead (colour to match /compliment tiling) is to be fitted to all exposed edges, reveals and corners (both external and internal) unless specifically instructed by the Authority not to do so.

## Unless otherwise stated, glazed wall tiles to be to BS2660, free from blemishes fixed to plastered walls with approved tile adhesive, in accordance with manufacturer's instructions and painted in white cement. Petroleum based adhesive to be used on timber/ply ducting, etc. Contractor to utilise a waterproof adhesive in all areas to comply with recommended fixing requirements.

## Any electrical accessories which are loosened in order to facilitate proper tiling must be re-fixed after completion of the tiling works by the contractor.

## Radiator brackets (if applicable) must be fixed on to and through the tiles. Therefore, cutting brackets around tiles is not permitted. Where brackets have been fitted prior to tiling, these must be removed (by a Plumber) before tiling commences and refitted following completion.

## The Contractor shall, when requested provide the hazard and data sheets and COSHH assessments. Under no circumstances should any waste substances be poured down drains.

## Joints to be true to line, continuous and without steps. Joints on walls are to be truly horizontal, vertical and in alignment round corners. Joints in floors to be parallel to the main axis of the space or specified features.

## Cut tiles/slabs to be kept to a minimum, as large as possible and in unobtrusive locations. All Joints are to be in alignment and all tiles to be cut neatly and accurately.

## Unless specified otherwise, fix tiles so that there is adhesion over the whole of the background/base and tile backs. Clean surplus bedding material from joints and face of tiles without disturbing tiles.

## When checked with a 2m straight edge with 3mm thick feet at each end, placed anywhere on the surface, the straight edge should not be obstructed by the tiles and no gap should be greater than 3mm.

##  Maximum deviation between tile and slab surfaces either side of a joint, including movement joints is to be 1mm for joints less than 6mm wide.

## Ensure joints in skirtings match and align with joints in floor tiling.

##  After completion, the tilework is to be grouted and polished.

# **Grouting**

# **Specification**. The contractor is to grout tile work as follows:

## Ensure the surface of the tile work is clean and free of any debris.

## Ensure the correct admixture and dry grout mix is mixed in a clean container then uses a beater bar at the lowest speed or margin trowel to mix the grout to a toothpaste consistency. Add more liquid or powder as needed. After mixing let the grout stand for 5 minutes before remixing with a margin trowel.

## Test the consistency of your grout by scooping it onto a grout float. The grout should stick to the float when it is turned to the ground but is still a smooth wet paste.

## Use a grout float or margin trowel to scoop the grout from the bucket and apply to your tile with firm pressure and spread the grout into the tile joints at a 45-degree angle.

## Apply and compact the grout with firm pressure until the grout is uniformly packed into the joints and level with the tile.

## Remove excess grout with a wet sponge, after excess grout is removed. Using a circular motion, continue sponging the tile until it is clean. Then clean the sponge and in a north/south direction wipe the entire surface of the tile.

## Allow the grout to dry for 24 hours before carrying out any sealing of grouted tile work.

# **Suspended (False) Ceiling finishes**

# **General**. False ceiling installation works are to be in accordance with the specification below and design drawing provided. This specification applies to following type of materials.

## **Acoustic Tiles**. The false ceiling shall **be Armstrong mineral fibre** triangular edges boards on T-bar on Ablutions block, Office Block 1 and 2. The size to be 600 x 600 mm, 16 mm thick. The proposed false ceiling to be asbestos free. The tiles are laid in such a way that no less than half of the length to be remained at the ends. The false ceiling is to be fixed in true horizontal level. The spacing of main and cross tee, end angle clips and GI wire hangers are to be as per manufacturers’ recommendations.

# **Specification.** The spacing of main and cross tee, end angle clips and GI wire hangers are to be as per manufacturers’ recommendations.

# **Installation**. Installation of suspended ceilings shall be in compliance with the manufacturer's instructions and approved ceiling drawings. Ceiling suspension systems shall be installed true to line and level in compliance with approved drawings. Suspension depth shall comply with the requirements shown, unless otherwise directed. All anchors shall be in stainless steel (type 316). Hangers and supports shall be appropriate to the suspension system and shall be spaced in accordance with manufacturer’s recommendations.

# **Finishes and fitments**

# **Skirting**

# **General**. All skirting shall be **Timber skirting.**

# **Specification**. The contractor is to carry out the following:

## The fixing of skirting must be arranged to minimise movement and shrinkage. All mitres in skirting are to be cut to 45º.

## Running joints in skirting and architraves must be reasonably inconspicuous, glue fixed.

##  All skirting is to be of timber material. Non-wood trim is to be neatly fixed in accordance with the manufacturer's recommendations.

## All skirting is to be screwed with a countersunk finish, the screw head is then to be filled and sanded before painting.

##  All skirting is to be treated prior to being fixed to the wall and they are to be painted with 1 coat of primer and 2 coats of gloss of a colour to be indicated by the Authority.

## The paint is to be left to dry completely between layers being applied.

## Work must be plum or level with care taken to minimise damage such as chipping before, during and after fixing. Face joinery must be protected as directed.

## Hammer marks or similar damage are to be made good.

# **Staircase Finishes**

# **Specification**. Staircase finishes shall allow safe use of the staircase. Items to be taken into account include:

## **Rise and going**. Staircase pitch and tread dimensions are specified within the drawing pack at Booklet 4. It is important that rise and going remain consistent and are not affected by the staircase finish, particularly at the top and bottom of the flight.

## **Slip resistance**. External staircases, such as those providing means of escape in fire, shall be provided with a non-slip surface or nosing.

## **External staircase handrail**. The external handrail shall **be Mild steel** as per specification detailed in the Authority design drawing.

# **Water Supply and Domestic Hot/Cold Water distribution**

# **General.** This section of the Specification covers the installation of the water main from the existing camp water supply to the plant room and the domestic hot and cold-water distribution from the plant room to all points of use.

# **Standard**. The Contractor is responsible for ensuring that both they and their staff are fully aware of the requirements laid out within this specification and drawings. They are to ensure they are fully capable of achieving this standard and to deliver the end product which is compliant with all relevant BSs and ratified enforceable documents. Notwithstanding that BS specifications have been quoted throughout this document, full compliance with the latest appropriate BS’s where such exist, including those issued in respect of materials manufactured to metric or harmonised standards, is required for all specified materials. All equipment shall be manufactured to these standards unless otherwise authorised; equipment that uses electricity must be CE marked and provided by the Authority.

# The proposed works should be discussed directly with the authority to ensure a full understanding of the works and associated disruption is known. The work shall be carried out in accordance with authority approved drawings contained in Booklet 4 and within the requirements of the ITT.

# It is the responsibility of the contractor to protect all the installed fixtures and fittings until the time of handing over to the Authority.

# All works must be carried out by a suitably qualified and competent person.

# **Inspection and testing of materials**. The contractor is to provide manufacture's test certificates for the materials supplied by them. The tests carried out are to be as per the relevant BSs.Sample of pipe material used must be provided to the authority for approval.

