TENDER DOCUMENTS

VOL.3.SPECIFICATIONS

TECHNICAL SPECIFICATION

The Technical Specifications to be used for this Contract contain two Parts as follows:

PART 1 The Standard Specifications for Road and Bridge Works, Published by the Ministry of Transport and Communication, Kenya 1986.

PART 2 Specifications of Particular Application (SPA)

Part 1 has not been bound into these Tender Documents but can be purchased from the Ministry of Transport and Infrastructure, Nairobi, Kenya.

The Specifications of Particular Application (Part 2) shall compliment, amend or supplement the Standard Specifications for Road and Bridge Works, 1986 (Part 1). Whenever there is conflict, the Provisions of Part 2 shall prevail over those in Part 1.

Clause numbers in the SPA coincide with the numbering as maintained in the Standard Specifications for Road and Bridge Works, 1986 (Part 1).

Equivalency of Standards and Codes

Wherever reference is made in the Contract to specific standards and codes to be met by the goods and materials to be furnished, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise expressly stated in the Contract. Where such standards and codes are national, or relate to a particular country or region, other authoritative standards that ensure a substantially equal or higher quality than the standards and codes specified shall be accepted subject to the Project Manager's prior review and written consent. Differences between the standards specified and the proposed alternative standards shall be fully described in writing by the Contractor and submitted to the Project Manager at least 28 days prior to the date when the Contractor desires the Project Manager's consent. In the event the Project Manager determines that such proposed deviations do not ensure substantially equal or higher quality, the Contractor shall comply with the standards specified in the documents."

Contractor's Responsibility for Design

The Contractor shall be responsible for the general and detailed design of all works to be carried out under the Contract and for all plant and equipment provided. Additionally, he shall be responsible for checking all technical information provided in the Tender Drawings, Specification and Bill of Quantities and for confirming the suitability and output of his proposed plant and equipment for the duty required.

The drawings provided with the bidding documents are only for use by the Contractor in computing his bid and are not to be taken as construction drawings, which he shall produce and upon approval by the project manager, will implement the construction.

The Contractor shall provide the manufacturer's name and technical details of all the components. Scales shown on title blocks do not apply to the reduced scale drawings provided.

The Contractor shall be responsible for making all necessary site measurements and establishing all relevant data regarding existing conditions on site, required for the design, manufacture, installation and commissioning of the equipment.

The Contractor's design shall include any necessary modifications to existing installations to suit the characteristics proposed by the Project manager.

The Project Manager's approval of the Contractor's designs shall not relieve the Contractor of his responsibilities under the Contract.

Specifications of Particular Application - Part 2

All the requirements of Part 1 of the Technical Specifications relating to materials, quality and workmanship, together with all tests specified shall be adhered to except where modified by the terms of these Specifications of Particular Application as set forth hereinafter.

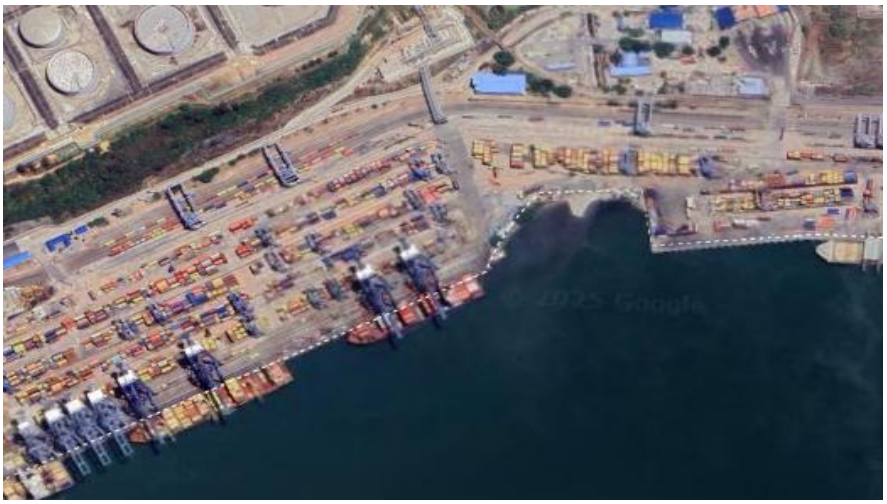
SECTION 1 – GENERAL

Background

Mombasa Port is the largest in East Africa and a natural gateway to East Africa linked by rail and road to other areas of Kenya as well as Uganda, Rwanda, Burundi, Northern Tanzania, Eastern Democratic Republic of Congo, Somalia and South Sudan. Currently there are several ongoing projects in the Port of Mombasa which focus on overcoming the various impediments to continuous growth in cargo throughput, such as reduction of congestion and delays at the port.
During the last 10 years cargo throughput at the port has increased substantially averaging 6.9 % growth per annum. This trend is expected to continue in the future which may lead to increased congestion and delays in and around the Port of Mombasa. In order to overcome these challenges, the development of a Gate and Traffic Management Plan is regarded as a first step to effectively improve the efficiency of the port in the short term.
Lot 2 of the "Gate, Safety Signage and Traffic Management Plan and Systems for the Port of Mombasa" is one such projects that Trademark Africa has committed to finance to aid in overcoming the various impediments to continuous growth on behalf of Kenya Ports Authority (KPA).

1.0. Project Location

The Works are located within the Mombasa Port and confined to the Container Terminal 1 (Between Yard 15 – 17) area as shown on the layout below with the details being contained in the Tender Drawings.



Site location layout

1.1. General Scope of Works

The objective of the assignment is to prepare an integrated Traffic Management Plan for the Container Terminals at the Port of Mombasa, inclusive of surrounding approach areas to ease congestion and facilitate the effective flow of cargo within and at the perimeter of the port through rearrangement of the yard and road marking.

The works under this Contract shall include all general and ancillary works and any nature that is deemed necessary for the due and satisfactory construction, completion and maintenance of the Works to the full extent and meaning of the drawings and specifications, while complying with all General Conditions of Contract whether specifically mentioned or not in the clauses of the Specifications.

1.2. Scope of the Works

The nature of the works is part of the implementation of the Gate and Traffic Management Plan for both Mombasa Port.

The general layout including details is presented in the Tender Drawings. Briefly, the Works include, but are not limited to:

- Preliminary items
- Site Clearance
- Removal of the existing road and yard marking paints.
- Demolition of damaged concrete pavements.
- Demolition of fence and gates for access to container yard.
- Re-marking the yard to denote container placement locations, numbering and remarking the slip roads.
- Directional markings to facilitate movement of trucks in and out of the yard in a clockwise direction.
- Installation of traffic and directional signage, on the road and yard, speed limit signs for trucks entering the terminal yard and installation identification signs within and for the yard.
- Reinstatement damaged concrete pavement sections.
- Installation of Fence and access gates to the yard.
- Preparation and Execution of a Traffic Management plan.
- Protection of gate, fence and others Services

The Project Manager may where necessary substitute some of the works with others without substantially altering the overall Scope of the Works.

Completion Times

The time for completion of the works indicated shall be

LOT 2: 12 months

Contract / Tender Drawings

A book of Drawings accompanies these Contract Documents as a separate DIN A3 size book.

Two complete sets of full-sized drawings will be issued to the successful Tenderer herein after referred to as the Contractor, at the commencement of or during the course of the Contract to facilitate the construction of the works in complete conformity with and to the full intent of the Contract. The Contractor will be supplied with additional copies that he may require during the period of the Contract.

The Contractor is expected to revise, amend or supplement the drawings further as the Project Manager may from time to time consider necessary for the satisfactory completion of the works, and such works implemented after approval by the Project Manager.

It shall be the Contractor's responsibility to construct all Works in conformity with the latest revision, amendment or superseding drawings current at the time of construction of such Works, provided always that the Project Manager has given to the Contractor in writing such reasonable prior notices to revise, amend or supersede as the nature of the revision or amendment requires, and the necessary revised or amended drawings have been approved.

The Contractor may be required to demolish, alter and correctly rebuild any part of the Works not in conformity with the drawings currently forming a part of the Contract at the time of construction of such Works at his own expense, provided always that such current drawings had previously been issued to him.

104.Programme for the Execution of the Works

Pursuant to Clause 104 of the standard Specifications, the Contractor shall submit a fully detailed and time related programme showing the order of procedure and method in which he proposes to carry out the Works. Additionally, he shall submit an expenditure chart showing his monthly anticipated expenditures.In details ;

(a) The programme shall be deemed to have considered normal climatic conditions to provide for the completion of the Works in the order and within the times specified therein.

(b) The information to be supplied to the Project Manager shall include drawings showing the general arrangement of the temporary offices and any other temporary buildings or structures which the Contractor proposes to use, details of the constructional plant, 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, plant and equipment and supervision arrangements

(c) The provision and maintenance of all temporary works, plant, equipment and appliances required for the Works shall be the responsibility of the Contractor in regard to construction, type, sufficiency and safety and approval by the Project Manager shall in no way relieve the Contractor of this responsibility.

(d) The order in which it is proposed to execute the permanent works shall be subject to adjustment and approval by the Project Manager, and the Contract Price shall be held to include for any reasonable and necessary adjustments required by the Project Manager during the course of the Works.

(e) The Contractor shall carry out the Contract in accordance with the programme agreed with the Project Manager but he shall in no manner be relieved by the Project Manager's approval of the programme of his obligations to complete the Works in the prescribed order and 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

fulfil these obligations.

(f) Once the proposed programme is approved by the Project Manager, the Contractor shall not depart from the programme without the written consent of the Project Manager. In the event of unforeseen difficulties or disturbances arising which force the Contractor to depart from the approved programme of Works, he shall advise the Project Manager in writing of such occurrences without delay and submit proposals for any necessary remedial measures, for which he shall obtain the Project Manager's approval before putting such measures into effect.

(g) The contractor is advised that the site is a busy 24-hour operational area and coordination with the Employer's activities will be a mandatory requirement.

The Employer will avail areas for works, in line with the approved programme of works.

105. Order of Execution of Works

In addition to Clause 105 of the Standard Specification, the Contractor shall carry out the Works such that a continuous and consecutive output of fully completed work is achieved.

108. Method of Construction

Delete the first sentence in the third paragraph of Clause 108 of the Standard Specification and insert instead:

The Project Manager's Representatives' normal working hours shall be 8 hours from Monday to Friday and 5 hours on Saturday with Sunday set aside for rest.

109.Notice of Operations

Notification Terms

It shall be the Contractor's responsibility to notify the Project Manager when any item of Works are completed and ready for approval, and the Contractor shall give sufficient notice to allow control test to be performed.

119. Use of Explosives

The Contractor shall ensure that he complies with the current Government regulations with regard to explosives. No explosives of any kind shall be used within any Part or area of operation within the Port.

120. Protection of Existing Works and Services

The appropriate provisions of Section 1 of the Standard Specifications as regards the protection of existing works and services shall be adhered to in all respects.

The Contractor's attention is drawn to the fact that it is essential to maintain existing power, telephone, water, ICT, fibre optic, sewage and other services throughout the Contract Period.

For all the utilities for Telkom Kenya, the Kenya Power & Lighting Co. Ltd., the Ministry of Water Development and other relevant authorities around the site area, the contractor to maintain the serviceability of their installations for the entire duration of the contract period.

