

**TECHNICAL SPECIFICATIONS FOR THE RECONSTRUCTION
/ REHABILITATION OF SCHOOLS AND HEALTH FACILITIES
OF RELIGIOUS INSTITUTIONS IN THE NORTH WEST AND
SOUTH WEST REGIONS OF CAMEROON THROUGH THE
RECOVERY PROGRAM OF THE UNDP**

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<p>CONSTRUCTION WORKS WITH THE RELIGIOUS AUTHORITIES OF THE NORTH WEST AND SOUTH WEST REGIONS UNDER THE RECOVERY PROGRAM WITH UNDP</p>

PART I GENERALITIES

I.1- Background and Justification

UNDP partners with people at all levels of society to help build nations that can withstand crisis, and drive and sustain the kind of growth that improves the quality of life for everyone. On the ground in 177 countries and territories, we offer global perspective and local insight to help empower lives and build resilient nations. This Technical Specifications for Construction Works (TSCW) is specifically related to the **UNDP Recovery Program in the North West and South West regions of Cameroon and particularly to the reconstruction of schools and health services of religious institutions destroyed due to the crisis.**

The Government of Cameroon designated UNDP as an implementing partner for the first leg of the Presidential Plan for Recovery and Reconstruction (PPRD) or the Recovery Program (RP) for the North West and South West. Within the framework of the PPRD or the Recovery Program (RP), UNDP designed a 2-year Recovery Program focusing on **(a) Rehabilitation of basic services infrastructures (b) Revitalization of the local economy; and (c) Social cohesion.** This programmatic engagement will serve as a platform for the UN system to engage in recovery and stabilization work to **widen the spectrum of assistance to Cameroon.**

It is within the framework of this intervention that the **Procurement Department** was mandated by the PPRD or RP for the technical capacity assessment of the religious institutions to implement the selected projects and selection of one or more civil engineering works companies to assist those religious institutions that did not meet up the selection criteria to build through their technical department.

I.2- Subject

These Terms of Reference constitute the Book of Technical Specifications for Construction Works clauses (TSCW) intended to recall the reference texts and regulations for each building trade as well as the qualities required for the various equipment and materials included in the scope of the construction works and / or rehabilitation subject of this call for tenders.

The specific technical clauses and the descriptive estimate relating to the various trades with the location of the requirements give as complete a description as possible of the work to be performed, with the aim of enabling the Contractor to interpret the details, to specify the nature of the materials to be used and to determine the particularities of manufacture and implementation. These requirements cannot claim to be a complete and perfect description of the work and it should be noted that this description of the work is not limiting.

The Contractor must perform without exception or reservation all the work provided for in his contract, and will therefore have included not only the work and supplies described in this document, but also those which could have escaped the details of the description and which are essential for the perfect completion of the works of restoration in good condition of the works of their trades, according to the submitted plans and the rules of the art of construction.

Likewise, the work provided for in the written and estimate documents of the contract, but which do not appear in the plans are due by the Contractor and included in the prices. The Contractor will provide the unit prices for all items of the Bill of Quantities (BOQs). And the sub-details of unit prices, if applicable, at the express request of the Project Owner.

Consequently, the Contractor can never argue that errors or omissions in the plans and specifications may exempt him from carrying out all the work of his trades or, be the subject of an additional request for an amount.

I.3 - Presentation of the operation

These projects relate to the reconstruction and / or rehabilitation of Schools and Health Centers belonging to the Religious Institutions (The Catholic, Full Gospel Mission, Cameroon Baptist Convention, The Presbyterian Church in Cameroon and the Islamic Institutions) in the North West and South West Regions of Cameroon. All the works planned on these sites constitutes 24 lots. 12 from the North West and 12

from the South West Region. ***But most importantly this Specification refers to a competitive Call for Tender for the reconstruction and/or rehabilitation of three Islamic Primary Schools, two from the north West Region (Islamic Primary School Babungo and Islamic Primary School Old Town Bamenda) and one from the South West Region (The Islamic School Complex Buea).***

In the texts that follow, the expressions «Project Owner» refer to the UNDP within the framework of these Terms of Reference (TOR).

The package of interventions involved in the reconstruction and / or rehabilitation of these buildings includes the following works:

- general works which include the installation and withdrawal of the site
- works of major and secondary works
- works of Drains and Miscellaneous Networks.

I.4- Allotment

The works covered by this Call for Tender are divided into 3 distinct lots (***2 from the NWR_Islamic Primary School Babungo and Islamic Primary School Old Town Bamenda, and 1 from the SWR_The Islamic School Complex Buea***) and each tenderer may not be awarded more than two (02) lots.

Tenders must designate all subcontractors carrying out parts of tasks which will not be performed by the tenderer.

I-5- Key personnel

The Tenderer must provide the names of personnel with the required qualifications as required in the following table:

N°	DESIGNATION	EXISTENCE		OBSERVATIONS
		NO	YES	
	List of Key Personnel			
A	Works supervisor : Civil Engineering Works Engineer (CEWE) or Senior Civil Engineering Technician (SCET).			
1	a- Certified copy of the Civil Engineering Works Engineer diploma registered with ONIGC + Certificate of			

	registration with ONIGC. b- Certified copy of the diploma of Higher Technician of Civil Engineering			
2	Certificate of availability dated and signed			
3	Dated and signed CV			
4	General experience in Civil Engineering \geq 05 years			
5	Experience as a Construction Supervisor \geq 03 years			
B	Site manager: Higher technician, Civil Engineering Technician or CAP in masonry			
1	Certified copy of the diploma			
2	Certificate of availability signed and dated			
3	Dated and signed CV			
4	General experience in Civil Engineering \geq 07 years			
5	Experience as a construction site manager \geq 05 years			
6	General experience in management \geq 03 years			

I-6- Material resources

The Bidder must provide the list of proposed equipment as required in the table below:

N°	DESIGNATION	Q'ty	Carte Grise ou Invoice/ Rental Contract		OBSERVATIONS
			NO	YES	
A	Construction vehicles				
1	Dump truck	01			
2	Liaison vehicle	01			
3	Tanker truck or towable tanker	01			
4	Hoist for metal framework at the AMCHIDE Market	01			
B	Construction Equipment				
1	Cement mixer	01			
2	Welding station	01			
3	Wheelbarrows	06			
4	Vibrating needle	02			
5	Round shovels	12			
6	Shovels Spades	08			
7	Pickaxe	08			
8	Mason Bucket	15			
9	Set of tools for masonry (Water level, Plumb bob, Trowel, Hammer, Chisel, Square, Mallet, 10 clamps, Mechanical bar ... etc)				
10	Tool set for painter (Wire brush, Roller, Brushes, etc.)				
11	Set of tools for woodworking (Handsaw, hammer, etc.)				

I.7- Special conditions

Considering the climatic conditions of the area, the materials must be effectively protected:

- Against heat and rust ;
- Against the effects of dust, debris and living micro-organisms.

