Secretariat for Catholic Education

REFERENCE NUMBER: **02 SfCE Balzan**

TENDER FOR THE ADDITIONS AND ALTERATIONS TO EXISTING PROPERTY AT THE GOOD SHEPHERD CONVENT IN BALZAN

Date Published:	**10 December 2021**	
Deadline for Submission:	**21 January 2022**	**at 09:30am CET**
Tender Opening:	**24 January 2022**	**at 10:00am CET**

Bid Bond requirement for this tender: Not Applicable

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Floriana FRN 1472
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SECTION 1 – INSTRUCTIONS TO TENDERERS

1. General Instructions

1.1 In submitting a tender, the tenderer accepts in full and in its entirety, the content of this tender document, including subsequent Clarifications issued by the Non Governmental Organisation (NGO), whatever the economic operator's own corresponding conditions may be, which through the submission of the tender is waived. Tenderers are expected to examine carefully and comply with all instructions, forms, contract provisions and specifications contained in this tender document. These Instructions to Tenderers complement the General Rules Governing Tenders for NGOs.

No account can be taken of any reservation in the tender in respect of the procurement documents; any disagreement, contradiction, alteration or deviation shall lead to the tender offer not being considered any further.

Prospective tenderers must submit their offer by depositing it in the tender box, located at Secretariat for Catholic Education, 16, The Mall, Floriana, FRN 1472. Any references in the tender document or tender forms to uploading of tender documentation and forms is to be ignored. **Tenderers must submit one original tender offer as well as a soft copy on a USB (soft copies of the tender offers submitted on CD are strictly not acceptable). Furthermore in the soft copy of the tender offer, Tenderers must submit the Bill of Quantities duly filled in, in excel format apart from a scanned copy of the filled in Bill of Quantities. It is important that the full tender bid package is provided in soft copy given that due to Covid 19 pandemic, utilisation of the soft copy will be highly required throughout the evaluation process. Tender reference number and tender title must be clearly indicated on the sealed bid. Prospective tenderers take full responsibility to submit their offer by the set tender submission deadline.**

Note:
Where in this tender document a standard is quoted, it is to be understood that the Contracting Authority will accept equivalent standards. However, it will be the responsibility of the respective bidders to prove that the standards they quoted are equivalent to the standards requested by the Contracting Authority.

The Estimated Procurement Value for this Call for Tenders has been based on comprehensive research including appropriate financial analysis. In the context of this procurement, the Estimated Procurement Value, based on market research, is that of €265,000 excluding VAT.

The purpose of this value shall be the guidance of prospective bidders when submitting their offer and is not to be considered as a binding capping price.

Therefore, the published Estimated Procurement Value is not restrictive and final on the Contracting Authority. Economic Operators are free to submit financial offers above or below the Estimated Procurement Value. However, the Contracting Authority reserves the right to accept or reject Financial Offers exceeding the Estimated Procurement Value

1.2 The subject of this tender is the additions and alterations of the new premises for the Secretariat for Catholic Education which is situated within the grounds of the Good Shepherd Convent in Balzan for the following works:

- the removal of accretions;
- the construction of small extensions to house a meeting room and the toilets; and
- the construction of a two-tiered walkway to link the separate components of the premises.

1.3 The place of acceptance of the works shall be Secretariat for Catholic Education, 16, The Mall, Floriana, Malta, the time-limits for the execution of the contract shall be thirty-six weeks (36 weeks) in accordance with the Work Plan and Program of Works, and the INCOTERM^{2020} applicable shall be **Delivery Duty Paid (DDP).**

1.4 This is a bills of quantities contract.

1.5 This call for tenders is being issued under an open procedure.

1.6 The beneficiary of this tender is ***Secretariat for a Catholic Education (SFCE)***.

1.7 This tender is not a reserved contract

2. Timetable

2.

	DATE	TIME
Clarification Meeting/Site Visit (Refer to Clause 6.1)	16 December 2021	11.00 CET
Deadline for request for any additional information from the NGO **Clarification requests should be addressed to:** tenders.schools@maltadiocese.org	7 January 2022	17.00 CET
Last date on which additional information can be issued by the NGO	14 January 2022	20.00 CET
Deadline for submission of tenders (unless otherwise modified in terms of Clause 10.1 of the General Rules Governing Tendering for NGOs)	21 January 2022	09.30 CET
Tender Opening Due to the Covid-19 Pandemic tender opening session will take place on 24/01/2022 and general public will not be allowed to attend physically. Tenderers are to leave their email address when submitting the tender and a TEAMS invitation will be sent to the bidders to connect should they wish to witness the tender opening session.	24 January 2022	10:00 CET
* All times Central European Time (CET) / Central European Summer Time (CEST) as applicable		

3. Lots

3.1 This tender is not divided into lots, and tenders must be for the whole of quantities indicated. Tenders will not be accepted for incomplete quantities.

4. Variant Solutions

4.1 Variant solutions are not permissible.

5. Financing

5.1 The project is financed from NGO private funds.

5.2 The Contracting Authority of this tender is *Secretariat for a Catholic Education (SFCE)*.

6. Clarification Meeting/Site Visit

6.1 A clarification meeting/site visit will be held on the date and time indicated in Clause 2, at Good Shepherd Convent', Triq Idmejda, Balzan to answer any questions on the tender document which have been forwarded in writing, or are raised during the same meeting. Minutes will be taken during the meeting, and these (together with any clarifications in response to written requests which are not addressed during the meeting) shall be posted online on the NGO's website as a clarification note as per the General Rules Governing Tendering for NGOs.

Meetings between economic operators and the NGO, other than that provided in this clause during the tendering period are not permitted.

7. Selection and Award Requirements

In order to be considered eligible for the award of the contract, economic operators must provide evidence that they meet or exceed certain minimum criteria described hereunder.

(A) Eligibility Criteria

Economic Operators are to complete the Eligibility Section through the ESPD and the necessary documents as follows:(Note2)

(i) No bid bond is required

(ii) Declare agreement, conformity and compliance with the General Rules Governing Tenders for NGOs. (Note 2A)

(iii) Declare agreement, conformity and compliance with the provisions of the Statement on Conditions of Employment by submitting the declaration including in the tender package in relation to this effect. (Note 2A)

(iv) Power of Attorney (if applicable) (Note 2A)

(vi) Information re Joint Venture/Consortium (Note 2A)

(B) Exclusion (including Blacklisting) and Selection Criteria (Note 2A)

(i) Declaration concerning exclusion grounds . (Note 2A)

(ii) Declaration concerning the selection criteria (Note 2A)

(iii) Provide a list of all subcontractors to be engaged by the Bidder to perform the tasks of this contract. Each subcontractor must fill in and sign the declaration concerning exclusion grounds(Note 2A).

(C) Technical Specifications

(i) Tenderer's Technical Offer in response to specifications. (Note 3)

A. Key Experts Form, accompanied by CVs of Key experts, copies of qualifications' certifications including warrants, the Statement of Exclusivity and Availability Form (if applicable), the Self-declaration form for Key Experts (relating to public employees – if applicable) and all other documentation as requested. (Note 2A)

The following Key Experts are required:

a) Key Expert 1: Perit who will assume all the responsibility in terms of the legal obligations as arising under Maltese law (Warrant Nos to be provided) – MQF Level 6. The Perit must

have at least ten (10) years work experience as Perit and must have held the role of Perit for a project worth a minimum of €250,000 excl. VAT in the years June 2016 to May 2021;

b) Key Expert 2: Accredited Health and Safety Officer; Proof of accreditation to be submitted
c) Key Expert 3: Valid Licensed Stone Mason. Copy of Valid licence to be submitted;
d) Key Expert 4: Land Surveyor ,must have either MQF Level 4 diploma in a related area of study or at least 10 years experience as land surveyor;
e) Key Expert 5: Site Foreman (must have a qualification MQF Level 4 Diploma in Construction), will be responsible for the works on site and to oversee and co-ordinate the works with the Supervisor in charge of the project. He or she shall act as a the contact point for the duration of the works. The proposed key expert must have held the role of site foreman for a project worth a minimum of €250,000 excl VAT in the years June 2016 to May 2021;
f) Key Expert 6: Quantity Surveyor (MQF level 4 in Construction or Civil Engineering or Quantity surveying) responsible for the measurement of the works

B. Tenderer's Technical Experience

The contractor must have carried out three (3) projects each worth a minimum of €250,000 excl VAT in the years June 2016 to May 2021. The Tenderer must list each one of the three projects and the value of the respective project.

C. Tenderer's Technical Offer which shall consist of: (Note 3)

a) Tender Technical Offer Declaration Form signed by the bidder (Note 3)
(Note: Submission of an unsigned declaration form or a modified declaration form will automatically invalidate the tender bid).
b) A Construction Management Plan. A site management plan clearly outlining hoarding and protection, site storage, the use of machinery and equipment, and the human resources that the tenderer envisages to deploy on the project site for the completion of the works in question. The plan may include drawings or sketches illustrating site dynamics and logistics. (Note 3)
c) A Risk Assessment. A preliminary risk assessment and outline of the health and safety procedures that the tenderer intends to implement for the duration of the works. These documents shall act as a basis for more detailed reports prior to commencement of works by the winning bidder. (Note 3)
d) A Gantt Chart Programme of Works as outlined in the Works Tenderer Technical Questionnaire. The implementation period for this tender is 36 weeks from order to start works. (Note 3)

(ii) **Literature** as per Form marked 'Literature List' to be submitted with the Technical offer at tendering stage.. (Note 2B)

(D) Financial Offer

(i) The Tender Form and Tenderer's Declaration are to completed, signed and submitted with the offer; (Note 3)

(ii) A financial offer is to be submitted by filling in Bill of Quantities, and is to be calculated on the basis of **Delivered Duty Paid (DDP)[2020] (Grand Total)** for the works tendered. (Note 3)

Notes to Clause 7:

1. Tenderers will be requested to clarify/rectify, within five (5) working days from notification, the tender guarantee only in the following four circumstances: incorrect validity date, and/or incorrect value, and/or incorrect addressee and incorrect name of the bidder. Rectification in respect of the Tender Guarantee (Bid Bond) is free of charge.

2. A) Tenderers will be requested to either clarify/rectify any incorrect and/or incomplete documentation, and/or submit any missing documents within five (5) working days from notification.

B) Tenderers will be requested to rectify/submit only missing documents within five (5) working days from notification. No changes to the information provided in the Literature submitted will be allowed. Literature submitted shall be rectifiable only in respect of any missing information. All Rectifications are free of charge.

3. No rectification shall be allowed. Only clarifications on the submitted information may be requested.

8. Tender Guarantee (Bid bond)

8.1 **No tender guarantee (bid bond) is required.**

9. Criteria for Award

9.1 The sole award criterion will be the price. The contract will be awarded to the tenderer submitting the cheapest priced offer satisfying the administrative and technical criteria.

SECTION 2 – Appeals Procedure

270. Any tenderer or candidate concerned, or any person, having or having had an interest or who has been harmed or risks being harmed by an alleged infringement or by any decision taken including a proposed award in obtaining a contract, a rejection of a tender or a cancellation of a call for tender after the lapse of the publication period, may file an appeal by means of an objection before the Review Board within the Archdiocese of Malta, which shall contain in a very clear manner the reasons for their complaints.

271. The objection shall be filed within ten calendar days following the date on which the NGO has by fax or other electronic means sent its proposed award decision or the rejection of a tender or the cancellation of the call for tenders after the lapse of the publication period.

272. The communication to each tenderer or candidate concerned of the proposed award or of the cancellation of the call for tenders shall be accompanied by a summary of the relevant reasons relating to the rejection of the tender or the reasons why the call for tenders is being cancelled after the lapse of the publication period, and by a precise statement of the exact standstill period.

273. The objection shall only be valid if accompanied by a deposit equivalent to 0.50 per cent of the estimated value set by the NGO of the whole tender or if the tender is divided into lots according to the estimated value of the tender set by the NGO for each lot submitted by the tenderer, provided that in no case shall the deposit be less than four hundred euro (€400) or more than fifty thousand euro (€50,000) which may be refunded as the Public Contracts Review Board may decide in its decision.

274. The Secretary of the Review Board shall immediately notify the Director and/or the NGO as the case maybe that an objection had been filed with his authority thereby immediately suspending the award procedure.

275. The NGO involved, as the case may be, shall be precluded from concluding the contract during the period of ten calendar days allowed for the submission of appeals. The award process shall be completely suspended if an appeal is eventually submitted.

276. The procedure to be followed in submitting and determining appeals as well as the conditions under which such appeals may be filed shall be the following:

(a) any decision by the NGO shall be made public by uploading it on the NGO's website prior to the award of the contract if the call for tenders is administered by the NGO;
(b) the appeal of the complainant shall also be uploaded on the website of the Review Board within the Archdiocese of Malta and shall be communicated by fax or by other electronic means to all participating tenderers;

(c) the NGO and any interested party may, within ten calendar days from the day on which the appeal is published , file a written reply to the appeal. These replies shall also be uploaded on the website of the Review Board within the Archdiocese of Malta ;

(d) within three working days of the publication of the replies, the Secretary of the Review Board shall prepare a report (the Analysis Report) analysing the appeal and any reply to it. This report shall be circulated to the persons who file an appeal and to all parties who submitted a reply to the appeal;

(e) after the preparatory process is duly completed, the Director or the Head of the NGO shall forward to the Chairman of the Review Board all documentation pertaining to the

call for tenders in question including files, tenders submitted, copies of deposit receipts and any motivated letter;

(f) The secretary of the board shall inform all the participants of the call for tenders, the NGO of the date or dates as the case maybe when the appeal will be heard if the Review Board deems that a hearing is warranted;

(g) When the oral hearing is concluded, the Review Board, if it does not deliver the decision on the same day, shall reserve decision for the earliest possible date to be fixed for the purpose, but not later than six weeks from the day of the oral hearing:
Provided that for serious and justified reasons expressed in writing by means of an order notified to all the parties, the Review Board may postpone the judgment for a later period.

(h) The secretary of the board shall keep a record of the grounds of each adjournment and of everything done in each sitting;

(i) After evaluating all the evidence and after considering all submissions put forward by the parties, the Review Board shall decide whether to accede or reject the appeal.

SECTION 3 – SPECIAL CONDITIONS

These conditions amplify and supplement, if necessary, the General Conditions governing the contract. Unless the Special Conditions provide otherwise, those General Conditions remain fully applicable. The numbering of the Articles of the Special Conditions is not consecutive but follows the numbering of the Articles of the General Conditions. Other Special Conditions should be indicated afterwards.

For the purposes of contracts issued by NGOs, the term 'approval from the Central Government Authority' shall be substituted by the term 'approval by the Head responsible for that NGO'; Furthermore, any references to the Contracting Authority throughout the General Conditions shall be deemed to be referring to the NGO responsible for that procurement.

Article 2: Law and language of the Contract

2.1 The Laws of Malta shall apply in all matters not covered by the provisions of the contract.

2.2 The language used shall be English.

Article 3: Order of Precedence of Contract Documents

3.1 The contract is made up of the following documents, in order of precedence:

(a) the Contract;
(b) the Special Conditions;
(c) the General Conditions;
(d) the Contracting Authority's technical specifications and design documentation;
(e) the Contractor's technical offer, and the design documentation (drawings);
(f) the bill of quantities/financial bid (after arithmetical corrections)/breakdown;
(g) the tender declarations in the Tender Response Format;
(h) any other documents forming part of the contract.

Addenda have the order of precedence of the document they are modifying.

Article 4: Communications

4.1 Further to the contents in the General Conditions, the communication details of the Contracting Authority are:

Secretariat for Catholic Education,
16, The Mall,
Floriana, FRN 1472
Tel: 27790060
Email Address: info@maltadiocese.org

Communications between the Contracting Authority and/or the Supervisor on one hand, and the Contractor on the other, shall be exclusively in writing and in the English language. Specific and standard procedures of communication (templates of request for information, contract submittal, site instructions, time of communication and for replies, frequency of meetings) shall be agreed among the Contracting Authority and the winning bidder within fifteen (15) days from the Commencement Date of the Contract, unless otherwise specified in these Special Conditions and in Section 4 – Technical Specifications.

Article 5: Supervisor and Supervisor's Representative

5.6 The Contractor shall be responsible to provide all access necessary for verifying and inspecting the works carried out and the items being provided.

The Supervisor or the Contracting Authority shall, without nullifying this Agreement make any and all changes to the work which are within the general scope of the Agreement. Adjustments in the Agreement times, if any, resulting from such changes shall be set forth in a Contract Change Order agreed to by the Contracting Authority and the Contractor. No such adjustment shall be made for any changes performed by the Contractor that have not been so ordered by the Contracting Authority.

Article 6: Assignment

Requests from the contractor for a change in assignment will not be allowed except in the case of force majeure which results in the Contractor being unable to carry out the tasks assigned in the contract.