121. Diversion of Services

If it should become necessary, for the proper execution of the work, temporarily, to remove or divert any existing pipe, cable, drain or other service, the Contractor shall obtain permission from the competent authority or owner for removal or diversion to the affected service. The Contractor shall carry out all necessary work in such a manner and at such times as may be approved by such authority or owner. The cost of all removal, diversion and reinstatement and all things connected therewith shall be paid for by the Employer through the Construction Contract.

If in the opinion of the Project Manager or of the competent authority or owner it should become necessary permanently to remove or realign any existing pipe, cable or other service, the Contractor shall obtain permission from the competent authority or owner for the removal or realignment to be affected.

The Contractor shall carry out all necessary work in such a manner and at such times as may be approved by such authority or owner and the completed work shall be to the satisfaction of such authority or owner. The cost of all permanent removal and realignment and all things connected therewith shall be paid for by the Employer through the Construction Contract.

Any of the work involving repair, replacement of existing pipes, cables or other services shall be carried out by the competent authority or owners if they so desire, in which case the Contractor shall allow them the facilities and assistance they may require and shall pay the full expense of such work and all things connected therewith in the first instance, but the cost shall be paid for by the Employer through the Construction Contract.

The Contractor shall allow in his rates for the programming of his work to allow for the necessary diversion of any services.

124. Provision of Land

The Contractor shall bear the costs of provision of any land he may require in respect of his own camps, offices, houses, temporary works, including Land for quarries and borrow pits, the cos of which shall be deemed to be included in his rates.

125. WATER SUPPLY

The Contractor shall be responsible for the provision of clean water supply for the Works and for making his own Power Supply Connections and related payment of all charges associated with the provision and use of these including but not limited to water tanks, water conveyance where necessary, pumps etc.

The water supplied to all offices, laboratories and houses shall be wholesome and portable to the satisfaction of the Medical Officer in the area.

126. Materials and Manufactured Articles

Notwithstanding the provision of Clause 126 of the Standard Specifications, the Contractor's attention is drawn to his obligation with regard to quality and delivery schedule of materials and goods obtained from suppliers.

The Contractor shall be responsible for obtaining all materials from any local or foreign source. The Employer shall not be liable for any additional costs due to shortage of materials.

The material located by the Contractor shall be subject to the approval of the Project Manager before use in the Works.

Should the Project Manager at any time be dissatisfied with any goods and materials intended for use or used by the Contractor upon the Works, he shall be empowered to reject goods and materials and

shall order that they be replaced by others of acceptable quality. Any more work that may consequently have to be redone and the costs of the new suppliers shall all be borne by the Contractor.

129.The Contractor shall submit to the Engineer tests certificate from suppliers of materials and manufactured articles for approval before delivery to site.

131. Signboards

The Contractor shall provide and erect one publicity signboard on the project site. The wording script and method of marking shall be to the approval of the Project Manager.

132. HOUSING ACCOMODATION FOR THE ENGINEER AND HIS STAFF, OFFICES AND LABORATORY FOR THE ENGINEERWITH LABORATORY AND SURVEY EQUIPMENT AND FURNITURE

General

The Contractor shall provide fully furnished and equipped housing and office accommodation for the Project Manager and his staff respectively. Rented accommodation to similar standard is acceptable. The location of the facilities shall be subject to the Project Manager's prior approval.

All houses and offices shall be of a design and construction approved by the Project Manager and shall be of strong, durable and waterproof materials with walls, ceilings and floors adequately insulated against heat and cold, and fitted with burglar-proofed, mosquito-proof windows.

A piped, drinkable, pure water supply; a water-borne sewage disposal system; a refuse collection service; and external security lights shall be provided and maintained to the satisfaction of the Project Manager for the duration of the Contract.

The Contractor shall provide electricity continuously and shall arrange for the houses and offices to be connected to an available public supply or to his own generating plant and shall ensure that each building shall be provided with a main switch and fuse box through which all power supplied to it shall passes and that these shall be of the approved standard of the public supplier.

In all cases where gas appliances are provided, the Contractor shall be responsible for purchasing refill gas cylinders and supplying them promptly to the houses as required.

133. TIME FOR ERECTION OF ENGINEERS STAFF HOUSES, OFFICES AND LABORATORIES

General

(1) The term "Engineer's site office" refers to the offices to be provided by the Contractor for the Engineer during the various stages of the Works.
(2) The Contractor shall provide and equip the Engineer's site office for the exclusive use of the Engineer.
(3) The Engineer's site office has to be provided at a location directly on or at the construction site.
(4) The first offices shall be made available within a period of latest 6 weeks after receipt of the order to commence the Works. The offices shall be provided at places approved by the Engineer.
(5) The Contractor shall maintain the site office for the entire period of the construction works plus an additional 4 weeks after completion of the Works.
(6) Upon issuing of the Performance Certificate for the Works the complete site office buildings including furniture and equipment shall be removed by the Contractor and the spaces of land returned to the Employer in good condition.

133.1. Site Office Building

The site office shall be located at the respective project site, close to Contractor's site offices.

The site office shall provide space for about 5 to 7 persons and comprise the following rooms:

- 1 meeting room 30 m²
- 1 office room 25 m²
- 3 office rooms 16 m²
- 1 store room 12 m²

Plus, adequate kitchen area and sanitary facilities (male / female toilet areas) to cater including PWDs.

All offices and meeting rooms shall be provided with air-conditioning of adequate capacity to the approval of the Project Manager.

Shaded car park shall be provided next to the main office for at least four cars.

133.2. Office Equipment and Furniture

The Contractor shall furnish Engineer's site office at least with the following new equipment:

- 1 office desks, 200 x 80 cm,
- 5 office desks, 160 x 80 cm,
- 1 conference table, 120 x 300 cm,

Commented [ND1]:

- 6 office armchairs of different categories,
- 10 chairs for the conference room,
- An office file cabinet,
- 1 cabinet for storing drawings,
- 1 photocopying machine, allowing at least A3 paper size print
- Small office computer network (LAN and Wi-Fi)
- 1 set of shelves each for the filing and store room,
- 1 refrigerator, capacity at least 250 litres,
- 1 set of kitchen equipment including but not limited to a cooker, 2 dispensers, kitchen wares etc.

133.3. Communication and Internet

The Contractor shall provide high-speed Internet access (minimum 32 Mbit/s) for the Engineer's sole use at the main office complex.

133.4. Training on Project Management

Provide 7 No. laptops of the latest generation with at least 16 GB RAM, 500 GB SSD Arch Graphics internet able, incl. latest Microsoft Windows, Microsoft Office, MS Project, AutoCAD, Civil 3D, Protastructure for purposes of trainings and knowledge transfer of Employers Staff on the project.
Quotations for the proposed machines Specifications to be submitted to the Engineer for approval before procuring the machines.

134. INSURANCE AND OWNERSHIP OF THE ENGINEERS STAFF HOUSES, OFFICES, LABORATORIES, FURNITURE AND EQUIPMENT

All buildings, furniture and equipment provided to the Engineer shall be insured by the Contractor against any loss or damage by accident, fire or theft, for the duration of the contract including maintenance period.

On completion, ownership of office furniture, lab and survey equipment shall revert to the Employer.

135. MAINTENANCE OF ENGINEERS STAFF HOUSES, OFFICES, LABORATORIES, FURNITURE AND EQUIPMENT

(1) The Contractor shall provide and pay for regular power supply, water and potable water, sewage treatment and disposal. For regular power supply stand-by generators are to be provided, capable to serve the electricity demand for the Engineer's site offices.
(2) The Contractor shall provide for daily cleaning of all of Engineer's site offices and its surrounding and maintain all furniture.
(3) The Contractor shall provide for all consumable items, printed matters and small office equipment, as are required by the Engineer to run the office.
(4) The Contractor shall provide security 7 days per week

138. PROVISION OF VEHICLES

(1) The Contractor shall provide the following vehicles for the sole use of the Engineer for the duration of the project:
- 1 Nos. station wagons, 4-wheel drive, 4 doors, at least 2,500 cc petrol engine, air-conditioned,

(2) The vehicle shall be the type/model as approved by the Engineer.
(3) The Contractor shall pay for the running cost of the vehicle, including tax, comprehensive insurance, fuel and lubricants, service and maintenance, cleaning and drivers.
(4) In case of any vehicle breakdowns, the Contractor shall provide equivalent replacement, in co-ordination with the Engineer.
(5) Ownership of the vehicle to revert to the Contractor on completion of the contract and as soon as practically possible after Taking Over the Works by the Employer.

Surveying Equipment

1) The Contractor shall make available to the Engineer topographic survey equipment, staff and labourers and other supporting facilities as and when required by the Engineer for check-surveys.
2) Only high precision survey equipment suitable to meet the demanded accuracy shall be provided.

Accommodation for the Engineer

A house for accommodation with two bedrooms each with en-suite bathrooms, with a surface area of at least 100 m² on an approved location in the vicinity to the port shall be provided for the Engineer. This house shall be fully equipped and serviced including furniture, kitchen and washing machine, international cable television (DSTV) and guards for 24 hrs a day. Included shall be air conditioning, telephone and high-speed internet connections. Provision of and payment for regular cleaning, security, power supply, water and potable water, sewage treatment and disposal will be provided free of cost to the Engineer.

Measurement and Payment

(1) All costs in connection with providing, operating and maintaining of the Engineer's facilities will be measured and paid for as per relevant items of the Bill of Quantities, but only up to the end of the contractual completion date, including approved extensions thereof, if any, or such additional period as instructed by the Engineer in writing.

(2) All costs in connection with the providing of the surveying equipment and supporting facilities shall be deemed to be covered by surcharges and overheads included in the items of the Bills of Quantities and will therefore not be paid for separately.

140. Payment of Overtime for Project Manager's Junior Staff

Delete Clause 140 of the standard specifications entirely and substitute with:

"If the Contractor wishes to execute permanent work outside the Project Manager's normal working hours, as stated in the Particular conditions of Contract, then the payment for the overtime for the Project Manager's Junior Staff shall be reimbursed in full by the Contractor to the Project Manager's Representatives including a percentage for administrative overheads.

If the Contractor wishes to execute works on the regular basis outside the Project Manager's normal working hours over a prolonged period, the Project Manager may, if he deems necessary, employ additional supervisory staff for which the required salaries including the percentage for administrative overheads shall be reimbursed in full by the Contractor to the Project Manager's Representative and the Contractor shall provide the required adequate accommodation facilities for such staff at his own costs.

141. Compliance with Specifications and Remedial Work

All materials, plant, labor and workmanship in and connected with the execution of the works shall be the best of their respective kinds without regard to any trade terms and the Contractors shall comply to these and in all other respects with the relevant clauses and shall carry out the contract in a proper and workmanlike manner and in strict accordance with the working drawings and instructions of the Project Manager.

When any part of the Works or any plant or material is found upon examination by the Project Manager not to conform to the requirements or is at any stage before final acceptance damaged so that it no longer conforms to the requirements of the Specifications, the Project Manager may order its complete removal and replacement, at the Contractor's expense, with satisfactory work, plant or material or he may permit the Contractor to apply remedial measures in order to make good any such defects or damage. The actual remedial measures taken shall at all times be entirely at the Contractor's own initiative, risk and cost, but subject to the Project Manager's approval regarding the details thereof.

