



DIVISION 1

GENERAL

SECTION 1.1

SUMMARY OF WORK

1.1.1 SCOPE OF WORK

For scope of work covered by these Specifications refer to Part 2 Section 1 Scope of Work.

1.1.2 ENGINEERING REQUIREMENTS

1.1.2.1 General

The Engineering design, for the bridges and roadwork's is based on detailed design under which the work for all items has been accurately designed, quantified and located prior to Contract Award, based on detailed topographic and soils surveys. Consequently there will be no detailed engineering design required to be carried out by the Employer after contract award.

The estimated quantities included in the tender documents are based on the detailed design and should be only subject to change should conditions have varied between the time of the preparation of the final design drawings and the commencement of the Contract.

1.1.3 SPECIFICATION SYSTEM

In general, each item in these Specifications is arranged in the following order :

1.1.3.1 General

This part describes general matters related to the work/activity which shall be carried out by the Contractor.

1.1.3.2 Materials

This part describes detailed specifications and requirements of the materials needed for the works. In general, material description shall consist of the requirements of raw materials, mixed materials and manufactured materials.

1.1.3.3 Construction

This part describes detailed construction guidance. Including the requirements for equipment, trials, and execution.

1.1.3.4 Quality Control

This part describes the complete instructions and guidelines to achieve the specified quality.



1.1.3.5 Measurement and Payment

This part describes the method of measurement and payment to the contractor for the items covered under the specification.

1.1.4 PAYMENT FOR WORK

1.1.4.1 The Contractor shall construct the Works to the details given in the Contract Drawings, and the directions of the Engineer under a predominantly unit price system. Payment to the Contractor shall be made for the actual measured quantities of Contract Pay Items performed in accordance with the relevant Sections of these Specifications concerning measurement and payment. Payment shall also be made on the basis of the measurement and payment provisions of the lump sums for Mobilization, Traffic Management and Safety, Cofferdams and Dewatering, and Routine Maintenance Works as well as for Works authorized on a Day work basis.

1.1.4.2 The payments made to the Contractor shall constitute full compensation for all costs incurred for all labor, materials, construction plant, organization of work, overheads, profits, royalties, taxes, custody of completed work, payment to third parties for land or the use of land or for damage to property, as well as all incidental work which is not paid for separately, such as temporary drainage to protect the works during construction, haulage, tools, explosives and materials for blasting, sheeting, shoring, staging, centering and support, and all other costs necessary or usual for the proper completion and performance of the works.



SECTION 1.2 MOBILIZATION

1.2.1 GENERAL

The extent of mobilization activities required for this Contract shall be dependent upon the type and volume of work to be performed, as specified elsewhere in the Contract Documents, and in general shall conform to the following :

1.2.1.1 Mobilization Requirements for all Contracts :

- (a) Land purchase or rental for the Contractor's base camp, temporary detours, for the storage of equipment, for office buildings, housing, or other uses necessary to the execution of the Works.
- (b) Mobilization and installation of Construction Plant and all equipment required for the execution and completion of the works, from their existing locations to the sites where they are to be used under this Contract.
- (c) Provision and maintenance of the Contractor's base camp, including as necessary, site offices, living quarter, workshops and stores, etc.
- (d) Strengthening of Existing Bridges when required, for Transportation of Construction Equipment.

1.2.1.2 Mobilization Requirements for Field Offices and Facilities for Engineer

The provision and maintenance of Field Offices and Facilities is detailed in Section 1.3.

1.2.1.3 Mobilization Requirements for Quality Control Facilities

The provision and maintenance of the field laboratory together with the field laboratory equipment as detailed in Section 1.4 of these Specifications. The laboratory building and equipment, when supplied under this Contract, shall remain the property of the Contractor at the completion of the project.

1.2.1.4 Demobilization Requirements for all Contracts

Demobilization from the Site by the Contractor at the end of the Time for Completion, including the removal of all installations, Construction Plant and equipment from Government owned land, and the restitution of the Site to its original condition prior to the Commencement Date of Works. In this case, the removal of equipment from Government owned land shall not alter the Contractor's obligation to provide all resources required during the Defect Notification Period such as finance, management, equipment, labor and material.



1.2.2 MOBILIZATION PROGRAMME

1.2.2.1 Within 7 days of the Contract Agreement being signed, the Contractor shall attend a pre-construction meeting with the Employer, Engineer, and Engineer's Assistant (if any), to discuss both technical and non technical matters relating to the project. The meeting agenda shall include (but not limited to) the following :

- (a) Introduction
- (b) Exchange Organization Charts
 - (i) Employer's Organization
 - (ii) Contractor's Organization
 - (iii) Engineer's Organization
- (c) Site Issues, for example:
 - (i) Right of Way
 - (ii) Sources of Materials
 - (iii) Location of Base Camp
- (d) Permits
- (e) Submittals
- (f) Final Construction Documents
- (g) Phasing and Milestones
- (h) Work Plan
 - (i) Outline Construction Schedule indicating the timing and sequence of the principal activities comprising the Works
 - (ii) Mobilization Plan
 - (iii) Relocation Plan
 - (iv) Health and Safety Plan
 - (v) Quality Plan
 - (vi) Traffic Management and Safety Plan
 - (vii) Inspection and Testing Plan
 - (viii) Environment Management Plan
- (i) Communication and correspondence
- (j) Coordination meetings, schedule and frequency
- (k) Reporting and monitoring



- 1.2.2.2 Following this and within the next 15 days the Contractor shall submit to the Engineer for his approval a detailed mobilization program (including bridge strengthening program, if any) and detailed construction schedule demonstrating how the Works shall be completed within the Time for Completion stated in the Contract Data.
- 1.2.2.3 The Mobilization Program shall specify the timing of all applicable mobilization activities listed in Article 1.2.1 and shall incorporate the following additional information :
- (a) Location of Contractor's base camp with a general location plan and detailed site plan showing the locations of the Contractor's office, workshop, stores and major construction equipment, together with the laboratory when such facilities are included in the Scope of the Contract.
 - (b) Equipment Delivery Schedule indicating the current location of all equipment listed in the schedules submitted with the Bid, together with the proposed means of transport and scheduled arrival dates at site. This schedule shall satisfy the Engineer as to date of arrival, type, size, capacity or power and quantities of the items included. For each item of equipment the type, make, identification number and year of manufacture, and whether or not reconditioned, shall be stated. The Contractor shall in due time place on the Site all the Constructional Plant listed.
 - (c) Any changes in the equipment and staffing schedules submitted with the Tender for which the Contractor needs the approval of the Engineer.
 - (d) A detailed list indicating the structures that require strengthening for safe passage of construction traffic, the proposed execution methodology and the scheduled starting and finishing dates for strengthening of each structure.
 - (e) An overall progress schedule in the format of a bar chart showing each of the major mobilization activities and a progress curve measured in terms of percentage completion.

1.2.2.4 Mobilization Period

The mobilization program shall be completed within 90 days from the Commencement Date of the Works except that the quality control facilities or services shall be installed and operational within 60 days. Penalties shall be applied in accordance with Article 1.2.3.2 for delays.

1.2.3 MEASUREMENT AND PAYMENT

1.2.3.1 Measurement

Measurement of mobilization progress shall be assessed by the Engineer against the approved overall progress schedule for mobilization described in Article 1.2.2.2 above.

1.2.3.2 Basis of Payment

Mobilization shall be paid for on a proportional lump sum basis according to the schedule given below, which payments shall constitute full compensation for furnishing and placing all equipment, and for all labor, materials, tools and incidentals necessary to complete the work described in Article 1.2.1 of these Specifications. However, the Engineer may, during the Contract Period, order the Contractor to add laboratory equipment as necessary without any change to the lump sum price for Mobilization.



- 50% (fifty percent) when mobilization is 50% complete and the laboratory testing facilities are installed and operational (within 60 days).
- 20 % (twenty percent) when all major items of equipment are on site and accepted by the Engineer (within 90 days).
- 30 % (thirty percent) on completion of demobilization.

In the event that the Contractor does not complete mobilization in accordance with either of the two time limits specified in Article 1.2.2.4, the amount to be certified by the Engineer for payment shall be the full percentage installments of the Lump Sum price for Mobilization less an amount of 1% (one percent) of the value of the installment for each day's delay in completion up to a maximum of 50 (fifty) days.

Pay Item No.	Name	Unit of Measurement
1.2	Mobilization	Lump Sum



SECTION 1.3 FIELD OFFICES AND FACILITIES

1.3.1 GENERAL

1.3.1.1 Description of Work

The Contractor shall, under this Section, construct, furnish, install, maintain, clean, guard and at the Completion of the Contract, remove or dispose of all temporary field offices, storage sheds, living quarters, and workshops, that are required for the management and supervision of the project.

1.3.1.2 General Requirements

- (a) The Contractor must at all times comply with the requirements of Government regulation.
- (b) Offices and facilities shall be located in accordance with the general location and site plans approved as part of the Mobilization Program detailed in Article 1.2.2.(2), which shall be as close as possible to the site and approved by the Engineer.
- (c) Buildings for offices and accommodation must be sited so as to be free of pollution from any construction operations.
- (d) Buildings shall be structurally sound, weatherproof with floors raised above ground.
- (e) Buildings required for storage of materials shall be suitably insulated to prevent deterioration of the stored materials.
- (f) At the Contractor's option, buildings may be of in situ or prefabricated construction.
- (g) Temporary field offices and storage sheds should be installed on proper foundations and provided with connections for utility services.
- (h) Materials, equipment and furnishings used in the buildings may be new or used, but must be serviceable, adequate for the required purpose, and must not violate applicable codes or regulations.
- (i) Sites for field offices and the like must be filled and graded to accept the building structures, shall be free draining, surrounded by approved fencing and provided with gravelled access roads and parking areas.
- (j) The Contractor shall provide adequate fire fighting equipment in all camps, offices, stores and workshop areas.

1.3.2 FIELD OFFICE AND FACILITIES

1.3.2.1 General

The Contractor shall provide suitable field offices for the Contractor, accommodation for Contractor's personnel and facilities to meet the needs of the project in accordance with this Section of the Specifications.



1.3.2.2 Size

The size shall be as required for general use and to provide a room for progress meetings.

1.3.2.3 Telephone

One direct line telephone or two mobile telephones shall be provided and remain operational for the duration of the Contract.

In the event that telephone services cannot practicably be provided, or cannot be provided within the scheduled Mobilization Period, the Contractor shall provide instead a radio transceiver system capable of clear and reliable vocal communication between the Employer's office in the provincial capital city and the farthest point on the contract. This radio system shall have at least six stations capable of transmitting and receiving spoken messages, and shall be located and used as directed by the Engineer.

1.3.2.4 Furnishings in Meeting Room and for the Storage of Project Record Documents

- (a) Conference table and chairs for at least eight persons.
- (b) Racks or drawers for vertical or horizontal filing of drawings and files for Project Record Documents located in or adjacent to the meeting area.

1.3.2.5 Branch Office

Should the Contractor find it necessary to erect one or more branch office for his own use at a distance of 50 km or more from his main site office, he shall provide, maintain and furnish to the satisfaction of the Engineer one room of approximately 12 square metre area for the exclusive use of the Engineer's staff at each of such branch offices.

1.3.3 CONTRACTOR'S WORKSHOP AND WAREHOUSE

1.3.3.1 The Contractor shall have on the site a suitable workshop, adequately equipped and provided with electric power, to allow for repairs on the equipment employed to carry out the Works. A warehouse for the storage of equipment spare parts shall also be provided.

1.3.3.2 The workshop shall be managed by a chief foremen qualified for mechanical repairs and have an adequate number of skilled mechanics.

1.3.4 OFFICES AND ACCOMODATION FOR THE ENGINEER

These requirements shall be provided by Contractor:

1.3.4.1. Office Building for Engineer and Project owner Staff,

(a) Site Office building furnished space area building 200 sq.m. approved by Engineer completed with sanitation, air condition, electricity, Wifi LAN, water supply, toilets, excluded office stationery.

(b) Vehicle purchase by contractor for Engineer and Project owner staff facility shall include maintenance and operation:

Four wheel drive car Ford Ranger or equivalent with air condition, brand new 8 units.

Motor bike Honda GL or equivalent, brand new 16 units.



1.3.5 MEASUREMENT AND PAYMENT

Payment for the buildings described in this Section shall form part of the Lump Sum payment for Mobilization in accordance with Section 1.2 of these Specifications, which payment shall be considered full compensation for constructing, furnishing, servicing, maintaining, cleaning and removing upon completion of the Works all such buildings.

SECTION 1.4 LABORATORY TESTING SERVICES

1.4.1 GENERAL

1.4.1.1 Description

This Section covers the provision of materials, facilities, labor, services and items needed to perform the quality control testing of materials and workmanship required under the Contract. Generally the Contractor shall be responsible for the execution of all testing work under the direction supervision of the Engineer

1.4.1.2 Location of Quality Control Tests

The Contractor shall undertake the quality control tests in the field laboratory or in situ or at another laboratory approved by the Engineer.

1.4.1.3 Work not included in this Section:

Testing performed by the Engineer and Employer.

1.4.1.4 Submittals

- (a) Proposed testing laboratory: Details shall be provided for the mobilisation of the field laboratory and equipment as part of the mobilisation program
- (b) Proposed testing personnel: Accompanying the data required above, a list shall be submitted, together with CVs, of all technical personnel the Contractor proposes to employ for inspecting and testing under the Contract.
- (c) Schedule for testing: A master schedule of all items to be tested shall be prepared. By co-ordination with the construction schedule, tentative dates shall be established for each such activity. This data in preliminary form shall be submitted for the Engineer's review at the beginning of each month.
- (d) Forms: Within 60 (sixty) days from the Commencement of Works proposals shall be submitted for standard test forms to be used on the Contract, for all tests required by the Specifications, for the Engineer's approval. If he so chooses the Engineer may direct the Contractor to use alternative forms.

1.4.1.5 Hold Points. The Contractor shall notify the Engineer, and the Engineer or his delegate shall inspect and approve the following work stages before covering up.

- (a) Setting out
- (b) Ground level
- (c) Pile tests
- (d) Bridge foundation excavation



- (e) Steel reinforcement and formwork before concrete casting
- (f) Top of subgrade
- (g) Top of compacted Base B
- (h) Top of compacted Base A inclusive of proof rolling, impact hammer or other test nominated by the Engineer
- (i) Existing asphalt preparation for overlay
- (j) Each asphalt layer
- (k) Pipe culverts, drainage structures
- (l) Subgrade drains, bleeder drain and permeable fill
- (m) Underground utilities

The Engineer may nominate other activities for which inspection is required, and may also nominate any test which is to be provided before giving approval for covering up. For each of the above mentioned stages and activities, the Engineer and Contractor shall agree the procedure, place and time for giving of notice to inspect. The Contractor shall not be bound to delay work if the Engineer's or Engineer's Assistant is not present at the agreed time, provided notice has been correctly given, and provided all other applicable requirements have been met.

1.4.2 LABORATORY AND TESTING FACILITIES

1.4.2.1 The Contractor shall provide such laboratory testing services and/or facilities as is required to meet in full the quality management provisions of these Specifications.

