

**SECTION 1 GENERAL**

## SECTION 1 - GENERAL

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# **SUPPLEMENTARY SPECIFICATIONS SECTION 1 \_GENERAL**

## **1.1 APPLICATION OF SPECIFICATION**

The submission of a Tender will be taken as evidence that Tenderer is prepared to comply in all respects with this specification, excepting only departures covered by written sanction of the Engineer given at the time of acceptance.

## **1.2 EXAMINATION OF CONTRACT DOCUMENTS**

The Contractor is directed to examine the conditions of contract and specification and any cost incurred in their fulfillment is to be included in his tender.

Should the Contractor have any doubt as to the requirements of the contract he shall request to have such doubts fully explained in writing to him by the Engineer before making out his tender. Should any misunderstanding arise later as to the meaning of the requirements the decision of the Engineer as to the true intent and meaning shall be conclusive and binding on the Contractor.

## **1.3 DRAWINGS**

The Contractor will be assumed in submitting a Tender to have inspected the drawings and be aware of their contents. A list of Contract Drawings is included in Appendix A. Additional drawings may be issued from time to time in accordance with the Conditions of Contract.

## **1.4 PROGRAMME OF WORKS**

In accordance with Clause 14 of the Conditions of Contract the Contractor shall furnish and discuss with the Engineer a programme of all works contained in the documents at the earliest opportunity and within 14 days of receiving an order to commence work. No payment certificate will be passed until the programme has been agreed.

## **1.5 RECORDS**

The Contractor shall keep accurate records, plans and charts showing the dates and progress of all the main operations on the site, and these are to be made available for inspection by the Engineer if required.

## **1.6 INSPECTION OF WORKS**

No part of the work shall be filled in or covered over on any pretext whatsoever until the same has been inspected and approved and measured, if necessary, by the Engineer or his representative. The Contractor shall give notice to the Engineer or his representative when any part of the works is ready for inspection.

## **1.7 MEASUREMENT OF WORK**

The Contractor's and Engineer's representatives shall jointly measure up the work and materials and reach agreement before any account for payment is submitted to the employer.

Specified thickness of material and layers of material means the finished thickness after compaction or setting. All specified lengths or depths are measured nett. No allowance will be made for diminution, bulking cutting, or waste. In measuring excavations no account shall be taken of any slips.

The "Civil Engineering Standard Method of Measurement" (abbreviated as CESMM) published in 1976 by the Institution of Civil Engineers, London, has generally been used for the preparation of quantities shown in the Bill of Quantities. The rules for measuring the works shall be those stated in the CESMM any exceptions to the quantities, method of measurement, etc., shall be specifically stated where such deviation occurs.

## **1.8 SETTING OUT OF WORKS**

In explanation of parts of, but without limiting the Conditions of Contract, the Contractor shall before commencing the work check verify and satisfy himself as to the existing levels of the ground concerned as shown on the drawings and agree them with the Engineer.

The Contractor shall define the site of the works by marking the centre lines and/or the limits and extent of the works by means of wooden 50mm dia or steel pegs set in concrete blocks in the ground. For the purpose of levels the Contractor shall use the same Survey of Kenya and temporary bench marks as used by the Engineer in the preparation of the drawings and shall establish such additional temporary bench marks on site as the Engineer directs.

The Contractor shall be responsible for setting-out in accordance with Clause 17 of the Conditions of Contract and shall in addition provide all facilities, including labour, materials and equipment for the Engineer's Representative to check the setting-out.

Properly painted sight rails shall be erected at regular intervals and maintained during the progress of the works

Such sight rails shall be erected at all changes in gradient or direction of pipe lines and at such other positions as the Engineer's Representative' may' consider necessary.

Properly constructed boning rods shall be supplied used on conjunction with the sight rails.

## **1.9 PROVISION OF INSTRUMENTS AND LABOUR**

The Contractor shall provide at his own expense all instruments, materials, tools and other things which the Engineer considers necessary for his proper supervision of the works and shall maintain the same in good order. He shall also provide labour for attendance on the Engineer and his representative in carrying out operations connected with the supervision of the works.

## **1.10 TEMPORARY BUILDING, PLANT AND STORAGE AREAS**

The approval of the Engineer shall be obtained for the sitting of all sheds, plant, storage areas and sanitary conveniences. The Contractor shall remove these on completion

## **1.11 OFFICE ACCOMMODATION - ENGINEER'S REPRESENTATIVE**

Before commencing work the Contractor shall provide and erect an office for the sole use of the Engineer and his staff in such a position as the Engineer may direct. The office shall not be moved around the site, or from the site until the end of the maintenance period, without the written permission of the Engineer.

The office shall be thoroughly waterproofed, insulated and lined, have a floor area of at least 19 sqm be fitted with a lock and furnished with two chairs, two stools, two desks, planchest, cupboard with shelving and a lockable four drawer steel cabinet or safe.

Throughout the duration of the Contract the office shall be adequately heated, ventilated, lighted, cleaned and maintained.

Satisfactory washing and a water borne flushing toilet facilities in or adjoining the office shall be provided (together with drainage to a public sewer or septic tank) or chemical toilet or other approved means of sewage disposal. The Contractor shall arrange for the clearance of sewage from a septic tank or chemical toilet on a regular basis. Washing facilities with an adequate potable water supply to a hand basin shall be provided.

The Contractor shall equip the office with adequate lighting facilities.

#### **1.12 OFFICE FOR CONTRACTOR**

The Contractor shall have an office on or near the Works on a site to be approved by the Engineer and which shall be open and attended at all hours during which work is in progress.

Notwithstanding anything contained in Clause 68 (1) of the Conditions of Contract, any notice to be given to or served under the Contractor shall be deemed and taken to be effectively given or served by the delivery thereof at such office on the site.

#### **1.13 ADDITIONAL LAND**

The Contractor shall select and arrange at his own expense for any temporary occupation of land outside the site which he requires for the efficient prosecution of the works. The Contractor must comply fully with all By-laws and regulations currently in force in the employer's area

#### **1.14 PROTECTION OF WORK AND MATERIALS**

The Contractor shall provide and maintain all necessary sheds and stores for the housing of tools and materials to be used on the works.

The Contractor's attention is drawn to the risk of damage to structures due to temperature expansion and contraction, and he shall protect all bricks, aggregate, sand, and other materials, before embodiment in the permanent works, from the direct rays of the sun so that the temperature of the materials when build into the permanent work shall not be substantially higher than the temperature they will eventually assume under normal weather conditions.

The Contractor shall ascertain, before tendering from nominated suppliers and sub-contractors, the delivery dates for the various items of plant, equipment, and materials to be incorporated in the works and shall store such equipment in the dry until it is required. The Contractor shall take all necessary measures to prevent deterioration or rusting of the goods, including arrangement of deliveries to give a minimum storage time on- site.

The advice of manufacturers is to be sought as to the methods of storage and the Contractor is to allow for seeking and complying with this advice.

#### **1.15 NUISANCES (INCLUDING NOISE) AND DAMAGE TO PROPERTY**

The Contractor shall take all precautions to prevent any damage whatsoever to existing property and shall prevent any danger, nuisance, or inconvenience to the owners, tenants or occupiers of other properties and to the public generally

The Contractor will be responsible for any acts of trespass committed by his employees or sub-contractors and shall at his own expense make good to the satisfaction of the owners or occupiers concerned any damage to sewers, drains, mains, services, roads, paths or any other damage whatsoever caused by the execution of the works or by traffic brought thereon by the Contractor.