I.8- Tests and Materials

- All materials must be new, of the best quality and free from any defects capable of compromising the strength, appearance or duration of the works ;
- The holders are required, at the request of the Client to justify the origin of the materials, either by the presentation of invoices or by any other means;
- The contractor must provide free of charge for examinations, tests or analyzes, all the samples that the Project Owner deems useful to request from him;
- The materials are subjected, at the expense of the Contractor to such tests as the Project Owner deems necessary and, in such places as he designates;
- Holders must allow the engineer appointed by the Project Owner to monitor and permanently monitor, in the quarries and workshops, the strict execution of the specifications, with regard to the origin and quality of materials, the manufacture of materials, the making of parts, etc.;
- The Project Owner may authorize the use of products similar to those prescribed, if he judges these products of at least equal or superior quality performance.

I.9- Execution plans

The various works will be carried out in accordance with the indications in the plans listed below (See Annex 1) and attached to this Construction Works Standard Specifications (CWSS).

- Plan views for all trades ;
- Foundation plans ;
- Sections ;
- Facades ;
- Detailed plans.

Before any execution, the contractor must verify the dimensions appearing on all the plans that will be given to him as well as the consistency between this document and the plans. It is also required to reproduce the execution plans approved by the Project Owner before implementation or production in the workshop if there has been a possible modification to the existing plans. He informs the Engineer representing the Project Owner in good time of any errors or omissions observed.

I.10- Site and work visibility signs

Before the start of work and within ten (10) days from the date of notification of the contract, the contractor must ensure the supply and installation in visible places chosen in agreement with the engineer appointed by the Client, two site signs conforming to the model supplied and comprising in a legible manner the indications marked on the model.

I.11- Recognition of places

The company will have to measure perfectly, by a detailed visit of the places and to include in its offer, all the particular works specific to the realization of the works.

Once the contract has been signed, additional work caused by ignorance of the location, the environment and its constraints, access and storage possibilities, etc. will not be accepted.

All the constraints arising from the context of the transaction will be taken into account in the company's offer, as well as the consideration of the necessary means to be considered to ensure all the services provided for at its expense.

The company must take note of all the written and drawn documents constituting the contractual documents in order to ensure that its service is compatible with that planned.

The Company is required to verify all quantities before bidding and it must notify the Client of certain discrepancies in its bid, otherwise, it will not be able to claim anything after signing the contract.

I.12- Approval of supplies - samples

This book of technical clauses prescribes supplies and materials by giving technical details in terms of either requirements or results.

These data make it possible to set the qualitative level requested and put companies at the same level of service. The company has the option of offering any product that meets the requested technical description. The company is obliged to provide the technical sheet of the product offered either when submitting the offer if this is required in the consultation file, or during site preparation for validation of the product by the Project Owner.

The Project Owner and the engineer will examine the quality of the products offered and judge whether they can be accepted or not.

During the work, if the company wishes to offer a brand and reference different from that initially planned, it must present the prescribed sample to the market, accompanied by its technical sheet as well as the variant sample proposed by the company and its technical sheet. The Project Owner will examine the quality of the variant and will decide subsequently on the acceptance or rejection of the variant.

Any material used that has not been the subject of prior approval of the Project Owner will be refused and must be changed, at the expense of the company.

The Project Owner may also require all additional samples necessary for the choice of materials and the development of the assemblies entering into the realization of the project and the controls and tests.

The samples may be subjected at the request of the Project Owner to tests in order to determine their resistance, their resistance to atmospheric agents, their durability over time, their compatibility with other materials.

In addition, the contractor must perform all test applications and provide all samples allowing the Project Owner to make the aesthetic choices (colors, appearances, shapes, etc.)

The samples must be communicated by the company to the Project Owner from the start of the preparation period and at the latest at the end of the second week of construction otherwise the penalties for delay in the delivery of elements of may be applied.

In general, taking into account the climatic conditions of the area, the materials must be:

- effectively protected against heat and against living microorganisms ;

- Tropicalised ;
- new, of the best quality and free from all defects capable of compromising the solidity, appearance or durability of the works.

The company is required, at the request of the Project Owner to justify the origin of the materials, either by presentation of invoices, or by any other means.

The Company must allow the Project Owner to follow up and permanently monitor, in the quarries and workshops, the strict execution of the specifications, with regard to the origin and quality of materials, the manufacture of materials, the making of concrete elements... etc.

I.13- Inspection - Tests - Functional verification

I.13.1- Technical controls

In order to prevent technical hazards arising from improper operation of the facilities, the company must carry out at least, before acceptance, the necessary tests and verifications based on the technical recommendations.

The results of these tests must be recorded in reports which will be sent for examination to the Project Owner.

I.13.2- Internal control of companies

The contractor must provide free of charge for examinations, tests or analyzes, all samples that the Project Owner deems useful to request.

The internal control to which the company is subject must be carried out at different levels:

- In terms of supplies, regardless of their degree of finish, the contractor will ensure that the products ordered and delivered comply with the standards and any additional specifications of the contract.
- In terms of storage, the contractor will ensure that those of his supplies which are sensitive to attacks from atmospheric agents or mechanical deformation are suitably protected.
- In terms of manufacturing and implementation, the head of internal controls of the company will verify that the implementation is carried out in accordance with the rules of the art.

- At the testing level, the contractor will carry out the checks imposed by professional rules and additional tests required by the written documents.

I.14- General organization of the site

Site meetings will take place at least once a week, on the days and at the times set by the Project Owner.

The company must be represented at these meetings by a representative approved by the Project Owner. Any subcontractors may also be summoned to site meetings if necessary.

The company must propose a site foreman who will oversee the work throughout its duration. The CV of the site manager must be included in the company's technical offer.

Any change of person before or during the work must be validated by the project engineer on the proposal of another person with higher or equivalent skills and experience.

Punctuality will be required at site meetings, in the interest of participants. Any delay or unexcused absence will result in a penalty.

A report of the meeting will be drawn up by the Engineer representing the Project Owner and communicated to all participants.

In the event of disagreement on its content, observations may be made at the start of the next meeting or in writing before this meeting in the event of absence.

After the observations have been settled, the report will be deemed to be approved without reservation.

I.15- Site cleaning

I.15.1- Ongoing works

The Company must ensure the general cleaning of the site and its surroundings throughout the duration of the work. The company must do the cleaning following its work as the work progresses and according to the instructions of the Project Owner. For this, the worksite teams must be equipped with suitable cleaning equipment.

In the event of failure, the Project Owner and the Project Manager may request the execution of these cleanings from another team at the expense of the defaulting contractor.

I.15.2- At the end of the works

The company will carry out the final cleaning of the site. Cleaning will concern the following structures:

- The pavements ;
- Sanitary facilities (including accessories) ;
- Lightings ;
- Wall plastering and tiling ;
- Repointed masonry and finishings;
- The exterior joinery and woodwork.
- The Interior joinery and woodwork.
- Glazing and windows ;
- Ceilings.

It is specified that the service will include cleaning prior to preliminary reception operations and a second cleaning for handing over the premises to users.

Subsequent cleanings which may prove necessary to follow up the lifting of reservations will be the responsibility of the Company.

