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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 roadworks 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 competed 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 Pre-construction Meeting (PCM). Within 14 days of the Contract Agreement being signed, the Employer shall invite the Contractor, Engineer, an Engineer's Assistants (if any), and the other related parties as necessary to attend a pre-construction meeting to discuss both technical and non technical matters relating the Works. 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) Contractor's Work Plan, includes:
  (i) Outline Construction Schedule indicating the timing and sequence of the principal activities comprising the Works
  (ii) Mobilization Plan
  (iii) Public Utilities Relocation Plan
  (iv) Health and Safety Plan
  (v) Quality Control Plan
  (vi) Traffic Management and Safety Plan
  (vii) Environment Management Plan
(i) Engineer's Quality Assurance Plan
(j) Employer's Audit Plan
(k) Communication and correspondence
(l) Coordination meetings, schedule and frequency
(m) 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 programme (including bridge strengthening programme, 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 Programme 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. The Contractor shall show that the location of contractor's base camp meets all requirements given in Section 1.17, Environmental Safeguards.

(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 programme 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

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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 National and Provincial regulations.

(b) Offices and facilities shall be located in accordance with the general location and site plans approved as part of the Mobilization Programme 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 in a separate Contract.

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 and coordination of the Quality Control Manager and under 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.

All surveys, tests, technical audits, etc shall use GPS instruments for their exact coordinates (latitude-longitude).

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 inspection and testing: A master schedule of all items to be inspected and tested shall be prepared. In accordance 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

1.4.2 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 Programme. 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	**SOIL TESTING**	
1.1	**Compaction Test:**	
	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 Laboratory CBR:

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 Specific Gravity:

Pycnometer bottles of 100 cc capacity	3
Porcelain mortar and pestle	1
Hot plate, 1000 watts, 220 volts 50 cycle	1

1.4 Atterberg Limits:

Standard liquid limit device	1
ASTM grooving tool	1
Evaporating dish	3
Flexible spatula	2
100 cm graduated cylinder	2
Casagrande grooving tool	1
Plastic limit glass plate	1

1.5 Grain Size Analysis:

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 Field Density Test, Sand Cone Method:

Sand cone	1
Replacement jug	1
Field density plate	1
Spoon	1
Steel chisel, 1 inch	1
Rubber mallet	1
Sand scoop	1
1 gallon field cans	6

1.7 Moisture Content:

Speedy, moisture tester, 26 grams capacity	1
Cans "Speedy" reagent	6

2 BITUMINOUS TESTING

2.1 Marshall Asphalt Test:

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 extractor	1
Stainless steel mixing bowls	2

2.2 Extraction Test, Centrifuge Method :

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 Extraction Test, Reflux Method:

Reflux extractor set, 1000 gram capacity	1
Boxes filter paper (50 - box)	1

2.4 Specific Gravity of Coarse Aggregates:

Density Basket	1
Sample Splitter 1"	1
Sample Splitter 1/2"	1

2.5 Specific Gravity of Fine Aggregates :

Cone	1
Tamper	1
Pycnometer	1
Thermometer (Glass), 0 - 150 ^{0} C	3
Desiccator	1

2.6 Mix Air Voids Content, (Accurate Method):

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 Core Drilling:

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 ^{0} Metal Thermometer	1
0 - 250 ^{0} Metal Thermometer	1

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, 10 kVA	1
Double wall oven, 1600 W 240 volt 50 cycle	2
Plastic funnels	3
Sodium hexametaphosphate	1 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

4 OTHERS

Hand held GPS sub-metre accuracy	4

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.

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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 ensure that all contractors vehicles meet the axle load legal limit, and 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 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) PPN/VAT (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.

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SECTION 1.7
PROVISIONAL SUM

1.7.1 GENERAL

The only Provisional Sum which is included in this Contract is to cover the costs of the Dispute Board identified in Clause 20 of the General Conditions.

1.7.1.1 Description

As stated in the Sub Clause 20.2 of the General Conditions, the terms of remuneration of either the sole member or each of the three members of the Dispute Board (DB), including the remuneration of any expert whom the D B consults, shall be mutually agreed upon by the Parties when agreeing the terms of the appointment. This will not include a retainer fee for the members of the DB. Each party shall be responsible for paying one half of the total remuneration.

1.7.2 PAYMENT

As indicated above, the costs associated with the Dispute Board are to be shared equally between the Employer and the Contractor. The Provisional Sum included in the Bill of Quantities has been included to cover the costs for the Employer's contribution to the costs of the DB. The Contractor's contribution to the remaining half of the remuneration of the DB is to be included in his overall overhead costs for the project and not as a separate bid item.

Pay Item No.	Description	Unit of Measurement
1.7	Employer's Share of Dispute Board Costs	Lump Sum

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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 Directorate General of Highways.

(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 road user's, Contractor's, Employer's and Engineer's 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 of 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 makings 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 galvanize iron sheet shall be Gauge 26 (0.48 mm thick) painted with green color, conforming to the requirement of Item 411, Plaint and tied to the pipe framing by tie wire.

Post anchorage is either though 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 traffic control devices and services for the control and protection of traffic through areas of construction of the different subcomponent as shown in the Drawings.

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 ….. 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**

1.8.2.10 Special events and holidays

Table 1.8.A.3

EVENTS	**DATE**	**SPECIFIC CONSTRAINT**
"Ramadhan" for example		*No closure allowed after sunset*

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, kilometre 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 kilometre 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 kilometre 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 equivalences shall apply:

EQUIVALENCES BETWEEN AASHTO AND INDONESIAN SPECIFICATIONS

AASHTO	INDONESIAN SPECIFICATIONS	TITLE
AASHTO T11-05	SNI 03-4142-1996	Metode Pengujian Jumlah Bahan Dalam Agregat Yang Lolos Saringan No.200 (0,075 mm).
AASHTO T21-05	SNI 03-2816-1992	Metode Pengujian Kotoran Organik Dalam Pasir Untuk Campuran Mortar dan Beton.
AASHTO T22-07	SNI 03-1974-1990	Metode Pengujian Kuat Tekan Beton
AASHTO T23-04	SNI 03-4810-1998	Metode Pembuatan dan Perawatan Benda Uji Beton di Lapangan.
AASHTO T27-06	SNI 03-1968-1990	Metode Pengujian Tentang Analisa Saringan Agregat Halus dan Kasar.
AASHTO T48-06	SNI 06-2433-1991	Metode Pengujian Titik Nyala dan Titik Bakar Dengan Cleveland Open Cup.
AASHTO T49-07	SNI 06-2456-1991	Cara Uji Penetrasi Aspal.
AASHTO T51-06	SNI 06-2432-1991	Metode Pengujian Daktilitas Bahan-bahan Aspal.
AASHTO T53-06	SNI 06-2434-1991	Cara Uji Titik Lembek Aspal dengan Alat Cincin dan Bola (Ring and Ball).
AASHTO T55-02 (2006)	SNI 06-2490-1991	Cara Uji Kadar Air dalam Produk Minyak dan Bahan Mengandung Aspal dengan Cara Penyulingan.
AASHTO T78-05	SNI 06-2488-1991	Metode Pengujian Fraksi Aspal Cair Dengan Cara Penyulingan.
AASHTO T84-00 (2004)	SNI 03-1970-1990	Cara Uji Berat Jenis dan Penyerapan Agregat Kasar.
AASHTO T85-891 (2004)	SNI 03-1969-1990	Cara Uji Berat Jenis dan Penyerapan Air Agregat Halus.
AASHTO T87-86 (2004)	SNI 03-1975-1990	Metode Mempersiapkan Contoh Tanah dan Tanah Mengandung Agregat.
AASHTO T88-00 (2004)	SNI 03-3423-1994	Cara Uji Analisis Ukuran Butir Tanah.