If any foul or offensive matter arises or flows into the excavations or trenches, the Contractor shall immediately remove it from the works and such precautions shall be taken during its removal as may be directed by the Engineer. The Contractor shall use every precaution to prevent the escape of sewage, gases or other obnoxious matters arising from the works during their progress or from any old sewers or drains with which they are in connection. All places in connection with the works from which offensive gases or nuisances of any kind are likely to arise shall be shut off, covered up, disinfected, or otherwise dealt with in such manner as may be directed by the Engineer, so as to prevent any nuisance arising therefrom.

Noise due to the works shall be kept to a minimum by muffling and silencing devices and the use of suitable plant and equipment.

Mechanical equipment may only be used between 7:00 am and 6:00 pm on Monday to Saturday unless the written consent of the Engineer to alternative times has first been obtained.

## **1.16 LIGHTING AND GUARDING OF OBSTRUCTIONS**

The details of the method of signing and guarding an obstruction to traffic caused in the course of the execution of the works shall be submitted to the engineer for approval before that portion of the works is commenced.

No greater area of the road than the Engineer considers' necessary shall be closed at any one time.

Temporary traffic signs shall comply with Clause 1.17.

Generally the following precautions will be required.

### **a) Signing:**

An advance warning at least 1.25m x 1m in size and 70 metres in advance of the obstruction will be required, and, where an appreciable change of direction is necessary at the obstruction a sign (of the arrow or chevron type) at the obstruction itself.

At particular danger points more comprehensive signing may be required.

### **b) Guarding:**

The obstructions shall be marked by posts carrying red flags or reflective red markers and by red lamps. The latter shall be spaced at 6 metre intervals in the direction of traffic flow and at 0.9 metre intervals across this direction. At least 3 lamps shall be placed across the direction of traffic flow. The flags and lamps on the traffic side of the obstruction shall be at least 15 metres from it.

### **c) Footpaths**

Where a footpath is affected by an obstruction in any way it shall be separated from both obstruction and traffic by effective banners and red lamps spaced at intervals.

## **1.17 TEMPORARY TRAFFIC SIGNS**

The Contractor shall erect and maintain on the works and at prescribed points on the approached to the works, all traffic signs necessary for the warning, direction and control of traffic and the size of all such signs and the lettering and wording thereon shall be approved by the Engineer before erection. The signs shall be reflectorised or adequately illuminated by night by approved means.

## **1.18 OPENING OF ADOPTED ROADS AND STREETS**

Before commencing any work within an adopted road or street, the Contractor shall obtain from the employer a Road Opening Permit. This must be obtained at least 28 days in advance of commencing any such works. The Contractor shall be responsible for ascertaining which roads and streets are adopted. The Contractor shall pay all inspection fees and charges and required by the employer and the rates shown for such work shall be deemed to have included for this. Fees and charges for final reinstatement shall not be paid by the Contractor.

## **1.19 CONTROL OF TRAFFIC**

In the event of single way traffic becoming necessary on any particular length of the works, or on the approaches to the works, the Contractor shall, in maintaining through routes, provide a width of at least 3m for single way traffic. He shall also provide approved electrically operated signals for traffic control on each of the affected lengths and any additional traffic signs as may be directed in accordance with Clause 1.17. The electric signal lights are to be hand operated by a competent operator provided by the Contractor, if and when required by the Engineer. Manually operated "stop - Go" signs will only be permitted if approved by the Engineer, and shall be of the size, colour and type authorized.

## **1.20 TEMPORARY DIVERSION OF TRAFFIC**

Temporary diversion ways, including those listed in the schedule to the Bill of Quantities shall be constructed wherever the site is intersected by existing public and private roads, footpaths, cycle tracks, farm accesses, temporary accesses and accommodation roads.

Any diversion way shall be of such a standard of construction that it is suitable in all respect for the class or classes of traffic requiring to use it. It shall be constructed in advance of the taking up/the existing way/of and regularly maintained for so long as required in a satisfactory condition all to the approval of the Engineer.

## **1.21 SERVICES**

Before commencing works the Contractor shall at his own expense ascertain in writing from the Post Office, Kenya Power and Lighting Co. Ltd., Water and Sewerage Department and all other public bodies, companies and person who may be affected, the position pipes, or other appurtenances. He shall thereupon search for and locate such services.

The Contractor shall at his own expense arrange to have effectually propped, protected, underpinned, altered, diverted, restored and made good as may be necessary, all after courses, pipes, cables or ducts, poles or wires or their appurtenances disturbed or damaged during the progress of the works, or in consequence thereof.

Except that such services as require to be removed or altered by virtue of the layout of the permanent work and' not the manner in which the work is carried out, shall be so removed or altered at the direction and at the expense of the employer.

The Contractor shall be liable for the cost of repairs to any services damaged as a result of carrying out the works and shall further be liable for any damage which may be shown during the period of maintenance, to have arisen through the execution of these works.

## **1.22 PRIVATELY OWNED SERVICES**

If any privately owned service passing through the site will be affected by the works, the Contractor shall provide a satisfactory alternative service in full working order to the satisfaction of the owner of the services and the Engineer, before the cutting off the existing service.

## **1.23 USE OF HEAVY PLANT**

In the event of the Contractor desiring to use heavy machinery or plant, he shall first satisfy the Engineer that they will be of such size and used in such a manner as not to cause any disturbance or damage in particular to water, electricity, Post Office or other mains, cables and connections or to sewers culverts, etc., or interfere with the line or position of any overhead wires and cables and connections or to sewers culverts, etc. or interfere with the line or position of any overhead wires and cables of any sort, telegraph poles, power poles, etc.

The Contractor will be held liable for any such damage or disturbance and shall pay the full costs or any rein-statement, relaying, repairing or refaxing as may be required, as agreed between the Engineer and the owner affected.

## **1.24 PROTECTION OF EXISTING HIGHWAYS**

The use of tracked vehicles on existing highways will not be permitted unless the Contractor provides adequate protection to the road surfaces by means of sleepers or other approved methods.

Damage caused to existing highway by the Contractor's negligence will be repaired at his expense.

## **1.25 CLEANING ACCESS ROADS AND HIGHWAYS**

The Contractor shall maintain his temporary access roads in a clean condition and shall remove to the satisfaction of the Engineer, any mud or other debris which may be deposited on any highway in the area by his vehicles.

## **1.26 WORK IN PRIVATE LANDS**

The employer will serve the necessary notices to permit work in private lands in accordance with the Contractor's programme.

The Contractor shall not enter onto these lands until given permission in writing by the Engineer. The Contractor shall also consult with owners and tenants (if any) before entering on their land or cutting through any ditch, bank, hedge, wall, fence or any other form of boundary marking and he shall ascertain and carry out their reasonable requirements as approved by the Engineer in the matter of reinstatement.

Work within, and reinstatement of, private lands, shall be completed in such time and manner as to cause the least amount of inconvenience to owners and occupiers to the satisfaction of the Engineer.

The Contractor will be required to produce a signed "Certificate of Satisfaction" from the owners and/or occupiers of property affected to certify that reinstatement has been completed to their satisfaction.