1.4.2.2 The Contractor shall provide and maintain on site a fully equipped laboratory in accordance with the following requirements:

- (a) Premises
 - (i) The laboratory shall be housed in a separate building located in accordance with the general location and site plans approved as part of the Mobilization Program. The location shall be such as to provide sufficient distance from construction plant for the laboratory to be free of pollution and vibration disturbance during the operation of the plant.
 - (ii) The building layout shall be in accordance with the Drawings, or as directed by the Engineer for the accommodation and operation of the apparatus needed for the performance of all tests specified or required as well as to provide office facilities for the testing personnel of both the Contractor and the Engineer.
 - (iii) The building shall be provided with a concrete floor with waste water drainage facilities, shall be fitted with two air conditioning units of 1.5 HP capacity, and shall comply with all other requirements of Article 1.3.1.2 of these Specifications.
 - (iv) The interior fixtures for the building shall include work benches, cupboards, lock-up storeroom, curing tanks, cabinets, tables and chairs as required and to the satisfaction of the Engineer.



(b) Equipment and Apparatus

The laboratory equipment and apparatus listed below shall be provided and in operation in accordance with Article 1.2.2.4 of these specification.

Items and quantities identified in the list below are given as a general guide only as to the minimum testing equipment required for the project. The absence of any required testing equipment from this list shall in no way absolve the Contractor of his responsibility to carry out fully all testing work in accordance with the Specifications or as directed by the Engineer.

ITEM	Quantity
1	<u>SOIL TESTING</u>
1.1	<u>Compaction Test:</u>
Standard Proctor mould	5
Standard Proctor hammer	1
Modified compaction mould	5
Modified compaction hammer	1
Straight edge	1
Sample ejector	1
Mixing spoon	1
Mixing trowel	1
Spatula	1
Mixing Pan	5
Aluminium pan 25 cm diameter	1
Wash bottle	1
Moisture cans	36
1.2	<u>Laboratory CBR:</u>
Mechanical loading press	1
6000 lbs capacity Proving ring	1
CBR moulds	6
Spacer disk	6
Swell plate surcharge plate	6
Tripod attachment	6
Swell dial indicator	6
Surcharge weight	6
Slotted surcharge weight	6
Steel cutting edge	1
1.3	<u>Specific Gravity:</u>
Pycnometer bottles of 100 cc capacity	3
Porcelain mortar and pestle	1
Hot plate, 1000 watts, 220 volts 50 cycle	1
1.4	<u>Atterberg Limits:</u>
Standard liquid limit device	1



	<u>ASTM grooving tool</u>	1
	Evaporating dish	3
	Flexible spatula	2
	100 cm graduated cylinder	2
	Casagrande grooving tool	1
	Plastic limit glass plate	1
1.5	<u>Grain Size Analysis:</u>	
	Hydrometer jars	3
	Constant Temperature Bath	1
	Mechanical stirrer, electric powered 220 V 50 cycle	1
	Dispersion cups with baffles	2
	Hydrometer, scale 0 - 60 gr	1
	Set brass sieves, 8 inches diameter, 75 mm, 50, 38, 25, 19, 12.5, 9.5, No. 4, 10, 30, 40, 60, 100 including cover and pan	2
	No. 200 brass sieves	4
	Wet washing sieve	1
	50 ml. graduated cylinder	1
	Sieve brushes for fine sieve	2
	Sieve brushes for coarse sieves	2
	Balances Sensitive to 0.01 gr and 0.1%	1
1.6	<u>Field Density Test, Sand Cone Method:</u>	
	Sand cone	3
	Replacement jug	3
	Field density plate	3
	Spoon	3
	Steel chisel, 1 inch	3
	Rubber mallet	3
	Sand scoop	3
	1 gallon field cans	12
1.7	<u>Moisture Content:</u>	
	Speedy, moisture tester, 26 grams capacity	3
	Cans “Speedy” reagent	12
2	<u>BITUMINOUS TESTING</u>	
2.1	<u>Marshall Asphalt Test:</u>	
	Stability compression machine 220 volt 50 cycles complete with 6000 lbs proving ring	1
	Stability compaction mould 4”	15
	Stability compaction mould 6” (if AC-Base to be used)	15
	Mechanical compaction hammer for 4” mould	1
	Mechanical compaction hammer for 6” mould(if AC- Base to be used)	1
	Mould holder for 4” mould	1



Mould holder for 6” mould (if AC-Base to be used)	1
Stability mould 4”	1
Stability mould 6” (if AC-Base to be used)	1
Dial flow indicator	1
Pedestal	1
Water bath 220 V 50 cycle	1
Sample ejector	1
Stainless steel mixing bowls	2
2.2 <u>Extraction Test, Centrifuge Method :</u>	
Centrifuge extraction, 1500 gram capacity, 220 V 50 cycle	1
Boxes filter paper rings (100 - box)	10
Extractor bowl	1
Bowl cover	1
Bowl nut	1
2.3 <u>Extraction Test, Reflux Method:</u>	
Reflux extractor set, 1000 gram capacity	1
Boxes filter paper (50 - box)	1
2.4 <u>Specific Gravity of Coarse Aggregates:</u>	
Density Basket	1
Sample Splitter 1”	1
Sample Splitter 1/2”	1
2.5 <u>Specific Gravity of Fine Aggregates :</u>	
Cone	1
Tamper	1
Pycnometer	1
Thermometer (Glass), 0 - 150 ⁰ C	3
Desiccator	1
2.6 <u>Mix Air Voids Content, (Accurate Method):</u>	
200 cc Conical Flask with neck large enough to admit 25 mm aggregate, with airtight ground glass stoppers	2
Vacuum pump (+ special oil)	1
Rubber tubing	1
Warm air fan	1
2.7 <u>Core Drilling:</u>	
Core drill machine, 7 HP, 4 cycle	1
9” extension shaft	1
18” strap wrench	1
Diamond bit 4” diameter (resettable)	2
Expanding adaptor	1



2.8 Metal Thermometer:

0 - 100 ^o Metal Thermometer	2
0 - 250 ^o Metal Thermometer	2

2.9 Accessories and Tools:

Heavy duty balance complete with set of weights, scoop and counterweight	2
Triple beam scale complete with set of weights	1
Generator, 20 kVA	1
Double wall oven, 1600 W 240 volt 50 cycle	2
Plastic funnels	3
Sodium hexametaphosphate	2 lb.
Pairs asbestos gloves	2
Laboratory tongs	2

2.10 Penetrometer :

Penetration Apparatus	1
Penetration Needle	2
Sample Container diameter 55 mm, internal depth 35 mm	6
Water Batch min.10 litres, 25 + 0.1°C	1
Transfer Dish, min. 350 ml	1
Timing Device, accurate to within 0.1 s for 60 s interval	1
Thermometer, maximum scale error of 0.1 °C	1

2.11 Softening Point :

Ring	2
Pouring Plate	1
Ball	2
Ball Center Guide	2
Bath (a glass vessel)	1
Ring Holder and Assembly	1

**2.12 Refusal Density Compactor of BS 598 Part 104
(1989) : 1 set**

3 CONCRETE TESTING

Slump Cone	1
Cylinder/Cube moulds	10
“Speedy” moisture tester	1
Cube crushing machine (provisional)	1



The calibration of all measuring apparatus shall have been validated by an independent laboratory approved by the Engineer not less than 12 months prior to the commencement of the Works and the Contractor shall provide evidence of this upon request by the Engineer.

1.4.3 EXECUTION OF TESTING

1.4.3.1 Codes and Standards:

Testing shall be executed strictly in accordance with all pertinent codes, regulations and specified standards.

1.4.3.2 Personnel

Personnel engaged for the purpose of materials testing shall be sufficiently experienced and familiar with the required material tests and shall be approved by the Engineer prior to starting work.

1.4.3.3 Forms

For the actual testing and reporting of test results, only those test forms approved in advance by the Engineer shall be used.

1.4.3.4 Notification

The Engineer shall be notified of the planned timing of all quality control tests at least one hour in advance of their execution.

1.4.3.5 Distribution

Test reports shall be promptly processed and distributed to ensure that any necessary retesting, replacement of materials, or re-compaction of materials may be carried out with the least delay to the Works.

1.4.4 MEASUREMENT AND PAYMENT

1.4.4.1 Samples

All samples whether in natural pits or in the completed pavement shall be supplied by the Contractor without additional cost to the Contract.

1.4.4.2 Tests

The cost of carrying out all quality control tests required under the Contract shall be borne by the Contractor and all such costs shall be deemed to be already included in the lump sum payments made for Mobilization, except as provided below.

If any test not intended, nor specified, nor implied to be necessary, nor otherwise provided for in the Contract Documents is ordered by the Engineer, or if the Engineer orders any test which excluding the requirement of Article 1.2.1.3 to be carried out by a third party or at any place other than the site of the Works or the place of manufacture or fabrication of the materials to be tested, then the cost of the test shall be borne by the Employer unless the test results show the workmanship or materials not to be in accordance with the provisions of the Contract Documents, in which case the cost of the test shall be borne by the Contractor.

1.4.4.3 Laboratory and Testing Facilities

No additional payment shall be made to the Contractor for providing and maintaining the field laboratory premises, interior fixtures, equipment and apparatus, and compensation for this work shall be deemed to be included in the lump sum payments made for Mobilization.



SECTION 1.5 TRANSPORTATION AND HANDLING

1.5.1 GENERAL

1.5.1.1 Description

This Section sets out provisions for the transportation and handling of soils, hot mix materials, other materials, equipment, and tools.

The provisions of Section 1.8, Traffic Management and Safety, Section 1.11, Materials and Storage, and Section 10.2 Maintenance of Adjacent Roads and Bridges are to be treated as being complementary to the contents of this Section.

1.5.1.2 Related Works Specified Elsewhere

- | | | | |
|-----|---|---|------------------|
| (a) | General Conditions of Contract | : | relevant Clauses |
| (b) | Traffic Management and Safety | : | Section 1.8 |
| (c) | Materials and Storage | : | Section 1.11 |
| (d) | Environmental Safeguards | : | Section 1.17 |
| (e) | Excavation | : | Section 3.1 |
| (f) | Maintenance of Adjacent Roads and Bridges | : | Section 10.2 |

1.5.2 PRE-CONSTRUCTION REQUIREMENTS

1.5.2.1 Haul Route Plan

Prior to commencing any operation on public roads which will be used for hauling materials the Contractor shall provide the following information :

- Detailed maps showing the location of all sources of materials for the project and the routes along which the material will be hauled from the source location to the construction site. This shall include the location of any stock pile areas.
- The Contractor shall obtain the axle load limits along all designated routes from local authorities and show these on all the above maps.
- The Contractor shall obtain permits as required if it intends to carry loads greater than the specific limits across any road and bridges. This shall only apply to loads that are indivisible.

1.5.2.2 Infrastructure Condition Assessment

Upon approval of the Haul Route Plan the Contractor shall, under the supervision of the Engineer, make a complete condition survey of all infrastructure on the haul roads.

This will most likely concentrate on road pavement and bridges, but may include other structures that may be affected by frequent passage of heavy vehicles. The survey shall record all pre-existing damage on all roads. Surface or structure, supported by photographs and exact cross-reference to locations on the maps.



1.5.3 EXECUTION

1.5.3.1 Standards

Work processes shall be conducted in conformity with National, Provincial and District regulations governing the work as well as requirements for the preservation of natural resources and the environment.

1.5.3.2 Coordination

The Contractor's attention is directed to the fact that he shall be required to coordinate his transport operations with the work being performed or to be performed on other Contracts, with work of subcontractors, utility companies and others as may be required

In the case of interference between the operations of different Contractors the Engineer shall have sole power to direct each Contractor and to determine the sequence of work necessary to expedite the completion of the entire project, and in all cases his decision shall be accepted as final and no cause for claim.

1.5.3.3 Transportation Weight Limitations and Damage

- (a) The Engineer may impose weight restrictions for the protection of any existing road or structure within the vicinity of the project.
- (b) The Contractor shall be responsible for any damage to roads or structures resulting from his construction operations.
- (c) If, in the opinion of the Engineer and shown from the Infrastructure Condition Assessment, the Contractor's hauling operations are causing damage to a public road or structure, or in the event of any flooding that halts the Contractor's hauling operations, the Engineer may direct the Contractor to use an alternative route, and the Contractor shall have no right to claim for additional compensation as a result of the Engineer's instruction.

1.5.3.4 Disposal of Material Outside the Site

- (a) The Contractor shall make his own arrangements for the disposal of materials outside the Site as specified in Article 3.1.1.11.(d) of these Specifications
- (b) When any material is to be disposed of outside the Site, the Contractor shall obtain a written permit from the property owner on whose property the disposal is to be made, which permit shall designate the disposal location and shall be submitted to the Engineer together with a request for approval to proceed.
- (c) When material is disposed of as provided above and the disposal location is visible from a highway, the Contractor shall dispose of the material in a neat and uniform manner to the satisfaction of the Engineer.

1.5.4 MEASUREMENT AND PAYMENT

No measurement applies to this Section. The cost of the requirements of this Section must be included in all Pay Items which are listed in the Bill of Quantity, without any additional cost. The equipment supplied by Contractor for all activities in this Section shall remain the property of the Contractor at the completion of the Project



SECTION 1.6 PAYMENT OF MONTHLY CERTIFICATES

1.6.1 GENERAL

1.6.1.1 Description

This Section details the requirements and procedures for the execution of regular monthly interim payments by way of preparation and submission of Monthly Statement by the Contractor, checking and certification by Engineer, and application to the Employer for payment.

1.6.1.2 Related Work Specified Elsewhere

- (a) General Conditions of Contract : relevant Clauses
- (b) Variations Procedures : Section 1.13
- (c) Contract Close Out : Section 1.14
- (d) Daywork : Section 9.1
- (e) Relevant Articles concerning Measurement and Payment for each Section of these Specifications.

1.6.1.3 Submittals

A Monthly Statement is required to be submitted for each calendar month of the Time for Completion.

The Contractor shall be fully responsible for the preparation and submission of each Monthly Statement which shall conform to the following :

- (a) The Monthly Statement shall be prepared in a format acceptable to the Engineer.
- (b) The Monthly Statement shall be supported by sufficient supporting documentation to make the submission complete and fully substantiated, in order that the Engineer may certify the application for payment within the time restraints of relevant Clauses of the General Conditions of Contract and these Specifications.
- (c) The Monthly Statement together with its supporting documentation shall be submitted to the Engineer according to the timing specified hereunder.
- (d) If the Contractor fails to provide supporting data to the satisfaction of the engineer, or is otherwise late in his submission, then the actual payment date may be delayed and the Engineer shall not be held responsible for any such delay in payment.

1.6.2 PREPARATION AND SUBMISSION

1.6.2.1 Timing

Each Monthly Statement shall be dated on the last day of the calendar month but the sum claimed shall be based on the value of work completed up to and including the twenty-fifth day of that particular monthly period. The Monthly Statement shall be issued to the Engineer no later than the last day of each calendar month.



