



SPECIFICATIONS FOR SMALL SCALE ISLAND BASED CONTRACTORS

May 2017

A.1 Preliminaries and General Items

Item No. / Name:	A.1.1 Consult Communities within the Work Section		
Category:	Labour Intensive	Scope: Preliminaries & General Items	Unit: Lump Sum (LS)
Description:	This activity involves consulting the communities in which the contractor will be working and chiefs to discuss work related issues with them and seek agreements to execute the contract successfully.		
Typical Crew: Contractor Supervisors	Typical Hand tools/Equipment: Hired Vehicle		
Materials: <input type="checkbox"/> Traditional consultation token for Chiefs in the road custom boundaries			
<p>Work Specification:</p> <ol style="list-style-type: none"> 1. Ask for and visit the chief of the custom boundary in which the work section passes through to book appointment to meet all community members and chiefs within the custom boundary 2. Arrange with the CPO to consult communities and conduct awareness education on work related issues focusing on labour recruitment and water sources and write down the names of interested community members willing to work on the road. At all sites, the public will be informed of forthcoming works through public meetings, notices, and installation of signage; 3. Make arrangements for a suitable site to erect a site camp, sources of construction materials, water sources and local skilled labour 4. Discuss, explain and sign Sub-Contract Agreements with the communities and chiefs to recruit interested community members directly or through the chiefs 5. Distribute copies of agreements signed with the communities and chiefs to PWD, the communities and Island Stakeholder Committee 6. Distribute leaflet with construction information, and Contractor contact details including contact phone numbers; 7. Erect signs at entrance to each site with construction information, and Contractor contact details including contact phone numbers; 8. Record all complaints and grievances in writing and pass copies to PWD; 9. Contractor's staff will undergo training on the environmental management plans, and related health and safety management plans including HIV/AIDS awareness training and traffic management plans and other requirements to minimise social disruption or impacts prior to commencement of works. 			
<p>Measurement for Payment:</p> <p>The activity shall be measured as an agreed Lump sum (LS) and the unit rate shall include full compensation for all steps necessary to comply with the above including contractor, transport and materials necessary to successfully undertake the activity as specified above. The payment Lump Sum of this item will be done an agreed percent per month</p>			

Item No. / Name:	A.1.2 Site Meetings with Local Community to promote Health & Safety & HIV/AIDS-STD Prevention		
Category:	Labour Intensive	Scope: Preliminaries & General Items	Unit: Provisional Sum (PS)
Description:	The Contractor will hire an approved service provider to carry out this task. This involves organising awareness meetings to discuss workplace health and safety related issues and educate the workers and communities on Health & Safety and HIV/AIDS and STDs Prevention		
Typical Crew: Contractor Approved Service Provider	Typical Hand tools/Equipment: Not Applicable		
Materials: <input type="checkbox"/> Site Meeting template			
<p>Work Specification:</p> <ol style="list-style-type: none"> 1. The Service Provider will arrange meetings that will include the representatives of the local community, the PWD, and the IBC Contractor to foster partnerships with the communities to promote health and safety and HIV/AIDS- STD prevention awareness 2. Prior to the implementation, Service Provider will submit the program for the approval by the PWD 3. Records of these meetings must be written and distributed to the attendees and copied to PWD Headquarters 4. The objective of the meetings will be to familiarize the IBC Contractor, communities, Public Works Department with the Workplace Health and Safety Management Plan requirements, raise their awareness about health and safety related risks and appropriate mitigation measures. As a minimum, it is mandatory that following topics are covered: <ol style="list-style-type: none"> a. Importance of safety at work; b. Responsibilities for ensuring the safety at work; c. Safe work practices; d. Proper use of road safety signage during road works; e. Traffic control during road works; f. Responsible behaviour for the prevention of HIV/Aids and STDs. 5. The status of monitoring HIV/AIDS & STD prevention awareness campaigns and incidents. 6. Allow the communities to air any complaints or grievances about the works such as: <ol style="list-style-type: none"> a. Traffic being maintained through the maintenance site b. Problems with dust on the work site c. Problems with drainage maintained through the maintenance site d. IBC Contractor’s Waste being properly disposed of e. IBC Contractor’s employees respecting the community’s standards and property f. Any other problems 			

7. To obtain inputs to and opinions about the needs and priorities of stakeholders in respect of proposed impact mitigation measures as well as gender sensitive and safety features to be incorporated into the project

Measurement for Payment:

The activity shall be measured as provisional sum (PS) item upon the submission of the invoice from the Service Provider and record of meeting(s). The exact amount to be paid will be the actual cost of hiring an approved service provider plus 15% to cover the Contractor's profit and overheads. This will be paid as per actual costs occurred plus overhead and profit per month.

Item No. / Name:	A.1.3 Mobilisation to Site		
Category:	Labour Intensive	Scope: Preliminaries & General Items	Unit: Lump Sum (LS)
Description: This involves all the works, materials and services necessary for the the mobilisation to the site by contractor and establishment of the campsite			
Typical Crew: Contractor, Supervisor	Typical Hand tools/Equipment: Pick-up Truck, Tipper Truck, Hammer, Pickaxes, Spades, Bush knife,		
Materials: Timber, Nails, First Aid Kit, Water Containers, Paint,			
<p>Work Specification:</p> <p>Mobilisation to Site</p> <ol style="list-style-type: none"> 1. Prior to use of the land and facilities, the Contractor will undertake a pre-construction condition survey to document existing conditions; 2. Procure and transport construction and camp materials, to site and erect site camp 3. Provide safe drinking water for the workers and first aid kit on the site 4. Provide materials, produce and erect <u>contract announcement board</u> 5. If required in the Contract, procure workman’s compensation insurance 6. Recruit workers according to work plans and schedules 7. Provide materials and produce safety signs, templates in accordance to specification and work items, batch boxes and cube/cylinder moulds 8. Mobilise to site and commence the works 9. Where practicable, workers will be housed in existing accommodation; 10. If using existing accommodation then existing water supply, toilet and ablution facilities and kitchens may be used with Contractor supplying generator for electricity supply; 11. Consultation with landowners and adjacent community shall be undertaken prior to establishment of any camp; 12. If required construction camps will be located away from rural villages and settlements to minimise disturbance; 13. Construction camps shall be located on open, underused and already disturbed areas, vegetation clearance for construction camps will not be permitted if alternative areas exist; 14. Construction camps will be equipped with water supply, separated waste receptacles, toilet and ablution facilities and readily available first aid equipment 			
<p>Measurement for Payment:</p> <p>The activity shall be measured as a lump sum (LS) item for mobilisation. The lump sum will be an agreed amount and paid as soon as the mobilization is complete.</p>			

Item No. / Name:	A.1.4 Provide Materials and Erect Project Announcement Board to Specification		
Category:	Labour Intensive	Scope: Preliminaries & General Items	Unit: Lump Sum (LS)
Description: This involves procurement of materials, produce the sign board, paint and inscribe project information and erect to design and specification			
Typical Crew: Contractor	Typical Hand tools/Equipment: Hammer, Hand Saw, Pickaxe, Spade, Bucket		
Materials: <input type="checkbox"/> Paint, Paint Brushes, Nails, Timber, Masking Tape, Cement, Coral, Sand, Black Plastic			
Work Specification: <ol style="list-style-type: none"> 1. Procure materials and produce the project sign board according to design and drawing 2. Paint the board and inscribe the information required according to design and drawing 3. Procure concreting materials and install the sign board according to design and specification 			
Measurement for Payment: The activity shall be measured as Lump Sum (LS) item. Unit rate for this activity shall be the agreed percentage or estimated amount to install the project announcement board			

Item No. / Name:	A.1.5 Procure Workman's Compensation Insurance for a Maximum of Forty (40) Workers per Day		
Category:	Labour Intensive	Scope: Preliminaries & General Items	Unit: Provisional Sum (PS)
Description:	This involves liaising with PWD to procure the workman's compensation insurance of behalf of the Island Based Contractor for the required number of workers before the commencing the works		
Typical Crew: Contractor	Typical Hand tools/Equipment: Not Applicable		
Materials: <input type="checkbox"/> Not applicable			
Work Specification: <ol style="list-style-type: none"> 1. Seek proof or confirmation of procured insurance in writing for a maximum number of 40 IBC site staff (i.e. IBC, IBC site supervisors, support and workers) BEFORE mobilising to the site 2. Ensure that the maximum number of forty (40) IBC site staff per day is NOT exceeded 3. Ensure that a first aid box is always available on the work site 4. It is the responsibility of the IBC to immediately report any/all accidents in writing to the Employer 			
Measurement for Payment: The activity shall be measured as provisional sum (PS) item. The amount paid will be the actual cost for providing workman's compensation insurance and paid for as actual receipts plus 15% for the Contractor's overhead and profit.			

Item No. / Name:	A.1.6 Implementation of the Traffic Management Plan		
Category:	Labour Intensive	Scope: Preliminaries & General Items	Unit: Lump Sum (LS)
Description:	This requires the contractor to provide traffic management to allow traffic to pass through the site. This includes procure/produce traffic warning or signs and using them to control trucks to keep the section on which the contractor is working safe for the workers.		
Typical Crew: Contractor	Typical Handtools/Equipment: Hammer, Hand Saw, Pickaxe, Spade, Bucket		
Materials: <input type="checkbox"/> Approved warning signs, Paint, Paint Brushes, Nails, Timber, Masking Tape, Cement, Coral, Sand, Black Plastic			
Work Specification: <ol style="list-style-type: none"> 1. Estimate the number and type of traffic warning or signs required for the planned activities 2. Estimate the number and type of safety equipment required for use on the site 3. Procure the traffic warning or signs and the safety equipment according to the estimated numbers for the item that have to be procured 4. Provide materials and produce warning or signs and safety equipment that could be produced locally according to design and specification. 5. Keep existing roads that are undergoing improvements open and maintained in such a condition as to safely accommodate traffic. 6. Provide and maintain temporary detours, approaches, or crossings and intersections with trails, roads, businesses, parking lots, and campgrounds in a safe and passable condition. 7. Perform no work that interferes or conflicts with traffic until a plan for handling traffic has been submitted and approved. 8. Before any suspension of work take precautions necessary to prevent damage to the project, such as temporary detours, approaches, crossings, or intersections, and make provisions for normal drainage and to minimize erosion. Leave all roads in a condition suitable for traffic unless otherwise specified. 9. Existing access levels will be maintained through the provision of temporary crossing as required at each site; 10. Vehicular access to adjacent properties shall be maintained throughout construction except for essential works where temporary closure shall not exceed one hour per day; 11. Where access is temporarily affected, the Contractor shall notify the affected parties of the disruption at least 7 days prior. 12. Temporary signage and barriers (fences) are to be used to prevent the public from entering the sites; 13. Excavated areas are to be clearly signed and fenced to protect people, especially children, from harm; 			

14. Traffic control measures shall include reduced speed limits through construction sites and adjacent villages;

Measurement for Payment:

The activity shall be measured as lump sum (LS) item. The lump sum will be agreed with the contractor and will be paid on a pro-rata basis per month. The agreed lump sum will be paid as a pro-rata basis per month amount. This percentage of the total will be paid each month upon the Engineer's certification of compliance. The monthly fixed percentage will be adjusted according to the Contractor's compliance with the above Work Specification as follows:

- 100% for full compliance.
- 30% for partial compliance (50 - 99% compliance analysed in a one-month period).
- 0% nil compliance (0 – 49% compliance analysed in a one-month period).

Item No. / Name:	A.1.7 Provide 3rd Party Insurance		
Category:	Labour Intensive	Scope: Preliminaries & General Items	Unit: Provisional Sum (PS)
Description: The Contractor shall provide 3 rd Party Insurance			
Typical Crew: Contractor	Typical Hand tools/Equipment:		
Materials: N/A			
<p>Work Specification:</p> <p>The Contractor shall take full responsibility for the care of the Works from the Commencement Date until the completion. Responsibility shall then pass to the Employer. If any loss or damage happens to the Works during the above period, the Contractor shall rectify such loss or damage so that the Works conform with the Contract.</p> <p>Unless the loss or damage happens as a result of an Employer's Liability, the Contractor shall indemnify the Employer, the Employer's contractors, agents and employees against all loss or damage happening to the Works and against all claims or expense arising out of the Works caused by a breach of the Contract, by negligence or by other default of the Contractor, his agents or employees.</p> <ol style="list-style-type: none"> 1. The Contractor shall, prior to commencing the Works, effect and thereafter maintain insurances in the joint names of the Parties: <ol style="list-style-type: none"> a. for loss and damage to the Works, Materials, Plant and the Contractor's Equipment, b. for liability of both Parties for loss, damage, death or injury to third parties or their property arising out of the Contractor's performance of the Contract, including the Contractor's liability for damage to the Employer's property other than the Works, and c. for liability of both Parties and of any Employer's representative for death or injury to the Contractor's personnel except to the extent that liability arises from the negligence of the Employer, any Employer's representative or their employees. 2. The policies shall be issued by insurers and in terms approved by the Employer. The Contractor shall provide the Employer with evidence that any required policy is in force and that the premiums have been paid. 3. All payments received from insurers relating to loss or damage to the Works shall be held jointly by the Parties and used for the repair of the loss or damage or as compensation for loss or damage that is not to be repaired. 4. If the Contractor fails to effect or keep in force any of the insurances referred to in the previous Sub-Clauses, or fails to provide satisfactory evidence, policies or receipts, the Employer may, without prejudice to any other right or remedy, effect insurance for the cover relevant to such default and pay the premiums due and recover the same as a deduction from any other monies due to the Contractor. 			
Measurement for Payment:			

The activity shall be measured as provisional sum (PS) item. The amount paid will be based on the actual cost of the 3rd Party insurance plus if the Contractor has arranged 15% for the Contractor's profit and overhead as per actual receipts.

Item No. / Name:	A.1.8 Supervision of the Works by the Contractor (Transport, Supervision, Site Administration) for Duration of the Works		
Category:	Labour Intensive	Scope: Preliminaries & General Items	Unit: Lump Sum (LS)
Description:	This involves the contractor's overheads (transport, site supervision and administration) for the duration of the works.		
Typical Crew: Contractor	Typical Hand tools/Equipment: Truck, Calculator, Setting Out Aid, Overall, Raincoat, Gumboots, Safety Boots		
Materials: <input type="checkbox"/> Supervision materials, stationary			
<p>Work Specification:</p> <p>Estimate the cost of maintaining the Contractor's management and site supervision. This cost will include the wage cost and other overheads of the required contractor's site staff such as site supervisors, operators, skilled and unskilled labourers, administrative staff, storekeepers, watchmen and all other required staff. This cost will include all the Contractor's other overheads.</p> <p>Basic Requirement to look after the work site and the Contractor's Staff</p> <ol style="list-style-type: none"> 1. Transport Contractor's staff to and from the site 2. Ensure that the Contractor's IBC Staff wages are duly and promptly paid 3. Ensure the that the Contractor's Camp is maintained (if a camp is erected) 4. Ensure that the site has the required provision of fuel, utilities and other consumables 5. Ensure that the Contractor's staff are provided with the required safety equipment as required by Item A.1.9 and these are maintained 6. Ensure that the Traffic Management plan is maintained as per Item A.1.6 7. Ensure that the Contractor's IBC registration licence is up to date and renewed as required 8. Ensure the proper provision of potable water for the Contractor's staff and the Construction Supervisor's staff 9. Ensure that Latrines are provided and maintained as per Item A.1.9 <p>Optional as and when required under the contract</p> <ol style="list-style-type: none"> 10. Ensure that the Contractor's staff Income Tax are deducted as per the legal requirements. 11. Ensure that the Contractor's company income tax and other taxes are paid as required. 12. Ensure that any interest on the Contractor's loans are duly and promptly paid. 			