# **Jointing.** All pipes shall be **SDR 11 cPVC** pipes laid and solvent weld jointed as per manufacturer’s specifications.

# **Installation.** The installation of all material and equipment shall be in accordance with the requirements of the manufactures in all instances. The Contractor shall ensure that all equipment is supplied complete with all requisite components to provide a completed system and shall also ensure that any materials, fixings, and so on, required to complete the installation is obtained to facilitate the relevant installation.

# **Submission for Authority’s approval**. The following are to be submitted for Authority’s approval prior to installation:

## Material sample.

## Proposed layout plan if required.

## All other data deemed appropriate by the Authority.

# **Main Supply pipe.** The existing uPVC pipework is located within DIO Compound. The new supply pipework is to be routed along the perimeter wall to the plantroom with an isolated new stop cock and capped. All as per authority approved drawing contained in Booklet 4.

# Supply and installation of **SDR 11 cPVC** cold water supply pipe works are to be in accordance with the authority approved drawings contained in Booklet 4 and the specification below. This specification applies to following cPVC pipe diameters:

## 3/4” / 20mm SDR 11 cPVC pipe works.

## 3” / 80mm SDR 11 cPVC pipe works.

# Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workman like manner.

# Valves and other appurtenances shall be so located that they are easily accessible for operation, repairs and maintenance.

# Pipes are to be surfaced laid as per the details in the authority approved drawing contained in Booklet 4 and this specification.

# **Domestic Hot/Cold Water Distribution.** Hot and cold-water distribution supplies shall be run from the Plant room equipment to all outlets as per the authority approved drawings contained in Booklet 4 and this specification. The contractor shall fit 90° action isolating valves with handles to the hot and cold water supplies as close as reasonably practical to the WC, WHB and Urinal service points. The shower isolation valves are to be fitted on the supply pipework above the false ceiling. The following is to be observed:

## Cold water distribution incorporates a main supply ring main.

## Hot water distribution incorporates a secondary return to the plant room.

## Hot water pipework is to be run above cold water when laid horizontally and always no less that 100mm space between.

## Surface/exposed pipework is to be insulated as pre the below section.

## Pipe work in the plant room and void above the false ceiling can be surface mounted, all areas below the false ceiling are to be concealed.

## Surface laid pipes are to be supported with appropriate brackets fixed to walls or hangers fixed to the ceiling unless otherwise specified. Brackets/hangers used are to be as per the pipe manufacturers recommendations. Support spacing should comply with the following:

### 1/2” / 15mm not more than 850mm

### 3/4” / 20mm not more than 850mm

### 1” / 25mm not more than 1000mm

### 1 1/4” / 32mm not more than 1150mm

### 1 1/2” / 40mm not more than 1300mm

### 2” / 50mm not more than 1300mm

# Supply and installation of surface laid/concealed cPVC pipe works are to be in accordance with the specification below. This specification applies to following pipe diameters:

## 1/2” / 15mm cPVC pipe works.

## 3/4” / 20mm cPVC pipe works.

## 1” / 25mm cPVC pipe works.

## 1 1/4” / 32mm cPVC pipe works.

## 1 1/2” / 40mm cPVC pipe works.

# **Specification**. The following is the specification for the supply and installation of 1/2" / 15mm – 2” / 50mm cPVC surface/concealed pipe works:

|  |  |
| --- | --- |
| Pipe anchorage | Pipe is to be anchored on the surface using brackets. Anchor blocks are to be secured firmly; movement of anchored blocks are not acceptable.  |
| Anchor distance | 600mm minimum c/c |
| Pipe joints | All pipe joints are to be as per manufacturer’s guidelines.  |
| Minimum testing pressure | 1.5 times the working pressure. |

# **Cutting and jointing**. The pipes & fittings shall be inspected at site before use to ascertain that they confirm to the specification given above. The defective pipes shall be rejected. Where the pipes have to be cut, the ends shall be carefully filed out so that no obstruction to bore is offered. The taps & dies shall be used only for straightening screw threads which have become bent or damaged & shall not be used for turning of the threads so as to make them slack, as the later procedure may not result in watertight joint. Joints are to be full and consistent solvent welds as per the manufacturer recommendations.

**Insulation**

# **General.** The Contractor is to supply and install phenolic thermal insulation such as Kingspan Kooltherm CFC and HCFC free or equivalent (and authority approved) to all domestic exposed water services pipework.

# The insulation installation is to be complete with no gaps and include a protective reinforced aluminium vapour barrier. This insulation shall be suitable for the chosen supports where necessary and be sealed with manufacturers complimenting adhesive tape wrap providing a sealed insulative barrier to the pipework.

# Insulation boxes / jackets shall be installed within the plant room to all valves and equipment to minimise heat losses and unnecessary heating of the plant room.

# The contractor is to ensure the highest standards of workmanship, quality, materials, thickness and finish and be provided to all parts of the pipework, including valves, pipe brackets, bends, tees and where pipes pass through walls and floors. Insulation shall be sealed to valve arrangements and shall provide a continuous protection system to the domestic services from penetration to the building to final outlet.

# **Prevention against Legionellosis**

# All water service supplies are to be installed to comply with the latest publications for prevention against Legionellosis including Legionnaires Disease.

# The Contractor is to acquaint himself with the following publications, which are current at the time this Specification was drafted. Any later publications issued shall apply.

## CIBSE TM13:1991 Technical Memoranda ‘Minimising the Risk of Legionnaires Disease.

## Health and Safety Executive Series Booklet C130 9/98 - The control of Legionellosis in hot and cold-water systems

## Health and Safety Commission (Approved Code of Practice)-The prevention or control of Legionellosis (including Legionnaires Disease).

# **Legionella**. Legionella bacteria survive and multiply in water. Water temperatures between 20°C and 45°C is the range in which legionella will proliferate most rapidly. The route of infection is through the inhalation of the bacteria either by aspiration of water or possible use of nasogastric tubes. Control measures that are to be implemented are:

## **Temperature control**. Water in the pipework should not be allowed to reach a temperature of 20°C as the risk of legionella bacteria multiplying increases considerably. This is to be achieved by insulating the pipework and turnover of the water in the pipework by opening outlets.

## **Periodic testing**. Contractor to notify Client for necessary arrangements – produce Legionella Risk Assessment with mitigation measures and Water samples are to be collected and analysed for the presence of legionella bacteria. Records are to be kept in H&S file.

## **Stagnation**. Water should not be left in pipework for a considerable amount of time. Outlets are to be regularly opened to allow the water to recharge the system. Flushing should be carried out at least weekly IOT reduce the risk of Legionella and other bacterial growth iaw ACOP L8.