## **1.27 TIPPING**

The Contractor shall provide his own tip and pay all necessary charges for tipping, leveling and other works in connection with tip unless specified to the contrary in the supplementary specification. These charges shall be deemed to be covered by the rates inserted for the excavation items in the Bills of Quantities.



### **1.28 SURVEY BEACONS**

During the progress of the works, the Contractor shall not remove, damage, alter or destroy in any way whatsoever, any plot or survey beacons. He shall notify the Engineer of the need to interfere with any beacon. The Engineer shall be responsible for any removal and reinstatement that he considers necessary. Should any beacon be found to be above or below the level of the finished work, the Contractor shall immediately report the same to the Engineer.

Should any beacon be damaged or destroyed, the Contractor shall forthwith report the damage to the Engineer and the Director of surveys and shall be held liable for the cost of reinstatement thereof.

### **1.29 TRIAL HOLES**

The Contractor shall excavate refill and restore in advance on his sewer and pumping main laying programme all such trial holes as may be requisite for the location of water mains cables, irrigation culverts etc. whether in public or private roads, verges, or private property.

### **1.30 WATER SUPPLY**

The Contractor shall provide and allow in his rates for all cost involved in maintaining an adequate supply of water for purposes of the work from a source approved by the Engineer,

### **1.31 MAINTAINING FLOW**

Items are provided in the Bill of Quantities for maintaining the foul sewage or surface water flow in conduits during the construction of the works. The Contractor shall be deemed to have included in these items for everything he may require for this purpose, whether by arranging the order in which the work is performed or by the use of temporary piping, conduits, by pumping or any other method. In no circumstances will the Contractor be allowed to direct the flow from a foul sewer into any surface water drainage system or any open watercourse.

### **1.32 WORKS TO BE KEPT FREE FROM WATER**

The works shall be kept free from water, from whatsoever source it may come at all times. The method of disposal of the water shall be agreed with the Engineer. The Contractor is to allow in his rates for all pumping and temporary drains and shall pay due regard to and be responsible for the stability of existing structures, mains and services, and for the keeping clean of all ditches and drains affected by the works.

### **1.33 WORKS TO BE WATERTIGHT**

All works which are intended to hold or exclude water shall be tested by the Contractor and proved watertight on completion to the satisfaction of the Engineer. The nature of the appropriate tests shall be determined by the Engineer in accordance with the requirements of each specific case. The Contractor shall allow in his rates for these tests and other tests which will be required during the progress of the works.

### **1.34 STANDARDS**

All materials and workmanship shall comply with the requirements of the appropriate Standards or Codes of Practice of the British Standards Institution, or equivalent Kenyan Standard of the Kenta Bureau of Standards and if none is applicable, with the standards of best practice. Should the Contractor wish to supply material or execute work to an alternative National or International

Standard Specification he shall give full details of his proposals in writing to the Engineer, together with authenticated English translations of such proposed Specifications^ in duplicate.

Where a specification issued by the British Standards institution is current at the date of the tender and is appropriate, all plant and materials required in connection with the works shall be in accordance with the specification or other international specification or other international specification of equal standing unless the contract shall otherwise provide. The Contractor shall produce a copy of the relevant British Standards at site for reference within 24 hours of being requested so to do by the Engineer.

### **1.35 ORIGIN OF MATERIALS**

All materials used in or upon the works shall as far as practicable be of Kenya origin and shall be to the satisfaction of the Engineer and his authorized representatives.

### **1.36 ORDERING MATERIALS**

Unless directed otherwise, the Contractor is not to order materials from the Bills of Quantities, but must calculate his own estimates based on the working drawings and measurements made on site.

On placing an order with a nominated sub-contractor approved in accordance with Clause 59 of the conditions of contract, the Contractor shall supply copies of such order to the Engineer in duplicate, and any variation of such order that may subsequently be found necessary shall be immediately communicated to the Engineer.

The employer shall not pay any money to the main Contractor for materials or permanent plant and equipment supplied by nominated Sub-contractors until proof of payment for such plant, equipment or materials is supplied.

### **1.37 DELIVERY OF MATERIALS**

All material shall be delivered and deposited on the works when and where required by the Contractor who must include in his prices for the cost of all carriage haul-age, loading, unloading, handling, storage and protection necessary.

### **1.38 SAMPLING AND TESTING MATERIALS**

#### a) Sampling and Testing

In explanation of parts of, but without limiting the conditions of contract.

#### b) Approval of Materials

No material shall be used on or upon the works without the prior approval of the Engineer or his representative and all materials used shall be equal in every way to the approved samples.

#### c) Samples

As soon as possible after the contract has been awarded, or at the time of tender if specifically stated in the supplementary specification, the contractor shall submit to the Engineer a list of suppliers from whom he proposes to purchase the materials necessary for the execution of the works.

Further information regarding the suppliers may be submitted at different times, as may be convenient, but no source of supply shall be changed without the authority of the Engineer.

The Contractor shall provide and deliver to the Engineer's office properly representative samples of such materials and in such quantities and at such times as the Engineer may decide. Subsequent to the Engineer's approval of the use of any material, further samples from the bulk of materials delivered to the site may be required by the Engineer and in the event of these samples failing to come up to the standard of the approved sample, the whole of the consignment from which the further sample was taken shall be removed from the site by the Contractor at his own expense.

d) Selection of Samples

The Contractor shall also provide facilities and labour, if necessary, to enable the Engineer or his representative to select and transport to the Engineer's office, if required, at any time, samples of any materials in use in or to be used on the works.

e) Testing of Specimens

The Contractor shall normally carry out regular tests for quality control of concrete for himself as specified under Clause 4.11 (a) but the Contractor shall provide all apparatus, to be approved by the Engineer, for the preparation of test specimens of concrete, for the carrying out of compaction factor tests on concrete and such other tests on other materials as the Engineer may require. The Contractor shall provide all facilities and labour required by the Engineer to assist him or his representatives to carry out the preparation of specimens or the execution of such tests, at any time at which the Engineer or his representatives may desire.

All tests on materials shall be carried out entirely at the Contractor's expense and it shall be the Contractor's responsibility to ascertain which materials and articles are required for testing and to ensure that they are submitted sufficiently far in advance as to avoid delay in the work.

Should the Contractor fail to provide any of the equipment and apparatus required under the terms of this clause or under the terms of any other clause in this specification, the employer may purchase such equipment and apparatus, and recover any costs incurred by deduction from any monies due to the Contractor for work done. Such equipment will remain the property of the Contractor.

All samples for testing shall be selected by the Engineer or his representative and no materials shall be used in the works unless such samples have been approved after such tests as the Engineer may require.

f) Notice of Testing

When so directed by the Engineer materials shall be tested at their place of manufacture and in such case the Contractor shall give the Engineer at least seven days' notice in writing of the date when the material will be ready for testing so that he or his representative may be enabled to attend for the purpose of selecting the samples and supervising the tests. All materials, apparatus, and instruments necessary for the proper carrying out of such tests shall be provided by the Contractor.

g) Testing of Soil

During the progress of earthworks the Contractor shall provide facilities for, and all assistance required by the Engineer, in carrying out tests, taking samples of the soil and packing these into containers. When required the Contractor shall then send them to an approved laboratory for testing.

h) Cube and Core Testing of Concrete

150mm cubes shall be made, cured and tested all in accordance with British Standard 1881: Methods of testing concrete. When required the cubes shall be sent to a testing laboratory approved by the Engineer. All cubes made in compliance with this clause shall be cast in the presence of the Engineer's Representative and their reference numbers shall be submitted to the Engineer in a weekly report.