Measurement for Payment:

The activity shall be measured as lump sum (LS) item. The lump sum will be agreed with the contractor and will be paid on a pro-rata basis per month. The agreed lump sum will be paid as a pro-rata basis per month amount. This percentage of the total will be paid each month upon the Engineer's certification of compliance. The monthly fixed percentage will be adjusted according to the Contractor's compliance with the above Work Specification as follows:

- 100% for full compliance.
- 30% for partial compliance (50 - 99% compliance analysed in a one-month period).
- 0% nil compliance (0 – 49% compliance analysed in a one-month period).

Item No. / Name:	A.1.9 Implementation of Workplace Health and Safety Management Plan		
Category:	Labour Intensive	Scope: Preliminaries & General Items	Unit: Lump Sum (LS)
Description: The Contractor is required to do everything reasonably practicable to ensure health and safety of persons working on the Site.			
Typical Crew: Supervisor Labourers	Typical Hand tools/Equipment: <ul style="list-style-type: none"> • Personal Protective Equipment (PPE) – Safety vest (hi-visibility), safety glasses, hard hat, gloves, masks, ear protection and appropriate footwear (including steel capped work boots and rubber boots) • First Aid Kit • Pit latrine – Black plastic or local materials 		
Materials: <input type="checkbox"/> Not applicable			
Work Specification: <ol style="list-style-type: none"> 1. The Contractor shall ensure that all their personnel wear PPE. This includes, but not limited to, safety vests (hi-visibility), hard hat (if required for a specific activity) and appropriate footwear (including steel capped work boots and rubber boots). Contractor’s personnel undertaking concrete works are to be provided gloves, masks and rubber boots as appropriate. Contractor’s personnel undertaking demolition works are to be provided safety glasses, masks and ear protection as appropriate. 2. The Contractor shall provide an appropriately equipped first aid kit that shall be available on-site at all times. The kit shall be regularly replenished. 3. The Contractor shall construct temporary pit latrines on-site. Two pit latrines will be used for the duration of the Works; one for males and one for females. They must be properly walled with black plastics or using local materials that best suit the community. After the completion of Works, the Contractor must ensure that all pit latrines are covered and properly buried. 4. The Contractor shall ensure that there is safe drinking water for their personnel available on-site; whether it has to be transported by vehicle or collected by some responsible members. 5. The Contractor shall ensure that the necessary traffic signs and ‘men at work’ signs are in place prior to work occurring, so as to prevent traffic accidents. 6. The Contractor shall keep record of their personnel’s accidents or injuries during work hours. 			

Measurement for Payment:

The activity shall be measured as a Lump Sum (LS) and the unit rate shall include full compensation for all steps necessary to comply with the above. The agreed lump sum will be paid as a pro-rata basis per month amount. This percentage of the total will be paid each month upon the Engineer's certification of compliance. The monthly fixed percentage will be adjusted according to the Contractor's compliance with the above Work Specification as follows:

- 100% for full compliance.
- 30% for partial compliance (50 - 99% compliance analysed in a one-month period).
- 0% nil compliance (0 – 49% compliance analysed in a one-month period).

Item No. / Name:	A.1.10 Implementation of the Environmental Management Plan		
Category:	Labour Intensive	Scope: Preliminaries & General Items	Unit: Lump Sum (LS)
Description: The Contractor shall be responsible for protection of the environment at the Site and all other sites related to the Works.			
Typical Crew: Contractor	Typical Hand tools/Equipment: • Rubbish bag		
Materials: <input type="checkbox"/> Not applicable			
<p>Work Specification:</p> <ol style="list-style-type: none"> 1. The Contractor shall ensure that the required vegetation to be cleared has been given written consent by the relevant Community and that only trees marked and approved for clearing are removed and recorded. 2. The Contractor shall ensure that all cuttings from vegetation clearance from the Site are gathered and disposed of in unobtrusive and uncultivated areas at least 15 meters from the road. The burning of cuttings is not permitted. 3. The Contractor shall ensure that all non-hazardous solid wastes (e.g. used cement bags) are collected and disposed in a landfill. If there is no landfill nearby, a small hole could be dug and used. The hole shall be an adequate size and depth. However after completion of the Works, this hole should be filled with the excavated material dug from the hole that covers the materials to a depth of at least 1-metre. 4. The Contractor shall ensure that any fuels (diesel/petrol), oils and lubricants (engine oil, transmission oil, hydraulic oil) used are stored in drums on a plastic bounded surface storage area, and to ensure that the equipment using these fuels, oils and lubricants do not leak. Dirty oil (used oil) should be kept in drums and shipped back to the supplier in Port Vila for appropriate disposal or can be used in formwork. 5. The Contractor shall ensure that dust generated from work activities are minimised by watering and to avoid burning (smoke pollution) in all forms on site. Contractor shall reduce dust and air emissions including those from delivery vehicles and workers' transport. Vehicles hauling materials will limit speeds through residential areas, including villages located by roadsides on haul routes. Dust control measures to be used for demolition works. 6. When working near or on water bodies (streams, rivers and the sea), the Contractor shall ensure that the required latrines and fuel/oil storage areas are constructed at a minimum of 30 metres away from the stream/river/sea; that solid waste such as left over concrete, cement bags, plastic bags, tree cuttings etc. are not dumped in the water body; and to avoid the washing of tools and equipment that is soiled with oil/lubricant in the water body. The Contractor is also to ensure that silt traps, silt fences and other appropriate drainage measures are installed to prevent soil erosion and thus siltation of the water bodies. 7. When it is necessary to create steep slopes and embankments, the Contractor is to ensure that the steep slopes are stabilized and protected by spreading topsoil on all exposed formed slopes and embankments, and to plant grass on them, and to slope all 			

vertical faces especially in catch water drains, mitre drains and culvert outlet channels. Other erosion mitigation measures include the construction of masonry (wet/dry), stone pitching, rip rapping in steep side drains, culvert inlets and outlet channels.

8. In the matter of material extraction of sand, coral and limestone, the Contractor shall ensure that there is a valid PWD quarry permit and that the volume of material extracted must not exceed the amount stated in the permit and must not go beyond the area permitted, and that volume of material extracted is recorded either by way of receipt for payment of such material or other. The Contractor shall ensure that excavations of borrow material are done in such a way to avoid possible cause of erosion to the ground surface or ponding of water, and upon completion, the site restoration shall consist of the sloping of any vertical faces, the re-spreading of overburden topsoil and the planting of grass.
9. Construction vehicles shall be regularly serviced and maintained to prevent emission of visible particulates;
10. Number and size of materials stockpiles shall be minimised and be contained to prevent dust and sediment discharges;
11. There shall be no visible discharge of sediment or pollutants into receiving waters from construction sites;
12. No mechanical works within the inter-tidal zone;
13. Effective stormwater management shall divert clean water away from construction areas and stockpiles, and divert contaminated water/run-off to sediment control devices such as excavated traps and bunds. Any discharges associated with sediment shall be directed into an excavated pit to allow sediment to settle before discharging into any river or sea;
14. Stockpiles to be appropriately contained to prevent discharge of sediment offsite;
15. Stockpiles to be located at least 20m from watercourses, coast and/or the inter-tidal zone;
16. Vegetation clearance shall be minimized as much as possible;
17. Areas of exposed soil shall be grass-seeded and/or re-vegetated and stabilized after completion of earthworks;
18. No earth works shall be undertaken during periods of heavy rainfall
19. All hazardous substances and chemicals to be clearly marked and labelled;
20. Storage of all hazardous substances and chemicals (including fuel) in banded areas and at least 20m for watercourses and/or the coast and any habitations;
21. No re-fueling of machinery to occur within 20m of watercourses and/or the coast and any habitations;
22. Concrete shall only be poured during dry weather conditions;
23. Proper formwork will be in place to prevent concrete discharges;
24. Contractors shall conduct daily inspections of machinery with particular attention paid to repair of hydraulic and fuel systems;
25. The Contractor shall have a spill kit in every vehicle and staff be trained in their use.

26. At work sites and accommodation, waste shall be separated into different waste streams for appropriate disposal;
27. All demolition wastes (concrete, steel and fixings) not reused will be disposed of in a pit dug for that purpose at an agreed location on the site
28. Contractor to remove and ship all residual and hazardous wastes to a licensed facility for disposal at completion of works;
29. Dumping of any waste and burning of inorganic wastes or hydrocarbons (plastic, oils etc) shall be strictly prohibited
30. Only aggregate and sand sourced from a licensed supply will be used for works;
31. The Contractor shall provide a record of the quarry license and DEPC approval from aggregate and sand supplier(s) prior to commencement of construction;
32. The Contractor shall ensure that aggregates are properly covered or stored when transported to project site.
33. Vegetation, clearance limits to be to be identified on site-plan and clearly marked, including any mature trees (and their drip-lines) to be protected;
34. Vegetation clearance will be limited to the minimum amount necessary;
35. Cutting of timber or removal of wood by workforce shall be prohibited;
36. Topsoil and cleared vegetation shall be mulched and stockpiled for later re-use
37. No native fauna to be caught trapped, killed or poached by workforce.
38. Any discharges associated with sediment shall be directed into an excavated pit to allow sediment to settle before discharging into any river or sea;
39. The Contractor should cease work during heavy rainfall to prevent any extensive sediment discharge into any river or coastline which could affect both freshwater organisms and marine life.

Measurement for Payment:

The activity shall be measured as a Lump Sum (LS) and the unit rate shall include full compensation for all steps necessary to comply with the above. The agreed lump sum will be paid as a pro-rata basis per month amount. This percentage of the total will be paid each month upon the Engineer's certification of compliance. The monthly fixed percentage will be adjusted according to the Contractor's compliance with the above Work Specification as follows:

- 100% for full compliance.
- 30% for partial compliance (50 - 99% compliance analysed in a one-month period).
- 0% nil compliance (0 – 49% compliance analysed in a one-month period).

Item No. / Name:	A.1.11 Demobilisation from Site		
Category:	Labour Intensive	Scope: Preliminaries & General Items	Unit: Lump Sum (LS)
Description: The work consists of the demobilization of the Contractor's forces and equipment necessary for performing the work required			
Typical Crew: Contractor Supervisor	Typical Hand tools/Equipment: Pick-up Truck, Tipper Truck, Hammer, Pickaxes, Spades, Bush knife,		
Materials: Timber, Nails, First Aid Kit, Water Containers, Paint,			
<p>Work Specification:</p> <p>Demobilisation from Site</p> <ol style="list-style-type: none"> 1. At the end of the works, take appropriate measures to make good all defects issued by the Engineer's Representative and clean the site 2. Ensure that all community workers are fully paid and 3. Reinstate all borrow pits and properly cover all pit latrines and rubbish dumps 4. Clean and return all PWD equipment and tools, remove left over materials and dismantle camp structures 5. Demobilise finally from site after a final inspection and a completion certificate is issued by PWD 6. Disassembly, removal, and site cleanup of offices, buildings, and other facilities assembled on the site. 7. Repair of access roads, temporary haul roads, and equipment parking areas leaving the project site in the same or better condition than at the start of the project. 8. General clean-up and housekeeping needed to restore a neat and orderly project site. 9. Prepare a Decommissioning Plans for any campsites, which define how the site will be restored and PWD should approve such plans. The Decommissioning Plans should have the following: <ul style="list-style-type: none"> • Relocation of machinery used and all the parts and accessories • The systematic demobilisation of the work force, which should take into account their payments in terms of salaries and wages, other benefits and compensation, should there be any claim. • Due payment of the compensations and claims relating to the lease or purchase of camp site land. • Safe distance from the structures must be established to eliminate the hazard of debris falling on workers or the public during the process. • Competent persons to lead demolition must be identified. • The site should be inspected beforehand. • Utilities such as water and electricity must be disconnected. • Establish sites where the materials can be safely deposited. 			

Measurement for Payment:

The activity shall be measured as a lump sum (LS) item for demobilisation. Unit rates shall be the estimated amount as indicated above or a lump sum. Payment for demobilisation shall be made after a final measurement is made and the contractor had demobilised from the site as approved by the Engineer upon submission of an invoice for final payment



PUBLIC WORKS DEPARTMENT

B.2 Setting Out for Road Works

Item No. / Name:	B.2.1 Set Out Road Alignment/Re-establish Road Centre Line and Cross-Sections				
Category:	Labour Intensive	Scope:	Setting Out	Unit:	Linear Metre (lm)
Description:	The scope of works involves setting out or re-establishing the centre line of the existing road, centre lines of structures and erection of chainage pegs along the road section awarded to the contractor.				
Typical Crew: Supervisor (part-time) Labourers	Typical Hand tools/Equipment: Setting out aids - Tape measure, Ranging Rods, Profile Boards, Sledge Hammer, Bush Knives, Paint Brushes, Line level, Crowbar, Wheelbarrow				
Materials: Twines, Strings, Pegs, Paint					
Work Specification:	<ol style="list-style-type: none">1. Erect traffic warning signs at both ends of the work section, paid under A.1.6.2. Provide pegs and set out/re-establish centre line of road and peg out every 10 m on straight section and 5 m on curved sections3. Chain road along set out/re-established centre line and erect chainage pegs at 50 m intervals.4. Determine drainage areas and record chainages of sags (low points) and crests (high points)5. Determine average gradients of each drainage area6. Set out cross-sections and establish control pegs				
Measurement for Payment:	The works shall be measured in linear Metre (lm) of set out road that has been accepted. Physical measurements shall be recorded to confirm to the length of the contractor's work section. Only those areas that were directed by the Employer's Representative shall be measured and work outside this section will not be measured. Unit rate shall include full compensation for all steps necessary to comply with the above including labour, hand tools and materials necessary to complete the work as specified.				



PUBLIC WORKS DEPARTMENT

Item No. / Name:	B.2.2 Provide Materials and Erect/Replace Chainage Markers		
Category:	Labour Intensive	Scope: Setting Out	Unit: Number (No)
Description:	This involves provision of materials, preparation and erection at regular intervals to specification to indicate the road length from an agreed starting point.		
Typical Crew: Contractor	Typical Hand tools/Equipment: Setting out aids - Tape measure, Ranging Rods, Profile Boards, Sledge Hammer, Bush Knives, Paint Brushes, Line level, Crowbar, Wheelbarrow		
Materials: <input type="checkbox"/> Twines, Strings, Pegs, Paint			
Work Specification: <ol style="list-style-type: none">1. Erect traffic warning signs at both ends of the work section, paid under A.1.6.2. Measure 50m intervals from Ch.0+000 along the set out/re-established centreline3. At each 50m interval mark, set out a 90 degree line to the centreline4. Set up a temporary peg 1m behind the back slope along the line 90 degrees line to the centreline5. Procure chainage markers, prepare/shape to drawing/specification and inscribe the chainage of the location on the peg in black on a white background6. The chainage marker should be 1.30m long and at least 0.10m in diameter7. The writing on the chainage marker should be readable from at least 10m to the chainage marker8. Replace the temporary pegs with the prepared chainage markers and ensure that at least 0.50m of the marker is hammered into the ground to secure it.			
Measurement for Payment: The activity shall be measured as Number (No) item. Unit rate for this activity shall be the agreed percentage or estimated amount to produce and erect the markers			



C.3 SITE CLEARANCE

Item No. / Name:	C.3.1 Clear Bush and/or Cut Grass and Local Disposal				
Category:	Labour Intensive	Scope:	Site Clearance	Unit:	Square Metre (m²)
Description:	This operation consists of cutting, collecting, removing and disposing of cleared/cut vegetation on shoulders, side slopes, inlet and outlets of culverts and ditches, and around the base of road signs and power poles or other approved installations/items within the work site.				
Typical Crew: Supervisor (part-time) Labourers	Typical Handtools/Equipment: Road works traffic warning signs (2 No. minimum.) Hand tools: slasher, machete, rakes				
Materials:	<input type="checkbox"/> Not applicable				
Work Specification:	<ol style="list-style-type: none">1. Erect traffic warning signs at both ends of the work section, paid under A.1.6.1. Set out the limits of the clearing area as directed by the Employer's Representative. Additional clearing may be directed on the inside of bends for traffic visibility reasons.2. Remove vegetation by cutting to a finished cut height of 50 mm above ground surface. On no account may vegetation be removed by burning or by the application of herbicides.3. Clearing of vegetation at the base of road signs and power poles (and other approved installations/items) that are within the limits of grass cutting width.4. All cuttings must be gathered and disposed of in unobtrusive and uncultivated areas at least 15 metres from the road (back of drain). The burning of cuttings will not be permitted for environmental reasons.5. On completion of the works, the site shall be cleaned of all surplus materials and waste, and left in a clean and tidy condition.				
Measurement for Payment:	The works shall be measured in square metres (m ²) of cleared ground that has been accepted. Physical measurements of length and breadth shall be recorded to arrive at the cleared area. Only those areas that were directed by the Employer's Representative shall be measured and work outside these areas will not be measured. Unit rates shall include full compensation for all steps necessary to comply with the above including labour, hand tools and materials necessary to complete the work as specified.				