I.16- Protection

The company must protect the materials, installations, tools and structures, from any damage that they could suffer, in particular due to bad weather.

It must repair the damage resulting from the lack of precaution, restore or replace at its own expense any constructions that have been damaged as a result.

If the work is interrupted for any reason whatsoever, the company must protect the constructions and works carried out against the damage they may suffer, at no additional cost to the Project Owner.

I.17- File of executed works

The Contractor is bound, during the warranty period, to an obligation known as the "obligation of perfect completion or good performance".

As such, he must, at his own expense, submit to the Project Owner, the plans of the works conforming to execution within one (1) month from the date of provisional acceptance.

After the period of one month, after receipt, the company will suffer the penalties provided for.

PART II – ORIGIN, QUALITY AND IMPLEMENTATION OF MATERIALS

Chapter 1- Reference texts, reminder of the regulations

The production of these works is subject to compliance with regulatory, technical and technological texts in Cameroon, as well as those published in France, Britain and in the European Union, made applicable in Cameroon.

The work will be calculated and carried out in accordance with the standards and regulations in force, in particular.

The work will be calculated and carried out in accordance with the standards and regulations in force, in particular :

Trades	Norms	
Concrete and steel	NF P15-301	Hydraulic binders
	NF A35-027	Steel products for reinforced concrete
	BS EN 12620	Aggregates for concrete
Sanitation	DTU 64.1	Non-collective sanitation devices for single-family dwellings
	BS EN 752	Drainage and sanitation networks outside the building
Masonry	NF DTU 20.1 EN 1996-1-1	Small-unit masonry structures
Plasters	DTU 26.1	Mortar rendering work
Plumbing	DTU 60.11	Rules for calculating sanitary plumbing installations and installations.
Electricity	NF P 80-201-2	Electrical installations of residential buildings

For architectural lots, the services will be performed according to the following standards :

Trades	Norms	
Cladings	DTU 52-1	Sealed Floor Coverings - August 1994
	DTU 53-1	Textile floor coverings - December 1986
	DTU 53-2	Glued plastic floor coverings - April 1961
	DTU 55	Sealed wall cladings - April 1961

	DTU 55-2	Thin stone attached wall claddings
Ceiling	DTU 25.51	Implementation of staff structures
Aluminum joinery	NM 10.02.038	Aluminum profiles
	NM 10.02.039	Anodizing of aluminum alloy profiles
	NM 01.9.001 – NM 01.9.007	Relating to the anodization tests of aluminum alloy profiles
	NF P 24.101	Window terminology
	NF P 24.301	Technical specifications of windows, doors and metal frames
	NF P 20.501	Air permeability test, water tightness and wind resistance, deformation of opening frames
	DTU 37.1	Pose de la menuiserie sur le gros œuvre
Glazing	DTU n°39	Glass glazing works
Painting	NF T 30.001	Terminology and miscellaneous defects
	NF T 30.002	Classification of mineral pigments
	NF T 30.003	Classification of the families of paints, varnishes and related products.
	NF T 30.015	Painting, abrasion resistance tests
	NF T 31.001	Whites ground in linseed oil
	NF T 32.001	Windows, glass, terminology
	NF T 78 301	Window glass, quality
	NF T 78.331	Linseed oil mastic
	NF T 32.500	Classification and thickness
	NF T 78.401	Window glass and dimensions

Chapter 2 - Origin and quality of materials

The supply of all materials is the responsibility of the contract winner. However, the provenance of the materials must be subject to the approval of the Project Manager. The Contractor must submit to the Project Manager, and **within a minimum of 5 days** before the expected supply, all samples of the materials necessary for the execution of the work.

The Project Manager appointed by the Project Owner has **three (03) days** to make his observations and give his opinion on the contractor's request.

The contractor must choose the best materials, it being understood that he is deemed to have visited all the sites and its surroundings before giving his price.

The origin, the quality, the characteristics, the manufacturing processes as well as the control and acceptance tests of the materials and products manufactured must meet the standards set by this Technical Specification Book (TSB) and in any case

the approved or regulatory standards. in force at the time of signing the contract, which the Contractor is deemed to know.

However, subject to the approval of the Project Manager, corresponding materials and equipment of equivalent quality or higher than that of the standards set by this TSB may also be used. The Contractor shall attach to his proposal an integral collection of the standards proposed and translated into English if applicable.

The Contractor shall produce the approval certificate for each supply and indicate for each product offered the technical specifications, instructions for use as well as any contraindications. The Contractor remains solely responsible to the Project Manager for the quality of the materials and equipment delivered.

Supplies and materials being imported into Cameroon must include documents justifying their production in the country concerned.

All supplies and all imported materials used in the composition of the works must be approved by the Project Manager.

To obtain this approval, the Contractor will present to the Project Manager for acceptance a technical approval file for the imported materials, equipment and supplies, included in the composition of the works.

This file must include all documents to justify the origin and quality of the materials or products manufactured as well as a detailed description of the equipment including, among other things, the schematic installation plans and the characteristic operating curves.

Important notes: the product references indicated in the documents in this file, in the form of a trade name, are made only for descriptive purposes without any requirement for supply in the types or brand mentioned.

2.1- Aggregates for mortars and concrete

Aggregates for mortars and concrete must meet regulatory requirements and standards. The aggregates will be of uniform quality and without excess of flat or elongated lumps, dust or impurities.

In addition, it is specified that the dimension of the concrete chippings will be at most equal to 25 mm. This maximum size will be reduced to 15 mm in the rubbed areas.

However, in massive structures and with the express agreement of the Project

Manager, the maximum size may be increased to 40 mm.

0/25 concrete will be made up of at least three classes of aggregates, the grain size curves being taken from the following series of strainer sizes, expressed in millimeters: 2 - 4 - 6.3 - 10 - 20 or 3 - 5 - 8 - 12.5 - 15 - 25.

The sands will be of good quality, stable, clean and free of dust, shale, clay or organic debris. They should not contain more than 5% of fine elements passing through an 80 micron sieve. No grain should be larger than 6.3mm. The sand equivalent will necessarily be greater than 70.

The aggregates will be stored in such a way that the different classes cannot mix. Contamination by mud and dust should be avoided. A good drainage of stocks must be ensured.

The quality and grain size of the aggregates must be subject to the approval of the Project Manager. This approval will only be acquired after the resistance tests on concrete specimens carried out with the proposed aggregates have been found to be satisfactory.

2.2- Hydraulic binders

The cement used in the composition of ordinary or reinforced concrete and mortars will be of class CEM II of resistance 42.5 or CPA 325. The use of aluminum cement will not be authorized as well as the cement mixture.

Cement must be stored in dry, well ventilated rooms that are effectively protected against bad weather. The floor surface of wooden or concrete rooms should be at least 20 cm above the ground to prevent any rising damp. Each supply should be stored separately so that it can be easily identified and controlled.

The cement must be used in the order of delivery or as directed by the Project Manager. The piling of the cement in bags will be done to a maximum height of two (02) meters.

The tonnage of cement stored must be sufficient to ensure consumption of at least one month during site activity. Any cement showing traces of humidity or setting must be removed from the site.

