

REPUBLIC OF KENYA



KISII COUNTY GOVERNMENT



ARAB BANK FOR ECONOMIC
DEVELOPMENT IN AFRICA



SAUDI FUND FOR
DEVELOPMENT



MINISTRY OF HEALTH
TENDER DOCUMENT FOR
PROPOSED CANCER CENTRE AT
THE KISII TEACHING AND REFERRAL HOSPITAL

Mechanical Works
(LP GAS INSTALLATIONS)
INSTRUCTIONS TO BIDDERS
QUALIFICATION INFORMATION
REQUIREMENTS
SPECIFICATIONS

REF: No. MOH/NCCP/ICB/001/2021-2022

Volume III (5 of 5) (a) of VI

CLOSING DATE: WEDNESDAY, 24TH NOVEMBER 2021 AT 11.00 A.M. LOCAL TIME

SCHON ASSOCIATES



NARCO ENGINEERING
CONSULTANTS



**PROPOSED KISII CANCER CENTRE AT KISII TEACHING AND REFERRAL
HOSPITAL**

TECHNICAL SPECIFICATION AND BILLS OF QUANTITIES

FOR

LPG INSTALLATIONS

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SECTION 1:

SIGNATURE PAGE & SPECIAL NOTES

PROPOSED KISII CANCER CENTER, KISII COUNTY, KENYA

SUB-CONTRACTOR QUALIFICATION INFORMATION

BID ELIGIBILITY AND QUALIFICATION CRITERIA

The following criteria will be used in the evaluation of all bids. The submission of the required documents will be used in the determination of the Completeness and Suitability of the Bid. Bids that do not contain all the information required will be declared non-responsive and shall not be evaluated further.

MANDATORY EVALUATION

ITEM	MANDATORY REQUIREMENT	YES	NO
1.	Copy of Certificate of Registration/Incorporation		
2.	Copy of Valid Tax Compliance Certificate from Country of Residence		
3.	Copy of valid business permit or International equivalent		
4.	Copy of Valid Registration with National Construction Authority (NCA) for Mechanical (Class 1) or equivalent International standard, include relevant licenses, registration, and certifications		
5.	Attach copies of Recommendation letters from three of your major clients having undertaken similar assignment		
6.	Show proof of Local/Regional presence		
7.	Certified copy of valid contractor's annual NCA practicing license for Mechanical works or equivalent International Standard		
8.	Certified copy of Company Record showing shareholders (CR12 or Equivalent)		
9.	Audited Accounts for the last three years (2018, 2019 & 2020)		
10.	Prove of having completed at least one relevant project valued at Kshs 10 million and above for LP Gas sub-contract, completed in the last 10 years. Attach award letter and completion certificate.		
11.	Technical specifications of all the equipment proposed as laid out in the Specifications and Drawings. Include Brochures and Catalogues.		
12.	The Bidder shall provide details of line(s) of credit available to the bidder, including amount(s) and name of bank(s) making available such line(s) of credit		
13.	The Bidder shall provide letter(s) authorizing the Employer to seek references from the bidder's bankers		
	PASSED (RESPONSIVE)		
	FAILED (NON-RESPONSIVE)		

NOTE: Failure to comply with Mandatory requirements will lead to automatic disqualification.

Only bidders who are successful at this stage will proceed to the next stage of evaluation.

PROPOSED KISII CANCER CENTRE, AT KISII COUNTY
TECHNICAL SPECIFICATION AND BILLS OF QUANTITIES
FOR
LPG INSTALLATIONS

Preamble

Supplied as part of the Main Tender for the LPG Installations at PROPOSED KISII CANCER CENTRE, AT KISII COUNTY.

ISSUED BY:

Republic of Kenya / Kisii County Government

PREPARED BY:

Schon and Associates
P. O. Box 38601 – 00100 Nairobi

The Tender for the above mentioned works dated this _____ day of _____ 2021 by the undersigned parties refers to the Bills of Quantities consisting of the pages numbered on contents page.

.....

SUB-CONTRACTOR

Date2021

.....

MAIN CONTRACTOR

Date2021

SIGNATURE PAGE

PROPOSED KISII CANCER CENTER – AT KISII COUNTY
TECHNICAL SPECIFICATION AND BILLS OF QUANTITIES
FOR
LP GAS INSTALLATIONS

Preamble

Supplied as part of the Main Tender for LP Gas Installations at PROPOSED KISII CANCER CENTER – AT KISII COUNTY

.

ISSUED BY:

Principle Secretary
Ministry of Health
P.O. Box 30016 – 00100
Nairobi, Kenya

PREPARED BY:

Schon & Associates
P. O Box 38601 – 00100
Nairobi

The Tender for the above-mentioned works dated this _____ day of _____ 2021 by the undersigned parties refers to the Bills of Quantities consisting of the pages numbered on contents page.

.....
SUB-CONTRACTOR

.....
MAIN CONTRACTOR

Date2021

Date 2021

SIGNATURE PAGE

PROPOSED KISII CANCER CENTER – AT KISII COUNTY

TENDER FOR LP GAS INSTALLATIONS

SPECIAL NOTES

1. The Tenderer shall tender for the above Works in accordance with the appended drawings, Technical Specification and Bills of Quantities.
2. The Tenderer is required to check the numbers of the pages of these Bills of Quantities against the contents stated on Page 1-i and should he find any missing, in duplicate or illegible he must inform the Engineer at once and have the same rectified.
3. Should the Tenderer be in doubt about the precise meaning of any item or figure, for any reason whatsoever, he must inform the Engineer in order that the correct meaning may be decided before the date for submission of the tenders.
4. No liability will be admitted or claim allowed in respect of errors in the Tenderer's tender due to mistakes in the Bills of Quantities that should have been rectified in the manner described above.
5. The annexed Bills of Quantities must be fully priced in ink. The Tenderer shall not alter or otherwise qualify the text of these Bills of Quantities. Any alteration or qualification made without authority will be ignored and the text of the Bills of Quantities as printed will be adhered to.
6. **Fully priced Bills of Quantities must be accompanied by brochures and technical literature for the major mechanical and electrical items.**
7. The Tenderer shall be deemed to have made allowance in his prices generally to cover items of Preliminaries or additions to Prime Cost Sums or other items, if the Tenderer has not priced these where appropriate.
8. All items of measured work shall be priced in detail and tenders containing lump sums to cover trades or groups of work must be broken down to show prices of each item before they will be accepted. Lump sums to cover items of Preliminaries shall be likewise broken down if so required.
9. Under no circumstances will any expense incurred by Tenderers in preparation of this tender be allowed.
10. The copyright of these Bills of Quantities is vested in the Engineer and no part thereof may be reproduced without express permission given in writing by the Engineer.
11. The Tenderer is solely responsible for the accurate ordering of materials in accordance with the Drawings and Engineer's instructions and no claim for any loss or expense will be entertained for orders for materials based upon the Bills of Quantities.