In particular remedial measures must ensure full compliance with the Specifications for the final product, shall not endanger or damage any other part of the Works and shall be carefully controlled and submitted to the Project Manager for examination when completed or at any intermediate stage as may be required.

For the guidance, an indication is given below of what would normally be required in the more common cases of defects or damage, but the Project Manager will in no way be bound to approve of or adhere to the measures given below as the actual remedial measures will be dictated by the circumstances of each particular case.

(a) Earthworks

(i) Where a cut slope has been over excavated or under cut, backfilling will not normally be allowed and the entire slope may have to be re-trimmed to obtain a uniform slope.

(ii) Where the floor of a cutting has been taken too deep, it will normally require backfilling and re-compaction with selected gravel in the case of soil or gravel excavation and with crushed stone material or suitably sized rock in the case of hard excavations. All necessary measures shall be taken to drain away ground water that may accumulate in

backfilled sections.

(iii) Excess width of fills will have to be trimmed back.

(iv) Where erosion has damaged the surface of cuts or fills the damage shall be made good by backfilling with suitable material and re-trimming. In more serious cases the slopes may have to be cut back and back-filled by benching and compaction to the required standard of compaction with suitable small equipment and then re-trimmed.

(b) Local Defects in Pavement Layers

Where remedial measures are taken to make good local defects, the length and width of the area to be repaired by machines shall be such as will be necessary to accommodate the full width of the machines used and a reasonable length to ensure effective operation.

The depth to which material will have to be removed will depend on the type of material. Gravel will require breaking up to a depth of at least 75mm and crushed stone will usually require breaking up over its full depth. Asphalt material will normally require removal for its full depth.

(c) Concrete

Concrete work will normally require the cutting back and complete removal of any weak or honeycombed sections and making good using special epoxy adhesives to bind fresh concrete to old concrete. Cracks when permitted to remain, shall be injected with suitable epoxy compounds and test cores drilled to test the efficiency of the injection process.

142. Environmental Protection and Waste Disposal

The contractor shall ensure so far as reasonably practicable to the satisfaction of the Supervisor that the impact of the construction on the environment shall be kept to a minimum and that appropriate measures are taken to mitigate any adverse effects during construction.

a) After extraction of materials, all borrow pits shall be back-filled to the satisfaction of the Project Manager. In particular borrow pits near the road sides shall be backfilled in such a way that no water collects in them. However, if a borrow pit is located at such a site where water that may collect in it can be used by the local people without creating conflict, then such borrow pits could be improved to remain as a water pan upon completion of works.

The Project Manager will issue instructions regarding such borrow areas during the time of construction.

a) Spilling of bitumen, fuels, oils and other pollutants shall be cleaned up immediately by the Contractor.

Landscape Preservation

(a) General

The Contractor shall exercise care to preserve the natural landscape and shall conduct his construction operations so as to prevent any unnecessary destruction, scarring or defacing of the natural surroundings in the vicinity of the Works. Except where clearing is required for permanent works, approved construction roads or excavation operations, all trees, native shrubbery and vegetation shall be preserved and shall be protected from damage by the Contractor's construction operations and equipment. The edges of clearing and cuts through trees, shrubbery and vegetation shall be irregularly shaped to soften the undesirable visual impact of straight lines. Movement of labour and equipment within the right-of-way and over routes provided for accesses to the Works shall be performed in a manner to prevent damage to grazing land, crops or property.

Except as otherwise provided in Section 5 of the Specification, special reseeding or replanting will not be required under these specifications; however, on completion of the Works, All unnecessary destruction, scarring, damage or defacing of the landscape resulting from the Contractor's operations shall be repaired, replanted, reseeded or otherwise corrected and directed by the Project Manager

and at the Contractor's expense.

(b) Construction Roads, Access Roads and Haulage Routes

The location, alignment and grade of construction roads shall be subject to the approval of the Project Manager. When no longer required by the Contractor, construction roads shall, if required by the Project Manager, be restored to the original contour and made impassable to vehicular traffic. The surfaces of such construction roads shall be scarified as needed to provide a condition which will provide for proper drainage and prevent erosion.

(c) Construction Facilities

The Contractor's workshops, office and yard area shall be located and arranged in a manner to preserve trees and vegetation to the maximum practicable extent. On abandonment, all temporary buildings, including concrete footings and slabs and all construction materials and debris shall be removed from the site. The area shall be re-graded, as required, so that all surfaces drain naturally, blend with the natural terrain and are left in a condition that will facilitate natural re-vegetation, provide for proper drainage and prevent erosion.

(d) Blasting Precautions

In addition to any requirements of local regulations, the Contractor shall adopt precautions when using explosives, which will prevent scattering of rocks, stumps or other debris outside the Work area and prevent damage to surrounding. Blasting should be done during the day, and residents within the vicinity of the blast site should be given ample warning including the time and date of the blasting operation.

Preservation of Trees and Shrubbery

(a) **Preservation**

All trees and shrubbery which are not specifically required to be cleared or removed for construction purposes shall be preserved and shall be protected from any damage that may be caused by the Contractor's construction operations and equipment. Special care shall be exercised where trees or shrubs are exposed to injuries by construction equipment, blasting, excavating, dumping, chemical damage or other operations; and the Contractor shall adequately protect such trees by use of protective barriers or other methods approved by the Project Manager. The removal of trees or shrubs will be only after prior approval by the Project Manager. The layout of the Contractors construction facilities such as workshops, warehouse, storage and parking areas; location of access and haul routes; operation in borrow and spoil areas shall be planned and conducted in such manner that all trees and shrubbery not approved for removal by the Project Manager shall be preserved and adequately protected from either direct or indirect damage by the Contractors operations.

Except in emergency cases or when otherwise approved by the Project Manager, trees shall not be used for anchorages. Where such use is approved, the trunk shall be wrapped with a sufficient thickness of approved protective material before any rope, cable or wire is placed.

(b) **Repair or Treatment of Damage**

The Contractor shall be responsible for injuries to trees and shrubs caused by his operations. The term ''injury[1]'' shall include, without limitation, bruising, scarring, tearing and breaking of roots, trunk or

branches. All injured trees and shrubs shall be repaired or treated without delay, at the Contractor's expense. If damage occurs, the Project Manager will determine the method of repair or treatment to be used for injured trees and shrubs as recommended and undertaken by an experienced horticulturist provided by and at the expense of the Contractor. All repairs or treatment of injured trees shall be performed at the expense of the Contractor.

Prevention of Water Pollution

(c) General

The Contractor's construction activities shall be performed by methods that will prevent entrance or accidental spillage, of solid matter, contaminants, debris and other pollutants and wastes into streams, flowing or dry water courses, lakes, ocean and underground water sources. Such pollutants and wastes include, but are not restricted to, refuse, garbage, cement, concrete, sanitary waste, industrial waste, radioactive substances, oil and other petroleum products, aggregate processing tailings, mineral salts and thermal pollution. De- watering work for structures foundations or earthwork operations adjacent to, or encroaching on, streams or watercourses shall be conducted in a manner to prevent muddy water and eroded materials from entering the streams or watercourses by construction of intercepting ditches, bypass channels, barriers, settling ponds or by other approved means. Excavated materials or other construction materials shall not be stockpiled or deposited near or on stream banks, lake shorelines or other watercourse perimeters where they can be blown away or washed away by high water or storm runoff or can in any way encroach upon the watercourse itself.

Wastewater from aggregate processing, concrete batching, or other construction operations shall not enter streams, watercourses or other surface water without the use of such turbidity control methods as settling ponds, gravel-filter entrapment dykes, approved flocculating processes that are not harmful to fish, recirculation systems for washing of aggregates or other approved methods. Any such wastewater discharged into surface waters shall contain the least concentration of settleable material possible. For the purpose of these Specifications, settleable material is defined as that material which will settle from the water by gravity during a 1-hour quiescent detention period.

(d) Compliance with Laws and Regulations

The Contractor shall comply with all applicable Kenyan Laws, orders, regulations and water quality standards concerning the control and abatement of water pollution Abatement of Air Pollution

The Contractor shall comply with applicable Kenyan laws and regulations concerning the prevention and control of air pollution.

Notwithstanding the above in conduct of construction activities and operation of equipment, the Contractor shall utilize such practicable methods and devices as available to control, prevent and otherwise minimize atmospheric emissions or discharges of air contaminants.

Such practicable methods and devices include transport of water over long distances in tankers and/or provision of water extracted from new boreholes, as necessary to meet the applicable laws and regulations.

Equipment and vehicles that show excessive emissions of exhaust gases due to poor engine adjustments or other inefficient operating conditions shall not be operated until corrective repairs or adjustments are made.

Burning of materials resulting from clearing of trees and brush, combustible construction materials and rubbish will be permitted only when atmospheric conditions for burning are considered favourable and when authorised by the Project Manager. In lieu of burning, such combustible materials may be disposed of by other methods as provided in Sub clause 145.9 hereof. Where open burning is permitted, the bum piles shall be properly constructed to minimise smoke and in no case shall unapproved

materials, such as tires, plastics, rubber products, asphalt products or other materials that create heavy black smoke or nuisance odours, be burnt.

Dust Abatement

During the performance of the work required by these Specifications or any operations appurtenant thereto, whether on the right-of-way provided by the Employer or elsewhere, the Contractor shall furnish all the labour, equipment, materials and means required and shall carry out proper and efficient measures wherever and as often as necessary to reduce the dust nuisance and to prevent dust which has originated from his operations from damaging crops, orchards, cultivated fields and dwellings or causing a nuisance to persons. The Contractor will be held liable for any damage resulting from dust originating from his operations under these Specifications on the right-of way or elsewhere. The Project Manager may direct sprinkling or other measures for dust abatement if necessary to obtain adequate control.

The cost of complying with this paragraph shall be included in the prices tendered in the Bill of Quantities for other items of Work.

Noise Abatement

The Contractor shall comply with applicable Kenyan laws, orders and regulations concerning the prevention, control and abatement of excessive noise. The movement of heavy vehicles if any should be restricted to working hours.

Preservation of Historical and Archaeological Data

Should the Contractor or any of his employees in the performance of his contract discover evidence of possible scientific, pre-historical or archaeological data, he will notify the Project Manager immediately giving the location and nature of the finding. Written confirmation shall be forwarded within 2 days. The Contractor shall exercise care so as not to damage artefacts or fossils uncovered during excavation operations and shall provide such co- operation and assistance as may be necessary to preserve the finds for removal or other disposition by the Employer.

Where appropriate by reason of a discovery, the Project Manager may order delays in the time of performance or changes in the Work or both. If such delays or changes or both are ordered, the time of performance and Contract Price shall be adjusted in accordance with the General Conditions of Contract.

The Contractor shall insert this Sub-Clause in all Subcontracts, which involve the performance of Work on the terrain of the site.

Pesticides

Pesticides include herbicides, insecticides, fungicides, rodenticides, pesticides, surface disinfectants, animal repellents and insect repellents.

Should the Contractor find it necessary to use pesticides in Work areas of this contract, he shall submit his plan for such use to the Project Manager for written approval. The Contractor shall read and comply with all labelling requirements when using pesticides.