2.3- Additives

The possible use of admixtures for the preparation of concrete will be subject to the approval of the Project Engineer. The admixtures must be used in accordance with the Technical Specifications, in particular with regard to the maximum dosage, the

precautions to be taken and the contraindications. Chlorine additives are prohibited, air entrainers must be approved by the Project Engineer.

The use of the additives must be such that it is guaranteed against any abnormal concentration. To this end, the admixture of the additives and the mixing water will take place in the tank or in an auxiliary tank which will be fitted with a sufficiently powerful independent stirring device in permanent motion.

Any additives used by the Co-contractor and supplied by him on the site must give rise to the presentation of a certificate of origin, indicating the deadline beyond which these products must be scrapped.

2.4- Mixing water

The supply of water is the responsibility of the Co-contractor. The proportion of materials dissolved or suspended in the mixing water must be low enough so that it does not cause a reduction in the qualities.

In particular, it will be soft and must contain less than 2g/l of suspended matter and less than 2g/l of salts and will be free from earthy, organic and chlorine matters. It should not exhibit any retarding or accelerating effect of the cement setting.

Doubtful water will be subjected to chemical analysis by the care and at the expense of the Co-contractor.

2.5- Steels for reinforced concrete

The steels used for reinforced concrete will be as follows :

- High adherence steel Fe400 conform to standards and must have a minimum yield strength of 400 Mpa.

For each supply of steels intended for the work, the Co-contractor will provide certificates indicating the results of tests undergone by the materials. If test results are not available, the Project Manager may refuse its use. The steels will be securely tied in bundles. The bundles must be clearly marked with the supplier, the quality, the date of delivery and the length, diameter and number of bars.

Steels for reinforced concrete will be stored on supports above the ground and will be protected against rust, oil and other harmful effluents.

2.6- Curing products

Curing products that may be used for concrete will be subject to the prior approval of the Project Manager and will comply with the Technical Specifications.

2.7- Timber for Framing

All the woods will be of first quality, sound, perfectly dry, the humidity level in accordance with the requirements of the climate, without vicious knots, presenting no significant deterioration, such as spalling, frost, internal cracks or rolling ... etc. and guaranteed against all possible illnesses.

The wood should also not show traces of insects, the cracks will only affect the surface of the parts and will be few.

These woods will be chosen on the basis of their dimensional stability, their mechanical qualities and the possibilities of supply.

The Contractor will be responsible for diseases that may occur in his works after their implementation (mold, fungi, etc.).

It will also be responsible for all twists, splits, bursts, etc. due to the use of imperfectly dry wood.

All wood will undergo an insecticide and fungicide treatment against termites by soaking before assembly. Provision will be made to paint the parts which have been the subject of new cuts and which leave the visible wood untreated.

2.8- Roofing sheets

The roofing sheets will be of Aluminum 6/10th thick and will come from approved manufacturers and factories.

2.9- Materials for aluminum, wood and metal joinery

The Contractor is required to submit beforehand to the Project Manager a sample of each type of joinery for approval before mass production and installation of joinery (verification of dimensions, verification of the thickness of the steel sheets, (aluminum, timber and tubular frame, number and arrangement of hinges, number and arrangement of sealing brackets, brand and origin of locks).

The Contractor is required to communicate to the engineer the address of the workshop where this joinery is manufactured for monitoring. The presentation of the sample for acceptance by the Project Manager will take place at least fifteen (15) days before the installation of the joinery.

2.10- Electricity materials

All sheaths, wires and electrical devices will be of very good quality and subject to the assessment of the Project Manager before installation.

2.11- Painting

All products used for painting, painting preparations, varnish or other coatings must be of good brand from approved manufacturers and factories. They will be delivered to the site in their original containers labeled by the manufacturer. Handcrafted products or those composed on the job are strictly prohibited. The Client will always have the right, whatever the degree of progress of the work, to have the quality of the products used checked by a laboratory of his choice and at the expense of the Co-contractor. This verification will be carried out either by analysis on samples taken, or by tests on the works executed.

2.12- Materials for cladding

Porcelain or earthenware tiles and accessories must come from well-known factories, corresponding at least to CERABATI products.

Their dimensions and manufacturing tolerances will be those defined by standards NFP 61.311 0 314 or DTU No. 52.1 for thin elements, its being understood that the “good choice” manufacturing quality corresponds to the second classification. The characteristics of the porcelain stoneware tiles must be guaranteed by the approval of the Engineer and recorded in a report justifying their physical qualities.

Chapter 3- Methods of execution of building works

3.1- Site visits

The Contractor must visit the site, to enable him to assess the consistency of the work incumbent on him and the viability of the project site. He must also accurately assess all the conditions of execution of the works and realize the difficulties associated with them. A detailed report of the visit should be drawn up and should highlight general and specific observations related to the project.

3.2- Overview

The works will be carried out by the company, including the following trades :

- preparatory works ;
- earthworks;
- masonry and concrete works ;
- framing works - roofing ;

- aluminum, wood and metal joinery works ;
- electrical works ;
- painting works ;
- plumbing - sanitary works ;
- floor and wall coverings;
- Drainages and utility networks.

3.2.1- Composition of concrete and mortars

3.2.1.1- Concrete

Concretes used for the construction of structures meeting the following specifications:

Concrete Type	Cement dosage per m ³	Area in Need	Resistance at 28 days - compression - Mini traction	Water /Cement ratio maximum
Common concrete (CC)	200 kg	Lean concrete		0,70
Grade 1 concrete (G1C)	250 kg	Form concrete	18 Mpa 1,8 Mpa	0,60
Grade 2 concrete (G2C)	300 kg	For structural elements that are not reinforced or lightly reinforced	23 Mpa 2,05 Mpa	0,55
Grade 3 concrete (G3C)	350 kg	For works or parts of works in reinforced concrete	27 Mpa 2,32 Mpa	0,55
Grade 4 concrete (G4C)	400 kg	For structures or parts of structures in reinforced concrete	30 Mpa 2,67 Mpa	0,55

The dose of cement indicated in the table cannot be reduced even if the resistance of the tests exceeds the prescribed values.

a)- Consistency

The consistency of quality concretes G2C, G3C and G4C will be measured with the Abrams Cone Test Method (ACTM), the subsidence will be less than 5 cm. The Co-contractor must in all cases have the necessary equipment to ensure satisfactory

vibration of the concrete used.

b)- Composition

The study of the composition of concrete is the responsibility of the Co-contractor. He must present his proposals to the Project Manager and submit for his approval the particle size composition and the volumes of water to be incorporated per cubic meter, in good time to meet the contractual execution time.

The Co-contractor has a period of fifteen (15) working days from the notification of the contract to present the composition of the concrete.

The Project Manager will make his/her observations or give his/her approval within three (03) working days from the date of receipt of the Co-contractor 's proposals.