PROPOSED KISII CANCER CENTER – AT KISII COUNTY

TENDER FOR LP GAS INSTALLATIONS

CONDITIONS OF TENDERING

- 1.01 Each Tenderer must submit two plain sealed envelopes one clearly marked “TENDER FOR LP GAS INSTALLATIONS FOR THE PROPOSED KISII CANCER CENTRE – KISII COUNTY (TECHNICAL PROPOSAL)” and the other clearly marked “TENDER FOR LP GAS INSTALLATIONS FOR THE PROPOSED KISII CANCER CENTRE – KISII COUNTY (BILLS OF QUANTITIES).
- 1.02 The Technical Proposal and Bills of quantities as in 1.01 above shall be placed in a sealed outer envelope labelled “TECHNICAL AND FINANCIAL PROPOSAL FOR LP GAS INSTALLATIONS FOR THE PROPOSED KISII CANCER CENTRE – KISII COUNTY” and be submitted together with the Main Contractor’s tender in accordance with the instructions in the Letter of Invitation.
- 1.03 Tenders and all the Documents in connection therewith as specified above must reach the Address as advised and on the date stated in the covering letter accompanying these documents
- 1.04 In the case of a tender not being delivered by hand, the Tenderer must arrange for his tender and other documents to be posted in time to reach the above office not later than the stipulated time.
- 1.05 Any tender delivered after the stipulated time, from whatever cause arising, will be disqualified.
- 1.06 In no case will any expense incurred by the Tenderer in the preparation of his tender be allowed.
- 1.07 Tenders shall remain valid for One Hundred and Twenty (120) days from the final date of submission of tenders stipulated in Paragraph 2.01 above, and no Tenderer may withdraw his tender after that period.
- 1.08 The Employer shall not be bound to accept the lowest or any tender and shall not be bound to give reasons for his decision.
- 1.09 The Engineer shall notify the accepted approved Tenderer (if any) of such acceptance by letter within One Hundred and Twenty (120) days during which, by Paragraph 3.01 thereof, the tender is to remain valid and the said Tenderer shall then within the time stated in the Form of Tender first execute the formal Contract Agreement and then on the same day his approved Surety shall sign the Bond. The Engineer however, reserves the right to extend the period for executing the formal Contract Agreement if satisfied that adequate reasons exist for so doing.
- 1.10 Every notice to be given to a Tenderer may be posted to the Tenderer's address as given in his tender and such posting shall be deemed to be good service of such notice.
- 1.11 The term "Electrical and Mechanical Engineer" wherever used in these Conditions and in all Contract, Documents shall be such person or persons as may be duly authorized to represent M/s Greentec engineering consultants ltd, Consulting Engineers.
- 1.12 The words "Approved Tenderer" in these Conditions shall mean that the Tenderer shall be approved by the Employer as having complied with these Conditions in every respect.

- 1.13 The word "Tenderer" in these Conditions shall be deemed where applicable to include two or more persons. The word "his" may also mean "their" and the word "he" may also mean "they".
- 1.14 If it is found on the examination of a tender that there is a discrepancy between the Total Amount of the tender and the amount arrived at by valuing the quantities set out in the Bills of Quantities at the rates or prices set against them by the Tenderer, then the figures shall be corrected arithmetically and the differences between the tender and the corrected total shall be applied as a percentage adjustment or addition or omission on all the rates, so that the original tender amount remains unaltered. When calculating the percentage adjustment, the total cost of the Preliminaries, Provisional and P.C. Sums, Contingencies and any other items of a similar nature shall be excluded.
- 1.15 If it is found on examination, that any rates for the work appear to be unreasonable then the attention of the Tenderer shall be drawn to any such items. If as a result of this, the Tenderer asks for any rates to be changed, then the arithmetical effect of any change will be adjusted in accordance with sub-paragraph 8.01 above.
- 1.16 Non-compliance with the above Conditions in any respect shall render the tender liable to rejection.

DECLARATION ON AVAILABILITY OF MATERIALS, PLANT, SUPERVISION AND SKILLED LABOUR

To: Principle Secretary
Ministry of Health
P. O. Box 30016 – 00100
Nairobi

Sirs,

PROPOSED KISII CANCER CENTER – AT KISII COUNTY

TENDER FOR LP GAS INSTALLATIONS

In connection with the attached tender for the above Sub-Contract, I/We have made full enquiries with manufacturers and/or distributors of the relevant materials and plant required to be incorporated or used in the Works and I/We hereby declare that I/We will have available: -

- * (a) all the necessary
- or * (b) a proportion of the necessary

Materials, plant, tools and equipment, supervision and skilled labour

- * (a) from stocks in hand
 - or * (b) from sources of supply available to me/us
- for use as and when they are required for the Works.

Signature of Tenderer

Name of Tenderer

Address

Date.....

NOTES: -

1. *Delete whichever is not applicable.
 2. *The Tenderer may be required before approval
- (a) To disclose the (i) actual quantities of the various materials and (ii) plant available for immediate use and, (iii) To submit names and CV's and academic certificates of available supervision personnel and team leader being a mechanical engineer with over 10 years' experience, (iv) Skilled labour.
- b) To give details of the arrangements which have been made by the Tenderer for the obtaining and delivery to the site of the further materials and plant and employment of supervision and skilled labour required to complete the works.
3. Failure to satisfy the Engineer that adequate arrangements have been made to provide or obtain the whole of the materials, plant, tools and equipment necessary to complete the Works within the contract period or such extended period as may be authorized, may render the Tenderer liable to be considered in default.

CONFIRMATION OF SUFFICIENCY OF INFORMATION PROVIDED / SITE VISIT

This is to certify that we _____
(Name of Tenderer)

of the firm of _____
(Name of firm tendering)

Having studied the contract documents, have made our selves familiar with all local conditions likely to influence the works and cost thereof.

We undertake to treat all provided information with strict confidentiality.

We further certify that we are satisfied with the description of the works and explanations given and confirm as follows:

We visited the site on _____ and confirmed all necessary information.

We did not visit the site but confirm sufficiency of provided information:

Signed

(Name & Signature of Tenderer)

PART 3:
GENERAL REQUIREMENTS
KISII CANCER CENTRE, KISII COUNTY, KENYA

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3 GENERAL REQUIREMENTS

3.1 DESCRIPTION OF THE MAIN CONTRACT WORKS

The Proposed Kisii Cancer Centre is located in Kisii Country, Kenya. The project shall include infrastructure and civil works.

The LPG installations shall be to the local and international standards and best engineering practice to provide systems that are operational, efficient, optimal, buildable, maintainable and cost effective. The services included in this tender package include:

This tender package is for LPG Installation and shall comprise of:

- Ground LPG bulk storage tank;
- LPG distribution pipework;
- Safety devices, etc.

Drawings of the development may be inspected at the offices of the Architect and the Engineer provided this is done by appointment.

The services drawings are provided with the Specification - as per the Schedule of Drawings.

The above sub-contract works shall be carried out by a nominated sub-contractor and as such will be required to work in close liaison with the main contractor and all other sub-contractors. It is essential that complete co-ordination is maintained at all times to enable the timely completion, within the specified contract periods, of the Works. The sub-contractors will be required to agree with the main contractor the full working programme for all elements of the contract. Certain areas are more critical to the completion than others as certain items of plant and equipment, which will be required to be installed and commissioned, may experience long delivery dates. The specialised sub-contractors must identify these areas and agree on dates for completion with the main contractor and the Engineer so that no delays to the main contractor and other specialists are caused.

This section of the contract relates to the LPG installations.

3.2 SCOPE OF THE WORKS

The works to be carried out under this section of the contract shall include LPG installations including all the necessary accessories. These items, together with other contract requirements, have been further expanded under later sections of the Specification.

- (i) Design;
- (ii) Manufacture;
- (iii) Supply;
- (iv) Delivery to site;
- (v) Installation;
- (vi) Works testing;
- (vii) Commissioning;
- (viii) Performance testing;
- (ix) Making good any defects that occur during the defect liability period;
- (x) Provision of 'As Installed' drawings and Maintenance and Operation documents;
- (xi) The whole of the labour and all materials necessary to form a complete installation (whether or not all the necessary components are indicated).

The sub-contractor shall supply all labour, materials, plant, equipment and components necessary and execute the services installations described above and set out in this section of the Specifications, Bills of Quantities and the accompanying Drawings and in accordance with the general specifications herewith.

Unless otherwise indicated within this Specification, all equipment and materials to be installed shall be new and the Contractor shall ensure that all equipment can be installed in the allotted spaces and maintain adequate access for maintenance and repair. All equipment shall be installed in accordance with the manufacturers written instructions.

3.3 EXTENT OF SUB-CONTRACT

The sub-contract shall include, in addition to all items scheduled above, for the design, manufacture, inspection and testing, packing for shipment, insurance, shipping, customs, dues, duties, taxes, delivery to site, unloading and all other charges, complete erection, tests on completion, setting to work, finishing, painting and maintenance for a period of twelve calendar months, all to the satisfaction of the Architect and Engineer, of the items of Plant and Equipment described or implied within this Specification and shown on the relevant Drawings.