The cost of complying with this Sub-Clause shall be included in the prices tendered in the Bill of

Quantities for other items of Work.

Clean-up and Disposal of Waste Materials

(a) **Clean-up**

The Contractor shall, at all times, keep the construction area, including storage areas used, free from accumulations of waste materials or rubbish. All waste water and sewage from office, residential and mobile camps shall be piped to soak pits or other disposal areas constructed in accordance with local government regulations, and where and when such regulations require it, the Contractor shall obtain a permit or other appropriate documentation approving the disposal methods being used.

All used fuels, oils, other plant or vehicle fluids and old tyres and tubes shall be collected to a central disposal point, on a regular basis and disposed of as specified below. All household, office, workshop and other solid waste shall be collected to a central disposal area, on a daily basis and disposed of in a manner approved by the Project Manager.

Servicing of plant, equipment and vehicles shall whenever possible be carried out at a workshop area. This workshop area shall be equipped with secure storage areas for fuels oils and other fluids constructed in such a way as to contain any spillages which may occur and similar storage where used fluids can be stored securely prior to their disposal.

When servicing of plant, equipment and vehicles is carried out away from the workshop area it shall be done at locations and in such a manner as to avoid spillage and contamination of streams and other drainage courses. Any spillages shall be cleaned up by either burning in place or collecting the contaminated soils and burning them at the central disposal area, all to the satisfaction of the Project Manager.

Prior to completion of the Work, the Contractor shall remove from the vicinity of the Work all plant facilities, buildings, rubbish, unused materials, concrete forms and other like material, belonging to him or used under his direction during construction. All Work areas shall be graded and left in a neat manner conforming to the natural appearance of the landscape as provided in Sub-Clause 145.1.

Any residue deposited on the ground from washing out transit mix trucks or any similar concrete operations shall be buried or cleaned up in a manner acceptable to the Project Manager.

In the event of the Contractor's failure to perform the above work, others may be engaged to perform the work at the expense of the Contractor.

(b) **Disposal of Waste Material**

(i) **General**

Waste materials including, but not restricted to, refuse, garbage, sanitary wastes, industrial wastes and oil and other petroleum products, shall be disposed of by the Contractor as directed by the Project Manager. Disposal of combustible materials shall be by burying, where burial of such materials is approved by the Project Manager; by burning, where burning of approved materials is permitted; or by removal from the construction area. - Disposal of non-combustible materials shall be by burying, where burial of such materials is approved by the Project Manager, or by removal from the construction area. Waste materials removed from the construction area shall be dumped at an approved dumping site.

(ii)**Disposal of Material by Burying.**

Only materials approved by the Project Manager may be buried. Burial shall be in pits the location, size and depth of which shall be approved by the Project Manager. The pits shall be covered by at least 0.6 m of earth material prior to abandonment.

(iii) **Disposal of Material by Burning**

All materials to be burned shall be piled in designated burning areas in such a manner as will cause the least fire hazards. Burning shall be thorough and complete and all charred pieces remaining after burning, except for scattered small pieces, shall be removed from the construction area and disposed of as otherwise provided in this Sub-Clause.

All burning activities are to be supervised. The Contractor shall, at all times, take special precautions to prevent fire from spreading beyond the piles being burned and shall be liable for any damage caused by his burning operations. The Contractor shall have available, at all times, suitable equipment and supplies for use in preventing and suppressing fires and shall be subject to all laws and regulations locally applicable for pre-suppression, suppression and prevention of fires.

(iv) **Disposal of Material by Removal**

Material to be disposed of by removal from the construction area shall be removed from the area prior to the completion of the Work under these Specifications. All materials removed shall become the property of the Contractor.

Materials to be disposed of by dumping shall be hauled to an approved dump. It shall be the responsibility of the Contractor to make any necessary arrangements with private parties and with local officials pertinent to locations and regulations of such dumping. Any fees for charges that are to be paid for dumping of materials, shall be paid by the Contractor, and shall be included in the prices tendered in the Bill of Quantities for other items of Work.

Hunting and other Use of Natural Resources:

(i) The Contractor is required to prohibit his workers from hunting, trapping, killing or other use of natural resources (with the exception of vermin) on the site or on adjacent lands.

(ii) Both solid and liquid waste including empty containers should be managed in such a manner as to avoid exposing wildlife/livestock to possible poisoning or disease infection. Empty containers should not be strewn carelessly but disposed of in a responsible manner

(iii) Fuel wood or charcoal as well as rustic construction wood required for fencing or general construction should preferably be harvested in a controlled manner, and clearing or felling of trees or shrubs in an area should be forbidden.

Fire and Prevention

a) The Contractor shall prepare and carry out an effective fire-protection and prevention Programme covering all phases of construction under this contract.

The plan shall be submitted to the Project Manager, prior to the start of construction operations. At the option of the Contractor, the fire-protection and prevention Programme may be incorporated into a safety Programme.

b) The Contractor shall provide and maintain in a ready condition near each active work location a fire-tool cache consisting of at least one 19 litre back pump filled with water, two axes, two McLeod tools, and enough shovels to equip five workers for firefighting purposes. A sufficient number of employees familiar with use of the equipment shall be available at all times when work is in progress. In the event of a fire resulting from project operations, the local fire-protection agency having jurisdiction shall be notified, and the Contractor shall take immediate control action with any and all available equipment and manpower.

c) In areas where significant fire hazard exists as determined by the Project Manager, the Contractor shall provide a fire patrol for 1 hour after shutdown of construction operations each day during the dry season

d) In areas where grass, bush, or other natural fuels are present and where roads or creek beds will not serve the purpose, the Contractor shall establish a firebreak on the uphill side of the project. The firebreak shall be within the right-of-way acquired by the Employer

Measurement and Payment for Environment Protection and Waste Disposal

Except as specifically included in the Bill of Quantities or otherwise provided above, no separate measurement or payment will be made for any work included in this Clause, and relevant cost of all these requirements shall be included by the Contractor in his rates in the Bill of Quantities for other items of Work.

146 **DEMOLITION AND BREAKING OUT**

General

The Contractor shall demolish, break out wholly or partially and remove all structures and superficial obstructions on the Site as shown on the Drawings, as described in the Specification or as instructed by the Project Manager

Method of Demolition or breaking out

The Contactor shall prepare and submit his methods of demolition and breaking out to the Project Manager for consideration 4 weeks before such work is due to begin. Any approval given under this Clause shall in no way relieve the Contractor of his contractual obligations.

Removal of existing steelwork

All steel fixings, poles, brackets supporting services etc. that require to be removed from the works shall be unbolted or cut off using methods to be approved by the Project Manager. All such steel work shall if not reused in any part of the works, shall be removed from site either to a dump site or to scrap yard outside the Port area.

SECTION 2 - MATERIALS AND TESTING OF MATERIALS

202. TESTING BY THE CONTRACTOR

Add the following paragraph to Clause 202 of the Standard Specifications:

The onus rests with the Contractor to produce work which confirms in quality and accuracy of detail to the requirements of the Specifications and drawings, and the Contractor must, at his own expense institute a quality control system to ensure adequate supervision and positive control of the Works at all times. The Contractor must provide chainmen and surveyor for the Project Manager to carry out checks on the Works.

The Contractor shall submit to the Project Manager the results of the relevant tests, measurements and levels indicating compliance with the specifications on completion of every part of the work.

The Contractor shall make his laboratory accessible to the Project Manager's Representative for cross checking the test results and inspection during material testing in the laboratory. Should there be any need for the Contractor to carry out material tests away from the site laboratory, he should decide for the Project Managers Representative to attend and witness the testing to ensure its to the satisfaction of the Project Manager.

204. SIEVES

Amend the following:-

204.1 SIEVE SIZES

A standard set of sieves for general use shall consist of the following sieve sizes mm: 100- 63-50-37.5-25-20-14-10-6.3-5-42-1-0.6-0.5-0.425-0.300-0.150-0.075mm.

The sieves from 0.425 to 0.075 mm shall be suited for wet sieving.

205. SOILS AND GRAVELS

Whenever in the Contract Documents a minimum California Bearing Ratio (CBR) is specified, the CBR of the materials shall be determined at the specified state of compaction.

(a) after four days soaking in the case of neat materials, and

(b) after seven days curing plus seven days soaking in the case of cement or lime improved materials.

207. CEMENT

Delete "KS 02-21" and replace with "KS 1725 2001 CEM 1 42.5"

226. FREQUENCY OF TESTING

In (i) (ii) (iii) and (iv) delete "T99" and substitute "T180" instead.

228. OUTLINE TESTING AND INSPECTION BY THE PROJECT MANAGER

The Project Manager will at regular intervals inspect and test materials and completed work for compliance with the specified requirements. Samples and lot sizes for routine testing shall be at the Project Manager's discretion.

All sections of completed work including all test results carried out by the Contractor, shall be submitted to the Project Manager for routine inspection and testing and the Contractor shall not cover up or construct any work on top of sections of completed work before written approval has been given by the Project Manager.

The Contractor shall arrange the submission of work for testing in such a manner that the Project Manager will have the opportunity to inspect and test the Works.

SECTION 5. EARTHWORKS

505.CONSTRUCTION OF EMBANKMENTS

In Clause 505 of the Standard Specification in paragraph 3 line 2 delete "25" and substitute "60" and in paragraph 3, line 3 delete "8%" and substitute "6%".

Unsuitable material shall include the following:

- Material containing more than 5% by weight of organic matter such as topsoil, humus, materials from swamps, mud, log stumps and perishable material;
- Material with a swell of more than 3%
- Clay with a Liquid Limit exceeding 50%
- Material having a moisture content greater than 105% of OMC in its naturally occurring state.

Only material approved by the Project Manager shall be used for construction of fills and subgrade. Material with a natural moisture content exceeding the optimum moisture content shall not be used for the construction of embankments, unless specifically directed by the Project Manager in writing. During the "short" and the "long" rains the material is expected to contain a high residual moisture content. The above material can be used in the work if allowed to dry out sufficiently to the satisfaction of the Project Manager.

508. COMPACTION OF EARTHWORKS

In the second paragraph, delete items (i), and replace with the following:

(i) All fill material in embankment: 97% of MDD (AASHTO T99)

Moisture content of suitable fill material or in-situ materials beyond 105% of the Optimum Moisture Content during compaction shall be brought by drying out the material, to moisture content ranges stipulated for different layers in Clause 508 of the Standard Specification.

509. MASS HAUL DIAGRAM

Delete this clause entirely and substitute "No mass haul diagram has been provided. The Contractor shall be responsible for locating suitable materials for constructing earthworks and shall include in his rates for fill and spoil the cost of haulage required."

510. SPOIL MATERIAL

The Contractor's attention is drawn to the fact that no payment for spoil of unsuitable material will be made, unless the Project Manager has instructed to spoil such material.

511. BORROW PITS

Clause 511 of the Standard Specification is deleted, and substituted by the following.

Fill material which is required in addition to that provided by excavation shall be

obtained from borrow pits to be located by the Contractor and approved by the Project Manager. The Contractor will be entirely responsible for locating suitable sources of borrow material for fills.

Once the Contactor has identified the materials sources to be used, he will be responsible for acquiring or leasing such land at his own cost, and such costs shall be deemed to be included in the Contractor's rates.