The Engineer may order cores to be cut, in which case they shall be drilled and tested in accordance with British Standard 1881: Methods of testing concrete.

**1.39 REJECTED MATERIALS OR UNSATISFACTORY WORKMANSHIP**

All rejected materials shall be removed from the site within 24 hours. Any work which is considered unsatisfactory or defective shall be both removed and re-execution of this work commenced within 7 days: such work to be at the expense of the Contractor.

**1.40 WORKMANSHIP**

Workmanship throughout is to be the best of the respective trade or class, and if in the opinion of the Engineer any Foreman or Workman employed by the Contractor be found incompetent the Engineer shall be at liberty to order him to be removed from the site forthwith.

Where appropriate British Standard Specification or British Standard Codes of Practice lay down standards of workmanship, these are to be recognized as the minimum standards of workmanship on the site

**1.41 WORKING SPACE**

Separate items have not been provided for the excavation for and backfill of working space and the Contractor must allow for this in his rates for appropriate items included in the Bills of Quantities.

**1.42 TEMPORARY WORKS**

The Contractor shall provide, maintain and remove on completion of the works all temporary works including roadways, sleeper tracks and stagings, etc., overload, footpaths, streams or suitable in every respect to carry all plant required for the work or for providing access or for any other purpose.

**1.43 PRESERVATION OF TREES**

No tree shall be cut without prior written permission of the Engineer.

If trees are removed or damaged by the Contractor or his employees without approval, then the Contractor shall replace such trees. Replacement of trees shall be not less than two years of age, obtained from a reputable nursery and of a species approved by the Engineer. The Contractor shall plant, water and ensure that the replacement trees are properly established.

**1.44 BUILDING REGULATIONS**

All buildings erected by the Contractor upon the site and camp site or sites and layout of the buildings shall comply with the Laws of Kenya and all local by-laws in so far as they are applicable.

#### **1.45 PROGRESS PHOTOGRAPHS**

Photographs showing the progress of the works shall be taken by a competent photographer from time to time as directed by the Engineer. The photographs shall be of size 120mm x 90mm and shall be inscribed with the date when taken and a brief description or title. All negatives shall be numbered and on completion of the works shall become the property of the employer.

#### **1.46 SIGNBOARDS**

Signboards shall be constructed of durable materials, and to a substantial design approved by the Engineer, and erected firmly on a concrete foundation,

#### **ADDENDUM TO SPECIFICATION**

### **SUPPLEMENTARY SPECIFICATION**

#### **EXTENT OF CONTRACT AND ALTERNATION OF DESIGN**

1. The works specified under this contract shall include all general work preparatory to execution of all matters, things, requisites and work of any kind necessary for the due and satisfactory construction, completion and maintenance of the work to the intent and meaning of the drawings and this specification, and further drawings and orders, that may be issued by the Engineer from time to time, compliance by the Contractor with all the General Conditions of Contract, whether specifically mentioned or not in the clause of this specification, all materials, apparatus, plant, machinery, tools, fuel, water, timbering and tackle of every description; transport, offices, stores, workshops, staff, labour, the provision of proper and sufficient protective works, temporary fencing, lighting and watching required for the safety of the public and protection of the works and adjoining lands; first aid equipment, sanitary, accommodation for the staff and workmen; the effecting and maintenance of all insurances, the payment of all wages, salaries, fees, royalties, duties or other charges arising out of the execution of the works and the regular clearance of rubbish, re-instatement and clearing and leaving perfect on completion. The Contractor will be deemed to have included in his rates the cost of complying with the requirements of this specification and General Conditions of the Contract unless otherwise specified.
2. Should the Contractor have comments regarding soundness of the design of any part of the work, or should he consider that the execution of the design is impossible on any part of the Contract, the Contractor is required to notify the Engineer in writing at the time of the tender and provide factual evidence substantiating his opinion when required to do so by the Engineer.
3. Notices given by the Contractor in respect of the above after the tender is submitted will not be considered as the basis of a claim for additional cost or extensions of the time.
4. The Engineer may require to alter the design of any part of the structure should site conditions warrant such a change, and the rates entered in the Bill of Quantities should be applicable for the similar items. The rates for the items of the work not covered by the Bill of Quantities shall be established by the Engineer.

## **PROGRAMME FOR EXECUTION OF THE WORKS**

Clauses 1.4 and 1.34 shall be deleted and the following substituted.

1. In accordance with the terms of clause 14 of the General Conditions of the Contract the Contractor shall submit to the Engineer within 28 days from the order to commence a fully detailed programme showing the order, procedure and method by which he proposes to carry out the construction and completion of the works.
2. The information to be supplied to the Engineer shall include drawings showing the general arrangement of the temporary offices and any other temporary structures, which the Contractor proposes to use together with details of the construction plant and temporary works and all other devices, which he proposes to adopt for the construction and completion of the whole of the works, and in addition details of the labour strength, skilled and unskilled, and supervision arrangements.
3. The order in which it is proposed to execute the permanent works is subject to adjustment and approval by the Engineer and the Contract Price shall be held to include for any reasonable and necessary adjustment required by the Engineer during the course of the Works.
  1. The Contractor will be deemed to have considered the effect of seasonal weather variations, when programming his operations. It must be clearly understood, that rains of upto 75mm per day will be deemed to be normal and expected. No claims by the Contractor for extension of time due to rains of floods less than 75mm per day as measured by the Meteorological Department will be considered by the. Engineer.
  2. The Contractor, when preparing his programme has to consider the time for the delivery of any imported material and the Engineer's normal working hours.
  3. The Engineer's normal working hours shall be defined as 8 a.m. to 5 p.m. on weekdays with Saturdays and Sundays set aside for rest. If the Contractor wishes to execute permanent works outside these hours, he shall obtain the written permission of the Engineer to make provision for supervision of such works.
  4. The Contractor shall carry out the Contract in accordance with the Programme agreed with the Engineer, but he shall in no manner be relieved by the Engineer's approval of the programme of his obligations to complete the works by the prescribed completion date, and he shall from time to time review his progress and make such amendments to his rate of execution of the works as may be necessary to fulfill his obligations.
  5. If in the opinion of the Engineer the plant or the equipment used by the Contractor for any specific item of the work does not fulfill the requirements of the specifications in respect of the workmanship quality and safety of structures, such items of plant and equipment shall be replaced with similar or equivalent items of plant or equipment to the satisfaction of the Engineer. No extra payment will be made in respect of such replacements.

## **TEMPORARY WORKS**

Clause 1.43 shall be deleted and shall be substituted with the following.

1. After the Contract is placed and before the work commences the Contractor shall submit to the Engineer drawings showing the general arrangements of his offices, quarters, workshops etc. and other temporary works with diagrams and descriptions showing how he proposes to execute such temporary works and how they fit into his programme for the permanent works, all to be subject to adjustment and approval by the Engineer.
2. The Contractor shall be fully responsible for the sufficiency, stability and safety of all temporary works and their care in accordance with the Conditions of Contract.
3. The Contractor shall at his own expense, supply in advance to the Engineer for his approval, detailed drawings and calculations of stability of such temporary works as the Engineer may direct, but no approval given or implied by the Engineer shall relieve the Contractor of his responsibilities in connection with the temporary works.
4. Unless otherwise instructed, upon completion of the Contract and after receiving approval in writing from the Engineer, the Contractor shall take down and remove all structures forming part of his own camp and that of the Engineer, and shall arrange for the disconnection of water supply, remove all drains and culverts, backfill trenches, fill in all latrine pits, soakways and other sewage disposal excavations, with the exception of items and services to revert to the ownership of the Employer, and shall restore the site as far as practicable to its original condition and leave it neat and tidy to the satisfaction of the Engineer.