Article 8: Supply of Documents

8.4 Any documents and drawings prepared by the Contractor are to be submitted for approval to the Contracting Authority and the Supervisor, the procedure being agreed to between the parties as indicated in Clause 4 of the Special Conditions.

Article 9: Access to Site

9.1 In addition to sub clause 9.1 of the General Conditions, contractor may be required to suspend all or part of the works being carried out in order not to disturb any official function or activity held as indicated by the Contracting Authority. The contractor will be notified of such suspension of works at least 48 hours in advance and will not be eligible for compensation, apart from an extension of time.

9.5 The contractor is to note that access to the public/private buildings shall be maintained at all times and shall maintain pedestrian and vehicular access (where applicable) at all times.

To this effect, the contractor and his employees shall be required to abide by the instructions issued from time to time by personnel responsible for the security of the underlying/adjoining properties and shall ensure that all works are carried out without jeopardizing the security of the place.

Article 10: Assistance with Local Regulations

10.3 The contractor is responsible for complying with local regulations at his expense to ensure the project is compliant with all the relevant local regulations.

Article 11: The Contractor's Obligations

11.9 As per article 15.4 of the Special Conditions

11.11 The contractor shall draw up and submit any documents literature or items required for the execution of the works and submit them for approval to the Contracting Authority and Supervisor, the procedure being agreed to between the parties as indicated in Clause 4 of the Special Conditions.

11.17 Further to Article 11.2 in the General Conditions, the contractor shall deploy the necessary resources so as to maintain a good progress of work on the site and shall also, where necessary, undertake to perform works outside normal working hours, and on public holidays and weekends at no additional cost to the Contracting Authority, so as to ensure the completion of the Works within the required time-frame, in accordance with the Technical Requirements and with the Period of Execution.

11.20 Furthermore, the contractor shall be expected to be co-operative and allow the use of his scaffolding or other elevation equipment and/ or other facilities available on site for the efficient execution of the above-mentioned works. Same contractor will not be entitled to any compensation (financial or otherwise) for these services, etc.

11.21 The Contractor shall be obliged to follow any and all instructions issued by the Supervisor in relation to the Works in so far as these fall within the overall scope of the Contract.

11.22 The Contractor shall be obliged to ensure avoidance of disruption and inconvenience to the day to day business on and around the site, including the co-ordination with other contractors that may be engaged on or in the vicinity of the site, the free movement of traffic and pedestrians, except where this is absolutely unavoidable. In particular, the Contractor shall take all such precautions as may become necessary so as to avoid causing any damage to adjacent buildings or property, including public spaces, during the execution of the Works.

11.23 The Contractor shall also, in addition to the above, take any necessary action to ensure and maintain the health and safety of his employees, together with those of the employees of any other contractor engaged on or in the vicinity of the site, together with the general public and shall follow any relevant instructions and /or recommendations of the contractor's Health and Safety Offices and the Contracting Authority Project Supervisor to fulfil the obligations set out in Legal Notice 88 of 2018 (or subsequent amendments).

11.24 In addition to other obligations arising under the Contract pertinent to the execution of the Works, the Contractor shall, following completion of same, fulfill all obligations during the Defects Liability Period as outlined in Article 58.6 of these Special conditions.

The Contractor shall not dismantle the scaffolding or other elevation equipment prior to the approval of the Contracting Authority's architect and civil engineer in charge. The contractor shall give the Contracting Authority's architect and civil engineer in charge at least one week notice to allow for a final inspection and the measurement of works.

11.25 All lifting equipment used on site shall be certified by a warranted Mechanical Engineer every six (6) months, in accordance with the regulations issued by the Occupational Health and Safety Authority

11.26 Copies of the certificates shall be sent to the Contracting Authority's Architect and civil engineer in charge/Project Manager before commencement of work and as necessary should the six (6) month certification period elapse.

11.27 A suitable "housekeeping" programme shall be established before commencement of the project, and be continuously implemented on the Site.

11.28 The Contractor will be available to attend regular site, management and progress meetings.

Article 13: Performance Guarantee

13.1 The Contractor shall, within 15 calendar days of receipt of the contract, sign and date the contract and return it together with an original copy of the Performance Guarantee to the Contracting Authority. The amount of the guarantee shall be 4% where the amount of the total contract value is between €10,000 and €500,000 exclusive of VAT. If the same Contractor has more than one contract with the Contracting Authority, then the Contractor will be allowed to submit a single bid bond in accordance with the schedule stipulated in the Tender Form.

13.3 The performance guarantee shall be in the format given in Section 5 and shall be provided in the form of a bank guarantee. It shall be issued by a bank in accordance with the eligibility criteria applicable for the award of the contract.

Furthermore, the Contracting Authority will not affect any payment to the Contractor until the performance guarantee has been submitted.

13.8 The performance guarantee shall be released within 30 days of the signing of the Provisional Acceptance Certificate including any snag lists.

Article 14: Insurance

14.1 Without any prejudice to Article 14.1 a, b, c of the General Conditions, the contractor is required to insure for the whole duration of the contract against risk of damage to the historic fabric of the building being restored through this contract for the amount of €235,000 per accident with the number of occurrences unlimited.

14.2 Without any prejudice to 14.1 a, b, c of the General Conditions, the contractor is required to insure for the whole duration of the contract for the amount of €1,500,000 per accident with the number of occurrences unlimited against each party's liability for any loss, damage, death or bodily harm, that may be caused to third parties, or to any person that is authorized to be on site at any given time, or any damages to property belonging to third parties, including loss of profits that may be sustained by third parties.

14.3 Amount per personal injury and unlimited occurrences as specified in Article 14.2 of the Special Conditions.

Article 15: Performance Programme (Timetable)

15.1 The Contractor shall provide a detailed Programme of Works.

15.4 The Programme of Works shall be updated whenever required by the Supervisor, to be in line with the progress of the actual Works. The Programme of Works shall be accompanied by sufficient data and information. The Supervisor shall approve the Programme of Works within ten (10) working days from submission by the Contractor to the Supervisor. Should the Supervisor consider any alteration in or addition to the Programme of Works as submitted, the Contractor shall conform therewith without additional cost. Any changes to the Programme of Works shall be approved by the Contracting Authority.

Article 17: Contractor's Drawings/Diagrams

17.1 The Contractor shall submit to the Supervisor for approval any documents, programme of works, technical literature, samples and /or models that the Supervisor may reasonably require for the performance of the contract within 5 working days from written request by the Supervisor or from date when meeting where minutes are taken.

Article 18: Tender Prices

18.2 The contractor will ascertain that all the respective rates have included double handling, carting away and dumping fees

18.3 The Contractor shall be deemed to have taken into account in his tender price all works, material, fees and costs that are necessary to complete the project and to fully hand over in operational condition.

Article 19: Exceptional Risks

19.5 Further to the provisions of Article 19.5 of the General Conditions, if the Contractor is granted an extension of time in the implementation of the works, the Contractor cannot make a request for financial compensation for extension of time.

Article 20: Safety on Site

Further to the provisions of the General Conditions, it is the obligation of contractor to carry out a suitable, sufficient and systematic assessment of all the occupational health and safety hazards which may be present at the place of work and the resultant risks involved concerning all aspects of the work activity.

Further to the provisions of the General Conditions, it is also the duty of a contractor to cooperate with other employers, contractors and, or self-employed persons who share a common work place, on the implementation of Health and Safety provisions. The contractor or his designate shall co-ordinate necessary actions in matters which concern protective and preventive measures, and shall inform all on site as well as the Health and Safety Project Supervisor regarding any potential risks.

Article 22: Interference with Traffic

The Contractor is responsible to obtain necessary permits that may be required if the works impact of traffic.

Article 23: Cables and Conduits

23.3 The contractor shall be responsible for locating existing drains and services, and underground cables and pipes where applicable, for seeking instruction from the appropriate authorities as to how to deal with such services, and for carrying out any necessary work relating to deviations or protection, or any other works deemed necessary by the respective Utility or authority.

Article 25: Demolished Materials

25.1 Demolition material unless indicated otherwise in the bills of quantities and by the supervisor in charge, shall become the property of the Contractor and the carting away and dumping charges are at the expense of the Contractor.

25.4 Further to Article 25.4 of the General conditions, the contractor shall also take care to dispose of the waste material fully at his expenses and in an environmentally friendly manner.

Article 26: Discoveries

26.2 Further to provisions of Article 26.2 of the General Conditions, the Contractor shall observe the provisions set out in the Cultural Heritage Act 2002 (CAP 445) at all times.

26.3 Further to the provisions of Article 26.3 of the General Conditions, any findings of interest which are discovered must be reported immediately to the Superintendence of Cultural Heritage. The contractor shall halt the works and follow all instructions given by the Supervisor and Supervisor to protect or to investigate further the discovery.

The Contractor shall co-ordinate and co-operate with the supervisor appointed by the Contracting Authority and with the Local Authorities at all times.

Article 31: Commencement Date

31.1 The Commencement Date for this contract shall be 1 week from the Order to Start Works. The performance of the contract is to commence on order to start works. The order to start works will not be issued later than two (2) months from the last date of signature shown on contract.

No works however will be allowed to commence on site unless the Contractor has furnished the Contracting Authority with a certified true copy of the Insurance Policy together with all

documentation related to Health and Safety and the performance guarantee. Delay in submitting the documentation following the elapse of the 1month period from the last date of signature of the contract, will result in daily penalties of €50 a day up to a maximum 2% of the contract value.

Article 32: Period of Execution of Tasks

32.1 The period of performance of this contract shall be 36 weeks from the Commencement indicated in the Order to Start Works which will be issued by the Contracting Authority.

The contractor will be expected to commit sufficient resources to carry out works on more than one area at the same time, to guarantee the on-time completion of all the Works as specified in this tender.

Article : Extension of the Period of Execution of Tasks

33.4 Further to the provisions of Article 33 of the General Conditions, should the Contractor be granted an extension of the period of execution of the tasks that are the subject of this contract, the Contractor cannot make a claim for financial compensation for such extension in the period of execution of the tasks of the contract-.

Article 34: Delays in Execution

34.1 Any delay in performance from the approved programme of works for this contract, will be charged €500 per calendar day of delay, up to a maximum of 20% of the contract value.

Upon reaching the maximum penalty, the Contracting Authority reserves the right to terminate the contract and seek the services of a third party for the completion of works and such costs will be charged to the Contractor.

Article 35: Modification to the Contract

35.8 The Contracting Authority has a right to increase or reduce works of a similar nature by a maximum of 15% of the contract value which have become necessary for the purpose of achieving the scope of the contract. These inter alia include the detection of unidentified works evident only once close inspections can be carried out and/or interventions have commenced such as changes emanating as a result of site investigation during the course of works; additional works that are complimentary in nature to those originally envisaged and required in order to execute the project in its entirety; archaeological discoveries; geotechnical terrain issues detected during the works; detection of unidentified buried service utilities, poor condition of leakage from existing buried services; weak underlying foundations, abnormal foundations which are discovered during the works; and abnormal water seepage due to bed rock being fully saturated. Such works would be resulting from close inspection of works exposed during the course of works.

35.9 The Contracting Authority will have the right to instruct additional works up to a maximum of 15% of the contract value which have become necessary for the purpose of achieving the scope of the contract. Such works would be resulting from close inspection of works accessible during the course of works. These inter alia include works evident only once the interventions have commenced such changes emanating as a result of site investigation during the course of works; additional works that are complimentary in nature to those originally envisaged and required in order to execute the project in its entirety; archaeological discoveries; geotechnical terrain issues detected during the works; detection of unidentified buried service utilities, poor condition of leakage from existing buried services; weak underlying foundations, abnormal foundations which are discovered during the works; and abnormal water seepage due to bed rock being fully saturated.

35.11 The provisions provided for in Article 35.11 of the General Conditions shall not be applicable to this contract.

35.12 The provisions provided for in Article 35.12 of the General Conditions shall not be applicable to this contract and no claims may be submitted by the Contractor in this regard

35.13 The provisions provided for in Article 35.13 of the General Conditions shall not be applicable to this contract and no claims may be submitted by the Contractor in this regard.

Article 37: Work Register

37.1 The Contractor shall maintain a Weekly Work Register (Work Diary) on the site, listing works carried out every week in the template specified and/or approved by the Contractor's representative and approved by the Supervisor, including at least the following information:

(a) weather conditions, interruptions of work owing to inclement weather, hours of work, number and type of workmen employed on the site, materials supplied, equipment in use, equipment not in working order, tests carried out in situ, samples dispatched, unforeseen circumstances, safety, health and welfare of persons and damage to property, progress of the Works, as well as progress of the Works orders given to the Contractor;

This Work Register shall be made available in digital form and submitted once weekly

Article 38: Origin

38.1 No derogation to the rules of origin is authorised.

Article 39: Quality of Works and Materials

39.2 All components, materials, and interventions/methodologies shall be submitted to the Supervisor for written preliminary technical approval, prior to their implementation or procurement. All requests and documentation must be submitted with 15 calendar days prior to execution of works on site.

Article 40: Inspection and Testing

40.2 As specified in the General Conditions.

Article 42: Ownership of Plants and Materials

42.2 All equipment, temporary works, plant and materials on site owned by the Contractor or by any company in which the Contractor has a controlling interest shall, for the duration of the execution of the works be:

a) Vested in the Contracting Authority.

Article 43: Payments: General Principles

43.1 Payments will be made in Euro. This is a Bill of Quantities works contract.

43.6 Payments shall be authorized by the Contracting Authority in line with the following schedule:

Payment Schedule		
Interim Payments	As per measured works	95% of contract value
Retention Monies	As per payment schedule in Clause 45.2 of the Special Conditions	5% of contract value

Article 45: Retention Monies

45.2 The sum of money retained from the interim payments shall be of 5%. This sum shall be paid when issuing the Final Acceptance Certificate as specified in Article 58.

Article 46: Price Revision

46.1 Tender prices are fixed and not subject to revision with the exception of that resulting from causes listed under Article 46.3 of the General Conditions.

Article 47: Measurement

47.2 The works shall be measured net of areas covered as detailed in the Bill of Quantities, and as specified in the appropriate clauses in the Technical Specifications – Section 4. The appointed contractor shall satisfy the Supervisor that the materials are such as specified or equivalent.

Article 48: Interim Payments

48.1 Interim Payments of sums due for the executed and provisionally accepted works shall be authorized by the Contracting Authority and payment will be issued by the Contracting Authority paid against a valid invoice after works in accordance to quality and progress of works. The retention shall be released in accordance to Clause 45.2 of these special conditions. The Contractor shall submit his claim for progress payments to the Contracting Authority in writing. Such claims are to be supported by evaluation of the works executed and materials installed on site and show the value of the permanent works executed by him up to the end of the month. All claims shall be evaluated by the Contracting Authority in relation to the Bills of Quantities and Contract Rates and documentation produced by the Contractor and on the basis that such works have been executed in accordance with the Contract Documents and to the satisfaction of the Contracting Authority. Provided the Contracting Authority agrees with the statement, the relevant Payment Certificate will be issued.

Article 50: Delayed Payments

50.1 The Contracting Authority shall pay the contractor sums due within 60 days of the date on which an admissible payment is registered, in accordance with Article 43 of these Special Conditions. This period shall begin to run from the approval of these documents by the competent department referred to in Article 43.1 of these Special Conditions. These documents shall be approved either expressly or tacitly, in the absence if any written reaction in the 30 days following their receipt accompanied by the requisite documents.

50.2 Once the deadline laid down in Article 50.1 has expired, the Contractor may, within two months of late payment, claim late-payment interest:

- at the rediscount rate applied by the issuing institution of the country of the Contracting Authority;
- on the first day of the month in which the deadline expired, plus two percentage points (2%). The late-payment interest shall apply to the time which elapses between the date of the payment deadline (exclusive) and the date on which the Contracting Authority's account is debited (inclusive).

Article 56: Partial Acceptance

56.2 The supervisor will issue partial provisional acceptance upon completion of full works on the structure envisioned within the contract and not upon completion of works on parts of the structure envisioned within the contract.

56.3 The maintenance period shall run from the date of the Provisional Acceptance Certificate issued as per Article 57.

Article 57: Provisional Acceptance

57.6 Further to the provisions of Article 57 of the General Conditions, the Provisional Acceptance Certificate can only be issued once all pending snags included in the relevant snag list, are appropriately addressed by the Contractor and to the satisfaction of the Supervisor.

Article 58: Maintenance Obligations

58.6 Further to the provisions of Article 58 of the General Conditions, the contractor shall guarantee that works specified in this tender document are in good order for a period of 5 years from issuing of the Provisional Acceptance Certificate.

Any remedial works performed during the guarantee period (until 5 years after completion of ALL works described in this contract) shall be carried out as specified in this document and approved by the Supervisor. The contractor shall be responsible for providing all suitable means, for obtaining all permissions, and making all the necessary arrangements with all authorities concerned to carry out all the remedial works at any height levels at no extra cost to the Contracting Authority.

