

## **SS - 9 ENGINEER’S FACILITIES**

### **9.1 General**

The Contractor shall provide and maintain for the period as specified herein, for Contract purposes, the following facilities for the Engineer and his staff:

#### **Engineer’s main Residency (Mithi City) and other Residency (Tando Jan Mohammed / Jhuddo)**

- a) Office accommodation for Resident Engineer and his staff.
- b) Residential accommodation for Resident Engineer and his staff.
- c) Vehicles for Resident Engineer and his staff.
- d) Engineer’s Base Laboratory at all packages.

#### **Engineer’s Site Facilities**

- a) Field Accommodation (Office cum residential) for Engineer’s field staff
- b) Vehicles for field staff.
- c) Field laboratory.
- d) Survey equipment.

The Contractor shall also provide all consumable and pay for all other incidental or running costs and provide and pay for all utilities which include power, gas, water supplies, telephone and/or other means of communication within and off the site.

All facilities shall be completed and ready for use within 15 days of the Engineer’s instruction.

The location of accommodations and laboratory facilities shall be as approved by the Engineer.

Contractor shall be responsible for and take all necessary measures to ensure the security of the all the Engineer’s facilities and their contents at all times and shall employ guards/watchmen for this purpose.

Details of construction elements of rented buildings for the facility shall be as follows:

- a) Floors should be tiled to suit the purpose of the room.
- b) Walls with plaster on masonry. Finish shall be painting of colour (s) to be agreed with the Engineer. Splash areas of bathroom and kitchen walls are to be ceramic-tiled.
- c) Ceilings shall be plastered to suit the roof construction. Ceilings shall be finished in white distemper.
- d) Roof construction with be reinforced concrete suitably waterproofed and insulated and be constructed to drain to collection points provided with full-

height discharge pipes to galleys at ground level.

- e) Doors and windows will be of solid, tight-fitting construction.
- f) Window sizes should generally be 1.3 m x 1.2 m with plain glass, except for special purpose rooms. Frames should be of steel & painted. All windows should be lockable and provided with fly screens on opening lights.
- g) Internal doors shall be of plywood in steel frames. Good quality door furniture with lever handles will be provided and fixed. Two keys for each lock will be handed over to the Engineer.
- h) External doors may be glazed aluminium or exterior quality timber with steel frames. Good quality door furniture will be provided including security locks and two keys for each lock. Additional fly-screen doors shall be fitted on the outside of external doors.
- i) Wooden doors and frames shall be finished and painted or varnished to suit their location.
- j) Lighting, air conditioning, fans, ventilation, waste disposal, water, gas and electricity installations and supply shall be provided as appropriate to the rooms of the office. Air conditioning and heating installations should be capable of regulating temperatures within 20 minutes of switch-on to between 18 0C minimum and 24° maximum in the offices, assuming an external air temperature of 45°C with over-capacity in the conference room and the laboratory to allow for additional sources of hot air.
- k) There shall be appropriate number of power outlets in each room to allow for the different uses of electrical equipment. Additional outlets shall be installed by the Contractor, if required by the Engineer.
- l) Lighting shall be provided to acceptable standards by fluorescent fittings, placed as agreed with the Engineer. Switches and fittings shall be of good quality manufacture, earthed and properly wired. Exterior lighting shall be provided by street lamps or similar, for the safety and security of the compound.
- m) Back-up power supply by diesel generator shall be provided. The backup generator shall have automatic cut-in in case of failure of the main supply.

The power circuit shall be equipped with voltage regulation to protect electrical equipment from overload and to ensure proper operation of computers and the like.

The generator for each of the accommodation facilities shall be housed in a separate room having noise insulation.

- n) A continuous water supply shall be available for normal use. At least all kitchens shall be provided with potable water. The source shall be tested by

the Contractor and certified as potable. Tests shall be repeated at intervals as directed by the Engineer.

A elevated storage tank in RCC, having a minimum capacity of five thousand (5,000) gallons, shall be available. The elevation of the storage tank shall be so as to provide the distribution system with an operating pressure of 1.06 Kg/sq.cm (15 psi). An alternative underground storage tank with roof storage tank and pump is acceptable.

- p) Continuous supplies of water, gas, electricity and fuel for generators shall be provided by the Contractor who shall be responsible for and pay all costs of installation, connection and maintenance.
- q) The Contractor shall provide and install communications facilities/ operational STD telephone line (2 Nos) with extensions as per requirements with all appurtenances for Resident Engineer office and residential accommodations, and laboratory.
- r) The Contractor shall take appropriate measures to discourage the presence or entry to the buildings of termites," cockroaches and the like. Such measures may include chemical treatment of foundations and sealing of joints in construction.