The proposed installations within the new facilities are required to be complete in all respects as specified herein, and shall include all items of equipment, materials, accessories, fittings, supports, etc. necessary whether such items are specifically referred to in the contract or not. The sub-contractor shall be deemed to have included in his tender price for all items necessary such that the installations are complete in all respects and left in a satisfactory working order.

The sub-contractor shall provide fully detailed drawings of the entire installation together with layouts of all civil and building works etc. required to accommodate/house the plant and equipment, these layout drawings and details being related to the existing layouts as may be necessary. The drawings shall be submitted for approval within three weeks of the award of the sub-contract such that the Architect and Engineer can be made aware of all requirements. It shall be fully the responsibility of the sub-contractor to liaise with the main Contractor to ensure all civil and builder's works required for this sub-contract are prepared and/or provided to suit the programme of this contract. No claims will be entertained.

All modifications to existing layouts and all proposed new layouts and structures shall be subject to the full approval of the Architect, Engineer and the Employer.

3.4 SUB-CONTRACT PERIOD AND PROGRAMME

The sub-contractor shall provide within the stipulated period after the acceptance of his Tender, a complete programme for the execution of this contract. This programme shall indicate the expected dates of the commencement and completion of the following specialist contract works: -

- (i) Submission of Working Drawings for approval;
- (ii) Placing of orders with other specialists or sub-contractors for Plant and Equipment to be incorporated in the Works;
- (iii) Receipt by the sub-contractor from other specialist or sub-contractor's of Plant to be incorporated in the Works;
- (iv) Manufacture by the sub-contractor of Plant to be incorporated in the Works;
- (v) Inspection and testing by the Engineer;
- (vi) Shipment from country of supply;
- (vii) Delivery to Site;
- (viii) Erection on Site, details for all activities;
- (ix) Tests on Completion. Operations shall be commenced when instructed and shall be carried forward to completion with the greatest possible expediency, to the satisfaction of the Architect, and Engineer, in accordance with the Programme. The sub-contractors

programme shall be agreed with the main contractor, as the sub-contractor shall adhere fully to the requirements and timing of the agreed main contractors programme.

3.5 DRAWINGS ACCOMPANYING THE TENDER DOCUMENTS

Drawings accompanying this Specification indicate generally the arrangement of the installations and are for assistance in tendering. The position of equipment and apparatus shown thereon are approximate only, the exact positions, together with the actual runs of ductwork, trunking and conduit etc., will be agreed with the Architect, the Engineer and the Employer before commencement of work. It shall be deemed that the prices entered by the sub-contractor include for the repositioning, of the various services, to meet the above requirements. No claims will be entertained.

The sub-contractor shall satisfy himself as to correctness of all Drawings and measurements particularly the dimensions of the works already constructed on site. If the sub-contractor finds any discrepancy in the Drawings or between the Drawings and the Specification or between the constructed works and the Drawings he shall immediately refer the same to the Architect and Engineer who will decide which shall be followed. Figured dimensions shall be taken in preference to the scale mentioned on or attached to any Drawings. Details shown on Drawings shall be read in conjunction with items in the Specification.

Copies of all Drawings and of the Specification will be furnished free of cost to the sub-contractor for his own use.

The Architect will furnish to the sub-contractor within a reasonable time after the receipt by the Architect of a written request for the same, any details which, in the opinion of the Architect are necessary for the execution of any part of the work such request to be made only within a reasonable time before it is necessary to execute such work in order to fulfil the contract. One copy of the Drawings, details and Specification shall be kept on the site until the completion of the sub-contract and the Architect shall at all reasonable times have access to the same. All copies of Drawings and details shall be returned by the sub-contractor to the Architect on the completion of the Contract.

Additional Drawings will be issued by the Engineer to suit the design requirements of the works these Drawings being issued either during or after the tender period as may be required or necessary. These drawings will supplement the details contained within the Specification and Bills of Quantities and the tenderer shall be deemed to have taken these into account in his pricing. Where the sub-contractor can demonstrate that the Drawings relate to new or additional items these new or additional items shall be priced to approval and shall be in accordance with the sub-contract rates and prices.

3.6 SUB-CONTRACT WORKING DRAWINGS

The sub-contractor shall prepare fully detailed Working Drawings for all items of plant, equipment and accessories required for installation under this section of the contract. Two copies of each Drawing shall be forwarded to the Engineer for approval and or comments. One copy will be returned stamped "approved" or "not-approved". Where Drawings require further information and/or modifications to meet the comments made by the Engineer they shall be re-submitted, again in duplicate, for approval.

When Drawings have been approved two further copies shall be forwarded to the Engineer, together with copies to the Architect, site and the Employer.

Drawings, and, where relevant, calculations in respect of the following shall be prepared by the sub-contractor and submitted to the Engineer for his approval commencing within ten (10) days from acceptance of the tender.

All drawings shall be to scale and fully detailed and all-important dimensions shall be given and the material of which each part is to be constructed shall be indicated.

During progress of the building works, the sub-contractor shall make all necessary checks on site to make certain the various Services can be installed as specified and shown on the approved Drawings.

Where such works cannot be so installed, this must be immediately brought to the notice of the Architect and Engineer prior to the progress of such works.

The Engineer, in conjunction with the Architect and the Employer, will check and return the Drawings submitted for approval within a reasonable period, not exceeding fourteen (14) days from receipt.

The layouts of plant and equipment are for general guidance only. The sub-contractor shall assess the requirements immediately and prepare a plant layout for approval, the required liaison being maintained with other specialists, sub-contractors and main contractor such that an agreed layout is submitted for approval.

3.7 RECORD DRAWINGS

As soon as the works are complete and all tests have been satisfactorily carried out, the sub-contractor shall hand to Architect/Engineer two sets of Record Drawings, together with one set of negatives of these record drawings, showing the works as finally installed. These drawings shall be prepared on approved transparent plastic material in black ink or as approved by the Architect/Engineer. The certificate, of making good defects, will not be issued until this condition has been complied with. Record Drawings are in addition to detailed Working Drawings and shall show all cable routes, circuits, trunking, conduits, plant, trenches, ductwork and ducts etc., together with the entire Kitchen, LPG and Laundry Equipment as finally installed.

The Architect will provide the sub-contractor with a set of Contract Drawings (in addition to the two sets provided for the sub-contractor's site and office use), which shall be maintained by the sub-contractor's representative on site and which shall be used for recording contract variations as they occur. This set of Drawings shall be available for the Architect's inspection on site, and shall be kept up to date.

The cost of the preparation and submission of the above Contract and Record Drawings shall be deemed to be included within the sub-contractor's prices.

3.8 MAINTENANCE MANUALS

Upon Practical Completion of the Contract Works, the Contractor shall furnish the Engineer four copies of a Maintenance Manual relating to the installation forming part of all of the Contract Works.

The manual shall be loose-leaf type, International A4 size with stiff covers and cloth bound. It may be in several volumes and shall be sub-divided into sections, each section covering one Engineering service system. It shall have a ready means of reference and a detailed index.

There shall be a separate volume dealing with Kitchen, LPG and Laundry Equipment installation where such installations are included in the Contract Works.

The manual shall contain full operating and maintenance instructions for each item of equipment, plant and apparatus set out in a form dealing systematically with each system. It shall include as may be applicable to the Contract Works the following and any other items listed in the text of the Specifications:

System Description shall include but not limited to:

- 1) Plant;
- 2) Valve Operation;
- 3) Switch Operation;
- 4) Procedure of Fault Finding;
- 5) Emergency Procedures;
- 6) Lubrication Requirements;
- 7) Maintenance and Servicing Periods and Procedures;

- 8) Colour Coding Legend for all Services;
- 9) Schematic and Writing Diagrams of Plant and Apparatus;
- 10) Record Drawings, true to scale, folded to International A4 size;
- 11) Lists of Primary and Secondary Spares.

The manual is to be specially prepared for the Contract Works and manufacturer's standard descriptive literature and plant operating instruction cards will not be accepted for inclusion unless exceptionally approved by the Engineer. The Contractor shall, however, affix such cards, if suitable, adjacent to plant and apparatus. One spare set of all such cards shall be furnished to the Engineer.