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Item No. / Name:	C.3.2 Grub Up Roots, Remove Unsuitable Materials and Local Disposal				
Category:	Labour Intensive	Scope:	Site Clearance	Unit:	Square Metre (m²)
Description:	This operation consists of removing top soil including roots of grass and bushes up to 0.15-metres in diameter from the carriageway shoulders and ditches.				
Typical Crew: Supervisor (part-time) Labourers	Typical Handtools/Equipment: Hoe, Slasher, Bush Knife, Rakes				
Materials:	<input type="checkbox"/> Not applicable				
Work Specification:	<ol style="list-style-type: none">1. Erect traffic warning signs at both ends of the work section, paid under A.1.6.2. Set out the grubbing limits as directed by the Employer's Representative.3. Grub up all roots of bushes up 0.15-metre in diameter and top soil.4. On no account may roots be removed by burning or by the application of herbicides.5. Dispose of grubbed up materials at least 5 metres behind the back slope of the drain.6. Burning will not be permitted for environmental reasons.				
Measurement for Payment:	<p>The works shall be measured in square metres (m²) of grubbed up ground that has been accepted. Physical measurements of length and breadth shall be recorded to arrive at the cleared area. Only those areas that were directed by the Employer's Representative shall be measured and work outside these areas will not be measured. Unit rates shall include full compensation for all steps necessary to comply with the above including labour, hand tools and materials necessary to complete the work as specified.</p>				



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Item No. / Name:	C.3.3 Prune Trees and/or Cut & Remove Fallen Tree Trunks and Debris from the Road Carriageway and Local Disposal			
Category:	Labour Intensive	Scope:	Site Clearance	Unit: Number (No)
Description: This operation consists of cutting, collecting and removing fallen trees larger than 0.15-metre diameter, removing roots, pruning tree branches and disposing of all from carriageway.				
Typical Crew: Supervisor (part-time) Labourers		Typical Handtools/Equipment: Road works traffic warning signs (2 No. minimum.) Chainsaw, Axe, Bush Knife, Crowbars, Rakes, Ropes, Wheelbarrows		
Materials: <input type="checkbox"/> Fuel, Engine Oil				
Work Specification: <ol style="list-style-type: none">1. Erect traffic warning signs at both ends of the work section, paid under A.1.6.2. This specification is for vegetation greater than 0.15-metres in diameter. If smaller it will be paid under C.3.23. Prune tree overhang by cutting branches which are overhanging over the side drains4. Cut and roll off any fallen tree within the carriageway and from the bed and sides of the table drains, concrete drains, and stone pitched drains and pile up behind the side drains for collection by the community.5. Grub up all roots of cut or fallen trees.6. Clear the work area of all debris and dispose of all locally. Burning of cuttings will not be permitted for environmental reasons.7. All cuttings must be gathered and disposed off in unobtrusive and uncultivated areas at least 15 metres from the road (back of drain).8. On completion of the works, the site shall be cleaned and left in a tidy condition.				
Measurement for Payment: The works shall be measured in numbers (No) of cut trees, pruned trees and fallen tree trunks cut and removal of roots from the roadway that has been accepted. Physical counting of trees shall be recorded to arrive at the number. Only those trees that were directed by the Employer's Representative shall be counted and work outside these numbers will not be considered. Unit rates shall include full compensation for all steps necessary to comply with the above to complete the work as specified.				



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Item No. / Name:	C.3.4 Remove Stones and/or Boulders and Stockpile at Designated Locations				
Category:	Labour Intensive	Scope:	Site Clearance	Unit:	Cubic Metre (m³)
Description:	This operation consists of digging out and/or collecting and disposing of all stones/boulders from carriageway due re-gravelling of the road at designated areas.				
Typical Crew: Supervisor (part-time) Labourers	Typical Hand tools/Equipment: Road works traffic warning signs, wheelbarrows, gloves, pickaxes, crowbars				
Materials:	<input type="checkbox"/> Not applicable				
Work Specification:	<ol style="list-style-type: none">1. Erect traffic warning signs at both ends of the work section, paid under A.1.6.2. Set out the limits of the work section as directed by the Employer's Representative.3. Remove/collect stones or boulders on the carriageway within the work section directed by the Engineer's Representative.4. Stockpile all stones/boulders at designated locations.				
Measurement for Payment:	The works shall be measured in cubic metres (m ³) of stones/boulders that have been accepted. Physical measurements of stones/boulders removed shall be recorded to arrive at the volume removed. Unit rates shall include full compensation for all steps necessary to comply with the above to complete the work as specified.				



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D.4 Drainage & Structures

Item No. / Name:	D.4.1 Set out for Drains to Standard Drawing and Specification				
Category:	Labour Intensive	Scope:	Drainage & Structures	Unit:	Linear Metre (lm)
Description:	The task involves setting out for all drains and outfall drains (structure outlet channels) to standard drawing.				
Typical Crew: Supervisor Labourers	Typical Hand tools/Equipment: Road works traffic warning signs, Setting Out Aids, Pickaxe, Wheelbarrows, Mattock, Spades, Ditch Template, Traveller head board, Spirit level, Club/Sledge Hammer				
Materials:	Twine, Pegs/Stakes				
Work Specification: <ol style="list-style-type: none">1. Erect traffic warning signs at both ends of the work section, paid under A.1.6.2. The Engineer's Representative shall confirm the required cross-sectional shape of the drains. Refer to the side drain drawing attached to contract.3. Set out/re-establish road centreline and set out cross-sections 90 degrees to the centreline at 10m intervals on straight sections and 5m intervals in curves.4. Using the side drain drawing attached to the contract, set out the ditch, the foreslope and the backslope.5. Cut cross-sectional slots at intervals using the template to set the required invert level. Use pegs and/or string lines to maintain the trimmed shape throughout.6. Ensure that the Engineer's Representative inspects and corrects the setting out before proceeding to excavate the drains.					
Measurement for Payment: The unit of measurement for setting out drains is linear metre (lm). The Unit rate shall include full compensation for all steps necessary to comply with the above to set out the drains as specified.					



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Item No. / Name:	D.4.2 Excavate or Re-excavate Side, Mitre, Catch Water and Other Specified Drains				
Category:	Labour Intensive	Scope:	Drainage & Structures	Unit:	Linear Metre (lm)
Description:	The activity involves excavation of all new drains and/or re-excavation of all existing drains and controlling gradients and required shape in the drains as specified in the contract agreement.				
Typical Crew: Supervisor (part-time) Labourers	Typical Hand tools/Equipment: Road Works Traffic Warning/Safety Signs, Setting Out Aids, Pickaxe, Hoes, Wheelbarrows, Mattock, Spades, Ditch Templates, Set of Travellers, Spirit level, Club/Sledge Hammer, Bush Knife				
Materials: Wooden Stakes, Twines					
Work Specification:	<ol style="list-style-type: none">1. Ensure that approval is given for the drain excavation to commence after setting out for the drains.2. Ensure that mitre drains are first excavated before the side drains are excavated.3. Commence excavation at the outfall end and proceed upstream.4. Set out the tasks and distribute the workers to commence work, making sure that they are not in each other's way to avoid accidents.5. Check and control the quality of the excavation with strings, twines and templates6. Use the set of travellers to control the gradients in the drains and ensure that the natural gradients are maintained as much as possible.7. The Contractor shall provide and maintain a sturdy template for each drain shape. No work shall proceed without a template being available at the site.8. The Employer's Representative may use the Contractor's template to check any location where he suspects that the finished profile is incorrect.9. A tolerance of 30mm shall apply to the level or position of any point. In addition the drain profile shall be smooth and work that does not comply shall be re-performed at the Contractor's own expense before the work is recorded for payment.				
Measurement for Payment:	The unit of measurement shall be linear metre (lm). The unit rates shall include full compensation for all steps necessary to comply with the above including labour, hand tools, production of templates and materials necessary to complete the work as specified.				



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Item No. / Name:	D.4.3 Provide Materials and Construct/Repair Scour Checks to Standard Drawing and Specification		
Category:	Labour Intensive	Scope: Drainage & Structures	Unit: Number (No)
Description:	The activity involves identifying washed out scour checks, damaged ones and replacing or repairing the identified scour checks. It includes collecting stones/boulders, cutting and preparing wooden stakes or bamboo for the work.		
Typical Crew: Contractor Supervisor, Labourers	Typical Hand tools/Equipment: Setting Out Aids, Bush Knife, Wheelbarrow, Scour Check Template, Spirit Level, Club/Sledge Hammer, Twine, Crowbar		
Materials: <input type="checkbox"/> Wooden Stakes/Bamboo, Stones and Boulders			
Work Specification: <ol style="list-style-type: none">1. Erect traffic warning/safety signs and inspect the scour checks to be repaired or re-installed2. Depending on the inspection, collect stones/boulders, cut and shape wooden stakes/bamboo and haul enough materials to complete the works to scour check location3. Set out for the scour checks and repair damaged ones and/or replace washed out ones with wooden stakes/bamboo and protect the back with stones/boulders4. Clean the site of excess material and leave the site in a tidy condition			
Measurement for Payment: The activity shall be measured as number (No) of scour checks replaced or repaired. Unit rate for this activity shall be the agreed percentage or estimated amount and shall include full compensation for all steps necessary to comply with the above including labour, hand tools and materials necessary to complete the work as specified.			



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Item No. / Name:	D.4.4 Provide Materials and Construct/Repair Grouted Stone Protection in Drains/Areas Prone to Erosion				
Category:	Labour Intensive	Scope:	Drainage & Structures	Unit:	Square Metre (m²)
Description:	This protection work involves providing materials for grouted stone, setting out, arranging stones/boulders and filling the voids between them with mortar to bind the stones/boulders together to design drawing or specification.				
Typical Crew: Contractor, Supervisor, Labourers	Typical Hand tools/Equipment: Truck/Tipper, Tractor and Trailer, Setting Out Aids, Pickaxes, Templates, Twine, Trowels, Spades, Wheelbarrow, Concrete Mixer, Club Hammer, Wooden Float, Foam				
Materials: <input type="checkbox"/> Stones/Boulders, Cement, Sand, Water, Fuel and Engine Oil					
Work Specification: <ol style="list-style-type: none">1. Erect traffic warning/safety signs and re-establish road centreline and set up pegs along it at 10m intervals on straight sections and 5m intervals on curves.2. Tie twine on erected pegs at 10m intervals on straight sections and 5m intervals on curves of drains3. Set out tasks and excavate to level of grouted stone foundation and control with grouted stone template within the limits of the twine to form the shape required4. Provide stones/boulders and hand pack to design drawing or specified thickness and control final level with grouted stone template5. Provide materials to produce mortar to design drawing or specification, fill in voids and finish roughly on steep slopes and sections and smoothly on shoulders6. Cure grouted stone protection in drains and erosion prone areas7. Clean the site of excess materials and leave the site in a tidy condition					
Measurement for Payment: The activity shall be measured as a square metre (m ²) item. Unit rate for this activity shall be the agreed percentage or estimated amount and shall include full compensation for all steps necessary to comply with the above including labour, hand tools and materials necessary to complete the work as specified.					



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Item No. / Name:	D.4.5 Install/lay corrugated steel pipe culvert to standard drawing		
Category:	Labour Intensive	Scope:	Drainage & Structures
Unit:	Linear Metre (lm)		
Description:	The task involves setting out correctly for a pipe culvert and installing it according to drawings attached to the contract. It includes construction of inlet and outlet headwalls, aprons and cut-off walls to ensure that the structure invert has free-flowing discharge.		
Typical Crew:	Typical Hand tools/Equipment:		
Supervisor Labourers Truck driver (part-time)	Setting Out Aids, Mall Hammer, Wheelbarrow, Pickaxe, Crowbar, Shovel, Safety goggle, Gloves, Gumboots, Sledge Hammer, Hacksaw, Rope Tipper truck or other means of transport (part-time), Concrete Mixer, Poker Vibrator, Plate Compactor		
Materials:	Galvanised Steel Pipes, Cement, Sand, Coral, Stones, Timber, Nails,		
Work Specification:	<ol style="list-style-type: none"> 1. Check the possibility of providing a bypass at structure location. 2. If possible, erect safety signs; construct a bypass, open to traffic and set out for the whole structure. 3. If not possible to provide a bypass, erect safety signs and set out for half the structure at a time. 4. Erect safety signs, re-establish 100m road centre line, 50m on both sides of the structure position, set out for structure centre line and seek approval to proceed 5. Determine depth of excavation to invert level and seek approval to proceed 6. Excavate culvert trench to invert level at required gradient, set out for culvert base, cut-off walls, wingwalls and seek approval to proceed. 7. Set out and excavate for structure foundation 8. Provide materials and construct cut-off walls on both inlet & outlet. 9. Provide approved fill materials and fill, water and compact for bedding. 10. Fix Galvanised Steel culvert pipe and place on compacted bedding in culvert trench and set out for culvert apron, head and wingwalls and seek approval to proceed. 11. Provide materials and construct culvert aprons, head and wingwalls. 12. Backfill around the structure to drawing and specification 13. Clean structure position of excess materials, waste and dispose of debris at locations designated by the Engineer's Representative 		
Measurement for Payment:	The work shall be measured in metres (m) of pipe culverts installed. The payment will only be certified, after the full culvert length, cut-off walls, aprons, head walls and wingwalls has been constructed and the site cleaned. Unit rates shall be full compensation for all steps necessary to comply with the above, including all transport, materials handling, labour, hand tools and materials to complete the work as specified. Payment for providing Traffic warning signs and safety equipment will be done under Item A.1.6. Payment for headwalls and wingwalls will be done under the E.5.3 or F.6.3. Payment for backfill will be done under G.7.6		



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Work Items:

A.1.6	Provide Traffic Management through the Maintenance Site	Lump Sum (LS)	Yes
G.7.1 to G.7.5	Manual excavation of soil	m3	
D.4.5	Install/lay corrugated steel pipe culvert to standard drawing	lm	Yes
E.5.2	Concrete M15, Cement Concrete Works Including supply, mixing, placing, compacting and curing all complete (1:2:4)	m3	
E.5.3	Concrete M20, Cement Concrete Works Including supply, mixing, placing, compacting and curing all complete (1:1.5:3)	m3	
F.6.3	Construct wet stone masonry (1:5 mortar) including mixing, placing, and curing	m3	
E.5.5	Supply, cut and built formwork for concrete works	m2	
E.5.6	Supply, cut and tie rebars in reinforced concrete	kg	
G.7.6	Structural Backfill	m3	