1.6.2.2 Content

- (a) The Monthly Statement shall summarize the value of all work completed for each Division of the Specification since the commencement of the Contract and shall also show the approximate percentage completion of each Division as a measure of the value of work completed compared to the Contract Sum for each respective Division. The gross sum of the Statement shall be calculated from the summation of the value of work completed for each Division together with the value of material on site approved for payment and any additional work authorized by Variation.
- (b) The value of work completed for each Division as nominated on the Monthly Statement shall be fully supported by attached documentation showing how each value was calculated. Such calculations may include but shall not be limited to :
 - (i) The application of certified measured quantities and the contractual Pay Item Unit Prices as entered in the Bill of Quantities.
 - (ii) The application of certified measured quantities and, where the provisions of these Specifications provide, such adjusted Pay Item Unit Prices as required for approved construction of asphalt overlays of lesser thickness or bitumen content than originally specified, however, they should conform to the specified limits of tolerances and approved by the Engineer.
 - (iii) The inclusion of any work executed under an authorized Variation for which new Unit Prices or alternative payment sums have been established for work pertaining to that Division.
- (c) A separate Summary sheet or sheets shall be attached to the Monthly Statement showing the status of :
 - (i) Advance Payment and Repayments.
 - (ii) Retention monies held.
 - (iii) Variations requested and the proposed method of payment.
 - (iv) Variations.
 - (v) Claims (if any).
 - (vi) Value Added Tax
- (d) Where the Contractor has submitted a separate payment statement in the case of Substantial Completion of a Section or Part of the Works, both the Monthly Statement and the supporting documentation shall be calculated to reflect the value of the substantial completion statement.

1.6.2.3 Other Substantiating Data

The Contractor shall maintain a record of all approved measurement sheets and other substantiating data and shall make this record available to the Engineer and his representative for the purpose of verifying the Contractors Monthly Statement quantity calculations. The method of measurement used in determining the quantities for payment shall be strictly in accordance with the relevant provisions concerning measurement and payment for each Section of these Specifications.



1.6.3 CERTIFICATION BY THE ENGINEER

1.6.3.1 Timing

- (a) The Engineer and/or his assistant shall check the detail and calculations of each Monthly Statement and shall complete this check and advise the Contractor of his agreement or disagreement within seven (7) calendar days from the date of receipt.
- (b) Irrespective of whether corrections are required to be made to the Monthly Statement or not, as determined by the Engineer during his check, each Monthly Certificate shall be completed, signed by the Contractor and the Engineer, and ready for issue to the Employer by the close of the tenth day of the following month.

1.6.3.2 Corrections to Certificates

- (a) Where the Engineer determines that a correction or corrections are required to the Monthly Statement as proposed by the Contractor, he may take either of the following actions:
 - (i) Return the Statement to the Contractor for the Contractor's agreement, adjustment and resubmitting, or,
 - (ii) Make such amendment as is necessary to correct the Statement and to promptly notify the Contractor in writing giving the details and reasons for the amendment.
- (b) In the case where agreement on particular quantities proposed to be included in the Monthly Certificate by the Contractor or the method of measurement of the same cannot be agreed before the closing date for submission of the Certificate to the Employer, the item shall not be included and certified for that Monthly Certificate but may be included in a future Certificate once agreement has been reached. Such agreement shall be based on a joint re-measure or such other justification provided by the Contractor which is acceptable to the Engineer.

1.6.3.3 Certification For Payment

Within the time limitation stipulated above, the Engineer shall compute the net sum of the Statement by deducting the items nominated in relevant Clauses of the General Conditions from the gross sum nominated by the Contractor or such other agreed or amended sum as determined by the Engineer. The Statement thus completed shall be certified for payment by the Engineer and released to the Employer for the processing of the payment, a copy of which shall be forwarded to the Contractor.



SECTION 1.7

PROVISIONAL SUM

1.7.1 GENERAL

1.7.1.1 Description

Unless specifically allowed for elsewhere in the Contract there shall be no Provisional Sum included in this Contract.



SECTION 1.8 TRAFFIC MANAGEMENT AND SAFETY

1.8.1 GENERAL

1.8.1.1 Description

- (a) The Contractor shall provide traffic control devices and services for the control and protection of Contractor's and Engineer's employees, and road users through areas of construction, including locations of sources of materials and haul routes, in accordance with the following specifications and in close conformity with the details and the locations shown on the plans or established by the Engineer.
- (b) The Contractor shall furnish, install and maintain at all times during the Time for Completion, necessary traffic signs, barricades, flexible and rigid guardrails, lights, signal, road marking and other traffic devices and shall provide flagging and other means of guidance of traffic through the work zone. Traffic control shall be conducted in accordance with prevailing rules and regulations.
- (c) All Devices mentioned above shall be in conformity with the requirements of the Ministry of Finance.
- (d) All traffic control devices furnished and installed by the Contractor shall be reviewed for compliance by the Engineer as to size, location, reflectivity, visibility, adequacy and proper use under specific work conditions.

1.8.1.2 Related Work Specified Elsewhere

- (a) General Conditions : relevant Clauses
- (b) Transport and Handling : Section 1.5
- (c) Cleaning : Section 1.16
- (d) Environmental Safeguards : Section 1.17
- (e) Reinstatement of Existing Pavement : Section 8.1
- (f) Routine Maintenance of Pavement, Shoulders,
Drainage, Road Furniture and Bridges : Section 10.1
- (g) Maintenance of Adjacent Roads and Bridges : Section 10.2



1.8.2 TRAFFIC MANAGEMENT AND SAFETY PLAN

1.8.2.1 Work Sequence and Traffic Management Plan

The Contractor shall keep the entire length of the project in such condition that traffic shall be accommodated safely and Contractor employees shall be protected.

Prior to any works, the Contractor shall prepare and submit to the Engineer, a Traffic Management and Safety Plan (TMSP) for his operation during the maintenance and construction phase. The TMSP shall be based on a macro as well as micro level analysis of traffic flow and shall not only concentrate on the construction area. The TMSP shall be updated regularly based on experience and work site conditions. The TMSP shall take into account Safety Procedures (see Sub-Clause 4.8 of General Conditions) and the following requirements. TMSP shall take into account and provide specific devices for pedestrians and non-motorized vehicles if any are in the proximity of works.

1.8.2.2 Allowed Road Closure

The construction area is divided into WORK SITES which are divided into WORK ZONES defined in the Attachment 1.8.A. Work is allowed simultaneously on a specific number of WORK SITES and WORK ZONES as shown in the Attachment 1.8.A at the end of this section.

1.8.2.3 Implementation of Traffic Management and Safety Works

If at any time, the Engineer determines that proper provisions for safe traffic control are not being provided, maintained or executed within the scope of the TMSP, he may restrict the Contractor's operations affected by such situation until required adjustments have been made. The Engineer may also suspend the entire work until compliance is achieved.

In cases of serious and willful disregard by the Contractor for safety of the public or his employees, the Engineer may take appropriate corrective measures and deduct the cost thereof as liquidated damages from amount to become due to the Contractor.

All personnel shall be at least 18 years old, and shall wear reflective clothing, protective boots and helmet at all times during work hours.

Night time operations shall be illuminated by lighting and/or reflective system approved by the Engineer. The lighting system shall be positioned and operated to preclude glare to the approaching traveling public. Incandescent light shall not be permitted.

1.8.2.4 Coordination Between Various Civil Work Contracts

The Contractor will be informed of any other civil works listed in the Attachment 1.8.A which are scheduled to be realized during the Time for Completion.

1.8.2.5 Maintenance of Temporary Traffic Signs

The Contractor shall provide personnel to undertake continuous surveillance over his traffic control operations. Such personnel shall be available day and night to respond to calls involving damage to barricades, lights, signs, etc. either through vandalism or traffic accident.

The Contractor shall identify such personnel to both the Engineer and the local traffic authorities (including police) at the work sites.

1.8.2.6 Material and Equipment

All the material and equipment provided for the implementation of the traffic management and safety activities shall be provided by the Contractor and remain his property at the end of the contract.



Traffic-handling equipment and devices damaged by any cause during the progress of work shall be repaired or replaced immediately, including painting if necessary by the Contractor at his expenses.

When traffic control devices furnished by the Contractor are no longer needed for controlling traffic, they shall be removed from the site of the work.

Traffic control devices shall be constructed so that they shall not cause damage or injuries to vehicle and road users if struck or knocked over and shall be stable and stay in place in windy weather.

1.8.2.7 Contractor Traffic Management and Safety Coordinator

The Contractor shall employ a suitably qualified Traffic Management and Safety Coordinator (TMSC), with adequate and minimum 3 years experience in such duties and necessary staff (minimum number of 2) under him for the overall control of traffic management and safety, including coordination with the national and local traffic authorities with jurisdiction over the project area, so as to minimize traffic obstruction, safety risk and facilitate the flow of traffic through the construction area and through appropriate and approved diversion roads. TMSC selection shall be approved by the Engineer.

Traffic Management and Safety Coordinator (TMSC) shall actively participate in all regular and special meetings with the Engineer. TMSC shall be available at all time (24 hours a day, 7 days a week) via mobile communication, for difficulties, emergencies and other traffic and safety management issues throughout the entire duration of the civil works.

The TMSC is the individual to whom the Engineer addresses all requests related to traffic management and safety issues. The TMSC has the authority to make decisions and coordinate the Contractor's personnel for traffic management and safety related issues.

The TMSC duties shall include the following:

- (a) Understand the contractual requirements, including plans, specifications and the environment in which the civil works are to be implemented;
- (b) Routinely inspect the condition and effectiveness of traffic control devices in use on the project and ensure that they are in proper working order, clean, visible and conform to the specifications, plans and local regulations;
- (c) Review and anticipate appropriate traffic control devices needs, advise the Engineer thereof, and ensure the TMSP is implemented for safe and efficient traffic movement;
- (d) Coordinate maintenance of the traffic operations with the Engineer;
- (e) Hold Contractor's traffic safety meeting prior to beginning construction, and periodic meetings thereafter as deemed necessary or as directed by the Engineer. The Engineer shall be noticed sufficiently advance to attend these meetings.

1.8.2.8 Unauthorized Road Closure

All premature road or lane closing outside the authorized timeframe (Attachment 1.8.A) is considered an unauthorized road closure.

All full road closure without a suitable deviation road shall be deemed an unauthorized road closure and subject to the above permanent deduction.



1.8.2.9 Access to Work Area

The Contractor shall make use of an Escort Vehicle when entering or exiting the work area to the highway/expressway opened to traffic. The Contractor shall provide the same facilities for the Engineer and the Employer's Personnel.

This maneuver (entering and exiting the work area) shall be executed safely so as to minimize risk for the workers and the road users.

1.8.2.10 Special Events and Holidays

Table 1.8 A.3 identifies special events during which the Engineer reserves the right not to allow road closure. The Contractor shall take into consideration such events in his work plan.

In cases of Force Majeure, the Engineer may also cancel road closure.

1.8.2.11 Lane/Road Closure Using Visual Marker (*this clause should refer to standard drawings for lane closure*)

Lane closure using visual marker shall be performed in compliance with the details on the Drawings or as instructed by the Engineer.

1.8.2.12 Closure of Highway Exit/Entrance

Closure of highway exit/entrance shall be done in compliance with the details on the Drawings or as instructed by the Engineer.

1.8.2.13 Closure of Highway Exit/Entrance in Urban Area

Closure of highway exit/entrance in urban area shall be done in compliance with the details on the Drawings or as instructed by the Engineer.

1.8.2.14 Additional Traffic Signs

At the request of the Engineer, the Contractor shall provide additional traffic signs or traffic handling devices. This equipment shall comply with the Engineer's specifications. The Contractor shall provide such equipment within 48 hours and install and maintain them for the Time for Completion.

1.8.3 MATERIAL AND EQUIPMENT DESCRIPTION

1.8.3.1 Flashing Arrow Signs

Flashing arrow signs shall be furnished with commercial quality flat enamel and shall be equipped with yellow or amber lamps that form arrows or arrowheads. The lamps shall be controlled by an electric circuit that shall provide between 30 to 45 complete flashing cycles per minute. The control shall include provisions for dimming the lamp by reducing the voltage to 50% ±5percent, for night use.

Flashing arrow signs shall be capable of being operated in 4 different display modes as follows. The display to be used shall be as shown in the agreed TMSP or as directed by the Engineer.

- (a) Pass to the left display – (←)
- (b) Pass to the right display – (→)
- (c) Pass to the right or left display – (↔)
- (d) Caution display – (–)



Flashing arrow signs shall be capable of operating in one or both of the following modes, at the option of the Contractor: 1) Flashing arrow mode; 2) Sequential Mode. In the flashing mode, all lamps forming the arrowheads and the lamps of the arrow shaft shall flash simultaneously.

1.8.3.2 Portable Flashing Beacon

Portable flashing beacons shall be installed at the start and the end of the project sites.

Each portable flashing beacon unit shall consist of a flasher, and a battery power source. The units shall be assembled to form a complete, self contained, flashing beacon which can be delivered to the site and placed in immediate operation. The lens shall be manufactured from high lexan polycarbonate to withstand normal day to day operation conditions. The body shall be molded from impact resistant polypropylene secured with a tamper proof bolt. The battery case shall be large enough to accommodate a minimum of two (2) 12 volt, automotive type storage batteries and shall be of such shape and weight that the beacon shall not roll in the event it is struck by a vehicle or pushed over. It shall be finished with two (2) applications of commercial quality orange enamel. The flashing beacon assembly shall be weatherproof and shall be capable of operating a minimum of 150 hours between battery recharging or other routine maintenance.

The flasher unit shall provide 50 to 60 flashes per minute with 250 to 350 millisecond dwell time. The lamp shall be rated at 25 watts for operation on 120 volt direct current.

1.8.3.3 Construction and Deviation Signs

The term “Construction Area signs” shall include all temporary signs required for the direction of public traffic through and around the work during construction. These signs are shown or referred to on the Drawings.

Construction area signs shall be installed at the locations shown on the plans as directed by the Engineer.

Construction area signs designated as stationary mounted on the plans and construction area signs designated as portable signs on the plans shall all conform to the provisions in Section 8.4 “Road Furniture and Traffic Control Devices”.

Construction area signs not designated as stationary mounted nor as portable on the plans shall be at the Contractor’s option, either stationary mounted or portable signs.

All construction area signs shall conform to the dimensions, color and legend requirements of the plans and these specifications.

Construction area signs shall be visible at 150 metres and legible at 90 metres at noon in a cloudless day and night under illumination of legal low beam headlights, by persons with vision of or corrected to 20/20.

The Contractor may be required to cover certain signs during the progress of the work. Covers for construction areas signs shall be of sufficient size and density to completely block out the message so that it is not visible either during the day or at night. Cover shall be fastened securely to prevent movement caused by wind action.

The Contractor shall clean all construction area sign panels at the time of installation and as often thereafter as the Engineer determines to be necessary, but at least once every 4 months.

Used signs with the specified sheeting material shall be considered satisfactory if they conform to the requirements for visibility and legibility and colors conform to the requirements as directed by the Engineer. A significant difference between day and nighttime reflective color shall be grounds for rejecting signs.



To properly provide for changing traffic conditions and damage cause by public traffic or otherwise, the Contractor shall be prepared to furnish on short notice additional construction area signs panels, posts and mounting hardware or portable signs mount. The Contractor shall maintain an inventory of the commonly required items at the jobsite and to furnish such items on short notice

(a) Stationary Mounted Signs

Stationary mounted signs shall be installed on wood posts in the same manner shown on the plans or as directed by the Engineer for installation of roadside signs, except as follows :

- (i) Back braces and blocks for sign panels shall not be required
- (ii) The height of the bottom of the panel above the edge of traveled way shall be at least 1.50 metres except when the sign is located in the path of pedestrians or bicycles the height to the bottom of the sign panel above the edge of the traveled way shall be at least 2.10 metres.
- (iii) Construction area sign posts may be installed on above the ground temporary flat form sign supports as approved by the Engineer, or the signs may be installed on existing lighting standards or other supports as approved by the Engineer. When Construction area signs are installed on existing lighting standards, holes shall not be made in the standards to support the sign.
- (iv) The post embedment shall be 0.80 metres and post holes shall be backfilled around the posts with Portland cement concrete produced from commercial quality aggregates and cement with not less than 168 kilograms of cement per cubic metre.