3.9 BUILDER'S WORK AND CIVIL WORKS

All Builder's Work and Civil Works incidental to this section of the contract such as the cutting of holes in walls and floors, the provision of foundations for plant and machinery, the building in of lifting beams, breaking into the existing plant rooms and duct systems, changes in levels the protection of existing structures, painting and the re-instatement of the plant rooms and associated areas to their original standard etc shall be the responsibility of the main contractor. The sub-contractor shall however be fully responsible for the preparation of all such details that relate to this sub-contract works, the details being subject to approval by the Architect and Engineer prior to submission to the main Contractor for action. Other items such as the fixing of brackets, cable and ductwork ducts and trenching, making good, etc shall be carried out by the sub-contractor to suit the installation of all the services.

It is the sub-contractor's sole responsibility to ensure that all holes and chases etc are in the required position and that any additional ducts, holes and chases necessary for the erection of the installations in situ concrete walls, floor slabs etc., are included in the early stages of construction as appropriate.

The sub-contractor shall furnish the Architect, Engineer and main Contractor with all information as to where foundations, brackets and fixings are required and shall ensure that such work is done in accordance with such information.

The sub-contractor shall include in his tender for all supports, fixings, the plugging of all walls, ceilings and floors to facilitate the fixing of the pipework, accessories, and all other portions of the Kitchen, LPG and Laundry Equipment installations. Any purpose made fixing brackets shall also be provided and installed by the sub-contractor, including escutcheon plates and the like.

The sub-contractor is to set out at the earliest opportunity the position of all holes necessary for the passage of ducts, pipe-work and conduits or otherwise required in connection with his work, and should additional holes or openings be required due to failure of the sub-contractor to fulfil the conditions of this clause, then he must arrange for the main Contractor to make such openings, etc at his own expense. The sub-contractor is not to arrange for the cutting of any holes or openings unless specifically authorised to do so and should he do so without approval, he will become liable for any damage to the building or fittings.

The sub-contractor shall supply and install approved pipework support brackets and hangers. It shall be deemed that the prices entered include for any special requirements and that the sub-contractor has visited the site during the tender period to ascertain all details.

The sub-contractor shall pay particular attention to the fixing and alignment of items. All items shall be installed square, true and perpendicular to floors i.e. as shown on Drawings and as may be required at site to the Engineers approval and to suit the existing and new services.

3.10 GUARANTEE

The sub-contractor shall guarantee all work for a period of twelve months after acceptance by the Architect. In the event of a defect arising within the contract defects liability period which, in the opinion of the Architect, is due to faulty workmanship or materials, the sub-contractor shall, at his own expense,

make good such defects where instructed to do so, to the satisfaction of the Architect.

3.11 SETTING TO WORK

The sub-contractor shall instruct the Employer's Maintenance Engineer or his representative on the operation and maintenance of the various components forming the Kitchen, LPG and Laundry Equipment installations and shall provide such drawings, diagrams and manuals to ensure the Maintenance Engineer or his representative is completely conversant with such installations.

The sub-contractor shall ensure that the Services Installations are left in complete safe working order and operating to the satisfaction of the Architect and the Engineer.

3.12 REGULATIONS AND STANDARDS

The Installations must be carried out strictly in accordance with the following documents: -

Electrical Services

- (i) The current edition of the 'Regulations for the Electrical Equipment of Buildings' issued by the Institute of Electrical Engineers of Great Britain;
- (ii) Electrical Supply Authority;
- (iii) Relevant British Standard Specifications and Codes of Practice published by the British Institution (hereinafter referred to as B.S. and C.P. respectively);
- (iv) Regulations of the Government of Kenya;
- (v) Water Supply and Sewerage Authorities Regulations;
- (vi) Any other duly constituted authorities' regulations having jurisdiction over the works;
- (vii) The Specification and accompanying documentation and Drawings;
- (viii) The Working Drawings, produced by the sub-contractor and approved by the Architect/Engineer.

Mechanical Installations

- (i) The Kenya Bureau of Standards;
- (ii) Relevant British Standard Specifications and Codes of Practice published by the British Standard Institution (hereinafter referred to as B.S. and C.P. respectively);
- (iii) Regulations of the Government of Kenya;
- (iv) Water Supply and Sewerage Authorities Regulations;
- (v) Any other duly constituted authorities' regulations having jurisdiction over the works;
- (vi) The Specification and accompanying documentation and Drawings;
- (vii) The Working Drawings, produced by the sub-contractor and approved by the Architect/Engineer;
- (viii) The Loss Prevention Council Regulations.

The sub-contractor shall undertake all modifications demanded by the authorities in order to comply with the regulations, and produce all certificates, if any, for the authorities without extra charge.

3.13 QUALITY OF MATERIALS

All materials, fittings and accessories are to be new and in accordance with the requirements of the current rules and regulations where such exist, and with the relevant British Standard Specification.

Uniformity of type and manufacture of fittings or accessories is to be preserved as far as practicable throughout the whole work.

Wherever in this specification the practice is adopted of specifying a particular item as 'similar' to that listed in a particular firm's catalogue, it is to be clearly understood that this is to indicate the type and quality of the equipment required. No attempt is being made to give preference to the equipment supplied by the firm whose catalogue is quoted.

Where particular manufacturers only are specified herein no alternative makes will be considered without

good reasons.

All materials shall be good quality, suitable for the purpose specified, and to the approval of the Architect and Engineer.

3.14 WORKMANSHIP

The sub-contractor shall take into consideration, when pricing his tender, that there will be other sub-contractors working. Any disruptions to the existing services must therefore be kept to an absolute minimum, and in this respect the sub-contractor shall include in his prices for carrying out works outside normal operating hours as may be directed by the Architect or Engineer. No claim will be entertained where abnormal working hours are required to meet this requirement and completion of the works within the specified contract period.

The sub-contractor shall be fully responsible for the co-ordination of all services, both new and existing, and in this respect, he shall ascertain that the installation of the services will not foul other new or existing services. In all cases services through ducts etc. must be readily accessible for maintenance.

The sub-contractor shall be deemed to have included in his tender prices for locating switches, terminal points, ductwork, outlets and fixtures in positions and/or locations at least one metre, both horizontally and vertically from those positions indicated on the contract drawings. Within these limits no variations in the sub-contract sum will be made unless the work has already been executed in accordance with previously approved Working Drawings.

All trade work shall be carried out by tradesmen fully competent and qualified in their respective trades, and the entire installation shall be performed in a neat and workmanlike manner.

The sub-contractor shall take every precaution to avoid damage to all existing property including roads, paved walkways, grassed areas, landscaping, cables, drains and other services, and he will be held responsible for and shall make good all such damage arising at his own expense to the satisfaction of the Architect.

The sub-contractor will be responsible for the exact runs and placing of pipework, conduit, boxes, ductwork and accessories that are to be cast in concrete ceilings, floors, walls, columns and beams, and for the proper fixing of the pipework and accessories to the shuttering and the steel reinforcement work.

Where ductwork is to be concealed, the pipes etc shall be in an exact position relative to the finished plaster or such other finishes as may be applied to enable adequate cover to be applied.

Where services are run above the false ceilings the sub-contractor shall ensure that access to all services is readily available such that future maintenance can be carried out without difficulty. Full details shall be included on the Working Drawings such that the Architect and Engineer can give consideration to the sub-contractor's proposals.

3.15 LAYING OUT OF WORK

The sub-contractor will be responsible for laying out his work and shall obtain all necessary information as may be required to carry out the work, and such information shall be obtained sufficiently in advance to avoid any possibility of delay to the works as a whole.

The sub-contractor shall be fully responsible, and shall inform himself of, the details of all work being carried out by the various trades on Site, particularly where such trades may interfere one with the other, or where co-ordination is necessary. No claims for extra costs will be met arising from omissions, oversights, or neglect in this regard.