# **Testing of Water Services**

# The contractor is to carry out a final complete hydraulic test of the domestic water services installation prior to any concealed/buried pipework in the system being covered. The pipes, fittings and connections to appliance shall be subject to a test of not less than 1.5 times the maximum closed valve pressure in accordance with BS8558:2015. Where manufactures instructions are supplied with an appliance, the instructions in regards of testing and commissioning are to be adhered to above the guidance detailed in this document. The outline of testing and commissioning of the overall pipework systems is as follows:

# **Pre-test inspection**. Before the testing and commissioning is carried out, there should be a pre-test inspection of the entire pipe. This should include:

## A visual inspection of the pipework. All pipework fittings and supports are to be checked for tightness. The section that is to be tested first should have the valves closed to isolate that section from the tank or pumps.

## Ensure that the site is clean and no rubbish is on the site of the test.

## Ensure that the pipework is complete, correctly installed and ready for commissioning.

## Check all drain valves are closed and any fittings that are open should be closed or capped. All pipework is to be adequately supported to include the weight of the pipework, components and weight of water within the pipe.

## Ensure the system is safe to fill and personnel are kept clear of areas that might be hazardous due to unforeseen failure during filling.

# **Pipework**. The pipework is to be tested and commissioned in line with CIBSE Commissioning Code W and Approved Doc H. An outline of checks to be completed on the pipework is as follows:

## Pre-commissioning checks to ensure valves fittings are installed correctly where required to facilitate the commission procedure.

## Adequate access has been provided around measuring equipment.

## If there is a delay of more than 48 hours between the initial system fill and the start of flushing and chemical cleaning, then the growth of bacteria should be considered as described in BSRIA guide AGI/2001.1 pre commission cleaning of water systems.

# **Air leak testing**. The test that is be carried out in accordance with CIBSE Commissioning Code W. These are in accordance with British standards and the breakdown of the test is as follows:

## The pipe should be pressurised up to a pressure of 110 mm water gauge and held for approximately 5 minutes before testing. Following this, the pipe should hold an initial 100 mm pressure with a maximum loss of head of 25 mm water gauge in a period of 7 minutes.

# **Pressure testing**. The test that is be carried out in accordance with CIBSE Commissioning Code W. These are in accordance with British standards and the breakdown of the test is as follows:

## **Water mains services**. Water is to be administered into the pipeline slowly to ensure that all air is eliminated from the system using air vents at the high points. Once fully charged, the system outlets are to be closed and then the water pressure is to be raised to 1.5 time the system working pressure (2 bar). This pressure is to be held for 1 hour in order to pass the test. If any leaks are found, the section is to be drained, the leak rectified, and the section is to be retested. There shall be no visible leakage of water and the pressure shall be maintained for a further one hour.

# All materials and equipment found defective shall be replaced and whole work tested to meet the requirements of the specifications.

# The contractor is to keep a record of the tests carried out on the domestic water services installation throughout the contract, recording date of test, by whom tested and witnessed and the result. One copy of the record should be provided in the H&S file on completion of the contract.

# **Foul drainage and Lateral Drainage**

# **General Construction**. Where socketed pipes are required to be laid on a granular or sand bed or directly on a trench bottom, joint holes shall be formed in the bedding material or excavated formation to ensure that each pipe is uniformly supported throughout the length of its barrel and to enable the joint to be made.

# **Inspection and testing of materials**. Contractor shall produce manufacture's test certificate for the materials supplied by him. The tests carried out shall be as per the relevant British Standards.

# For examination and testing of materials and work at the site, contractor shall provide all testing and gauging equipment necessary as listed below but not limited to the following:

## Theodolite.

## Plumb bobs, Sprit level, Hammers.

## Hydraulic test machine.

## Smoke test machine.

# Pipes shall be laid on setting blocks only where a concrete bed or cradle is used.

# Where pipes are required to be bedded directly on the trench bottom, the formation shall be trimmed and levelled to provide even bedding of the pipeline and shall be free from all extraneous matter that may damage the pipe, pipe coating or sleeving.

# Pipes and fittings shall be examined for damage and the joint surfaces and components shall be cleaned immediately before laying.

# Suitable measures shall be taken to prevent soil or other material from entering pipes, and each pipe shall be anchored to prevent flotation or other movement before the Works are complete.

# Where pipeline marker tapes are specified, they shall be laid between 100 mm and 300 mm above the pipe. Where a tracer system is specified, it shall be continuous and adequately secured to valves and fittings.

# **Layout principle.** Foul drainage and lateral drains should be laid in straight lines in both the vertical alignment (profile) and horizontal alignment (plan) unless agreed with the Authority.The layout should ensure that sufficient access points are located so that they are accessible.

# **Pipe bedding.** Bedding for pipes shall be constructed by spreading and compacting granular bedding material over the full width of the pipe trench. After the pipes have been laid, additional granular material shall, if required, be placed and compacted equally on each side of the pipes and, where practicable, this shall be done in sequence with the removal of the trench supports

# **Pipeline gradients.** The following guidelines on gradients are accepted as normally providing self-cleansing conditions:

## DN150 pipe may be laid at a gradient not flatter than 1: 150, provided that at least five WC's are connected.

# **Excavation and preparation of trench.** All construction and testing of drains and sewers will be in accordance with BS EN 1610 15. Care should be taken to limit loads close to the edge of the trench, such as excavated material, which should be no closer than 1.5 m to any trench. Particular ground conditions may require detailed consideration to limit any damages to the pipes.

# In wet, fine grain soil such as soft clays, silts or fine sands, suitable blinding or other stabilising material should be placed on the virgin soil immediately after the last cut and before any traffic is permitted on the trench bottom to prevent disturbance and softening of the foundation.

# Where the formation is low and does not provide continuous support, low areas should be brought up to the correct level by placing and compacting suitable material.

# **Laying pipes**. Where the design permits and the nature of the ground is such as to allow it to be trimmed to provide a uniform bearing, pipes may be laid direct on the trench formation so that their barrels make reasonable contact with the formation.

# Socket and joint holes should be as short as practicable, scraped or cut into the formation, and deep enough to give a minimum clearance of 50 mm between the socket and the formation.

# **Concrete protection to pipes**. Pipes to be bedded on (or cradled with) concrete shall be supported on precast concrete setting blocks, the top face of each block being covered with two layers of compressible packing.

# Where pipes with flexible joints are used, concrete protection shall be interrupted over its full cross-section at each pipe joint by a shaped compressible filler.

# **Placing backfill material.** Backfilling shall, wherever practicable, be undertaken immediately when the specified operations preceding it have been completed. Backfilling shall not, however, be commenced until the works to be covered have achieved a strength sufficient to withstand all loading imposed thereon.

# Backfilling shall be undertaken in such a manner as to avoid uneven loading or damage. 3. Filling material shall be deposited in layers not exceeding 225 mm unconsolidated thickness, and then fully compacted to form a stable backfill. Mechanical compaction equipment should not be used until there is a minimum of 450 mm of compacted material above the crown of the pipe.

# **Pipe Jointing**. Pipe jointing surfaces and components shall be kept clean and free from extraneous matter until the joints have been made or assembled. Care shall be taken to ensure that there is no ingress of grout or other extraneous material into the joint annulus after the joint has been made.