Post size and number of posts shall be as shown on the Drawings, except that when stationary mounted signs are installed and the type of sign installation is not shown on the Drawings, post size and the number of posts shall be determined by the Engineer. Posts shall be good sound wood, suitable for the purpose intended.

Sign panels for stationary mounted signs shall consist of plywood sheeting.

Legend and border may be applied by a screening process. Size and spacing of letters and symbols shall be as depicted on the sign specification sheets published by the Employer.

(b) Portable Signs

Each portable sign shall consist of base, standard or framework and a sign panel. The units shall be capable of being delivered to the site of use and placed in immediate operation.

Sign panels for portable signs shall be plywood sheeting.

The sign standard or framework shall be capable of supporting panel of 120 centimetres maximum dimension, in an upright position with the center of the sign panel a minimum of the sign panel a minimum of 1.20 metres above the pavement.

If portable signs are displaced or overturned, from any cause, during the progress of the work, the Contractor shall immediately replace the signs in their original locations.



1.8.3.4 Traffic Barrier

Traffic barriers shall consist of new “pre-cast concrete type or traffic barrier of the plastic type” as shown on the plans.

Traffic barriers shall be used for traffic guidance away from freshly laid road pavements and installed at the locations shown on the plans or as directed by the Engineer.

The Traffic barrier designated pre-cast concrete traffic barrier on the Drawings and traffic barrier designated as the “plastic type” on the Drawings shall conform to the provisions in Section 8.4 “Road Furniture and Traffic Control Devices”

Traffic barriers shall conform to the dimensions and color requirements of the Drawings and these Specifications.

(a) Traffic Barrier, Precast Concrete Barrier

Traffic barriers, pre-cast concrete type, shall consist of new pre-cast concrete barrier unit as shown on the Drawings. Exposed surfaces shall be freshly coated with the color of paints as indicated in the Plans prior to their first use on the project. The paint shall conform to the provisions of their Section 8.4 “Road Furniture and Traffic Control Devices”. Repainting or making good of units, when ordered by the Engineer after the units are in place, shall be the responsibility of the Contractor.

Traffic barriers, pre-cast concrete type, shall be used for traffic guidance away from freshly laid Portland cement concrete pavement.

For manufacturing pre-cast concrete traffic barrier, concrete shall conform to the requirements of Section 7.1. “Structural Concrete” and reinforcing steel shall conform to the requirement of Section 7.3, “Reinforcing Steel”

Pre-cast concrete units shall be placed with distance between the units as indicated in the Plans. The Pre-cast concrete units shall be positioned straight on tangent alignment and a true arc on curved alignment.

(b) Traffic Barrier, Plastic type

Traffic barriers, plastic type shall be used for traffic guidance from freshly laid asphalt concrete pavement.

Traffic barriers, plastic type shall be weighted to keep them stable in wind or in eddy currents from passing traffic.

Ballast used for the traffic barrier, plastic type shall be water.

1.8.3.5 Temporary Pavement Markings

Painted markings shall conform to Section 8.4 “Road Furniture and Traffic Control Devices”:

Temporary pavement ridgeline shall be a minimum 150 mm wide solid yellow line.

Temporary pavement markings shall be placed on each lift of the pavement prior to opening the roadway to public traffic. On asphaltic concrete pavement overlays, markings shall be applied as soon as practical after a lift has been placed. As a minimum, pavement markings shall be applied the same day that the asphaltic concrete overlay is placed on those roadways where traffic is to be routed. Temporary pavement markings on the final surface course shall be removed prior to placing permanent markings.

All conflicting construction striping and pavement markings shall be removed to the fullest extent possible by sand blasting or other approved method that does not materially damage the surface or texture of the pavement. The removal pattern shall be in an uneven shape that does not perpetuate the outline of the removed markings by using diagonal strokes and



including some surroundings surface area. Damage to the surface shall be repaired at the Contractor's expense by methods acceptable to the Engineer. Accumulations of sand or other material that might constitute a traffic hazard shall be removed. Upon completion, sandblasted areas on bituminous surfaces shall be lightly coated with a coal tar emulsion or approved equal.

1.8.3.6 Detachable Fences

Detachable fences shall be either of the Cyclone Wire type or Plain Galvanized Iron Sheet type

Detachable fences shall comply to the details shown on the plans and shall be as specified in this Section.

(a) Detachable Fences, Cyclone Wire Type

Stand posts and horizontal framings shall be Galvanized Iron pipe, 75 mm in diameter, conforming to the requirement of ASTM 501, Cyclone wire shall be fabricated from Gauge 10 galvanized wire complying to AASHTO M 181 and tied to the frame by tie wire.

Post anchorage is through a precast concrete stand block support manufactured in accordance with the detail in the plan.

For manufacturing precast concrete stand block support concrete shall be in accordance with Section 7.1 "Structural Concrete" and reinforcing steel shall conform to the requirement of Section 7.3, "Reinforcing Steel".

Two lifting bar, 12 mm in diameters, shall be provided for each precast stand block support as indicated in the plans.

Extreme care should be observed in handling, storing and installing to avoid cracking or damage to the precast concrete stand block support. Precast concrete stand block support shall be handled, transported and installed in an upright position and the points of support and directions of the reaction with respect to the block shall be approximately the same as when the block is in final position.

(b) Detachable Fences, Plain G.I. Sheet Type

Stand posts and horizontal framing shall be Galvanized Iron pipe, 75 mm in diameter, conforming to the requirement of ASTM 501. Plain galvanized iron sheet shall be Gauge 26 (0.48 mm thick) painted with green color, and tied to the pipe framing by tie wire.

Post anchorage is either through pre-cast concrete block support constructed in accordance with the details in the plan.

For manufacturing concrete block and pre-cast concrete stand block support concrete shall be in accordance with Section 7.1 "Structural Concrete" and reinforcing steel shall conform to the requirement of Section 7.3, "Reinforcing Steel".

A lifting hook, 20 mm in diameter and two lifting bar, 12 mm in diameter shall be provided respectively for each concrete block and concrete stand block support as indicated in the Plans.

Extreme care should be observed in handling, storing and installing to avoid cracking or damage to the precast concrete. Precast concrete shall handled, transported and installed in an upright position and the points of support and directions of the reactions with respect to the block shall be approximately the same as when the block is in final position.



1.8.3.7 Other

The Contractor shall provide the following traffic control devices and services for the control and protection of traffic through areas of construction of the different subcomponent as follows :

Description	Unit	Total
Flashers Lights	Each	.....
Traffic Barrier (Concrete Type)	Each	.....
Traffic Barrier (Plastic Type)	Each	.....
Detachable Pedestrian Barrier (Including Concrete Footings)	Each	.....
Traffic Aide (Flagman)	M-Hr	.....
Safety Supervisor (TMSC)	M-Hr	.....
Traffic Signboard (including post and concrete footings)	Each	.....
Rope Light	Ln. m	.....
Pavement Ridgeline (150 mm wide, Solid Yellow line)	Ln. m	.....
Steel Plate (4'x8'x3/4")	Each	.....
Safety Net with 50 mm dia. Horizontal and Vertical Bracing (including accessories)	Ln.m	.....
Warning Sign	Each	.....
Others		.....

1.8.4 **TEMPORARY ROAD OR BRIDGE WORKS**

1.8.4.1 General

The Contractor shall furnish, maintain and remove on completion of the Works, all temporary road works, bridges, access ramps and the like that are required for providing access for the Contractor or the public.

Such temporary works shall be constructed to the satisfaction of the Engineer, but the Contractor shall nevertheless be responsible for any damage done to or caused by such temporary road works.

1.8.4.2 Land Required

Before constructing temporary road or bridge works, the Contractor shall make all necessary arrangements, including payment if required to any landowners concerned, for the use of the land and, shall obtain the approval of the responsible authority and the Engineer. Upon completion of the Works, the Contractor shall clean and restore the land to its original condition to the satisfaction of the Engineer and the landowner concerned.

1.8.4.3 Passage of Other Contractor's Plant

The Contractor shall make all necessary arrangements in order that the Construction Works can be safely passed by equipment, materials and employees belonging to other Contractors engaged in the construction of adjacent works. For this purpose the Contractor and the other Contractors concerned in the construction of the adjacent works, shall with at least 15 (fifteen) days notice, submit to the Engineer for his approval, a schedule for such transportation.



1.8.4.4 Temporary Diversions or Detours

Temporary diversions or detours of traffic shall be constructed as appropriate for the prevailing traffic conditions with regard to safety requirements and structural strength. All such diversions shall not be open to public traffic until the alignment, construction, drainage and erection of temporary traffic signs has been approved by the Engineer. Throughout the public use of the diversion the Contractor shall maintain the construction, drainage and signs to the satisfaction of the Engineer.

1.8.4.5 Temporary Traffic Ramps

The Contractor shall construct and maintain temporary bridges and traffic ramps for public access to the road at all points where vehicle access was available before the Works commenced and at other places where necessary or as required by the Engineer.

1.8.5 MAINTENANCE FOR TRAFFIC SAFETY

1.8.5.1 Temporary Road Works and Traffic Control

All temporary road works and traffic control installations provided by the Contractor shall at all times during the performance of the Works be maintained in a safe and serviceable condition to the requirements and satisfaction of the Engineer, to ensure the safety of traffic and of the public using the road.

1.8.5.2 Clearance of Obstructions

At all times during the performance of the Works, the Contractor shall ensure that the pavement, shoulders and adjacent areas within the right-of-way shall be maintained free of construction material, debris or other such loose objects that may obstruct or endanger the free and safe passage of traffic. The Works shall also be maintained free of any unauthorized parking or street trading activity except in areas designated for such purposes.

1.8.6 MEASUREMENT AND PAYMENT

1.8.6.1 Measurement

The measurement for Traffic Management and Safety is made based on a combination of mobilization, demobilization, and monthly payments. For measurement for monthly payments it is a requirement that all provisions of this Article have been fulfilled. When the Contractor does not fulfill all of the provisions of this Article, item there which shall be no payment for that month for Traffic Management and Safety.

1.8.6.2 Basis of Payment

Traffic Management and Safety work shall be paid for on a proportional lump sum basis according to the schedule given below, which payments shall constitute full compensation for furnishing, all materials, all equipment, labor, tools and other incidentals necessary for erection and maintenance of all temporary installation, for traffic control during the Time for Completion and for clearance of any obstruction necessary to complete the work described in Article 1.8.1.1 and 1.8.2 of these Specifications. However, the Engineer may, during the period for the Time for Completion, order the Contractor to provide additional equipment as necessary without any change of the lump sum price for Traffic Management and Safety.



- 25 % (twenty five percent) when all major items of equipment are on site, accepted and approved by the Engineer.
- 50 % (fifty percent) shall be paid pro rata on a monthly basis, based on satisfactory progress. i.e. 50%/T payment per month, where T is the Time for completion of the contract in months.
- 25 % (twenty five percent) on completion of demobilization.

When the quantity is not listed in the Bill of Quantities, no separate payment shall be made for Traffic Management and Safety executed in accordance with this section of the Specification. The cost of this work shall be included in the unit price of all other Pay Items included in the Contract.

If the Contractor fails to carry out the traffic management and safety operations as specified in this Section of these Specifications, he shall be charged with the full actual cost all traffic management and safety operations which are necessary out by the Engineer or other parties as directed by the Engineer.

Pay Item No.	Description	Unit of Measurement
1.8	Traffic Management and Safety	Lump Sum

ATTACHMENT 1.8.A

1.8.2.1 Work Sequence and Traffic Management and Safety Plan (Example that need to be accompanied by drawings)

Work consists of construction of of

The Contractor shall take into account the following restriction while preparing the Traffic Management and Safety Plan.

Construction area is divided into (.....) Works Sites, which are in turn divided in Work Zones.

Work Site is located along the Project, between Sta..... to Sta.

Work Zone allows the Contractor to implement the work on the (left, center, right) lane(s) between Sta..... to Sta..... Complete road closure is allowed between exit\entrance no.01 (Sta.) and exit\entrance no.02 (Sta.....), no diverted Traffic.

Contractor is allowed to work on Work Zone 1 simultaneously.
 Authorized road closures are as follows:

Table 1.8.A.1

Work Zone 1-A

DAYS	HOURS
Sunday to Thursday	-----
Friday	-----
Saturday	-----



Contractor’s operations that require road closure shall be executed within the above mentioned hours. These operations shall include the setting up and removal of temporary traffic signs and deviation. Road closure outside the above mentioned time frame constitute an unauthorized road closure and is subject to deduction specified in Article 1.8.2.8 of the Special Specifications.

1.8.1.4 Coordination Between Various Civil Work Contracts

Table 1.8.A.2

CONTRACT	DATE	SPECIFIC CONSTRAINT
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1.8.2.10 Special events and holidays

Table 1.8.A.3

EVENTS	DATE	SPECIFIC CONSTRAINT
<i>“Christmas event” for example</i>		<i>No closure allowed after sunset</i>



SECTION 1.9 FIELD ENGINEERING

1.9.1 GENERAL

1.9.1.1 Description

Field Engineering is an activity for matching the original design as shown on the Drawings to the actual field requirements. This activity includes the field survey and data analysis.

The Contractor shall provide all necessary specialist engineering personnel to facilitate the construction of the works to the specified requirements as to quality, performance, and dimensions.

Initially the personnel shall be involved in the execution of a comprehensive field survey and the preparation of a survey report to determine the physical and structural condition of the existing Site. Subsequently the personnel shall be involved in the staking out and surveying of the project, the investigation and testing of construction materials, and engineering and drafting to maintain Project Record Documents.

1.9.1.2 Specified Elsewhere

- | | | |
|---|---|------------------|
| (a) General Conditions | : | Relevant Clauses |
| (b) Mobilization | : | Section 1.2 |
| (c) Laboratory Testing Services | : | Section 1.4 |
| (d) Project Record Documents | : | Section 1.15 |
| (e) Environmental Safeguards | : | Section 1.17 |
| (f) Ditches and Waterways | : | Section 2.1 |
| (g) Culverts and Concrete Drains | : | Section 2.3 |
| (h) Reinstatement of Existing Pavement | : | Section 8.1 |
| (i) Routine Maintenance of Pavement, Shoulders,
Drainage, Road Furniture and Bridges | : | Section 10.1 |
| (j) Maintenance of Adjacent Roads and Bridges | : | Section 10.2 |

1.9.2 FIELD SURVEY FOR MINOR REVISION

1.9.2.1 Description

During the first thirty days of the Mobilization Period the Contractor shall deploy his engineering personnel to carry out field survey over the entire length of project on the physical and structural condition of the existing road pavement, drainage ditches, culverts, bridges and other structures and such miscellaneous items as road signs, kilometer posts and guard rails.

The field survey shall include geometric inventory of the existing pavement width, surface condition, type of surface and shoulder details, radius of curve, cross fall (super-elevation on curve), and grade.



The reporting completed long-section drawings along each side of the road shall be of a standard acceptable to the Engineer and shall be submitted to the Engineer in one original and three copies as part of the Contractor's overall survey report.