## **SITE PERSONNEL**

1. The Engineer will require the Contractor to submit a list of professional and sub-professional personnel to be employed on the site stating their qualifications and experience.
2. The Contractor shall be responsible for ensuring, that all personnel of Non-Kenyan origin employed on site by himself or his Subcontractors or who are otherwise connected with the construction contract through the Contractor are approved and cleared individually in writing by the appropriate Government Official to work on the project. Where personnel are not approved, the Contractor shall be responsible at his own expense for obtaining and employing suitable and approved personnel.
3. The Engineer reserves the right to determine suitability of the persons employed by the Contractor and may request replacement at any time of any member of the team employed by the Contractor, if in the opinion of the Engineer the presence of such a person is deleterious to the execution of the contract. The Engineer's decision is final and binding.
4. The Contractor shall keep constantly literate English speaking Agent or Engineer as his representative on the site, competent and experienced in the type of works involved, who shall give his whole time to the supervision of the Contractor's operations.

5. The name of such Agent or Representative shall be submitted in writing to the Engineer for approval and he shall receive on behalf of the Contractor all directions and instructions from the Engineer or his representative and such directions and instructions shall be deemed to have been given to the Contractor in accordance with the conditions of contract.

### **NOTICE OF OPERATIONS**

1. No important operations shall be carried out without the consent of the Engineer in writing, or without full and complete notice also in writing, being given to the Engineer by the Contractor sufficiently in advance of the time of the operation as to enable the Engineer to make such arrangements as he may deem necessary for its inspection.
2. The Contractor shall supply, from time to time, to the Engineer in writing, full information with respect of locations in which the work is being prepared.
3. The Contractor shall give the Engineer not less than 24 hours' notice of his intention to set out or give levels for any part of the works, in order that arrangements may be made for checking. Any benchmarks, setting out pegs or other line or level markings installed or made by the Engineer shall be carefully preserved by the Contractor. Working shall be suspended for such times as may be necessary for checking the lines and levels on any part of the work.

### **SETTING OUT OF WORKS**

Clause 1.8 of the specifications will be deleted and the following substituted.

1. It will be the responsibility of the Contractor to obtain before commencing work the value and location of the benchmarks to be used for the works from the Engineer. All temporary benchmarks will be referred hereto. The Contractor shall construct such temporary benchmarks as the Engineer may direct and agree the level thereof with the Engineer. The establishment of such temporary benchmarks will be deemed to be part of the Contractor's responsibility in setting out the works and no additional payment will be allowed.
2. Should the Contractor discover any error in the alignment or levels of the basic setting out, he shall at once notify the Engineer, who will then issue amended drawings or instructions regarding the correction of the error.
3. The Contractor shall establish temporary benchmarks at less than 500m intervals and shall provide the Engineer with a schedule of their levels and locations.
4. The Contractor shall allow in the Bill of Quantities complying with the provisions of this clause and any abortive setting out occasioned by errors in the alignment or levels of the Contractor's basic setting out.

### **INFORMATION FROM BORINGS AND PITS**

1. When certain exploratory borings have been made by the Engineer on the site of the works and the results obtained are shown on the drawings, the Contractor is warned, that this information is given without guarantee of correctness, and any conclusion which the Contractor may draw from such information are entirely his own responsibility.



2. The Contractor will satisfy himself by his own investigation and experience as to the strata and ground conditions actually occurring. He shall allow for such investigation in his rates and prices and arrange his method of working to take account of such strata and any natural or artificial variations which may occur. In this connection the Contractor's attention is drawn to his obligations with regard to the inspection and examination of the site as detailed in clause 11 of the conditions of contract.
3. The Engineer reserves the right to adjust foundation levels and other levels for construction below ground level, in the light of information, that become available as general excavation proceeds upon the site.

#### **HEALTH, SAFETY AND ACCIDENT**

1. The Contractor shall ensure, so far as is reasonable practicable, and to the satisfaction of the Engineer, the health, safety and welfare at work of his employees including those of his Sub-contractors and of all other persons on the site.
2. From the time any portion of the works is commenced, until the end of the maintenance period, the Contractor shall be responsible for protecting the public from anything dangerous to persons or property and for the safe and easy passage of pedestrians and vehicular traffic.
3. The Contractor shall designate one of his senior staff, who shall have specific knowledge of safety regulations and experience of safety precautions on similar works and who shall advise on all matters affecting the safety of workmen and on measures to be taken to promote safety in compliance with the factories act cap. 514, as a safety officer.
4. The Contractor shall provide protective clothing and equipment, first aid stations with such personnel and equipment as are necessary. The appropriate information, instructions, training and supervision will be arranged by the Contractor to ensure the safety and health of all the persons employed on the works, all in accordance with the laws of Kenya.
5. The Contractor shall provide adequate waterborne sanitation and refuse collection and disposal complying with the laws of Kenya and all local by-laws, and to the satisfaction of the Engineer, for all houses, offices, workshops erected on site. Construction of pit latrines will not be permitted unless the Engineer has given his approval in writing.
6. During the period of execution of the works the Contractor shall ensure that no pollution of existing water courses or of reservoir catchment areas is allowed to take place as a result of his operation.

#### **COMPLIANCE WITH STATUTES AND REGULATIONS**

1. In addition to the requirements of clause 26 of the General Conditions of Contract, the Contractor shall be responsible for acquainting himself with all current valid statute ordinance or bye-laws or building regulations, which may affect the Works and shall include in his rates for all costs arising from compliance with the same. This applies in particular to the training levy and similar taxes for which no claims on the part of the Contractor will be entertained.
2. The Contractor shall also keep in close touch with Police and other Government Officials of the area regarding their requirements in the control of traffic or other matters, and shall provide all assistance or facilities, which may be required by such officials in the execution of their duties.

3. The Contractor's attention is drawn to legal notice No. 237 of October, 1971, which requires payment of VAT his tender must include for all costs arising or resulting thereof. The original receipt shall be given to the Engineer for verification.

### **PROTECTION FROM WATER**

Clauses 1.31 and 1.32 shall be deleted and the following substituted.

1. Except as otherwise specified, the Contractor shall be responsible for dealing with water, whether from existing drainage systems, water courses, underground springs, precipitation or any other source or cause. In discharging and diverting water he shall avoid flooding or damaging other works or services, causing erosion and/or polluting water courses.
2. The Contractor shall keep the whole of the works free from water and shall provide all dams, cofferdams, pumping, piling, shoring, temporary drains, sumps, etc. necessary for this purpose.
3. Well in advance of commencing the permanent works, the Contractor shall at his own expense cut drains and ditches and carry out any other measures necessary to effectively drain the original ground and/or shall so programme his works, that the necessity of temporarily draining the original ground is partially or totally obviated by working in the dry season.
4. Any damage to the works or to adjacent properties resulting from the Contractor's failure to take the necessary precautions shall be made good at the Contractor's expense.