Article 66: Dispute Settlement by Litigation

66.1 If no settlement is reached within 120 days of the start of the amicable dispute-settlement procedure, each Party may seek:

(a) either a ruling from a national court, or

(b) an arbitration ruling, in the case where the parties, i.e. the Contracting Authority and the Contractor, by agreement decide to refer the matter to arbitration.

Article 70: Further Additional Clauses

70.1 The Supervisor will organise project management meetings (which may be held in person or on-line) and site meetings. The Contractor's representative must also attend these meetings in order to review the arrangements of future work. The Supervisor shall record the business of these meetings and supply copies of the record to those attending the meeting and Contracting Authority. In the record, responsibilities for actions to be taken shall be in accordance with the contract.

The Contractor's Key Experts must also attend these meetings when requested by the Supervisor and/or the Contracting Authority. The Supervisor shall notify the Contractor of the requirement of a particular Key Expert's attendance at least three (3) days prior to the meeting. The Contractor shall become liable to a penalty of €100 (one hundred euro) for each occurrence in which a Key Expert fails to attend meetings. Such penalties will be deducted from the next interim payment due.

70.2 Following the issue of an administrative order by the Supervisor, the Contractor shall execute the administrative order within the specified deadline. Without prejudice to other penalties which may be due in terms of the Contract, if the Contractor fails to respect the specified deadline for the respective administrative order, Contractor shall be liable to a penalty for mere delay in execution of the administrative order in the amount of €100 (one hundred euro) for each calendar day following the deadline until Supervisor certifies the completion of the administrative order, which penalty shall be deducted from the next interim payment.

70.3 The Contractor shall be liable to a penalty of €2,000 (two thousand euro) if he fails to abide with any of the conditions of permits for works issued by ERA [Environment and Resources Authority], the PA [Planning Authority] and the BRO [Building Regulation Office] or any other Malta Government Authority and related to or in connection with this contract. This penalty shall be applied for each occurrence where the result of the non-compliance is irreversible. In case the effects and results of the non-compliance are reversible the contractor shall be liable to a penalty of €1,000 per calendar day commencing from the deadline set by the Supervisor to complete the remedial works. The reversibility of the breach of permit conditions shall be determined by the Supervisor. The penalties in this Article shall apply without prejudice to the other penalties that may be issued by the Planning Authority and/or other Governmental Entities. Penalties will be deducted with the next interim payment due.

SECTION 4 –SPECIFICATIONS/TERMS OF REFERENCE (Note 3)

Note: Where in this tender document a standard is quoted, it is to be understood that the Contracting Authority will accept equivalent standards. However, it will be the responsibility of the respective bidders to prove that the standards they quoted are equivalent to the standards requested by the Contracting Authority.

TECHNICAL SPECIFICATIONS FOR THE CONSTRUCTION WORKS TO BE CARRIED OUT ON EXISTING PROPERTY AT THE GOOD SHEPHERD CONVENT IN BALZAN

1. DEMOLITION WORKS

1.1 HOURS OR WORK

Construction operations will be restricted to those periods recognized and permitted by local regulations and legislation.

Any works outside the permitted hours will only be carried out further to prior approval of the Project Manager.

1.2 GENERAL NOTES

i. SAFE WORKING CONDITIONS

This specification does not replace the Contractor's legal responsibility to provide and maintain safe working conditions in accordance with current Maltese Occupational Health and Safety legislation, namely LN 36 of 2003, LN 281 of 2004 and other subsidiary legislation and regulations.

All worksite access gates and entry points should be strictly controlled to give the minimum amount of time open for passage of vehicles, in order to minimize plant vehicle noise to the local environment.

ii. PRELIMINARY CONSIDERATIONS

An experienced supervisor shall be continuously in charge of the works.

Demolition operations shall generally comply with BS 6187: Code of Practice for Demolition.

iii. GENERAL SITE PROVISIONS

Plant and equipment must only be operated by skilled operators and must be regularly serviced.

Protective Clothing and shoes must be worn at all times.

iv. TECHNIQUE

The Contractor shall comply with the recommendations set out in BS 5228:1997, Code of Practice for Noise Control on Construction and Demolition sites.

The demolition technique and choice of equipment should be dependent on the nature of the structure, the surrounding buildings and the environment.

v. SHORING AND UNDERPINNING

When removing sections of the building which could leave other parts unsafe, the

Contractor shall provide adequate temporary supports and shoring

vi. WORKING AREAS

These will need to be well signposted and clear warnings given that demolition work is in progress. This shall include the necessity for adequate illumination during the night.

vii. DEBRIS

Sections of the building must not be overloaded with debris either on suspended floors or against walls.

viii. WEATHER CONDITIONS

All walls and slabs shall be propped to protect against strong winds.

Adequate provisions shall be had to ensure site drainage while eliminating risk of water ingress into the building and third-party properties.

ix. OVERHEAD CABLES

Crane heights must be checked against the height of any surrounding overhead cables to avoid damage and cutting off supplies etc.

It shall be within the remit of the Contractor to co-ordinate with entities regarding the presence of overhead cables (as well as cables along the façade).

x. SCAFFOLDING AND HOARDING

These must be constructed and illuminated to the relevant local building regulations, including for all necessary screening, protection against propagation of dust, toe boards, hand rails, protection against falls, capping of protrusions and well illuminated.

xi. BUILDING INFORMATION

If information on the building in terms of "As Built" drawings and structural details, are not completely available, adequate site investigations are necessary, both to ascertain the way in which the building was originally constructed, and to identify the stresses and strains which exist within it. Consideration should be given to conducting a site and building survey, with a structural bias.

xii. DEMOLITION PROCESSES

The demolition method shall take into account the method of construction used for the original building and its proximity to other buildings, structures and the general public.

xiii. DEMOLITION METHOD STATEMENT – GENERAL

A detailed method statement, produced before demolition work starts, is mandatory. It should include fulfilling the recommendations arising from the Risk Assessment, identify problems and their solutions, and form a reference for the site supervision.

The method statement should be easy to understand, agreed by and known to all levels of management and supervision.

xiv. DEMOLITION METHOD STATEMENT – RISK ASSESSMENT

A detailed risk assessment in accordance with Legal Notice 36 of 2003 (and any other relevant legislation) is mandatory.

xv. DEMOLITION METHOD STATEMENT – ISOLATION OF STRUCTURE

If only parts/sections of the building is to be demolished the Method statement shall contain details of how to isolate the part/s to be demolished from the remaining structure. This shall normally be through vertical cuts in masonry walls and horizontal stitch drilling in concrete floor slabs using hand held tools.

xvi. DEMOLITION METHOR STATEMENT – PARTICULARS

The Method Statement shall clearly define:

The sequence and method of demolition or dismantling of the building or structure with details of personnel access, working and protective platforms and machinery requirements;

Details and design of any temporary supporting structures to be used during the demolition process;

Specific details of any pre-weakening on structures which are to be pulled down or demolished;

Arrangements for the protection of personnel and the public and the exclusion of unauthorized persons, with details of areas outside the site boundaries that may occasionally need to be controlled to improve safety during critical aspects of the work;

Details of the removal or making safe of electrical, and other services and drains;

Details of temporary services available or required for the contractor's use; Arrangements for the control of site transport used for the removal of demolition debris

xvii. DEMOLITION METHODS

Generally, buildings and structures should be demolished in the reverse order to their erection, although where partial demolition is involved a more careful evaluation of the nature of the effects of the demolition is necessary.

Normally, the demolition Contractor is able to adopt a method of work which gradually reduces the height of the building; Controlled collapse of the building or structure is strictly NOT PERMITTED.

Only piecemeal demolition, using hand-held tools or machines, to reduce the height of the building or structure gradually shall be permitted.

Demolition of buildings or structure by hand-held tools such as electric or pneumatic breakers, sometimes as a preliminary to using other methods, should be carried out, where practicable, in the reverse order to the original construction sequence. Lifting appliances may be necessary to hold larger structural members during cutting and for lowering severed structural members and other debris. Chutes may be used to discharge debris into a vehicle or hopper. Note - Foundations would normally be grubbed up by excavation machines.

Where a building that is to be demolished by machine is bonded to another structure, the two should be separated by the use of hand methods before the main demolition process begins.

No machinery shall be supported directly on the structure that is being demolished. No demolition personnel shall be supported directly on the structure that is being demolished.

When any part of a building is being demolished only the machine operator and assistant should be allowed close to the working area. The cabs of all machines should be strong enough to

protect the operator against the fall of debris. In particular, the windscreen and roof light should be of shatterproof material and guarded by a grille of steel bars or a substantial mesh.

Impact hammers and nibblers are permitted but in either case, material should be

removed from the top of walls or columns in courses not greater than 600mm in depth whilst steel reinforcement should be cut separately as necessary

1.3 DEMOLITION OF STRUCTURES

Rates for demolition of Structures shall be deemed to include:

a) Reinforced concrete suspended slabs.
b) Stone slab over steel or timber beams
c) T-beam and block flooring
d) Stone walls

Same rate shall be applicable to any quantity and to any location within the project area.

All the adjoining, overlying and underlying finishes; supporting steel/ wood beams (incl. making good wall at beam ends); any reinforced concrete beams attached to slabs whether down stand or up stand; removal of any services and plumbing works for any limitation on the dates and times as to when demolition works can be carried out which will subject to the Client's approval.

The formation of bearing on adjacent beams or walls (to receive new slabs) by means of electric jigger to avoid damage of structures not designated for demolition.

The contractor shall not cause any damage to nearby structural elements, which are not earmarked for demolition.

Any damage to nearby structures caused by the contractor through negligence shall be made good at his own expense and to the approval of the Project Architect.

Careful co-ordination with other work executed at the Site must be obtained to perform the demolition work involved. Before starting any demolition work, the contractor shall inspect the structures to be demolished and he shall take all necessary precautions to ensure that those parts to be retained will remain undamaged. All damage to retained parts shall be repaired by the contractor at his expense.

It shall be the contractor's responsibility to secure all load-bearing parts by adequate temporary supports, in case the demolition will change the load-bearing behaviour, or when higher loads will have to be taken either for temporary purposes or permanent use.

When executing the demolition work, the surrounding areas must only be affected to the absolutely necessary minimum. In the event that demolition work might cause damage to surrounding structures, the contractor shall, in conjunction with the Engineer and the owners of such structures, determine their present condition and the contractor shall, if required. Take appropriate measures before demolition work commences.

All debris, rubbish and other materials resulting from demolition operations shall be removed from the site. Storage of removed materials will not be permitted on the site.

The Contractor is to provide all requisite plant, scaffolding, drawing-in ways, highways, planks, gantries, tarpaulins, etc., for the proper protection and execution of the Works.

Materials arising from the demolition must not be stacked or allowed to accumulate on existing structures in such a way as to endanger their stability. The contractor will be held entirely responsible for damage arising from this cause.

The Contractor is allowed to dispose of all existing furniture, furnishings, fixtures and fittings as he deems fit. Some of these items are considered to be still in a good state of repair and the Contractor is expected to take their value into consideration when submitting his Tender.

Should any subsidence, caving in or any other damage occur due to the inefficiency of the shoring or any other support provided, the damage shall be made good by the contractor at his own expense.

The method and machinery used for demolition shall be subject to the approval of the Project Architect. Due consideration will be given to the noise generation of the machinery used.

1.4 DEMOLITION OF WALLS

All rates are to include for the demolition of structural and non-structural walls including the provision and installation of any temporary supports as well as the removal of all the adjoining finishes, cladding, skirting, wall tiles, joinery etc., making good jambs and forming of a neat vertical cut in the edge of un-demolished walls, as well as the removal and transport of all the material away from site.

The same rate shall be applicable for Limestone and H.C.B walls.

All single skin walls shall be assumed to be 230mm thick unless specifically stated otherwise

1.5 CRANE LOCATIONS

i. Every effort shall be made to confine crane arcs to within the site periphery. Should crane rotation arcs extend beyond the site perimeter approval shall be sought from the Project Manager. When the erection of cranes is located in areas under the jurisdiction of public authorities and entities the Contractor shall ensure that all necessary permits, fees, protection and safety provisions are in place and at no additional expense to Hospice Malta.

ii. At the completion of works the Contractor will leave the site free from plant, rubble and any unwanted materials.

iii. The security of neighbouring property should be considered. Care should be taken not to leave scaffolding and ladders or any conditions, which facilitate access to neighbouring property.

iv. The Contractor will follow a "good housekeeping" policy at all times. This will include, but not necessarily be limited to, the disposal of rubbish and waste at adequate intervals.

v. Noise and Hours of Working; The Contractor shall comply with EU Directive 2002/49/EC relating to the assessment and management of environment noise.

vi. Before works on site are commenced, the Contractor will be required to submit to the Project Manager for approval the following information: -

1. A method statement (in accordance with the principle described in BS 5228) stating precisely the type of plant to be used and the proposed noise control methods.
2. A programme of work indicating the noise intensity and the location for each activity on the programme.
3. Documentation from the manufacturer’s literature establishing the sound power levels of the plant.

vii. Vehicles and mechanical plant used for the purpose of the works shall be fitted with effective exhaust silencers and maintained in good and efficient working order and operated in such a manner as to minimize noise emissions.

viii. For each item of plant used in the works, the values quoted in the relevant EC Directive should not be exceeded.

ix. Plant muffling should be in accordance with the recommendations set out in BS 5228:1997.

x. Compressors should be fitted with properly lined and sealed acoustic covers, which should be kept, closed whenever in use.

xi. Pneumatic percussive tools should be fitted with mufflers or silencers of the type recommended by the manufacturers.

xii. Machines in intermittent use should be shut down in the intervening periods between work or throttled down to a minimum.

xiii. Care should be taken when loading or unloading vehicles or dismantling scaffolding or moving materials etc. to reduce impact noise.

xiv. The delivery and collection of skips in noise sensitive areas will be restricted to specified hours.

xv. Blasting is strictly NOT PERMITTED.

1.6 NOISE LIMITS

Sound levels will be monitored according to the methods set out in Annex E of BS 5228:1997 Part l. All measurements shall be made on a sound level meter (currently calibrated) complying with BS EN 60651:1994, Specification for Sound Level Meters. A programme of noise monitoring by a suitably qualified specialist will be agreed between the Contractor and the Project Manager.

The noise limits to be applied to a site are those set out in the BS 5228, Appendix 1.

Noise shall be measured at first floor level or above, 1 metre from the nearest residential facade. These limits do not apply to buildings in occupation during construction.

1.7 DUST AND AIR POLLUTION

Dust pollution will be minimised during demolition works and the watering of the area should be undertaken where necessary to minimise dust transference into neighbouring premises. Whenever possible dust suppressed tools should be used. Stockpiles shall aim to minimise the effects of attrition and wind action. They shall be sited and shaped to minimise the potential for dust generation. Handling operations shall be kept to a minimum and materials must be deposited onto the stockpile from the minimum practicable height without causing obstruction to lighting to adjacent property. The surface of long-term stockpiles shall be stabilised.

Wheel-wash facilities should be provided at site exits to prevent any transfer of mud onto roads.

The Contractor should take all necessary precautions to prevent the occurrence of smoke emissions or fumes from site plant or stored fuel oils for safety reasons and to prevent such emissions or fumes drifting into residential areas. In particular, plant should be well maintained and measures taken to ensure that they are not left running for long periods when not in use.

1.8 DISMANTLING AND REMOVAL OF JOINERY WORKS AND METALWORKS

Rates to include:

1.8.1 All internal / external timber / steel doors, windows, jambs and box frames to doors and window openings;

1.8.2 The removal of all (indicated) damaged timber/ steel glazed doors and windows in the facades
1.8.3 Removal of all windows in any material
1.8.4 Removal of all brackets and fixings to all fittings and services
1.8.5 Removal of steel security grilles, wrought iron grilles and the like.

2. EARTH WORKS

2.1 GENERAL

Earthworks shall generally comply with BS 6031 – Code of Practice for Earthworks, or equivalent European Standard if applicable.

i. COMPLIANCE – SAMPLE SIZE AND FREQUENCY OF SAMPLING (WHERE APPLICABLE)

Where applicable, sample size and frequency of sampling for compliance shall be established on the basis of standard statistical guidelines.

ii. COMPLIANCE – TESTING AND CERTIFICATION

Compliance shall be demonstrated through testing and/or certification of products and/or processes as outlined in the ensuing clauses.

iii. PRELIMINARY INSPECTION FOR EXISTING SERVICES

The Contractor, subject to any instructions or contrary directions in accordance with the Contract, shall inspect the site, take all actions necessary to establish and/or verify the presence or absence of existing services, pipes, drains, cabling and supplies and precisely identify and document such findings on detailed plans and cross-sectional drawings. These shall be presented to the Project Manager for review.

iv. WORKS TO COMMENCE ONLY ON INSTRUCTIONS

The Contractor shall commence or proceed with excavations only on instructions from the Project Manager.

v. CAUTION

The Contractor, subject to any instructions or contrary directions in accordance with the Contract, shall take all actions, measures and precautions required by any recognised public entity or owners of privately-owned services or supplies, for rendering safe, disconnecting and properly sealing off of all pipes, drains, cabling, services and supplies.

vi. EXCAVATIONS

All excavation shall be carried out in any extractable materials encountered to the lines and levels shown on the Drawings or as directed by the Project Manager.