## **9.2 Engineer's main Residency (Mithi City) and other Residency (Tando Jan Mohammed / Jhuddo)**

### **9.2.1 Resident Engineer Office Accommodation**

#### **A. General**

The Contractor shall provide the office accommodation for the whole Contract Period. The office accommodation shall be provided in a rented building to be hired by the Contractor for this purpose. The building shall be located in a safe and clean area of the city. The location and construction of the rental accommodation shall be approved by the Engineer. The office accommodation shall be of minimum 6 to 7 office rooms of suitable sizes, a conference room, 4 toilets with washing facilities, kitchen and a tea room.

The rental accommodation shall have construction in accordance with the standard applicable building code and shall have a leak-free, properly insulated, with adequate structural capacity for normal static and dynamic loads, including any high winds or earthquakes which could be reasonably expected in the area.

The Contractor shall maintain, for the whole Contract Period, the Office accommodation including the repair and/or replacement of any item contained therein and in addition shall supply all materials as stipulated therein, including, toilet paper, light bulb, fluorescent tubes, supply of water and electrical power, gas, telephone, office consumable and items and other services as hereinafter specified.

The Contractor shall provide and guard services for the office on a twenty-four (24) hour basis. The total number and schedule of all guard personnel shall be such as to

provide round the clock watch & guard service. The contractor shall also provide appropriate office messengers.

The Contractor shall provide all necessary janitorial services for the entire facilities. The services shall include floor cleaning, servicing and cleaning toilets, window washing, etc. Janitorial services shall be performed on a daily basis with personnel and programming of the work as approved and directed by the Resident Engineer.

The Contractor shall maintain the Office in a neat and attractive manner and provide daily garbage and trash collection and disposal. The Contractor shall maintain all fire extinguishers and air conditioners as recommended by the manufacturer and shall clean/or replace air filters at regular intervals of one month or as required by the manufacturer of these items.

## **B. Furniture and Equipment for the Resident Engineer Office**

The Contractor shall in addition to normal stationery requirements, provide for specified period (s), new furnishings and equipment complying at least to the following list and as per the approval of the Engineer. All furnishings and equipment are for the exclusive use of the Resident Engineer and their staff.

### **i) Office**

<b>Quantity (Nos)</b>	<b>Item</b>
1	- Light table, (1.60 x 0.80 x 0.75 m high) with in-laid opaque plate glass 1.4 m x 0.60 m x 5 mm and 6 no. fluorescent lamps, 40 watts each, mounted 10 cm under the plate glass.
5	- Lockable metal filing cabinets for drawings (1.0.x 0.80 x 0.75 m) with 4 no. drawers.
5	- Metal filing cabinets with 4 no. lockable drawers
As Req'd.	- Metal waste baskets
5	- Standard good quality office desks
5	- Swivel type padded desk chairs with arms and castors
4	- Executive desk with lockable drawers & glass top
4	- Executive type upholstered desk chair
2	- Computer Operator desk with chair and matching computer table.
1	- Conference table with padded swivel chairs for fifteen (10) persons
10	- Standard office chairs
2	- Book cases with two shelves
2	- Display boards
5	- Fire ,extinguishers (C02) wall hung
6	- Standard size staplers

1	-	Heavy duty stapler
2	-	Paper cutters
6	-	Paper hole punches
As Reqd.	-	Pencil sharpeners
4	-	Pencil sharpeners, desk mounted
1	-	Electric water cooler
6	-	Calculators, Casio (Scientific) latest model
1	-	Xerox or equivalent Photocopier including enlarging reduction etc. and automatic voltage stabilizer.
As Reqd	-	Venetian blinds and traverse drapes on all windows.
6	-	Air conditioners split (cooling & heating) 18,000 BTU or as required.
4	-	Plastic trash containers, 50 cm diameter. minimum by 75 cm high
10	-	Construction hard hats
1	-	Binding machine, Model No.212 PB by General Binding Corp or similar.
As Reqd.	-	ZEA 2500 W voltage regulator.
1	-	Facsimile Machine, heavy duty.
2	-	Branded Core 2 Duo computers including required hard and soft wares, laser printer, stabilizer, USB devices, other accessories and unlimited internet services.
2	-	Laser Printer latest model.
1	-	Lap top computer Sony or equivalent latest model of specifications to be approved by the Engineer
2	-	UPS, 1 KVA
1	-	Scanners
1	-	Digital camera Sony or equivalent
4	-	Mobile Phones (Nokia) with accessories (monthly maximum limit of phone bills shall be Rs. 3000 for each phone)
-	-	Generator set of adequate capacity for standby power supply to office