The sub-contractor shall arrange for the supply, in advance of the delivery of the equipment, of all necessary foundation bolts, templates, nuts, plates, sleeves, anchorage, etc., as required and as may be

directed by the Engineer or Architect.

3.16 ERECTION AND CHECKING OF WORK

The sub-contractor shall provide, and be solely responsible for, all skilled and unskilled labour, tools, lifting tackle and other equipment required for transport to the site, the handling and transport about the site and the erection of the plant and equipment.

As each part of the Works is erected, it shall be subject to approval by the Engineer.

All parts shall pass such tests on the site as required by the Architect and Engineer to prove compliance with the contract irrespective of any tests which may already have been carried out at the Manufacturer's Works. In particular all electrical pressure tests made at the Manufacturer's Works shall be repeated at voltages approved by the Engineer.

The sub-contractor shall supply and install all supports, fixings, brackets and similar items as may be necessary for the completion of the installation of the services as specified and as shown on the Drawings.

3.17 PERFORMANCE AND ACCEPTANCE TESTS ON SITE

The sub-contractor shall give to the Engineer in writing at least five days notice of the date after which he will be ready to make the specified tests on completion of installation. Unless otherwise agreed the tests shall take place within seven days after the said date on such day or days as the Engineer shall in writing notify the sub-contractor. The tests shall be carried out under normal working conditions to the satisfaction of the Engineer and shall extend over such continuous periods as he may direct.

All skilled labour, supervision, apparatus, fuel for tests and instruments required for carrying out the tests efficiently will be the responsibility and at the expense of the sub-contractor. The accuracy of the instruments shall be demonstrated if required.

If any part of the plant or equipment fails to pass the specified tests, further tests of the said part shall, if required by the Engineer, be repeated. The sub-contractor shall, without delay, put in hand such modifications as are necessary to meet the requirements as described in the Contract and any expense which the Employer may have incurred by reason of such further tests shall be deducted from the sub-contract price.

Each completed system within the installation shall be tested as a whole under operating conditions to ensure that each component functions correctly in conjunction with the rest of the system.

3.18 TEST RECORDS

The sub-contractor shall make all necessary records of the tests carried out, and when the tests have been successfully completed he shall provide the Architect and Engineer with test records and reports in a form to be agreed.

The LPG installation shall be deemed to be complete when the following obligations have been fulfilled by the sub-contractor: -

- (a) The satisfactory completion of the Performance and Acceptance Tests on Site;
- (b) Test records and reports have been received;
- (c) The handing over of two preliminary sets of Record Drawings. The supply of these preliminary Record Drawings shall not relieve the sub-contractor of his obligations to supply Record Drawings in accordance with the requirements of the Specification;
- (d) The issue of an acceptance certificate by the City Council for all works associated with the LPG installation systems as may be necessary and required;

3.19 DUST, INSECT AND VERMIN PROOFING

All equipment, which is affected by ingress of dust, shall be effectively dust proofed and also vermin proofed where no protection is afforded in its normal manufactured form. All materials used shall be in general resistant to attack by insects, microbiological life or other local fauna and such materials shall be to the approval of the Architect and Engineer.

3.20 PAINTING AND FINISHING

All mechanical and electrical equipment installed under this sub-contract shall be painted or otherwise finished to approval in accordance with B.S. Code for Standard Colours including all pipework and ductwork, etc. Such finish shall be entirely compatible with the conditions of heat, humidity, exposure to the weather, and other relevant factors arising from the materials, location and condition of operation of the equipment.

The Architect may request examples of paint finishes, the cost of which shall be deemed to have been included within the tendered prices for all works.

All final painting of equipment, fixtures, and accessories shall be carried out by the sub-contractor, except where it is the usual practice of the manufacturer of items of plant, equipment, and switchgear etc to apply a high standard of protective finishing paintwork in the shop before despatch. This will be acceptable provided any damage to paintwork that occurs before the plant is taken over is made good by the sub-contractor at his own costs.

The interiors of electrical switchboards, control panels, and similar items, where supplied by the sub-contractor shall be finished in approved enamel and shall comply with the appropriate B.S. for enamel finish. The exteriors of such panels and enclosures shall be of British Standard Specification colour as specified by the Architect.

3.21 LABELS

All items of plant, valves, tee's etc shall be neatly and clearly labelled externally with identification marks corresponding with those on Drawings or in Specifications. Final details shall be agreed.

Identification labels shall be of laminated plastic material engraved, black on white, with no less than 6mm "Lino" style letters and shall be fixed on or adjacent to all items by means of at least two brass screws or to approval.

All main switches, circuit breakers, isolators, valves, motors, switch-fuse, consumer's service units, and distribution boards etc shall be neatly and clearly labelled externally with identification marks corresponding with those on Drawings or in Specifications. Final details shall be agreed with the Engineer, but all labels/plates shall be in English.

3.22 SPARE PARTS AND SPECIAL TOOLS

The sub-contractor shall submit his recommended list of spares covering a period of two years for all plant and auxiliary equipment supplied under this sub-contract. This list shall be priced individually, but not carried forward to the Bills of Quantities where provisional sums have been included for the purchase of spare parts. Before a Taking-Over Certificate is issued a full set of spares as agreed shall be handed over to the Engineer.

Complete sets of any special tools, necessary for the operation, maintenance and dismantling of various sections of the plant and equipment shall be provided in a strong box or boxes each fitted with a suitable padlock and two keys. Such tools shall not be used by the sub-contractor during the erection of the plant or equipment. The cost of these tools shall not be carried forward to the Bills of Quantities where a

provisional sum has been included for the purchase of these special tools.

3.23 SPECIALIST MANUFACTURERS AND SUB-CONTRACTORS

Where specialists are not nominated by the Employer, the sub-contractor shall appoint specialist manufacturers and contractors for any sections of the Works described herein in which he is not himself an experienced, recognised and approved operator.

The Tenderer shall, on submission of his Tender, indicate the names of all proposed specialist manufacturers and contractors, together with the precise sections of the Works for which each will be responsible. The sub-contractor may be required to seek alternative manufacturers or contractors or to accept specialists nominated by the Employer. It shall be deemed that the prices entered include for this requirement.

The sub-contractor shall allow in his prices for phasing his work to meet the requirements of the other sub-contractors and any specialists, and for varying his programme or otherwise, to comply with the erection programme of such specialist or sub-contractors. No additional costs will be allowed to the sub-contractor for any disruptions to his programme, or otherwise, in his compliance with the above requirements.

3.24 USE OF SITE

The lands and other places outside the Site that are the property of or under the control of the Employer shall not be used except with the approval of the Architect or Engineer.

The sub-contractor shall at any time remove any vehicle, wagon, or any other obstruction within his control that may be required to be moved by the Architect/Engineer for any purpose and the sub-contractor shall move such obstruction promptly on instruction being given and at his own cost, unless the Architect/Engineer shall decide otherwise.

The sub-contractor shall maintain access for the inspection, operation and maintenance of any of the Employer's plant or work that lies within the Site or elsewhere. The sub-contractor shall not use any portion of the Site for any purpose not connected with the Works unless the prior written permission of the Engineer has been obtained.

Except with a written permission of the Architect / Engineer, which shall be given when necessary for the execution of the works, the sub-contractor's employees will not be permitted to enter any of the Employer's buildings or lands or sites under the control of the Employer, other sub-contractors or the Engineer. The sub-contractor shall warn his employees that any man found within such buildings or sites without authority is liable to be removed from the Works.

3.25 POSSESSION OF SITE

It shall be deemed that the prices entered by the sub-contractor for the completion of the works are inclusive of all required temporary supplies associated with retaining of essential services as may be directed by the Architect / Engineer or the Employer. All details shall be fully agreed as the works proceed to suit the operational situations as and when they arise.

3.26 INTERFERENCE WITH THE WORKS

The sub-contractor shall not interfere in any way with any existing Works whether the property of the Employer or of a third party and whether the position of such works is indicated to the sub-contractor by the Architect or Engineer or not except where such interference is specifically described as part of the Works either in the contract or in any instruction from the Architect/Engineer.