# **Pipes passing through structures.** Where pipes pass through structures, rocker pipes shall be used to minimise any risk of pipe failures.

# Where a pipeline passes under a building, the Contractor shall ensure that all pipework is both protected from imposed loadings and as well as ensuring that the building stability is not impaired.

# Where a pipeline has less than 300 mm cover under a load-bearing floor slab, the Contractor shall ensure that the pipe is surrounded with concrete integral with the slab.

# **Connection to existing drainage pipes**. Connections shall be made using standard pre-formed junctions, where possible. Saddle connections to existing sewers shall only be allowed when the internal diameter of the major pipe is at least 150 mm greater than the internal diameter of the branch pipe.

# **Gully Traps**

# **General.** Supply and installation of access gully traps in accordance with the specification below. This specification applies to the following size access gully traps:

## 75mm access gully traps.

## 110mm access gully traps.

## 150mm access gully traps.

# **Specification.** The following is the specification for the supply and installation of 110mm access gully traps:

|  |  |
| --- | --- |
| **Item** | Gully trap |
| **Construction material** | uPVC |
| **Diameter** | 75 mm – 110 mm |
| **Suitable for** | Gravity drainage & Sewerage |

# **Scope of works**. The followings are the scope of works:

## Obtain statement of known services from the Authority.

## Dig ground to the required depth keeping extra depth for gully traps concrete foundation.

## Prepare concrete pad foundation where gully trap sits. The foundation pad must be levelled.

## Install gully trap ensuring all fittings are correctly fitted preventing obvious leaks.

## Place trap cover provided on the top of gully prior to backfill.

## Backfill hole with fine soil / sand and compact to maintain level with the existing ground. Alternatively concrete the surround area around the gully.

# **Submission for Authority’s approval**. The following are to be submitted for Authority’s approval prior to installation:

## Material sample.

## Proposed layout plan if required.

## All other data deemed appropriate by the Authority.

# **Testing and inspection**. All works must be carried out by the qualified and competent person.

# Sample of material used must be provided to the authority for approval.

# All testing certificates must be submitted to the authority as part of Health and Safety (H&S) file including all as built drawings.

# **Rodding Eye**

# **General.** Supply and installation of 75 – 150 mm rodding eye in accordance with the specification below and design drawing provided.

# **Specification.** The following is the specification for the supply and installation of 110mm access gully traps:

|  |  |
| --- | --- |
| **Item** | Rodding eye (75 mm, 100 mm or 150 mm) |
| **Construction material** | uPVC |
| **Diameter** | 75 mm – 150 mm as specified |
| **Finish material**  | Concrete to level the existing ground level |

# **Scope of works**. The followings are the scope of works:

## Obtain statement of known services from the Authority.

## Dig ground / trench to the required depth (Maximum 2000mm from the ground level) and width required.

## Install rodding eye as detailed in the drawing provided. Ensure all fittings are done correctly preventing as any obvious leaks.

## Make good the surrounding of rodding eye with concrete and ensure it is levelled with the existing ground.

## Backfill hole with fine soil / sand and compact.

# **Submission for Authority’s approval**. The following are to be submitted for Authority’s approval prior to installation:

## Material sample.

## Proposed layout plan if required.

## All other data deemed appropriate by the Authority.

# **Testing and inspection**. All works must be carried out by the qualified and competent person.

# Sample of material used must be provided to the authority for approval.

# All testing certificate must be submitted to the authority as part of Health and Safety (H&S) file including all as built drawings.

# Construction of Manholes and wet wells

# **Brickwork and Blockwork**. Brickwork and blockwork shall comply with the relevant provisions of BS EN 1996-1-2, BS EN 1996-2 and BS EN 1996-3.

# **General**. Supply and installation of manhole in accordance with the specification below. The specification is for the installation of following manholes:

## Depth up to 600mm.

## Depth up to 1000mm.

## Depth up to 1500mm.

# **Specification**. The followings are the specification:

|  |  |
| --- | --- |
| **Item** | Manhole |
| **Construction material** | Concrete |
| **Manhole cover opening**  | 450 mm diameter or 450 mm square minimum  |
| **Depth**  | As specified  |

# **Scope of works**. The followings are the scope of works:

## Obtain statement of known services from the GE’s department.

## Excavate to the required depth allowing for space around (300mm min) to work in. Ensure additional 150mm deep is dug to allow manhole foundation.

## Lay reinforce concrete foundation of 150mm minimum.

## Install required diameter manhole structure directly on top of reinforce concrete foundation OR alternatively construct manhole walls using concrete blocks to the required height.

## Place top frame of manhole as supplied OR alternatively construct metal frame to suit load bearing of the location. Ensure frame is secured firmly.

## Place manhole covers to suit the load classification of the location. Manhole cover must be in accordance with [European Standard EN124](http://shop.bsigroup.com/ProductDetail/?pid=000000000000338783), [which classifies manhole covers into 6 different groups](http://muayenebacasi.com/ENG/2.3.en124.html).

# Brickwork and blockwork shall be built in English bond. Bricks and blocks shall be set in mortar with all bed and vertical joints filled solid. Exposed work shall be flush pointed as the work proceeds. The moisture content of the bricks and blocks shall be adjusted so that excessive suction is not exerted on the mortar.

# Bricks and blocks in each course shall break joint correctly with the bricks/blocks underneath. The courses shall be laid parallel, with joints of uniform thickness, and shall be kept straight or regularly curved, as required. Brickwork and blockwork shall be gauged to rise 300 mm in four courses. Vertical joints shall be in alignment, as required by the bond, and shall have an average thickness of 10 mm. Bricks and blocks forming reveals and internal and external angles, shall be selected for squareness and built plumb.

# Brickwork and blockwork shall rise uniformly. Corners and other advanced work shall be racked back and not raised above the general level more than 1 m. No brickwork or blockwork shall be carried up higher than 1.5 m in one day. No bats or broken bricks and blocks shall be incorporated in the work unless essential for bond. Where cuts to blocks are required, all cutting shall be carried out with a mechanical cutting disc.

# Completed brickwork and blockwork shall be protected at all times from scaffold splash, mortar droppings, grout leakage from suspended slabs and the harmful effects of weather. Brickwork and blockwork shall be allowed to set following thoroughly hard before cutting or chasing is carried out.

# **In-situ Inverts and Benchings.** Inverts and benchings in manholes, chambers and the wet well shall have a screeded, ridged finish and shall have a smooth, high-strength concrete topping applied with a steel trowel before the concrete has set.

# **Setting Manhole Covers and Frames.**

# Manhole frames shall be set to level, bedded and haunched externally over the base and sides of the frame in mortar, in accordance with the manufacturer’s instructions. The frame shall be seated on at least one course of Class B engineering bricks, on precast concrete masonry units or on precast concrete cover frame seating rings to regulate the distance between the top of the cover and the top rung to no greater than 675 mm. A mortar fillet shall be provided where the corners to an opening in a slab are chamfered and the brickwork is not flush with the edges of the opening.