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Item No. / Name:	D.4.6 Provide Materials and Construct Reinforced Concrete Box Culvert		
Category:	Labour Intensive	Scope:	Drainage & Structures
		Unit:	Cubic Metres (m3)
Description:	The task involves setting out correctly for a box culvert and installing it according to the drawings attached to the contract. It includes construction of inlet and outlet headwalls, wingwalls, aprons and cut-off walls to ensure that the box culvert invert has free-flowing discharge.		
Typical Crew: Supervisor Labourers Truck driver (part-time)	Typical Hand tools/Equipment: Setting Out Aids, Mall Hammer, Wheelbarrow, Pickaxe, Crowbar, Shovel, Safety goggle, Glove, Sledge Hammer, Hacksaw Tipper truck or other means of transport (part-time), Concrete Mixer, Poker Vibrator, Plate Compactor		
Materials:	Cement, Sand, Coral, Stones, Steel Bars, Hacksaw Blades, Nails, Water, Fuel, Binding (Tie) Wire, Timber, Plywood, Form Striking Oil		
Work Specification:	<ol style="list-style-type: none"> 1. Check the possibility of providing a bypass at the culvert location. 2. If possible, erect safety signs; construct a bypass, open to traffic and set out for the whole culvert. 3. If not possible to provide a bypass, erect safety signs and set out for half the culvert at a time. 4. Erect safety signs and re-establish 100m road centre line, 50m on both sides of the culvert position, set out for culvert centre line. 5. Determine depth of excavation to invert level and seek approval to proceed. 6. Excavate culvert foundation to the required depth as per drawing and seek approval. 7. Provide and compact approved fill material for bedding in layers to specification (as described in G.7.6) 8. Provide materials and erect formwork for lean concrete base, mix and cast lean concrete. 9. Provide, cut and fix reinforcement bars for bottom slab, wall and chamfer as per drawing provided. 10. Provide materials and erect formwork for bottom slab and walls, up to chamfer level. 11. Mix, haul and place concrete (25 MPa which is the 1:1:2 mix) up to chamfer level including base slab with shear joint. 12. Provide materials and erect formwork for walls and seek approval to proceed 13. Mix, haul and place concrete in box culvert walls. 14. Provide materials and erect formwork for culvert deck slab and kerb, and fix reinforcement bars for deck slab as per drawing and seek approval to continue. 15. Mix, haul and place concrete for deck slab and kerb, protect and cure for 28 days. 16. Back fill with selected fill material around culvert walls and compact in layers to specification (as described in E.5.6) 17. Provide materials and erect formwork for approach slabs on both sides of the box culvert. 18. Cut and fix reinforcement bars for approach slabs as per drawing provided 		



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19. Mix, haul and place concrete for approach slabs, protect and cure.
20. Set out and excavate to the required depth of cut-off wall foundation as per drawing provided.
21. Provide materials and erect formwork for cut-off walls, cut and fix reinforcement bars.
22. Mix, haul and place concrete for cut-off walls, protect and cure.
23. Provide and erect formwork for both inlet and outlet wing walls and aprons.
24. Cut and fix reinforcement bars for wing wall and aprons as per drawing provided and seek approval to proceed.
25. Mix, haul and place concrete for aprons and wing walls, protect and cure

Measurement for Payment:

The concrete work shall be measured in cubic metres (m³) of box culvert installed. Other works will be paid for under the other appropriate items. The payment will only be certified, after a full box culvert length, cut-off walls, aprons and wingwalls has been constructed and the site cleaned. Unit rates shall be full compensation for all steps necessary to comply with the above, including all transport, handling, labour, hand tools and materials to complete the work as specified.

Work Items:

A.1.6	Provide Traffic Management through the Maintenance Site	Lump Sum (LS)	
E.5.2	Concrete M15, Cement Concrete Works Including supply, mixing, placing, compacting and curing all complete (1:2:4)	m ³	
E.5.4	Concrete M25, Cement Concrete Works Including supply, mixing, placing, compacting and curing all complete (1:1:2)	m ³	
E.5.5	Supply, cut and built formwork for concrete works	m ²	
E.5.6	Supply, cut and tie rebars in reinforced concrete	kg	
G.7.1	Manual excavation of ordinary soil	m ³	
G.7.6	Structural Backfill	m ³	



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Item No. / Name:	D.4.7 Provide Materials and Construct Concrete Drift		
Category:	Labour Intensive	Scope: Drainage & Structures	Unit: Cubic Metres (m³)
Description:	The activity involves setting out correctly for a drift and installing it according to drawings attached to the contract. It includes construction of inlet and outlet cut-off walls to ensure that the structure invert has free-flowing discharge and not undermined.		
Typical Crew: Supervisor Labourers Truck driver (part-time)	Typical Hand tools/Equipment: Setting Out Aids, Mall Hammer, Wheelbarrow, Pickaxe, Crowbar, Shovel, Safety goggle, Gloves, Gumboots, Sledge Hammer, Hacksaw Tipper truck or other means of transport (part-time), Concrete Mixer, Poker Vibrator, Plate Compactor		
Materials:	Gravel, Cement, Sand, Coral, Stones/Boulders, Welded Mesh, Steel Bars, Binding (Tie) Wire, Nails, Fuel, Engine Oil		
Work Specification:	<ol style="list-style-type: none"> 1. Check the possibility of providing a bypass at the structure location. 2. If possible, erect safety signs; construct a bypass, open to traffic and set out for the whole structure. 3. If not possible to provide a bypass, erect safety signs and set out for half the structure at a time. 4. Erect safety signs, re-establish 100m road centre line, 50m on both sides of the structure position, set out for splash/drift centre line and seek approval to proceed 5. Determine depth of excavation to invert level and seek approval to proceed 6. Excavate up to structure invert level, cut-off walls and seek approval to proceed 7. Excavate structure foundation and compact base of foundation 8. Fill base with approved material, water and compact structure bedding. 9. Cut, fix/prepare and place steel mesh and/or bars for the structure and seek approval to proceed 10. Provide materials, mix concrete, haul and place for the structure 11. Protect and cure for 28 days 12. Clean structure position of excess materials, waste and dispose of debris at locations designated by the Engineer's Representative 		
Measurement for Payment:	The work shall be measured in cubic metres (m ³) of drift constructed. Payment will only be certified, after the full splash/drift has been constructed and the site cleaned. Unit rates shall be full compensation for all steps necessary to comply with the above, including all transport, materials handling, labour, hand tools and materials to complete the work as specified.		

Work Items

A.1.6	Provide Traffic Management through the Maintenance Site	Lump Sum (LS)	Yes
G.7.1	Manual excavation of ordinary soil	m3	
D.4.7	Provide Materials and Construct Concrete Drift/Splash	m3	Yes



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E.5.2	Concrete M15, Cement Concrete Works Including supply, mixing, placing, compacting and curing all complete (1:2:4)	m3	
E.5.5	Supply, cut and built formwork for concrete works	m2	
E.5.6	Supply, cut and tie rebars in reinforced concrete	kg	
F.6.3	Construct wet stone masonry (1:5 mortar) including mixing, placing, and curing	m3	
G.7.6	Structural Backfill	m3	



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Item No. / Name:	D.4.8 Inspect and Remove Obstructions from Side Drains, Mitre Drains and Catchwater Drains		
Category:	Labour Intensive	Scope:	Drainage & Structures
Unit:	Metre (m)		
Description:	The activity involves physically inspecting all drains and channels and removing obstructions such as stones/boulders, uprooted vegetation and anything obstructing the drains to ensure free-flowing of water through the drains.		
Typical Crew: Supervisor Labourers	Typical Hand tools/Equipment: Wheelbarrow, Pickaxe, Crowbar, Shovel, Safety goggle, Gloves, Sledge Hammer and Bush Knife		
Materials:	Not Applicable		
Work Specification:	<ol style="list-style-type: none">1. Erect traffic warning/safety signs at the beginning and the end of the section on which obstructions in the drain will be removed.2. Physically inspect the drains, measure and estimate the quantity of any obstruction to be removed and seek instruction to proceed3. When the site instruction is given, go ahead and remove anything that appear to obstruct the free flow of water in the drains apart from scour checks and grouted lined sections4. Ensure that mitre drains have enough gradient to discharge water away from the road and not to drain back water into the road.5. Dispose of all removed materials on the outfall side of mitre drains or at least 2m behind the back slopes.		
Measurement for Payment:	The work shall be measured and paid under metre (m). Payment will only be certified, after to the contractor completes the work instructed to be done and the drains are free of obstructions. Unit rates shall be full compensation for all steps necessary to comply with the above, including all labour and hand tools to complete the work as specified.		



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Item No. / Name:	D.4.9 Inspect and Remove Obstructions from Structures, Inlet and Outlet Channels				
Category:	Labour Intensive	Scope:	Drainage & Structures	Unit:	Number (No)
Description:	The activity involves inspecting and removing out vegetation, logs, stones, sticks and anything that appear to obstruct or impede the free flow of water through all drainage structures including the inlet and outlet.				
Typical Crew: Supervisor (part-time) Labourers	Typical Hand tools/Equipment: Wheelbarrow, Pickaxe, Crowbar, Shovel, Safety goggle, Gloves, Sledge Hammer				
Materials:	Not Applicable				
Work Specification:	<ol style="list-style-type: none">1. Erect traffic warning and safety signs 50 m on either side of the structure to be cleared.2. Care should be taken before entering structures to check for snakes or other hazardous creatures.3. Physically inspect the structure, measure and/or estimate the quantity of any obstruction to be removed and seek instruction to proceed4. Whenever practical, the works should start at downstream end (outlet channel) and proceed upstream through the structure to the inlet channel.5. Remove all recorded obstructions from the structure to allow free flowing of water				
Measurement for Payment:	The work shall be measured in number (No) of structures cleaned. The payment will only be certified, after the full structure has been de-silted and the site cleaned. Unit rates shall be full compensation for all steps necessary to comply with the above, including materials handling, labour and hand tools to complete the work as specified.				



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Item No. / Name:	D.4.10 Inspect and Desilt Water Catch Pits				
Category:	Labour Intensive	Scope:	Drainage & Structures	Unit:	Cubic Metres (m³)
Description:	The work involves clearing around a catchpit and de-silting it to its original depth and disposing of the excavated silt beyond the pit.				
Typical Crew: Supervisor Labourers	Typical Hand tools/Equipment: Setting Out Aids, Wheelbarrow, Pickaxe, Crowbar, Shovel, Safety goggles, Gloves, Gumboots				
Materials:	Not Applicable				
Work Specification:	<ol style="list-style-type: none">1. Set out and clear 1m around the catchpit. The area to clear will depend on the diameter of the catchpit2. Measure the existing depth of silted catchpit from the top of the pit and not from the channel feeding it3. Desilt the catchpit to the original depth or depth instructed by the Engineer's Representative4. Dispose of excavated silted material beyond the catchpit or at locations designated by the Engineer's Representative				
Measurement for Payment:	The work shall be measured in cubic metres (m ³) of de-silted material removed. Payment will only be certified after the catchpit has been de-silted, the de-silted materials disposed off and the site cleaned. Unit rates shall be full compensation for all steps necessary to comply with the above, including all materials handling, labour and hand tools to complete the work as specified.				



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Item No. / Name:	D.4.11 Provide Materials and Carry Out Minor Repairs on Existing Structures		
Category:	Labour Intensive	Scope: Drainage & Structures	Unit: Cubic Metres (m³)
Description:	The task involves physical inspection and repair of any damage and/or cracks in the main structure, wingwalls, headwalls and aprons of all existing structures.		
Typical Crew: Supervisor Labourers Truck driver (part-time)	Typical Hand Tools/Equipment: Tipper truck or other means of transport (part-time) Setting Out Aid, Traffic Warning & Safety Signs, Bush Knife, Wheelbarrow, Bucket, Pickaxe, Shovel, Trowel, Float & Hoe Road works traffic warning signs		
Materials:	Cement, Sand, Stone, Coral, Water, Plywood, Timber, Welded Mesh, Reinforcement, Binding (Tie) Wire, Nails		
Work Specification:	<ol style="list-style-type: none">1. Erect traffic warning and safety signs 50 m on either side of the structure to be repaired.2. Care should be taken before entering structures to check for snakes or other hazardous creatures. Whenever practical, repair works should start at the downstream end and proceed upstream. This is to enable any water seepage to discharge.3. The condition of the structure shall be visually checked and the repair works required recorded before labourers commence working on the structure.4. Provide materials and repair all recorded and approved defects to be repaired by the Engineer's Representative.5. The completed work shall be checked visually by sighting from one end of the structure to the other.6. On completion of the works, the site shall be cleaned of all surplus materials and waste, and left in a tidy condition.		
Measurement for Payment:	The work shall be measured in cubic metres (m ³) measured in place before the repair work is done. Payment will only be certified after the repair work is done. Unit rates shall be full compensation for all steps necessary to comply with the above, including all transport, handling, equipment, labour, hand tools and materials necessary to complete the work as specified.		



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Item No. / Name:	D.4.12 Demolition and Disposal of Existing Structures				
Category:	Labour Intensive	Scope:	Drainage & Structures	Unit:	Lump Sum (LS)
Description:	The activity involves breaking up existing structures and disposing of the debris at designated locations				
Typical Crew:	Typical Hand tools/Equipment:				
Supervisor	Mall Hammer, Wheelbarrow, Pickaxe, Crowbar, Shovel, Safety goggle, Gloves, Sledge Hammer, Chisel, Gum Boots				
Labourers					
Materials:	<input type="checkbox"/> Not applicable				
Work Specification:	<ol style="list-style-type: none">1. Check the possibility of providing a bypass/diversion at structure location2. If it is possible, erect safety signs, construct traffic diversion (bypass), open to traffic and demolish the whole structure3. If it is not possible to provide a bypass, erect safety signs and demolish half the structure at a time,4. Commence the demolition from the outlet side of the structure and work towards the inlet side5. Dispose of demolished structure material at locations designated by the Engineer's Representative				
Measurement for Payment:	The unit rate shall be a lump sum (LS) and include full compensation for labour, hand tools and disposal of debris to complete the demolition work as specified.				



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Item No. / Name:	D.4.13 Procure and Install Gabion/Reno Structure to Standard/Design				
Category:	Labour Intensive	Scope:	Drainage & Structures	Unit:	Cubic Metres (m³)
Description:	The activity involves correctly setting out for a Gabion/Reno mattress structure and installing it according to drawings attached to the contract. It includes excavating foundation for the Gabion/Reno, fixing and filling the baskets/mattresses with stones/boulders and tying them.				
Typical Crew: Supervisor Labourers Truck driver (part-time)	Typical Hand tools/Equipment: Setting Out Aids, Mall Hammer, Wheelbarrow, Pickaxe, Crowbar, Shovel, Safety goggle, Gloves, Gumboots, Sledge Hammer, Pliers, Iron Bar, Timber, Hacksaw, Tipper truck or other means of transport (part-time), Plate Compactor				
Materials:	Gabion Baskets/Reno Mattresses, Stones/Boulders, Galvanised Binding (Tie) Wire, Geo-Textile Material				
Work Specification:	<ol style="list-style-type: none">1. Erect safety signs, re-establish 100m road centre line, 50m on both sides of the structure position, set out for gabions and seek approval to proceed2. Determine depth of excavation for first layer of baskets/mattresses and seek approval to proceed3. Excavate up to depth required for gabion basket/Reno mattress according to drawing attached to the contract and compact base to receive basket/mattress4. Provide and fix gabion baskets/Reno mattresses and install in first layer in foundation5. Fill baskets/mattresses with approved stone/boulder sizes, brace every third layer of fill to avoid bulging, cover and tie in place6. Repeat installation process up to the required height shown in the drawings attached to the contract7. Remove all surplus materials from the site and leave the gabion structure in a neat and tidy condition.				
Measurement for Payment:	The work shall be measured in cubic metres (m ³) of gabions constructed. The payment will only be certified, after the full Gabion/Reno structure has been constructed according to drawing and the site cleaned. Unit rates shall be full compensation for all steps necessary to comply with the above, including all transport, materials handling, labour, hand tools and materials required to complete the work as specified in the contract.				