AASHTO	INDONESIAN SPECIFICATIONS	TITLE
AASHTO T89-02	SNI 03-1967-1990	Cara Uji Penentuan Batas Cair untuk Tanah.
AASHTO T90-00 (2004)	SNI 03-1966-1990	Cara Uji Penentuan Batas Plastis dan Indeks Plastisitas Tanah.
AASHTO T96-02 (2006)	SNI 03-2417-1991	Cara Uji Keausan Agregat dengan Mesin Abrasi Los Angeles.
AASHTO T99-01 (2004)	SNI 03-1742-1989	Cara Uji Kepadatan Ringan untuk Tanah.
AASHTO T104-99 (2003)	SNI 03-3407-1994	Cara Uji Sifat Kekekalan Agregat dengan Cara Perendaman Menggunakan Larutan Natrium Sulfat atau Magnesium Sulfat.
AASHTO T106M/ T106-07	SNI 03-6825-2002	Metode Pengujian Kekuatan Tekan Mortar Semen Portland Untuk Pekerjaan Sipil.
AASHTO T112-00 (2004)	SNI 03-4141-1996	Metode Pengujian Gumpalan Lempung dan Butir-butir Mudah Pecah Dalam Agregat.
AASHTO T119-07	SNI 03-1972-1990	Metode Pengujian Slump Beton.
AASHTO T126-90	SNI 03-2493-1991	Metode Pembuatan dan Perawatan Benda Uji Beton Di Laboratorium.
AASHTO T128-86	SNI 15-2530-1991	Metode Pengujian Kehalusan Semen Portland.
AASHTO T129-06	SNI 03-6826-2002	Metode Pengujian Konsistensi Normal Semen Portland Dengan Alat Vicat Untuk Pekerjaan Sipil.
AASHTO T131-06	SNI 03-6827-2002	Metode Pengujian Waktu Ikat Awal Semen Portland Dengan Alat Vicat Untuk Pekerjaan Sipil.
AASHTO T133-98 (2006)	SNI 15-2531-1991	Metode Pengujian Berat Jenis Semen Portland.
AASHTO T134-05	SNI 03-6886-2002	Metode Pengujian Hubungan Antara Kadar Air dan Kepadatan pada Campuran Tanah Semen
AASHTO T135-97 (2005)	SNI 13-6427-2000	Metode Pengujian Uji Basah dan Kering Campuran Tanah Semen Dipadatkan
AASHTO T141-05	SNI 03-2458-1991	Metode Pengujian Pengambilan Contoh Untuk Campuran Beton Segar.
AASHTO T144-86	SNI 03-6412-2000	Metode Pengujian Kadar Semen pada Campuran Segar Semen Tanah.
AASHTO T164 -06	SNI-03-6894-2002	Metode Pengujian Kadar Aspal dan Campuran Beraspal Cara Sentrifius
AASHTO T165-02 (2006)	SNI 03-6753-2002	Cara Uji Ketahanan Campuran Beraspal Terhadap Kerusakan Akibat Rendaman.
AASHTO T166-07	SNI 03-6756-2002	Metode Pengujian untuk Menentukan Tingkat Kepadatan Perkerasan Beraspal.
AASHTO T170-00 (2005)	SNI 03-4797-1998	Metode Pengujian Pemulihan Aspal Dengan Alat Penguap Putar.
AASHTO T176-02	SNI 03-4478-1997	Metode Pengujian Agregat Halus Atau Pasir Yang Mengandung Bahan Plastis Dengan Cara Setara Pasir.
AASHTO T179-05	SNI 06-2440-1991	Metode Pengujian Kehilangan Berat Minyak dan Aspal Dengan Cara A.
AASHTO T180-01 (2004)	SNI 03-1743-1989	Cara Uji Kepadatan Berat untuk Tanah.
AASHTO T182-84	SNI 03-2439-1991	Cara Uji Penyelimutan dan Pengelupasan Pada Campuran

AASHTO	INDONESIAN SPECIFICATIONS	TITLE
(2002)		Agregat-Aspal.
AASHTO T191-02 (2006)	SNI 03-2828-1992	Metode Pengujian Kepadatan Lapangan Dengan Alat Konus Pasir.
AASHTO T193-99 (2003)	SNI 03-1744-1989	Metode Pengujian CBR Laboratorium.
AASHTO T209-05	SNI 03-6893-2002	Metode Pengujian Berat Jenis Maksimum Campuran Beraspal.
AASHTO T228-06	SNI 06-2441-1991	Metode Pengujian Berat Jenis Aspal Padat.
AASHTO T245-97 (2004)	SNI 06-2489-1991	Metode Pengujian Campuran Aspal Dengan Alat Marshall.
AASHTO T255-96 (2004)	SNI 03-1971-1990	Metode Pengujian Kadar Air Agregat.
AASHTO T258-81 (2004)	SNI 03-6795-2002	Metode Pengujian unuk Menentukan Tanah Ekspansif
AASHTO M6-03	SNI 03-6820-2002	Spesifikasi Agregat Halus Untuk Pekerjaan Adukan dan Plesteran Dengan Bahan Dasar Semen.
AASHTO M17-07	SNI 03-6723-2002	Spesifikasi Bahan Pengisi untuk Campuran Aspal.
AASHTO M29-03	SNI 03-6819-2002	Spesifikasi Agregat Halus Untuk Campuran Perkerasan Aspal.
AASHTO M81-92 (2004)	SNI 03-4800-1998	Spesifikasi Aspal Cair Tipe Penguapan Cepat.
AASHTO M82-75 (2004)	SNI 03-4799-1998	Spesifikasi Aspal Cair Tipe Penguapan Sedang.
AASHTO M85-07	SII 0013-81	Semen Portland
AASHTO M145-91 (2004)	SNI 03-6797-2002	Tata Cara Klasifikasi Tanah dan Campuran Tanah Agregat untuk Konstruksi Jalan
AASHTO M179-84 (1990)	SNI 03-6799-2002	Spesifikasi Pipa Saluran Dari Tanah Lempung.
AASHTO M208-01 (2005)	SNI 03-4798-1998	Spesifikasi Aspal Emulsi Kationik.
AASHTO M247-07	SNI 15-4839-1998	Spesifikasi Manik-manik Kaca (Glass Bead) Untuk Marka Jalan
AASHTO M248-91 (2003)	SNI 06-4825-1998	Spesifikasi Campuran Cat Marka Jalan Siap Pakai Warna Putih dan Kuning
AASHTO M249-98 (2003)	SNI 06-4826-1998	Spesifikasi Cat Termoplastik Pemantul Warna Putih dan Warna Kuning Untuk Marka Jalan (Bentuk Padat)
AASHTO M251-06	SNI 03-4816-1998	Spesifikasi Bantalan Karet Untuk Perletakan Jembatan

EQUIVALENCES BETWEEN ASTM AND INDONESIAN SPECIFICATIONS

ASTM	INDONESIAN SPECIFICATIONS	TITLE
ASTM C 1252 – 93 or AASHTO TP-33	SNI 03-6877-2002	Metode Pengujian Kadar Rongga Agregat Halus yang tidak dipadatkan.
ASTM D 1632 - 63	SNI 03-6798-2002	Tata Cara Pembuatan dan Perawatan Benda Uji Kuat Tekan dan Lentur Tanah Semen di Laboratorium.
ASTM D 1633 - 94	SNI 03-6887-2002	Metode Pengujian Kuat Tekan Bebas Tanah Semen.

EQUIVALENCES BETWEEN THE “BS” AND INDONESIAN SPECIFICATIONS

BRITISH STANDARD	INDONESIAN SPECIFICATIONS	TITLE
BS 1924 Test 18	SNI 19-6426-2000	Metoda Pengujian Pengukuran pH Pasta Tanah Semen untuk Stabilisasi.
BSI 1973	SNI 03-2834-2000	Tata Cara Pembuatan Rencana Campuran Beton Normal

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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 metres.

(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.

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SECTION 1.12
CONSTRUCTION SCHEDULES

1.12.1 GENERAL

1.12.1.1 Description

Construction Schedules are required for proper planning, execution and monitoring of the work. They are needed to describe the work activities after the activities in the Mobilization Programme are completed.