Excavation shall be carried out by hand or machine as found expedient for the work to be executed, including grading and trimming the bottom of the excavations to the precise levels required. The Contractor shall take all precautions necessary to avoid damage to existing services.

The sides of excavations in open cut shall be trimmed and made safe to the satisfaction of the Project Manager.

The measurements of all excavations and subsequent disposal are those before excavating and to any depth required. The increase in bulk and any extra excavation required for planking and strutting and formwork for concrete, are to be allowed for by the Contractor.

The Contractor is to allow in his rates for all double handling of excavated material and wheeling and depositing spoil heaps as may be necessary.

Excavations for foundations and other substructure will be in accordance with the drawings and requirements of the bearing pressure of the ground.

Bottoms of excavations shall be level and thoroughly rammed and consolidated and the Contractor is to allow for this in the rates for excavation.

The Contractor must give reasonable notice to the Architect when foundation excavations are ready for inspection and no concrete is to be poured or work of similar nature commenced until such excavations have been approved.

In the event of the Contractor excavating below the levels or beyond the widths shown or directed, without written instructions, the Contractor shall, at his own expense, fill the excavation to the proper level specified, with concrete of the same quality to be used in the foundations, all at his own expense. No payment for over excavation shall be entertained.

2.2 ORGANIC TOPSOIL

Topsoil which is stripped from the natural ground surface and which contains sufficient organic matter for the germination of grass seed shall be stockpiled in a distinct and separate stockpile and under no circumstance shall it be used for fill operations. Disposal shall be subject to the local regulations.

Topsoil shall be soil which is stripped from the natural ground surface and which contains sufficient organic matter for germination of grass seeds.

2.3 SOFT AREAS

Soft areas which, in the opinion of the Architect, are unsuitable for bearing the overlying construction and applied loadings, shall be removed to such depths and widths as are directed by the Architect, and the material excavated shall be removed from the Site. The excavation shall be back-filled with suitable properly compacted fill material as directed by the Project Manager.

2.4 STABILITY OF EXISTING STRUCTURES

All excavation shall be carried out in such a way as not to endanger the stability or safety of any existing structure or any part of the Permanent or Temporary Works. Any temporary measures necessary in order to comply with this requirement shall be agreed with the Architect. The Contractor is to allow in his rates for excavation, all the necessary planking and strutting. The Contractor is at all times responsible for the safety of the excavations; He is to provide all necessary planking and strutting to ensure this. Should any damage result to the excavations or works, the Contractor will be held entirely responsible and any extra work required by virtue of this will be entirely at his own expense.

2.5 CONTROL OF WATER

Excavation for foundations of structures shall be carried out, generally, "in the dry". Water shall not be allowed to accumulate in the excavations and the Contractor shall install and maintain such pumping or other water control measures as are necessary, due regard being paid to the stability of adjacent structures. Any subsidiary water run-off systems shall be approved by the Project Manager and must be of a temporary nature. Any damage caused by inadequacy of these water control measures shall be made good at the Contractor's own expense.

2.6 OVER-EXCAVATION

In the event of the Contractor over excavating below the appropriate levels or beyond the alignments shown on the Drawings or directed by the Project Manager, the Contractor shall, at his own expense, fill the excavation to the proper level specified with concrete of the same quality used in the foundation.

2.7 LEVEL SURVEYS

A level survey is mandatory prior to and on completion of excavations and fill operations. This shall be extended to include any superimposed new layer. This survey shall be along an adequate grid to be jointly established with the Project Manager.

2.8 CONTRACTOR'S RESPONSIBILITY

Cultivated trees, shrubs, and grass in rights-of-way or easements, but outside the specified limits for excavation, shall be protected and preserved during the entire period of construction. Site preparation shall be considered incidental to the construction work and no specific payment will be made therefore, unless otherwise noted in the contract documents.

The Contractor shall be responsible for all notifications for inspections and testing as outlined in the specifications.

The Contractor is responsible for the disposal of all debris resulting from clearing, grubbing, and demolition work in a manner and location satisfactory to the Project Manager. If stockpiling is done adjacent To excavations, the Contractor is responsible for ensuring they are placed in such a manner that no damage will result to the work or property in the event of rain.

2.9 SITE WORK

All large roots and stumps shall be removed to a depth of at least 600mm below the original surface. Pits or cavities resulting from the grubbing which extend beyond the excavation limits shall be backfilled as specified herein.

In the presence of underground services, utilities or structures the Contractor shall use a high degree of caution. The Contractor shall bear all costs of repairing underground utilities or structures damaged in the work and shall be fully responsible for all damage to other property and persons resulting from damage to the underground utilities and structures. All damages shall be repaired within a reasonable time.

2.10 AREAS OUTSIDE CONSTRUCTION LIMITS

Areas outside the designated construction limits shall not be disturbed.

2.11 SETTING OUT AND LEVELLING

Further to what is stated elsewhere in these documents, the Contractor shall, before commencing any excavation, satisfy himself that any dimensions, setting out and site levels, whether spot or contour, shown on the drawings, are correct. If not satisfied with their accuracy, he should give a written note to the Architect and ask for instructions, as otherwise no claim will be entertained.

2.12 KEEPING SITE DRY

The Contractor shall, at his own expense, take all necessary measures and shall allow for keeping the Site of Works free of any ground or rain water.

Water shall not be allowed to accumulate in excavations and the Contractor shall install and maintain such pumping or other water control measures as necessary - due regard being paid to the stability of adjacent structures. Any damage caused by inadequacy of these water control measures shall be made good at the Contractor's own expense. In order to keep the Site dry, the Contractor shall:

1. Form any drainage channels, whether temporary or permanent, at no extra charge to the Employer, and at positions to be agreed with the Architect.
2. Provide, maintain and run sufficient pumps on Site, together with all related equipment to remove all water from the Site of Works and to discharge this into the public sewer, or into such other location as may be indicated by the Project Manager, and to remove any silt or debris left by the work.
3. Obtain and maintain any consent necessary in respect of pumping of water as described in (2) above, and give any notices required and pay any fees due in connection therewith.
4. Not, without written permission from the Project Manager, use any method of keeping the excavation free from water which involves continuous pumping so as to withdraw water from the foundations of adjoining Sites.

2.13 BACKFILL OVER AND AROUND STRUCTURES

Backfill over and around structures shall be selected well graded granular material, e.g. natural gravel, natural sand, crushed rock, crushed concrete.

The Contractor shall obtain the approval of the Architect before commencing backfilling around or over any structure.

The grading shall be:-

Nominal aperture of sieve size	Percentage by mass passing through sieve
75mm	100%
0.063mm	less than 15%

Grading shall be tested in accordance with BS 1377:1990 Test 7.

The uniformity coefficient shall be tested in accordance with BS 6100-2.4.1:1990 with an acceptable lower limit of 10.

The resistance of the fill to crushing shall be measured by the 10% fines test. The 10% fines test shall be determined in accordance with BS 812:1990, with a l00kN force (the samples shall be tested in a saturated and surface dried condition).

Backfill over and around structures shall be compacted to an end product of 95% of maximum dry density of BS 1377:1990 Test 14.

Where fill to structures is required to the same level on more than one side of a structural element, it shall be maintained at heights not differing by more than 250mm after compaction on opposing sides of the structural elements as filling proceeds, unless otherwise permitted by the Architect. The Contractor shall restrict compaction plant used on fill to structures, within 2m of a structure, to the following items:

1. Vibratory roller having a mass per metre width of roll not exceeding 1,300kg with a total mass not exceeding 1,000kg;
2. Vibrating plate compactor having a mass not exceeding 1,000kg;

3. Vibro-tamper having a mass not exceeding 75kg.

The compacted level of the fill within this zone shall not differ during construction from the compacted level of the remainder of the adjoining fill to structures by more than 250mm.

2.14 GRANULAR SUB-BASE MATERIAL TYPE 1

Any fill for sub-grade to footings and ground slabs shall be inert Type I granular material made up of crushed rock, crushed slag, crushed concrete or well burnt, non-plastic shale. The material shall be well graded and lie within the grading envelope given below. Rubble from building demolition shall not be used unless it has been passed through a crusher.

The material passing the 425µm BS sieve shall be non-plastic as defined by BS1377:1990, and tested in compliance therewith.

The material shall be transported, laid in 150mm layers and compacted by means of a steel-wheeled vibrating roller with a minimum roll load of 55kN per metre width without drying out or segregation. Each layer shall be given a minimum of eight passes.

The material shall have a 10% fines value of 50kN or more when tested in compliance with BS 812-111:1990 except that samples shall be tested in a saturated and surface dried condition. Prior to testing, the selected test portions shall be soaked in water at room temperature for 24 hours without previously having been oven dried.

The sub-base shall be finally blinded with sand or crushed fine material to form a smooth level surface, with a tolerance of +0/-22mm.

Sub-base Type 1 Range of Grading	
Nominal aperture of sieve size	Percentage by mass passing through sieve
75mm	100
37.5mm	58 – 100
10mm	40 – 70
5mm	25 – 45
0.06mm	8 – 22
0.08mm	0 – 10
The particular size shall be determined by the washing and sieving method of BS EN 933-1:1997	

2.15 NOTICE OF TRENCH WORKS

A minimum of 3 working days notice of when trenching Works are to be undertaken shall be given to the Architect in order that inspection can be made.

2.16 GENERAL

Trench excavation shall be carried out in any material to the lines, levels, falls etc. as required. Trenches are to be formed by a machine that produces clean-sided trench of the required foundation width. Final trimming shall be made as necessary by hand, to achieve a trench bottom that is scraped level and clean.

2.17 TRENCH WIDTH

All trenches shall be excavated to the minimum width necessary to permit proper laying and jointing of pipes, cables, etc. A cavity of adequate size shall be excavated in the sides and bottom of trenches at each pipe or cable joint and sling position to allow ample working space for making a sound joint and to allow free withdrawal of slings without damage to the pipes or the cables.

2.18 TIMBERING

Trenches shall be properly and adequately timbered or otherwise riveted and maintained to ensure their stability and the safety of the workmen.

Where directed by the Architect, the Contractor is to leave any or all timbering in the trenches. Any timber so left is to be measured and paid for at agreed rates providing that, in the opinion of the Architect, the necessity for leaving it is not due to careless workmanship.

2.19 CONTROL OF WATER

Trenches shall be kept free of water at all times by pumping or other means.

2.20 SOFT MATERIAL

Any soft ground or loose rock in the bottom of trenches shall be cut out and along with any inequalities in excavation, filled up with a sand bed or 'lean mix' concrete as appropriate to the requirement of the trench bottoming.

2.21 ROCK WEDGES AND ROCK BOLTING

If rock wedges that might be unstable are encountered during excavation, the Contractor is to inform the architect immediately in order to decide whether to remove the wedge or whether remedial works such as rock bolting are necessary. These works are to be carried out as part of the contract and during the same period defined in such contract.

The process of rock bolting shall involve the coring of 60 or 80mm Ø drill holes into the rock and filling with proprietary grouting material. Epoxy (or equal alternative) coated 32mm bars including fixing of the bolt cover steel plates at the rock surface shall be installed.

2.22 REFILLING TRENCHES

After pipe laying, testing, placing and filling around pipes with an approved sand has been completed, the remainder of the trench shall be refilled with suitable excavated material in 250mm layers, each being separately consolidated as necessary to ensure full compaction. Mechanical compaction equipment shall not be used until there is a minimum of 450mm of compacted materials over the crown of any pipe or cable.

2.23 PLANKING AND STRUTTING

The Contractor is to allow in his rates for excavation, all necessary planking and strutting. The Contractor is at all times responsible for the safety of the excavations. He is to provide all necessary planking to ensure this. Should any damage result to the excavations of Works, the Contractor will be held entirely responsible for any necessary extra works required or needed by virtue of this and such works will be entirely at his own expenses.

2.24 REINSTATEMENT OF EXCAVATION

Prior to backfilling, all formwork and support timber shall be removed from the bottom of the excavation. Support timber shall only be removed to a height consistent with preventing collapse of the excavation and shall be progressively withdrawn as filling proceeds.

No formwork or support timber shall be abandoned by the excavation without the specific approval of the Architect. Filling and ramming shall be added to make the rock soft and cohesive.

All reinstated excavated material to foundations must be solidly tamped at every 250 mm backfill.

No voids are to be left in the filling and every effort should be made to return the maximum volume of backfill into the excavation.

The Contractor is to select material for backfilling, which is to be the best of the excavated material, free from:

1. Top soil, roots and other vegetable matter;
2. Soil with high moisture content;
3. Combustible or perishable material;
4. Any material not capable of being satisfactorily compacted.

The Contractor shall plug any pipes cut off at the perimeter of excavations with foundation grade concrete rammed in to refusal (but not less than 300mm).

3. CONCRETE

3.1 GENERAL

The constituent materials, manufacture and transport of all concrete for the works shall comply with the requirements of BS 8500-1:2002; BS 8500-2:2002; BS EN 206-1:2000 (Methods for specifying concrete including ready-mix concrete) and also to the approval of the Architect.

A copy of these standards shall be kept on Site at all times by the Contractor.

3.2 READY-MIX CONCRETE

Ready mixed concrete shall comply with the requirements of these Specifications and shall additionally conform to the requirements of the B.R.M.C.A. publication "Codes for Ready Mixed Concrete" or approved equivalent. If any anomalies arise between this publication and BS 8500-1:2002; BS 8500-2:2002; BS EN 206-1:2000, the British/European Standard will take precedence.

Prior to commencement of any ready-mix Works on Site, the Contractor shall inform the Architect of the proposed source of supply of ready-mixed concrete and submit details of the constituents and qualities of each concrete mix per cubic metre of compacted concrete for the Architect's written approval.

The ready-mixed concrete supplier shall allow the Architect or his appointed Representative to inspect the batching plant and plant records for the purpose of checking quality control for concrete produced for Works.

3.3 SITE-MIXED CONCRETE

In the case of Site-mixed concrete, prior to commencement of concrete Works on Site, the Contractor shall submit samples and details of the proposed sources of the constituents and details of the proposed weights of constituents per cubic metre of compacted concrete for the Architect's consideration.

3.4 CONSTITUENTS – CEMENT

3.4.1 GENERAL

Before placing orders for cement, the Contractor shall submit to the Architect:

1. The name of the proposed supplier.
2. Cement manufacturer's certificates in accordance with the relevant Eurocode or British Standard. Details of all cements and cementitious materials shall be supplied, including any alternative sources that might be used. Details shall also be provided of test results on the cement giving:
   (i) The proportion by weight of tri-calcium aluminate in the cement;
   (ii) The acid-soluble alkali level of cement measured as Na + 0.658 1(2);
   (iii) The heat of hydration at 7 days;
   (iv) The specific surface;

3. Details of the proposed methods of transport and storage.

3.4.2 QUALITY

Cement shall be Ordinary Portland Cement conforming to BS EN 197-1:2011, or equivalent, unless stated otherwise, except that the tri-calcium aluminate content shall not be less than 5% nor greater than 10%. Where required, Sulphate Resistant Portland Cement (SRPC) shall be used as specified in the Bill of Quantities and/or Drawings. Each consignment of cement shall be stored in a dry, well ventilated waterproof place, with boarded timber floors.

Cement shall moreover be of a brand approved by the Architect and shall be consumed in order of delivery. Tests on cement shall be made at the discretion of the Architect, and any cement below the standard required will have to be removed from the Site and replaced by the Contractor at his expense. Partially set or damaged cement shall not be used in concrete works. Different brands of cement are not to be mixed in the same batch.

Where additives are specified (e.g. plasticisers) the Contractor shall provide all documentary information, including source of manufacture of the additive for the Architect's approval.

In general, the cement shall comply with the following requirements:

1. The acid-soluble alkali level measured as (Na_2O + 0.658 K_2O) shall not exceed 0.6% by weight;
2. The heat of hydration shall not exceed 75 calories per gram at 7 days when tested in accordance with ASTM C 186;
3. The specific surface shall not be greater than 325sm/Kg and not less than 225sm/Kg when tested as described in BS EN 196-6:2010;
4. The temperature of the cement shall not exceed 75°C at the time of incorporation into a concrete mix.

3.4.3 TEST CERTIFICATION

Having obtained approval for a particular type of cement, the Contractor shall not change the agreed arrangements without permission. Each consignment of cement shall be accompanied by a certificate showing the place of manufacture and the results of standard tests carried out on each day's bulk production included in the consignment. Additionally, the Contractor shall make arrangements with an authorized independent local specialized laboratory for carrying out the standard physical and chemical tests as may be ordered by the Architect. The Contractor shall store the cement so that separate consignments can be identified.