3.27 WATER AND POWER FOR USE ON THE WORKS

Water for construction purposes and for use by the sub-contractor's staff during the contract period will be the responsibility of the contractor. The contractor shall make his own arrangements for connection to the nearest suitable water supply/main and for metering the water used. In this respect the sub-contractor shall liaise with main Contractor and the Employer who may be able to assist.

The sub-contractor shall be responsible for the supply of all electrical power for construction purposes prior to the issue of the Taking-Over Certificate.

3.28 TELEPHONE AND COMMUNICATIONS

The sub-contractor shall make his own arrangements for the provision of a telephone at the site, the sub-contractor being fully responsible for all charges and costs incurred in providing this facility. In this respect the sub-contractor shall liaise with the main contractor and the Employer who may be able to assist.

3.29 SITE OFFICES, WORKSHOP AND STORAGE

A space will be provided by the Main Contractor for the sub-contractor's site offices, workshops and storage. The sub-contractor shall be responsible for providing all buildings, fencing, etc that he may require and on completion of the Works shall be required to remove all such buildings, fencing, etc and to restore the land to its original condition.

The sub-contractor shall state, with his Tender, the areas that he requires for his site offices, workshops and storage. The areas of land available are limited and the Employer reserves the right to allocate areas of land smaller than the sub-contractor may require, in which case, the sub-contractor shall make such additional or alternative arrangements as may be necessary for his full requirements, all at his own cost.

3.30 SANITATION OF THE WORKS

The sanitation of the works shall be the responsibility of the contractor who shall arrange and maintain all required sanitation facilities to the satisfaction of the Local Authorities, Labour Department and Architect.

The Sub-contractor shall warn his employees and other specialists and sub-contractors that any employee found fouling the site shall be removed from the Site immediately.

In this respect, the sub-contractor shall arrange for erecting temporary toilet and ablution facilities, these facilities being connected, on a temporary basis, but to approval, into the existing foul sewage system. Full details shall be agreed. These temporary ablutions are a specific requirement of the Employer and shall therefore be provided for this duration of the contract, all items being removed at the completion of the Works and the existing system fully reinstated to its original condition.

3.31 PROTECTION OF WORKS

The sub-contractor shall carefully protect from injury by weather all work and materials which may be affected thereby and allow in his prices for all dams, pumping, shoring, temporary drains, sumps etc, necessary for the purpose, and shall clear away and make good at his own cost to the satisfaction of the Engineer all damage caused thereby.

3.32 SUNDRIES

The necessary holding down bolts, supporting brackets and templates, guards and screens, locks, piping, conduits, lamps and other requisite sundries whether specified in detail or not shall be provided, under the contract and it shall be deemed that the sub-contractor's prices, rates and the like include for all

such items.

3.33 MAINTENANCE CONTRACT

The Employer will consider the introduction of long-term maintenance contracts with specialist manufacturers and sub-contractors. In this respect the sub-contractor shall submit, with his tender, details of a planned maintenance contract that will take effect after the completion of the six-month maintenance period previously specified.

3.34 DELETION OF ITEMS FROM CONTRACT

Where Provisional Sum items have been identified within the Bills of Quantities these may be expended in whole, in part or may be totally deleted from the sub-contract works. In addition, certain items that have been designed, specified and included within the Bills of Quantities may finally be deleted from the sub-contract, as the Employer has not finally decided whether they are to be provided. It shall be deemed that the tender price entered by the sub-contractor has taken into account the possible deletion of these items, and Provisional Sum items, as no claims for loss of profit or any other such claim will be entertained.

3.35 AMBIENT CONDITIONS

The following climatic conditions apply at the site of the contract works and plant, equipment, apparatus and installation shall be suitable for these conditions:

CLIMATIC CONDITIONS	KISII TOWN
Maximum out door dry bulb Temperature, t_o	29°C
Minimum Temperature	8°C
Relative Humidity	41% - 97%
Altitude	1962 M ASL
Longitude	35° 21' 32" E
Latitude	0° 44' 37" S
Max. solar radiation occurs during the month of February	

Extremely heavy rains fall during certain periods of the year and the contractor shall be deemed to have taken account of this fact both in his prices and his planning for the execution of the works.

3.36 SCHEDULES OF TECHNICAL DATA

Where included in the Tender Documents, Schedules of technical data shall be completed by all tenderers, otherwise the Tender may not receive full consideration, and will be liable to rejection.

3.37 COPIES OF ORDERS

Copies of all orders for major items of plant, equipment and materials placed with suppliers shall be provided in triplicate to the Engineer.

3.38 INSPECTION AND TESTS AT MANUFACTURER'S WORKS

The Engineer, and his duly authorised representative, shall have at all reasonable times access to the Contractor's premises to inspect and examine the materials and workmanship of the mechanical and

electrical plant and equipment during its manufacture there; and if part of the plant and equipment is being manufactured on other premises, the Contractor shall obtain for the Engineer and for his duly authorised representative permission to inspect as if the plant and equipment was manufactured on the Contractor's own premises. Such inspection, examination or testing, if made, shall not relieve the Contractor from any obligation under the Contract.

Where the plant and equipment are a composite unit of several individual pieces manufactured in different places, it shall be assembled and tested as one complete working unit, at the Maker's works, to the relevant British Standard where applicable.

PART 4:
GENERAL SPECIFICATIONS
KISII CANCER CENTRE, KISII COUNTY

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4.1 GENERAL SPECIFICATION FOR L.P. GAS INSTALLATIONS

4.1.1 GENERAL

The specification covers the storage and transmission of liquefied petroleum gas (L.P.G) which refers to butane, propane or a mixture of both stored in liquid form under pressure. When mixed with air at atmospheric pressure, the gas requires a concentration of 2% of the vapour for ignition to take place. The percentage fill in the storage vessel is about 85%.

4.1.2 REGULATIONS AND STANDARDS

Material, equipment, installations and workmanship shall comply with the requirements of the latest Editions of the following:

- Kenya Government By-laws;
- Relevant standards published by the Kenya Bureau of Standards;
- Relevant British Standards, Specifications & Codes of Practice; referred to as B.S.&B.S.C.P respectively in this document;
- Requirements of the clients proposed local L.P Gas Supplier;
- This specification and the contract drawings.

4.1.3 L.P.GAS BULK STORAGE TANKS

The L.P Gas bulk storage tank shall be of either vertical or horizontal cylindrical mild steel construction manufactured from rolled carbon steel plate, welded together in compliance with the requirements of KS 200:2002 and BS 5500 or ASME (American Society of mechanical Engineers) Codes. The tank shall be earthed to protect against accumulation of static electricity.

The storage tank shall have the following minimum pressure requirements: -

Test Pressure: 25 bars
Working pressure: 9 bars at 20°C

A test certificate shall be provided with the tank. It shall contain details such as the Standards to which the tank is manufactured, tests done, results of such tests, etc. To be stamped on the is the supplier, test pressure and the date of testing.

The tank shall be supplied complete with:

- Filing valve, take off connection with first stage regulator, Pressure relief valve, Pressure gauge and magnetic float gauge, all housed under a lockable-hinged cover, forming integral part of the tank.
- Drain plug.
- Main isolating Valve.
- Lifting lugs welded at both ends of the tank
- Mounting feet welded to the base of tank, which shall be used to anchor the tank to concrete;
- The tank shall be pickled and primed on the outside and painted with two coats of weather resistant paint.

The tanks are manufactured in various sizes but the following are the standard sizes used in commercial kitchen applications.

Tank capacity 0.5 Ton	1000mm diameter	2000mm long
Tank capacity 1.0 Ton	1000mm diameter	3000mm long
Tank capacity 2.0 Ton	1220mm diameter	4100mm long

Apart from the above minimum specification for the bulk L.P Gas storage tank, any additional requirements may be specified by the L.P. Gas supplier.

For vertical cylinders, they shall be fitted with a discharge isolation valve, pressure relief valve. Where there is a multiple cylinder bank installation, an automatic change-over valve with a regulator to reduce pressure to 37 mbar shall be incorporated.