1.12.1.2 Specified Elsewhere

(a)	General Conditions of Contract	:	relevant Clauses
(b)	Mobilization	:	Section 1.2
(c)	Field Engineering	:	Section 1.9
(d)	Materials and Storage	:	Section 1.11
(e)	Variations Procedures	:	Section 1.13

1.12.1.3 Submittals

(a) Within 15 days after the Pre Construction Meeting, the Contractor shall prepare, submit and obtain the Engineer's approval of Construction Schedules to the detail specified in Article 1.12.2 showing the sequence in which he proposes to carry out the Works.

(b) By the end of each month the Contractor shall provide the Construction Progress Schedules to accurately depict the actual progress up to the end of the 25th day of that month.

(c) At weekly intervals the Contractor shall submit an Activity Schedule on Monday morning showing the locations of all operations and activities intended to be carried out during the following week.

(d) Sub-Contract Construction Schedules must be submitted separately or be incorporated into the overall Construction Schedule.

1.12.2 DETAILED CONSTRUCTION SCHEDULES

1.12.2.1 Financial Progress Schedules

The Contractor shall provide a financial progress schedule in the form of a horizontal bar chart and overall progress curve with the following characteristics:

(a) Each Pay Item activity or group of related Pay Item activities shall be represented by a separate bar, which shall be formatted according to the sequential order of the respective Work activities.

(b) The horizontal time scale shall be measured on a monthly basis.

(c) Each horizontal bar scale have provision for recording actual progress measured against scheduled progress.

(d) The overall progress curve shall identify the scheduled financial progress at the end of each month against which the actual progress shall be recorded.

(e) The scale and format of the Financial Progress Schedule shall be such as to allow sufficient space for notations, future revisions and updating. An A3 size sheet shall be used.

1.12.2.2 Network Analysis

If required by the Engineer, the Contractor shall provide a Network Analysis giving early and late start dates of each activity to enable critical path schedules to be prepared and provide sub-schedules to define critical items in the construction schedule.

1.12.2.3 Production Schedule for the Asphalt Plant and Equipment

The Contractor shall provide a Production Schedule for the Asphalt Plant and the Equipment on a separate schedule with supporting calculations showing that the planned output which can be achieved.

1.12.2.4 Materials Schedule

The Contractor shall provide on a separate schedule the location of all materials sources, together with planned submittal dates for material samples and planned material production and delivery schedule.

1.12.2.5 Bridge Construction Schedule

The Contractor shall provide each bridge construction schedule with a horizontal bar scale for each work category and provision for recording actual progress against the programme for each item.

1.12.3 REVISED PROGRAMME (CONSTRUCTION SCHEDULES)

1.12.3.1 Timing

If, at any time:

(a) actual progress is too slow to complete within the Time for Completion, and/or

(b) progress has fallen (or will fall) behind the current programme under Sub-Clause 8.3 [Programme] of the Conditions of Contract, other than as a result of a cause listed in Sub-Clause 8.4 [Extension of Time for Completion] of the General Conditions, then the Engineer may instruct the Contractor to submit, under Sub-Clause 8.3 [Programme] of the General Conditions, a revised programme and supporting report describing the revised methods which the Contractor proposes to adopt in order to expedite progress and complete within the Time for Completion.

1.12.3.2 Report

At the time of submitting a revised programme the Contractor shall provide a narrative report giving the reasons for the revision which shall include :

(a) Description of the revision, including the effect on all schedules due to a change of scope, revision in quantities or duration of activities and any other changes that may affect the schedule.

(b) Discussion of problem areas, including current and anticipated delay factors, and their impact.

(c) The revised methods which the Contractor proposes to adopt in order to expedite progress and complete within the Time for Completion, and its effect.

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SECTION 1.13
VARIATIONS PROCEDURES

1.13.1 GENERAL

1.13.1.1 Description

Changes to the Works may be initiated by the Engineer or the Contractor, and shall be agreed by way of a Variation signed by both parties. If the basis of payment established in such a Variation introduces a variation in the Pay Item Unit Price structure or an anticipated variation in the Contract Price, the Variation shall be negotiated and formalized in an Addendum to the Contract.

Variations and Addenda shall comply with the following:

(a) Variation :

A written order issued by the Engineer which is countersigned by the Contractor indicating his acceptance of changes to the Works or Contract Documents and his agreement on the basis of payment and time adjustment, if any, for the execution of the changes. Variations shall be issued in a standard format and shall cover all instructions issued by the Engineer which will effect a change in the Contract Documents or previous instructions issued by the Engineer.

(b) Addenda :

A written agreement between Employer and Contractor formalizing a change in the Works or Contract Documents which has resulted in a variation in the Pay Item Unit Price structure or an anticipated variation in the Contract Price and has been previously negotiated and agreed under a Variation. Addenda shall also be made for all significant contractual or technical changes irrespective of whether variations to the Unit Price structure or Contract Price occur.

1.13.1.2 Related Work Specified Elsewhere

(a)	General Conditions of Contract	:	relevant Clauses
(b)	Payment of Monthly Certificates	:	Section 1.6
(c)	Field Engineering	:	Section 1.9
(d)	Construction Schedules	:	Section 1.12
(e)	Contract Closeout	:	Section 1.14
(f)	Project Record Documents	:	Section 1.15

1.13.1.3 Submittals

(a) The Contractor shall designate in writing the member of his organization who is authorized to accept variations in the Works and who is responsible for informing others in the Contractor's employ of the authorization of variations.

(b) The Engineer shall designate in writing the person who is authorized to administer variations procedures on behalf of the Employer.

(c) The Contractor shall support each quotation for a lump sum proposal, and for each Unit Price which has not previously been established, with sufficient substantiating data to allow the Engineer to evaluate the proposal.

1.13.2 PRELIMINARY PROCEDURES OF VARIATIONS

1.13.2.1. The Engineer may initiate Variations by submitting a written notice to the Contractor containing:

(a) A detailed description of the proposed change and its location in the Project.

(b) Supplementary or revised Drawings and Specifications detailing the proposed change.

(c) The projected time span for making the proposed change.

(d) Whether the proposed change can be executed under the existing Pay Item Unit Price structure or whether any additional Unit Prices or Sums are required to be agreed and formalized in an Addendum.

Such a notice is a request for information only, and is not an instruction to execute the changes, nor to stop work in progress.

1.13.2.2. The Contractor may request a change by submitting a written notice to the Engineer, containing:

(a) Description of the proposed change.

(b) Statement of the reason for making the proposed change.

(c) Statement of the effect on the Construction Schedule, if any.

(d) Statement of the effect on the work of separate Subcontractors, if any.

(e) Detail as to whether all or part of the proposed change would be executed under the existing Pay Item Unit Price structure together with any additional Unit Prices or Sums that he considers may require to be agreed.

1.13.3 EXECUTION OF VARIATIONS

1.13.3.1 The Content of Variations shall be based on, either:

(a) Engineer's Request and the Contractor's response as mutually agreed between the Engineer and the Contractor, or;

(b) Contractor's Request for a change, as accepted by the Engineer.

1.13.3.2 The Engineer shall prepare the Variation and allot a sequential Variation number,

1.13.3.3 The Variation shall describe the change in the Works both additions and deletions, with attachments of revised Contract Documents as necessary to define details of the change.

1.13.3.4 The Variation shall establish the basis of payment and any time adjustments required as a result of the change, and where necessary, shall designate any additional Unit Prices or

Sums that have been negotiated between the Engineer and Contractor which are required to be formalized in an Addendum.

1.13.3.5 The Engineer shall sign and date the Variation as authorization for the Contractor to proceed with the change.

1.13.3.6 The Contractor shall sign and date the Variation to indicate agreement with the details therein

1.13.4 EXECUTION OF ADDENDA

1.13.4.1 The content of Addenda shall be based on any of the following:

(a) Employer's instruction for a change in the Contract Documents, or;
(b) Significant contractual or technical changes, or;
(c) A signed Variation or Variations containing additional Pay Item Unit Prices or Sums, or;
(d) Changes in estimated quantities resulting in a variation in the Contract Price as entered in the Contract Agreement or preceding Addendum, or;
(e) Final calculated quantities and Contract Price for the closing Addendum at the time of Contract Closeout.