# Frames for manhole covers shall be bedded in a bedding mortar.

# **Cleansing of Gravity Sewers and Manholes**. On completion of construction, internal surfaces of sewers, manholes and other access points shall be thoroughly cleansed to remove all deleterious matter, without such matter being passed forward into existing public sewers or watercourses. The sewers and manholes shall be maintained in a clean and serviceable condition until they are vested as public sewers.

# **First Inspection and testing**. The drainage works will be inspected and tested in two stages, that is as, as work proceeds and immediately before the work is handed over on completion to the Authority. The works should be protected during all stages of construction, and the entry of foreign matter into any part of the system prevented.

## **Stage inspection and testing**. The Contractor to carry out this test in the presence of the Authority. Tests will be carried out to locate and remedy any defects in the soundness that may exist during construction. This test will take place immediately before backfill is applied and the work is covered up so as to facilitate replacement of any faulty pipe or fitting or to rectify any joint defect.

## **Final testing.** The Contractor to carry out this test in the presence of the Authority. Testing and inspection will take place immediately before handover when all relevant works have been completed.

##  **Water test**. A water test will be used to check the integrity of the drainage pipe system.

# **Soil Vent Pipe**

# **General**. Installation of soil vent pipe for the DIO Office Facility Project building is to be in accordance with the specification below.

# **Specification**. The followings are the specification:

|  |  |
| --- | --- |
| **Task** | **Installation of soil vent pipe for DIO Office** |
| Construction material | uPVC to EN 1329 |
| Pipe diameter | 110mm |
| Securing bracket distance | 450mm c/c min with approved pipe bracket |

# **Submission for Authority’s approval**. The following are to be submitted for Authority’s approval prior to installation:

## Material sample.

## Proposed layout plan if required.

## All other data deemed appropriate by the Authority.

# **Testing and inspection**. All works must be carried out by the qualified and competent person.

# Sample of material used must be provided to the authority for approval.

# All testing certificates must be submitted to the authority as part of Health and Safety (H&S) file including all as built drawings.

# Sanitary fittings and pipework

# **Male and Female Toilet Water Closet**

# **General**. Supply and installation of WC, works are to be in accordance with the specification below. This specification applies to following type:

## Water Closet with low level cistern.

## Products are to be selected to maintain consistency with those installed elsewhere on site.

# **Specification**. 380 x 660 x 750mm white ceramic 6ltr water closet toilet to BS EN 14055. The toilet is to come fitted with ball valve and associated connections, chrome effect push button flush, suitably sized thermoplastic toilet seat, flexible hose and 100mm dia outlet ready to connect to sanitary pipework.

# **Scope of works**. The toilet is to be secured to the floor with appropriate fixings at the designated fixing points and sealed around the base with a white bacteria resistant silicone sealant. An **isolation** valve is to be fitted to a water supply pipework before a standard stainless steel braided hose is used to connect the water supply to the cistern.

# **Submission for Authority’s approval**. The following are to be submitted for Authority’s approval prior to installation:

## Material sample.

## Proposed layout plan if required.

## All other data deemed appropriate by the Authority.

# **Testing and inspection**. All works must be carried out by the qualified and competent person.

# Sample of door material used must be provided to the authority for approval.

# **Toilet roll holders**. Toilet roll holders required in each male and female cubicle. Where possible, the toilet roll holder should be installed on the hinge side of the cubicle

# **Male and Female shower rooms**

# **General**. The contractor is to construct shower rooms, works are to be in accordance with the specification detailed in the design drawings at Booklet 4. This specification applies to the following types:

## Shower cubicles.

## Tiling all shower walls.

## Shower head and mixer taps are to maintain consistency with those installed elsewhere on site.

## Wastewater drainage installation.

# **Scope of works**. The contractor is to shower cubicles with 100 mm thick concrete block partition walls. The shower floor shall be concrete floors with an incline to enable wastewater to self-drain towards the shower drain point. The shower cubicles walls and floors shall be finished using tiles approved by the Authority. All edges of the shower cubicle adjoining a wall or floor surface are to be sealed with bacteria resistant silicone sealant.

# Hot and cold-water supplies shall be run in a sized pipework as detailed in design specification. All pipework below false ceiling wall shall be concealed within the shower wall. The Contractor shall fit 90° action isolating valves with handles to the hot and cold-water supplies to showers above the false ceiling. All pipework shall be adequately supported. All fixings shall be securely fastened and fit for purpose. All pipe joints are to be as per manufacturer’s guidelines.

# **Mixer Taps**. The **shower mixer taps Jaguar brand** to be installed will be in accordance with specification in the design drawings.

# Contractor shall install shower curtain rails made from stainless steel complete with plain white or cream shower curtains. The curtain rail is to be securely fitted to the wall at the edges of the shower wall. The shower curtain is to fit easily and must be removable for cleaning without removing the rail.

# **Male and Female washroom Wash Hand Basins**

# **General**. Supply and installation of wash hand basin and mirror, works are to be in accordance with the specification below. This specification applies to following type.

## 450 x 385 x 385mm Vitreous China wall hung.

## Install mirrors above each WHB.

## Hot/cold water WHB outlets, mixer taps maintain consistency with those installed elsewhere on site.

# **Scope of works**. The contractor is to provide a wash hand basin to BS EN 14688: 2006 complete with mixer taps, trap, flexible hose connections, isolation valves, wall fixings and plug. Singles thermostatic mixer taps are to be provided to the WHB. Mixer taps are to be consistent with existing installation in camp ablutions and with chrome finished. The trap is to be a P trap or bottle trap made from HTPE to BE EN 274-1: 2002.

# Flexible hoses are to be of a suitable length to fit to the existing water supply pipework and to have a stainless steel braided outer and rubber inner. Isolating valves are to be fitted the water supply pipework before the connection of the flexible hose. A suitably sized rubber plug is to be provided secured to the sink with a stainless-steel chain; the plug must fit the sink correctly to prevent passage of water when in place.

# The sink is to be mounted to the proposed surface with suitable fixings to allow a large adult to lean his weight onto the front of the WHB without any undue movement. All connections are to be secure and free from leaks and additional seals such as PTFE tape are to be used where required. When installed the joining edge between the WHB and the wall is to be carefully sealed with a suitable sanitary (bacteria resistant) silicone sealant.

# **Mirrors**. Mirrors shall be installed in all toilets, project dependent. They should be installed (screwed) 300mm above sinks. Consideration should be made to allow thorough cleaning therefore they should not be installed to full ceiling height. The centre of the mirrors shall be installed at 1500 mm above the finished floor level.

# Submission for Authority’s approval.

# The following are to be submitted for Authority’s approval prior to installation:

## Material sample.

## Proposed layout plan if required.

## All other data deemed appropriate by the Authority.

# **Testing and inspection**. All works must be carried out by the qualified and competent person.

# **Taps including the necessary accessories**

# **General**. Supply and installation of taps are to be in accordance with the specification below. This specification applies to all mixer taps.