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Item No. / Name:	D.4.14 Provide Materials and Repair Gabion Structures		
Category:	Labour Intensive	Scope: Drainage & Structures	Unit: Cubic Metre (m³)
Description:	The activity involves dismantling faulty, damaged or opened gabion baskets, setting out correctly and re-installing them according to drawings and specification attached to the contract. It includes provision of all materials necessary to carry out the gabion repair work.		
Typical Crew: Supervisor Labourers Operator (part-time)	Typical Hand tools/Equipment: Setting Out Aids, Wheelbarrow, Pickaxe, Crowbar, Shovel, Safety goggle, Gloves, Sledge Hammer, Hacksaw, Hand Rammer, Tractor and Trailer, Tipper Truck		
Materials:	Gabion Baskets, Stones/Boulders, Galvanised Binding (Tie) Wire, Fuel and Lubricants		
Work Specification:	<ol style="list-style-type: none">1. Inspect the gabion structure to be repaired with the site inspector and record the number of baskets to repair and the amount of materials required2. Record the number of good baskets to remove to get to the damaged ones (depending on the location of baskets to repair)3. Seek approval to carry out the repair work4. Procure materials and transport to site and stockpile close to the work place as much as possible5. Set out for the work and repair or re-place the gabions according to drawing and specification6. Ensure that stones and/or boulders placed in the gabion baskets are greater in diameter than the openings in the gabion baskets7. Ensure that the filled gabion baskets are properly covered and firmly tied to prevent bulging8. When the work is completed, clean the site of all waste and excess materials and leave the site in a clean and tidy condition		
Measurement for Payment:	The work shall be measured in cubic metre (m ³) of repaired gabions. Payment will only be certified after the gabions have been repaired according to drawing and specification and the site cleaned of waste and excess materials. Unit rates shall be full compensation for all steps necessary to comply with the above, including all transport, materials handling, labour, hand tools and materials to complete the work as specified.		



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E.5 Concrete for Structures

Item No. / Name:	E.5. Concrete for Structures		
Category:	Labour Intensive	Scope: Concrete Structures	Unit: Cubic Metres (m3)
Description:	The work specified herein shall include the furnishing, placing, compacting and finishing concrete to the lines, levels and dimensions shown on the Drawings, or where not shown, as directed by the Construction Supervisor.		
Typical Crew: Supervisor Labourers	Typical Hand tools/Equipment: Wheelbarrow, Shovel, Safety goggle, Gloves, Loader, Concrete Mixer		
Materials: <input type="checkbox"/> Cement, sand (fine aggregate), stone (coarse aggregate),			
<p>1. Materials:</p> <p>1.1 Portland Cement</p> <p>All cement used shall be Ordinary Portland Cement (OPC) of an approved brand and shall comply with AS 3972.</p> <ul style="list-style-type: none"> • Cement should be stored in a dry place protected from atmospheric elements on a wooden platform raised at least 150mm above the floor • Avoid stacking more than ten to twelve bags as the bottom bags may burst. Generally, bags should not be stacked to a height exceeding 4.5 metres • Store the cement in close stacks to avoid air circulation and absorbance of moisture from the air • Avoid storing cement for more than two months from the date of leaving the Manufacturer's premises before usage. Cement stored for more than two months should not be used for critical structural members. Cement stored for more than two months but less than six months may be used in some minor works with the Engineer's approval. Cement stored for more than six months should be discarded or at least re-tested before any reuse is considered. <p>1.2 Water</p> <p>Water used for concrete should generally be free from oils, acids, alkalis and organic impurities. As a guide water fit for drinking can be used in concrete. Salt water should not be used for any concrete works. Water shall be subject to the approval of the Construction Supervisor. The use of brackish water and/or water from the sea or tidal rivers shall not be permitted under any circumstances.</p> <p>1.3 Fine Aggregate</p> <p>Fine aggregate shall consist of natural sand, a combination of natural sands, or a combination of natural and manufactured sands containing not less than 50 per cent natural sands.</p> <p>Where sand is only available from beach sources, the sand shall be stockpiled on a suitable plastic membrane at or near the batching plant and as far away from the coast as is practical. The sand stockpile shall be spread out to a maximum thickness of approximately 300mm and</p>			



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shall be washed with fresh water using either fixed or hand held sprinklers for a minimum overall period of 24 hours or shall undergo adequate natural rain washing as to be confirmed and approved by the Construction Supervisor. In general, adequate natural rain washing is defined as a total period of 72-hours exposure to rain. Sand stockpiles shall not be covered.

1.4 Coarse Aggregate

Coarse aggregate shall consist of clean, durable, uncrushed gravel, crushed gravel, stone, or combinations thereof, free from coatings of clay or dirt, organic or other deleterious matter. Aggregates shall not contain harmful materials such as vegetable matter, iron pyrites, coal, mica, shale or similar laminated materials. Unless noted otherwise on the Drawings, the maximum nominal size of aggregate which may be used in all grades of concrete shall be 20 mm except in mass concrete where the maximum nominal size shall be 40 mm.

1.5 Storage of Aggregates

Aggregates shall be stored on Site in such manner that they will not segregate, become contaminated by foreign matter or intermixed nor shall water be permitted to drain into them. Aggregates shall not be stored in direct contact with the ground. Generally, storage areas shall be surfaced with concrete slabs, which shall be removed on completion of the Works.

2.0 Batching the Concrete

Batches involving the use of fractional bags will not be permitted. Water and admixtures may be batched by weight or volume. If batched by volume, water shall be measured in vessels clearly calibrated in litres or in a manner approved by the Construction Supervisor. The quantity of water and aggregate added to the mix shall be adjusted to allow for the water content of the aggregates.

2.1 Mixing of the Concrete

Concrete shall be mixed in a batch mixer of approved type and capacity with the drum rotating at the speed recommended by the manufacturer. The capacity of the mixer shall be such that one or more whole bags of cement can be used per batch of concrete. The mixer shall be set up level and the volume of mixed concrete in a batch shall not exceed the rated capacity of the mixer.

When concrete is to be placed at a rate of 15 or more cubic metres per day, a spare mixer, in serviceable condition, shall be kept on site. The batch shall be charged into the mixer so that some water will enter in advance of any aggregate. Materials shall be so placed in the hopper that at least two-thirds of the sand and gravel comprising the batch will enter the drum before the cement. Mixing shall continue until the concrete is thoroughly mixed. The minimum mixing time after all materials, including water, have entered the mixer shall be two minutes for drum type mixers.

2.2 Placing Time

Site mixed concrete shall be placed and compacted with 45 minutes of charging the mixer for concrete temperatures up to 32°C and within thirty minutes of charging the mixer for concrete temperatures exceeding 32°C.

2.3 Water-cement ratio

The strength of concrete depends to a great extent on the amount of water used during



mixing. The amount used should be the minimum necessary to give sufficient workability for efficient consolidation of the concrete. Using too much water compromises the ultimate strength of the concrete whilst using less water reduces its workability and also compromise quality. The amount of water is specified by weight and stated as a fraction of the cement used, alternatively weight of water divided by weight of cement:

If the sand is damp (moisture can amount to up to 25% of its weight) then the added water quantity has to be reduced.

2.4 Measuring the Ingredients

For ease of construction, the various concrete ingredients are measured by volume or by weight where accuracy and equipment permit. This is referred to as batching and are produced using a concrete mixer available on site. When volume batching, in order to achieve the required mix proportions gauge boxes are used to batch the dry aggregates.

Batching (measuring material proportions) can be done in two ways, namely by volume or by weight. A gauge box, made out of wood or steel, can easily be manufactured to same volume as a 40kg bag of cement - 28 litres when filled level with the top. The box is fitted with handles for ease of lifting and unloading within mixing areas or at concrete mixers as shown in Figure 1.

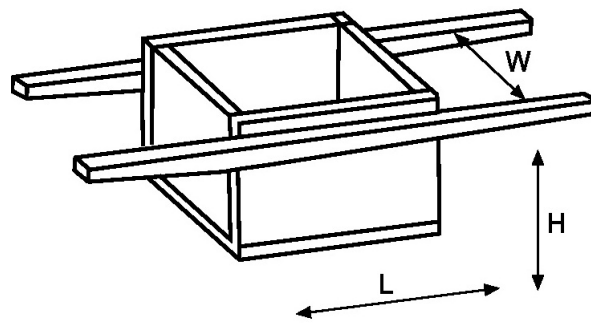


Figure 1: Concrete Mix Gauge Box

Table 1: Internal Dimensions of Concrete Gauge Box for 40 Kg Bag

L	=	Length	=	0.350m
W	=	Width	=	0.320m
H	=	Height	=	0.250m
Total Volume			=	0.028m ³
			=	28 Litres

2.5 Concrete Mixer

A mobile concrete mixer should be used to manufacture concrete. Concrete mixers sizes are designated by two numbers say 142/100; 199/142. The first figure indicates the drum capacity in litres and this is the capacity of the mixer for dry materials. The second indicates the approximate volume of concrete produced in litres. A 142/100 mixer produces 100litres of concrete from 142 litres of dry material. The following are typical steps for using concrete mixers:

1. All formwork needs to be ready and approved by the engineer before commencing a concrete pour.
2. Transport batched materials close to the mixer.
3. Stone aggregate is placed first in mixer hoper followed by sand and then cement.
4. A small quantity of water is then added into the revolving drum to lubricate it followed by the dry mixture to achieve uniformity.



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5. Add the remaining quantity of water gradually whilst mixing. The concrete should be mixed for at least two minutes until the concrete is uniform in colour and consistency.
6. After each batch is discharged the drum should be washed clean before placing the next batch.

Table 2: Concrete Mix Guide for Grade of Concrete

Grade	Strength	Mix Ratio				Maximum Water Cement Ratio by weight
		Cement Bag	Sand	Stone	Water Litres	
M10	10 MPa	1	3	6	21	0.52
M20	20 MPa	1	2	4	20	0.50
M25	25 MPa	1	1.5	3	18	0.45
M30	30 MPa	1	1	2	18	0.45

3.0 Placing and Compaction of Concrete

Concrete should be mixed as near as possible to the site it is to be placed to avoid segregation during transport and to shorten the time between mixing and placing. On site, concrete is usually transported in wheelbarrows, head pans or buckets.

Concrete should be placed as soon as possible and before it starts setting. It should be placed within one hour of discharge from a concrete mixer and within fifteen minutes of mixing if hand-mixed. The formwork, or shuttering, must be clean, secure from movement or leakage and should be wetted before the concrete is poured. Steel and wooden formwork should be oiled (used engine oil mixed with diesel is acceptable for this purpose) to allow it to be removed easily later on.

Compaction of concrete may be undertaken in two ways, either manually by hand ramming or by using a mechanized vibrator (poker vibrator). For concrete layers of thickness not exceeding 30cm hand vibration may be considered. This may be increased to 50cm when a vibrator is used. Each layer should be rammed or vibrated before the next layer is spread. As a rule of thumb, sufficient compaction is achieved when water appears on the surface and/or drips through the joints of the formwork, provided the water/cement ratio is correct and the formwork has been constructed with tight joints. Care must be taken not to over-vibrate the layers as this leads to segregation and compromises its ultimate strength.

Manual vibration can be carried out using a round steel reinforcement bar. Poke the bar in small distances deep into the concrete layer, twist the bar and move it up and down at the same time. Repeat this procedure at every 10cm to 15cm in all directions on the layer.

Before placing the concrete, ensure that the reinforcement is free from loose scales, scaly rust, oil and grease. A thin coat of light rust which firmly adheres to the steel bars is not considered harmful. When steel rods are stored for long periods they may be given a cement wash to mitigate against rust and placed off the ground with cover against rain. Loose rust can be removed by using wire brushes. Oil, grease and paint may be removed by mild heat from a blow torch. Overheating of steel rods should be avoided at all costs.

4. Curing Concrete

Curing concrete is the process of providing moisture and favourable temperature to enable cement to continue to hydrate thereby increasing the strength of concrete. A chemical reaction, commonly known as hydration, takes place when water is added to cement, which result in the setting and hardening of cement. The concrete should be maintained at a



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temperature of between 5°C and 25°C in the first half day after casting as higher temperatures may retard future development in strength whilst lower temperatures may reduce significantly the ultimate strength of the concrete. This is achieved by using isolation mats to keep the concrete warm. Keeping the concrete moist lowers the temperature when the water evaporates. It is generally accepted that concrete continues to harden for at least one year after casting. Table 7-4 below shows the relationship of strength and concrete age over a period of one year.

It takes at least 28 days for concrete to gain design strength. This time span is called the curing period and special care must be provided during this time. The surface of the concrete should be kept constantly wet. Slabs can be covered with damp sand or wet canvas and watered regularly; or by covering the concrete with polyethylene sheets (additional water must be added from time to time); concrete should be protected from direct sunshine; walls and beams should be covered with wet canvas, polyethylene sheet or leaves.

Measurement for Payment:

The quantity of concrete for structures will be calculated from dimensions on the Drawings or as revised by the Construction Supervisor. Deductions will not be made for the volume occupied by reinforcing steel, drainage facilities or expansion and contraction joint material. No deduction will be made for fillets and chamfers 40 mm or less nor for conduits 100 mm or less encased in the concrete.

The work measured as provided above for the various Grades of concrete shall be paid for at the unit price agreed according to the particular purpose provided in the Bill of Quantities per cubic metre. The payment shall include full compensation for furnishing all labour, material, plant, tools, equipment and all miscellaneous items necessary for the finished concrete including supply and storage of material, mixing, transporting, placing, finishing, curing and the furnishing and placing of all other incidental construction items not otherwise covered as a separate schedule item, all as required by this Specification and as directed by the Construction Supervisor.

The unit rates provided in the Bill of Quantities for the various Grades of concrete will be inclusive for finishing of unformed surfaces to all finishes.

E.5	Cement Concrete for Structures	
E.5.1	Concrete Grade M10, Including supply, mixing, placing, compacting and curing all complete (1:3:6)	m3
E.5.2	Concrete Grade M20, Including supply, mixing, placing, compacting and curing all complete (1:2:4)	m3
E.5.3	Concrete Grade M25, Including supply, mixing, placing, compacting and curing all complete (1:1.5:3)	m3
E.5.4	Concrete Grade M30, Including supply, mixing, placing, compacting and curing all complete (1:1:2)	m3



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Item No. / Name:	E.5.5 Supply, cut and tie reinforcing steel bars in reinforced concrete				
Category:	Labour Intensive	Scope:	Concrete Structures	Unit:	Kilogram (Kg)
Description:	This work shall consist of the supply for all reinforcing bars, mesh and fabric of the type, shape, size and grade required for concrete structures and incidental concrete construction and placing them in accordance with this Specification, as shown on the Drawings or as directed by the Construction Supervisor.				
Typical Crew: Supervisor Labourers Truck driver (part-time)	Typical Hand tools/Equipment: Rebar cutting tools, pillars, gloves, protective goggles, string-line, means of transport (part-time)				
Materials:	Reinforcing steel bars, wire mesh, annealed binding (Tie) Wire				
1. Materials:					
1.1 Reinforcing Steel	Steel for reinforcement shall conform to AS 4671. The grade shall be R250N or D500N as specified on the Drawings. If not so specified, the grade shall be D500N.				
1.2 Protection of Steel Reinforcement	Steel reinforcement shall be protected at all times from damage. It shall be stacked in racks above the ground and shall at all times be kept clear of mud. When placed in the work it shall be free from dirt, detrimental scale, paint, oil or other foreign substance. When steel has on its surface detrimental rust, loose scale and dust which is easily removable, it shall be cleaned by a method approved by the Construction Supervisor.				
1.3 Placing & Fixing	All steel reinforcement shall be accurately placed in the positions shown in the Drawings and firmly held during placing and setting of the concrete. Bars shall be held in position by wiring at all intersections with annealed wire not less than 1.25 mm diameter except where spacing is less than 300 mm in each direction when alternate intersections shall be tied. Cover to reinforcement shall be maintained by precast concrete blocks or other devices acceptable to the Construction Supervisor. Metal supports and tie wires which extend to the surface of the concrete shall not be permitted. Stirrups and ligatures shall pass around the main bars and be securely wired thereto. Welding of bars to form a rigid cage shall be kept to a minimum and not more than one third of the main reinforcement at any cross section shall be so welded. Welding of reinforcement shall only be permitted with the written approval of the Construction Supervisor. If fabric reinforcement is shipped in rolls, it shall be straightened into flat sheets before being placed. Reinforcement in any member shall be placed and then inspected and approved by the Construction Supervisor before the placing of concrete begins. Concrete placed in violation of this provision may be rejected and removal required.				