1.13.4.2 The Engineer shall prepare the Addendum.

1.13.4.3 The Addendum shall describe any contractual, technical or quantity changes in the Works, both additions and deletions, with attachments of revised Contract Documents to define the details of the changes.

1.13.4.4 The Addendum shall provide concise accounting of any Pay Item Unit Price additions or adjustments together with any variations in the Contract Price or adjustments in the Contract.

1.13.4.5 The Engineer and the Contractor shall sign the Addendum and forward it to the Employer for his approval and signature.

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SECTION 1.14
CONTRACT CLOSEOUT

1.14.1 GENERAL

1.14.1.1. The Contractor shall comply with all requirements stated in relevant Clauses of the General Conditions and the Specifications concerning the closing out of the Contract.

1.14.1.2. Related Works Specified Elsewhere

(a)	General Conditions of Contract	:	relevant Clauses
(b)	Payment of Monthly Certificates	:	Section 1.6
(c)	Variations Procedures	:	Section 1.13
(d)	Project Record Documents	:	Section 1.15
(e)	Cleaning	:	Section 1.16

1.14.2 PERFORMANCE CERTIFICATE

1.14.2.1 Timing

Within the time constraints and requirements of the relevant Clauses contained in the Conditions of Contract and when the Contractor considers the Works to be complete, including all obligations under the Defects Notification Period, he shall make application for Issue of Performance Certificate. After completion of any remedial work requested by the Engineer, and subsequent final inspection and acceptance of the Works, the Engineer shall prepare and issue the Performance Certificate.

1.14.2.2 Content of Contractor's Application

Application for Issue of Performance Certificate shall contain the Contractor's certification of the following:

(a) The Contract Documents have been fully reviewed, and;

(b) The Works have been constructed in accordance with the Contract Documents, and,

(c) The Works have been fully inspected and tested for compliance with the Contract Documents, and that all inspection and test results have been accepted by the Engineer, and;

(d) The Works are complete and ready for final inspection and Issue of Performance Certificate.

1.14.3 FINAL STATEMENT

1.14.3.1 Timing

Within the time constraints and requirements of the relevant Clauses contained in relevant Clauses of the Conditions of Contract, the Contractor shall submit a Final Statement, together with all supporting detail as may be required by the Engineer. After review by the Engineer and if necessary, amendment by the Contractor, the Engineer shall issue an agreed Statement of Final Account for payment by the Employer.

1.14.3.2 Content

The content of the Statement of Final Account issued by the Engineer, shall include, but not be limited to, the following:

(a) The Contract Price as entered in the Contract Agreement

(b) The final quantities of work completed as verified by certified measurement and the computed value of such work.

(c) The value of any additional or deleted works as authorized by Addenda during the Contract Period.

(d) The value of any additions or deductions to the Contract Price as a result of:

  (i) Liquidated damages, if any

  (ii) Incomplete or incorrect work

  (iii) Approved Variations still to be incorporated in an Addendum

  (iv) Any other adjustments necessary within the terms and conditions of the Contract Documents

(e) The computed final Contract Price

(f) A summary balance sheet showing the completion of all Advance Payment Repayments and the release of all Retention Monies.

(g) A schedule of all previous payments authorized by the Engineer.

(h) The resulting sum due to, or due from the Contractor.

1.14.4 CLOSING ADDENDUM

Based on the details of the Engineer's Statement of Final Account and the Final Price Adjustment Certificate, the Engineer shall also prepare for the signature of the Employer and Contractor, a closing Addendum giving the final computed Contract Sum. After obtaining the Contractor's signature the Engineer shall forward the closing Addendum to the Employer for his signature along with the agreed Statement of Final Account.

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.

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 he 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. The Final Record Documents shall include:

(a) General Conditions of Contract.

(b) Contract Drawings and As-built Drawings

(c) Specifications.

(d) Addenda (if any).

(e) Other Modification of Contract.

(f) As-built Drawings

(g) Quality Control Documentation

(h) Relocation Plan and reports

(i) Environment Management Plan and reports

(j) Health and Safety Plan and reports

(k) Traffic Management and Safety Plan and reports

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) In order to ensure the effective implementation of all the Environmental Safeguards included in this section the Contractor shall complete columns 2 and 3 of the Environmental Management and Monitoring Plan (EMMP) prior to or at the Pre-Construction meeting. This EMMP is referred to in (e) below and included in Appendix 1.17. The EMMP shall cover all aspects of the Construction activities at the worksite and all other sites controlled by the Contractor.

(e) In order to assist in ensuring the effective implementation of all the Environmental Safeguards referred to in this section the Engineer shall complete on a monthly basis columns 4,5,6 and 7 of the Environmental Management and Monitoring Plan identifying for each sub clause of Section 1.17 the adverse environmental activities or environmental omission, details of those activities and omissions, and activities carried out to rectify or remedy that omission. The recommended format of the Environmental Management and Monitoring Plan (EMMP) is attached as Appendix 1.17 and will also be available from the Sub-Directorate of Guidance and Standard Preparation. On completion of columns 4, 5, 6 and 7 a copy shall be submitted to the Contractor for his immediate action where necessary.

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
(v)	Routine Maintenance of Pavement, Shoulder, 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 *(Refer specifically to Government Regulation (Peraturan Pemerintah) No.82 Year 2001 regarding Water Quality Management and Water Pollution Control).*

(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 Contactor 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 *(Refer specifically to Government Regulation (Peraturan Pemerintah) No.41 Year 1999 regarding Air Pollution Control).*

(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. *(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.)*

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 when required for any necessary permits or other authorization for their diversion or temporary cessation. (Ref: This work shall be carried out in accordance with Section 1.19)

(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 maintain vehicular and pedestrian access to all houses, commercial, industrial and all other uses. Temporary accesses must 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 *(Refer specifically to Law No. 1 Year 1970 regarding Work Safety and Law No. 12 Year 1999 regarding Fire Safety in work sites);* (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 necessary actions to protect the health and wellbeing of the Contractor's Personnel employed on the Site by ensuring that all parts of the worksite are regularly kept clean and sanitary.

(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. *(Refer specifically to Government Regulation (Peraturan Pemerintah) No. 82 Year 2001 regarding Quality Management and Water Pollution Control, and Law No. 1 Year 1970 regarding Work Safety).*

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 or for the clear zone 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 planting should take place within the clear zone. Tree planting shall be in accordance with Section 8.3 Landscaping, of the Specifications and in accordance with pay item 8.3.3.

(b) The Contractor shall limit the movement of his employees, the location of Base Camps, AMP etc and equipment within the sensitive environmental areas, such as the National Parks, Forest areas and all other officially protected sensitive areas so as to minimize damage to natural vegetation and shall endeavor to avoid any damage to land. No Base Camp, AMP, equipment or vehicle parking or storage area will be allowed outside the ROW where the road passes through an officially protected sensitive area.

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 *(Refer specifically to Government Regulation (Peraturan Pemerintah) No. 82 Year 2001 regarding Quality Management and Water Pollution Control).*

(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

(a) The disposal of all solid and liquid waste from construction activities should only take place i) in accordance with Section 1.5 Transportation and Handling clause 1.5.3.4. as referred to below, and ii) in accordance with requirements and permissions of responsible institution at Province or Kabupaten/Kota.

(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 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.

1.17.2.9 Impact on Cultural Heritage

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

1.17.2.10 Other Matters

(a) For all quarries and other sources of material (whether owned or not owned by the Contractor) the contractor must submit to the Engineer details of the location of the material source in accordance with Section 1.11 Materials and Storage, Clause 1.11.1.3. The contractor must also submit to the Engineer a Haul Route Plan in accordance with Section 1.5 Transport and Handling, Clause 1.5.2.1 defining the routes on which the material will be hauled from the location of materials. The Engineer may require that the relevant local government institutions confirm that the source location and operation, and the haul route operation is undertaken in an Environmental and Socially acceptable manner in accordance with all local and national regulations.