# **Specification**. The following is the specification for the supply and installation of taps.

|  |  |
| --- | --- |
| System installation | The tap is to be installed to suite the usage of the installation |
| Joints | All pipe joints are to be as per manufacturer’s guidelines.  |

# **Scope of works**. The scope of works is as highlighted below:

## Connecting the tap to the installation.

## Making good any damaged area which might have been affected by the installation.

# **Submission for Authority’s approval**. The following are to be submitted for Authority’s approval prior to installation:

## Material sample.

## Proposed layout plan if required.

## All other data deemed appropriate by the Authority.

# **Testing and inspection**. All works must be carried out by the qualified and competent person.

# **Urinals**

# Urinals shall be controlled via a push-button valves to allow control the flow of water for a set period of time. Urinal shall be **Armitage Shanks Sanura 50cm bowl**.

# **Male and Female Hand dryers**

# **General**. The Authority will **Supply and install electrical supply** to the hand dryers and Contractor will **Mount** Only in accordance with the manufacturer’s specification and installation diagrams.

# **Specification**. The following is the specification for the supply and installation of hand dryers:

## Surface mounted.

## Mounting heights from floor to dryer bottom edge.

|  |  |
| --- | --- |
| Men’s washrooms | 117 cm |
| women’s washrooms | 112 cm  |

# **Storm Water Drainage**

# **General Construction**. Drainage systems shall be designed in accordance with relevant codes and standards to convey surface water satisfactorily to an appropriate outfall. Issues to be taken into account include:

## Connections to existing storm water drainage.

## Connections to surface water disposal systems.

## Capacity of private sewers.

# The location and level of existing drainage connections and existing services is to be checked prior to commencement of drainage works.

# The positions of surface water drainage points are indicative only, refer to the drawing package for setting out details.

# All surface water connections to be as per design specification and to be laid at a minimum gradient of 1/80 unless noted otherwise.

# Rainwater down pipes are to connect to a drain via a rest bend. where drainage is combined a 'p' trap must also be provided.

# For in situ concrete floor slabs, drain channels are to be cast integral with the slab.

# Channel steel gratings are to be fabricated to cover all storm water drainage channel.

# **Layout principle.** Storm water drainage should be laid in straight lines in both the vertical alignment (profile) and horizontal alignment (plan) unless agreed with the Authority.The layout should ensure that sufficient gradient is provided to allow storm water to self-drain.

# **Excavation and preparation of trench.** Care should be taken to limit loads close to the edge of the trench, such as excavated material, which should be no closer than 1.5 m to any trench. Particular ground conditions may require detailed consideration to limit any damages to the pipes.

# In wet, fine grain soil such as soft clays, silts or fine sands, suitable blinding or other stabilising material should be placed on the virgin soil immediately after the last cut and before any traffic is permitted on the trench bottom to prevent disturbance and softening of the foundation.

# Where the formation is low and does not provide continuous support, low areas should be brought up to the correct level by placing and compacting suitable material.

# **Drinking fountain point**

# **General**. The Authority will **Supply and install electrical supply** to the drinking fountain and Contractor will **Mount unit and install water supply** Only in accordance with the manufacturer’s specification, installation diagrams are at Booklet 4 Authority design drawings. Drinking fountain will be located on the bottom and top floor of the main office building.

# **Specification**. The following is the specification for the installation of the water fountain:

## Floor mounted.

## Drainage pipework to be routed to the nearest waste pipe via the shortest and most **concealed route.**

# **Security Perimeter Wall**

# **General Construction**. The security perimeter wall shall be constructed in accordance with the authority approved drawings contained in Booklet 4 and specification at Para 149 – 152.

# **Mechanical ventilation**

# **General**. The **Authority** will supply all Mechanical ventilation and the **Contractor** is to conduct all preparatory works for the installation of ventilation fans and cooling/heating systems as detailed below;

# **Scope.** All preparatory and installation works are to be conducted by the contractor. All electrical works are to be conducted by the authority. The contractor is to deliver the following in accordance with the authority approved drawings contained in Booklet 4 and the manufacturer’s instructions:

## **Ablution mechanical extract fan**. Extract ventilation to all ablutions through the installation of five (four male, one female) 3no. of Xpelair Simply Silent Timer Extractor Fan 150mm 67l/s wall mounted extract Fans and 2no. of HIB Hus Wall Mounted Bathroom Fan with timer and humidity sensor 97m3/hr. Fans provided by the authority.

## **Cooling/Heating**. The Contractor to provide preparatory works for cooling and heating systems in accordance with the authority approved drawings contained in Booklet 4.

# **Penetrations**

# **General.** All penetrations in the building fabric are to be suitably cut, sealed and finished to ensure thermal, fire and acoustic barriers are maintained and do not provide a source for ingress of water or diminished standards of appearance. The following are to be observed:

## **Block/brick wall.** Penetrations in the block/brick walls are to be in accordance with the best practice and relevant BSs.

# **Hot water system and plant**

# The Authority will supply and install all Hot water system plant equipment within the plant room/cage area and solar panels on the roof.

# Due to the size of some of the hot water system plant; the contractor is to ensure the large plant items have been placed in the plant room/cage and are protected against damage prior to completely enclosing these areas with the building fabric.

# **Electrical Specification**

# All preparatory works are to be conducted by the contractor. This includes trenching for the underground services and making allowance for the installation of concealed containment. All other electrical works, including first fix, second fix, testing and commissioning, are to be conducted by the **Authority**.

# **Scope**. This Specification defines the requirements for the electrical elements to be delivered by the Contractor.

# **Standard**. Trench digging, including the positioning of the ducts, shall be carried out in accordance with the electrical drawings provided in booklet 4.

# **Exclusions**. All electrical works other than those specified below will be carried out by the Authority employed electricians, and therefore shall not be priced.

# **Inspections**. The Authority may direct from time to time as the work proceeds that the whole or part of the work is inspected before the next stage of the works commences, this includes:

## Demonstrating, before digging commences, that the setting out of the ducts and trench conform to the drawings.

## Demonstrating that the base of the trench is as specified.

## Demonstrating that the backfilling is carried out in layers and as specified below.

# **Underground cable ducts**. The ductwork shall be installed at locations as shown in the drawings. **The ducting shall be laid in C25 concrete to minimise damage that may be caused due to ground movement.** The duct opening within the building shall finish flush with the finished floor level.

## The ends of ducts shall be sealed after cables have been installed. Where the ducts enter the building, proprietary seals shall be used to form a barrier against gas, water, oil, fire and attack by vermin. The method shall be submitted for the Authority’s approval before work commences.

## Bends in the ducts shall not be less than that specified in the drawings in order to facilitate minimum bending radius of the armoured cables.