Following the approval by the Project Manager of the proposed concrete compositions, the Co-contractor will carry out mix tests for each grade of concrete indicated. The tests must correspond to the manufacturing conditions on the site. The Co-contractor will only apply the mixtures approved by the Project Manager.

c)- Concrete control

The Co-contractor is responsible for carrying out the study tests and suitability tests in good time to meet its contractual obligations relating to the execution times, whatever the results of said tests.

The test pieces will be made in approved molds. The transport to the test specimen control, suitability and information control laboratory will be carried out by the Co-contractor.

Concrete control will be carried out accordingly as prescribed in the table below :

Class of Concrete	Number of test pieces to collect	Compression	Frequency of Traction tests	Consistency fresh concrete
G2C 300 kg	Per day of concreting 4 cylinders	2 tests at 7 days	2 tests at 7 days	1 per ½ days of concreting
	8 prisms	4 tests at 28 days	4 tests at 28 days	
G3C 350 kg	Per day of concreting 10 cylinders	3 tests at 3 days, 2 tests at 7 days	3 tests at 3 days 2 tests at 7 days 1 per ½ days concreting	
	Prisms (at the request of the Project Manager)	5 tests at 7 days	5 tests at 28 days	
G4C 400 kg	Prisms (at the request of the Project Manager)	7 tests at 7 days	7 tests at 28 days	

Structures or parts of structures, for which the tests thus carried out show resistances 15% lower than the required resistances will be refused.

3.1.1.2- Mortars

Depending on their destination, the mortars will have the following compositions :

- M400: Mortar with 400 kg of cement per cubic meter of sand. It will be used for the realization of the facings seen of the works (covers of manholes, works in superstructures) ;
- M500 : Mortar at 500 kg of cement per cubic meter of sand with the addition of Sika N1 product according to the dosage prescribed by the manufacturer and subject to the approval of the Project Manager. This mortar will be used for the waterproof interior plaster of the structures ;
- M600 : Mortar dosed at 600 kg of cement per cubic meter of sand. It will be used for all seals (metal profile descent rungs, etc.) and for repointing masonry rafters ;

The mortars will be manufactured mechanically or exceptionally, manually for very small quantities. Manufacturing equipment must provide the same dosage guarantees as for concrete.

Any mortar which has started to set or which has dried out will be rejected and must not be mixed with fresh mortar.

3.1.1.3- Formwork

Formworks will be made up of metal elements, wood or any other equivalent material. They will be subject to the approval of the Project Manager.

The slab, raft and wall forms that will remain in view will be smooth, ensuring smooth and regular surfaces. They will comply with the technical requirements and plans.

3.1.1.4- Bending of reinforcements for reinforced concrete

The conditions of use of the reinforcements must comply with the specifications of the technical clauses.

When it is necessary to constitute a reinforcement element with several bars, the joints are distributed over a certain length so that, in a section, there are at least 2/3 of the continuous bars, assuming that the overlap of the reinforcements with improved adhesion will comply with the requirements of the reinforced concrete rules in force.

Immediately before installation, the steel bars and stirrups will be cleaned and rust-free. The reinforcements will be well fixed so that there is no risk of displacement during the pouring of the concrete. Are forbidden :

- the deliberate bending and unbending of the reinforcement;
- assembling of reinforcements by welding.

3.3- Site installation

Site installation works will be the responsibility of the Company benefiting from the contract. they include :

- The construction of a temporary fence ;
- Cleaning and security of the site ;
- The measures necessary to comply with legal and regulatory provisions relating to staff health and safety. (Setting up a temporary latrine, have jars of water treated with bleach, a pharmacy box equipped with first aid products: aspirin, nivaquine, adhesive plaster, betadine, bands, alcohol, etc.) ;
- Temporal access roads and the maintenance of temporary or permanent roads inside the site ;
- An on-site storage warehouse ;
- Le Bureau de chantier : Pendant toute la durée de réalisation des travaux, et en plus de ces bureaux où le cahier de chantier, le journal de chantier seront disponibles en permanence, l'attributaire du marché devra mettre à la disposition de l'Ingénieur dans un emplacement déterminé conjointement avec celui - ci :
- Un bureau ou local d'au moins 16 m² équipé d'une table bureau et deux chaises réservé à l'Ingénieur ;
- A room for site meetings that can accommodate at least 5 people equipped with a meeting table, two 1.5 m benches, a display board for plans and planning (chronogram) placed permanently;
- Adequate water drainage should be provided over its entire area ;
- Receptacles for receiving waste are to be installed near the various facilities. These receptacles are to be emptied periodically and the waste to be placed in a container for recovery or in a dump (pit). This pit must be located at least 100m from the installations and in the event of the presence of water courses

at least 150m. At the end of the work, the pit is to be filled with earth up to the level of the natural ground.

(If deemed necessary in the UNDP Recovery Program of North West and South West, since it is low profile operation) In addition to all these aspects mentioned above, 02 (two) very visible panels, the locations of which will be defined and indicated by the Project Manager will be fixed for indication and information of the site and will bear the following indications:

- Project references;
- References of the Client (Project Owner);
- References of the beneficiary structure ;
- The source of funding ;
- Company references ;
- The duration of the work (the dates of the start and end of the work).

No other sign will be authorized on the site, except with written agreement except for regulatory signs, those prohibiting access to the site and those concerning safety.

3.4- Preparatory works

3.4.1- Studies

The studies include:

- Studies of soil bearing capacity;
- the establishing of execution plans and details at appropriate scales;
- the different calculation reports ;
- the establishing of the work schedule.

These documents will be given in 04 copies before the start of work to the Engineer within 15 working days after signing the Service Order to start work.

3.4.2- Labor-based jobs

The specificity of labor-based work is to fight against poverty by creating temporary jobs for local unskilled labor and the use of local materials in construction work. The recruitment of unqualified staff must be done through a local labor agreement between the holder and the representative of the beneficiaries.

In the case of this labor-based construction site and to achieve one of the objectives which is the creation of temporary jobs in order to fight against poverty, the company must only employ the unskilled local labor of the site of the construction site for the

execution of the work mentioned in the following paragraph. The financial benefits for the beneficiaries should in principle be within a range of 5 to 15% of the amount of the contract, part of which is allocated to female labor.

As part of the execution of the works, subject of this Call for Tenders, the following tasks must be performed manually:

- cleaning of the infrastructure footprint ;
- stripping of topsoil ;
- excavations of all kinds;
- backfilling of excavations ;
- backfilling under the pavement;
- land clearing ;
- participation as a laborer in the construction of major works ;
- participation as a laborer in the realisation of finishes.

The transport of water, sand, rubble and gravel will be done only by means of wheelbarrows or rickshaws. The improvement of these local resources is the responsibility of the company. However, in cases where the distances are greater than two (02) kilometers, the company has the option of using motorized vehicles.

3.4.3- Survey Layouts / setting outs

The installation of the structures will be carried out by the company. The Contractor is responsible for the layout of the works and he is also responsible for the levels, alignments and dimensions of the works executed according to the indications of the site plan and the ground plan.

In the event of a setting out or levelling error, the Contractor will be required to carry out at his own expense and regardless of their importance all the work necessary to restore the structures to their planned position.