(b) All Quarries used must be licensed and have full legal authorization from the Local government.

(c) The extraction of any construction materials will not be allowed in any National Park or other officially protected sensitive area.

(d) 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.

(e) 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). In Provinces where the Surat Keterangan Sahnya Hasil Hutan (SKSHH) (Letter indicating source from legal production forest) operates a certificate of its legal nature be attached to the purchase document for submission to the Engineer.

(f) 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 UKL/UPL or AMDAL, in accordance with the Government of Indonesia's environmental laws, the Contractor must comply with any specific recommendations which will have been incorporated into the design and specifications. The full UKL/UPL or Amdal document will be made available to the Contractor and Engineer for information.

1.17.4 MONTHLY REPORT

1.17.4.1 Submittal

Columns 4, 5, 6 and 7 of the monthly Environmental Management and Monitoring Plan (EMMP) is required to be submitted for each calendar month of the Time for Completion. A recommended format of the EMMP is included in Appendix 1.17 and will be available from the Sub-Directorate of Guidance and Standard Preparation.

The Engineer shall be responsible for preparation and submission of Columns 4, 5, 6 and 7 of each EMMP which shall conform to the following :

(a) The EMMP shall be prepared in the recommended format.

(b) The EMMP 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) A copy of the EMMP together with its supporting documentation shall be submitted to the Contractor for his immediate action where necessary.

The Contractor 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 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 necessary to rectify the issue and preparing a cost estimate.

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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 metres. When bearing stratum has not been reached within 50 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. Basement 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 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/cm^2 is reached or the depth is 60 metres.

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 SPT and Report	Linear Metre
1.18.2	Dutch CPT including Report	Linear Metre

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 AND RELOCATION 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 Metre
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

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SECTION 1.20

VALUE ENGINEERING CHANGE PROPOSAL

The Contractor may, at any time, submit to the Engineer a written proposal which (in the Contractor's opinion) shall, if adopted, (i) accelerate completion, (ii) reduce the cost to the Employer of executing, maintaining or operating the Works, (iii) improve the efficiency or value to the Employer of the completed Works, or (iv) otherwise be of benefit to the Employer.

1.20.1 VALUE ENGINEERING CHANGE PROPOSALS (VECP) BY THE CONTRACTOR

1.20.1.1 The Contractor, when so allowed in the General Conditions, is encouraged to develop and offer proposals for improved construction techniques, alternative materials and other innovations.

1.20.1.2 Proposals must provide a project comparable to the original design either at lower cost or improved quality, or both. No proposals shall be accepted that lowers the quality of the intended project.

1.20.1.3 If a proposal is rejected, the work shall be completed in accordance with the Contract at contract prices. Any delay to the project due to a proposal submittal and review shall be considered within the Contractor's control and shall be non-excusable with the exception of those delays that are approved as part of the proposal.

1.20.1.4 A VECP shall produce savings to the Employer or provide improved project quality without impairing essential functions and characteristics of the facility. Essential functions include but are not limited to: service life, requirements for planned future development, prior commitments to governmental agencies or the public, corridor requirements, economy of operation, ease of maintenance, desired appearance, safety, and impacts to the traveling public or to the environment during and after construction.

1.20.2 SCOPE OF VALUE ENGINEERING

1.20.2.1 A VECP includes the design and construction of a structure including but not limited to a bridge, retaining wall, concrete box culvert, building, earthworks (slope or embankment).

1.20.2.2 A proposal changing the type or thickness of the pavement structure only shall be rejected

1.20.2.3 Alternatives investigated and not selected in the Project Design Reports may be presented in a VECP, if significant benefits can be demonstrated to the Engineer. In addition, any design criteria and constraints listed in the Project Design Report can not be modified or relaxed as part of a VECP unless significant and previously unknown benefits can be proven to the Engineer.

1.20.2.4 Experimental or demonstration-type design concepts, products, structures, or elements that have not been pre-approved by Employer, in writing, for general use may be considered in a VECP.

1.20.2.5 Proposals shall also result in a realized and shared cost savings to Employer. Cost savings generated to the Contract as a result of VECP offered by the Contractor and accepted by the Employer shall be shared between the Contractor and the Employer.

1.20.3 SUBMISSION OF A VECP

The Contractor shall submit a preliminary Conceptual VECP, followed by a full proposal if the preliminary concept is approved. These proposals are subject to rejection at any time if they do not meet the criteria outlined in this subsection.

1.20.3.1 Submittal of Conceptual Proposal.

For a VECP that requires a significant amount of design or other development resources, the Contractor may submit a Conceptual Proposal for preliminary evaluation. The Engineer shall evaluate the information provided. The Contractor shall then be advised in writing if any conditions or parameters of the Conceptual Proposal are found to be grounds for rejection. Preliminary review of a conceptual proposal reduces the Contractor's risk of subsequent rejection but does not commit the Employer to eventual approval of the full VECP. The following information shall be submitted for each Conceptual Proposal:

(a) Statement that the proposal is submitted as a Conceptual VECP.

(b) General description of the difference between the existing Contract and the proposed change, and the advantages and disadvantages of each, including effects on service life, requirements for planned future development, prior commitments to governmental agencies or the public, corridor requirements, economy of operation, ease of maintenance, desired appearance, safety, and impacts to the traveling public or to the environment during and after construction. The Contractor shall request in writing the necessary information from the Engineer.

(c) One set of conceptual plans and a description of proposed changes to the Contract specifications.

(d) Estimate of the anticipated cost savings or increase.

(e) Statement specifying the following:

(i) When a response to the conceptual proposal from the Employer is required to avoid delays to the existing contract prosecution.

(ii) The amount of time necessary to develop the full Proposal.

(iii) The date by which a Contract Modification Order must be executed to obtain maximum benefit from the Proposal.

(iv) The Proposal’s impact on time for completing the Contract.

1.20.3.2 Submittal of Full Value Engineering Change Proposal.

The following materials and information shall be submitted for VECP.

(i) A statement that the proposal is submitted as a VECP:

(ii) A description of the difference between the existing Contract and the proposed

change, and the advantages and disadvantages of each, including effects on service life, requirements for planned future development, prior commitments to governmental agencies or the public, corridor requirements, economy of operation, ease and cost of maintenance, desired appearance, safety, and impacts to the traveling public or to the environment during and after construction. The Contractor shall request in writing the necessary information from the Engineer.

(iii) A complete set of plans and specifications showing the proposed revisions relative to the original Contract. This portion of the submittal shall include design notes and construction details. The proposed plans and specifications shall be signed and sealed by the Contractor's Engineer.

(iv) A cost comparison, summarizing all of the items that the proposed VECP replaces, reduces, eliminates, adds, or otherwise changes from the original Contract work, including all impacts to traffic control, detours and all other changes. The cost comparison shall not include cost savings resulting from purportedly decreased inspection or testing requirements, or Employer overhead; All costs and proposed unit prices shall be documented by the Contractor.

(v) A statement specifying the date by which a Contract Modification Order must be executed to obtain the maximum cost reduction during the remainder of the Contract and the date when a response from the Employer is required to avoid delays to the prosecution of the Contract.

(vi) A statement detailing the effect the Proposal shall have on the time for completing the Contract.

(vii) A description of any previous use or testing of the proposed changes and the conditions and results. If the Proposal was previously submitted on another Employer project, the proposal shall indicate the date, Contract number, and the action taken by the Employer.

(viii) An estimate of any effects the VECP will have on other costs to the Employer.

(ix) A statement of life cycle costs, when appropriate. Life cycle costs shall not be considered as part of cost savings but shall be calculated for additional support of the Proposal. A discount rate of four percent shall be used for life cycle calculations.

1.20.3.3 Evaluation.

VECP shall be evaluated by Employer in accordance with the Employer Construction Manual.