1.9.2.2 Preparatory Works

Before survey work commences the Contractor shall study the Contract Drawings in consultation with the Engineer. The Contractor shall perform the work in accordance with the intention of the Drawings and Specifications, and shall take no advantage of any error or omission in the Drawings or discrepancy between the Drawings and these Specifications, and Contractor shall locate and propose corrections for any errors or omissions, particularly with respect to existing ground level or road widths and the location of any pavement widening and drainage structures. The Engineer shall make such corrections and interpretations deemed necessary for the fulfillment of these Specifications. Any deviation from the Drawings due to field conditions not anticipated will be determined by the Engineer and authorized in writing. The Contractor and the Engineer shall reach agreement on the accuracy of any alterations made to these Drawings.

1.9.2.3 Survey of Existing Pavement, Shoulders, and Drainage System Condition

The Contractor shall carry out and report on the survey work of the existing pavement, shoulders, and drainage system.

1.9.2.4 Failure to carry out the Field Survey Works

The timely completion of the field survey works covered in this Section is critical to the Employer's obligation of carrying out any minor design revision and furnishing the Contractor with construction drawings prior to the scheduled commencement of construction activities.

The Engineer shall therefore monitor the progress of the Contractor's field survey activities to ensure that this work is completed within the scheduled time frame.

If, in the opinion of the Engineer, the Contractor's progress is not satisfactory to meet the completion date or in the event that the Contractor does not commence the work, or does not carry out the work to the standards required by the Engineer, the Engineer may elect to complete the field survey using his own resources or such other resources as he deems necessary. In this event the Engineer shall impose the sanctions detailed in Article 1.9.7(C) when determining the level of payment due to or due from the Contractor.

1.9.3 ROUTINE CONSTRUCTION SURVEY WORKS

1.9.3.1 After the Engineer has completed his minor design revision and issued the construction drawings, the Contractor shall ensure that the surveyor is provided with all such drawings containing current correct information on required widths and standard cross sections. All field survey measurements should be recorded in standard survey field notebooks. Loose leaf books are not to be used.

1.9.3.2 The stationing of the existing kilometer posts within the Site shall be checked and a plan prepared giving the exact location of each post in terms of the project chainage. Unless absolutely necessary for the proper execution of the Works, and previously agreed in writing by the Engineer, the existing kilometer posts shall not be relocated or moved at any time during the Time for Completion, unless absolutely necessary for the proper execution of the Works.

1.9.3.3 At locations where pavement edge correction or widening is required original cross sections shall be recorded for the measurement of quantities.



- 1.9.3.4 For measurement of all Leveling layers and, where necessary, adjustment in the design camber, a longitudinal profile along the road centre-line together with cross-section profiles shall be prepared.

1.9.4 SETTING OUT OF WORK

- 1.9.4.1 In general, the Design Survey bench marks shall be the reference from which the road works will be set out.
- 1.9.4.2 The Contractor shall accurately survey and install additional permanent bench marks at certain locations along the project to enable redesign, pavement level surveys or setting out of the work to be done. Permanent bench marks shall be established on ground which is not subject to movement.
- 1.9.4.3 The Contractor shall set construction stakes, profile, pegs and other references as necessary to establish lines and grades for new construction, pavement edge correction, shoulder widths, side drainage ditches, embankment and cutting batters and other features according to the standard cross sections given in the Drawings, and shall secure the Engineer's approval of his stake-out before proceeding with construction. All setting out shall be in accordance with the approved Construction Drawings and Standard Drawings. If, in the opinion of the Engineer, any modification of the line or grade is advisable, either before or after stake out, the Engineer shall issue detailed instructions to the Contractor for such modifications and the Contractor shall revise the stakeout for further approval.
- 1.9.4.4 Whenever required for the purposes of measurement of quantities the Contractor shall take cross sections on the original ground at 25 metre intervals, or as otherwise directed by the Engineer. The drawn cross sections shall include the proposed finished lines derived from the design details.
- The original profile drawings together with three copies shall be submitted to the Engineer who shall endorse one copy with his approval, or his revision thereof, and return it to the Contractor.
- 1.9.4.5 Should the Engineer so require, the Contractor shall provide to the Engineer all necessary instruments, personnel, labor and material that the Engineer may require for checking the setting out or for any other relevant work to be done.
- 1.9.4.6 The Contractor shall not commence any part of the Works until he has obtained the approval to his setting out of those Works.

1.9.5 SPECIALIST FIELD ENGINEERING PERSONNEL

- 1.9.5.1 The Contractor shall provide the services of suitably qualified construction personnel to advise and direct edge correction operations, construction of overlays, including the leveling layer, and the construction of shoulders, side ditches and drainage structures.
- 1.9.5.2 The Contractor shall provide the services of suitably qualified soils/asphalt personnel who shall be responsible for asphalt production, including the procurement of materials, production of job mix, setting of cold bin and hot mix settings and all other requirements so as to ensure that the Specifications of the hot mix materials are achieved.



1.9.6 QUALITY CONTROL OF MATERIALS

- 1.9.6.1 The soil/asphalt personnel provided by the Contractor shall investigate material sources, carry out trial mix designs for Hot Mix Asphalt materials, concrete for bridge work and conduct routine laboratory tests for quality control of asphalt, concrete, base and shoulder materials. Diaries and records of test results shall be kept and be open to the inspection of the Engineer at all times.
- 1.9.6.2 All laboratory testing shall be carried out by the Contractor under the supervision of the Engineer as described in Section 1.4. of these Specifications.

1.9.7 BASIS OF PAYMENT

1.9.7.1 Routine Field Engineering during Time for Completion

The requirements of Articles 1.9.3, 1.9.4, 1.9.5 and 1.9.6 of this Section of the Specifications for the provision of labor, materials and equipment for all routine field engineering activity during the Time for Completion shall be met without additional payment and all costs thereof shall be deemed to have been included in the Unit Prices entered against the various Pay Items listed in the Bill of Quantities. Survey instruments and other equipment provided by the Contractor shall remain the property of the Contractor on completion of the Contract.

1.9.7.2 Field Survey Work for Minor Design Revision

- (a) Except as provided hereunder the provision of all labor, materials and equipment required to successfully carry out the field survey, to prepare long-section and other drawings as required and to prepare and furnish the field survey report all in accordance with the requirements specified in this Section of the Specifications shall be met without additional payment and all costs thereof shall be deemed to be included in the Unit Prices entered against the various other Pay Items listed in the Bill of Quantities.
- (b) The soil and/or pavement investigation which is not for the purpose of design review or design revision shall be paid for on a daywork basis in accordance with Section 9.1 of these Specifications.
- (c) In the event that the Engineer invokes the provision of Article 1.9.2.4 and elects to complete the field survey work using his own or other resources due to unsatisfactory progress on the part of the Contractor, the actual cost incurred by the Engineer in completing the work shall be borne by the Contractor.



SECTION 1.10 REFERENCE STANDARDS

1.10.1 GENERAL

1.10.1.1 Description

When materials or workmanship are required by these Specifications to meet or exceed specifically named codes or standards, it is the Contractor's responsibility to provide such materials and workmanship.

The specified codes and standards establish the quality requirements for the various types of work to be performed and the methods for testing for determination that the required quality is achieved.

1.10.1.2 Related Work Described Elsewhere:

- (a) General Conditions of Contract : relevant Clauses
- (b) Laboratory Testing Services : Section 1.4
- (c) Specific naming of codes or standards occurs on the Drawings and in other Sections of these Specifications.

1.10.2 QUALITY ASSURANCE

1.10.2.1 During Procurement

In procuring all items used in this Work, it is the responsibility of the Contractor to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this Work meet or exceed the specified requirements.

1.10.2.2 During Execution

The Engineer reserves the right to reject items incorporated into the Works which fail to meet the specified minimum requirements. The Engineer further reserves the right, and without prejudice to other recourse to accept non-complying items subject to an adjustment in the Unit Price or Sum for that item.

1.10.2.3 Contractor's Responsibilities

It is also the Contractor's responsibility, when so required by the Contract Documents or by written request from the Engineer, to deliver to the Engineer all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard.

1.10.2.4 Standards

Applicable standards listed in these Specifications, and elsewhere in the Contract Documents, include, but are not necessarily limited to, standards promulgated by the following agencies and organizations;

SII = Indonesian Industrial Standards

SNI = Indonesian National Standards

AASHTO = American Association of State Highway and Transportation Officials.



ACI	=	American Concrete Institute
AISC	=	American Institute of Steel Construction
ANSI	=	American National Standards Institute
ASTM	=	American Society for Testing and Materials
AWS	=	American Welding Society, Inc.
CRSI	=	Concrete Reinforcing Steel Institute
JIS	=	Japanese Industrial Standards
NEC	=	National Electrical Code
BS	=	British Standards Institute

1.10.2.5 Publication Date

The publication in effect on the date of issue of the Contract Documents, except when a specific publication date is specified, shall be taken as the relevant standard.

1.10.2.6 Throughout this specification the following testing method and specifications as given in Table of Appendix shall apply.



SECTION 1.11 MATERIALS AND STORAGE

1.11.1 GENERAL

1.11.1.1 General

Material incorporated into the Works shall:

- (a) Conform to applicable specifications and standards.
- (b) Comply with size, make, type and quality specified on the Drawings or in other sections of these Specifications, or as specifically approved in writing by the Engineer.
- (c) All products are to be new.

1.11.1.2 Related Work Specified Elsewhere

- (a) General Conditions of Contract : relevant Clauses
- (b) Transportation and Handling : Section 1.5
- (c) Cleaning : Section 1.16
- (d) Environmental Safeguards : Section 1.17

1.11.1.3 Submittals

- (a) Before placing an order, opening a borrow area or delivering to site any materials for the Works the Contractor shall supply to the Engineer samples for his approval, together with details of the location of the material source and the Specification Section to which the samples are intended to conform.
- (b) The Contractor shall make all arrangements for locating, selecting and processing natural materials in accordance with these Specifications and shall submit for approval full information regarding the proposed location of the material source at least 30 days in advance of commencement of working the material. The Engineer's approval of a source does not imply that all the material in that source is approved.
- (c) In the case of bituminous materials, cement and other manufactured material the manufacturer's test certificates are required to be submitted to the Engineer for his initial approval. The Engineer shall give his approval in writing to the Contractor for ordering. All materials that are delivered to the site shall be tested as specified under the supervision of or as directed by the Engineer.

1.11.2 AVAILABILITY OF MATERIALS

1.11.2.1 Material Source

The Contractor is responsible to identify and verify the suitability of all material sources required for the execution of the Works.



1.11.2.2 Material Variability

The Contractor shall determine for himself the amount of equipment and work required to produce a material meeting the Specifications. It shall be understood that it is not feasible to ascertain from samples the exact limits for an entire deposit and that variations shall be considered as usual and are to be expected. The Engineer may order procurement of material from any portion of a deposit and may reject portions of the deposit as unacceptable.

1.11.2.3 Approvals

- (a) Orders for materials shall not be placed without the approval of the Engineer in writing for the specific application it is intended for. Materials shall not be used for any purpose other than the purpose they have been approved for.
- (b) If the quality of the material delivered to site does not conform to the quality previously inspected or tested, the offending material shall be rejected, and shall be removed from the site within 48 hours unless agreed otherwise with the Engineer.

1.11.3 **STORAGE OF MATERIAL**

1.11.3.1 General

Materials shall be stored in such a manner as to ensure preservation of their specific quality and suitability for use in the Works. Materials which must be kept dry shall be protected from the rain. Stored materials shall be located so that they are readily available for use and can be easily inspected by the Engineer. Private property shall not be used for storage purposes without the written permission of the owner or lessee.

1.11.3.2 Storage Site

Storage sites shall be free of vegetation and debris, free draining and if necessary shall be elevated. Material placed directly on the ground shall not be used in the Works unless the site has been prepared and surfaced with a 10 (ten) centimeter layer of sand or gravel to the satisfaction of the Engineer.

1.11.3.3 Stockpiles

- (a) The material shall be stored in such manner as to prevent segregation or contamination and to ensure proper gradation and to avoid excessive moisture content. The maximum height of stockpiles shall be limited to five meters.
- (b) Stockpiling of the various aggregates to be used for asphalt concrete, bituminous surface treatment, penetration macadam or concrete shall be permitted only in separate stockpiles for each nominal size of aggregate. These shall be separated sufficiently to prevent mixing of materials.
- (c) Aggregate stockpiles for base course and sub base shall be protected from rain to prevent saturation of the aggregates which would result in a reduction in the quality of the placed material or adversely affect the placement of the material.



1.11.4 PAYMENT

- (a) The Contractor shall make all arrangements with the owners and users of the land to acquire the necessary rights to remove material for the Works. The Contractor shall be responsible for all compensation and royalties due in respect of quarried or other materials. No separate payments shall be made for compensation and royalties paid by the Contractor, and all such costs shall be allowed for in the Unit Prices entered against the relevant Pay Items in the Bill of Quantities.
- (b) The Contractor shall be responsible for constructing accesses, removing overburden and all other construction costs required for the furnishing of the materials including the returning of top soil and the leaving of the area and accesses in a tidy and acceptable condition. Such costs shall be allowed for in the Unit Prices entered against the relevant Pay Items in the Bill of Quantities.



SECTION 1.15 PROJECT RECORD DOCUMENTS

1.15.1 GENERAL

1.15.1.1 Description

Throughout the progress of the Works the Contractor shall maintain an accurate record of all changes in the Contract Documents on a job set of Project Record Documents, and shall transfer the final as built information to the Final Record Documents before the issue of the completion of the Works.

1.15.1.2 Related Work Described Elsewhere

- (a) Payment of Monthly Certificates : Section 1.6
- (b) Contract Closeout : Section 1.14

1.15.1.3 Submittals

- (a) The Contractor shall submit for the Engineer's approval the job set of Project Record Documents as currently maintained on the 25th of each month. The Engineer's approval of these documents shall be a prerequisite for certification of the Monthly Certificates.
- (b) The Contractor shall submit for the Engineer's approval the Final Project Record Documents at the time of application for Tests on Completion. The Contractor shall accompany this submittal with a transmittal letter, containing:
 - (i) Date
 - (ii) Project Title and Number
 - (iii) Contractor's name and address
 - (iv) Title and number of each record document
 - (v) Certification that each document as submitted is complete and accurate
 - (vi) Signature of the Contractor, or his authorized representative

1.15.2 PROJECT RECORD DOCUMENTS

1.15.2.1 Job Set

Promptly following the Letter of Acceptance, the Contractor shall obtain from the Engineer, at no charge to the Contractor, one complete set of all Documents comprising the Contract.

The job set shall include:

- (a) General Conditions of Contract.
- (b) Contract Drawings.
- (c) Specifications.
- (d) Addenda (if any).



- (e) Other Modification of Contract.
- (f) Field Test Records
- (g) Relocation Plan and Reports
- (h) Environment Management Plan and Reports
- (i) Healthy and Safety Plan and Reports
- (j) Traffic Management and Safety Plan and Reports

1.15.2.2 Storage of Job Set

The job set shall be stored in the field office in files and racks and the Contractor shall maintain the job set protected from loss and damage until the transfer of as built data to the Final Project Documents has been completed. The record documents shall not be used for construction purposes and the documents shall be available at all times for inspection by the Engineer and Employer.

1.15.3 PROJECT RECORD MATERIALS

Following approval of all materials such as bitumen, aggregate, shoulder materials, cement, concrete, hot mix, etc. all approved samples shall be maintained at the job site.