The Project Manager may direct that materials be selected in borrow pits for "fill in soft material", and that other materials be excluded. The Contractor's rates shall include for all such requirements plus the cost of site clearance, selection of materials, double handling, stockpiling and provision of adequate supervision in every borrow pit to ensure that approved material is not contaminated with unsuitable material.

Unsuitable material shall be spoiled in accordance with the second paragraph of Clause 510 of the Standard Specification. Borrow pits shall be excavated to regular widths and shapes and shall be cleaned up on completion so that the sides are neatly trimmed and bottoms levelled and drained away from the works all in accordance with the provisions of Section 6 of the Standard Specification.

The Contractor shall propose to the Project Manager the haulage route he intends to use for the haulage of material, and shall not divert from this route without the approval of the Project Manager. The Contractor shall be responsible for the maintenance of this selected route, at his own cost.

516. TREATED MATERIALS

Any excavated sections that have exposed base layers shall be required to be reinstated with cement treated materials carried out on the subgrade. The treatment shall be following Section 14 of the Standard specifications.

517. MEASUREMENT AND PAYMENT FOR EARTHWORKS

Notwithstanding the provisions of Clause 517 of the Specifications, the Contractor shall have included in his rates for fill all costs for providing such material irrespective whether the material is originating from "Cut" or "Borrow". No separate payment will be made for opening up, operating and landscaping after use of a borrow area.

Delete in Clause 517 the third paragraph and its sub-clauses numbered (i) to (iv).

Delete in Standard Specification Clause 517(e) and substitute with "No separate payment shall be made for earthworks overhaul and all transportation of material whether in fill, spoil or otherwise shall be regarded as free-haul. The Contractor shall be deemed to have included for all necessary hauls in the relevant item for earthworks."

SECTION 6 - QUARRIES, BORROW PITS, STOCKPILES AND SPOIL AREAS

601. GENERAL

Notwithstanding the provisions of this Clause, the Contractor shall be responsible for locating and identifying sources and locations for borrow material, quarries, stockpiles and spoil areas. All such sources and locations subject to the approval of the Project Manager.

The Project Manager will not make available to the Contractor any land for quarries, borrow pits, stockpiles, and spoil areas.

The Contractor will be entirely responsible for locating suitable sources of material complying with the specification and for the procuring, winning, haulage, to the site of materials and all costs involved therein. Similarly, the Contractor will be responsible for the provision and costs involved in providing suitable areas for stockpiling materials and spoil dumps.

No additional payment will be made to the Contractor to cover costs arising from the requirement for this clause and the Contractor must include these costs in the rates inserted in the Bills of Quantities.

605. SAFETY AND PUBLIC HEALTH REQUIREMENT

Add the following to Clause 605:

"When working the material sites, the Contractor shall time and arrange his works in such a way that at no times the public safety is endangered in any way."

611. OBTAINING OF BORROW MATERIALS

(a) Borrow Pit Locations

Borrow material shall be located and obtained by the Contractor. Borrow material shall comply with the requirements of these Specifications for the use for which the material is intended.
The Contractor shall search for and test all possible sources of borrow material including any possible sources so designated by the Project Manager, within an economic distance of the location where the borrow material is to be utilized.

The Contractor shall excavate the necessary trial holes, take such samples and perform such tests as are deemed necessary by the Project Manager. The Contractor shall submit all the results to the Project Manager in sufficient detail to satisfy him that the quality and quantity of material available in the proposed borrow area is acceptable for the intended use, all at the Contractor's expense. The Contractor shall propose the use of those borrow pits which will be most economic to the Employer.

Approval of borrow pits or borrow areas shall apply only to those portions of the pit or area from which acceptable materials can be obtained or produced. The Contractor shall conduct his operations in any approved pit or borrow area or portions thereof so as to produce acceptable material.

Any approval given by the Project Manager shall not relieve the Contractor of the responsibility of ensuring that material obtained from a borrow pit or area complies in all respects with the specification for the material.

The Contractor shall plan his exploitation of the borrow pit in such a manner that the various materials excavated can be selected and either loaded directly for use or pushed to stockpile in a borrow area for later loading.

611. OPENING AND WORKING BORROW PITS

(a) Clearing and Grubbing, Topsoil and Overburden

The Contractor's rate for borrowed material must include for clearing and grubbing and the removal of topsoil and overburden.

(b) **Excavation of Borrow Material**

Where any borrow pit contains different types of materials, in separate layers which require to be mixed in order to produce a suitable product, the materials shall be excavated over the full depth of approved face in one operation without separation of the different types of material.

The Contractor shall exercise all reasonable care so as to avoid contamination of approved borrow material by the inclusion of clayey or otherwise unsuitable material from the floor of the borrow pit, from overburden, from unsuitable layers or from areas beyond the approved limits of the borrow area. During loading hard oversize material which will not break down during processing on the road shall be excluded as far as is practicable.

During the course of borrow operations and especially when excavating near the floor and outer boundaries of borrow areas, the Contractor shall plan his operations so as to reduce as far as possible the amount of earthmoving that will be necessary for the reinstating of borrow pits. Indiscriminate excavation without due regard for the desired final shape of the borrow pit will not be permitted.

The material in borrow pits shall be blasted or ripped and/or excavated in a manner that will ensure the effective breaking down of the material in the borrow pit before it is loaded. Rippable material which tends to break into large blocks shall be cross ripped.

(c) **Quality Control at Borrow Pit**

The Contractor shall be responsible for controlling his operations at every borrow pit where material is being excavated, to ensure compliance with the requirements of Sub-section (b) above.

He shall carry out sufficient tests on the material being excavated from the borrow pit in order to satisfy himself that the quality of the material will comply with the specified requirements for the particular layer for which it will be used.

(d) **Protection of Borrow Pit**

Borrow pits shall be continuously protected against the ingress of surface water and the

Contractor shall construct such temporary banks as may be required to divert surface water and as far as possible his operations shall be planned in such a way that the borrow pit is self-draining. Where this is not possible, borrow pits shall be dewatered by pumping. The Contractor shall be solely responsible for keeping borrow areas dry and ensuring that borrow material is sufficiently dry when required for use.

612. Reinstatement Of Borrow Areas

On completion of his operations in a borrow area, the Contractor shall reinstate the entire area so as to blend with the surrounding area and to permit the re - establishment of vegetation. For this purpose the borrow area shall be shaped to even contours. All material in and around the borrow area, whether spoil from road building operations, excess stock-piled material, oversize material left in the borrow pit, material resulting from clearing and grubbing operations and excess overburden, shall be used or disposed off as directed by the Project Manager. Material not capable of supporting vegetation shall be buried and used in shaping the borrow area and subsequently covered with soft material. All available soft material shall be spread evenly to the thickness directed and where sufficient material is not available for this purpose to cover the entire area, the remaining portions shall be scarified along the contours so as to avoid undue erosion.

All haul roads shall be obliterated and the surface scarified, earth banks constructed to prevent erosion and all damaged fences and other structures reinstated.

The shaping and reinstatement of the borrow pit shall be done in such a way that the borrow pit will be properly drained whenever practicable and where required, the Contractor shall place earth banks to divert any surface water away from the borrow area.

The reinstatement of any borrow pit shall be to the entire satisfaction of the Project Manager, and the Contractor shall submit to the Project Manager a signed certificate from the landowner stating that he is fully satisfied with the reinstatement of any borrow area.

613. Disposal Of Borrow Material

The Contractor shall not have the right to use material obtained from borrow pits for any purpose other than for the execution of this Contract. He shall not dispose of any borrow material whether processed or not either by sale or donation to any person without the written authority of the Employer.

SECTION 9 – PASSAGE OF TRAFFIC

901. Scope of Section

The Contractor shall prepare a traffic deviation scheme for the period of the Works. This scheme shall include and not limited to temporary signs, barriers, lights, traffic marshals etc. which are necessary to allow a safe passage of traffic during the Works.

The traffic deviation scheme has to take into consideration the nature of port being a 24hr work environment to minimize any traffic congestion in the supposed diversion.

The traffic deviation Scheme must be submitted to the Project Manager for approval before implementation.

SECTION 13 – GRADED CRUSHED STONE SUBBASE AND BASE

1301 DEFINITIONS

The graded crushed stone for subbase shall meet the requirements specified in Clause 1303 for:

Stone Class "A" for Subbase; and Nominal size "0/40".

The crushing ratio for all graded crushed stone pavement materials shall be minimum 100%.

1304 CRUSHING, SCREENING AND MIXING

The crushing installation used in the production of Graded Crushed Stone shall be a multiple stage crusher capable of producing material complying with the specified requirements.
The crushed material shall be separated by screening into at least 4 different aggregate fractions and recombined in a mixing plant to produce the specified particle size distribution.
The mixing plant shall be an approved type mixer of proven suitability for producing a mixture complying with all the requirements of the specifications. The mixing plant shall be equipped with satisfactory means to control mix proportions of different aggregate fractions and water.

All materials shall be added and mixed on the plant ready for spreading and compaction. The water content added at the mixing plant shall be such that the moisture content during placing and compaction will be within +/-2 % of the optimum moisture content determined according to AASHTO T.180.

1306 LAYING AND COMPACTING GRADED CRUSHED STONE SUBBASE

Graded crushed stone shall be laid by paver. Laying and mixing by grader shall not be permitted, except on confined areas.

Construction Requirements

1.**Preparation of Existing Surface**

The existing surface shall be graded and finished as provided under Section 5 of these Specifications before placing the sub-base material.

2.Placing

The aggregate sub-base material shall be placed as a uniform mixture on a prepared sub-grade in a quantity which will provide the required compacted thickness.

When more than one layer is required, each layer shall be shaped and compacted before the succeeding layer is placed.

The placing of material shall begin at the point designated by the Project Manager. Placing shall be from vehicles especially equipped to distribute the material in a continuous uniform layer or windrow.

The layer or windrow shall be of such size that, when spread and compacted the finished layer be in reasonably close conformity to the nominal thickness shown on the Tender Drawings.
When hauling is done over previously placed material, hauling equipment shall be dispersed uniformly over the entire surface of the previously constructed layer, to minimize rutting or uneven compaction.

3.Spreading and Compacting

When uniformly mixed, the mixture shall be spread to the plan thickness, for compaction.

Where the required thickness is 150 mm or less, the material may be spread and compacted in one layer.

Where the required thickness is more than 150 mm, the aggregate sub-base shall be spread and compacted in two or more layers of approximately equal thickness, and the maximum compacted thickness of any one layer shall not exceed 150 mm.

All subsequent layers shall be spread and compacted in a similar manner.

The moisture content of sub-base material shall, if necessary, be adjusted prior to compaction by watering with approved sprinklers mounted on trucks or by drying out, as required in order to obtain the required compaction.

Immediately following final spreading and smoothening, each layer shall be compacted to the full width by means of approved compaction equipment.

Rolling shall progress gradually from the sides to the centre, parallel to the centreline of the road and shall continue until the whole surface has been rolled.

Any irregularities or depressions that develop shall be corrected by loosening the material at these places and adding or removing material until the surface is smooth and uniform.

Along curbs, headers, and walls, and at all places not accessible to the roller, the sub-base material shall be compacted thoroughly with approved tampers or compactors.

If the layers of sub-base material, or part thereof, do not conform to the required finish, the Contractor shall, at his own expense, make the necessary corrections.