Tank sizes are determined by the LPG dealers and they are available in various sizes. Each tank shall be identified with the following minimum information, permanently marked on the tank shell or imprinted on a stainless steel name plate affixed to the tank in a position normally accessible through the inspection chamber: -

- The name of the Vendor;
- The construction standard to which the tank is built;
- A reference number unique to the tank;
- The date of manufacture;
- The tank capacity

4.1.4 PIPEWORK

Pipes and gas manifolds for L.P. Gas installations shall be galvanized mild steel tubing to B.S. 1387: Class C with Pipe threads to B.S. 21, schedule 40 Black steel pipes with welded jointing or copper pipes to B.S 2871 with compression fittings to B.S 864. Only P.T.F.E tape or jointing compound specifically made for LPG shall be used. Use of hemp shall not be allowed. The L.P. Gas pipe work installation shall comply with the requirements of B.S.C.P. 331: Part 3.

Pipe fittings shall be either welded or seamless wrought steel pipe fittings to B.S. 1740: Class C. A union shall be provided on all straight runs of pipe work at a maximum interval of six meters.

Pipe work laid underground shall be wrapped with pipe wrapping material having vapour permeability of less than 0.11g/m²/d at 25° C and 75% relative humidity. The pipe wrapping material shall have high resistance to mineral acids, alkalis and salts and shall be on non-cracking and non-hardening characteristics.

Underground L.P. Gas distribution pipe work shall be laid to a slope of 1 in 200. Gas service pipes, from the gas distribution pipes to the parts of building they service, shall be laid to rise from the distribution pipe at a slope of 1 in 200. All pipes under the ground shall rest throughout their length on a 150mm deep, flue sand topping, followed by an approved backfilling.

Where the pipe passes through the building fabric, it shall be located within a pipe sleeve, one diameter larger than the pipe passing through it. The void between the pipe and the sleeve shall be packed with bitumen or approved equal material.

Horizontal and vertical pipes within the building shall be fixed off the walls with brass built brackets or spacer type steel pipe clips. The pipe supports spacing intervals for both the horizontal and vertical pipe runs shall be as follows:

Pipe nominal diameter (mm)	Support Spacing (m)
15	1.82
20 – 25	2.44
32 – 40	2.75
50	3
65	3.65

The pipe work underneath the tables worktops to which shall be connected the gas outlets shall be made from gas quality copper.

Pipework shall be bonded in accordance with I.E.E regulations.

4.1.5 GAS ISOLATION VALVES

The L.P. Gas isolation valves shall be quarter turn; lever operated ball valve of brass or stainless steel construction.

The valve shall have “open” and “closed” positions clearly marked on the valve body.

4.1.6 TANK SITING AND SAFETY

SITING

The position of the tank shall not be less than 7meters or 5metres away from adjacent buildings for aboveground and underground installations respectively. It shall be the responsibility of others to construct a concrete plinth to structural engineer’s specifications to support the tank. The tank should not be sited in a location known to be susceptible to flooding.

SAFETY

For above ground installations, a 1.8m high fence with lockable gates around the cylinders to protect them shall be provided. The fence shall be at least 1.5 m away from the tank. A crash barrier shall also be erected at 2 meters from the fence to stop any vehicles from the access road crashing into the facility.

Two approved NON-SMOKING OR NAKED LIGHTS notices in red background shall be fixed on the surrounding fence. They shall be of such a size that can be read from a distance of 20 meters.

A portable carbon dioxide fire extinguishers and shall comply with B.S. EN 3/BS 1449 and B.S. 1004. shall be mounted on the fence next to the entrance.

4.1.7 TESTING AND COMISSIONING

The whole pipe work system shall be pressure tested using compressed air. The test pressure shall be 7.0 bars. When this pressure is achieved, the pipework shall be uniformly coated with a soap solution. Particular attention should be paid to all connection points. Leaks shall be detected by the presence of bubbles. If bubbles are found around fittings, the fittings should be checked for tightness and repaired as necessary.

The pressure test on pipe work shall be made before any part of the pipe work is concealed in any manner.

The test pressure shall be maintained for a period of six hours. If the pressure drops during this period, leaks in the pipe work shall be made good and the pressure test repeated for a further six hours.

The bulk gas storage tank shall be pressure tested using compressed air and soap solution. Test pressure of 25 bars shall be applied and soap solution applied uniformly on the entire surface of the tank. If leaks are detected in seams or the shell, notify the tank Vendor. After completion of pressure tests and installation, the L.P. Gas installations shall be balanced to give the required gas flows at each gas user’s point.

PART 5:

PARTICULAR SPECIFICATIONS

KISII CANCER CENTRE, KISII COUNTY

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5 PARTICULAR SPECIFICATION FOR LPG INSTALLATIONS

5.1 General

This section specifies the particular requirements for LPG installations and materials forming part of the sub-contract works and shall apply except where specifically stated elsewhere in the specification or on the contract drawings.

5.2 Scope of Works

The contract works consist of the supply, delivery, erection, testing, commissioning and setting to work of the LPG installation works detailed in the specification and accompanying contract drawings. The sub-contractor shall include for all appurtenances and appliances not particularly called for in this specification or shown on the contract drawings but which are necessary for the completion and satisfactory functioning of the sub-contract works

No claims for extra payments shall be accepted from the contractor due to his failure to adhere to the above requirements. It is deemed that if in the opinion of the tenderer at the time of tendering there exists a difference between the specification and the contract drawings, that the tenderer has clarified these with the Project Manager /Engineer before tendering.

The works to be installed under this sub-contract shall comprise, but not restricted to the following:

1. Supply and installation of LPG system including the pipework, regulators and safety devices;
2. Electrical works associated with the installation.

5.3 Climatic Conditions

The following climatic conditions apply and all the materials and equipment used shall be suitable for these conditions:

CLIMATIC CONDITIONS	KISII TOWN
Maximum out door dry bulb Temperature, t _o	29°C
Minimum Temperature	8°C
Relative Humidity	41% - 97%
Altitude	1962 M ASL
Longitude	35° 21' 32" E
Latitude	0° 44' 37" S
Max. solar radiation occurs during the month of February	

5.4 PARTICULAR SPECIFICATION FOR LP GAS INSTALLATIONS

5.4.1 EXTENT OF INSTALLATION

The Contractor shall carry out all the necessary works for successful installation of the LPG Bulk Tank as described and set out in this section of the Particular Specification, Bills of Quantities and accompanying Drawings in accordance with the General Mechanical Specification herewith.

The Works, the major elements of which are scheduled below, includes the supply of all labour, material, equipment, plant and components necessary for complete installation and setting out work in respect of the entire mechanical services requirements within the proposed development and rendering it in complete working condition in respect of but not limited to the following installations:

New Installations: Supply, Installation, testing and commissioning of the following installations:

- LPG Bulk Tank;
- LPG pump;
- LPG Vaporiser;
- LPG isolation valves;
- LPG regulating valves;
- Solenoid Valves;
- All pipework and fittings to user points as per drawings.

In general, the installations shall be concealed in conduits except in areas where surface installation is necessary. In such cases, installation will be carried out in trunking, conduit or cable tray as indicated on the Drawings.

5.4.2 MATERIALS AND STANDARDS

LPG bulk storage tanks

The L.P Gas bulk storage tank shall be of horizontal cylindrical mild steel construction manufactured in compliance with the requirements of BS 5500 or ASME (American Society of mechanical Engineers) Codes suitable for underground installation.

The storage tank shall have all the seams Gamma-Ray filmed for approval and the following minimum pressure requirement to be achieved. An approval test certificate from a registered authority shall be supplied with the tank.

Test Pressure:	26 bars
Working pressure:	17.5 bars (250 psi.) at – 6.67°C to 343°C

The tank shall be supplied complete with the following: -

- (a) Marking plate giving:
- The name of manufacturer.....
 - The capacity of the tank.....