## ii) Kitchen

1	-	Single Stainless Steel Sink with Drainboard.
1	-	Electric Refrigerator, 0.40 cu.m capacity with separate freezer compartment, self defrost type.
1	-	Gas stove with 3 burners with gas bottles as required
1	-	Set of kitchen cabinets, lockable, with formica top for working space
2	-	Thermic jugs
2 Set	-	Pots, cups, saucers, water glasses, spoons and serving trays adequate for 20 persons
1 Set	-	Tea towels, w/towel rack and miscellaneous cooking pans, knives, forks, spoons etc. as required
As Reqd.	-	Exhaust fan

<b>iii)</b>	<b>Toilet</b>	<b>4 Nos.</b>
4	-	Water closets, European Style
4	-	Wash basins with hot and cold water and mirror
4	-	Stainless steel toilet paper holders
4	-	Paper towel dispensers
4	-	Mirrors, 40 cm x 50 cm
4	-	Ceramic urinals
4	-	Exhaust fan, W/screen, 1/2 Hp, 220 Volt
4	-	Towel holder

The Contractor shall provide any other item as required by the Resident Engineer for the office facility and maintain the office and equipment in proper manner all to the satisfaction of the Resident Engineer.

All furnishing, fittings, equipments shall remain the property of the Contractor and shall be handed over back to him on completion of the specified time period (s) in Contract Packages and as given in Bill No. 7. The rental building shall be handed over to its owner on Taking Over of the Works.

### C. Measurement & Payment

Provisional Sum included and so designated in the Bill of Quantities shall be used on the instructions of the Engineer, in whole or in part, for the cost of providing and maintaining the office accommodation in accordance with Clause 13.5 of Conditions of Contract.

Furniture and equipment provided for the office shall be paid month wise.

<b>Pay Item No.</b>	<b>Description</b>	<b>Unit of Measurement</b>
-----		
SS-9.2.1(a) & (b)	Provide , furnished & equipped Resident Engineer's Office (Rental)	Month
SS-9.2.1(c)	Maintain Resident Engineer's Office	Month

## **9.2.2 RESIDENT ENGINEER'S HOUSING ACCOMMODATION**

### **A. General**

The Contractor shall provide the housing accommodation for the whole Contract Period. The housing accommodation shall be provided in a rented building to be hired by the Contractor for this purpose. The building shall be located in a safe and clean area of the city. The location and construction of the rental accommodation shall be approved by the Engineer. The housing accommodation shall have minimum 6-7 bed rooms facility along with attached bath rooms, common room/dinning room, washing facility, kitchen room, store room, servant room, car parking area etc.

The rental accommodation shall have construction in accordance with the standard applicable building code and shall have a leak-free, properly insulated, with adequate structural capacity for normal static and dynamic loads, including any high winds or earthquakes which could be reasonably expected in the area.

The accommodation shall be provided with efficient drainage and sanitation. Housing shall be provided with potable water, gas and electricity available throughout 24 hours of each day.

The Contractor shall maintain, for the whole Contract Period, the residential accommodation including the repair and/or replacement of any item contained therein and in addition shall supply all materials as stipulated therein, including, toilet paper, light bulb, fluorescent tubes, supply of water and electrical power, gas, telephone, consumable items and other services as hereinafter specified. The Contractor shall pay for all utility bills.

The Contractor shall maintain all fire extinguishers and air conditioners as recommended by the manufacturer and shall clean/or replace air filters at regular intervals of one month or as required by the manufacturer of these items.

The Contractor shall provide guard services for the housing on a twenty-four (24) hour basis. The total number and schedule of all guard personnel shall be such as to provide round the clock watch & guard service.

The Contractor shall provide all necessary janitorial services for the entire facilities. The services shall include floor cleaning, servicing and cleaning toilets, window washing, etc. Janitorial services shall be performed on a daily basis with personnel and programming of the work as approved and directed by the Resident Engineer.

The Contractor shall provide, for specified period (s), furnishing and equipment, including curtains, linen, blankets, glassware, cutlery, crockery and kitchen utensils as appropriate. The requirements of furniture and equipment are listed in the schedule given below, which is intended only as a guide to indicate the minimum furniture requirements that will be acceptable.

All furnishings and equipment are for the exclusive use of the Engineer and their staff.

Contractor shall provide any other item as required by the Resident Engineer for the housing facility and maintain the office and equipment in proper manner all to the satisfaction of the Resident Engineer.

All furnishing, fittings, equipments shall remain the property of the Contractor and shall be handed over back to him on completion of the specified 24 months period. The rental building shall be handed over to its owner on Taking Over of the Works.