## The ducts shall be laid at depths which comply with the requirements specified in the drawings.

## The bottom of the trench shall be rammed to provide a flat firm bedding. Where rock is present a layer of loose soil shall be spread over the bottom and rammed before setting sand bedding as shown in the drawing.

# **Trench digging**. No works shall commence until the Contractor has taken all reasonable steps to ensure that the area is free of all cables, drains and other services, or that the location has been determined those services known to exist.

## Excavations within 600mm of existing services shall be by hand digging. All services uncovered, whether expected or not, shall be reported immediately to the Authority, and they shall be suitably protected.

## The trench shall be excavated to a depth specified in the drawings. If any services are damaged no repairs shall be done without the Authority’s approval.

## When cable trenches are opened, all necessary safety precautions shall be taken to prevent accidents and damage occurring.

# **Laying of cable**. All underground cables and ducts will be laid by the Authority employed electricians in accordance with the electrical drawings.

## Before cables or ducts are laid, the bottom of the trench shall be graded evenly, cleared of loose stones and then covered for the full width of the trench with a 75mm layer of compacted sieved sand.

## After the cables or ducts have been laid a further layer of sand shall be added over the full width of the trench and tamped to provide finally not less than 75mm cover over the cables.

# **Trench backfilling**. The Authority’s approval shall be sought before the trenches are backfilled. Ideally backfilling shall be commenced within 24 hours of cable laying and the work completed speedily.

* + 1. Trenches shall be backfilled in layers and each layer shall be rammed. The first two layers shall be 100mm deep and rammed by hand; the remaining layers shall not be less than 200mm deep and power ramming may be used.
		2. Electrical cable warning tape shall be included as specified in the drawing.
		3. The topsoil and turf shall be replaced where applicable, and the final level shall be 25mm above the adjacent ground.

# **As-Built Drawings**. On completion of the work, Contractor shall submit one complete set of “As-Built” drawings to the Authority for the entire underground cable installation work. This shall include the exact cable route with reference to prominent existing features.

# **Outline Construction specification for Civils works**

# **General**

# **Concrete and its Reinforcement**. Concrete and its reinforcement that complies with the guidance in this chapter, which covers plain and reinforced concrete, precast or in-situ, will generally be acceptable. Mix design should take account of strength and durability and comply with the relevant British Standards.

# **Survey work.** The said work involves at the very start of work taking-over of reference point from the Contractor, establishment of control points, triangulation points, bench marks, grid layout for all the steel structure foundations and other structures maintaining horizontal and vertical control within the permissible limits, incorporating changes (if any), submission of full data in the tabulation form and survey drawings including setting and layout of various works during the progress of work.

# **Barricading.** Barricading for the other areas like casting yard, batching plant, storage and other working area shall be done at own cost by the contractor. The detailed scope of work is as follows:

## Providing and installing the barricade of the site area.

## Dismantling of barricading and other temporary installations from the site and cleaning the site upon completion and acceptance of work.

## Providing Lighting on the periphery of Barricades for Direction illumination.

# **Demolition of walkway and Perimeter wall**

# The Contractor shall:

## Dismantle the walkways, demolition walkway foundation and remove all materials off site. Demolition to be to paras 76 – 81.

## Demolish Security perimeter wall, reinforced concrete foundation and remove all material off site. Demolition to be to para 365 and Para 76 - 81.

# **Fill in soakaway pits**

# The Contractor shall fill the 2 No. soakaway pits as detailed at para 82.

# **Earthworks**

# **Site Clearance.** The Contractor shall clear the Site as required by demolishing and removing vegetation, debris, trees along with their roots, etc. and the like to approved locations as detailed in drawing pack.

# Stumps and major roots shall be grubbed up and disposed of off the site.

# **Topsoil stripping**. Topsoil shall be removed as required, deposited in separate heaps at locations approved by the Authority.

# **Removal of Unsuitable Material**. The Contractor shall remove unsuitable material as ordered or agreed by the Authority and shall dispose of it on or off the site as directed in the required manner. Boulders, stones and materials of value or usable again on the works shall be neatly stacked and graded as directed by Authority.

# **Excavations**. All excavation to be to paras 83 – 103.

**Substructure**

# **Foundations**. All foundations will be constructed in accordance with specifications detailed in the drawing pack at Booklet 4 to the:

## **Concrete**. All concrete to be cast to paras 106 – 133.

## **Reinforcement**. All reinforcement to be constructed to paras 141 – 148.

## **Hardcore**. All hardcore to be placed to paras 159.

## **Unreinforced concrete.** All unreinforced concrete to be cast to para 114 – 117.

## **DPM.** All DPM to be installed to para 134 – 136.

# **Wall up to plinth level**. All wall constructions below plinth level to be built in accordance with specifications detailed in the drawing pack at Booklet 4 to the following:

## **Common Brick**. All common brick construction to be to paras 153 – 158.

## **Hollow Concrete Block.** All hollow concrete block construction to be to paras 149 – 152.

## **Reinforcement.** All hollow concrete blocks reinforcement to be construction to paras 136 – 143

## **Mortar**. All mortar to be to paras 114 and para154.

## **DPC.** All DPC to be installed to para 137.

# **Trench backfills**. All foundation trenches are to be backfilled as per para 99.

# **Structure Floor slab**

#  **Ground floor Slab**. All floor slabs are to be constructed as per design specification contained in the drawing pack at Booklet 4 to the following:

## **Concrete**. All concrete to be cast to paras 119 – 139.

## **Formwork**. All formwork to be constructed to paras 138.

## **Unreinforced concrete.** All unreinforced concrete to be cast to para 119 – **130**.

## **Hardcore**. All hardcore to be placed to paras 159.

## **Sand blinding**. All sand blinding to be in accordance with para 160 - 116.

## **DPM.** All DPM to be installed to para 134 – 136.

## **Reinforcement**. All reinforcement to be constructed to paras 122, para 141 – 148.

# **Suspended floor Construction**.All suspended floor slabs are to be constructed as per design specification contained in the drawing pack at Booklet 4 to the following:

## **Concrete**. All concrete to be cast to paras 119 – 139.

## **Formwork**. All formwork to be constructed to paras 138.

## **Reinforcement**. All reinforcement to be constructed to paras 122, para 141 – 148.

# **External Wall Construction**

# **External Wall**. All external walls are to be constructed as per design specification contained in the drawing pack at Booklet 4 to the following:

## **Hollow Concrete block**. All hollow concrete block wall to be constructed to paras 149 – 152.

## **Wall Connectors**. All wall connectors to be constructed to paras 155.

## **Fair Face Brick cladding**. All external brick cladding to be constructed to para 162.

## **Mortar**. All mortar to be to paras 114 and para 154.

## **DPC.** All DPC to be installed to para 137.

# **Concrete Columns**

# **Columns**. All columns are to be constructed as per design specification contained in the drawing pack at Booklet 4 to the following:

## **Concrete**. concrete to be cast to paras 119 – 139.

## **Reinforcement**. All reinforcement to be constructed to paras 29, para 122, para 141 – 148.

## **Formwork**. All formwork to be constructed to paras 138.

## **Column Connectors to walls**. All column connectors to walls to be 8 mm diameter steel at 400 mm c/c horizontally to tie the reinforced concrete block wall.