### **WATER SUPPLY**

Clause 1.30 of the specification shall be deleted entirely and the following substituted.

1. The Contractor shall provide clean and sufficient supply of fresh water both for construction of the works and for all offices and workshops etc., including the arrangements, pipelines, meters etc. for connecting to local water mains, the provision of storage tanks or water conveyance where necessary, ' payment of all fees and water charges.
2. The water shall be reasonably clear of suspended solids and free from any matter in quantities considered by the Engineer to be deleterious to the proposed work. Water supplied to the Engineer's offices, laboratories etc., shall be drinkable to the satisfaction of the Medical Officer in the area. No separate payment shall be made for the provision of water or its attendant facilities and the Contractor shall allow for all these in his tender rates.
3. In the event that a water main is not available on or near the site, or that any available mains will not have sufficient capacity to provide water adequate for the works, then the Contractor shall provide temporary or other means of collecting, storing and distributing water on the site.

### **LIGHT, POWER AND TELEPHONE**

1. The Contractor shall make his own arrangements for the supply of light, power and telephone required for the construction of the works and shall pay all fees and charges in connection therewith.

2. The Contractor shall arrange with the appropriate authority for a temporary meter and supply of electricity and provide all temporary wiring, power and lighting points as he may consider necessary, In the event of no fixed electricity supply being available, the Contractor shall provide the necessary power generating plant at his own expense.

#### **WORKING AREA**

1. The Contractor shall restrict his operation to those areas made available to him by the Engineer and shall at all times provide and maintain an adequate access for the Employer's employees and vehicles to carry out their normal duties in and around the existing works.
2. The Contractor shall, before entering upon any land purchased, rented, or for the use of which compensation has been paid, ensure that all formalities have been completed and the agreement of the Owner, Tenant and the Engineer has been obtained.
3. The Contractor shall not enter or occupy land outside the lands provided above without the written permission of the owner or competent authority. The Contractor shall make all necessary arrangements and- bear all costs involved in acquiring any additional land needed for his operations.

#### **CO-ORDINATION OF THE WORKS**

1. The Employer reserves the right to execute works on the site which are not included in this contract. He will employ for this purpose either his own employees or another contractor. The Contractor shall ensure that neither his own operations nor trespass by his employees will interfere with the operations of the Employer or his contractor on site work.
2. The contractor will be required to carefully coordinate his activities and work, both on and off site, with the activities and work of the other contractors, sub-contractors, statutory undertakings and all supervisory staff for the works appointed by the Employer. He shall allow all the works to proceed without undue hindrance and will co-operate to expedite execution of the works.
3. If any dispute or difference of any kind whatsoever shall arise between the Contractor or statutory undertakings regarding the phasing, progress or execution of the works, then the Engineer shall have full power to direct in what order the works, or any portion thereof shall be commenced, carried on or completed and he may from time to time require the whole or any portion of the works to be discontinued or the execution thereof postponed for such a period as he may think fit.
4. The Contractor shall respect any works executed by others and articles supplied or installed by others and will be held responsible for any loss or damage thereto, if caused by him or his sub-contractors.

#### **COPIES OF ORDERS AND TEST CERTIFICATES OF MATERIALS**

1. Before entering into any sub-contract for the supply of any material or article the Contractor shall obtain the Engineer's approval in writing of the subcontractor from whom he proposes to obtain such materials or goods. Should the Engineer at any time be dissatisfied with such materials or goods or with the method of operations carried out at such subcontractor's works or place of

business, he shall be empowered to cancel his previous given approval of such sub-contract and shall specify any other supplier, whom he may choose, or shall approve another sub-contractor for the supply of such materials or goods. The Contractor shall then obtain such said materials or goods from such other supplier and shall bear any additional cost thereof, together with the costs and consequences of replacing any unsatisfactory materials already incorporated in the works.

2. The Contractor shall deposit with the Engineer samples of such materials and manufactured articles including the manufacturer's specification, when and where appropriate.
3. When the Contractor instructed by the Engineer shall submit test-certificates from the suppliers of the materials and goods to be used for the contract to the Engineer. Such Certificates shall certify that the materials or goods concerned have been tested in accordance with the requirements of the specifications and shall give the results of all tests carried out. The Contractor shall provide adequate means of identifying the materials and goods delivered to the site with the corresponding certificates.
4. The Contractor shall provide the Engineer with copies of all orders for the supply of materials and goods required in connection with the works as the Engineer may require.
5. All materials and manufactured articles shall be stored on site in a manner acceptable to the Engineer. The Contractor shall carefully protect from weather and vermin all work, materials and manufactured articles, which may be affected.

#### **PROGRESS PHOTOGRAPHS AND RECORD DRAWINGS**

1. Colour negatives showing the progress of the works shall be taken every month by the Contractor from positions to be selected by the Engineer. The Contractor shall supply proof prints of each negative, from which the Engineer shall select negatives. The Contractor shall produce 2 sets of those selected photographs. Each set shall comprise of 2 numbers, 200 x 150mm colour prints, which shall be handed over to the Engineer together with digital copies saved on CD. Each photograph shall be marked with the number of the negatives and a statement shall be submitted giving the location and date when taken and a brief description or title.
2. The photographs shall be mounted on A4 loose leaf sheets, minimum 200g, with transparent plastic sheets.
3. After the work has been completed, the Contractor shall furnish 'as built' drawings, showing the works as constructed together with all other information that may either be required or be useful for the operation and maintenance of the works in the future, such as alignment and depth of cover of pipelines, type of soil, rock levels, type, dimensions and locations structures, size of pipelines and cables encountered during excavation.
4. All drawings shall be A1 in size to the ink border

## **SURVEY EQUIPMENT FOR THE ENGINEER**

Clause 1.9 of the specifications in volume II shall be deleted and shall be substituted with the following.

1. The Contractor will make available the following survey equipment for use by the Engineer and the Contractor for the duration of the contract. The survey equipment will be provided in proper adjustment and good working order.
  - 1 No. TOPCON ES105 theodolite or approved equivalent with tripod
  - 1 No. 50m metric steel tape
  - 1 No. 30m metric linen or plastic tape
  - 1 No. 3m metric steel tape
  - 5 No. ranging rods
  - 1 No. Engineer's automatic level, Topcon ET4 or approved equivalent.
2. A supply of wooden pegs, steel survey pins, hammer and other such surveying accessories.
3. The Contractor will maintain the equipment and replace items as necessary all to the satisfaction of the Engineer and for the entire duration of the contract.
4. The equipment will be deemed to be the property of the Employer during the contract and will revert to the Contractor only where specified in the contract documents.
5. The Contractor will provide two experienced chainmen for the assistance of the Engineer in checking the setting out of the works or whenever needed.

## **ENGINEER'S OFFICE**

Delete clause 1.11 of the specifications and substitute with the following.

1. Before commencing work The Contractor shall provide and erect the site office for the Engineer together with all the furnishings and fittings within 20 days of the Contractor's possession of the site. The Engineer's office shall be lighted, heated when necessary, ventilated, cleaned and maintained.
2. The office shall be of a design and construction, approved by the Engineer, and shall be constructed of strong, durable and weather-proof materials or concrete blockwork with walls, ceilings and floors adequately insulated against heat and cold. Sectional timber buildings of suitable design internally lined with soft boards including ceiling will be accepted as adequate construction. The office shall be constructed and equipped in accordance with the attached specification and schedules.
  - a) A solid timber framework.
  - b) External walls in tongued and grooved ship lap horizontal boards.
  - c) internal walls and false ceiling in two 3mm plywood and 20mm polystyrene sandwich construction boards.
  - d) Doors in flush paneling honeycomb structure plywood.