**B. Furniture and Equipment for Resident Engineer Housing**

	<b>Quantity</b>
<b>Item</b>	
Single Bed plus mattresses and pillows	6
Double Bed plus mattresses and pillows	1
Wardrobes	7
Chairs	10
Dining table and chairs (to seat 10 persons)	1 Set
Sofa Set (5-Seater)	3 Set
Kitchen cupboards and tables or fitted units	1 Set
Electric Water Coolers	1
Refrigerator large	2
Refrigerator small	1
Air Conditioners	8
Cooking Range	1
Bathroom wall mirror Shelf, medicine cabinet and towel rails	As Reqd
Elect. Gas water heater (geyser)	As Reqd
Glassware, cutlery, crockery, kitchen utensils etc	As Reqd
Towels, bed sheets, blankets/ quilts etc	As Reqd
Television Samsung 32 inch or equivalent	2
Fire Extinguisher	As Reqd
Room Heater (Electrical)	6 Nos.



### C. Measurement & Payment

Provisional Sum included and so designated in the Bill of Quantities shall be used on the instructions of the Engineer, in whole or in part, for the cost of providing and maintaining the housing accommodation in accordance with Clause 13.5 of Conditions of Contract.

Furniture and equipment provided for the housing accommodation shall be paid month wise.

Pay Item No.	Description	Unit of Measurement
SS-9.2.2(a) & (b)	Provide , furnished and equipped Resident Engineer's Housing(Rental)	Month
SS-9.2.2(c)	Maintain Resident Engineer's Housing	Month

### 9.2.3 ENGINEER'S BASE LABORATORY

#### A General

The Contractor shall provide and maintain, for the whole Contract duration, laboratory for the exclusive use of the Engineer and his staff, for testing soils, aggregates, concrete and bituminous materials. The laboratory shall be housed in a rental building, fully equipped with all utilities, furniture, apparatus and fittings appropriate to such use.

The Base Laboratory shall be located adjacent to the Resident Engineer Office or elsewhere as required by the Engineer. It shall consist of a hall and two offices with storage, lavatory and washing facilities. The total area of the laboratory building shall be 250 sq m. The hall shall be divided into bitumen section, soil and aggregates sections and a concrete section.

Outside the laboratory water tanks shall be constructed for curing concrete samples, of a size and location approved by the Engineer.

The laboratory shall be provided with electricity and shall be fully air-conditioned. It shall have a regular and dependable supply of water, gas and electricity available throughout 24 hours of each day. Payment of utility bills such as for electricity, gas, water supply and drainage will be the responsibility of the Contractor.

All rooms shall be provided with exhaust fans, located particularly over fume cupboards and the like.

The water supply shall be maintained by an elevated or pressure tank of adequate capacity.

The lavatory shall be connected to a septic tank of adequate capacity with a 200 mm sanitary pipe and ventilation pipe stack.

The Contractor shall provide qualified materials technicians and qualified laboratory helpers as deemed necessary by the Engineer to assist in operating the laboratory.

The Contractor shall maintain the Engineer's laboratory including the repair and / or replacement of any item. The Contractor shall maintain the laboratory and testing equipment in a satisfactory working condition at all times to enable the Engineer to test the materials and workmanship of the works during construction whenever required, damaged testing equipment shall be replaced by the Contractor and consumable goods shall be supplied in sufficient quantities when ordered by the Engineer for the sole use of testing the construction works. The Contractor shall meet all operating expenses.

The Engineer's Laboratory fittings, equipments including testing equipment and furnishings shall remain the property of the Contractor and shall be handed over back to him after 24 months period. The rental building shall be handed over back to its owner on Taking Over of the Works.

## **B Sampling**

It shall be the responsibility of the Contractor to take samples as required by the Engineer and to provide all necessary transport, labour, tools, containers, wrappings and so forth for uplifting and dispatching samples to the Engineer's Base Laboratory.