The Company will make all the readings it deems necessary and will remain responsible for the consequences of any measurement error, regardless of the origin of the plan and calculations. The Engineer or his representative reserves the right to carry out, at the contractor's expense, periodic checks of the various axes and elements of implantation or levelling of works.

3.4.4- Brush clearing and pruning

The land clearing will be done on the site of the building and on a 10 m right-of-way all around it. This work includes all subsection of tree felling and stump removal.

Brush clearing and pruning concern the immediate surroundings of the structure in order to improve the sunshine and provide visibility.

Regarding pruning, all branches overhanging the platform will be cut along a vertical line passing through the brush limit.

With regard to brush clearing, it consists of cutting low to the ground, without uprooting the vegetation and quality trees will be preserved and protected.

3.5- Earthworks

3.5.1- Excavations

The excavations will be lowered to good soil, ensuring perfect stability of the structure. For ease of implementation, the openings of the excavations will not be less than 60 cm. In any case, the depth of these excavations will not be less than 80 cm at all points. The excavation walls will be well erected and the bottoms perfectly leveled. The adjustment of the excavation bases to the final dimensions will be carried out.

The execution of the excavations will be subject to the approval of the site by the Project Owner or the Engineer.

In the case of isolated foundations, wells can be deepened up to 1.50 m.

3.5.2- Backfilling of excavations and under pavements

The soils resulting from these excavations will be subject to their good quality, used for the backfilling. In the case of the proven poor quality of the soil from these excavations, the backfill will be made with sand. These will be carried out in successive layers of 15 cm, watered and compacted.

Surplus soils as well as those of poor quality will be evacuated to the public landfill or to places approved by the Engineer. In any case, the backfilling of excavations will be purged of all detritus, roots, vegetable matter and rubble.

3.6- Foundations

3.6.1- Lean concrete

Lean concrete dosed at 200 kg/m^3 of 5 cm thick will be spread on the excavation bases.

3.6.2- Reinforced concrete footing

In reinforced concrete as indicated on the plans.

- Concrete: dosed at 400 kg/m^3 ;
- Steels: HA10 every 10 cm maximum.

3.6.3- Foundation walls

The foundation walls will be executed in agglomerates of cements of (LxWxH) 40 x 20 x 20cm, stuffed with ordinary concrete dosed at 250 kg/m^3 and laid with ordinary cement mortar.

3.6.4- Foundation beams and column footings

The Foundation beams and column footings will be made of reinforced concrete and will be :

- of section 20 x 20cm ;
- Concrete: dosed at 400 kg/m^3 ;
- Steel: $\Phi 6$ stirrups every 15 cm in + 4 T10 threads.

The Foundation beams of the foundation walls in agglomerates of 20cm packed will be made of reinforced concrete with a section of 20 x 20cm dosed at 400 kg/m^3 and having for steel: T6 frame every 15 cm + 4 T10 threads + 4 T10 stirrups at the corners.

3.6.5- Floor paving

The ground will receive a lightly reinforced concrete pavement of 08 cm thick on a polyethylene plastic films of 400 microns.

Concrete: dosed at 350 kg/m^3 .

3.7- Masonry - Elevation

3.7.1- Reinforced concrete for columns, chaining, lintels and window sills

The concrete elements will be dosed at 400 kg/m^3 with steels of 8mm for the threads and 6mm for the stirrups.

a) Columns

In reinforced concrete unless otherwise indicated in the section plans :

- 15 x 15cm in the gable and partition walls ;
- 15 x 15cm on the front and back facades ;
- Concrete: dosed at 400kg/m^3 ;
- Steel: $\Phi 6\text{mm}$ stirrups every 15 cm and 4 threads HA10mm.

b) Lintels

In reinforced concrete with a section of 15x20cm or 10x20cm depending on the thickness of the walls :

- Concrete: dosed at 400 kg/m^3 ;
- Steels: $\Phi 6\text{mm}$ stirrups every 15cm + 4 HA10 threads.

c) Top chaining

In reinforced concrete of 15 x 20cm

- Concrete: dosed at 400 kg/m^3 ;
- Steels: $\Phi 6\text{mm}$ stirrups every 15cm + 4 HA10 threads.

3.7.2- Walls in agglomerates of 15cm in elevation

The elevation walls will be mounted in (LxWxH) 40x15x20cm hollow cement agglomerates as indicated on the plans. These agglomerates must offer significant crushing resistance.

3.7.3- Interior and exterior plasters

On all masonry or concrete parts, a cement plaster of 2.5cm thick with cement mortar dosed at 400 kg/m^3 will be applied.

Hanging: Rough coat with coarse sand mortar. Coarse and Finish: With fine sand mortar.

3.7.4- Smooth screed

After cleaning, the surface should be roughened by manual or mechanical means. After this treatment, the surface must be carefully cleaned again, in particular to remove the dust released by the treatment. It must then be moistened or treated with bonding products.

The dosage of the mortar is 400 kg/m^3 of cement per cubic meter of smoothed

screed mortar and the final thickness will be 4 cm. The mortar is spread over the surface of the support, tamped then adjusted and floated before receiving the cement slip or tiles.

3.8- Roof - Frames

3.8.1- Treated wood frame

a) – Roof trusses

The trusses will be executed with hardwood treated with xylamon of 3x15cm. The entry and crossbow will be doubled.

These trusses will be solidly anchored in the masonry with the help of the retaining bars of the columns.

b)- purlins

They will be in hardwood treated with xylamon, section 8x8cm or 5x15cm according to the indication of the plans.

3.8.2- Fascia board

The fascia board used will be 30 cm wide and 03 cm thick. It will be made of hard wood and planed on one side and will receive an aluminum coating (hemmed strip).

Sprocket: 4x8 batten connecting purlins.

3.8.3- Metal frame (In case of Metal Frames)

The metal frame work will be carried out in accordance with the approved execution plans and following the rules of the art.

The quantities indicated in this document are indicative. It is up to the company to check them and correct them if necessary.

The construction will be in commercial profiled iron bath galvanized; the dimensions of the profiles are given as an indication and must be validated by a structural study.

The contractor must include in his execution program the following services :

- Receiving of the supports on which it operates ;
- The survey implementation of preparatory works ;
- The lifting and handling means specific to his work, work platforms and

scaffolding;

- The means of safety and protection of his workers;
- Sealing and caulking on neighbouring structures for a perfect completion of the work.

The company will also be responsible for the studies of the metal framework necessary for the design and construction of the project structures; will be included in the service:

- General detailed plans;
- The explanatory notes necessary for the execution of the works;
- structural steel framing members.

The contractor must have the supports accepted before any intervention on his part; the start of work will imply his tacit agreement to them..