Compaction of each layer shall continue until a density of not less than 96 percent of the maximum dry density determined in accordance with BS 1377 – Test 14 has been achieved. In- place density determination shall be made in accordance with AASHTO T 191.

4.Trial Sections

Before sub-base construction is started, the Contractor shall spread and compact trial sections as directed by the Project Manager.

The purpose of the trial sections is to check the suitability of the materials and the efficiency of the equipment and construction method which is proposed to be used by the Contractor. Therefore, the Contractor must use the same material, equipment and procedures that he proposes to use for the main work. One trial section of about 10 m2 shall be made for every type of material and/or construction equipment/procedure proposed for use.

After final compaction of each trial section, the Contractor shall carry out such field density tests and other tests required as directed by the Project Manager.

If a trial section shows that the proposed materials, equipment or procedures in the Project Manager's opinion are not suitable for sub-base, the material shall be removed at the Contractor's expense, and a new trial section shall be constructed.
If the basic conditions regarding the type of material or procedure change during the execution of the work, new trial sections shall be constructed.

5. Measurement and Payment

The graded crushed stone for sub-base and base shall be measured and paid for in cubic meters of material compacted in accordance with the Drawings and specification requirements, and accepted by the Project Manager.

The volumes to be measured shall be based on the road plan and typical cross section of road pavement shown on the Drawings where the required thickness is uniform and on the cross sections approved by the Project Manager.

Payment shall be full compensation for hauling, supplying, placing, compacting, finishing and testing the materials, the supply and placing of running course and maintenance of the surface under traffic, and all others costs necessary or usual for the proper completion of the works described in this Specification.

SECTION 17 – CONCRETE WORKS

1703. MATERIALS FOR CONCRETE

(a) Replace the first 3 lines with the following:

Only CEM I Class 42.5 N (or higher strength) Portland cement complying with the requirements of Kenyan Standard KS EAS 18-1:2001 shall be used in the works unless otherwise specified, ordered or permitted in writing.

1704. The Design of Concrete Mixes

The Concrete for the paved area of the terminals shall be; C32/40 (i.e. Cylinder strength 32, and cube strength 40).

The maximum aggregate size shall be 20 mm and the minimum cement content shall be 400 kg/m3 with water: cement ratio of 0.5.

1705. Fibre Reinforcement

Fibers for concrete shall be Macro synthetic Fibre Reinforcement for concrete, ENDURO 600 macro-synthetic fibres / Mapefibre ST 42 / similar approved polypropylene/polyethylene high performance macro-monofilament fiber and manufactured specifically for the reinforcement of concrete. The manufacturers test certificate for the proposed fibre reinforcement shall be submitted to the Engineer for approval before delivery of the product to site.

Commented [ND2]: Use of admixtures

The macro-synthetic fibres shall be mixed at the batch plant, at a rate of 9 kg/m³, and mixed to ensure uniform distribution of the fibres throughout the concrete mix. The specified dosage per cubic meter should be added to the mixer after batching the other concrete materials.

Applicable reference standards shall be the following:

ASTM C III6: Standard Specification for Fibre-Reinforced Concrete

ASTM C 1550 Standard Test Method for Flexural Toughness of Fibre-Reinforced Concrete.

SECTION 20 – ROAD FURNITURE

2004. PERMANENT ROAD SIGNS

Scope of Works

Works consist of furnishing, fabricating, and erecting the specified types of traffic signs at locations indicated on the Tender Drawings or as directed by the Project Manager.

Permanent road signs shall comply with the requirements of BS 873 parts 2. 6 and 7 in respect of quality including the pre-treatment, preparation and protective coatings for the frame, posts and fittings.

1) **Materials**

(a) Materials shall conform to the requirements noted in the Tender Drawings. Steel and aluminum materials shall be of durable quality and shall be approved by the Project Manager.

(b) Bolts to be used for tightening sign boards shall be steel bolts, fully galvanized and free from deformation and bending. Each bolt shall be tightened with a galvanized nut and washer.

(c) Aluminum plates shall be degreased, etched, neutralized and processed prior to use as traffic sign boards. Reflective sheeting shall conform to the requirements of AASHTO M 268 and shall be of the color specified by the Project Manager or as shown on the Tender Drawings and shall include a pre-coated adhesive on the back capable of forming a durable bond, by vacuum or roller method, to aluminum plates.

(d) Steel poles for traffic signs shall either be processed for rust prevention by phosphatic membrane or zinc galvanizing, or if approved by the Project Manager, by means of a rust prevention painting process. All details of materials and painting shall be approved in advance by the Project Manager.

2) Road signs shall be obtained from a manufacturer approved by the Project Manager and before placing any order for the manufacture of the road signs, the Contractor shall submit to the Project Manager two copies of the following information:

i. The name of the firm from which he proposes to obtain the signs together with the place of manufacture or fabrication.

ii. A description of the items to be supplied with the manufacturer's specification together with a description of quality, grade, weight and strength.

iii. The manufacturer's "type" test certificates or recent test results carried out on similar items.

iv. A sample sign, post and fittings which shall be stored on Site for the Project Manager.

(3) **Construction Requirements**

1) **Preparation**

(a) The manufacturer or vendor of the sign boards shall make available the following information:

(i) Instructions on the assembly and erection of the road.

(ii) Details of any limitations in location or usage.

(iii) Instructions on the operation and maintenance of the board.

(b) The type and location of the traffic sign boards shall conform to the Tender Drawings and the instructions of the Project Manager.

3) **Erection of Sign Boards**

(a) The type and location of traffic signs shall conform to the Tender Drawings and the instructions of the Project Manager.

(b) Poles shall be set on a foundation as shown on the Tender Drawing after digging holes by means of auger or other equipment approved by the Project Manager. When handwork is required, care shall be exercised not to damage existing pavement.

(c) Poles shall be supported as necessary until the concrete has achieved sufficient strength and the hole shall then be backfilled and thoroughly compacted with suitable material to the satisfaction of the Project Manager. The adjacent surface shall be restored to its original condition as directed by the Project Manager.

(d) When traffic signs are to be installed on existing roads or car park, extreme care shall be exercised to prevent obstruction of traffic. Any damaged portion shall be repaired to its original condition immediately after the installation of the boards. The boards shall be carefully handled so as not to cause damage, and the Contractor shall repair or replace boards at his own expense in the event of them sustaining any damage.

(e) The Contractor shall cut back trees and vegetation to permit visibility and shall not permit material to be dumped so as to obscure the signs.

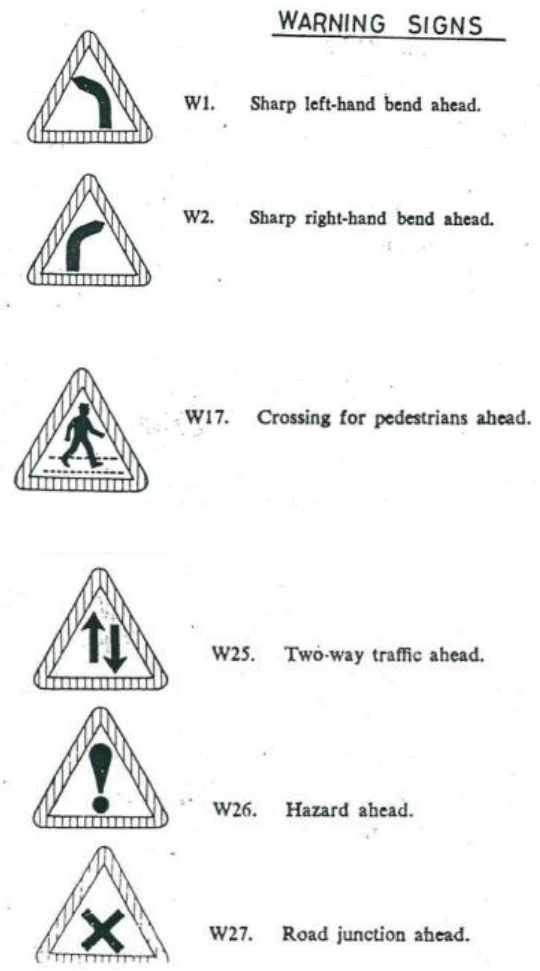
(f) All the boards shall be maintained in a clear and legible condition and shall be washed down when necessary.

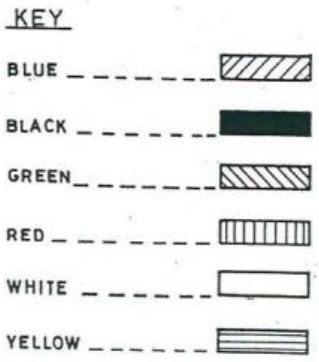
4) 3) Size and siting

All Signs Should Be Sited On the Drivers Nearside.

Warning Signage

Height (mm)	Distance of sign from hazard (m)	Recommended visibility distance (m)
750 (Height of triangle (mm))	50	60





Diameter (mm)	Size of additional plate below standing and parking signs		Size of single arrow plate A1,A3 WIDTH X HEIGHT (HEIGHT IN BRACKETS = HEIGHT WITHOUT DISTANCE FIGURE) mm	Size of single arrow plate A2 WIDTH X HEIGHT (HEIGHT IN BRACKETS = HEIGHT WITHOUT DISTANCE FIGURE) mm
	X- HEIGHT (mm)	Width (mm)		
1000 (Diameter (mm))	64	1000	600 X 300 (200)	750 X 300 (125)

P1. NO ENTRY. Entry forbidden to all vehicles.

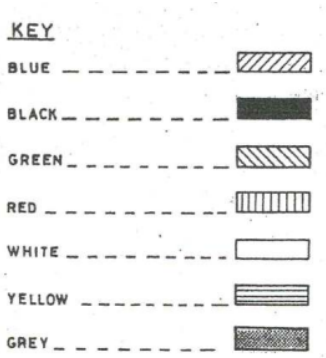
P20. Left turn prohibited to all vehicles.

P21. Right turn prohibited to all vehicles.

P22. About turn (or "U" turn) prohibited to all vehicles.

P23. NO OVERTAKING. Overtaking of any four-wheeled motor vehicle by any other four-wheeled motor vehicle prohibited.

P25. SPEED LIMIT. No vehicle to exceed such speed in kilometres per hour as is indicated by the numerals.



Mandatory signs

Diameter (mm)	**Size of additional plate below standing and parking signs**	
	X- HEIGHT (mm)	**Width (mm)**
1000 (Diameter (mm))	64	1000

M1. Requires all vehicles to turn to the left. (The direction of the arrow may be reversed in which case all vehicles are required to turn to the right).

M2. Requires all vehicles to travel straight ahead.

M3. Requires all vehicles to turn to the right at the next junction. (The direction of the arrow may be reversed in which case all vehicles are required to turn to the left at the next junction.)

M4. Requires all vehicles either to travel straight ahead or to turn to the right (or to the left if the direction of the horizontal arrow is reversed) at the next junction.

M10. MINIMUM SPEED REQUIRED. All motor vehicles must travel at a speed in kilometres per hour of or in excess of that which is indicated by the numerals.