1.15.4 MAINTENANCE OF JOB SET

1.15.4.1 Responsibility

The Contractor shall delegate the responsibility for the maintenance of Project Record Documents to one nominated person on the Contractor's staff as approved by the Engineer.

1.15.4.2 Identification

Immediately upon receipt of the job set, identify each of the Documents with the title “PROJECT RECORD DOCUMENTS - JOB SET”, in 5 cm. high printed letters.

1.15.4.3 Preservation

Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities shall be performed, a suitable method for protecting the job set shall be devised to the approval of the Engineer.

1.15.4.4 Making Entries on Drawings

Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by note and by graphic line as required. Date all entries. Call attention to the entry by a “cloud” around the area or areas affected. In the event of overlapping changes different colors may be used for each of the changes. Keep record documents current and do not permanently conceal any work carried out.

Legibly mark to record actual construction details such as :

- (a) Depths of various elements of foundation in relation to datum shown.
- (b) Horizontal and vertical location of underground utilities referenced to permanent surface improvements.
- (c) Location of internal utilities concealed in construction referenced to visible and accessible features of structure.



- (d) Field changes of dimension and detail.
- (e) Changes made by Variation.
- (f) Details not on original Contract Drawings.

1.15.4.5 Timing

All entries should be made within 24 hours after receipt of information.

1.15.4.6 Accuracy

Use all means necessary, including the proper tools for measurement, to determine actual locations of the installed items and the accuracy of entries.

The Contractor should thoroughly coordinate all changes within the Project Record Documents, making adequate and proper entries on each page of the Specifications and sheet of Drawings and other Documents where such entry is required to properly show the change. The accuracy of records shall be such that any future search for items shown in the Contract Documents may be obtained from the approved Project Record Documents.

1.15.5 FINAL RECORD DOCUMENTS

1.15.5.1 General

The purpose of the Final Record Documents is to provide factual information regarding all aspects of the Works, both concealed and visible, to enable future modification of design to proceed without lengthy and expensive site measurement, investigation, and examination.

1.15.5.2 Transfer of Data to Drawings

Carefully transfer all change data shown on the job set of Record Drawings to the corresponding drawing originals of the Final Record Drawings and clearly indicate the full description of all changes made during construction and the actual location of all items. Call attention to each entry by drawing a “cloud” around the area or areas affected. Make all change entries on the originals neatly, consistently, and in ink or crisp black pencil.

1.15.5.3 Transfer of Data to Other Documents

If Documents other than Drawings have been kept clean successfully during progress of the Works, and if entries have been sufficiently orderly to the approval of the Engineer, the job set of those Documents (other than Drawings) shall be accepted by the Engineer as Final Record Documents. If any such Document is not so approved by the Engineer, secure a new copy of that Document from the Engineer. Carefully transfer the change data to the new copy to the approval of the Engineer.

1.15.5.4 Review and Approval

Submit the completed set of Final Record Documents to the Engineer at the time of application for Tests on Completion. If requested by the Engineer, participate in a review meeting or meetings, execute any required changes and promptly resubmit the Final Record Documents to the Engineer for his acceptance.

1.15.5.5 Changes Subsequent to Acceptance

The Contractor shall have no responsibility for recording changes to the Works subsequent to the Taking Over except for changes resulting from replacements, repairs, and alterations made by the Contractor as part of his obligations



SECTION 1.16 CLEANING

1.16.1 GENERAL

1.16.1.1 Description

During the period of construction activity the Contractor shall maintain the Works free from accumulations of waste, debris, and rubbish, caused by the construction operations. At the completion of the Works all waste and surplus materials, rubbish, tools, equipment and machinery shall be removed, all sight-exposed surfaces shall be cleaned and the project left in a condition ready for occupancy to the satisfaction of the Engineer.

1.16.1.2 Related Work Specified Elsewhere

- | | | |
|--|---|------------------|
| (a) General Conditions of Contract | : | relevant Clauses |
| (b) Contract Closeout | : | Section 1.14 |
| (c) Environmental Safeguards | : | Section 1.17 |
| (d) Routine Maintenance of Pavements, Shoulders,
Drainage, Road Furniture and Bridges | : | Section 10.1 |

1.16.2 DURING CONSTRUCTION

- 1.16.2.1 Execute regular cleaning to ensure that the site works, structures, temporary offices and accommodation quarters, are maintained free from accumulations of waste materials, rubbish, and other debris resulting from the site work operations and maintain the site in a neat and orderly condition at all times.
- 1.16.2.2 Ensure that the drainage system is maintained free of debris and loose material and is in an operational condition at all times.
- 1.16.2.3 Ensure that grass growing on the existing or newly constructed berms and side slopes is regularly trimmed and maintained to a maximum height of 3 cm.
- 1.16.2.4 When required, spray dry materials and rubbish with water to prevent blowing dust or sand.
- 1.16.2.5 Ensure that traffic signs and the like are regularly cleaned free of dirt and other materials.
- 1.16.2.6 Provide on-site drum containers for the collection of waste materials, debris and rubbish awaiting removal from site.
- 1.16.2.7 Dispose of waste material, debris and rubbish at designated dumping areas and in accordance with National and Provincial ordinances and anti-pollution laws.
- 1.16.2.8 Do not bury rubbish and waste materials on the project site without the approval of the Engineer.
- 1.16.2.9 Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinners in storm or sanitary drains.
- 1.16.2.10 Do not dispose of wastes into streams or waterways.
- 1.16.2.11 Should it come to the Contractor's attention that the side drainage ditches or other parts of the drainage system are being used, whether by the Contractor's employees or by others for the disposal of anything other than surface water he shall immediately report the circumstances to the Engineer and shall take action as directed by the Engineer to prevent any further pollution from occurring.



1.16.3 FINAL CLEANING

- 1.16.3.1 At the completion of the Works the site shall be left clean and ready for use by the Employer. The Contractor shall also restore to original condition those portions of the site not designated for alteration by the Contract Documents.
- 1.16.3.2 At the time of final cleaning, all pavements, curbs, and structures shall be inspected for physical damage before final sweeping. Paved areas of the site and all public paved areas directly adjacent to the site shall be broomed clean. Other surfaces shall be raked clean and all resultant debris shall be completely removed.

1.16.4 BASIS OF PAYMENT

No separate payment shall be made for the Contractor's cleaning operations executed in accordance with this Section of the Specifications.



SECTION 1.17 ENVIRONMENTAL SAFEGUARDS

1.17.1 GENERAL

1.17.1.1 Description

- (a) This Section covers the provision of environmental countermeasures and actions that are needed to perform any civil works required under the Contract. In most cases the clauses have been extracted from other Sections of these Specifications and are included here to ensure awareness and compliance.
- (b) The Contractor shall take all reasonable steps to protect the environment (both on and off the Site, including base camp and other installations under the control of the Contractor) and to limit damage and disturbance to people and property resulting from pollution, noise and other results of his operations. The Contractor should also ensure that transportation and quarrying activities are undertaken in an environmentally acceptable manner.
- (c) As a means of minimizing environmental disturbance to all nearby communities all construction and transportation activities must be confined to the hours of operation as defined in Part 3 Conditions of Contract, Part A Contract Data, unless otherwise approved by the Engineer.
- (d) Prior to initiating physical activities on any site, the Contractor shall be notified of the requirement to prepare a monthly Environmental Monitoring and Mitigation Report identifying for each sub clause (i) the adverse environmental activities or environmental omission, (ii) provide details of those activities and omissions, (iii) activities carried out to rectify or remedy that omission, (iv) details of reporting to the Engineer (refer to Article 1.17.4 of these Specifications).

1.17.1.2 Related Work Specified Elsewhere

- | | |
|---|--------------------|
| (a) General Conditions of Contract | : relevant Clauses |
| (b) Mobilization | : Section 1.2 |
| (c) Field Offices and Facilities | : Section 1.3 |
| (d) Transportation and Handling | : Section 1.5 |
| (e) Traffic Management and Safety | : Section 1.8 |
| (f) Materials and Storage | : Section 1.11 |
| (g) Cleaning | : Section 1.16 |
| (h) Relocation of Existing Utilities and Services | : Section 1.19 |
| (i) Ditches and Waterways | : Section 2.1 |
| (j) Culverts and Concrete Drains | : Section 2.3 |
| (k) Excavation | : Section 3.1 |
| (l) Fill | : Section 3.2 |
| (m) Pavement Widening | : Section 4.1 |
| (n) Aggregate Base | : Section 5.1 |



- (o) Unsealed Road Base : Section 5.2
- (p) Prime Coat and Tack Coat : Section 6.1
- (q) Hot Asphaltic Mixtures : Section 6.3
- (r) Reinstatement of Existing Shoulders on Sealed Roads : Section 8.2
- (s) Landscaping : Section 8.3
- (t) Road Furniture and Traffic Control Devices : Section 8.4
- (u) Reinstatement of Existing Bridge Structures : Section 8.5
Routine Maintenance of Pavement, Shoulder,
- (v) Drainage, Road Furniture and Bridges : Section 10.1
- (w) Relevant Articles concerning the Environmental Aspects for each Section of these Specifications.

1.17.2 ENVIRONMENTAL MANAGEMENT

1.17.2.1 Impacts on Water Resources

- (a) The Contractor shall ensure that polluting effluent from all of the Contractor's activities shall not exceed the values stated in the prescribed applicable Laws.
- (b) Natural streams or channels within or adjacent to the works of this Contract shall not be disturbed without the approval of the Engineer.
- (c) If any excavation or dredging in the stream bed that is unavoidable for the proper execution of the works, the Contractor shall, after the works are constructed, backfill all such excavations to the original ground surface or stream bed with material approved by the Engineer.
- (d) Material deposited within the stream area from foundation or other excavations, or from the placing of cofferdams, shall be removed completely following construction.
- (e) Waterways shall be relocated to ensure unrestricted flow past the works at all usual levels of flood, where embankment stabilization or other permanent works will unavoidably block, or partially block, any existing waterway.
- (f) All excavation shall be maintained free of water and the Contractor shall provide all necessary materials, equipment and labor for diverting waterways and the construction of temporary drains, cut off walls and cofferdams.
- (g) Excavation for borrow materials shall be prohibited or restricted where they might interfere with all drainage channels.
- (h) Any damaging liquid or solid contaminant, such as hydraulic or lubricating oils, dropped or spilled upon any portion of the site work and adjacent environment, base camp, or haul route shall be cleaned up immediately by the Contractor in order to avoid contamination of water and soil. The Engineer must approve the completion of the clean up.
- (i) Adequate means of trapping silt at the mixing plants shall be provided through temporary systems discharging into permanent drainage systems.



- (j) Washing of contractor's vehicles and equipment shall only be permitted in specially designated and equipped areas and shall not be permitted in any existing water courses.

1.17.2.2 Impacts on Air Quality

- (a) The Contractor shall ensure that emissions from all the Contractor's activities including transportation activities are kept to an absolute minimum through of modern equipment and through good management and maintenance, and any emissions shall not exceed the values stated in the applicable Laws.
- (b) The asphalt mixing plant, stone crusher and any other static construction equipment shall be installed in area as distant as possible from housing and other sensitive areas to ensure minimal disturbance and complaint from any member of the local community. The location shall be approved by the Engineer.
- (c) The asphalt mixing plant (AMP) shall be provided with a complete dust collector, i.e. dry cyclone and wet cyclone or filter tube system to ensure no air pollution in the atmosphere. If either of these systems is damaged or not functioning the equipment shall not be operated.
- (d) Trucks shall be sealed and all covers shall be securely fastened.
- (e) The Contractor shall maintain at the work site adequate supplies of water for moisture control during all placing and compacting operations, and shall also remove excess material from all existing roadways.

1.17.2.3 Impacts on the Noise Environment

The Contractor shall take all necessary precautions to minimize the amount of noise and vibrations coming from construction and transportation activities, by all vehicles and equipment, through the use of modern vehicles and equipment and through good management and maintenance. The contractor shall ensure that all noise and vibration levels from all the Contractors Activities are in accordance with the applicable Laws.

1.17.2.4 Impacts on Traffic, Adjoining Properties, and Utilities

- (a) The provision given in Section 1.8, regarding Traffic Management and Safety, shall apply.
- (b) Trenching or other excavation across the roadway shall be carried out using half width construction so that the road is maintained open to traffic at all times.
- (c) The Contractor shall be responsible for all the consequences of traffic and shall prohibit such traffic when necessary by the provision of a detour or by half width construction.
- (d) All the works shall be carried out with the least inconvenience to traffic and at least one traffic lane must be kept open at all times.
- (e) At all times during the performance of the Works, the Contractor shall ensure that the pavement, shoulders and adjacent areas within the right-of-way shall be maintained free of construction material, debris or other such loose objects that may obstruct or endanger the free and safe passage of traffic. The Works shall also be maintained free of any unauthorized parking or street trading activity except in areas designated for such purposes.
- (f) The Contractor shall be responsible for obtaining any existing information on the existence and location of existing underground utilities and for obtaining and paying for any necessary permits or other authorization for their diversion or temporary cessation.



- (g) The Contractor shall be responsible for the care and protection of any existing serviceable underground piping, cables, conduit, or other subsurface lines or structures that may be encountered and for repairing any damage caused to them by his operations.
- (h) All potholes in sealed pavements and holes in the finished Work made by density testing or otherwise shall be reinstated as soon as possible after damaged layers have been cut back, in order to avoid obstruction or hazards to traffic.
- (i) At all times during the time for completion the contractor shall retain vehicular and pedestrian access to all houses, commercial, industrial and all other uses. Temporary accesses must be provided where construction will close permanent access for any period of over 6 hours and all affected owners and community members must be notified at least 24 hours in advance of any impact on accesses.

1.17.2.5 Human Health and Safety

- (a) Provisions given in Particular Conditions sub clause 6.7 Health and Safety apply.
- (b) The Contractor shall: (i) comply with all applicable safety regulations; (ii) take care for the safety of all persons entitled to be on the Site; and (iii) provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent land.
- (c) The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel and shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents.
- (d) The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce their danger to health.
- (e) The provisions given in Article 3.1.1.5, regarding Safety of Excavation Works, shall apply.
- (f) All gears, pulleys, chains, sprockets, and other dangerous moving parts of Mixing Plants shall be thoroughly guarded and protected.
- (g) Adequate sanitary waste control facilities shall be provided for all project staff and workers and waste shall be collected regularly and disposed of in accordance with applicable laws.

1.17.2.6 Impact on Flora and Fauna

- (a) The cutting of trees shall be carried out only when absolutely necessary for widening either the carriageway or the shoulders and will be specifically defined and agreed by all parts during the field investigation. Every tree felled should be replaced by two semi mature trees of the same or similar species. No new tree planting should take place within the clear zone.
- (b) The Contractor shall limit the movement of his employees and equipment within the sensitive environmental areas, such as the National Parks, so as to minimize damage to natural vegetation and shall endeavor to avoid any damage to land. Further beneficial cooperation with locally authorized institution shall be undertaken.



1.17.2.7 Impacts on Soil

- (a) The Contractor shall ensure that pollutant discharge from the Contractor's activities shall not exceed the values stated in the prescribed applicable Laws.
- (b) In order to avoid land sliding and erosion during excavation for borrow materials, the edge of a borrow pit shall be not closer than 2 metres from the toe of the embankment or 10 metres from the top of any cutting.

1.17.2.8 Disposal of Waste

The disposal of all solid and liquid waste from construction activities should only take place in approved waste disposal sites or with the express authorization of the Engineer who should consult with the responsible agency to ensure disposal is in accordance with their requirements.