## **Column Footing**. All columns are to be constructed as per design specification contained in the drawing pack at Booklet 4.

# **Concrete Beams**

# **Beams.** All beams are to be constructed as per design specification contained in the drawing pack at Booklet 4 to the following:

## **Concrete**. All concrete to be cast to paras 119 – 139.

## **Reinforcement**. All reinforcement to be constructed to paras 29, 122, para 141 – 148.

## **Formwork**. All formwork to be constructed to paras 138.

## **Beam Connectors to walls.** All beam connectors to walls to be 10 mm diameter steel at 200 mm c/c vertically to tie the reinforced concrete block wall.

# **Roof**

# **Steel structure construction.** All steel structure will be constructed in accordance with specifications detailed in the drawing pack at Booklet 4 to the following:

## **Steel roof trusses**. All steel roof trusses to be constructed to paras 177 – 181.

## **Timber structure**. All timber battens to be to para 177(b)

## **Galvanising steel structure.** All steel structure galvanisation to be to paras 177(f).

# **Roof cladding.** All Decra roof cladding to be installed as to paras 177 (c).

# **Rainwater Gutters**. All rainwater gutters installation to be to paras 183 – 187.

# **Plant Room**

# **Plant Cage.** The Plant Cage steel structure construction to be to para 29, 182 and paras 177(f).

# **Internal Walls Construction**

# **Internal Wall**. All internal walls are to be constructed as per design specification contained in the drawing pack at Booklet 4 to the following:

## **Hollow Concrete block**. All hollow concrete block wall to be constructed to paras 149 – 152.

## **Walls Connectors**. All wall connectors to be constructed to paras 155.

## **DPC.** All DPC to be installed to para 137.

# **Glazing Glass partitions.** All internal glazing glass partitions are to be constructed as per design specification contained in the drawing pack at Booklet 4 to the following:

## Glazing glass panel. All glazing glass panel to be constructed to paras 170 – 176.

# **Ablution Partition walls**

# **Ablution partition walls.** All ablution partition walls to be constructed to paras 29, 145 – 152, 163 – 169, and 205 – 211.

# **Domestic Hot/Cold Water Supply**

# **Hot/Cold water Supply.** All Domestic Hot/Cold water supply to be installed to para 232 – 263.

# **Drainage system**

# **Foul Drainage system.** All wastewater drainage system to be constructed and installed to paras 264 – 331.

# **Sanitary fittings**

# **Sanitary fittings**. All MuH sanitary are to be supplied and installed as per design specification contained in the drawing pack at Booklet 4 to the following:

## **Water Closets**. All WCs to be installed to para 29, 232 – 263, 264 – 288, 289 – 312, 317 – 323 and 324 – 330.

## **Shower rooms**. All shower rooms to be constructed to para 29, 232 – 263, 264 – 288, 289 – 312, 317 – 323 and 331 – 335.

## **Wash Hand Basins**. All WHB to be installed to para 29(a), 336 – 348.

## **Taps**. All taps to be installed to para 29, para 334, 344 – 348.

## **Urinals**. All urinals to be installed to para 349.

## **Hand Dryer (Mounting only)**. All Hand Dryers to be installed to para 350 – 351.

## **Storm water drainage**

# **Storm water drainage**. All storm water drainage is to be supplied and installed and connected to existing camp storm drainage as per design specification contained in the drawing pack at Booklet 4 and to para 352 – 362.

# **Drinking fountain point**

# **Drinking fountain point**. Mounting and water point to be installed to para 363 - 364.

# **Internal Construction and finishes**

# **Glazed Windows, Doors and openings**

# **Windows**. All external fixed Glazed Windows to be supplied and installed to para 188 – 193.

# **Doors, door frame and linings**. All doors set to be installed to para 194 - 204.

# **Toilet doors and partitions**. All toilet doors and partitions to be installed to para 205 - 211.

# **Finishes – Walls**

# **Wall finishing work**. All wall finishing work to be completed to para 212 – 213.

# **Finishes – Floors**

# **Concrete screeding floor**. The floor to be constructed and finished by the Contractor to para 222 – 223.

# **Finishes - Wall/Floor tile**

# **Wall/Floor tile**. The Contractor to supply and install floor/wall tile to para 224 and para 225.

# **Suspended (False) Ceiling finishes**

# **Ceiling finishes.** The Contractor to supply and installation the false ceiling to para 226 – 228.

# **Skirting finishes**

# **Skirting.** The Contractor to supply and installation the skirting to para 229 - 230.

# **Staircase finishes**

# **Staircase**. The Contractor to supply and installation external staircase and its handrail to para 231.

# **Painting and decorating**

# **Painting works**. All painting work to be completed to para 214 - 221.

# **Security Perimeter Wall**

# **Security Perimeter Wall**. All perimeter walls are to be constructed as per design specification contained in the drawing pack at Booklet 4 to the following:

## **Hollow Concrete block**. All hollow concrete block wall to be constructed to paras 149 – 152.

## **Wall Connectors**. All wall connectors to be constructed to paras 155.

## **Mortar**. All mortar to be to paras 114 and para 154.

## **DPC.** All DPC to be installed to para 137.

# **Outline Construction specification for Mechanical works**

# **Mechanical ventilation**. The Contractor to provide internal space/room through installation of ventilation fans to para 366 - 370.

# **Cooling/Heating**. The Contractor to provide preparatory works to para 365 - 367.

# **Penetrations**. The Contractor to provide penetrations in the building fabric to para 367.

# **Outline Construction specification for Electrical works**

# **Underground cable ducts**. The Contractor to provide preparatory and installation works to para 371 - 379.

# **Additional Specifications**

**Restrictions/Constraints**

# **Access to the Site**. This is to be agreed in detail with the PM prior to start of the project during mobilization.

# **Working Hours**. The Contractor may be restricted to working between 0830 hrs and 1700 hrs (Monday to Sunday Inc), any deviation from these hours must have prior agreement with the PM. The work site is located in a restricted or controlled area. The contractor may therefore experience delays due to compliance with entrance/exit requirements of restricted/controlled areas.

Facilities/Temporary Works/Services

# **Locations**. The Contractor is to agree with the PM of the intended sitting of all temporary works and services in advance.

# **Lighting and Power**. The Contractor shall provide all temporary lighting and power for his works (if applicable).

# **Communications**. The Contractor shall provide his workforce with adequate means of communications throughout the life of the Contract in order to carry out the work specified.

# **Temporary Services**. The Contractor shall not provide temporary service connections to both mechanical and electrical systems. All temporary service connections are to be carried out by the Authority in accordance with current UK regulations

1. WCO is the Authority for this project/contract. [↑](#footnote-ref-2)