KEY

BLUE _ _ _ _ _ _ _

BLACK _ _ _ _ _ _ _

GREEN _ _ _ _ _ _

RED _ _ _ _ _ _ _

WHITE _ _ _ _ _ _ _

YELLOW _ _ _ _ _ _ _

5) **Curb and Gutter**

(1) **Scope of Works**

This Section shall consist of the construction of curb and gutter made of precast concrete in accordance with these Specifications at the location, and in conformity with the lines, grades, dimensions and design, shown on the Tender Drawings or as required by the Project Manager.

(2) **Materials**

1) Material for Bed Course

Bed course material as shown on the Drawings shall consist of cinders, sand, slag, gravel, crushed stone, or other approved porous material of such grading that all the particles will pass through 12.5 mm (1/2 inch) sieve.

2) Concrete

Concrete shall be of the class indicated on the Drawings and shall conform to the requirements of Section 17 in these Specifications.

3) Expansion Joint Filler

Expansion joint shall conform to the requirements of AASHTO M 153.

(3) **Construction Requirements**

1) Bedding

Excavation shall be made to the required depth and the base upon which the curb and gutter is to be set shall be compacted to a firm and even surface. All soft and unsuitable materials shall be removed and replaced with suitable material.

Bed course material shall be placed and compacted to form a bed of the required thickness as shown on the Drawings.

2) Placing

Precast concrete curb and gutter shall be place individually and checked for alignment and grade. Curbs and gutters constructed on curves shall have forms of phenolic board or metal and they shall be accurately shaped to the curvature shown on the Drawings.

The precast curb and gutter shall be fabricated in uniform sections of not more than 0.8 m in length except where shorter sections are required to coincide with the location of weakened planes or contraction joints of the concrete pavement, or for closures. The Sections shall be separated by sheet templates set perpendicular to the face and top of the curb and gutter and not less than 50 mm deeper than the depth of the curb and gutter. All the fabricated curb and gutter shall be approved by the Project Manager prior to installation.

Plastering shall not be permitted and all rejected curb and gutter shall be removed and replaced at the Contractor's expense.

2005. ROAD MARKINGS

(1) **Scope of Works**

Works included under this Section shall comprise the furnishing and application of permanent and temporary pavement markings on completed paved areas at the locations and of the dimensions shown on the Tender Drawings in accordance with the requirements specified or referred to herein

(2) **Materials**

a) **Hot Applied Thermoplastic Material**

(a) The material for hot-applied thermoplastic paint for bituminous surface pavement marking shall be in accordance with AASHTO M 247 (Type 2). Samples shall be submitted to the Project Manager at least 2 weeks prior to the proposed use.

(b) Colour

(i) The colour of white markings shall be BS Colour No 00E55 as per BS 4800.

(ii) The colour of yellow markings shall be to BS Colour No. 08E51 as per BS 4800.

(c) Composition

The thermoplastic material shall consist of light coloured aggregates, pigment and extender bound together with resin plasticized with oil as necessary, in approximately the following proportions:

Aggregate, including ballotini	:	60%
Pigment and extender	:	20%
Binder	:	20%

The maximum size of the aggregates shall be 2mm. The softening point of the binder shall be 45°C – 50°C.

(d) Reflectorisation

Reflectorisation shall be by ballotini beads pursuant to AASHTO M 247 (Type 2) or BS 6088, which shall make up approximately 20% of the total mix, and shall be treated as part of the aggregate. The ballotini shall be reasonably spherical and free from flaws and of a size suitable for this method of reflectorisation, subject to a maximum size of 2 mm.

(3) Construction Requirements

1) Layouts and Alignment

(a) Suitable layouts and lines of proposed stripes shall be spotted in advance of the paint application and control points shall be provided and spaced at such distances as will ensure an accurate location of all lines and markings.

(b) The Contractor shall provide an experienced technician to supervise the location, alignment, layout, dimensioning and application of paint.

(c) Single stripes shall be applied wholly on one side of the longitudinal pavement joints and double or multiple stripes shall be centred over similar joints.

2) Preparation

(a) The surface area to be marked shall be clean, dry and free from loose particles. Setting out and location of all the markings shall be approved by the Project Manager before the Works begin.

(b) Preparation and application of the material shall be in accordance with the manufacturer's instructions. On concrete surfaces the Contractor shall first apply a tack

coat of a type compatible with the thermoplastic material.

Application

All marks shall be laid by self-propelled machines equipped with cut-off valves and nozzles capable of forming clean and sharp-edged lines and markings of the specified thickness.

All markings shall present a clean cut, uniform and workmanlike appearance and the surface shall be free from streaks and cracks. All markings which do not have a uniform satisfactory appearance by day and night shall be corrected by the Contractor at his own expense.

Paint material shall be laid by a spray or screed to the dimensions shown on the Drawings. The finished thickness of the material shall be a minimum of 1.5 mm for spray application and 3 mm for screed application, both exclusive of the glass beads described below.

Glass beads shall be applied to the surface of permanent markings immediately after they have been laid. All glass beads shall be applied by a pressure or spray application at a rate specified in the manufacturer's specifications.

b) **Cold applied road Marking paint**

Sections of the container yard comprising of concrete pavement will have Plascon Acrylic Road Marking paint as Reflectorized paint for all the yard markings, including but not limited to Lines, arrows, letters and numbers.

Product data sheets and any other pertinent documents relating to the proposed material for road marking must be submitted to the Project Manager for approval before its use.

Application

1) Prior to paint application, the road surface to be cleaned thoroughly of loose material and completely dry by use of compressor.
2) Paint material shall be laid by a spray to the dimensions shown on the Drawings. All marks shall be laid by self-propelled machines equipped with cut-off valves and nozzles capable of forming clean and sharp-edged lines and markings.
3) Spray rate will vary with surface roughness but must give continuous coverage and minimum dry film thickness of 0.125mm.

4.Protection

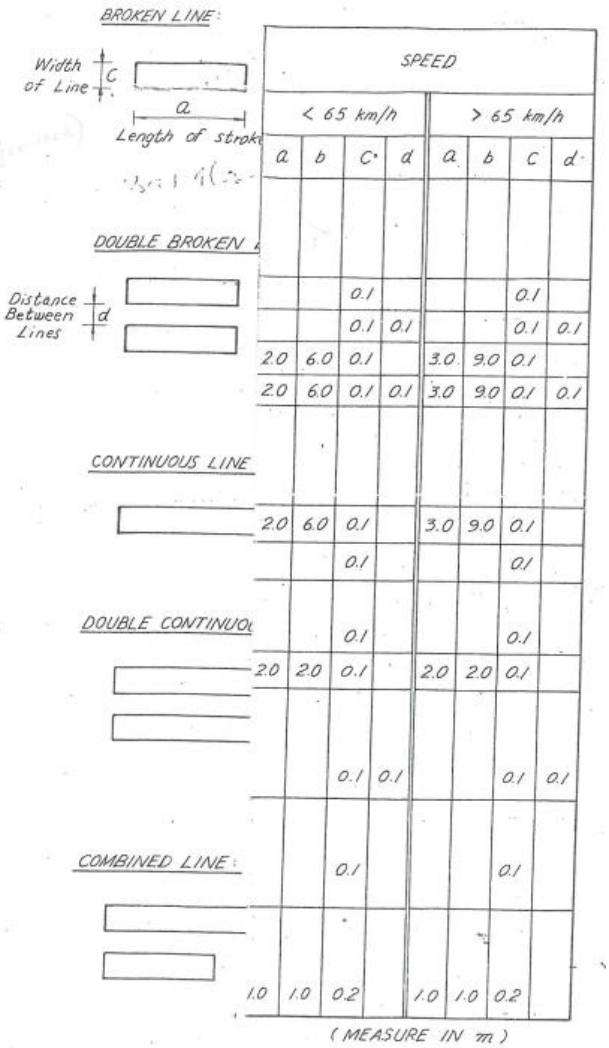
All pavement markings shall be protected from traffic.

After the application of the paint, all markings shall be protected from injury or damage of any kind. The Contractor shall be directly responsible and shall erect or place suitable warning signs, flags, or barricades, protective screens, or coverings as required.

Adjacent surfaces shall be protected from disfiguration by spatter, splashes, spillage, drippings of paint or other materials.

5) Dimensions

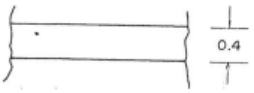
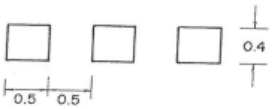
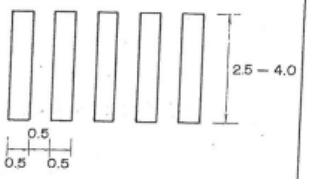
The specifications are as contained in the manual for traffic signs in Kenya Part I (Road markings) and as shown below:



SPEED							
< 65 km/h				> 65 km/h			
a	b	c	d	a	b	c	d
		0.1				0.1	
		0.1	0.1			0.1	0.1
2.0	6.0	0.1		3.0	9.0	0.1	
2.0	6.0	0.1	0.1	3.0	9.0	0.1	0.1
2.0	6.0	0.1		3.0	9.0	0.1	
		0.1				0.1	
		0.1				0.1	
2.0	2.0	0.1		2.0	2.0	0.1	
		0.1	0.1			0.1	0.1
		0.1				0.1	
1.0	1.0	0.2		1.0	1.0	0.2	

(MEASURE IN m)