Additional information needed to evaluate Proposals shall be provided in a timely manner. Untimely submittal of additional information shall result in rejection of the Proposal. Where design changes are proposed, the additional information shall include results of field investigations and surveys, design and computations, and changed plan sheets required to develop the design changes.

(a) The Engineer shall determine if a Proposal qualifies for consideration and evaluation. The Engineer may reject any Proposal that requires excessive time or

costs for review, evaluation, or investigation. The Engineer may reject proposals that are not consistent with the Employer's design and criteria for the project.

(b) VECP, whether or not approved by the Employer, apply only to the ongoing Contracts referenced in the Proposal and become the property of the Employer. Proposals shall contain no restrictions imposed by the Contractor on their use or disclosure. The Employer has the right to use, duplicate and disclose in whole or in part any data necessary for the utilization of the Proposal. The Employer retains the right to utilize any accepted Proposal or part thereof on other projects without obligation to the Contractor. This provision is subject to rights provided by law with respect to patented materials or processes.

(c) If the Employer is already considering revisions to the Contract or has approved changes in the Contract that are subsequently proposed in a VECP, the Engineer shall reject the Proposal and may proceed to implement these changes without obligation to the Contractor.

(d) The Contractor shall have no claim against the Employer for additional costs or delays resulting from the rejection or untimely acceptance of a VECP. These costs include but are not limited to: development costs, loss of anticipated profits, increased material or labor costs, or untimely response.

(e) Proposals shall be rejected if equivalent options are already provided in the Contract.

(f) Proposals that only reduce or eliminate contract pay items shall be rejected.

(g) The cost savings and other benefits generated by the Proposal must be sufficient to warrant review and processing, as determined by the Engineer.

(h) Right of Way cannot be bought as part of a VECP to eliminate phasing on a project.

(i) A VECP changing the design of a structure may be considered by the Employer, if the design meets the following conditions:

(i) The design shall not involve detouring of traffic onto local roads or streets to an extent greater than the original plans, unless previously approved by the affected local agencies.

(ii) The design has the same roadway typical section as the original plans.

(iii) The design meets or exceeds the benefits of the construction-handling or traffic phasing scheme shown in the original plans.

(iv) The design meets or exceeds all environmental commitments and permit requirements of the original Contract.

(v) The design shall not increase environmental impacts beyond those of the original Contract.

(vi) The design meets or exceeds the vertical and horizontal clearances and hydraulic requirements shown in the original plans.

(vii) The design has the same or greater flexibility as the original design to accommodate future widening.

(viii) The design shall not change the location of the centerline of the substructure elements, without demonstrating substantial benefits over the original plans.

(ix) The design shall not change the grade or elevation of the final riding surface, without demonstrating substantial benefits over the original plans.

(x) The design shall match corridor future development plans, architectural, aesthetic and pavement requirements, if applicable.

(xi) The design shall not adversely impact the Employer's Bridge Inspection, maintenance or other long-term costs or operations.

(xii) The design shall meet all Employer design standards and policies.

(xiii) The design shall include all additional costs and coordination necessary to relocate utilities.

(xiv) Major structure designs provided by the Contractor shall include an independent plan review and design check by a Professional Engineer and employed by a firm other than the engineer-of-record. This design review shall be performed at no additional cost to Employer and shall be included in the Contractor's engineering costs.

(xv) The Contractor shall provide the Employer with all design calculations, independent design check calculations, a rating package for each bridge prepared in accordance with the current Employer Bridge Rating Manual, and a record set of quantity calculations for each structure.

(j) The Engineer shall reject all or any portion of the design or construction work performed under an approved VECP if unsatisfactory results are obtained. The Engineer shall direct the removal of such rejected work and require construction to proceed under the original Contract requirements without reimbursement for work performed under the proposal, or for its removal.

If a structure design VECP meets these and all other requirements, the Employer may, at its sole option, accept or reject the proposal.

1.20.4 BASIS OF PAYMENT

If the VECP is accepted, a Contract Variation shall authorize the changes and payment. Reimbursement shall be made as follows:

1.20.4.1 The changes shall be incorporated into the Contract by changes in quantities of unit bid items, new agreed unit price items, lump sum or any combination, as appropriate, under the Contract. Unless there is a differing site condition, the Contractor shall not receive additional compensation for quantity overruns, design errors, supplemental surveys, geotechnical investigations, additional items or other increases in cost that were not foreseen in the accepted VECP, unless otherwise approved by the Engineer.

1.20.4.2 The incentive payment shall be calculated as follows:

(a) (gross cost of deleted work) - (gross cost of added work) = (gross savings)

(b) (gross savings) - (Contractor's engineering costs) - (Employer's engineering costs) = (net savings)

(c) Any net savings equal or less than Rp 50,000,000 can be kept by the contractor.

(d) If the net savings are greater than Rp 50,000,000 then the amount over Rp 50,000,000 shall be shared equally with Employer and calculated as follows:

(e) (net savings) - Rp 50,000,000 = shared savings

(f) Contractor's total incentive = (shared savings) /2 + Rp 50,000,000

(i) The Contractor's engineering costs shall be reimbursable only for outside consultant costs that are verified by certified billings. Employer's engineering costs shall be actual consultant costs billed to Employer and extraordinary in-house personnel labor costs. These labor costs shall be calculated at the fixed amount in Rp unit per hour per employee. Project personnel assigned to the field office or who work on the project on a regular basis shall not be included in Employer's portion of the cost.

1.20.5 AT THE COMPLETION OF THE VECP DESIGN WORK

At the completion of the VECP design work, the Contractor shall furnish the Employer any additional documentation such as surveys, geotechnical reports, documentation or calculations and shop drawings required to complete the work, and As-Constructed plans showing the VECP work.

SECTION 1.21
QUALITY MANAGEMENT

1.21.1 General

The Works shall be undertaken through a quality management process, utilizing Employer, Engineer, Contractor and third-party resources, as necessary.

The Employer accepts the following definitions associated with Quality Management:

- Quality Control (QC): The process of checking specific product or service results to determine if they comply with relevant quality standards, correct errors and substandard quality, and identifying ways to eliminate causes of unsatisfactory product or service performance.
- Quality Assurance (QA): The process of evaluating overall product or service, by persons or companies independent of those doing the Work, on a regular basis to provide confidence that the product or service satisfies the relevant quality standards.

The quality management program has two key components as follows:

- Quality Control – the Contractor's responsibility
- Quality Assurance – the Engineer's responsibility under the Engineer's Quality Assurance Plan

Each component of the program must address materials, processes, workmanship, products, and documentation.

The Contractor shall provide unrestricted access to all Quality Control operations and documentation produced by or on behalf of the Contractor and shall allow the Engineer full access at any time.

The Engineer will review the Contractor's performance of the Work and determine the acceptability of the Work based on the Engineer's Quality Assurance results and, where deemed appropriate by the Engineer, supplemented by the Contractor's Quality Control results.

Work failing to meet the conditions of the Contract shall be considered Unacceptable Work.

The Engineer may consider all Work from the last acceptable Quality Assurance testing as Unacceptable Work. The Contractor shall not be entitled to payment for Work that lacks the appropriate Quality Control documentation, verified by the QC Manager, as required by the Contract.

The Contractor shall implement a well-coordinated approach to all operations related to the Work and will organize its team and operations in keeping with the goal of doing things right the first time.

1.21.2 Quality Control Plan (QC Plan)

1.21.2.1 QC Plan General Requirements

As a part of the Contractor's Quality Assurance required under Clause 4.9 of the General Conditions, the Contractor shall be responsible for all Quality Control during the performance of the Work. QC work includes monitoring, inspecting and testing the means, methods, materials, workmanship, processes and products of all aspects of the Work as necessary to ensure conformance with the Contract.

The Contractor shall prepare a Quality Control Plan (QC Plan) in accordance with the Contract provisions and shall submit the complete QC Plan to the Engineer a minimum of two weeks in advance of commencement of any element of Work covered by the plan.