1.17.2.9 Impact on Cultural Heritage

The provisions given in GCC Sub Clause 4.24, regarding fossils, shall apply.

1.17.2.10 Other Matters

- (a) The Contractor must obtain all extracted materials (sand, gravel, etc) from Quarries that are (1) owned or rent, operated and managed in accordance with local and national laws and regulations, and (2) operates in a safe and environmentally acceptable manner and in accordance with this section.
- (b) The contractor must ensure that the Base Camp is operated in accordance with good environmental practice and that adverse environmental impacts are kept to an absolute minimum and in accordance with this section, and that the local community is not disturbed by any of the activities of the Base Camp.
- (c) In compliance with sustainable development practice, all timber materials for sheet piles, bearing piles, and mini timber piles, shall be purchased from a certified dealer (not from illegal logging) and a certificate of its legal nature be attached to the purchase document for submission to the Engineer.
- (d) All parts of the Site must be reinstated to its original condition prior to the commencement date of works.

1.17.3 **IMPLEMENTATION OF REQUIRED ENVIRONMENTAL STUDIES**

For any Subproject which has an Environment Management Plan/Environment Monitoring Plan or Environment Impact Assessment, **in accordance with the Government of Indonesia's environmental laws**, the Contractor must comply with any recommendations within the document for the time for completion. All of the time for completion recommendations will be included in Part 2 of the Contract Document and those recommendations NOT included in the Environmental Safeguards will be required to be implemented, on advice from the Engineer. The full Environment Management Plan/Environment Monitoring Plan or Environment Impact Assessment document will also be made available to the Contractor and Engineer for information purposes.



1.17.4 MONTHLY REPORT

1.17.4.1 Submittal

A monthly report of Environmental Impact Monitoring and Management is required to be submitted for each calendar month of the Time for Completion, as part of the Monthly Progress Report.

The Contractor shall be fully responsible for preparation and submission of each Monthly Report of Environmental Impact Monitoring and Management which shall conform to the following:

- (a) The Monthly Report of Environmental Impact Monitoring and Management shall be prepared in the recommended format as shown below.
- (b) The Monthly Report of Environmental Impact Monitoring and Management shall be supported by sufficient supporting documentation to make the submission complete and fully substantiated, in order that the Engineer may certify the application for payment within the time restraints of relevant Clauses of the General Conditions of Contract and these Specifications.
- (c) The Monthly Report of Environmental Impact Monitoring and Management together with its supporting documentation shall be submitted to the Engineer according to the timing specified hereunder.

The Engineer will be responsible for validating the accuracy of the report.

1.17.4.2 Timing

Each Monthly Report of Environmental Monitoring and Management Report shall be dated on the last day of the calendar month collectively with the Monthly Statement as stipulated in Article 1.6.2.1.

1.17.5 BASIS FOR PAYMENT

No separate payment shall be made for environmental management operations executed in accordance with this Section of these Specifications except for Article 1.17.2.6.(a) where payments will be made. The cost of this work shall be included in the Unit Price of all other Pay Items included in the Contract, which prices shall be deemed full compensation for furnishing all materials, labour, equipment, tools and other incidental necessary for the environmental management.

If the Contractor fails in the performance of this work, the Engineer, without relieving the contractor of his responsibility, shall be entitled to carry out such work as he deems to be necessary and to charge the Contractor with the full cost of rectification thereof plus ten percent of such cost, which sum shall be deducted from any money due or which may become due to the Contractor under the Contract. The Engineer will be responsible for defining the works to rectify the issue and preparing a cost estimate.



**ENVIRONMENTAL IMPACT MONITORING AND MANAGEMENT
 DURING THE CONSTRUCTION PHASE**

No. of Section : _____ Date Ref. No. : _____
 Name of Section : _____

Type of Activities	Activities		Type of Impact	Category of Impact Level			Management Efforts	Contract Specification VI.2	Observation		Obstacles / Problems
	Exist	None		Significant	Moderate	Minor			Observed (Y/N)	Compliant (Y/N)	
Mobilization of materials and equipment			Increased o Obstruction of traffic and nuisance to road users on the overall haul route and adjacent work site and work zone. o Damage of existing roads and bridges of haul route. o Air pollution during to transport of materials. o Dust due to exposed surfaces and materials o Noise and vibration at the locations adjacent to the project. o Risks to road users.	√	√	√	<ul style="list-style-type: none"> Prepare a Traffic Management and Safety Plan (TMSP) as a basic guidance for applying the traffic management during the work construction. Prepare detail maps of haul route and get approval from relevant institution in Kabupaten and conduct regular coordination between various local traffic authorities. Limit the axle load along all designated route and obtain permits to carry loads greater than the specific limits of existing road and bridges. A qualified Traffic Management and Safety Coordinator (TMSC) that employed by the Contractor shall be control the obedience of all transporters to fulfill the provision of limit allowed axle loads of vehicles transporting materials, routinely inspect the condition and effectiveness of traffic control devices and other traffic management and safety related issues. Use an Escort Vehicle when entering or exiting the work area to the highway/expressway opened to traffic, executed safely so as to minimize risk for the workers and the 	1.8.2.1 1.5.2.1 / 1.8.2.4/5 1.5.2.1 1.8.2.7 1.8.2.9			



Type of Activities	Activities		Type of Impact	Category of Impact Level			Management Efforts	Contract Specification V1.2	Observation		Obstacles / Problems
	Exist	None		Significant	Moderate	Minor			Observed (Y/N)	Compliant (Y/N)	
							road users. <ul style="list-style-type: none"> Install flashing arrow signs, portable flashing beacon, traffic controls devices, traffic barrier, temporary pavement markings, detachable fences, and other traffic control devices and services for the control and protection of traffic through areas of construction. Construct and maintain temporary bridges and traffic ramps for public access to the road at all points vehicles access was available before the commencement of works. All traffic control and temporary road works shall maintain in safe and serviceable condition. The pavement, shoulders and adjacent areas within the ROW shall be maintained free of construction materials, debris or other such loose objects that may obstruct or endanger the free and safe of traffic. All Contractor's activities including vehicles exhaust emission shall not exceed the standards quality or values stated in the applicable law /regulation. Trucks shall be sealed and all covers shall be securely fastened. To be carried out routine maintenance works to ensure that the pavement, shoulders, drainage, road furniture and bridges are maintained at all times in a serviceable condition. Areas of requiring routine maintenance shall be designated by the Engineer. Other management efforts (Please list): 	1.8.3			
							<ul style="list-style-type: none"> Construct and maintain temporary bridges and traffic ramps for public access to the road at all points vehicles access was available before the commencement of works. 	1.8.4.5			
							<ul style="list-style-type: none"> All traffic control and temporary road works shall maintain in safe and serviceable condition. 	1.8.5.1			
							<ul style="list-style-type: none"> The pavement, shoulders and adjacent areas within the ROW shall be maintained free of construction materials, debris or other such loose objects that may obstruct or endanger the free and safe of traffic. 	1.8.5.2			
							<ul style="list-style-type: none"> All Contractor's activities including vehicles exhaust emission shall not exceed the standards quality or values stated in the applicable law /regulation. 	1.17.2.2.(a)			
							<ul style="list-style-type: none"> Trucks shall be sealed and all covers shall be securely fastened. 	1.17.2.2.(d)			
							<ul style="list-style-type: none"> To be carried out routine maintenance works to ensure that the pavement, shoulders, drainage, road furniture and bridges are maintained at all times in a serviceable condition. Areas of requiring routine maintenance shall be designated by the Engineer. Other management efforts (Please list): 	10.1.1			



Type of Activities	Activities		Type of Impact	Category of Impact Level			Management Efforts	Contract Specification VI.2	Observation		Obstacles / Problems
	Exist	None		Significant	Moderate	Minor			Observed (Y/N)	Compliant (Y/N)	
Mobilization of Manpower			Possible: Social restlessness and misperceptions Social conflict due to the "new comers" Social jealousy	√	√		<ul style="list-style-type: none"> Providing adequate information and consult with local communities to improve their project understanding and participation. Prioritize project-affected people to be employed if possible and as qualified for the work. Coordinate with local officials to ensure safe site conditions. Other management efforts (Please list): 				
Construction and operation of base camp and AMP			Visual and aesthetic impact Improper storage / disposal of liquid and solid wastes Increase in air pollution / dust Increase in noise Water surface pollution resulting from improper disposal of wastes (such as oil, cement, and asphalt). Impact on human health and safety				<ul style="list-style-type: none"> Place offices and facilities (ware house, workshops) shall be located in location as approved by the Engineer and far enough from residential areas to ensure no disturbance and complaint from local people. The asphalt mixing plant shall be installed in an area which is far from residential areas and approved by the Engineer to ensure no disturbance and complaints from local people. Execute regular cleaning to ensure that the site works, structures, temporary offices and accommodation quarters, are maintained free from accumulations of waste materials, rubbish, and other debris resulting from the site work operations and maintain the site in a neat and orderly condition at all times. Provide on-site drum containers for the collection of waste materials, debris and rubbish awaiting removal from site. Dispose of waste material, debris and rubbish at designated dumping 	1.3.1.3 (b) and 1.17.2.2 (c) 6.3.4.1 1.16.2.1 1.16.2.6 1.16.2.7			



Type of Activities	Activities		Type of Impact	Category of Impact Level			Management Efforts	Contract Specification VI.2	Observation		Obstacles / Problems
	Exist	None		Significant	Moderate	Minor			Observed (Y/N)	Compliant (Y/N)	
							areas and in accordance with National and Provincial ordinances and anti-pollution laws. <ul style="list-style-type: none"> Do not bury rubbish and waste materials on the project site without the approval of the Engineer. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinners in storm or sanitary drains. Do not dispose of wastes into streams or waterways. Ensure that effluent from all of the Contractor's activities shall not exceed the values stated in the prescribed by applicable Laws. Any damaging liquid or solid contaminant, such as hydraulic or lubricating oils, dropped or spilled upon any portion of the site work and adjacent environment, base camp, or haul route shall be cleaned up immediately by the Contractor in order to avoid contamination of water and soil. Adequate means of trapping silt at the mixing plants shall be provided through temporary systems discharging into permanent drainage systems. Washing of contractor's vehicles and equipment shall only be permitted in specially designated and equipped areas and shall not be permitted in any existing water courses. The asphalt mixing plant shall be installed in area which is far enough from residential areas to ensure no disturbance and complaint from the local people, and location shall be approved by the Engineer. 	1.16.2.8 1.16.2.9 1.16.2.10 1.17.2.1.(a) 1.17.2.1.(h) 1.17.2.1.(i) 1.17.2.1.(j) 1.17.2.2.(b)			



Type of Activities	Activities		Type of Impact	Category of Impact Level			Management Efforts	Contract Specification VI.2	Observation		Obstacles / Problems
	Exist	None		Significant	Moderate	Minor			Observed (Y/N)	Compliant (Y/N)	
							<ul style="list-style-type: none"> Mining Plants shall be thoroughly guarded and protected. The Contractor shall provide adequate fire fighting equipment in all camps, offices, stores and workshop areas. The contractor must ensure that the Base Camp is operated in accordance with good environmental practice and that adverse environmental impacts are kept to an absolute minimum and in accordance with this section, and that the local community is not disturbed by any activities of the Base Camp. Other management efforts (Please list): 	1.3.1.2.(j) 1.17.2.10.(b)			
Materials Storage			Increased in air pollution / dust Water course / drainage obstruction Roadway or access obstruction Disposal of excess materials		√ √	√ √	<ul style="list-style-type: none"> Maximum height of material stockpiles should be 5 meters. Natural streams or channels within or adjacent to the location of materials storage shall not be disturbed without the approval of the Engineer. Maintain the material storage site adequate supplies of water for moisture control during all placing operation. Ensure that the pavement, shoulders and adjacent areas within the right-of-way shall be maintained free of construction material, debris or other such loose objects that may obstruct or endanger the free and safe passage of traffic. Other management efforts (Please list): 	1.11.3.3.(h) 1.17.2.1.(b) 1.17.2.2.(e) 1.17.2.4.(f)			
Drainage Works (including			Impairment of existing drainage Change of water surface	√ √			<ul style="list-style-type: none"> Restoration or preservation of existing streams, irrigation canals or other waterways which unavoidably must 	2.11.1.(h)			



Type of Activities	Activities		Type of Impact	Category of Impact Level			Management Efforts	Contract Specification V1.2	Observation		Obstacles / Problems
	Exist	None		Significant	Moderate	Minor			Observed (Y/N)	Compliant (Y/N)	
							the road is maintained open to traffic at all times. • All excavation shall be maintained free of water and the Contractor shall provide all necessary materials, equipment and labor for diverting waterways and the construction of temporary drains, cut off walls and cofferdams • When Work is being carried out in existing drains or other areas where seepage water or soil may be polluted, the Contractor shall at all times maintain at the actual site of work a supply of water of potable quality for use by the workmen for washing, together with an adequate supply of soap and disinfectant. • Obtain any existing information on the existence and location of existing underground utilities and for obtaining and paying for any necessary permits or other authorization to carry out the excavations required by the Contract. • Care and protection of any still serviceable underground piping, cables, conduit, or other subsurface lines or structures that may be encountered and for repairing any damage caused to them by his operations. • Any excavated materials temporarily allowed to be placed within a waterway shall be disposed of finally in such a manner as not to obstruct the waterway. • All necessary measures shall be taken during and immediately after	1.17.2.1.(f); 3.1.1.7.(a); and 3.1.2.7 3.1.1.7.(b) 1.17.2.4.(g) / 3.1.1.9.(a) 1.17.2.4.(g) / 3.1.1.9.(b) 3.1.1.12.(c) 3.1.2.4.(b)			



Type of Activities	Activities		Type of Impact	Category of Impact Level			Management Efforts	Contract Specification VI.2	Observation		Obstacles / Problems
	Exist	None		Significant	Moderate	Minor			Observed (Y/N)	Compliant (Y/N)	
							completion of the excavation, to prevent damage of the cut face. Such measures may include provision of catch drains, down slope drains, sodding or other measures. <ul style="list-style-type: none"> All cut faces shall be cleaned of any loose material that might become a hazard after completion of the work. Pits shall be prohibited or restricted where they might interfere with the nature or designed drainage; all borrow pits shall be so graded and drained as to control all surface water without ponding. Maintain at the work site adequate supplies of water for moisture control during all placing and compacting operations, and shall also remove excess material from all existing roadways. In order to avoid land sliding and erosion during excavation for borrow materials, the edge of a borrow pit shall be not closer than 2 meters from the toe of the embankment or 10 meters from the top of any cutting. The cutting of trees shall be carried out only when absolutely necessary for widening either the carriageway or the shoulders and will be specifically defined and agreed by all parties during the field investigation. Every tree felled should be replaced by two semi mature trees of the same or similar species. No new tree planning should take place within the clear zone. In compliance with sustainable development practice, all timber 	3.1.2.4.(d) 3.1.2.8.(d) & (e) 1.17.2.2.(e) 1.17.2.7 1.17.2.6 (a) 1.17.2.10 (c)			