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1.4 Splicing

All reinforcement shall be furnished in the full lengths indicated on the Drawings and bar bending schedules. Splicing of bars, except where shown on the Drawings, will not be permitted without written approval of the Construction Supervisor. Splices shall be staggered as far as possible. Where bars are spliced they shall be lapped the lengths shown on the Drawings and Reinforcement Bending Schedule.

Lapped bar splices not shown in the Drawings shall have lengths not less than the following:

Table 3: Lapped Bar Splice Lengths

Bar Type	Bar Diameter (mm)	Splice Length (mm)
Deformed	12	360
	16	480
	20	700
	24	950
	28, 32 and 36	1,250
Plain (fitment)	$d_b < 13 \text{ mm}$	40 d_b or 300 mm whichever is the greater

Note: "db" is the nominal diameter of a bar or wire.

Measurement for Payment:

The work shall be measured in kilograms (Kg). The quantity of steel reinforcement incorporated in the work in accordance with the Drawings or as directed by the Construction Supervisor will be determined from the calculated mass of the various sizes and lengths of the bars. The payment will only be certified, after the structure has been constructed according to drawing and the site cleaned. Unit rates shall be full compensation for all steps necessary to comply with the above, including all transport, materials handling, labour, hand tools and materials required to complete the work as specified in the contract.

E.5	Cement Concrete for Structures	
E.5.5	Supply, cut and tie reinforcing steel in reinforced concrete	kg



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Item No. / Name:	E.5.6 Supply, cut and built formwork for concrete works		
Category:	Labour Intensive	Scope: Concrete Structure	Unit: Square Metres (m²)
Description:	This work shall consist of all necessary work for the supply of materials, handling and treatment, erection, removal of formwork carried out in accordance with this Specification and to provide:		
Typical Crew: Supervisor Labourers Truck driver (part-time)	Typical Hand tools/Equipment: Setting Out Aids, Mall Hammer, Wheelbarrow, Pickaxe, Crowbar, Shovel, Safety goggle, Gloves, Gumboots, Sledge Hammer, Hacksaw, Tipper truck or other means of transport (part-time)		
Materials: Timber, Steel panels, nails,			
1 General Formwork shall be in accordance with AS 3610 subject to the exceptions, modifications and additions as listed in applicable legislation and regulations. All formwork shall be constructed to ensure no loss of material from the placed concrete and be of the required rigidity to produce hardened concrete in the position and of the shape and dimensions described in the Contract. Where required, sealing gaskets, or an alternative acceptable to the Construction Supervisor, shall be provided. No concrete shall be deposited in the forms until they have been thoroughly cleaned out and inspected by the Construction Supervisor. Any forms not conforming to the requirements of the Construction Supervisor shall not be used, and shall be removed without delay. This shall not relieve the Contractor of the responsibility for the design and adequacy of all formwork. Where stated on the Drawings or directed by the Construction Supervisor, provision shall be made for the attached of external vibrators to the underside of forms. In the case of concrete placed in earth excavations, forms shall be provided for all vertical surfaces unless otherwise shown on the Drawings or ordered by the Construction Supervisor. In the case of columns, walls or other thin sections of considerable height, forms shall be constructed with one side open from bottom to top, and the formwork of the open side shall be placed as successive layers of concrete, not more than twelve hundred (1200) millimetres in height, are placed, unless otherwise permitted by the Construction Supervisor. In the case of beams, girders and similar members forms shall be constructed so that the side forms may be removed without interference to the remaining forms.			
2. Material Timber Timber for formwork shall be well seasoned and free from loose knots and other defects. Timber which becomes warped or in the opinion of the Construction Supervisor unsuitable for re-use shall be replaced.			



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The class of timber selected for different portions of the structure shall be appropriate to the quality of line and surface required in the work, and shall be approved in advance by the Construction Supervisor. The formwork used for exposed surfaces shall have, in contact with the concrete, either dressed timber, or undressed timber lined with an approved watertight lining not liable to warp so as to give, on stripping, a smooth and even concrete surface true to the dimensions shown on the Drawings. For the backs of abutments and wing walls timber need not be dressed or lined.

3 Erection

Forms shall be so constructed that they may be removed without injury to the concrete or to the forms. The forms shall be built true to line and braced in a substantial and unyielding manner to maintain position and shape. Joints in forms shall be either horizontal or vertical. Timber forms shall be thoroughly soaked with water before application or release agents unless they are lined.

The use of wires and/or bolts extending to the surface of the concrete shall not be permitted. Where internal ties are permitted for support of formwork, they shall be such as to permit their extraction or that of their removable parts without damage to the concrete. All holes shall be filled with mortar to the satisfaction of the Construction Supervisor.

Forms shall be chamfered, and forms for corners shall be filleted, the bevel in each case having a width as shown on the Drawings, or if not so shown, of twenty-five (25) millimetres on each side with equal angles in all cases.

Dimensions of forms, especially those affecting the construction of subsequent portions of the work, shall be carefully checked after the forms are erected. Forms shall be aligned accurately and the location of all fittings, holes formers, etc, checked prior to placing concrete.

The interior surface of the forms, except for permanent formwork, shall be coated with a release agent acceptable to the Construction Supervisor which will permit the removal of the forms without injury to the concrete and will not stain or discolour the concrete surface.

4 Removal of Formwork

The Construction Supervisor shall be informed in advance of when the Contractor intends to strike any formwork. No formwork shall be removed before the concrete has attained sufficient strength to support its own weight plus any imposed loading.

Forms shall be removed with care and without unnecessary hammering and wedging and so as not to injure the concrete or disturb the remaining supports. Centres shall be gradually and uniformly lowered in such manner as to avoid injurious stresses in any part of the structure.

When the forms are removed and are intended for re-use, they shall be thoroughly cleaned and made good to the satisfaction of the Construction Supervisor.



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Measurement for Payment:

The unit of measurement for formwork shall be the square metre (m²). Payment shall include for supply, erection and stripping of formwork. The Contractor is to make due reduction in his rates for the scrap or re-use value of the formwork.



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F.6 STONE MASONRY WORK

Item No. / Name:	F.6 Stone Masonry Work including mixing, placing and curing		
Category:	Labour Intensive	Scope: Stone Masonry	Unit: Cubic Metres (m³)
Description: The task involves stone masonry works for drainage structures like: culverts, drifts, bridge abutments and wing walls, retaining walls and aprons.			
Typical Crew: Supervisor Labourers Truck driver (part-time)	Typical Hand Tools/Equipment: Tipper truck or other means of transport (part-time) Setting Out Aid, Traffic Warning & Safety Signs, Bush Knife, Wheelbarrow, Bucket, Pickaxe, Shovel, Trowel, Float & Hoe Road works traffic warning signs		
Materials: Cement, Sand, Stone, Coral, Water, Plywood, Timber,			
1. Material for stone masonry works			
1.1 Portland Cement			
All cement used shall be Ordinary Portland Cement (OPC) of an approved brand and shall comply with AS 3972. as per Specification for Concrete E.5.			
1.2 Water			
Water used for concrete should generally be free from oils, acids, alkalis and organic impurities. As a guide water fit for drinking can be used in concrete. Salt water should not be used for any concrete works. Water shall be subject to the approval of the Construction Supervisor. The use of brackish water and/or water from the sea or tidal rivers shall not be permitted under any circumstances.			
1.3 Sand			
Fine aggregate shall consist of natural sand, a combination of natural sands, or a combination of natural and manufactured sands containing not less than 50 per cent natural sands.			
Where sand is only available from beach sources, the sand shall be stockpiled on a suitable plastic membrane at or near the batching plant and as far away from the coast as is practical. The sand stockpile shall be spread out to a maximum thickness of approximately 300mm and shall be washed with fresh water using either fixed or hand held sprinklers for a minimum overall period of 24 hours or shall undergo adequate natural rain washing as to be confirmed and approved by the Construction Supervisor. In general, adequate natural rain washing is defined as a total period of 72-hours exposure to rain. Sand stockpiles shall not be covered.			
1.4 Stone			
Stone to be used for this purpose should be clean, hard and solid. Cracked and hollow stones should not be used. Stones should be chosen as close to rectangular shape as possible. Before using the stone must be washed and free from dust and dirt.			
2 Mortar for stone masonry works			
Mortar for the stone masonry work is a mixture of cement, sand and water. The strength of the mortar depends on quantity of the cement. Proportion of the mortar varies from one to			



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other type of structures. It is normally in the range from 1:3 to 1:5 (cement:sand).

Mortar should be mixed thoroughly. Mix sand and cement before adding water. Quantity of water for mixing should be in between 0.4 & 0.5 ratio of water/cement. The quantity of mortar to be mixed should not be more than a mason can use within 1 hour to avoid the mortar harden.

Table 1: Mortar mixing proportions for different structures

Type of structure	Mixture (cement : sand)
Stone linings, minor walls, not bearing walls	1:5
Small retaining walls, head walls and wing walls up to 1 m high	1:4
Bearing walls, walls for structures, retaining walls higher than 1 m	1:3

3. Joint and bond for stone masonry works Joint

The material quantities for the stone masonry work depends on shape of the stone to be used. The space from one pieces of stone to another must be filled by mortar, called " Joint". Thickness of the joint varies between 1 cm to 4 cm depending on the shape of the stone. If the stone is shaped as a rectangular prism the thickness of the join should be from 1 cm to 2.5 cm, if the stone is not shaped the thickness of the joint will be from 1 cm to 4 cm. The surface of the stone must not be touch each other without mortar but should be fully laid into the mortar.

Table 2: Type of Stone and joint thickness

Masonry type	Approximate width of joints	Required material for 1 m ³ of finished wall	
		Stone	Mortar
Rubble stone masonry. The stones are not specifically cut or shaped	1 cm to 4 cm	1.3 m ³ -1.5 m ³	0.3 m ³ -0.4 m ³
Shaped stone masonry. The stones are shaped to rectangular prism	1 cm to 2.5 cm	1.2 m ³	0.2 m ³ -0.3 m ³

3.1 Bond

When placing stones for the stone masonry work, they should overlap from one layer of stones to another layer. The overlap of the stone should be 1/4 length of the smaller stone. Most of the stones are laid as stretcher. Headers, or through stones, should be laid at regular intervals to bond the two faces of the wall together. The bond stones should cover at least 2/3rds of the wall thickness and overlap should not be less than 10cm.



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4. Foundations for Stone Masonry

Foundation for the stone masonry work must be excavated until reaching firm soil or the designed depth specified by the design engineer. The excavated footing should be compacted before placing the stone masonry foundation. If soil is not firm, the best solution is a wide foundation on a well compacted footing. In this case the engineer must approve the footing before masonry is laid.

For minor walls up to 1.5 m in height, which do not support heavy weight, no special concrete foundation is needed however, the required size of the foundation is:

- Minimum depth of the foundation = wall thickness and not less than 40 cm
- Minimum width of the foundation = 2 x wall thickness
- Thickness of lean concrete for the foundation 5 cm
- The first course should be laid using the largest stone and straightest stones.
- The mortar used for a foundation must be strong and resistant to water. The mix used should be 1:4 (1 cement: 4 sand)

5. Weep holes

Retaining walls of stone masonry must have weep holes. The weep holes should be installed above ground level and water level. Weep holes can prevent water pressure from building up behind the wall and allows water gathered to drain out through the hole. For minor walls, the diameter of the weep hole should be between 25 mm.

Measurement for Payment:

Payment will be made at the rate per cubic metre for stone masonry. The volume shall be measured by multiplying the length, width and height. The unit rate depends on the type of mortar mix used. The unit rates shall be full compensation for all steps necessary to comply with the above, including all transport, handling, equipment, labour, hand tools and materials necessary to complete the work as specified.

F.6	Stone Masonry Work	
F.6.1	Construct wet stone masonry (1:3 mortar mix) including mixing, placing, and curing	m3
F.6.2	Construct wet stone masonry (1:4 mortar mix) including mixing, placing, and curing	m3
F.6.3	Construct wet stone masonry (1:5 mortar mix) including mixing, placing, and curing	m3



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Item No. / Name:	F.6.4 Provide Materials and Repair Masonry Walls and Grouted Stone Masonry		
Category:	Labour Intensive	Scope:	Stone Masonry
			Unit: Cubic Metres (m³)
Description:	The activity involves inspecting masonry walls and grouted stone masonry, providing materials necessary to carry out the works and repairing damages, openings or cracks in the masonry walls or grouted stone masonry works.		
Typical Crew: Supervisor Labourers Truck driver/Operator (part-time)	Typical Hand tools/Equipment: Setting Out Aids, Mall Hammer, Wheelbarrow, Pickaxe, Crowbar, Shovel, Safety goggle, Gloves, Sledge Hammer, Chisel, Hacksaw, Concrete Mixer, Poker Vibrator, Plate Compactor		
Materials:	Cement, Sand, Coral, Stones/Boulders, Water, Timber, Plywood, Nails		
Work Specification:	<ol style="list-style-type: none"> 1. Inspect masonry walls and grouted stone masonry to be repaired with the site inspector and record details of the work to be done. the number of baskets to repair and the amount of materials required. Record the number of good baskets to remove to get to the damaged ones (depending on the location of baskets to repair) 2. Seek approval to carry out the repair work 3. Procure materials and transport to site and stockpile close to the work as much as possible 4. Set out for the work and repair or re-place the gabions according to drawing and specification 5. Ensure that stones and/or boulders placed in the gabion baskets are greater in diameter than the openings in the gabion baskets 6. When the work is completed, clean the site of all waste and excess materials and leave the site in a clean and tidy condition 		
Measurement for Payment:	The work shall be measured in cubic metre (m ³) of splash/drift constructed. The payment will only be certified, after the full splash/drift has been constructed and the site cleaned. Unit rates shall be full compensation for all steps necessary to comply with the above, including all transport, materials handling, labour, hand tools and materials to complete the work as specified.		

F.6	Stone Masonry Work	
F.6.4	Provide Materials and Repair Masonry Walls and Grouted Stone Masonry	m3



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G.7 Earthworks

Item No. / Name:	G.7. Manual excavation soils		
Category:	Labour Intensive	Scope:	Earthworks
Description:	All excavation operations shall include excavation and removal of the excavated matter. The removal shall include depositing the excavated materials as specified.		
Typical Crew:	Typical Hand tools/Equipment:		
Supervisor Labourers	Wheelbarrow, Pickaxe, Shovel, Spreader, Camber Board, Spirit Level, Twine, crowbar, screen, rake, Jack hammer, Leveling beam		
Materials:			
<input type="checkbox"/> Fuel, Pegs/Stakes, Water			
1. Types of Soil for Excavation			
Please note that the Construction Supervisor will determine the type of rock to be excavated.			
1.1 Ordinary soil			
Loose Soil which yields to the use of a shovel, or to spade, rake or other digging implement, such as vegetable or organic soil, turf, gravel, sand, silt, loam, clay, peat, etc.			
1.2 Medium Hard soil			
Soils which can be removed with shovel or spade after some loosening with pick axe, such as clay, soil mixed with lime or calcium carbonate, or cornus carbonate material.			
1.3 Hard soil			
Soils which can be removed with shovel or spade but only much work loosening with pick axe, such as hard and compact cornus and soft laterite. or soil mixed with small boulders not exceeding 25% in quantity.			
1.4 Weathered Soft Rock:			
Weathered soft rock which requires the application of picks, and crowbar to loosen, such as hard and compact hard laterite, hard cornus, or other rock which may be split with crow bars for loosening of strata.			
1.5 Hard Rock: -			
Hard rock or hard laterite, hard copra and hard conglomerate or other rock which may be quarried or split only using jack hammers.			
2. Excavation			
During the excavation the natural drainage of the area shall be maintained. Excavation shall be done from top to bottom. Undermining or undercutting shall not be done.			
The excavation shall be done true to levels, slope, shape and pattern indicated by the Construction Supervisor. Only the excavation shown on the drawings with additional allowances for centring and shuttering or as required by the Construction Supervisor shall be measured and recorded for payment.			