Under the present work will be due :

- The supply of profiles and materials necessary for all assembly accessories, corresponding assembling;
- Transport, assembly and adjustment of all metal elements ;
- Regulatory protections, materials and equipment required for assembly ;
- Evacuation of debris and cleaning of the site at the end of the intervention.

a)- Roof frame

The main dimensions of the frame will be determined by the co-contractor in his execution documents; it will be:

- The length between gantry axes;
- The inner width of the columns ;
- The outer width of the columns: (according to column hypothesis = IPE80) ;
- Slope (%) ;
- IPE columns and rafters;
- IPE or UPN of structural purlins ;
- IPE or UPN Secondary frameworks ;
- The tube binds in angle of 30x30x3cm;
- IPE or UPN profile trusses.

b)- Rust protection

The steel elements will receive protection by applying a good quality glycerophthalic primer paint. The use of ordinary rust remover such as iron, zinc chromate, etc ... is strictly prohibited. The metal will first be descaled by effective brushing or sandblasting if necessary and degreased with gasoline or stripper. The anti-rust application will be done with a brush, on all profile developments, including parts that are difficult to access.

c)- Assembling

The assemblies will be of different types depending on the nature of the works: bolting or pointing.

d)- Plates for fixing purlins on masonry

For frames made up of purlins anchored to the chainings of gable or shear walls, using steel plates, an anchoring device composed as follows will be adopted:

- A 15x8 mm fixing plate with 2 threaded rods with hooks sealed in the concrete chaining, where a reservation has been made.

3.8.4- The Roof Cover

The roofing will be made of sheets or corrugated sheets in Aluminium 6/10th in a length of 6 m fixed on the purlins by 8 x 80 lag screws with accessories for the infrastructures with wooden frame; and in 6/10th Aluminium sheets without anti-condensation and fixed by bolting for those with metal frame.

The ridge will be raised and covered with 50 cm ridge sheets and the gables will receive aluminium edges.

3.8.5- Ceiling

a) - Joist

It will be made of hardwood treated with xylamon, section 4 x 8 mini and the edges will be planed.

b)- Cladding

The cladding will be 4mm plywood and Ayous gasoline in 60 x 120cm sheets. Peripheral joint covers will be both inside and outside.

3.9- Aluminum, wood and metal joinery

The Contractor is required to submit beforehand to the Project Manager, a sample of

each type of joinery for approval before mass production and installation of joinery (verification of dimensions, verification of the thickness of the steel sheets and the tubular framework, number and arrangement of hinges, number and arrangement of sealing brackets, brand and origin of locks, protection against corrosion).

The Contractor is required to communicate to the Project Manager the address of the workshop where these joinery is manufactured for monitoring.

The presentation of the sample for acceptance by the Project Manager will take place at least fifteen (15) days before the installation of the joinery.

All exterior joinery must be perfectly watertight and airtight even in heavy rain and strong winds. All metal joinery will be executed from current profiles.

The elements will be laid with the greatest accuracy both in plumb level and wedging (tolerance 20 mm).

The metal frames are provided to equip the doors. They will be made from metal profiles of thicknesses and profiles in accordance with the layout provisions and according to the width of the bays provided by the plan view. The frames will be pre-treated with a minimum of lead and equipped with the following accessories :

- the reinforcement for hinges will be provided in number of 3 (bottom, central and top) for each shutter;
- anchoring brackets per upright and an additional bracket on the cross member for doors over one meter wide;
- The Contractor must pay particular attention to the following adjustments before fixing:
 - checking the squareness of the frames;
 - Checking the clearances between the frame and the shutter with a maximum tolerance of 5 mm;
 - control of articulation and rotation joints with a maximum tolerance of 5 mm ;
 - Shutter adjustment, all the constraints of installation, fixing and handling are included; as well as the supply of locking wedges for the shutters according to the detail of the execution plan ;
 - The doors provided for in this chapter must be made in accordance with the execution and detail plans attached to the tender document.

3.10- Electricity and Solar Energy Installations

This specification strongly encourages the use of **Solar Energy Installations** in all buildings. All the equipment will be screw fixing, the flush mounting boxes must be chosen accordingly. The LEGRAND brand is offered, and unless otherwise indicated, in the MOSAÏC series, with 38 mm deep superbox mounting boxes, and 40mm deep frame, and so forth. Other equivalent solutions may be offered by the Co-contractor.

3.10.1- Switches

The axis of the switches will be placed at 1.10 m from the floor and 0.15 m from the door frame, on the side opposite to the opening of the doors. Each switch will be placed so that ignition is obtained by the low position of the mechanism.

a) - Single ignition switch

The single ignition switches will be LEGRAND brand NEPTUNE series ref. 80500.

b) - Two way switches

The two-way switches will be LEGRAND brand NEPTUNE series ref. 74011.

c)- Double ignition switch

They will be LEGRAND brand NEPTUNE series ref. 80551.

3.10.2- Sockets

The sockets will be placed at 0.30 m from the ground in general. They will be either ordinary sockets or 2P + E sockets, 16 A, 250 V, NEPTUNE series from LEGRAND, mechanism reference 80529.

3.10.3- Sheathing

It will be made of isorange tube of suitable diameter embedded in the masonry.

3.10.4- Cabling

The cables will be in VGV or TH. As a general rule it is necessary to consider following sections :

- 1,5 mm² for lighting circuits ;
- 2,5 mm² for the socket circuits.

Each circuit will include a maximum of 08 devices and will be protected by 10A fuses for the 16A lighting circuits for the outlet circuits.

3.10.5- Equipment

The recommended brands will be "LEGRAND" or "INGELEC" and the models will be approved by the Project Manager before installation.

3.11- Painting

The painting work will include all subject matter of ginning, sanding and filling with painter's plaster.

➤ **Printing**

- Walls: lime ;
- Ceilings: Painting approved by the Engineer ;
- Wood: Diluted glycerol.

➤ **Finishing**

Walls and ceilings :

- Ceilings: painting approved by the Engineer;
- Exterior walls: Paint approved by the Engineer PANTEX 1300 in two (02) coats ;
- Interior walls: Paint approved by the Engineer PANTEX 800 in two (02) coats.

- **Basement** : glycerophthalic paint in 02 layers with variable height according to the buildings.

3.12- Plumbing – Sanitary

All materials and equipment manufactured and produced within the framework of this contract must comply with ISO international standards.

All the material necessary for packaging, protection, up to storage, will be provided by the Co-contractor. It must be new when it arrives on the site.

PVC pipes (unplasticized Polyvinyl Chloride) will comply with international standards ISO 161 / 1-1978, 2505-1981, 3606-1976 and following. They will be manufactured for assembling by gluing. They will not show any damage and will be free from any material or interior or exterior manufacturing defects which would reduce the resistance to internal pressures or which would endanger the correct installation or good performance of the pipe in service.

The inner sheath must not contain any water soluble or unhealthy elements and must leave the water odorless, tasteless and colorless. Nominal pressures will be PN = 6.10.

Masonry structures must have good resistance to crushing. The manholes and the

septic tank must have a layer of water-repellent coating on their inside. The sump will be sized like a soak away pit. All the installations must be pre-sized as to accommodate an average number of operators equal to 100 people.

3.13- Claddings

3.13.1- The wall tile

It must be covered with a colored enamel with a so-called satin or shiny type appearance, without relief, of a uniform color. The tile must be 10X10 format and 4 mm thick minimum. The color is chosen by the Client on the basis of the samples presented by the Co-contractor.