Type of Activities	Activities		Type of Impact	Category of Impact Level			Management Efforts	Contract Specification VI.2	Observation		Obstacles / Problems
	Exist	None		Significant	Moderate	Minor			Observed (Y/N)	Compliant (Y/N)	
							<p>materials for sheet piles, bearing piles, and mini timber piles, shall be purchased from a certified dealer (not from illegal logging) and a certificate of its legal nature be attached to the purchase document for submission to the engineer.</p> <ul style="list-style-type: none"> The Contractor shall be responsible for the care and protection of any existing serviceable underground piping, cables, conduit, or other subsurface lines or structures that may be encountered and for repairing any damage caused to them by his operations. Keep all noise and vibration levels from all the Contractors Activities are in accordance with the applicable Laws. (Refer specifically to Decree of Minister of Environment No 48 Year 1996 regarding Noise Level Standard and Decree of Minister of Environment No 49 year 1996 regarding Level of Vibration. Other management efforts (Please list): 	1.17.2.4.(g)			
Pavement Widening and shoulders; Road and Bridge Asphalt Pavement;			Obstruct traffic safety and smoothness Soil pollution Loss of vegetation and roadside trees / landscape Air pollution Noise Increase in traffic accidents Damage to haul route alternative roads used as detours	√		√	<ul style="list-style-type: none"> All temporary road works and traffic control installations provided by the Contractor on adjacent or feeder roads to the site of works shall at all times during the Contract Period be maintained in a safe and serviceable condition to the requirements and satisfaction of the Engineer, to ensure the safety of other traffic and of the public using the road. The Contractor shall be responsible for all the consequences of traffic being admitted to the newly constructed shoulders and shall 	10.2.3.1			



Type of Activities	Activities		Type of Impact	Category of Impact Level			Management Efforts	Contract Specification VI.2	Observation		Obstacles / Problems
	Exist	None		Significant	Moderate	Minor			Observed (Y/N)	Compliant (Y/N)	
							prohibit such traffic when necessary by the provision of a detour or by half width construction. <ul style="list-style-type: none"> All potholes in sealed pavements and holes in the finished Work made by density testing or otherwise shall be reinstated as soon as possible after damaged layers have been cut back, in order to avoid hazards to traffic. Any damaging liquid or solid contaminant, such as hydraulic or lubricating oils, dropped or spilled upon any portion of the site work and adjacent environment, base camp, or haul route shall be cleaned up immediately by the Contractor in order to avoid contamination of water and soil. The Engineer must approve the completion of the clean up. The disposal of all solid and liquid waste from construction activities should only take place in approved waste disposal sites or with the approval of the Engineer who should consult with the responsible agency to ensure disposal is in accordance with their requirements. Maintain at the work site adequate supplies of water for moisture control during all placing and compacting operations, and shall also remove excess material from all existing roadways. Moisture content within the range specified in Article 5.1.3.3 of General Specifications. Emission from all the Contractor's activities including vehicles and any of equipments shall not exceed the values stated in the applicable laws. 	1.17.2.4 (h) 1.17.2.1.(h) and 6.3.6.4.(k) 1.17.2.8 1.17.2.2.(e) and 5.1.3.2 1.17.2.2.(a)			



Type of Activities	Activities		Type of Impact	Category of Impact Level			Management Efforts	Contract Specification VI.2	Observation		Obstacles / Problems
	Exist	None		Significant	Moderate	Minor			Observed (Y/N)	Compliant (Y/N)	
							<ul style="list-style-type: none"> Other management efforts (Please list): 				
Quarries			Decrease in slope stability and cover. Loss of vegetative cover. Visual / aesthetic impacts. Increase in sedimentation. Increased river erosion. River ecosystem impacts. Disruption of river flow patterns and/or capacity.	✓ ✓ ✓	 ✓ ✓		<ul style="list-style-type: none"> All borrow pits or quarries used by the Contractor shall be left in a trim and tidy condition with stable sides and slopes, and adequate drainage and waterways. Excavation for borrow materials shall be prohibited or restricted where they might interfere with the natural or designed drainage. In order to avoid land sliding and erosion during excavation for borrow materials, the edge of a borrow pit shall be not closer than 2 meters from the toe of the embankment or 10 meters from the top of any cutting. <ul style="list-style-type: none"> The contractor must obtain all extracted materials (sand, gravel, etc) from Quarries that are (1): owned or rent, operated and managed in accordance with local and national laws and regulations, and (2) operates in a safe and environmentally acceptable manner and in accordance with this section. For the excavation of more than 5 meters depth, the terraces shall be implemented with minimum terrace width of 1 meter or accordance to the range value provided by Local Government. Other management efforts. (Please list): 	3.1.1.12.(d) 1.17.2.1.(g) 1.17.2.7 1.17.2.10 (a) 3.1.1.5			
Blasting for Materials			Sound resulted from explosions. Dust due to explosion. Blockage of access roads. Decrease and disrupt visual		✓	✓ ✓	<ul style="list-style-type: none"> Explosives required for rock excavation shall be stored, handled, and used with the utmost caution and strictly in accordance with the statutory government regulations. 	3.1.1.5.(f)			



Type of Activities	Activities		Type of Impact	Category of Impact Level			Management Efforts	Contract Specification VI.2	Observation		Obstacles / Problems
	Exist	None		Significant	Moderate	Minor			Observed (Y/N)	Compliant (Y/N)	
							<ul style="list-style-type: none"> All noise and vibration levels from all the Contractors Activities are in accordance with the applicable Laws. (Refer specifically to Decree of Minister of Environment No.48 Year 1996 regarding Noise Level Standard and Decree of Minister of Environment No 49 year 1996 regarding Level of Vibration). Other management efforts. (Please list): 	1.17.2.3			
Structures Works			<ul style="list-style-type: none"> Accidents involving laborers or other people. Disrupt traffic conditions adjacent road/access. Increase in sedimentation Noise and vibration from heavy equipment. 		√	√	<ul style="list-style-type: none"> All temporary road works and traffic control installations provided by the Contractor on adjacent or feeder roads to the site of works shall at all times during the Contract Period be maintained in a safe and serviceable condition to the requirements and satisfaction of the Engineer, to ensure the safety of other traffic and of the public using the road. All management efforts for the activity of mobilization of materials and equipments should apply. Other management efforts (Please describe) 	10.2.3.1			

Seen By,

Approved By,

Prepared By,

Date/Month/Year

Engineer

Date/Month/Year

Supervising Engineer

Date/Month/Year

General Superintendent



SECTION 1.18 TEST DRILLING

1.18.1 GENERAL

This work shall consist of test drilling for the investigation of sites on which any structure foundation is to be provided.

1.18.2 TEST BORES

1.18.2.1 General

When testing is required the Contractor shall take several test bores at each bridge site to establish the exact soil profile or as otherwise directed by the Engineer. Locations shall be agreed with the Engineer but shall generally be in the position of proposed abutments and piers. Where rock is outcropping on the surface the Engineer may dispense with test bores.

1.18.2.2 Depth of Bores

The test bores shall be taken down to the bearing stratum and into it sufficiently to prove its continuity. Generally this shall be five meters. When bearing stratum has not been reached within 30 metres of the surface, the test bore may be stopped after the approval of the Engineer.

1.18.2.3 Method of Boring

The Contractor may use rotary wash drilling. Bed rock shall be continuously core drilled.

1.18.2.4 Test Required on All Holes

Standard penetration test (SPT) and disturb samples (DS) on Drilling Tests shall be taken as directed by the Engineer. SPT and DS shall be taken at two (2) metre intervals or at each change of strata whichever is lesser. The static ground water level shall be recorded for each hole. In rock core drilling the full core samples shall be recovered and stored in core boxes for inspection by the Engineer. Dutch Cone Penetration Test (Dutch CPT) shall measure the cone resistance and friction at 0.2 m intervals until a maximum cone resistance of 250 kg/cm² is reached or the depth is 30 meters.

1.18.2.5 Logging of the Bores

If so requested by the Engineer, the Contractor shall supply on the working day following completion of the bore the following information:

- (a) Structure name
- (b) Bore position and code number
- (c) Reduced level of top of the bore
- (d) Date and time of boring
- (e) Diameter of bore
- (f) Type of plant used
- (g) Depth to which bore was cased



- (h) Depth to base of each stratum from the surface
- (i) Description of strata
- (j) Depth and results of tests
- (k) Static water level
- (l) Remarks

All descriptions and classifications of soils shall be in accordance with “Procedures for Testing Soils, ASTM” and “Unified Soil Classification System, USCS”.

1.18.2.6 Further Tests that may be Required

The Engineer may call for more elaborate testing than described above at any bridge site if he finds that the information is not adequate.

When instructed by the Engineer, undisturbed core samples shall be taken in cohesive soil strata by using shelby tubes.

The sampling cylinder is to be sealed and used for transport of the core from site to testing laboratory. All laboratory testing shall be the responsibility of the Engineer.

1.18.3 MEASUREMENT AND PAYMENT

1.18.3.1 Measurement

The test drilling shall be measured for payment purposes as lengths of hole drilled no matter what materials are encountered.

1.18.3.2 Basis of Payment

Payment shall be made on the quantities as measured above and at the Contract prices per linear metre for the pay item listed below and shown in the Bill of Quantities. The payment shall include full compensation for all drilling, casing, if necessary, penetration test and split-barrel sampling, recording and presenting the results and storing the samples until their disposal is approved by the Engineer.

Pay Item No.	Description	Unit of Measurement
1.18.1	Boring including UDS, SPT and Report	Linear Meter
1.18.2	Dutch CPT including Report	Per Location Point



SECTION 1.19 RELOCATION OF EXISTING UTILITIES AND SERVICES

1.19.1 DESCRIPTION

This work shall consist of the relocation of existing underground service conduits, cables, lighting, electric power poles, telephone poles and traffic signal poles, together with all associated fittings, as necessary for the proper and smooth execution of the road works, as shown on the Drawings or as directed by the Engineer.

1.19.2 ARRANGEMENTS WITH LOCAL AUTHORITIES

- 1.19.2.1 In this context the term Local Authority shall mean any public utility, supply authority or other authority responsible for public utilities and services.
- 1.19.2.2 In accordance with the Conditions of Contract, the Contractor is responsible for liaising with Local Authorities and Supplying to the Engineer the following :
- (a) Details of the location of all utilities and services which will need to be removed, located or temporarily disrupted to allow the planned road works to proceed.
 - (b) Copies of the relevant Local Authority regulations, codes, standards and specification.
 - (c) Detailed working plans showing the require relocation of utilities and services.
 - (d) Written approval of these plans from each local authority concerned, and
 - (e) Local Authority permits or licenses required.
- 1.19.2.3 The payment of any fees associated with obtaining such permit etc. shall be the responsibility of the Contractor. In all such matters, the Employer shall assist the Contractor to lease with the Local Authorities.
- 1.19.2.4 Any damage to existing utilities and services caused by the Contractor's operations shall be repaired by the Contractor at his expense.

1.19.3 INSPECTION OF WORK ANDRELOCATION OF FACILITIES

- 1.19.3.1 The relocation work, if carried out by the Contractor with the agreement of the Local Authority and the Engineer, shall be subject to inspection and acceptance by both.
- 1.19.3.2 Irrespective of the agency carrying out the work the Contractor shall be responsible for arranging with the respective Local Authorities the necessary formalities for ensuring prompt and satisfactory reconnection of the facilities following completion of the relocation work.



1.19.4 SCHEDULING OF WORK

- 1.19.4.1 The necessary arrangements with Local Authorities, shall be carried out during the Mobilization Period or before, and the Contractor shall submit to the Engineer a programme for the relocation work before the end of Mobilization Period.
- 1.19.4.2 In the event of temporary disruption to existing services becoming necessary during the course of the Contract, the Contractor shall make the necessary arrangements with the Local Authorities, and submit his programme for the work to the Engineer within 30 days of written notice from the Engineer approving the work.
- 1.19.4.3 The late submittal of the said programme, or late initiation of arrangements with the Local Authorities by the Contractor which result in delays to the road and bridge works arising in any way from the performance of the relocation works or the temporary disruption of the existing services, shall not be deemed grounds for granting any extension of time for Time for Completion.

1.19.5 EXECUTION

- 1.19.5.1 In the case where the Engineer directs some or all of the actual relocation work to be carried out by the Contractor, the Contractor shall carry out the work strictly in accordance with these Specifications and in full compliance with the relevant regulations, codes, specifications and other requirements or directions from the Local Authorities concerned.
- 1.19.5.2 The Contractor, shall be responsible for obtaining from the Local Authorities concerned all existing information regarding the location, function and present usage of the utility or service to be moved and shall thoroughly investigate the site conditions before commencing his operation.
- 1.19.5.3 Any damage or subsequent claims caused by these operations arising from ignorance, negligence or carelessness on the part of the Contractor shall be rectified by the Contractor at his own expense.
- 1.19.5.4 Existing services which have to be either temporarily or permanently disconnected, shall be either diverted or correctly and safely shut off under the supervision of the Local Authority, and all salvageable materials shall be carefully cleaned and stored on site for recovery by the owner (either the Local Authority or the Employer, as the case may be).
- 1.19.5.5 Materials with existing surface coatings which are to be re-installed in a new location shall be prepared, as directed by the Engineer and in accordance with Local Authority requirements, with preservatives or rust preventatives and shall then be repainted before re-installation.
- 1.19.5.6 Existing materials which are too badly damaged or decayed to be re-installed in the works shall be disposed of off-site by the Contractor, and replaced by all new materials as directed by the Engineer. If the existing materials are rendered unusable because of damage caused by the Contractor, they shall be repaired or replaced by the Contractor at his own expense unless it is mutually agreed by all parties involved that the damage was unavoidable.
- 1.19.5.7 Holes or other damage caused to the site shall be reinstated by the Contractor as directed by the Engineer and in accordance with the relevant provisions of the Contract Documents.



1.19.6 MEASUREMENT AND PAYMENT

1.19.6.1 Measurement

Separate Pay Items for each of the relevant Local Authority are provided under this section for removal, relocation or disruption of Existing Utilities and Services.

- (a) Measurement for payment under this contract for the portion of the relocation work carried out either by the Local Authority/Utility Company concerned or by the Contractor shall be on a unit basis with the exception of relocated pipe which shall be measured on a linear metre basis. In the event that the relocation is carried out by the Local Authority/Utility Company, the Contractor shall make payment first direct to the Local Authority/Utility Company. Reimbursement shall be carried out whenever the work is complete and accepted by the Engineer.
- (b) Fees for Local Authority permits, copies of relevant regulations, etc. which have been paid for by the Contractor shall not be separately measured for payment.

1.19.6.2 Basis of Payment

The accepted work, measured as provided above, shall be paid for at Contract Price per unit of measurement for the Pay Items listed below and shown on Bill of Quantities, which price and payment shall be full compensation for relocating of the utility concerned to the designed position, and for any part of material or supporting work necessary required, reinstatement of existing pavement areas after completion of relocation, and all other work or costs necessary or usual for the proper completion of the work prescribed in this Section.

Pay Item No.	Description	Unit of Measurement
1.19.1	Relocation of Existing Phone Utility Pole	Each
1.19.2	Relocation of Existing Electric Utility Pole – Low Voltage	Each
1.19.3	Relocation of Existing Electric Utility Pole – Medium Voltage	Each
1.19.4	Relocation of Existing Gas Utility Pipe. Diameter () m	Linear Meter
1.19.5	Relocation of Existing Traffic Light Utility	Unit
1.19.6	Relocation of Existing Traffic Sign Pole	Each
1.19.7	Relocation of Existing Electrical Panel	Each
1.19.8	Relocation of Existing Road Lighting Pole	Each