- e) Suspended floors on hardwood joists bearers in tongued and grooved boards screwed down.
- f) Roof in galvanised corrugated sheeting.
- g) Windows in galvanised steel or anodised aluminum frames with integral security bars. Window opening arrangements' shall include a security latching device.
- h) Clear glass shall be used throughout except in the toilet where obscure glass shall be used.
- i) Windows shall generally have 20% of the area available to open, except the toilet which shall have 50%.

Minor amendments will be permitted provided that the overall floor and window areas are maintained. Yale and mortise type of locks shall be fitted to the outer and inner office doors, and a sliding bolt to the toilet door. Two sets of keys shall be given to the Engineer for his, or his representative's sole use.

3. The Contractor shall arrange for the installation of electricity supply to the Engineer's office and shall pay all fees and obtain all permits in connection therewith. The Contractor shall allow in his prices for such installation and for the installation of electrical lights and 5 Amp plug points in each room, security lights in the yard, plug points for tea kettle and 100 watt hot plate. A supply of drinkable water and waterborne sanitation connected to a conservancy tank or septic tank of adequate size shall be provided and maintained.
4. The Contractor shall arrange for the provision of a telephone for the exclusive use of the Engineer and his The Contractor shall include in the sum for provision of the office for the charges for the telephone service.
5. The Engineer's office shall be separate from the Contractor's yard and shall be situated in a compound size 30 x 20m fenced with a 1.5m high chain link fence on cedar posts, complete with a gate and a padlock. Hard standing and access drives (not exceeding 4 0% of the area of the compound) shall be provided within the compound and constructed of murrum or other stable road making materials. The area so provided shall be shaped to falls to provide adequate drainage and incidental kerbing and outfall drainage shall be provided where necessary. A lean-to corrugated iron shelter shall be provided for 3 cars.
6. Should the need arise to increase or decrease the floor area of the offices, then a cost adjustment (upwards or downwards) will be made to compensate for the increase or decrease in size of the offices. This will be made under the appropriate item in the bill of Quantities and shall be calculated on a pro rata floor area basis.
7. No construction of the works will be permitted until the Engineer's office and laboratory have been accepted by the Engineer as finished and able to function efficiently. Should the Contractor fail to hand over the houses, offices or laboratories within the period specified, the Engineer will make such alternative arrangements as he considers necessary. These arrangements may include the use of rented accommodation or the hire of a caravan, etc. The Contractor will be responsible for all costs of such temporary arrangements made by the Engineer, including that of additional transport.

8. The office, equipment and furniture as detailed in the schedules shall remain client property after the completion of the works and after the maintenance period, unless otherwise specified. The Contractor's rates and prices entered in the bill will be held to cover for this contingency and no claims for additional cost associated thereby will be entertained.
9. The Contractor shall be paid 80% of the cost of providing, furnishing and equipping the Engineers office, when the offices have been erected, furnished and equipped and the remaining 20% will be paid in equal monthly instalments, spread over the period from the time the offices are taken over by the Engineer, until the end of the contract.

#### **MAINTENANCE AND INSURANCE OF BUILDINGS**

1. The Contractor shall keep all buildings provided by him, for the use of the Engineer and his staff, in a well maintained, clean and fully habitable condition, and shall maintain all access roads, car parks, footpaths, fences, gates, drains, potable water supplies and sewage disposal systems in a good state of repair, all to the satisfaction of the Engineer.
2. The Contractor shall also provide an adequate refuse collection service for the office, laboratory and other buildings provided by the Contractor for the use of the Engineer and his staff.
3. The Contractor shall maintain all furniture and equipment provided in a reasonable state of repair and usable condition and shall replace promptly any item which becomes unserviceable or is lost.
4. All buildings, furniture and any equipment provided by the Contractor for the Engineer's use shall be insured by the Contractor against any loss or damage by accident, fire or theft to the full replacement cost for the duration of the- Contract, in accordance with the general conditions of contract. Theft shall include all personal belongings of the Engineer and his staff.

#### **ATTENDANCE ON ENGINEER AND STAFF**

1. The Contractor shall provide such labour as is reasonably necessary to attend to the day to day office requirements and maintenance, and to assist with office cleaning, site measurements and the checking and testing of the works ^ Adequate ^domestic and sanitary supplies shall also be made available as required.
2. The Contractor shall provide a continuous supply of drinking water , soap, towels and toilet paper, tea, sugar and milk and cleaning equipment.
3. The Contractor shall provide adequate security by day and by night for all the buildings provided by him for use of the Engineer and his staff. This shall include the provision of full-time attending permanent watchmen.

## SCHEDULE NO. 1

### OFFICE FURNITURE, EQUIPMENT AND CONSUMABLES

No.	Description
	<u>Resident Engineer's Office Furniture &amp; Equipment</u>
2	Writing desks, 1.8mx900mm with 3 lockable drawers
4	Chairs with arms
2	Lockable cupboards (steel)
2	4-drawer lockable steel filing cabinets
1	Stapling machine (giant)
2	Stapling machines (small)
3	Paper punches (one heavy-duty)
2	Pairs of 250mm set squares (60° and 45° )
1	conference table with 8 chairs
2	Set of fully divided triangular metric scales including the following range:1/20, 1/25, 1/50, 1/100, 1/500, 1/1000, 1/1250, 1/2000, 1/2500, 1/5000
2	2n0 desktop computers model 2016 or later capable of running autocad civil 3d software
	<u>Consumables</u>
10	Printing paper, 750mm x 20m, medium paper, blueline
10	Tracing paper, permatrace, size 750mm x 20m
10	A4 Xerox paper, 80g, ream
4	Waterproof coats and hats (any sizes)
4	Pairs Gum Boots (any sizes)
4	Safety helmets

Consumables to be replaced as required other items to revert to the Client at the end of the contract.



## ELECTRICAL SPECIFICATIONS

	DESCRIPTION	UNIT OF MEASUREMENT
	<p><b>All materials shall be approved by the engineer prior to ordering</b></p> <p><b>The engineer reserves the right to amend the below outlkin specifications</b></p>	
1.1	<b>LIGHTING INSTALLATION</b>	
1.2	Lighting points will be wired in 3x 1.5 sq.mm PVC insulated single core copper cable drawn in 20mm dia.GI conduit surface mounted and concealed in building fabric for one way switching.	No.
1.3	Lighting outlet point will comprise of wiring in 3x2.5mm sq. single core PVC insulated copper cables drawn in 25 mm diameter GI steel conduits concealed in ringbeam complete with all the necessary accessories and photo- cell switched. 10A 500V metak clad switchplate as Shneider Electric or equal and approved as described:	No.
1.4	a) One gang one way.	No.
	<p><b>Supply, install, test and commission in accordance to BS 7671:1998, the following as described below:</b></p> <p>Installation of the following lighting fixtures complete with the control switchgears and lamp as per description and symbols:</p>	
1.5	a) 2x36watts IP65 rated dust and moisture resistant flourescent fitting with injection moulded GRP canopy, acrylic diffuser and stainless steel toggles, fitted with warm start high frequency ballast as Phillips, as type '4B	No.
1.7	c)70W Polycarbonate bulkhead with black base, tool-less gear tray fixation with honeycomb prismatic diffuser as Thorn Leopard, as type 'B1	No.
	<b>SMALL POWER INSTALLATION</b>	
1.8	Ringmains circuit power points shall be wired in 3x 2.5 sq.mm PVC insulated single core copper cable drawn in GI steel conduit concealed in building fabrics .	No.
1.9	Radial circuit power points shall be wired in 6.0 sq.mm PVC SWA PVC four core copper cable laid in cable tray rawl bolted to wall and or on cable trench for: (25m approximate cable length, Cable tray measured elsewhere)	
	a) water pump	No.
2	200x 25mm x 16SWG stainless steel perforated cable tray rawl bolted to wall complete with its associated accessories	LM
2.1	Metal Clad socket plates as Clipsal or equal and approved as described:	