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While carrying out the excavation for drainage work care shall be taken to cut the side and bottom to the required shape, slope and gradient. The surface shall then be properly dressed. If the excavation is done to a depth greater than that shown on the drawing or as required by the Construction Supervisor, the excess depth shall be made good by the contractor at his own cost with stiff clay puddle at places where the drains are required to be pitched and with ordinary earth, properly watered and rammed, where the drains are not required to be pitched. In case the drain is required to be pitched, the back filling with clay puddle, if required, shall be done simultaneously as the pitching work proceeds. The brick pitched storm water drains should be avoided as far as possible in filled-up areas and loose soils.

Measurement for Payment:

Measurement for payment will be done by calculating dimensions to the lines, grades, slopes and dimensions shown on the Drawings or as determined by the Construction Supervisor as the work proceeds on the basis of his evaluation of the type of material being excavated and set forth above. All required and accepted excavation shall be measured from its original position. The volume shall be determined in cubic meters by average area method to be computed from the original and final cross-sections of the completed works as per the drawings or as directed by the Construction Supervisor.

G.7	Earthwork	
G.7.1	Manual excavation of ordinary soil	m3
G.7.2	Manual excavation of medium hard soil	m3
G.7.3	Manual excavation of hard soil	m3
G.7.4	Manual excavation of weathered soft rock	m3
G.7.5	Manual excavation of Medium hard rock	m3



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Item No. / Name:	G.7.6 Structural Backfill				
Category:	Labour Intensive	Scope:	Earthworks	Unit:	Cubic Metres (m³)
Description:	Provide Compaction Equipment and Compact Foundation Bases and Fill Materials in Layers. The task involves ensuring that approved fill materials or gravel are spread in layers, watered and compacted to specification depending on the compaction equipment available and practical to use in areas or sections where the compaction is required.				
Typical Crew: Supervisor Labourers Truck Driver	Typical Hand tools/Equipment: Wheelbarrow, Shovel, Safety goggle, Glove, Spreader, Bucket, Watering Cans, Compaction equipment				
Materials:	Approved fill/gravel materials, Water, Fuel, Engine Oil				
Work Specification:	<ol style="list-style-type: none">1. Set out area to be compacted, backfill with excavated trench material, gravel or selected material approved by the Engineer's Representative for bases of foundations, structure beddings, around structures, aprons and culvert inlet boxes and approaches, water and compact in layers.2. Backfill, water and compact in layers of 50mm by hand rammer.3. Backfill, water and compact in layers of 75mm by plate compactor.4. Backfill, water and compact in layers of 100mm by non-vibratory roller.5. Backfill, water and compact in layers of 150mm by pedestrian vibratory roller.6. Backfill, water and compact in layers of 200mm by tandem (ride-on) roller.7. Backfill, water and compact in layers of 250mm by heavy duty vibratory roller. 6- 8 passes of rolling				
Measurement for Payment:	The work shall be measured in cubic metres (m ³), measured in place. Payment will only be certified, after the full volume of materials has been compacted. Unit rates shall be full compensation for all steps necessary to comply with the above, including all that is necessary to complete the work as specified.				



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H.8 Pavement Works

Item No. / Name:	H.8.1 Reshape Existing Road Formation including Watering and Compaction to Specification		
Category:	Labour Intensive	Scope:	Pavements
		Unit:	Square Metre (m²)
Description:	This activity involves using the camber board and spirit level to reshape road to original camber and/or using gravel material to shape and restore the carriageway camber/crossfall to standard drawing and compacting to specification		
Typical Crew: Contractor	Typical Hand tools/Equipment: Compaction Equipment, Wheelbarrow, Pickaxe, Shovel, Spreader, Camber Board, Spirit Level, Twine		
Materials: <input type="checkbox"/> Fuel, Pegs/Stakes, Water			
Work Specification:			
<ol style="list-style-type: none"> 1. Re-establish road centreline and erect pegs along it at 10m intervals on straight sections and 5m intervals on curves. 2. Place the camber board with spirit level on the shoulder breakpoint at 90 degrees to the centreline and to set out the cross-falls on both sides of the centreline with pegs and twine at 10m intervals on straight sections and 5m intervals on curves. 3. Spread soil materials within the limits of the twine using excavated or borrowed material to form or reshape the carriageway 4. Compact without vibrating for 2 passes from the shoulder break point to the centreline of the road on each side. 5. Water the compacted road without vibration and leave for about 2 - 3 hours for the water to sip into the material 6. Ensure that the road surface has the right amount of water to avoid the material sticking onto the drum of the roller by doing the hand test before compacting again for 6 passes with the roller vibrating. 7. Check the camber as the roller is working and correct humps and depressions to achieve a uniform surface shape to the desired crossfall. 			
Measurement for Payment:			
The activity shall be measured as a square metres (m ²) item. Item shall include full compensation for all steps necessary to comply with the above including labour, hand tools and materials necessary to complete the work as specified.			

H.8	Pavement Works	
H.8.1	Reshape Existing Road Formation including Watering and Compaction to Specification	m2



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Item No. / Name:	H.8.2 Borrow to Fill		
Category:	Labour Intensive	Scope:	Pavements
			Unit: Cubic Metre (m³)
Description:	This involves excavating gravel materials from approved quarries, transporting to reshape road surface, repair potholes, ruts, erosion gullies, erosion on shoulders and raising low lying areas, and compacting to specification.		
Typical Crew: Contractor	Typical Hand tools/Equipment: Bush Knife, Rake, Pickaxe, Shovel, Wheelbarrow, Spreader, Hand Rammer, Watering Can, Truck, Compaction Equipment, Twine		
Materials: <input type="checkbox"/> Approved fill Material, Fuel, Water, Engine Oil, Pegs,			
<p>1. Work Specification: Borrow shall consist of suitable and satisfactory material, obtained from Borrow Pits nominated on the Drawings or from sites approved by the Construction Supervisor, actually used for the construction of required embankment.</p> <p>2. Stake out of Borrow Pit Borrow Pits nominated on the Drawings or approved by the Construction Supervisor shall be so excavated that they will drain the nearest natural outlet or to such outlets as designated by the Construction Supervisor. Side slopes of Borrow Pits shall be trimmed and dressed to such slopes as the Construction Supervisor may direct. Borrow Pits shall be staked out and cross-sectioned by the Contractor in the presence of a representative of the Construction Supervisor before the Contractor begins work therein and no excavation, other than the excavation of test pits for material testing, will be allowed of any material from the Borrow Pits prior to this being done to the satisfaction of the Construction Supervisor.</p>			
Measurement for Payment: The activity shall be measured as a cubic metre (m ³) item. The unit rates shall include full compensation for all steps necessary to comply with the above including labour, hand tools and materials necessary to complete the work as specified. The Contractor's rate for Borrow shall include the removal of overburden and its disposal, the maintenance and tidying up on completion of the Borrow Pits and the construction and maintenance of access roads thereto. The Contractor's rate for Borrow shall also include the winning, stockpiling, loading and haulage of the material for a distance of up to five kilometres.			

H.8	Pavement Works	
H.8.2	Borrow to Fill	m3



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Item No. / Name:	H.8.3 Pothole patching		
Category:	Labour Intensive	Scope:	Pavements
		Unit:	Cubic Metre (m³)
Description:	The activity involves sourcing good fill materials, cleaning and preparing pot holes, ruts and gullies on the carriageway, shoulders and side slopes and repairing with approved materials and compacting in layers to specification.		
Typical Crew: Supervisor Labourers Truck driver/Operator (part-time)	Typical Hand tools/Equipment: Setting Out Aids, Wheelbarrow, Pickaxe, Crowbar, Shovel, Spade, Spreader, Rake, Safety goggle, Gloves, Sledge Hammer, Templates, Spirit Level, Hand Rammer, Plate Compactor		
Materials:	Gravel, Water, Fuel, Engine Oil		
Work Specification:			
<ol style="list-style-type: none"> 1. Erect safety signs, 50m on both sides of the section on which you plan to repair 2. Source good gravel or fill material from quarries approved by the Engineer's Representative 3. Excavate and transport to site or request PWD assistance to supply materials for the work 4. Set out and measure area of pot hole, rut or gully to repair together with the site inspector and record the details 5. Seek approval to proceed and excavate potholes, ruts and gullies in square or rectangular shapes with vertical sides and up to the specified depth. 6. Compact the base of potholes, ruts or gullies before filling with approved materials. 7. Fill potholes, ruts and gullies with approved material as described in E.5.6, water and compact. 8. For potholes, ruts and gullies on the riding surface, raise and compact to a level of 15mm above the surface. 9. Clean the site of excess materials and leave the site in a clean and tidy condition 			
Measurement for Payment:			
The work shall be measured in cubic metres (m ³) of prepared, filled and compacted surface. The payment will only be certified, after each the surface to be repaired has been compacted to specification and the site is cleaned. Unit rates shall be full compensation for all steps necessary to comply with the above, including all transport, materials handling, labour, hand tools and materials to complete the work as specified.			

H.8	Pavement Works	
H.8.3	Pothole patching	m3



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Item No. / Name:	H.8.4 Concrete tyre paths		
Category:	Labour Intensive	Scope: Pavements	Unit: Cubic Metres (m³)
Description:	The activity involves setting out correctly for a concrete tyre path and installing it according to drawings attached to the contract. It includes the set out, excavation, formwork, steel fixing, supply and delivery, placing, compaction, finishing, curing and protection of concrete for concrete strips laid as wheel tracks.		
Typical Crew: Supervisor Labourers Truck driver (part-time)	Typical Hand tools/Equipment: Setting Out Aids, Mall Hammer, Wheelbarrow, Pickaxe, Crowbar, Shovel, Safety goggle, Gloves, Gumboots, Sledge Hammer, Hacksaw Tipper truck or other means of transport (part-time), Concrete Mixer, Poker Vibrator, Plate Compactor		
Materials: Gravel, Cement, Sand, Coral, Stones/Boulders, Stone masonry Concrete, Welded Mesh, Steel Bars, Binding (Tie) Wire, Nails, Fuel, Engine Oil, 150x40mm timber, stakes, hessian, plastic sheets, water			
Work Specification: <ol style="list-style-type: none"> 1. Check the possibility of providing a bypass at the structure location. 2. If possible, erect safety signs; construct a bypass, open to traffic and set out for the whole structure. 3. If not possible to provide a bypass, erect safety signs and set out for half the road at a time. 4. Erect safety signs, re-establish road centre line, to 15 m on both sides of the road, set out for road strip centre line and seek approval to proceed 5. Check the ground level and excavate or fill and compact to correct any irregularities. 6. Excavate to a depth and width as shown on the drawing for each strip over the length of the section. 7. Compact the subgrade using tampers or plate compactors. 8. Rough sawn timber may be used for longitudinal forms. Place the forms on edge and secure them in place using metal or wooden stakes driven into the ground no further than 1m apart. Forms for curved track can be made from strips of 6mm hardboard or plywood that is suitably bent and held in position with stakes. 9. Cut, fix, bend, prepare and place steel bars and forms for construction joints and seek approval to proceed. 10. Prior to placing concrete the subgrade must be damp, with all free surface water removed. 11. Aggregates not larger than 5mm in diameter for concrete mixing shall be clean river/beach sand free from dust, salt, lumps, soft or flaky particles or organic matter 12. Aggregates no larger than 20mm in diameter shall be well graded and free from organic material and salt 13. Water shall be clean, free of oil, free of salt and shall not contain any impurity that may affect concrete durability 14. The water / cement ratio shall not be more than 0.5. Excessive over-mixing shall not be 			



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permitted and any concrete which has been retained in the mixer so long that it requires additional water to permit satisfactory placing shall be rejected.

15. All concrete in a batch shall be placed in its final position and compacted within 30 minutes of adding water to the mix.
16. Either a continuous or alternate panel method may be used. A poker vibrator must be used to compact the concrete, ensuring that the concrete is levelled off flush with the top edges of the forms. Broomed surfaces shall be obtained by finishing with a wood float followed by brooming transversely to the principal slope direction, or perpendicular to the edges one hour after placing. The broomed finish shall contain grooves between 1mm and 3mm deep spaced between 2mm and 6mm apart so as to provide a non-slip surface.
17. The concrete must be damp cured for at least 7 days. The concrete must be covered with copra bags or hessian, which is kept permanently wet. Plastic sheeting kept in place with sand, rocks or stakes must cover this. It will be necessary to wet the hessian or copra bags daily.
18. The Contractor shall protect all completed surfaces from damage and staining from any source including rain water and concrete spillage and grout spillage and contact with hardwoods and ferrous metals.
19. The Contractor is responsible for protecting the works by maintaining safety signs, barriers and bypasses to ensure that no traffic is imposed on the concrete strips for 7 days.
20. Clean structure position of excess materials, waste and dispose of debris at locations designated by the Engineer's Representative. All formwork must be cleaned for reuse.

Measurement for Payment:

The work shall be measured in cubic metre (m³) of road strip constructed. Payment will only be certified, after the full concrete strip roadway has been constructed and the site cleaned. Unit rates shall be full compensation for all steps necessary to comply with the above, including all transport, materials handling, labour, excavation, hand tools and materials to complete the work as specified.

H.8	Pavement Works	
H.8.4	Concrete tyre paths	m3



PUBLIC WORKS DEPARTMENT

Item No. / Name:	H.8.5 Cement Grouted Stone Pitching between the concrete wheel path strip road		
Category:	Labour Intensive	Scope: Pavements	Unit: Cubic Metres (m³)
Description: The activity involves filling in the centre strip between the concrete tyre path paving and installing it according to drawings attached to the contract. It includes the set out, excavation, formwork, supply and delivery, placing, compaction, finishing, curing and protection of stone pitching concrete between the concrete strips laid as wheel tracks.			
Typical Crew: Supervisor Labourers Truck driver (part-time)		Typical Hand tools/Equipment: Setting Out Aids, Mall Hammer, Wheelbarrow, Pickaxe, Crowbar, Shovel, Safety goggle, Gloves, Gumboots, Sledge Hammer, Hacksaw Tipper truck or other means of transport (part-time), Concrete Mixer, Poker Vibrator, Plate Compactor	
Materials: Gravel, Cement, Sand, Coral, Stones/Boulders, Welded Mesh, Steel Bars, Binding (Tie) Wire, Nails, Fuel, Engine Oil, 150x40mm timber, stakes, hessian, plastic sheets, water			
<p>Work Specification:</p> <p>1 General Stone pitching shall be laid between the two concrete wheel patch as specified on the Drawings or ordered by the Construction Supervisor. The stone shall be roughly dressed naturally occurring sound rock with a general minimum dimension of 100 mm and maximum dimension of 250 mm and of such shape as can allow close laying.</p> <p>2 Mortar for Grouting Mortar for the cement grouting of stone pitching shall consist of one part of Portland Cement to two parts of clean well graded fine sand mixed with just sufficient water to be of workable consistency. Mortar shall be used within 30 minutes of adding water.</p> <p>3 Laying The stones shall be well bedded in mortar, trowelled to a depth of 60 percent of the maximum thickness of the stones onto the underlying formation. They shall fit closely and present an even top surface. The large stones shall be used as toe stones at edges or in aprons. Stone pitching shall be placed on a freshly excavated and stable surface and when on any embankment or backfill, this shall be compacted well in advance of the pitching to avoid settlement. The foundation for stone pitching must on a hard non-erodable strata, it shall be founded and sealed on the bottom as shown on the Drawings. Stone pitching shall be placed in tight contact with the concrete wheel paths. Weep holes and joints shall be constructed as shown on the Drawings or as directed by the Construction Supervisor.</p> <p>4 Cement Grouting of Stone Pitching The mortar shall be applied by means of a trowel and shall be well rodded between the stones so that the interstices are completely filled as far down as practicable but to a depth of at least 75 mm. The grouted stone shall be kept damp for at least 48 hours after the mortar is set.</p>			



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Measurement for Payment:

Payment will be made at the rate per cubic metre for stone pitching for Cement Grouted Stone Pitching. The volume shall be measured by multiplying the surface area by the average depth perpendicular to the surface. The length in linear metres shall be measured along the longitudinal centre line of the road. Unit rates shall be full compensation for all steps necessary to comply with the above, including all transport, materials handling, labour, excavation, hand tools and materials to complete the work as specified.