3.4.4 REJECTION OF CEMENT

The Architect may order that any consignment or any part of a consignment, of cement which does not comply with these Specifications shall not be used in the Works and shall be removed from the Site at the Contractor's expense. The Contractor shall remain responsible for the quality of the cement and should subsequent test results indicate the cement used in any part not in accordance with the relevant or of approved quality, the Architect may direct that the Contractor shall remove and replace at his own expense any concrete made with that consignment of cement.

3.5 CONSTITUENTS – AGGREGATE

3.5.1 GENERAL

Aggregate shall conform to BS EN 12620:2002+A1:2008 and shall be tested in accordance with BS 812:1990. The Contractor shall obtain approval of proposed aggregate sources, and shall select suitable aggregate and samples of sand and stone for specified testing before obtaining aggregate. Laboratory tests shall be made at regular intervals by the aggregate supplier and additionally as required by the Architect to confirm the suitability of aggregate.

3.5.2 TESTING

1. The following criteria shall be ascertained by testing to assess the suitability of aggregate:

   (i) Grading;
   (ii) Magnesium sulphate soundness;
   (iii) Specific gravity and water absorption;
   (iv) Clay, silt and dust content;
   (v) Organic impurities;
   (vi) Sulphate and chloride content;
   (vii) Crushing value; alternatively 10% fines value or impact value as approved;
   (viii) Elongation and flakiness;
   (ix) Potential alkali reactivity;
   (x) Los Angeles abrasion test, if required;
   (xi) Drying shrinkage in accordance with BRS Digest 35;
   (xii) Moisture content;

2. The frequency of tests (i) to (xii) shall be as agreed with the Architect.

3. Testing shall be carried out in accordance with British and/or ASTM standards, as appropriate, and the results shall comply with the limits given therein, or as otherwise stated herein.

4. Grading tests shall be carried out daily or per 100 cubic metres whichever is the more frequent when concrete is being produced on a regular basis or beforehand when production is irregular.

5. The combined grading of aggregate shall be constant. The percentage passing any sieve size as determined by approved trial mixes shall be the target grading for all concrete of that type. The combined grading of the Works concrete shall not vary by more than 4% on any one sieve from that target. If the estimated or measured combined grading of the permanent works concrete does not meet this requirement then a new trial mix shall be prepared for approval.

3.5.3 FINE AGGREGAT

Sand or fine aggregate is to be clean, sharp and 'gritty' free from loamy matter and other deleterious substances to pass a 5mm BS test sieve and retaining 25% on a 3mm BS test sieve, graded between these limits. The sand is to be washed and screened when so directed by the Architect at the expense of the Contractor.

3.5.4 COARSE AGGREGATE

1. Coarse aggregate shall consist of first quality crushed hard stone passing an 18mm BS test sieve and retained on a 6mm BS test sieve; the grading shall be within the limits prescribed in BS EN 12620:2002+A1:2008: Table I so that when mixed with the approved fine aggregate and cement a workable concrete of maximum density is produced.

2. The amount of material passing a 75 micron BS 410-1:2000, ISO 3310-1:2000 and BS 410-2:2000, ISO 3310-2:1999 fine test sieve when tested in accordance with BS 812 (wet-sieving method) shall not exceed 1% by weight.

3. Coarse aggregate shall be tested for drying shrinkage characteristics in accordance with BRS Digest 35. The drying shrinkage shall not exceed 0.05%.

4. The flakiness and elongation indices of the predominant size fractions in each single-sized coarse aggregate, determined in accordance with BS 812, shall not exceed 20% and 35% by weight respectively.

5. Material for use in concrete which is subject to abrasion and impact shall comply with the test requirements of BS 812 and the specifications of BS EN 13043:2002 and BS EN 12620:2002+A1:2008.

3.5.5 SULPHATE AND CHLORIDE CONTENT

1. The acid-soluble sulphate in aggregate (SO3) level shall not exceed 0.4% by weight.

2. The acid-soluble chloride level chloride ion (CI) in aggregate as a percentage by weight shall not exceed the limits given in the following table:

Concrete Type	Coarse Aggregate	Fine Aggregate
Mass with OPC	0.10%	0.10%
Reinforced with OPC	0.02%	0.04%

3. These limits shall be subject to the overall limit elsewhere given for the concrete as mixed.

3.5.6 REJECTION OF AGGREGATE

The Architect may order that any aggregates which do not meet with his approval shall not be used in the Works. Aggregates rejected by the Architect shall be removed from the Site by the Contractor at his own expense.

The Contractor shall remain responsible for the quality of the aggregates. Should subsequent test results indicate that aggregates used in any part of the Works were not in accordance with the relevant Specifications nor of approved quality, the Architect may direct that the Contractor shall remove and replace at his own expense any concrete made with that consignment of aggregates.

3.6 CONSTITUENTS – WATER

3.6.1 GENERAL

In accordance with the requirements of BS EN 1008:2002, clean, fresh water, entirely free from organic matter, sediment and dissolved or suspended matter, shall be used. Unless provided for by the Employer the necessary quantities of water shall be provided by the Contractor at his own expense

3.6.2 TESTING

The Architect may instruct the Contractor to take water samples for testing at intervals throughout the duration of the Contract. If the samples are unacceptable, the Contractor shall either change to a new supply or take steps to improve the existing source, as approved.

3.6.3 SULPHATE AND CHLORIDE

The acid-soluble (SO3) content shall not exceed 500mg/l and the acid-soluble chloride ion content shall not exceed 350mg/l. Tests to establish the contents shall be carried out at monthly intervals.

These limits shall be subject to the overall limit given for the concrete as mixed.

3.6.4 STANDBY WATER SUPPLY

The Contractor may be required to install standby fresh water tanks of sufficient capacity to ensure continuation of concreting for sections of work being cast should water supplies be disrupted.

3.7 ADMIXTURES

1. Admixtures shall not be used without the written approval of the Architect;

2. Where approved or specified, admixtures shall be used as a means of:
    a. Achieving workability with the lowest appropriate water/cement ratio in order to achieve durability;
    b. Controlling and retarding setting;
    c. Reducing bleeding and associated plastic settlement and cracking;
3. Admixtures containing chlorides or other corrosive agents shall not be used;

4. In the event of admixtures being used, the concrete tests described in these Specifications shall be incorporated to ensure the specified strengths are achieved and comparison shall be made with concrete manufactured without the admixture to prove that the density has not been reduced. If air entraining agents are used the density shall not be reduced by more than 5%;

5. When admixtures are used in the Works very strict control is to be maintained to ensure that the correct quantity of admixture is used at all times. The equipment to be used for dispensing and the method of incorporating the admixture in the concrete shall be to the approval of the Architect.

3.8 CONCRETE MIX DESIGN

3.8.1 TRIAL MIXES AND MIX DESIGN

Not less than two weeks before the start of any concrete Works on the Site, the Contractor shall submit to the Architect for his information and subject to his approval, a statement of mix proportions in order to achieve the concrete compressive strength at 28 days as listed below. This statement shall provide the following information:

a. For each of the concrete grades: C15, C20, C25, C30, C35, C40;
b. Mix proportions and types;
c. Type and amount of additives;
d. Slump;
e. Target strength;
f. For all concrete;
g. Method to be adopted for adjusting the amount of water added to compensate for variation in moisture content of the aggregates.

The statement shall be accompanied by evidence in the form of a statement from an approved independent laboratory of the results of trial mixes establishing that concrete made with the materials in the proportions proposed will have the properties specified.

The initial target mean strength (T) for the trial mixes of each grade shall be taken as:

T = specified characteristic strength +12N/smm unless agreed otherwise by the Architect.

The trial mixes shall be sampled and tested according to the requirements of BS 8500:2002 and BS EN 206-1:2000. Accelerated curing techniques that predict 28 day cube crushing strengths with acceptable accuracy may be used.

The type of aggregates and cement, and their sources of supply shall not be altered during the currency of the Contract without the prior written agreement of, or instruction from the Architect.

3.8.2 SAMPLING AND TESTING

All sampling, making, curing, testing and analysis of concrete test specimens shall comply with the requirements of BS 1881:2011 - Testing Concrete, unless otherwise stated in BS 8500:2002 and BS EN 206-1:2000. All sampling and testing shall be undertaken by the Contractor at his own expense. For strength testing, one sample shall comprise four 150mm test cube specimens as described in BS 8500:2002 and BS EN 206-1:2000. Two test cubes shall be tested at 7 days and the other two cubes shall be tested at 28 days.

The Contractor shall notify the Project Manager and the Architect in writing of the proposed selected independent test laboratory, and await the their approval prior to commencement of testing.

A full record of all testing, identifying test cubes, etc. with the part of the work executed, shall be kept on Site and be available for inspection by the Architect at all times.

3.8.3 FREQUENCY OF SAMPLING AND TESTING

At least one set of samples shall be taken from each grade of each day's casting. In addition, samples shall be taken for every 20 cubic metres or part thereof produced.

Test cubes should be taken from every individual pour of concrete irrespective of the volume of concrete poured - a pour being defined as one continuous concreting operation i.e., not necessarily one lorry load of concrete.

3.8.4 CUBE TESTING PROCEDURES

Each cube shall be marked on its surface without any etching of the surface with a distinguishing number and the date, and a record shall be kept on site giving the following:

1. Cube Number
2. Date made
3. Location of work within the Site
4. Design mix
5. Name of person taking samples
6. Crushing tests results
7. Date
8. Strength
9. Density
10. In the case of Ready Mix Concrete, the Delivery Note Number

All cubes shall be stored on Site in their mould for at least 24 hours, in a place free from vibration, under damp matting and completely covered with polythene. When the concrete has achieved sufficient strength, the cubes shall be demoulded and immediately submerged in a tank of water until they are taken to the approved testing laboratory. No cubes shall be dispatched before they are 3 days old.

One copy of all cube test results shall be forwarded to the Project Manager and the Architect. Compliance with the specified concrete quality shall be judged according to BS 8500:2002 and BS EN 206-1:2000. The concrete in each grade will be considered acceptable if the average of any four consecutive 28 day test

results exceeds the specified grade by 3N/smm and if no individual 28-day test result is less than the specified grade by more than 3N/smm.

The Contractor shall allow in his rates for concrete for all expenses in connection with the preparation of all cube tests and for their testing.

3.9 CONTROL OF CHLORIDES AND SULPHATES IN TOTAL CONCRETE MIX

3.9.1 CHLORIDES IN CONCRETE

1. The levels of equivalent acid-soluble chlorides ions (Cr) in the constituents of concrete as stated elsewhere are indicative and are subject to the over-riding limits for the total concrete mix.

2. The total estimated (Cl) content as a percentage by weight of the cement in the mix shall not exceed 0.1%.

3. The Contractor shall test the constituents of the concrete to establish these contents as provided for elsewhere in these Specifications.

4. In addition, regular tests to BS 1881-124:1988 for chloride content shall be made on the hardened concrete whereby 95% of the test results shall not exceed 0.1% (C1) by weight of cement.

3.9.2 SULPHATES IN CONCRETE

1. The following levels of acid-soluble sulphates (SO3) are indicative and are subject to the over-riding limit for the mix:-

Coarse aggregate	0.4% by weight
Fine aggregate	0.4% by weight
Water	500mg/l

2. The total estimated sulphate content (SO3) of the mix, including that present in the cement, shall not exceed 3.7% by weight of cement in the mix.

In addition, regular tests to BS 1881-124:1988 shall be made on the hardened concrete to determine the total sulphate content, which shall not exceed 4% by weight of cement in the mix.

3.10 COMPLIANCE

The compliance of the constituent materials and of the concrete shall be judged against the requirements of BS EN 206:2000.

3.10.1 ACTION IN EVENT OF NON-COMPLIANCE

In the event that test results, representative of the concrete placed in the Works, fail to comply with the specified standards, the Architect shall determine the action to be taken. This may range from rejection and removal of the suspect concrete to qualified acceptance, depending on the degree of non compliance and the type of member involved.

The Architect may order further tests to be carried out on the hardened concrete which may include cored samples and non-destructive testing.

The cost of such action and testing shall be at the contractor's expense.

All consequential investigations, additional testing, and remedial measures, if any, will be at the expense of the Contractor, and will not be considered as grounds for claims for extension of time. This will apply even if the concrete work is eventually accepted with or without qualification or penalty.

3.11 PLACING OF CONCRETE

3.11.1 WRITTEN NOTIFICATIONS OF CONCRETE POUR

The Contractor shall notify the Project Manager and the Architect of all intended concrete pours at least two working days before the pours are planned to commence, through specified Site Procedures outlined in the Site Procedures Manual.

3.11.2 PLACING

Except where otherwise directed, concrete shall not be placed unless the Architect or his Representative is present and has previously examined and approved the positioning, fixing and condition of reinforcement and of any other embedded items and the cleanliness, alignment and suitability of the formwork or other containing surfaces. Such checking by the Architect or his Representative will not relieve the Contractor from any of his responsibilities under the Contract.

Concrete shall be deposited as nearly as possible in its final position and shall be placed in such a manner as to avoid segregation of the materials and displacement of formwork, reinforcement and other embedded items. The manner of placing shall be to the approval of the Architect.

Placing shall be continuous between specified or approved construction joints. In the case of footing type 5, the Contractor will submit a method statement detailing how to ensure a continuous pour from one narrow end of the footing to the other.

If, for any reason, the placing of concrete is discontinued, the Contractor shall immediately inform the Architect's Representative and shall form a construction joint as instructed by the Architect's Representative. All works involved in these remedial measures shall be carried out at the Contractor's expense.

Concrete shall not be placed in running water and any water standing on areas to receive concrete shall be removed before concrete is deposited.

Concrete is not to be distributed to its final position by means of vibration.

Care must be taken not to move reinforcement during concreting. Shaking of reinforcement to assist the placing of concrete will not be permitted.

Care must be taken to ensure that any rods which project from set or partially set concrete are not moved or jarred.

Concreting must be carried out continuously up to construction joints. All construction joint locations are to be submitted by the Contractor to the Architect for approval 2 weeks before concreting starts. All construction joints must be carefully arranged in approved positions where they will have least effect upon the strength of the structure, and no pause of works will be allowed unless this has been arranged to occur at approved construction joints. No slips will be permitted in connection with construction joints in

concrete, and all such joints must be made against a rigidly fixed board having one or more splayed battens fixed longitudinally thereto, (either vertically or horizontally as ordered) so that the joint is on a surface in a plane normal to it for the next section of work or in such other manner directed. Great care is to be taken to ensure that all battens and boards are removed before any further concrete is deposited.

Where approved by the Architect, construction joints shall be located at points of minimum shear, at right angles to the general direction of a member and shall coincide with any features in the finished work.

No traces of construction joints will be permitted in concrete with a specified surface finish.

Kickers for forming vertical elements shall be at least 70mm high and cast monolithic with the slab. Separate pours for kickers will not be permitted.

In all cases, where work has to be recommenced on a surface which has hardened, all laitance, loose stones and debris must be removed therefrom, the surface must be well hacked rough swept clean and thoroughly wetted. In all cases, great care must be taken to ensure by thoroughly ramming that the new concrete bonds solidly with the old.

When placing concrete directly onto earth fill or any other porous material, the existing underlying surface should be dampened prior to pouring of concrete in order to reduce loss of water from concrete.

Where placing concrete on sheet membranes, due care shall be exercised in order not to damage or displace these membranes.

3.11.3 TRANSPORTING OF CONCRETE

The concrete shall be discharged from the mixer and transported to the Works by means which shall prevent segregation or loss of ingredients, and so as to ensure that the concrete is of the required workability at the point and time of placing. Segregated concrete will be rejected.

3.11.4 CLEANING OF CONCRETE DELIVERY TRUCK

Arrangements shall be made for the disposal of washings and wash water from the concrete delivery trucks. On no account will washings be allowed to mix with the concrete being placed.

3.11.5 CURING AND PROTECTION OF CONCRETE

Minimum periods shall be as indicated in BS EN 1992-1-1:2004.

Unless otherwise directed all concreted areas shall be cured employing a curing membrane, being a solvent based resin curing compound.

The curing membrane can be applied by brush or portable or fully mechanical spraying equipment. Application shall be carried out as soon as possible after the concrete has been surface finished; within 30 minutes or sooner in strong drying conditions. Complete coverage of surface shall be ensured. The spray nozzle shall be held 40 to 50 cm above the surface and slowly passed back and forth to ensure complete coverage.

The treatment should not be applied to dry and semi-dry concrete. Any surface which has been held in shuttering for several days should be thoroughly wetted prior to application of the curing membrane.

Subject to the Architect’s approval, alternative methods of curing may be applied immediately after completion of placing by one or more of the following methods:

1. By covering with a layer of sand, sacking, canvas, hessian, straw mats or similar absorbent materials and keeping constantly wet for 72 hours.
2. By thoroughly wetting and then covering with a layer of approved waterproof paper or plastic sheet or insulated mats for 72 hours.

Once properly cured the concrete shall be protected from foot/vehicle traffic or loading until the concrete is, in the opinion of the Architect, sufficiently matured, and in no case shall traffic or loading be of such magnitude as to cause deflection or other movement in the formwork or damage to the concrete.