- The weight of the tank
 - Date of Manufacture.....
 - Design code.....
 - Serial No.....
 - Max. Working pressure.....
 - Test Pressure & Date of Testing
- (b) Filling valve, magnetic float gauge, multi valve and pressure regulator all housed under a lockable hinged cover forming an integral part of the tank.
- (c) Safety relief valve
- (d) Level Indicator;
- (e) Main isolating valve
- (f) Lifting lugs and mounting feet.
- (g) LPG pumps to gas supplier's specifications as Blackmer LPG pumps or approved equal;
- (h) By-pass / return line.

The tank shall be pickled and primed on the outside and painted with two coats of weather resistant paint. The tank shall be treated against corrosion by applying an 800-micron thick epoxy paint. Cathodic protection shall be used to further protect the tank against corrosion.

Care shall be taken when handling the tank to ensure that the epoxy protective painting is not damage. Should any damage occur, the repairs shall be carried out in accordance with the tank manufactures requirements.

Apart from the above minimum specification for the bulk L.P Gas storage tank, the tenderer shall ensure that he has allowed for in his pricing of the tank any additional requirements needed by L.P. Gas supplier.

Pipework and Fittings

The L.P. Gas pipe work installation shall comply with the requirements of B.S.C.P. 331: Part 3.

The underground pipework shall be polyethylene pipes and fitting, while the above ground shall be seamless schedule 40 black mild steel pipework. Where required, Copper tube to B.S. 2871 part 1, with copper alloy capillary and compression fittings to B.S. 864 for use with copper tube complying with B.S. 2871 shall be used.

Pipe fittings shall be either welded or seamless wrought steel pipe fittings to B.S. 1740: Class C and BS 143.

5.4.3 INSTALLATION_

General

Installation of all pipework, valves, fittings and equipment shall be carried out under adequate supervision from skilled staff to the relevant codes and standards as specified herein. The Sub-contractor shall be responsible to the Main Contractor for ensuring that all builders work associated with his piping installation is carried out in a satisfactory manner to the approval of the Engineer.

Regulations and standards

Material, equipment, installations and workmanship shall comply with the requirements of the latest Editions of the following:

- (a) Kenya Government By-laws;
- (b) Relevant standards published by the Kenya Bureau of Standards;
- (c) Relevant British Standards, Specifications & Codes of Practice; referred to as B.S. & B.S.C.P respectively in this document especially but not limited to:
 - CP 331 Part 3: - Low Pressure Installation pipes
 - B.S. 5482 Part 1 -1979: - Domestic Butane and Propane gas burning installations.
 - B.S. 3016: 1983 – Specification or pressure regulator and automatic change-over device for L.P.G. installations.
 - B.S. 3212: 1983 Flexible rubber tubing and hose for use in L.P.G. Installations.
- (d) Requirements of the clients proposed local L.P Gas Supplier for the sub-contract;
- (e) This specification and the sub-contract drawings.

LPG pipework

All the pipework joints shall be made using non hardening jointing compound suitable for L.P gas. A union shall be provided on all straight runs of pipe work at a maximum interval of six meters.

Pipe work laid underground shall be wrapped with pipe wrapping material having vapour permeability of less than 0.11g/m²/d at 250 C and 75% relative humidity. The pipe wrapping material shall have high resistance to mineral acids, alkalis and salts and shall be on non-cracking and non-hardening characteristics.

Underground L.P. Gas distribution pipe work shall be laid to a slope of 1 in 200. Gas service pipes, from the gas distribution pipes to the parts of building they service, shall be laid to rise from the distribution pipe at a slope of 1 in 200. All pipes under the ground shall rest throughout their length on a 150mm deep, flue sand topping protected by fire resistant sealant reinforced with glass fibre tissue, hessian cloth or other approved material, and follow by an approved backfilling.

Where the pipe passes through the building fabric, it shall be located within a galvanized steel pipe sleeve, one diameter larger than the pipe passing through it. The void between the pipe and the sleeve shall be packed with bitumen or approved equal material.

Horizontal and vertical pipes within the building shall be fixed off the walls with brass built in brackets or spacer type steel pipe clips. The pipe supports spacing intervals for both the horizontal and vertical pipe runs shall be as follows:

Pipe nominal diameter :	15mm	Interval :	1.82 metres
:	20 & 25mm	:	2.44 metres
:	32 & 40mm	:	2.75 metres
:	50mm	:	3.00 metres
:	65mm	:	3.65 metres

The pipe work underneath the tables worktops to which shall be connected the gas outlets shall be made from gas quality copper.

LPG Isolation valve

The L.P. Gas isolation valves shall be quarter turn; lever operated ball valve of stainless steel construction. The valve shall have “open” and “closed” positions clearly marked on the valve body.

The valves shall be as ‘Saunders’ or equal and approved.

LPG pressure regulating valves

L.P. Gas pressure regulating valves shall be type REGO, suitable for High Pressure and Low Pressure regulation with proper identification colour (Red – High Pressure & Blue - Low Pressure) and sized to match the volumetric flow required. The units shall be of robust aluminium die-cast construction with tough and sensitive diaphragm.

Units shall be installed to manufacturer’s instruction.

Gas Meter

L. P Gas meter as Metrix or equal and approved, with maximum working pressure of 0.5 bar. The meter to have fire proof rating up to 650°C according to EN1359.

Solenoid Valve

Solenoid operated gas safety shut-off valve as Teknigas or equal and approved. The electrical power supply shall be 230V AC 50Hz

5.4.4 TESTING AND INSPECTION_

Testing and Commissioning:

The whole pipe work system shall be pressure tested using compressed air. The test pressure shall be 7.0 bars, which shall be maintained for a period of six hours. If the pressure drops during this period, leaks in the pipe work shall be made good and the pressure test repeated for a further six hours.

The pipework pressure tests shall be carried out before any part of the pipework is concealed in any manner including covering by earth or builder’s work. All testing shall be as detailed in B.S. 5482 Part 1, 1979, Appendices B, C.

The bulk gas storage tank shall be pressure tested using water and compressed air. Test pressure of 25 bars shall be maintained for a period of six hours.

After completion of pressure tests and installation, the L.P. Gas installations shall be balanced to give the required gas flows at each gas user’s point.

**PART 7:
DATA SCHEDULES
KISII CANCER CENTRE, KISII COUNTY, KENYA**

PART 7A. EQUIPMENT AND MATERIALS INCLUDED IN THE TENDERED SUM.

LPG TANK

Manufacturer /supplier.....
Model details.....
Country of supply.....

LPG METER

Manufacturer /supplier.....
Model details.....
Country of supply.....

SOLENOID VALVE

Manufacturer /supplier.....
Model details.....
Country of supply.....

LPG PUMP

Manufacturer /supplier.....
Model details.....
Country of supply.....

LEAK DETECTOR

Manufacturer /supplier.....
Model details.....
Country of supply.....

Further Technical literature to be supplied by completing the attached Schedules for all equipment offers.

PART 7B SPECIAL TOOLS REQUIRED

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PART 7C SPARE PARTS LIST OFFERED

LPG

.....

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OTHERS.....

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PART 7D: SUB-CONTRACTORS TO BE USED

LPG INSTALLATION

.....

OTHERS

.....

PART 7E: EQUIPMENT DELIVERY SCHEDULE

LPG INSTALLATION

OTHER EQUIPMENT

PART 8:
SCHEDULE OF DRAWINGS
KISII CANCER CENTRE, KISII COUNTY, KENYA

PART 8. SCHEDULE OF DRAWINGS.

1. P/02 Ground Floor Plumbing Layout
2. P/04 First Floor Plumbing Layout
3. P/07 Second Floor Plumbing Layout
4. P/10 Third Floor Plumbing Layout
5. P/13 Fourth Floor Plumbing Layout

VOLUME III MECHANICAL PACKAGES MAIN SUMMARY

Item	Volume	Description	Amount (KSH)
1	Volume III A	Plumbing, Drainage, Fire Fighting Installation, and Steam Boiler Installation	
2	Volume III B	Air Conditioning and Mechanical Ventilation	
3	Volume III C	Medical Gas Installations	
4	Volume III D	LP Gas Installations	
5		Total Volume III carried forward to Volume I Grand Summary	