H.8	Pavement Works	
H.8.5	Cement Grouted Stone Pitching between the concrete wheel path strip road	m3



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Item No. / Name:	H.8.6 Inspect and Maintain/Replace Road Traffic Signs		
Category:	Labour Intensive	Scope: Pavements	Unit: Number (No)
Description:	The activity involves inspecting road traffic signs along improved roads and re-placing, maintaining and/or repairing or reinstalling them correctly according to drawings attached to the contract.		
Typical Crew: Supervisor Labourers Operator (part-time)	Typical Hand tools/Equipment: Mall Hammer, Wheelbarrow, Pickaxe, Crowbar, Shovel, Safety goggle, Gloves, Sledge Hammer, Hacksaw, Concrete Mixer, Poker Vibrator		
Materials:	Cement, Sand, Coral, Stones, Black Plastic, Nails, Paint Brush, Paint, Sandpaper		
Work Specification:	<ol style="list-style-type: none">1. Erect traffic warning and safety signs, 25m on both sides of the traffic sign position2. Inspect the road sign and record all defects to be repaired together with the site inspector3. Request instruction to proceed and repair, maintain or replace the traffic sign4. Repair the safety sign and re-paint as necessary5. Clean the sign position when the work is completed		
Measurement for Payment:	The work shall be measured in number (No) of traffic signs. Payment will only be certified, after a traffic sign has been repaired or maintained and the site cleaned. Unit rate shall be full compensation for all steps necessary to comply with the above, including all transport, materials handling, labour, hand tools and materials to complete the work as specified.		

H.8	Pavement Works	
H.8.6	Inspect and Maintain/Replace Road Traffic Signs	No



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Item No. / Name:	H.8.7 Plant Erosion Resistant Grass on Side Slopes, Shoulders and Areas Prone to Erosion		
Category:	Labour Intensive	Scope:	Pavements
		Unit:	Square Metre (m²)
Description:	The activity involves sourcing for erosion resistant grass and organic soil, collecting and transporting to site, preparing eroded slopes, shoulders and areas prone to erosion and planting grass or erosion resistant vegetation and watering till the planted material takes root.		
Typical Crew: Supervisor Labourers Truck driver (part-time)	Typical Hand tools/Equipment: Setting Out Aids, Wheelbarrow, Pickaxe, Shovel, Spade (Yam), Safety Goggle, Glove, Watering Can, Rake,		
Materials:	Erosion Resistant Grass, Organic Soil (Black Soil), Water		
Work Specification:	<ol style="list-style-type: none"> 1. Erect safety signs at least 50m on both sides of the section to be protected 2. Set out the section to be protected and seek approval to proceed 3. Source erosion resistant vegetation (grass) and organic soil (black humus soil) and transport to site, and stockpile very close to the work 4. Prepare the surface or area to plant the grass and top it up with the organic soil 5. Plant the erosion resistant vegetation or grass 6. Water for planted grass until the grass takes root 7. Clean the site of excess grass and organic soil and leave it in a tidy condition 		
Measurement for Payment:	The work shall be measured in square metre (m ²) of planted erosion resistant vegetation or grass. Payment will only be certified, after the area instructed to plant grass has been completed and the site cleaned of excess grass and organic soil. Unit rates shall be full compensation for all steps necessary to comply with the above, including all transport, materials handling, labour, hand tools and materials to complete the work as specified.		

H.8	Pavement Works	
H.8.7	Plant Erosion Resistant Grass on Side Slopes, Shoulders and Areas Prone to Erosion	m2



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I.9 SUPPLY, TRANSPORTATION AND STORAGE OF MATERIALS

Item No. / Name:	I.9 Supply, Transport and Storage of Materials
Category: Labour Intensive	Scope: Supply, Transport Storage Unit: Cubic Metre (m ³) 40 Kg Bag Cement Kg Rebar
Description:	The Supply, Transport and Storage of Materials shall be done as directed by the Construction Supervisor. Any tools and plants, required for the work shall be arranged by the Contractor. The transport (carriage) of materials includes loading, unloading, stacking and storage.
Typical Crew: Contractor Driver	Typical Hand tools/Equipment: Loading equipment, truck or pickup
Materials: <input type="checkbox"/> N/A	
Work Specification: 1. General The Supply, Transport and Storage of Materials shall be done as directed by the Construction Supervisor. Any tools and plants, required for the work shall be arranged by the Contractor. The transport (carriage) of materials includes loading, unloading, stacking and storage. 2. Responsibility for Loss or Damage Loading, carriage, unloading and stacking shall be done carefully to avoid loss or damage to the materials. In case of any loss or damage, recovery shall be effected from the Contractor. 3. Transport Distance The item includes transportation up to 5 kms from the source of the material to the work site. All distances shall be measured over the shortest practical route and not necessarily the route actually taken. Route other than shortest practical route may be considered in cases of unavoidable circumstances and as approved by the Construction Supervisor along with reasons in writing. If the approved source of the material is further than 5 kms then the Contractor will be paid an agreed rate to transport one cubic metre one kilometre. 4. Stacking and Storage 4.1 Planning of Storage Layout For any site, there should be proper planning of the layout for stacking and storage of different materials, components and equipment with proper access and proper manoeuvrability of the vehicles carrying the material. While planning the layout, the requirements of various materials, components and equipment at different stages of construction shall be considered. Material shall be stored in such a manner as to prevent deterioration or intrusion of foreign matter and to ensure the preservation of their quality and fitness for the work. 4.2 Cement Cement shall be stored at the work site in a building or a shed which is dry, leakproof and as moisture proof as possible. The building or shed for storage should have minimum number of	



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windows and close fitting doors and these should be kept closed as far as possible.

Cement shall be stored and stacked in bags and shall be kept free from the possibility of any dampness or moisture coming in contact with them. Cement bags shall be stacked off the floor on wooden planks in such a way as to keep about 150 mm to 200 mm clear above the floor. The floor may comprise of lean cement concrete or two layers of dry bricks laid on well consolidated earth. A space of 600 mm minimum shall be left all round between the exterior walls and the stacks.

In the stacks the cement bags shall be kept close together to reduce circulation of air as much as possible. The height of stack shall not be more than 10 bags to prevent the possibility of lumping up under pressure. The width of the stack shall be not more than four bags length or 3 metres. In stacks more than 8 bags high, the cement bags shall be arranged alternately length-wise and cross-wise so as to tie the stacks together and minimize the danger of topping over. Cement bags shall be stacked in a manner to facilitate their removal and use in the order in which they are received; a record label showing date of receipt of cement shall be put on each stack to know the age of cement.

For extra safety during the rainy season, or when it is expected to store for an unusually long period, the stack shall be completely enclosed by a water proofing membrane such as polyethylene, which shall close on the top of the stack. Care shall be taken to see that the waterproofing membrane is not damaged any time during use.

Cement in gunny bags, paper bags and polyethylene bags shall be stored separately.

4.3 Aggregates (Stone for Masonry, sand, and coral, gravel)

Aggregates shall be stored at site on a hard dry and level patch of ground. If such a surface is not available, a platform of planks or old corrugated iron sheets, or a floor of bricks, or a thin layer of lean concrete shall be made so as to prevent contamination with clay, dust, vegetable and other foreign matter.

Stacks of (Stone for Masonry, sand, and coral, gravel) aggregates shall be kept in separate stock piles sufficiently removed from each other to prevent the material at the edges of the piles from getting intermixed. On a large job, it is desirable to construct dividing walls to give each type of aggregates its own compartment. Fine aggregates shall be stacked in a place where loss due to the effect of wind is minimum. Unless specified otherwise or necessitated by site conditions stacking of the aggregates should be carried out in regular stacks.

4.4 Reinforcing Steel

For each size of steel bars, separate areas shall be earmarked. It is desirable that ends of bars and sections of each class be painted in distinct separate colours.

Steel reinforcement shall ordinarily be stored in such a way as to avoid distortion and to prevent deterioration and corrosion. It is desirable to coat reinforcement with cement wash before stacking to prevent scaling and rusting.

Bars of different classification, sizes and lengths shall be stored separately to facilitate issues in



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such sizes and lengths so as to minimize wastage in cutting from standard lengths.

In case of long storage, reinforcement bars shall be stacked above ground level by at least 150 mm. Also in coastal areas or in case of long storage a coat of cement wash shall be given to prevent scaling and rusting.

Structural steel of different classification, sizes and lengths shall be stored separately. It shall be stored above ground level by at least 150 mm upon platforms, skids or any other suitable supports to avoid distortion of sections. In coastal areas or in case of long storage suitable protective coating of primer paint shall be given to prevent scaling and rusting.

Measurement for Payment:

Length, breadth and height of the material shall be measured correct to a cm. The quantity shall be worked out in cubic metre correct to two place of decimal. In the case of cement, the item will be per bag and reinforcing steel in kg. For the extra transport beyond the nominal 5 kilometres the volume of each type of material will be considered. Unit rate for this activity shall be the agreed percentage or estimated amount and shall include full compensation for all steps necessary to comply with the above including labour, hand tools and materials necessary to complete the work as specified.

I.9	Supply, Transport and Storage of Materials	
I.9.1	Supply, Transport and Storage of stone for masonry materials to the work site up 5kms	m3
I.9.2	Supply, Transport and Storage of beach sand materials using Pick-up up to 5 kms	m3
I.9.3	Supply, Transport and Storage of beach coral materials using Pick-up up to 5 kms	m3
I.9.4	Supply, Transport and Storage of gravel materials using Pick-up up to 5 kms	m3
I.9.5	Supply, Transport and Storage of Cement up to 5 kms	40 kg Bag
I.9.6	Supply, Transport and Storage of Reinforcing Steel up to 5 kms	Kg
I.9.7	Transport of materials greater than 5 kms	km-m3

LIST OF ITEMS

Item No.	Name	Unit
A.1	Preliminaries and General Items	
A.1.1	Consult Community(ies) within the Work Section	Lump Sum (LS)
A.1.2	Site Meetings with Local Community to promote Health & Safety & HIV/AIDS-STD Prevention	Provisional Sum (PS)
A.1.3	Mobilisation to Site	Lump Sum (LS)
A.1.4	Provide Materials and Erect Project Announcement Board to Specification	Lump Sum (LS)
A.1.5	Procure Workman's Compensation Insurance for a Maximum of Forty (40) Workers per Day	Provisional Sum (PS)
A.1.6	Implementation of the Traffic Management Plan	Lump Sum (LS)
A.1.7	Provide 3rd Party Insurance	Provisional Sum (PS)
A.1.8	Supervision of the Works by the Contractor (Transport, Supervision, Site Administration) for Duration of the Works	Lump Sum (LS)
A.1.9	Implementation of Workplace Health and Safety Management Plan	Lump Sum (LS)
A.1.10	Implementation of the Environmental Management Plan	Lump Sum (LS)
A.1.11	Demobilisation from Site	Lump Sum (LS)
B.2	Setting Out	
B.2.1	Set Out Road Alignment/Re-establish Road Centre Line and Cross-Sections	lm
B.2.2	Provide Materials and Erect/Replace Chainage Markers	No
C.3	Site Clearance	
C.3.1	Clear Bush and/or Cut Grass and Local Disposal	m2
C.3.2	Grub Up Roots, Remove Unsuitable Materials and Local Disposal	m2
C.3.3	Prune Trees and/or Cut & Remove Fallen Tree Trunks and Debris from the Road Carriageway and Local Disposal	No
C.3.4	Remove Stones and/or Boulders and Stockpile at Designated Locations	m3

Item No.	Name	Unit
D.4	Drainage Works & Structures	
D.4.1	Set out for Drains to Standard Drawing and Specification	lm
D.4.2	Excavate or Re-excavate Side, Mitre, Catch Water and Other Specified Drain	lm
D.4.3	Provide Materials and Construct/Repair Scour Checks to Standard Drawing and Specification	No
D.4.4	Provide Materials and Construct/Repair Grouted Stone Protection in Drains/Areas Prone to Erosion	m2
D.4.5	Install/lay corrugated steel pipe culvert to standard drawing	lm
D.4.6	Provide Materials and Construct Reinforced Concrete Box Culvert	No.
D.4.7	Provide Materials and Construct Concrete Drift	m3
D.4.8	Inspect and Remove Obstructions from Side Drains, Mitre Drains and Catchwater Drains	m
D.4.9	Inspect and Remove Obstructions from Structures, Inlet and Outlet Channels	No
D.4.10	Inspect and Desilt Water Catch Pits	m3
D.4.11	Provide Materials and Carry Out Minor Repairs on Existing Structures	m3
D.4.12	Demolition and Disposal of Existing Structures	No.
D.4.13	Procure and Install Gabion/Reno Structure to Standard/Design	m3
D.4.14	Provide Materials and Repair Gabion Structures	m3
E.5	Cement Concrete for Structures	
E.5.1	Concrete Grade M10, Including supply, mixing, placing, compacting and curing all complete (1:3:6)	m3
E.5.2	Concrete Grade M20, Including supply, mixing, placing, compacting and curing all complete (1:2:4)	m3
E.5.3	Concrete Grade M25, Including supply, mixing, placing, compacting and curing all complete (1:1.5:3)	m3
E.5.4	Concrete Grade M30, Including supply, mixing, placing, compacting and curing all complete (1:1:2)	m3
E.5.5	Supply, cut and tie reinforcing steel in reinforced concrete	kg
E.5.6	Supply, cut and built formwork for concrete works	m2
F.6	Stone Masonry Work	
F.6.1	Construct wet stone masonry (1:3 mortar mix) including mixing, placing, and curing	m3
F.6.2	Construct wet stone masonry (1:4 mortar mix) including mixing, placing, and curing	m3
F.6.3	Construct wet stone masonry (1:5 mortar mix) including mixing, placing, and curing	m3
F.6.4	Provide Materials and Repair Masonry Walls and Grouted Stone Masonry	m3

Item No.	Name	Unit
G.7	Earthwork	
G.7.1	Manual excavation of ordinary soil	m3
G.7.2	Manual excavation of medium hard soil	m3
G.7.3	Manual excavation of hard soil	m3
G.7.4	Manual excavation of weathered soft rock	m3
G.7.5	Manual excavation of Medium hard rock	m3
G.7.6	Structural Backfill	m3
H.8	Pavement Works	
H.8.1	Reshape Existing Road Formation including Watering and Compaction to Specification	m2
H.8.2	Prepare Approved Borrow Pit(s), Excavate, Haul, Place Material, Water and Compact to Specification	m3
H.8.3	Prepare & Repair Potholes, Ruts & Gullies with Approved Borrow Material & Compact to Specification	m3
H.8.4	Provide materials and construct concrete strip road (Concrete Tyre Path)	m3
H.8.5	Cement Grouted Stone Pitching between the concrete wheel path strip road	m3
H.8.6	Inspect and Maintain/Replace Road Traffic Signs	No
H.8.7	Plant Erosion Resistant Grass on Side Slopes, Shoulders and Areas Prone to Erosion	m2
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