3.11.6 WEATHER PRECAUTIONS

Do not start concreting in the open in heavy rains unless the risk of damage can be avoided.

In addition, under extreme hot/windy weather conditions, the following precautions shall be adopted:

1. Extend curing procedures as long as possible.
2. Prevent evaporation or other water loss from the concrete.
3. Use water spray to cool formwork or other hot surfaces.
4. Do not use water to cool hot immature concrete surfaces (this induces cracking).
5. Keep the surface temperature below 30 degrees C when placing.
6. Protect green concrete from long exposure to hot sunshine.

3.12 STEEL REINFORCEMENT

3.12.1 GENERAL

The steel reinforcement for all reinforced concrete Works shall be supplied by the Contractor and shall be hoisted, cut, bent and placed and kept firmly in position to suit reinforcement details indicated on the Drawings.

3.12.2 QUALITY

Bars for the reinforcement of concrete shall comply with the conditions and tests given in BS 4449:2005+A2:2009.

Cold worked steel bars shall comply with the tests and requirements of BS 4449:2005+A2:2009.

Steel fabric for reinforcement shall comply with the tests and requirements of BS 4483:2005.

Manufacturer's test sheets, incorporating Ladle Analysis and Manufacturer's test records, are to be supplied with each consignment of reinforcing steel. Notwithstanding these test sheets, the Architect may order samples of reinforcing steel to be tested independently.

Reinforcement which is found to have developed brittleness, cracks or other imperfections, or which when submitted for independent testing, is not found to comply with the specified requirements, shall be rejected and removed from the Site.

3.12.3 REINFORCEMENT TO BE CLEANED

All reinforcement shall be clean and free from loose mill scale, dust, loose rust and coatings such as paint, oil, etc.

3.12.4 BENDING OF REINFORCEMENT

Bars shall be bent cold in accordance with BS EN ISO 3766:2003. Bars showing signs of cracking and brittleness following bending shall not be used in the Works.

3.12.5 FIXING OF REINFORCEMENT

Reinforcement shall be wired together, placed on approved temporary spacers and chairs or otherwise effectively secured to prevent displacement during concreting. These items shall be deemed to be included in the Contractor's rates.

Wire for bending shall be at 1.63mm annealed soft iron and the binding shall be done tightly with proper tools. Alternative methods of fixing reinforcement shall be submitted to the Architect for his approval.

3.12.6 COVER TO REINFORCEMENT

Reinforcement shall, in all cases, be covered with the thickness of concrete shown on the Drawings. Accurate cover shall be secured by the use of plastic distance pieces of the correct size or other approved means.

Adequate and effective precautions should be taken to leave all reinforcement undisturbed during concreting, planking elevated on low trestles for the passage of wheel-barrows being provided by the Contractor. Wheel-barrows shall under no circumstances be allowed to transit directly over the reinforcement.

All reinforcement shall be placed strictly as directed. Nothing shall be allowed to interfere with the required disposition of the reinforcement. The Contractor shall make a particular point to see that all reinforcement is placed correctly in every respect, and temporarily fixed where necessary to prevent displacement before or during the process of tamping and ramming the concrete in place and shall ensure that the specified cover to steel reinforcement is provided.

3.12.7 WELDING TO REINFORCEMENT

No welding of rods will be permitted, except tack or positional welding between plain mild steel rods crossing approximately at right angles so as to fix them in position. Such welding of high tensile or work-hardened mild steel rods will not be allowed except in fabric to BS 4483:2005.

The welding of miscellaneous fixings such as holding-down bolts, edging angles, etc., to the reinforcement detailed on the Architect's Drawings will not be permitted. However, the Contractor may add lengths of austenitic stainless steel reinforcement which is to be conventionally wire-tied to the detailed reinforcement, and to which he may weld for the purposes of providing adequate support for fixings during the placing of concrete. The details of such additional reinforcement must be submitted to the Architect for approval prior to carrying out the Work. In all cases, the Architect may require an electrically insulating material such as plastic to be inserted between the additional reinforcement and the detailed reinforcement in order to minimize corrosion due to stray electrical currents.

The cost of the supply and fixing of all additional reinforcement and insulating material, for the purposes described above, are to be borne by the Contractor.

3.12.8 FIXING

Care is to be taken to ensure that the overall depth of bent beam and slab rods and the overall size of links are accurate, and that the rods are not unwinding after they are bent.

Fabric reinforcement shall be lapped 400mm in each direction and tied at 300mm centres along each joint, or as shown on the Drawings.

On no account is any reinforcement to be left out for insertion into wet concrete during the progress of concreting, and in no case may any portion of the concrete be put into position and allowed to set in order to act as a base upon which to set up any of the reinforcement for the member.

3.13 FORMWORK

3.13.1 GENERAL

Formwork shall be so designed and constructed that the concrete can be properly placed and thoroughly compacted and that the hardened concrete whilst still supported by the formwork shall comply with the required shape, position and levels, subject to the tolerances and standards of finish required by this specification.

3.13.2 CONTRACTOR RESPONSIBLE FOR FORMWORK

The contractor shall be entirely responsible for the sufficiency, design, erection and safe removal of all formwork, and if required by the architect he shall, before it is erected, submit details of formwork he proposes to use and its supports for approval.

Special care shall be taken to maintain the stability of the formwork and tightness of joints particularly during vibrating operations.

3.13.3 CLEANLINESS OF FORMWORK

Special care shall be taken to ensure the cleanliness of the formwork by means of compressed air prior to the deposition of concrete. Temporary openings shall be provided in stop-ends for the removal of water and debris.

3.13.4 TIES

The material and positioning of any ties passing through the concrete shall be approved by the architect. The whole or part of the tie shall be capable of being removed so that no part remaining embedded in the concrete shall be nearer the surface than the specified cover to the reinforcement. Any holes left after the removal of ties shall be plugged immediately with a cement mortar of the same richness using non-shrink materials.

3.13.5 SURFACE TREATMENT OF FORMS

The faces of the formwork in contact with the concrete shall be coated with non-staining shuttering oil or other approved material to prevent adhesion. Care shall be taken that the coating material is kept out of contact with reinforcement or embedded steelwork.

3.13.6 INSPECTION AND APPROVAL

All formwork shall be inspected and approved by the Architect before concrete is placed within it. This does not in any way remove any responsibility of the contractor for the stability of said shuttering/formwork for the structural stability of the formwork under the load of the poured concrete and all related loads.

3.13.7 STRIKING OF FORMWORK

Minimum striking times shall be agreed with the Architect. The contractor shall not impose construction loads on slabs and beams in excess of the design loads shown on the drawings of this Contract Document, and shall retain the propping in position until such loads are adequately accommodated. Where floor construction is required to support subsequent floor construction over, the new construction shall be supported by means of propping successive floors, such that all props shall be placed vertically above each other through the required floors. The contractor shall be responsible for such a system, and shall submit same to the Architect for approval prior to implementation. Notwithstanding any approval given by the Architect, the Contractor shall remain responsible for any damage arising from the removal of formwork. Any damage to the concrete or formwork will be made good at the Contractor's expense.

The agreed striking times may be changed by the Architect either if the concrete mix is in any way altered or if striking of the formwork results in defects to the concrete surface finish.

All shuttering shall be removed by gradual easing without such shock or vibration as would damage the concrete and in no circumstances shall the shutters be struck until the concrete reaches sufficient strength to withstand any stresses to which it may be subjected.

3.13.8 LOADS ON FORMWORK

Formwork shall be capable of withstanding without deflection the worst combination of self-weight, reinforcement and concrete weight, all loads and dynamic effects arising from construction and compacting activities, wind and weather forces.

3.13.9 RETARDERS

The use of retarders on formwork shall not be permitted except with the written permission of the Architect.

3.13.10 FORMWORK TO BE CLEANED

All formwork shall be thoroughly scraped, cleaned and, if necessary, repaired before being re-used.

3.14 TOLERANCES AND SURFACE FINISHES

3.14.1 TOLERANCES

Except as detailed elsewhere in these Specifications, the tolerances on all concrete Works shall be measured as follows:

Length of Straight Edge	Deviation (mm)
300mm	±1
1500mm	±3
3000mm	± 3.5

In particular, the above compliance must be checked with the Project Manager prior to de-propping slabs.

3.14.2 QUALITY OF FINISHES

The qualities of the finishes required shall be as indicated on the Drawings and Bill of Quantities and shall not be inferior to those described in the following Classes where appropriate.

3.14.3 CLASSES OF SURFACE FINISH WHERE CAST AGAINST FORMWORK

1. Class Fl - Finish for surfaces against which no backfill or other concrete is to be placed.
   Formwork shall consist of sawn boards, sheet metal or any other suitable material which will prevent the loss of grout when the concrete is vibrated.
2. Class F2 - Finish for permanently exposed surfaces but where special finishes are not required. Formwork shall be faced with sound and plane plywood, steel panels or other suitable materials arranged in a uniform pattern. Joints in facing shall be horizontal and vertical unless otherwise directed.
   On striking the formwork the surface shall be plane and smooth and shall not be treated in any way. The Architect may order rubbing down of any minor surface blemishes at the Contractor's expense.
3. Class F3 - Finish required for permanently exposed surfaces where a high standard is of particular importance.
4. The formwork shall be faced with plywood or equivalent suitable material in large sheets arranged to the approval of the Architect in a uniform pattern. Metal panels shall not be used for F3 finishes. Where possible, joints in sheets shall be arranged to coincide with architectural features or changes in direction of surface. All joints shall be vertical and horizontal unless otherwise directed.
5. Permanent formwork of precast slabs, natural stone, brickwork and the like shall have surface finishes of the quality shown on the Drawings. They shall be fixed to the structure by approved means and joints shall be made tight with mortar or other means of preventing grout leakage.

3.14.4 CLASSES OF SURFACE FINISH WHERE NOT CAST AGAINST FORMWORK

1. Class UI - Finishing operations shall consist of compacting and tamping the concrete to the required lines and producing a uniform lightly ridged surface.
2. Class U2 - Finishing operations shall consist of the above requirements for Class U1 and, after allowing the concrete surface to harden sufficiently, floating the surface by hand with a wood float to produce a uniform surface free of screed marks. Care shall be taken not to work the surface more than is necessary.
3. Class U3 - Finishing operations shall consist of the above requirements for Class U2 and, after allowing the concrete surface to harden sufficiently, floating the surface by power tool to produce a uniform surface free of screed marks which, with minimum under-lainment (adhesive) is sufficiently dense and smooth to receive thin sheet vinyl flooring and vinyl tiles or fitted carpet. Care shall be taken not to work the surface more than is necessary.
4. Class U4 - Non-skid surface Finishing operations shall consist of the above requirements for Class U2 using a plain wood float finish and evenly dusting the surface with carborandum grains graded between 500 microns and 3mm at the rate of 1.0kg/sm of surface area before the surface of the concrete has set. The carborundum shall then be trowelled lightly into the surface.

3.14.5 CHAMFERS AND ARISSES

Unless otherwise indicated on the Drawings, all exposed arisses shall be chamfered 25mm x 25mm.

3.14.6 DEFECTIVE CONCRETE FINISHES

Any defective concrete finish shall be rejected and the Architect may order the defect(s) to be cut out and made good all at the Contractor's expense.

Any proposed remedial treatment to concrete surfaces shall be submitted to the Architect for approval and no work shall be carried out until the approval has been obtained. This remedial treatment will be at the Contractor's expense.

Any concrete, the surface of which has been repaired before being inspected by the Architect, shall be liable to rejection.

3.15 ANCHORS INTO EXISTING STRUCTURE

3.15.1 ANCHOR BARS

Anchors shall be mild steel deformed bars of diameter and length as shown on the Drawings.

3.15.2 ANGLE AND PROTECTION OF HOLES

The holes for anchors shall be drilled at the angle and in the positions indicated on the Drawings or as directed by the Architect.

3.15.3 TYPE OF DRILLING MACHINE

The holes shall be drilled by rotary percussion drilling machine which gives a rough textured hole suitable for good adhesion.

3.15.4 DIAMETER OF HOLES

The diameter of the holes shall be a minimum of 15mm greater that the bar diameter unless otherwise indicated on the Drawings. Smaller holes 6mm greater than bar diameter are permitted where epoxy resin grout is to be used.

3.15.5 DEPTH OF HOLES

The depth of each hole shall be checked on completion. The tolerance on hole depth shall not exceed ±25mm on the depth stated on the Drawings.

3.15.6 CLEANING OF HOLES

Each hole shall be blown out on completion to ensure that it is clean and dry.

3.15.7 NON-SHRINK CEMENT BASED GROUT

Cement grout shall be cement-based, non-shrink type grout to the approval of the Architect, except where resin grout is indicated.

3.15.8 INTRODUCTION OF CEMENT GROUT

The cement grout shall, if necessary, be introduced to the bottom of the hole by tube so as to fill the lower part of the hole, expelling the air.

3.15.9 INSERTION OF ANCHOR BARS

Anchor bars shall be inserted into part-filled holes such that the whole of the space around the bars is filled with cement grout.

3.15.10 TESTING OF ANCHORS

Pull out tests shall be made on completed trial anchors as directed by the Architect. The loads to be applied, the method of application of these loads, and measurements of the resulting extensions shall be agreed with the Architect.

3.15.11 EPOXY RESIN GROUT

Epoxy resin grout, to be used only where indicated on the Drawings, shall be SBD fine grade pourable or approved equivalent.

3.15.12 CAST-IN FITTINGS

The contractor is to include in the rates for the installation of Halfen (or equivalent) anchor channels on the formwork, and is to allow for all coordination required with the re-bars to be placed in the formwork. The Halfen (or equivalent) anchors will be provided by the client for installation in the roof over level 1 transfer slab and elsewhere.

4. MASONRY

4.1 MATERIALS

Only best quality 'franka' stone from approved sources, free from all defects shall be used. Any stone showing blue markings (swaba) and/or any other defects on the exposed face, or whose edges or corners have been

chipped, shall be rejected. Should any such stone be used, the Architect reserves the right to reject such stone. All rejected work shall be removed and replaced using new materials at the Contractor's expense. The Contractor shall also be bound to replace any defective materials in all or parts of the existing Works by proper materials and/or workmanship as directed by the Architect.

All stone blocks are to be quarry-faced on site and trimmed in a way that no chipped edges are visible.

Mortar for laying is to be composed of one part first quality slaked slime and two parts crushed soft stone (dust) prepared in bulk with fresh water, well mixed and allowed to mature before use. It shall be further worked up with water in small batches, and cement in the ratio of 1:10 (cement/crushed soft stone fines) shall be added as and when required for use.

4.2 WALLS

Masonry walls shall be built from masonry units that are truly perpendicular, laid in parallel courses, and having vertical and horizontal joints not more than 6mm and 12.5mm thick respectively, with mortar spread over at least 75% of the joint area. Vertical joints are to be broken at not less than 150mm.

Double walls are to be constructed with bond stones not less than 225 mm thick and in every course, a maximum of 2135mm apart from centre to centre. Alternatively, hot dip galvanized metal wall ties to 851243 (or approved equivalent) shall be used. Metal wall ties shall be embedded in mortar to a minimum depth of 50mm. Horizontal spacing shall be at 750mm centres and vertical spacing shall be at every alternate course. Additional ties shall be provided within 230mm of all openings such that there is one tie at every course.

Walls at right angles to one another are to be properly bonded by forming toothings in every alternate course.

4.3 SILLS OF OPENINGS AND OTHER FEATURES

Sills of openings in masonry walls are to be in stone, at no extra payment unless specifically directed by the Architect to be constructed in concrete.

The stone in walls, copings, etc., shall be placed with the grain or natural bed horizontal and shall not be paid for extra unless otherwise specified.

The beds and all faces of stone including back joints shall be worked square and true from end to end.

All joints shall be painted, and scraped to a smooth finish on completion.

Sills shall be bedded hollow, and the bed joint filled and pointed on completion of the building.

Drip channels shall be formed under all projecting mouldings.

Outlet and inlet ventilators of uniform section and with joints pointed and well flushed during laying are to be formed wherever required by the Architect. Suitable tapping stones are to be provided to all outlet ventilators. The Contractor is to make sure that all ventilators are clear of all obstructions on completion of the Works.

All stone blocks are to be well wetted before laying.

Dressing of stone is to be truly square. Moulded or ornamental work is to be of the best workmanship and finish. Where directed by the Architect, templates for all mould work are to be prepared by the Contractor

and submitted for the approval of the Architect. Before approving such templates the Architect may require the Contractor to prepare and place on site samples of the moulded work. Such samples are to be provided and paid for by the Contractor.

Jamb stones of all openings in double walls shall extend in every alternate course to the whole thickness of the wall. Any mouldings around windows shall be in strict accordance with the Drawings.