The QC Plan shall be structured around the ISO 9001:2000/SNI 19-9001-2001 program (although ISO registration is not required), and clearly demonstrate the Contractor's understanding and commitment to ISO's eight principles of quality management:

- Customer focused organization
- Leadership
- Involvement of people
- Process approach
- System approach to management
- Continual improvement
- Factual approach to decision-making
- Mutually beneficial supplier relationships.

The QC Plan must also include sections detailing the Contractor's methodology associated with each of the relevant sections of ISO 9001:2000/SNI 19-9001-2001 as follows:

4 Quality Management System
- 4.1 General Requirements
- 4.2 Documentation Requirements

5 Management Responsibility
- 5.1 Management commitment
- 5.2 Customer focus
- 5.3 Quality policy
- 5.4 Planning
- 5.5 Administration:
- 5.6 Management review:

6 Resource Management
- 6.1 Provision of resources
- 6.2 Human resources
- 6.3 Facilities
- 6.4 Work environment

7 Product Realization
- 7.1 Planning of realization processes
- 7.2 Customer-related processes
- 7.3 Design and/or development:
- 7.4 Purchasing
- 7.5 Production and service operations
- 7.6 Control of measuring and monitoring devices

8 Measurement, Analysis and Improvement
- 8.1 Planning
- 8.2 Measurement and monitoring
- 8.3 Control of nonconformity
- 8.4 Analysis of data
- 8.5 Improvement

No Work shall be undertaken on any element of Work (including pay items and temporary Work, or submittals for review) for which there are QC Plan submission requirements until the Engineer has accepted the base portion of the QC Plan and the specific details for that element of Work.

The QC Plan shall cover the Work in its entirety, including without limitation all materials the Contractor and Subcontractors are supplying, and all items and phases of construction on the Project.

The plan may be operated wholly or in part by a qualified Subcontractor or an independent agency/organization. However, the plan's administration (including conformance with the plan and its modifications) and the quality of the Work remain the responsibility of the Contractor.

The Contractor's QC program and the Work shall be undertaken in accordance with the QC Plan and shall be well managed, with testing results representative of actual operations. Results will be reported accurately and in a timely manner.

The Contractor shall also ensure that all workers are familiar with the Quality Control Plans, its goals, and their role under it, as well as with the Contract specifications associated with the Work they are to undertake

1.21.2.2 QC Plan Quality Control Staff and Equipment Submission Requirements

In accordance with Section 1.3 and 1.4 of these Specifications, and Clause 7 of the General Conditions, the Contractor shall provide all resources and take all actions necessary to ensure:

- Provision of sufficient inspection or testing staff, with adequate equipment and technical support to perform all Quality Control functions in an accurate and timely manner.
- That QC staff perform only inspections and tests for which they are qualified
- All testing equipment is calibrated, properly maintained, and in good operating condition.
- All testing and inspection is performed in accordance with appropriate standards of the Contract.
- Submission to the Engineer, within twenty-four (24) hours, of daily reports for all tests and inspections that indicate non-conformance of the material being tested.
- Production, within forty-eight (48) hours, of daily reports for all tests and inspections that indicate conformance of the material being tested and the availability of back-up documentation to substantiate test results when required.
- Organization, compilation and submission of all project QC documentation within 14 days of issuance of the Completion Certificate.

The Contractor shall designate one person as the Quality Control Manager (QC Manager) who shall be responsible for the implementation of the QC Plan. The QC Manager shall be a qualified Professional Engineer, Certified Engineering Technician, or Applied Science Technologist, or other person with knowledge, skills and abilities acceptable to the Engineer.

The QC Manager shall be at arms length from the productivity part of the Contractor's organization and specifically shall not be the Project Manager or the Project Superintendent.

The Engineer recognizes the Contractor's Project Manager and Superintendent as the personnel responsible for making the product meet the contractual requirements, but the QC Manager's duties include being responsible to measure conformance and to ensure that quality is not compromised by production pressures.

The QC Manager, or a designated replacement acceptable to the Engineer empowered and able to perform all of the QC Manager's relevant duties, shall remain on Site at all times

the Contractor is performing Work which must be tested or inspected in-process, and must be readily accessible and able to return when off- Site.

The QC Plan will include the following information:

- the name of the QC Manager and qualifications establishing a proven capability to provide the specific services required for the Project;
- the name of QC testing agencies and their proven capability to provide the specific services required for the Project;
- a listing of QC staff (including names, qualifications and relevant experience) and their assigned roles and work scheduling in performing QC duties;
- a list of testing equipment to be used for the Work.

The QC Plan must include an organizational chart showing details of the flow of information, holding points as listed in 1.21.4 below, rectification of deficiencies and other relationships and responsibilities necessary to assure Project quality requirements are met.

The QC Plan should describe how the QC staff are allocated to Project requirements, the tasks assigned to each, and how their work will be coordinated.

Without limitation, the Contractor's QC Manager shall:

- implement the Contractor's QC Plan;
- be responsible for measuring conformance with all aspects of the contract quality;
- stop work when materials, product, processes or submittals are deficient;
- develop inspection and testing plans for each element of Work;
- ensure all surveys, tests, technical audits, etc shall use GPS instruments for their exact coordinates (latitude-longitute).
- develop acceptance/non-acceptance reports and quality control checklists for each element of Work in sufficient detail to gauge conformance with all significant contractual requirements;
- ensure the requirements for quality management (including an overview of how the QC Plan operates, the worker's role in it, contractual specifications for the Work, and work procedures) are known to, understood by, and adhered to by all workers on the Site;
- ensure that all QC checklists are signed-off by competent and responsible parties as close to the actual work as appropriate to the nature of the Work (e.g. by the actual worker or a foreman for most work; by a Professional Engineer for falsework erection; etc.)
- review, sign, and be responsible for all reports (materials and testing results);
- consult with field inspectors regarding materials and testing issues;
- receive notification by inspectors re deficiencies and ensure re-testing or rejection;
- provide weekly and monthly summary reports on testing and inspection results;
- initiate the non-conformance process when materials or product do not meet the required specifications and, inform the Engineer of such nonconformance;
- consult with the Contractor Representative and initiate corrective action on non-conformance;
- respond to each Non-Conformance Report (NCR) issued by the Engineer within the time specified in the NCR;
- schedule testing and inspection services in coordination with the Contractor's superintendent and foremen;
- monitor QC testing and inspection procedures including those of the Subcontractors;
- work directly with the Engineer on matters related to QC;
- ensure required approvals and permits from the Engineer and others are obtained as and when required;

- verify that all testing equipment is properly maintained and kept in good working order;
- keep an organized filing system to ensure that quality records are easily accessible so that auditors can obtain necessary information;
- review issued for construction drawings, calculations, and shop drawings and ensure that all concerned Contractor staff have current versions of documents applicable to their part of the Work;
- notify the Engineer of any changes in survey layout, location, line, grade, etc., for approval;
- notify the company principles of any issues that compromise the integrity or function of the Quality Management System, and
- provide an auditable trail for survey computations to the Engineer

1.21.2.3 QC Plan Submission Requirements

(i) Full Submission

Unless otherwise specified in the Special Provisions, the Contractor's QC plan shall provide details of the means, methods, and frequencies of Quality Control measures **for all elements of Work** in the Contract

(ii) Partial Submission

On projects considered by the Engineer to be of low complexity and/or risk, and only where explicitly invoked by the Special Provisions, the Engineer will accept a partial QC Plan submission.

Notwithstanding any such reduced submission requirements, the Contractor remains responsible for QC for all aspects of the Work.

The Contractor's partial QC Plan submission to the Engineer is only required to address the details of the following types of Work:

- Traffic Management and Safety
- Survey/layout
- Materials incorporated into the Work (concrete barrier, culverts, filter cloth, etc.)
- Compaction (sub-grade, embankments, granular aggregates, culvert backfill, etc.)
- Aggregate gradation
- Plus any other elements identified in the Special Provisions as a submission requirement.

The Contractor shall initiate such other Quality Control procedures as are necessary for ensuring the production of a quality product and may include them in the Quality Control Plan submission.