The tiles will be first choice, guaranteed by a certificate from the manufacturer. The installation will be done according to the following mode:

- Applying a rough coat of cement mortar dosed at 400 kg of cement per cubic meter of sand, this coating is perfectly prepared and flat;
- Installation, full of mortar or non-tinted cement adhesive;
- The joints will be continuous from 2 to 3 mm;
- The grouting will be in a color of the Employer's choice. This position includes:
 - Masonry dressing plaster, sealing mortar or adhesive cement;
 - Special tiles for finishing corners and around tiled surfaces, plinths;
 - PVC angle profiles for tile works ;
 - All seals, piercings and cutouts necessary for the various trades;
 - The angles (15X15) of protruding angles and the flexible expansion joint at the angles between floors and walls;
 - Grouting and cleaning surfaces.

3.13.2- Porcelain stoneware tile

It will have a thickness of 0.5 to 1cm, tinted in the mass or with a tinted topcoat.

When dry, the beautiful face of the tile is smooth and should not show any cracks, holes, etc.

The tiles will be laid in a full bath of cement mortar dosed at 400 kg of cement per cubic meter of sand, with continuous joints. The installation can be done with cement glue, for that, the support must be perfectly flat but rough and dry to allow the adhesion of the glue.

- The format will be (30X30) ;
- The color is determined by the Project Owner ;
- The joints will be closed afterwards ;
- The cement dosage is 400 Kg per cubic meter of sand ;
- The color of the joint must be approved by the Client, for this a sample of one square meter will be produced by the company ;
- the joints have a width of 2 to 3 mm maximum.

3.14- Drains and Miscellaneous Networks

3.14.1- Channels

Rectangular reinforced concrete gutters at a rate of 400 kg/m³ will be built around the buildings, with dimensions varying according to the buildings (10 cm thick).

These gutters will be covered with prefabricated reinforced concrete slabs at the places indicated by the Project Manager.

A minimum slope of 2% will be made at the bottom of said gutters to facilitate the flow of water.

3.14.2- External paving

The basement walls will be protected by paving **80 cm wide and 10 cm thick** all around the building. This paving will be in ordinary concrete dosed at 400 kg/m³.

3.15- Management plan for socio – environmental measures

Before the actual start of work, the company must prepare an environmental action plan specifying all the environmental measures to be implemented, as well as internal regulations specifically mentioning the safety rules, in particular the wearing of appropriate clothing, speed limitation. In addition, these internal regulations must prescribe the prohibition of consuming alcohol during working hours, of abusive use of firewood, as well as the sensitization of personnel to the dangers of STIs / AIDs, to respect for cultures and customs and neighbouring populations. This regulation must be displayed within the company.

In addition, an information and awareness campaign for staff and residents should therefore be organized in advance and their attention should be drawn to all these aspects, including the implementation schedule, employment opportunities. In particular, stakeholders should be informed about the reasons for choosing the site for the construction site, as well as the environmental action plan. This campaign will

have to be repeated during the execution of the works.

The various socio-environmental measures to be taken into account when carrying out the work will be :

- Reforestation ;
- hydrocarbon management;
- the safety of site personnel and users ;
- garbage management ;
- solid and liquid waste management ;
- water resources management ;
- repair of damages caused to third parties;
- the opening and exploitation of quarries and borrow pits ;
- site rehabilitation and site withdrawal.

a) - Hydrocarbon management

It is the responsibility of the contracting company. Company personnel, in this case drivers or mechanics, must take the necessary precautions to avoid contact of hydrocarbons with the ground through the use of garbage bins. This task is a business responsibility and therefore is not budgeted for. However, the work monitoring committee will ensure strict compliance with the recommended measures such as the use of emptying tanks.

b) - Safety of site personnel and users

The safety measures for site personnel and users to be observed are those intended to endanger the health of personnel working on the site as well as those of residents living near the site. Among the measures, we can note the wearing of safety equipment by company personnel on the site, the limitation of dust and safety sign boards.

In order to avoid work accidents, the wearing of safety equipment such as gloves, helmets, nose covers is compulsory for anyone on the site. The company is required to provide all these materials to the site in sufficient numbers and the Project Manager is responsible for ensuring strict compliance with these safety measures.

Earthworks, in the presence of winds, are likely to cause the lifting of dust or other fine powders such as cement. In this case, despite wearing nose covers which is a protective measure, workers must water the soil surfaces during their work.

In addition to the site indication signs bearing the project references (if found

necessary in the Recovery Program), the Company is also responsible for installing safety signs such as those preventing access to the site by foreign persons or those relating to traffic (exit of trucks, speed limit, attention to work... etc).

c)- Garbage management;

During work periods, the garbage produced by users must be placed in these bins. In addition, the Site Manager will organize weekly manual work sessions which will make it possible to recover all the garbage lying around in the yard. After the tanks have been filled, they will be emptied in a suitable place for sorting and in a pit 1.5 m deep to be burned. It will be up to the Site Manager to supervise the emptying, sorting and incineration operations.

d)- Water resources management

The contractor must avoid any conflict that may arise from the use of water resources. So for these water needs; the samples must be taken after consultation with the neighbouring populations. In any case, the company must avoid taking large samples from seasonal rivers, which could interrupt the satisfaction of the urgent water needs of the local populations.

In addition, he/she should avoid intervening in sensitive areas, introducing various pollution that may result from washing or emptying vehicles and machinery.

e) - Repair of damages caused to third parties

It may happen that the company causes harm to an individual deliberately or accidentally (destruction of crops, habitat, etc.). This damage shall be remedied at the expense of the company and in a manner satisfactory to that third party. In return, the latter will have to issue a certificate of compensation, in order to avoid any other subsequent claim.

PART III - WORK EXECUTION PROGRAM

Chapter 1 - At the start of the construction site

Within ten (10) days of the service order prescribing the start of work, the Contractor must provide :

- the organization chart of the site personnel management with the names and contacts, qualifications and functions of the various agents ;
- the detailed execution program for all the work, translated in the form of a graph (GANTT planning), in order to facilitate its updating and use.

This provisional program will include in particular all the information relating to :

- the site installations ;
- the arrangements made for the site supplies ;
- all construction work, with an indication of the personnel and equipment resources to be used;
- forecasts of any monthly work accounts.

He will specify :

- the provisions, methods and modes of execution that the Contractor proposes to adopt in order to execute the work ;
- the organization, resources and procedures over time and the phasing between works;
- the execution rates;
- the evolution of the workforce on site.

The Project Manager has five (5) days to comment on the programs submitted to him by the Contractor.

The actual start of work will be subject to the presentation of the detailed schedule to the Project Manager without the deadlines being thereby extended.

Chapter 2 In the course of works.

In addition to the general work schedule established at the start of the work; the contractor must establish a weekly program as the work progresses.

The Contractor will make any changes to his program and his provisional schedule that may be prescribed by the Project Manager during site meetings.

The general schedule will be constantly updated in the event that there is a discrepancy between the provisional schedule and the actual work progress schedule.