Quoins of openings shall be adequately protected during construction and any damage due to failure to observe this condition shall be made good by the Contractor to the satisfaction of the Architect. The Contractor is required to carry out any other protective measures which may be required and to make good any damage as before described.

4.4 TOLERANCE

All masonry shall be accurately set out and erected level, plumb and true to line, with all perpends in vertical lines in face work.

All masonry shall be no more than 3mm out of plumb in 3 meters height. All horizontal courses shall be level to ±3 mm in 5 metres.

All masonry shall be true in line to ± 3 mm in 5 metres.

Lintels over door and window openings shall have a minimum bearing of 190mm. Half blocks shall not be used directly under lintels.

It shall be the Contractors responsibility to ensure that all the masonry construction is securely braced and laterally supported at all times during the construction of the Works to prevent damage or collapse due to the effect of high winds, or any other cause.

5. CONCRETE BLOCKWORK

5.1 GENERAL

Concrete blocks shall be factory produced and cast under appropriate hydraulic pressure or by other approved methods.

The materials for all concrete blocks shall be mechanically batch mixed.

Precast concrete blocks shall comply with BS EN 772-2:1998 and BS EN 771-3:2011 and shall be manufactured using Ordinary Portland Cement as elsewhere specified, and dense natural aggregates to BS EN 12620:2002+A1:2008.

5.2 BLOCK SIZES AND STRENGTHS

Block sizes shall be in accordance with local building trade practice. The cast faces of concrete blocks as produced from the factory shall be adaptable to accommodate both plastering and rendering.

Concrete blocks shall have a minimum compressive strength of 7.0 N/mm2 for 230mm units and 5.5N/mm2 for 150mm units.

5.3 CASTING AND CURING BLOCKS

Blocks shall not be built into the works until they are at least 21 days old.

5.4 STORAGE, HANDLING AND PROTECTION

Concrete blocks shall be delivered to Site either palleted, bundled loose or protected.

When blocks are delivered on Site they shall be unloaded in such a way as to avoid damage. Blocks should preferably be stored under cover unless otherwise instructed by the Architect.

If kept in an open position they shall be stored in ventilated stacks, securely covered with waterproofing sheeting.

Freshly laid blockwork shall be protected from rain with properly anchored waterproofing sheeting.

5.5 TESTING OF CONCRETE BLOCKS

Quality control of concrete blocks, both at the Site and at the factory shall be in accordance with the procedures set out in BS EN 1996, BS EN 772-2:1998, BS EN 771-3:2011 and BS 6073-2:2008.

5.6 MORTAR

The mortar for laying concrete blocks shall conform to BS EN 1996-1-1:2005, mortar class M4. It shall be composed of one part Ordinary Portland Cement, one part lime, and five parts clean sand, free from salts, vegetable matter and impurities. Lintels, sills, flames, etc., shall be bedded with the same quality mortar.

All mortar for laying blocks shall be properly mixed upon a clean platform. No mortar which has been allowed to set to any degree prior to use shall be re worked and used on the work.

No dry packing and pointing shall be permitted. Mortar spatter shall be cleaned from the blockwork faces before setting and the work proceeds.

If the work is in white fair faced blockwork, only white cement shall be used in the mortar mix. Mortar to conform to BS EN 1996-1-1:2005, mortar class M4.

If the work is in grey fair faced blockwork, only grey cement shall be used in the mortar mix. Mortar to conform to BS EN 1996-1-1:2005, mortar class M4.

Mortar bed joints and perpendicular joints in hollow blockwork shall be 10mm thick, face-shell bedded and ironed.

5.7 CONCRETE GROUT

Where required, concrete grout for infilled concrete blockwork shall have a minimum Ordinary Portland Cement content of 300kg/m3, sufficient slump to completely fill the blockwork cores and minimum compressive cylinder strength of 10 N/mm2

5.8 PREPARATION AND CO-ORDINATION

All blockwork shall be set out and built in accordance with the dimensions, thicknesses and heights shown on the Drawings. Cutting shall be reduced to a minimum by careful setting out. Where cutting is required, blockwork shall only be mechanically cut by water-cutting machines, to maintain facing quality. Chasers will not be permitted.

Vertical disposal system recesses in masonry/ blockwork walling, as identified at various locations in the floor plans, are to be prepared as shown in the 'disposal system' drawing number B16_5150_DD_01/02/03, and the formation of the recesses to accommodate the pipes are included in the rates

5.9 TOLERANCES

All concrete blockwork shall be accurately set out and erected level, plumb and true to line, with all perpends in vertical lines in face work.

All blockwork shall be no more than 3mm out of plumb in 3 meters height. All horizontal courses shall be level to ±3 mm in 5 meters.

All blockwork shall be true in line to ± 3 mm in 5 meters.

Lintels over door and window openings shall have a minimum bearing of 190mm. Half blocks shall not be used directly under lintels.

It shall be the Contractors responsibility to ensure that all the blockwork construction is securely braced and laterally supported at all times during the construction of the Works to prevent damage or collapse due to the effect of high winds, or any other cause.

5.10 WORKMANSHIP

Workmanship shall comply with the relevant requirements of BS EN 1996 and the following requirements:

1. All masonry visible externally and internally shall be in facework masonry.
2. Masonry shall be set out plumb and level and properly bonded. Stretcher bond shall be used unless noted otherwise on the Drawings.
3. Walls shall be carried out evenly as the work proceeds with no part rising more than 1.0m above any other point. Rising work shall be raked back.

4. Grouting shall be carefully poured into the blockwork cores with minimum spillage, and compacted using a 25mm diameter rod. Grouting shall be carried out at heights not exceeding four courses, prior to proceeding with erection of subsequent courses.
5. Jambs, reveals, corners and the like shall be true and plumb. Perpends shall be true to line and uniform in size.

5.11 TOP COURSES, DOOR AND WINDOW REVEALS

Blockwork at door and window reveals shall be constructed of solid blocks for minimum length of 200mm. Top courses of hollow concrete blockwork shall be laid in solid blocks.

5.12 CLEANING

All fair faced blockwork shall be scrupulously cleaned from top down by scrubbing surfaces to remove all mortar droppings with a stiff brush or otherwise. After scrubbing, walls shall be rinsed copiously with clean water.

5.13 REJECTED WORK

The Architect reserves the right to reject any part of the Work which is not satisfactory in construction, jointing, general clean appearance, or where efflorescence appears. All rejected work shall be demolished and rebuilt in new materials at the Contractors expense without any extension of the Contract time.

5.14 FILLED BLOCKWORK

Concrete blockwork shall be filled with concrete infill of grade specified in the drawings. Cube samples of the concrete infill shall be taken at the discretion of the Architect. Concreting shall be carried out to four courses at a time. A poker vibrator shall be used while filling to ensure that the cavities are completely infilled with material and no air pockets are present.

If this method proves to be problematic on site and the Contractor fills more than four courses at a time, then, he shall specify a method statement including tests to show that all the blocks have been filled up effectively.

Reinforcement, if any, shall be placed centrally and lapping of reinforcement shall be held together.

5.15 DOUBLE WALLS

Double walls are to be constructed with hot dip galvanized metal wall ties to BS 1243 (or approved equivalent), embedded in mortar to a minimum depth of 50mm. Horizontal spacings shall be at 750mm centres and vertical spacings shall be at every alternate course. Additional ties shall be provided within 230mm of all openings such that there is one tie at every course.

Alternatively, 225mm thick bond stones shall be used at every course, a maximum of 2135mm apart from centre to centre.

6. THERMAL AND MOISTURE PROTECTION AND WATERPROOFING MEMBRANE

6.1 INTRODUCTION

This Section covers the application of waterproofing membrane for tanked areas and other floor and wall surfaces as per Drawings and Bill of Quantities.

The Contractor is responsible for the quality of waterproofing materials and workmanship, and shall provide a 10 year guarantee from date of completion of the Contract that he will maintain the Works in a waterproof condition free of charge as required by the Employer within this period, immediately he is notified of a defect.

During the course of the Works, the Architect shall have the power to order the Contractor to remove from Site any material which shall fall short in any way of the specified standard or quality. This also applies to workmanship which is not of the standard required. The Contractor shall be bound to comply with such orders at his expense.

All materials required for waterproofing shall be supplied by the Contractor.

The Contractor shall submit to the Architect, at least 14 days prior to commencement of waterproofing Works:

1. All specifications including water absorption of the material and the longitudinal and transversal elongation;
2. Method of application;
3. All descriptive literature and supplier's specifications of materials being used;
4. Detailed drawings showing the application and method of application of the material;
5. Details of where such material has been previously used;
6. Confirmation in writing by the materials suppliers that the waterproofing system being proposed is appropriate for the job.

For Works on roofs, waterproofing material shall be carried up the parapet walls or any other vertical surfaces as high as the first course, or any other height which is additional to the roof surfacing. The membrane will be tucked horizontally into the joint between the courses to a depth of 10mm. No right angled corners in the waterproofing system will be accepted.

The Contractor's rate shall be considered as inclusive and as covering all the Works specified as well as any other works which notwithstanding their omission are contingent, complimentary, or indispensable for the execution of the Contract in its entirety and as intended.

Water Test: The contractor is to agree with the Project Manager on water tests to be carried out on all horizontally laid membranes. The water test costs are included in the rates.

6.2 DAMP PROOF COURSES TO BLOCKWORK/MASONRY WALLS

Damp proof courses shall be provided and shall be in accordance with BS 8215:1991, and the types selected shall be suitable for the climatic conditions prevailing at the Site.

The Damp Proof Course shall consist of P.V.C. of 250 micron thickness under all blockwork walls, or as otherwise approved by the Architect. A minimum lap of 300mm shall be provided at all joints.

The Contractor shall ensure that D.P.C material is neither punctured nor ruptured prior to or during laying.

Care shall be taken to ensure that no creases or puckers are formed on the leading edge of D.P.C. during laying.

Where D.P.C. material is delivered in rolls the Contractor shall ensure that, during unrolling, any material that cracks is discarded.

The Contractor shall ensure that the external leading edge of the D.P.C. is finished flush with the face of the blockwork or masonry as appropriate.

6.3 APPLICATION OF THE WATERPROOFING SYSTEM

The application of waterproofing membrane and primer if applicable shall be carried out in strict accordance to manufacturer's recommendations. Joints in the membrane shall be formed with laps, and the use of adhesion promoters as recommended by the Manufacturer. Where a spray applied system is used, the minimum rate of spread, and minimum coating thickness, shall be achieved.

6.4 COMPLIANCE – SAMPLE SIZE AND FREQUENCY OF SAMPLING (WHERE APPLICABLE)

Where applicable, sample size and frequency of sampling for compliance shall be established on the basis of standard statistical guidelines.

6.5 COMPLIANCE – TESTING AND CERTIFICATION

Compliance shall be demonstrated through testing and/or certification of products and/or processes as outlined in the ensuing clauses.

6.6 PLASTIC AND VAPOUR CONTROL LAYERS

Plastic and vapour control layers for waterproofing shall comply with EN 13984.

6.7 FLEXIBLE SHEETS (MEMBRANE) FOR ROOF WATERPROOFING

Reinforced flexible sheets shall comply with EC Directive 89/106/EEC as implemented by decision 99/90/EC.

The membrane shall be laid and installed strictly as per manufacturer's instructions. The contractor shall submit a copy (in English) of the installation methodology before the start of the works.

Technical properties shall comply with EN 13707.

6.8 ROOF WATERPROOFING MEMBRANE – TEST CHARACTERISTICS

(a) Performance characteristics shall be as follows:

PROPERTY	CODE REFERENCE	TYPICAL VALUE
Reinforcement	N/A	Polyester/Fibreglass or Fibreglass
Weight (kg/m2)	N/A	4(Min.)

Flow resistance at 1000C	EN 1110	Stable
Tensile Strength at Break (Long./Trans)	EN 12311-1	>400N/50mm

(b) Polyester reinforced waterproofing membrane laid horizontally over concrete screeds that shall remain exposed is to incorporate a mineral chippings surface of approved colour and quality.

(c) Where waterproof membrane is to be covered over, a layer of not less than 25mm of fine graded material is to be laid directly over the waterproof membranes (i.e. before laying the ground slab concrete slab) to ensure that the membane is not in any way damaged. This layer is to be wetted to its optimum moisture value and tamped to a site density of at least 95%.

(d) The contractor shall make good at his expense any damage which results in the waterproof membrane as well as any damage to the building and/or finishes and fixtures which results from failure of the waterproof membranes.

(e) The membrane shall extend over any cement/sand fillets and up all upstands and sides of parapet walls to a height of not less than 230mm above finished roof level. The membrane shall be lapped and heat welded at all joints so as to give a continuously unbroken, impermeable surface.

6.9 SITE CONDITIONS

The contractor shall verify the site conditions by inspecting the surface to be treated prior to the execution of the works. The contractor shall also be responsible for the provision of any additional technical expert assistance, if this is required.

The surface to receive the membrane should be dry, free from standing water, sharp protrusions and hollows. The surface shall be primed with 2 coats of bituminous primer (min. 55% penetration grade bitumen residue) before applying the membrane.

Vertical surfaces shall be smooth, regular dry and free from nails and primed with a bituminous primer (min 55% penetration grade bitumen residue) at the rate depending on the porosity of the surface and allowed to dry completely before the application of the membrane. Masonry work and brickwork shall be flush pointed and rendered respectively to provide a smooth surface before priming. Any adhering paintwork shall be removed.

All cracks, expansion and construction joints and blisters shall be raked out, thoroughly swept, washed, cleaned and made good with an approved joint sealer before the application of the waterproofing treatment by the contractor. For all expansion joints to be bridged by the waterproofing membrane, the contractor is to provide detailed method statement for approval by the architect, showing how the membrane will be installed in a manner to cope with vertical and horizontal displacement of up to 10mm without rupture for the membrane.

The membrane shall be installed in such a way that:

(a) would allow for differential thermal and structural movement
(b) would include all necessary accessories such as edge flashings, funnel inserts for down pipes, and air-vents.

Parapet wall to roof slab junctions shall be filleted with a sand/cement in order to eliminate right angled corners.

6.10 BASE GRANULAR FOR ROOFING SCREED (SERVING AS THE BASE FOR CONCRETE SURFACING)

The base granular material shall consist of selected granular franka graded choppings ("Torba") free of any organic soil, clay or deleterious substances, spread, laid to levels, falls or currents, wetted to its optimum moisture content, tamped and adequately consolidated to the thicknesses described and detailed to provide a suitable surface to receive the concrete screed.

The material shall have the following typical grading:

SIEVE (mm)	PASSING (%)
75	100
14	100
2	<75
0.3	<50
0.63	<20

The base granular material shall be compacted to a site density of 95%.

Before consolidation of the bedding layer the contractor is to liaise with the M&E contractors to ensure that all services (if any) that are required to pass through the granular bed have been laid, covered and tested, and that no other work on them is required prior to casting of the concrete screed. The minimum consolidated thicknesses of torba beds at outlet points (into rain water pipes) are to be 75mm and a slope as indicated in the drawings is to be provided for in the compacted thickness.

6.11 MOISTURE BARRIER

A moisture barrier consisting of gauge 1000 polythene sheet shall be laid on a previously prepared smooth level sub-base, prior to casting of the concrete slab on ground. Adjacent sheets shall be lapped , taped and jointed with an approved polythene adhesive tape 300mm minimum to form a damp proof joint. Side and end taps shall not be less than 500mm so as to form a damp proof joint. The polythene sheet shall be turned up to the sides of the concrete slab at the ends of the slab.

The moisture barrier shall not be placed on the sub-base bedding until the architect has inspected and approved the sub-base.

The vapour barrier shall remain dry and intake at all times during concreting operations. Where the membrane is damaged before or during concreting, the contractor shall repair the damaged area immediately by an approved method to the satisfaction of the architect.

6.12 WORKMANSHIP

Proprietary waterproofing systems shall be installed only by applicators approved by the manufacturers and the Engineer and in accordance with the approved installation procedures.

The formation of defects affecting the integrity of the membrane including pin/blow holes and blisters in the waterproofing shall

i. be made good by repair in accordance with the manufacturers procedure before any subsequent layers are applied; or
ii. require the system to be replaced where directed by the Engineer.

Proprietary waterproofing systems shall be laid to follow the contours of the concrete surface and shall be incapable of flow and slump.

7. ROOF SCREED

7.1 GENERAL

The roof screed shall consist of 100mm thick Grade C25 concrete which shall be laid to falls in accordance with Drawing details, with expanded polystyrene joints 10mm wide shall be left between the screeding bays and against the parapet walls, shaft walls and other physical structural obstacles. Saw cut joints shall be chased to a depth of 75mm in the roof screed and to the layout as shown on the drawings. These joints shall subsequently be cleaned and shall then be filled with an approved compressible sealing compound.

Roof screed shall be finished smooth, Class U2 finish as described in Concrete Specifications.

8. STRUCTURAL STEELWORKS

8.1 GENERAL

Steel structural works shall generally comply with the provisions contained in the UK National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.