(iii) For Both Full and Partial Submissions

The initial QC Plan shall be submitted to the Engineer a minimum of seven (7) days in advance of the Project Pre-construction Meeting (PCM) and must provide details of all elements of Work anticipated to be undertaken within the Contractor's first thirty (30) days on Site.

Detailed submissions for the balance of the Work must be received a minimum of fourteen (14) days prior to the anticipated first day of Work on each element covered by the submission.
The initial submission, as well as any subsequent submission or revision, must be accompanied by the Contractor's QC checklist for Quality Management, verifying that the submission meets all relevant contractual requirements.

Improved procedures may be introduced after the start of work as necessary as amendments to the Quality Control Plan. All amendments require the written acceptance of the Engineer.

The type and frequency of QC tests shall be established by the Contractor and shall be in conformance with the requirements of the Contract, including the minimum frequencies specified in the Special Provisions and/or Standard Specifications (for those listed items applicable to the Work), and the current acceptable practice of the industry.

When materials or equipment are specified by the Specifications the Contractor shall obtain from suppliers or manufacturers independent test reports, or test certificates stating that the materials or equipment meet or exceed specified requirements. The Contractor shall provide back-up documentation of actual testing results upon request by the Engineer.

1.21.3 Quality Assurance Plan

The Engineer will prepare and implement a Quality Assurance Plan, based in part on the effectiveness and reliability of the Contractor's Quality Control Plan. The Engineer may also undertake random and systematic inspections of the Work and of the Contractor's QC documentation.

The purpose of the QA Plan and inspectional activities is to ensure that payment is made only for acceptable works in place, and may be based on a limited amount of sampling and testing.

The Engineer will monitor the Contractor's operations and the Quality Control program to assure that standards are being met and to assess what payments have been earned under the terms of the Contract.

Any instances of Unacceptable Work discovered will result in a Non-Conformance Report (NCR) being issued to the Contractor.

The QA program activities will not relieve the Contractor of Quality Control responsibilities under the terms of the Contract.

The frequency of QA inspection and testing will generally be approximately zero to ten percent (0 – 10%) of the frequencies undertaken by the Contractor in its QC Plan and will initially be set at a level commensurate with the Engineer's confidence in the anticipated effectiveness of the Contractor's QC program.

The Engineer may increase or decrease the frequency of QA inspection and testing during the course of the Work, based in part on the actual effectiveness of the Contractor's QC Plan.

1.21.4 Holding 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.

1.21.5 Tests on Completion

In accordance with Clause 9 of the General Conditions, the Contractor shall submit as-built documents including as-built drawings and QC documentations before the date of Tests on Completion.

Tests on Completion shall include:

- An evaluation of all as-built documents which show that all completed works are comply with the work requirements and all Non-Conformance Reports (NCRs) are resolved.
- Submission of written Engineer's instructions and/or approval where the as-built documents depart from the work requirements.
- Checking on the overall performance of the final works completed showing compliance with the Employer's overall requirements or the intention of the design/drawings, e.g. dimensions, levels, functions such as pavement surface roughness, water flows, etc.
- Minimum random sampling for testing if required by the Engineer.

The Engineer will evaluate the Engineer's QA documentations supplemented with Contractor's Documents to ensure that all completed works comply with the work requirements and all Non-Conformance Reports (NCRs) are resolved.

Tests on Completion shall assure the readiness of the Works to be taken over by the Employer for public use.

1.21.6 Quality Audit

As a part of the overall project management, the Employer may have one or more auditors on the Project, supplementing the work of the Engineer Quality Assurance staff. When utilized, the auditor(s) will report to the Employer and provide a systematic and independent assessment of whether or not the materials and Project activities and related results comply with the Contract, the Contractor's Quality Control Plan, and the Engineer's Quality Assurance Plan. These auditors may be Employer employees or other persons appointed by the Employer which have not otherwise been involved with the Work.

The objective of Quality Auditing is to have an independent opinion on both Quality Control and Quality Assurance activities and be proactive in avoiding or reducing quality related issues by requiring the process of conformance verification to be systematic.

The auditor(s) will be allowed unrestricted access to the Site and all activities therein, to all testing and documentation of the work done by the Engineer, Contractor and their agents and suppliers.

1.21.7 Non-Conformance Reports (NCRs)

The Contractor shall and the Engineer may review the Work to determine conformance with the contractual requirements. Non-conformances found shall be dealt with as follows.

1.21.7.1 Contractor's Internal NCR

Should the Contractor's QC reporting indicate that the Work is not in conformance, the QC Manager shall issue in internal Non-Conformance Report (NCR) to the Contractor, with a copy
to the Engineer, including a response time.

The Contractor shall then respond to the QC Manager, with a copy to the Engineer, with respect to the NCR, within the specified time, with proposed resolutions and corrective actions. The Contractor and/or the QC Manager may consult with the Engineer on the resolutions but is not required to do so.

Payment for a Quality Management will not be affected by internal NCRs, as long as the issue is diligently pursued and resolved.

Payment for the Work itself may be withheld until the NCR issue is resolved.

1.21.7.2 Engineer-Issued NCR

Should the Engineer's QA reporting indicate that the Work is not in conformance, the Engineer will issue to the Contractor a NCR, including a response time.

The Contractor shall then respond to that NCR, within the specified time, with proposed resolutions and corrective actions.

The Engineer will accept or reject the proposed resolution and corrective action proposal.

Assurance testing and inspection will be performed to determine if the corrective action has provided an acceptable product. Acceptance and rejection will continue until the Engineer determines that a quality product has been achieved.

A portion of the payment for a Quality Management may be withheld until the NCR issue is resolved or may be withheld permanently.

Payment for the Work itself may be withheld until the NCR issue is resolved.

1.21.7.3 Opportunity for Improvement

Should the QA review indicate that the Work is not in conformance, but the variance is deemed minor by the Engineer, the Engineer may issue an Opportunity for Improvement (OFI) report.

The Contractor is encouraged to review the findings and undertake such modifications to the QC Plan and the work procedures as necessary to address the issue.

An OFI will not affect payment for Quality Management or for the Work itself.

1.21.8 Appeal

If the Contractor disputes the validity of a finding in an NCR, the Contractor may file an appeal with the Engineer. The Engineer and the Contractor Representative will use all reasonable efforts to refine the area of dispute and to resolve the determination of conformance with the Contract.

If the Engineer and the Contractor Representative cannot come to a mutually agreeable resolution, the Work that is the subject of the Non-Conformance Report shall be re-evaluated by an independent third-party, selected by the Engineer in consultation with the Contractor, at a test frequency equivalent to twice that specified in the Contract or to such other frequency as may be mutually agreed between the Engineer and the Contractor.

If the appeal testing confirms the non-conformance determination, all appeal testing costs will be borne by the Contractor. If the appeal testing shows that the Work did in fact meet the requirements of the Contract, all appeal testing costs will be borne by the Engineer

1.21.9 Payment

The Lump Sum Price bid for Quality Management shall be full compensation for all costs resulting from the Quality Management requirements set out in the Contract.

Payment will be made on a monthly basis prorated for the percentage of the total Work completed as determined by the Engineer, subject to the Contractor being totally compliant with the requirements of this Section and with its own Quality Control Plan

The Engineer may deduct an amount from any monthly payment so computed, for any quality management work required but not satisfactorily undertaken during that month. The Engineer may also reduce the total Lump Sum payable by the value of any quality management work required but not satisfactorily undertaken during the Time for Completion. The foregoing determinations will be made in the sole discretion of the Engineer.

Inspection or testing by the Engineer will be at the Engineer's cost. However, re-inspection or retesting by the Engineer for repaired deficient details shall be at the Contractor's cost.

Work that is deemed unacceptable will not be eligible for payment from the applicable Item for that Work.

The Completion Certificate will not be issued if there are any unresolved Non-Conformance Reports.

Pay Item No.	Description	Unit of Measurement
1.21	Quality Management	Lump Sum