2.2	a) 13A Twin standard switched.	No.
	b) 32A TPN isolator surface mount as Clipsal	No.
	c) 63A TPN isolator surface mount as Clipsal	No.
2.3	6 Ways 100A TP MCBs recess fixed Distribution Board 'DB-P' complete with integral isolator and front lockable cover as Merin Gerin or equal and approved.	No.
2.4	Earthing shall comprise of 1500mm, 12mm diameter earth electrode, 6metres of 16mm sq.earth lead drawn in 20mm diameter conduit concealed in wall, 300x300x300mm earth pit as Furse or equal and approved, complete with all accessories.	Item
2.5	MCBs for the items above: a) 10A SP. b) 20A SP . c) 32A TP. d) 63A TP	No. No. No. No.
2.6	Submains shall comprise 4 core 25 mm sq. Cu XLPE armoured cable cable laid in cable trench from main distribution board to distribution board "P" and complete with cable lugs, glands,ties and all the necessary accessories.	LM.
<b>5.0</b>	<b>DUCTING</b>	
5.1	Excavate trenches to receive pipes not exceeding 1x150mm internal diameter starting from formation level not exceeding 1500mm depth a) average depth'- 750mm	M
5.2	Class B UPVC pipes and fittings, solvent weld straight couplings in the running length a) 1x150mm internal dia laid in trenches for power	LM
	<b>MANHOLE</b>	
5.3	750x750x1000mm deep manhole with concrete finish and iron cast frame and cover to KPLC standard.	No.
	<b>LV MAIN SWITCH BOARD</b> <i>install,test and commission the following as described below:</i>	
6.1	Wall mount cubicle type Main Switch Board 'MB', 200A,600V, Icu 25kA, Form 2b , as Schneider Electric or equal and approved ,and complete with the following: i)200 A TP+ N + E busbars	

	<ul style="list-style-type: none"> <li>ii) 2No.200 A TP+ N Isolators for Mains and Genset.</li> <li>iii) 1 No. 200 A TPN MCCB Adj.incomer MCCB with shunt tripcoil.</li> <li>iv) 2 No. 100A MCCB outgoing</li> <li>v) 1 No.100 A TP MCCB outgoing for PFCU</li> <li>vi) 2 No. 63 A TP MCCB outgoing</li> <li>vii) 1 No. 63 A TP MCCB outgoing for SPARE</li> <li>vii) 200 A TPN electrically and mechanically interlocked Automatic Transfer Switch panel incorporated in the main switch board complete with internal wiring.</li> <li>viii) 50 kVAr digital programmed,free standing modular type,4 automatic stepped with alarm for low power factor, Power Factor Correction bank complete with interconnecting cables and switching MCBs.</li> <li>ix) 200 A TPN manual by-pass for the main power supply AMF.</li> <li>x) Space for KPLC CT Metering and cut-outs</li> </ul>	
	<ul style="list-style-type: none"> <li>xi) 25kA,415V three-phase surge diverter as Furse ESP 415</li> <li>xii) 0-400A , 600V, Ammeter</li> <li>xiii) 0-600V , Volt meter</li> <li>xiv) Current transformers, phase Indicators and selector switches</li> <li>xv) Earthing</li> </ul>	Item
6.2	<p>Earthing shall comprise of 1500mm, 12mm diameter earth electrode, 6metres of 16mm sq.earth lead drawn in 20mm diameter conduit concealed in wall, 300x300x300mm earth pit as Furse or equal and approved, complete with all accessories.</p>	Item

## HDPE PIPE SPECIFICATIONS

1	Compound Material	The material from which the pipes are made shall be in accordance with ISO 4427-1. All pipes shall be manufactured using <b>pre-compounded carbon black, bimodal, high density polyethylene MRS 10.0 material (PE100)</b> . The use of natural PE100 with a Carbon black master batch is <b>strictly not allowed</b> . Carbon black should be well dispersed to give outstanding UV resistance, and should have a minimum carbon content of 2%. Pipes should be manufactured from certified <b>PE100+</b> material with <b>batch certification</b> available with pipe delivery.
2	Identification compound	The compound used for identification stripes shall be manufactured from a PE polymer manufactured from the same type of base polymer as used in the compound for pipe production.
3	General appearance	When viewed without magnification, the internal and external surfaces of pipes shall be smooth, clean and free from scoring, cavities and other surface defects such as would prevent conformity of the pipe to ISO 4427. The pipe ends shall be cut cleanly and square to the axis of the pipe.
4	Color	The pipes shall be black with colored identification stripes.
<b>5</b>	<b>Dimension</b>	
5a	General	The dimensions of the pipe shall be measured in accordance with ISO 3126 Manufacturing shall be to ISO 4427 Standard, as per <b>annexed dimensional chart. Pipes should be manufactured in machinery capable of ultrasonic wall thickness detection with production reports available with delivery of pipes.</b>
5b	Lengths and coils	Where coiling is possible, the minimum internal diameter of the coil shall be not less than $18d_n$ . The lengths shall be supplied to <b>minimize</b> the number of joints to be done in the field, and the size that is allowed to be legally transported on Kenyan roads by the traffic department.
<b>6</b>	<b>Marking</b>	
	General	All pipes shall be permanently and legibly marked in such a way that the marking does not initiate cracks or other types of failure and such that normal storage, weathering, handling, installation and use does not affect the legibility of the marking. The colour of the printed information shall differ from the basic colour of the product. The marking shall be such that it is legible without magnification. <b>The frequency of marking shall not be less than once per metre. Markings should be made using a hot embossed foil stamp printing.</b>
6a	Stripe Marking	Each pipe shall a minimum of 3 equispaced blue longitudinal stripes indicating medium of fluid transported in the pipes

6b

The minimum required marking shall be in accordance with Table 1, with the frequency of marking being **not less than once per metre**

**Table 1 — Minimum required marking**

Aspect	Marking
Standard Number	ISO 4427
Manufacturer's identification	Name or symbol
Dimensions ( $dn \times en$ )	e.g. 125X11.4
SDR series (for DN > 32)	e.g. SDR 11
Material and designation	PE 100
Pressure rating in bar	e.g. PN 16
Production period (date or code)	e.g. 0204 <sup>a</sup>
Country of Production	Kenya

Coils shall be sequentially marked with the metreage, indicating the length remaining on the coil.

<sup>a</sup> - In clear figures or in code providing traceability to the production period within year month and, if the manufacturer is producing at different sites, the production site.