8.2 INFORMATION TO BE PROVIDED

When the steelwork Contractor carries out detailing of the steelwork and design and detailing of connections based on the member design prepared by the Project Manager the information indicated in Table 1.2A, Design Checklist, Section 1, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002, shall be submitted.

When the steelwork Contractor carries out design and detailing of the steelwork commencing with the design of the members after the conceptual layout has been prepared by the Project Manager the information indicated in Table 1.2B, Design Checklist, Section 1, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002, shall be submitted.

When the steelwork Contractor carries out design and detailing of the steelwork commencing with arranging the layout of the members the information indicated in Table 1.2C, Design Checklist, Section 1, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002, shall be submitted.

The information required from the Contractor in relation to the following shall be as indicated in the relevant tables, Section 1, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002:

a)	Workmanship	Table 1.3
b)	Erection	Table 1.4
c)	Protective Treatment	Table 1.5
d)	Inspection and Tests	Table 1.6

8.3 MATERIALS

Material shall be steel in ROLLED SECTIONS, STRUCTURAL HOLLOW SECTIONS, PLATES and BARS and shall comply with the appropriate standard as indicated in Table 2.1, Material and Dimension Standards, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.

8.3.1 TESTING

All steel shall have been specifically tested in accordance with the appropriate material quality standard as indicated in Table 2.1, Material and Dimension Standards, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.

8.3.2 TEST CERTIFICATES

The Steelwork Contractor shall have access to the manufacturer's test certificates to ensure compatibility with any welding processes being used.

8.4 SURFACE CONDITION

Steel surfaces when used shall not be more heavily pitted or rusted than Grade C of BS EN ISO 8501-1.

Surface defects in hot rolled sections, plates and wide flats revealed during surface preparation which are not in accordance with the requirements of BS EN 10163 shall be rectified accordingly.

Surface defects in hot rolled hollow sections revealed during surface preparation which are not in accordance with the requirements of BS EN 10210-2 shall be rectified accordingly.

8.5 WELDING CONSUMABLES

Consumables for use in metal arc welding shall comply with BS EN 499, BS EN 440, BS EN 756 or BS EN 758 as appropriate.

8.6 STRUCTURAL FASTENERS

(a) Ordinary Bolt Assemblies - Ordinary Bolt and nut (and washer if used) assemblies shall be as European Standards given in Table 2.2 or the British Standards given in Table 2.3, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.

(b) Pre-loadable Bolt Assemblies - Pre-loadable HSFG bolt assemblies shall be as given in Table 2.4, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.

(c) Foundation Bolts Assemblies - Holding down bolt assemblies shall be as given in Table 2.5, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.

(d) Cup and Countersunk Bolts - Cup and countersunk bolts shall be as given in Table 2.6, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.

(e) Lock Nuts for Bolt Assemblies - Lock nuts shall be in accordance with BS 4190.

(f) Coatings for Bolt Assemblies - Where specific coatings are required, they shall be provided by the fastener manufacturer and shall comply with the appropriate part of BS 7371.

8.7 SHEAR STUDS

Proprietary studs used in composite construction shall be the headed type with the following properties after being formed:

(a) Minimum yield strength - 350 N/mm2
(b) Minimum ultimate tensile strength - 450 N/mm2
(c) Elongation of 15% on a gauge length of 5.65 ¤A, where A is the area of the test specimen.

8.8 PROTECTIVE TREATMENT MATERIAL

Metallic Blast Cleaning Abrasives - Chilled iron grit shall be in accordance with BS EN ISO 11124–2, and cast steel grit shall be in accordance with BS 11124–3.

Surface Coatings - Paint materials and other coatings supplied shall be in accordance with the appropriate British Standard or European Standard for the materials.

Sherardized Coatings - Sherardized coatings shall be in accordance with BS 4921.

Galvanizing Materials - The composition of zinc in galvanizing baths shall be in accordance with BS EN ISO 1461, Hot-dip galvanizing, Galvanizing, Metal coatings, Coatings, Zinc, Iron, Steels, Weight (mass), Homogeneity, Thickness, Adhesion tests.

8.9 PROPRIETARY ITEMS

All proprietary items shall be used in accordance with the manufacturer’s recommendations and instructions.

8.10 SUBSTITUTION OF MATERIAL OR FORM

Material quality or form of components may, with the agreement of the Project Manager, be substituted where it can be demonstrated that the structural properties are not less suitable than the designed component and that compatibility with the intention of the design is maintained.

8.11 INFORMATION TO BE PROVIDED BY CONTRACTOR

Marking System - Every component which is to be individually assembled or erected shall be allocated an erection mark.

Members which are identical in all respects may have the same erection mark.

General Arrangement Drawings (Marking Plans) - Drawings shall be prepared by the Steelwork Contractor showing plans and elevations at a scale such that the erection marks for all members can be shown on them. The preferred scales are 1:100 or larger.

The drawings shall identify member size, material quality, location relative to other members and the grid, and the specified surface treatment. They may include a reference system to connections.

Details at an enlarged scale should also be made if these are necessary to show the assembly of members.

8.12 FOUNDATION AND WALL INTERFACE INFORMATION

Information showing holding down bolts and the interface of steelwork components to foundations shall include a Foundation Plan showing the base location, position and orientation of columns, the marks of all columns, any other members in direct contact with the foundations, their base location and level, and the datum level.

Similar information shall also be provided for components connecting to walls and other concrete surfaces.

Complete details of fixing steel and bolts to the foundations or walls, method of adjustment and packing space shall be provided.

8.13 FABRICATION INFORMATION FOR COMPONENTS

Fabrication Shop Drawings or Fabrication Data used in the manufacturing system, details and dimensions necessary for the manufacture of components shall be available for the architect’s approval when so requested.

8.14 ATTACHMENTS TO FACILITATE ERECTION

Details of holes and fittings in components necessary for safety or to provide lifting and erection aids shall be included.

Unless specified otherwise by the Project Specification, such holes and fittings may remain on the permanent structure. Account shall be taken of this detailing the welding of temporary attachments.

8.15 WELDING

Any requirements for edge preparations for welds shall be indicated.

8.16 PACKINGS. CLEARANCES AND CAMBER

The Steelwork Contractor shall make provision for packings which may be necessary to ensure proper fit-up of joints, the need for clearances between the fabricated components so that the

permitted deviations in fabrication and erection are not exceeded and/or the design requirements for pre-set or cambers.

8.17 HOLE SIZES

Holes in components shall be shown in the sizes indicated in clause 3.4.5 of the National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.

8.18 HOLDING DOWN BOLT COVER PLATES

Holding down bolt details shall include provision of loose cover plates or

washers with hole diameter 3mm greater than the holding down bolts.

8.19 CONNECTIONS TO ALLOW MOVEMENT

Where the connection is designed to allow movement, the bolt assembly used shall remain secure without impeding the movement.

8.20 DRILLING NOISE

The component information shall indicate those locations where holes are to be drilled but not punched or formed in another way.

8.21 FAYING SURFACES FOR FRICTION GRIP CONNECTIONS

Faying surfaces which are to receive special treatment shall be identified in the production information system.

8.22 ERECTION DRAWINGS

When necessary to amplify the information given in his erection method statement the Steelwork Contractor shall prepare Erection Drawings.

On completion of the project, the Contractor shall provide the Project Manager with detailed “As Erected” drawings (including copies in electronic format).

8.23 TEMPORARY STEELWORKS DRAWINGS

Details and arrangements of temporary steelwork necessary for erection purposes shall be shown with the erection information.

8.24 TRACEABILITY OF STEEL

All steel to be used in The Works shall have a test certificate reference so that its properties are known and can be verified.

The material grade shall be identifiable within the manufacturing system.

Individual pieces shall be capable of positive identification at all stages of fabrication.

Completed components shall be marked with a durable and distinguishing erection mark in such a way as not to damage the material. Hard stamping may be used, except where otherwise specified in the Project Specification.

Where areas of steelwork are indicated on the drawings, or fabrication information, as being unmarked, they shall be left free of all markings and hard stamping.

8.25 HANDLING

Steelwork shall be bundled, packed, handled and transported in a safe manner so that permanent distortion does not occur and surface damage is minimised.

8.26 CUTTING AND SHAPING

Cutting and shaping of steel may be carried out by sawing, shearing, cropping, plasma cutting, laser cutting, nibbling, flame cutting, planning or machining. Hand-held cutting shall only be used where it is impractical to use machine flame cutting.

Flame-cut edges which are free from significant irregularities shall be accepted without further treatment except for the removal of dross, otherwise cut edges shall be dressed to remove irregularities.

8.27 COLUMNS AND COMPRESSION MEMBERS

Columns and compression members with ends not in direct bearing or intended to be erected on packs or shims, shall be fabricated to the accuracy.

Columns and compression members intended to be in direct bearing shall be fabricated to the accuracy given in Section 7, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.

The butting surfaces of column sections which are one metre and over in width or depth and are to be in direct bearing, shall be specially prepared so that after erection both the deviation in plumb and the permitted gap as shown in Section 9, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002, are not exceeded.

8.28 MACHINING

Thickness of Machined Parts - The thickness of elements shown on the drawings as requiring machining shall mean the minimum thickness after the machining operations.

8.29 DRESSING

Removal of Burrs - Cut edges shall be dressed to remove dross, burrs, and irregularities. Holes shall be dressed as required to remove burrs and protruding edges.

Dressing of Edges - Sharp edges shall be dressed, but a 90 deg. Angle rolled, cut, sheared or machined edge is acceptable without further treatment.

8.30 HOLING

Holes - Round holes for fasteners or pins shall be drilled, punched or plasma cut.

Matching holes for fasteners or pins shall register with each other so that fasteners can be inserted freely through the assembled members in a direction at right angles to the faces in contact. Drifts may be used but holes shall not be distorted.

Drilling Through More Than One Thickness - Where the separate parts are tightly clamped together drilling shall be permitted through more than one thickness. The parts shall be separated after drilling and any burrs removed.

Punching full size - Full size punching of holes shall be permitted when all the following conditions are satisfied:

(a) The tolerance on distortion of the punched hole does not exceed that shown in Section 7, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.
(b) The holes are free of burrs which would prevent solid seating of the
(c) parts when tightened;
(d) The thickness of the material is not greater than 30mm, nor greater than the diameter of the hole being punched;
(e) In spliced connections when the holes in mating surfaces are punched in the same direction and the splice plates marked to show the assembly faces, if packed separately.

8.31 PUNCHING AND REAMING

Punching is permitted, provided that the holes are punched at least 2mm less in diameter than the required size and the hole is reamed to the full diameter after assembly.

8.32 SLOTTED HOLES

Slotted holes shall be punched, plasma cut or formed by drilling two holes and completed by cutting.

8.33 ASSEMBLY

Connected components shall be drawn together such that they achieve firm contact consistent with the requirements for fit-up or direct bearing.

Drifting of holes to align the components shall be permitted, but must not cause damage or distortion to the final assembly.

8.34 CURVING AND STRAIGHTENING

Curving or straightening components during fabrication, shall be performed by one of the following methods:

(a) Mechanical means, taking care to minimise indentations, or change of cross-section;
(b) The local application of heat, ensuring that the temperature of the metal is carefully controlled, and does not exceed 650 dec. Celsius;
(c) The induction bending process when the procedure used includes careful temperature control.

8.35 STORAGE

Stacking - Fabricated components which are stored prior to being transported or erected shall be stacked clear of the ground, and arranged if possible so that water cannot accumulate. They shall be kept clean and supported in such a manner as to avoid permanent distortion.

8.36 VISIBLE MARKINGS

Individual components shall be stacked and marked in such a way as to ensure that they can be identified.

8.37 WORKMANSHIP

8.37.1 WELDING

Welding methods shall comply with Section 6, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.

8.37.2 Workmanship – Bolting

Bolts and bolt assemblies, including pre-loaded bolt assemblies shall comply with Section 7, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.

8.37.3 Workmanship - Accuracy of Fabrication

Permitted deviations in cross section, length, straightness, flatness, cutting, holing and position of fittings shall be as specified in 7.2 to 7.5 of Section 7, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.

8.37.4 Workmanship – Erection

Erection Method Statement - The Steelwork Contractor shall prepare a written detailed method statement. The Steelwork Contractor shall submit the method statement to the Engineer for acceptance at least two weeks before erection commences. Erection shall not commence before the method statement has been accepted by the Project Manager.

Erection of steelwork shall comply with the requirements of Section 8, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.

8.37.5 Workmanship – Accuracy of erected steelworks

Permitted deviations in erected steelwork shall be as specified in 9.1 to 9.6 of Section 9, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.

8.38 CORROSION

The categories of corrosivity risks shall be as indicated in EN ISO 12944, Part 2, Categories C1 to C5.

The categories of rust shall be as indicated in ISO 8501-1, ranging from Class A to class D.

8.39 PROTECTIVE TREATMENT

8.39.1 SURFACE PREPARATION

Surface Cleanliness - At the time of coating the surface cleanliness of the steelwork to be coated shall be in accordance with BS EN ISO 8501-1 ranging from grades St (Hand and Power Tools) to Sa (Abrasive Blast Cleaning, Classes Sa1 to Sa3).

The preparation of steel surfaces using power tool cleaning shall be as indicated in EN ISO 8504-3.

Surface Profile - The surface profile of the steelwork to be coated shall be compatible with the coating to be applied in accordance with BS EN ISO 8503-2.

Measurement of Surface Profile - Measurement of the surface profile of steelwork to be coated shall be made using the methods given in BS EN ISO 8503-2.

Surface Defects - Surface defects revealed during surface preparation shall be dealt with in accordance with Section 2.5, Section 2, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.

8.39.2 SPRAYED METAL COATINGS

Zinc or aluminium sprayed coatings shall be applied to the surface as required by BS EN 22063 to the thickness indicated in the Drawings.

All reinstatement of damaged coatings shall be made good to the standard of the original work.

Sealing Before Painting - Where a sprayed metal coating is to be overcoated subsequently, it shall be sealed before the application of the overcoating in accordance with BS EN ISO 12944-4.

8.39.3 METALLIC COATINGS

Note. Where higher strength steels are to be galvanized, advice on good practice to minimise the risk of cracking should be sought from a qualified metallurgist.

Hot dip galvanizing shall be carried out in accordance with EN ISO 1461. The typical coating thickness shall be 85 microns for sections not less than 6mm.

The Steelwork Contractor shall agree with the Engineer the position of vent and drainage holes in hollow members as laid down in BS EN ISO 14713, and any requirements for subsequent sealing.

Thermal (metal) spraying with either zinc or aluminium shall comply with EN 22063. Typical coating thickness is 150 – 200 microns for aluminium and 100 – 150 microns for zinc.

8.39.4 PAINT COATINGS

Surface Preparation Prior to Painting - Steelwork shall be prepared for coating in accordance with clause 10.2, Section 10, National Structural Steelwork Specifications for Building Construction, 4th Edition, 2002.

Painting of Site Weld Areas and Fasteners - Site weld areas and fasteners which are not suitably protected shall be painted with an approved paint system to ensure similar properties, performance and compatibility with the protective treatment system being used on the surrounding surfaces.

Fasteners and bolt assemblies which are supplied with a protective treatment which is equivalent to the protective treatment on the steelwork need not be painted.

The paint coating shall normally consist of 5 in number layers:

Primer Coat	Zinc rich Epoxy
Sealer	Epoxy
Undercoat	Epoxy MIO
Intermediate	Epoxy

Finish	Acrylic Urethane

8.39.5 PAINT TYPES

The following types may be used as indicated in the Drawings or Bills of Quantities:

(a) Air Drying Paints: Eg. Alkyds
(b) One pack Chemical Resistant paints: Eg. Acrylated rubbers, Vinyl
(c) Two pack Chemical Resistant paints: Eg. Epoxy, urethane
(d) Prefabrication primers: Eg. Etch, Epoxy, Zinc Epoxy, Zinc Silicate

8.39.6 COATING OF SURFACES TO BE ENCASED IN CONCRETE

Structural steel surfaces to be encased in concrete may be left unpainted and need not be blast-cleaned unless instructed otherwise by the Project Manager.

8.40 WEATHERING STEELS

Structural weathering steel shall comply with EN 10 155.

SECTION 5 – SUPPLEMENTARY DOCUMENTATION

5.1 - Draft Contract Form
5.2 – Glossary
5.3 – Specimen Performance Guarantee
5.4 – Specimen Tender Guarantee
5.5 – General Conditions of Contract

It is hereby construed that the tenderers have availed themselves of these general conditions, and have read and accepted in full and without reservation the conditions outlined therein, and are therefore waiving any standard terms and conditions which they may have.

These general conditions will form an integral part of the contract that will be signed with the successful tenderer/s.

5.6 – General Rules Governing Tendering for NGOs

The contents of this procurement document complement the latest version of the General Rules Governing Tenders applicable on the date of the publication of this tender, the Terms of Use and the Manual for Economic Operators applicable to Government's e-Procurement Platform (available from the Resources section of www.etenders.gov.mt).