FIG. 3 LONGITU MARKING

	TYPE	DIMENSION (m)
1	STOP LINE	
2	GIVE WAY LINE	
3	SAFETY LINE	
4	PEDESTRIAN CROSSING	

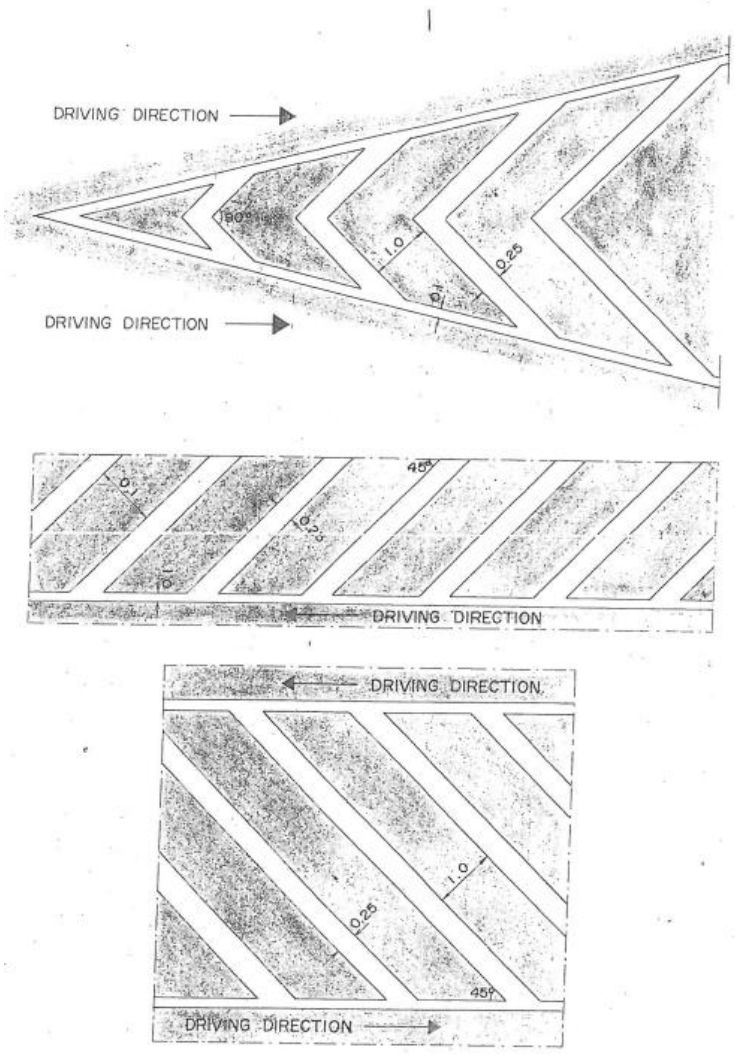
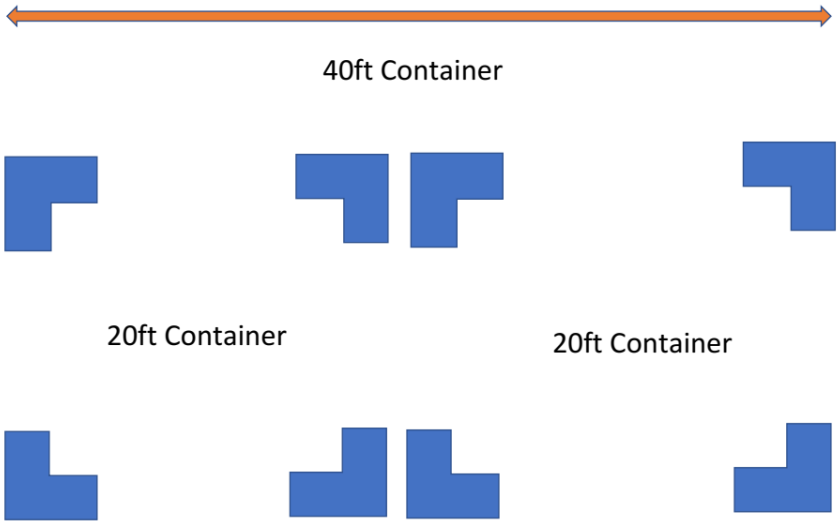


FIG. 7 HATCHED AND CHEVRON MARKINGS



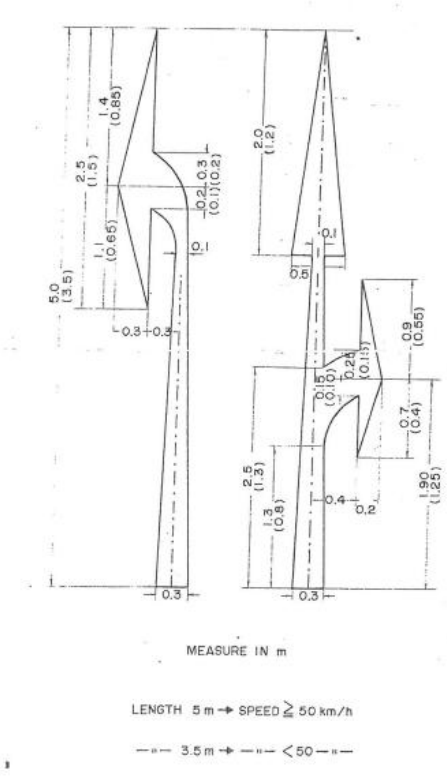


FIG. 6 LANE INDICATION ARROWS

2012. CRASH BARRIER

Crash barriers shall be single faced single barriers and shall comply with all applicable standards such as AASHTO M 180 and EN 1317 Part 1&2.

2014. TERMINAL FENCING

Terminal fencing shall be Galvanized Anti-climb fence with Powder Coating, with a minimum height of 3 m and poles at every 3m width with adequate corrosion protection. The fence should have complete sets of accessories for its full installation that are corrosion resistant. The fence posts shall be 75mm by 50mm by 2mm thick, with post square base plate of 160mm by 6mm

The Bidder shall submit together with his Bid technical specifications of the proposed terminal fence he intends to install.

SECTION 23 – RAILWAY WORKS

2301. RELOCATION OF MGR TRACKS

An existing MGR tracks shall be demolished as shown on the Tender Drawings and as instructed by the Project Manager.

2302.SURFACE CONSTRUCTION BETWEEN RAILWAY TRACKS

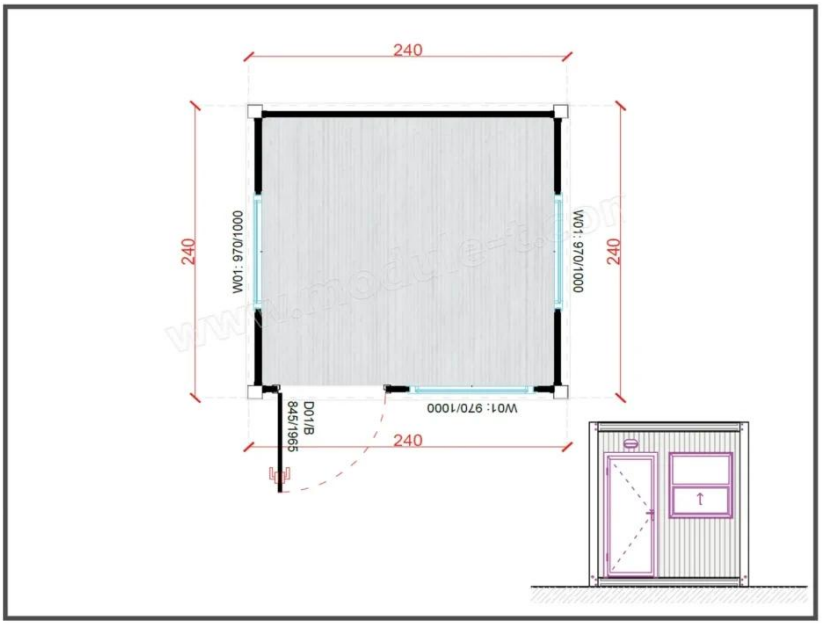
At the location of level crossings, the area between railway tracks has to be paved to enable the safe and reliable crossing of vehicles. This also includes heavy trucks.
The level crossings shall resemble the type of road construction (asphalt or concrete) in front of and behind the railway tracks.

2303 PREFABRICATED, MODULAR SECURITY BUILDING AT THE GATE

The dimensions of the gate house is 2400 x 2400 mm x 3000 mm high.

Structural Framework: They shall be robust steel or aluminium frames, which gives them a stable plinth that can withstand adverse weathering or usage.

The dimensions of the structure, windows and doors are as shown below (in cm).


240
240
240
240
W01: 970/1000
W01: 970/1000
W01: 970/1000
D01/B
845/1965

SECTION 24 – MISCELLANEOUS WORKS

COMPLIANCE WITH GENERAL SPECIFICATIONS

All pipe work, fittings, valves, plant and equipment shall be in accordance with the General Specifications of Plumbing & Drainage installation requirements. Where there are any deviations from the requirements of the standard specifications these requirements shall take precedence over the general specifications.

INSTALLATION DRAWINGS

The design drawings show the general design intent and are not intended as installation drawings.
The contractor shall produce detailed installation drawings at a scale not more than 1:50. Showing the full layout of all pipe work and valves including brackets and supports all fully dimensioned. Toilets and bathroom layouts should be produced at a scale of not less than 1:20. Two copies of the installation drawings must be submitted to the Project Manager for comment before any work proceeds.
No work shall be started on site until the drawings are approved by the Project Manager and the Contractor is instructed to proceed with the works.
Drawings shall be submitted to the Project Manager as many times as necessary to achieve A or B1 status.

BUILDERS WORK DRAWINGS

The Contractor shall where necessary produce builders work drawings, at a suitable scale but not less than 1:50, showing all openings, plinths, chases etc. that are required to be formed by the main contractor. All builders' works shall be fully dimensioned and located in relation to the structure so that the contractor can properly carry out the work.
Builders work drawings shall be submitted to the Project Manager for review in the same manner as the Installation Drawings.

RECORD DRAWINGS

During the execution of the contract works the contractor shall, in a manner approved by the Project Manager, record on working or other drawings at site all information necessary for preparing record drawings of the installed contract works. Marked-up working or other drawing and other documents shall be made available to the Project Manager as he may require for inspection and checking.

INCOMING WATER SUPPLY AND EXTERNAL WORKS

The Contractor shall liaise with the Mombasa / Nairobi Water Supply and Sanitation Company Limited to arrange for a new potable water connection to the site.
A meter pit shall be constructed by the Contractor 500 mm long x 400 mm wide x 400 mm deep. The Contractor shall install a new water meter in the meter pit. Isolating valves shall be installed each side of the meter and a disconnection union on the down streamside so that the meter can be removed for servicing if necessary.
A new water main is to be installed form the meter pit to the tank room. The pipe shall be Polypropylene Co-polymer Random (PP- R) suitable for working pressure of not less than 20 bar.
An alternate connection from the existing elevated tank delivery pipe shall also be provided.

The pipe shall be laid by the Contractor in accordance with these specifications and to the approval of the Project Manager and Mombasa /Nairobi Water Supply and Sanitation Company Limited.
Connections are taken from this main to feed any standpipes indicated on the drawings.
Standpipes shall be in PP-R securely anchored into a concrete base with a mounting support.

COLD WATER DOWN PIPE SERVICES

A PP-R cold water down service pipe droops from the roof tanks to feed the sanitary appliances in ground floor. Each branch connection shall be fitted with an isolating gate valve.
Branches shall be taken from the down service pipe to each toilet area.
The down service pipe is installed in the service duct and shall be properly clipped as required in the general specification.

PAINTING OF PIPEWORK

All exposed plumbing pipe work in finished areas including final connections to wash hand basins shall be painted with painted with one coat primer plus one coat brilliant white gloss paint.
Piping in service cabinets and fire-fighting piping services shall be painted with one coat primer plus one coat gloss paint with colour coding to BS standards.

GATE VALVES

Valves shall be supplied and fitted by the contractor at the positions shown on the contract drawings and at any other positions necessary for the proper working of the system. Any departure from the valve positions shall be agreed with the Project Engineer. Valves are generally required at the following positions.

a) In each service duct inside the building at the point of entry complete with drain tap.
b) In each branch pipe serving appliance.
c) At specific positions i.e. roof and landings, to control flow or isolate sections of the system or items of plant.
d) Angle valves shall be fitted for the toilet cisterns
e) All valves shall be tagged.
f)

SANITARY WARE

The Contractor shall submit a price for supply, deliver to site, install, and test and commission all sanitary ware and accessories.
Sanitary ware & fitments shall be as indicated on the schedule of unit rates and shall include any ancillaries necessary for the ordinary operation of the appliance/fitment.
The Contractor shall supply sanitary ware as shown on the Tender Drawings.

DRAINAGE SYSTEM

The Contractor shall provide a price for all of the internal drainage in uPVC as indicated on the Tender Drawings and the relevant BoQ Items. The installation shall be vented stack system as defined in the Plumbing Engineering services design Guide published by the Institute of Plumbing. The installation shall comply with all local authority requirements.

This system shall include all of the stacks down to the connection into the first manhole and external drainage up to the sewage tank and onwards to the nearest sewer manhole indicated by the Project Manager.