## **C Tests**

The Engineer's Base Laboratory shall be equipped to perform the following in-house tests :

TEST DESIGNATION	AASHTO
Moisture content test by oven drying	
Atterberg limits	T-89 & T-90
Moisture density relationship of soils (standard method)	T-99
Moisture density relationship of soils (modified method)	T-180, Method B and D

Specific gravity of soils	T-100
CBR test	T-193
Sieve analysis of soils and aggregate and mineral filler	T-88, T-27 and T-37
Specific gravity and water absorption of fine aggregates	T-84
Specific gravity and water absorption of coarse aggregates	T-85
Unit weight of aggregates	T-19
Los Angeles abrasion test for aggregates	T-96
Chemical tests:	
- Organic impurities for sand in concrete	T-21
- Chlorides and Sulphates in fine aggregates	ASTM-1411
- Potential alkali reactivity test	ASTM-C 289
Amount of material passing No. 200 sieve	T-11
Soundness of aggregates	T-104
Clay lumps and friable particles in aggregates	T-112
Curing concrete compressive test specimens	T-23
Compressive strength of concrete cylinder specimens	T-22
Quality of water to be used in concrete	T-26
Making and curing concrete test specimens in the laboratory	T-126
Plastic fines in graded aggregates and soils by use of sand equivalent test	T-176
Sampling bituminous materials	T-40
Marshall test and loss in stability	T-245
Specific gravity of compacted bituminous mixtures	T-166
Quantitative extraction of bitumen from bituminous paving mixtures	T-164
Viscosity of bitumen	T-20, T-202
Penetration of bitumen	T-49
Flash and fire points	T-48
Solubility of bituminous materials in organic solvents	T-44
Coating and stripping of bitumen-aggregate mixture	T-182
Petrographic analysis	

The Engineer's Base Laboratory shall be equipped to perform the following field tests:

TEST DESIGNATION	AASHTO
In-place density by sand cone method (with 15.25 cms and 30.5 cms cone)	T-191
In-place density of compacted base course containing large sizes of coarse	T-181
Coarse aggregates	
Sampling fresh concrete	T-141
Concrete slump	T-119
Sampling bituminous materials	T-40
Determining the temperature of bituminous paving mixtures	-
Coring and determination of bulk specific gravity of compacted bituminous Mixtures	T-230, T-166

If any additional testing is required other than mentioned above, the Contractor shall provide all assistance to conduct the test. The cost of all such tests shall be born by the Contractor.

## **D Furnishing**

The Contractor shall provide, for 24 months period, furnishings for the Engineer's Base Laboratory described in the following list to a quality approved by the Engineer. Substitution of type may be made only upon approval of the Engineer.

<b>No.</b>	<b>DESCRIPTION</b>
3	Standard office desks
3	Swivel type padded desk chairs
7	Work tables
15	Standard office chairs
6	Small tables
3	Side racks
3	Metal filing cabinets, 4-drawer
6	Electronic calculators
4	Air conditioners (cooling and heating)
2	Electric water coolers
1	Display board
3	Desk lamps, fluorescent, 20 watts
3	Standard size staplers
1	Heavy duty staplers
2	Paper cutters
2	Paper hole punches
2	Pencil sharpeners
4	Fire extinguishers

## **E Equipment**

The Contractor shall provide new laboratory equipment as noted in the list Equipment for the Engineer's Base Laboratory included herein. The equipment shall be purchased from Messrs Controls, or from equivalent international suppliers, all to the approval of the Engineer.

The Contractor shall submit a complete list of the equipment, apparatus and supplies he proposes to furnish for the Engineer's Laboratory. The list shall include the manufacturer's name and descriptive literature.

Additional equipment and materials shall be supplied by the Contractor at no additional cost as and when required by the Engineer to perform any test relevant to the Works.

## **F Measurement and Payment**

Provisional Sum included and so designated in the Bill of Quantities shall be used on the instructions of the Engineer, in whole or in part, for the cost of providing and maintaining the Engineer's base laboratory in accordance with Clause 13.5 of Conditions of Contract.

Furniture and equipment provided for the housing accommodation shall be paid month wise.

<b>Pay Item No.</b>	<b>Description</b>	<b>Unit of Measurement</b>
-----		
SS-9.2.3(a) & (b)	Provide, furnished and Equipped Engineer's Base laboratory (Rental)	Month
SS-9.2.3(c)	Maintain Engineer's Base laboratory	Month

### EQUIPMENT FOR THE ENGINEER'S BASE LABORATORY

SR. No.	EQUIPMENT DESCRIPTION	MODEL No. / Make	UNIT	QTY
<b>A.</b>	<b>GENERAL EQUIPMENT</b>			
1	Laboratory oven, capacity 220 litre	UNE-600	Each	1
2	Laboratory oven, capacity 100 litre	10-D1390	Each	1
3	Hot plate, maximum temperature 350°C	10-D1405/A	Each	1
4	Gas burner, two flames	999-G/S	Each	1
5	Bunsen burner with tripod	86D/1/1420	Each	1
6	Heavy duty straight spring scale	11-D695	Each	1
7	Heavy duty balance, 20 kg.	11-D610	Each	1
8	Triple beam balance, 2,610 grams	11-D605	Each	1
9	Cent-O-Gram balance, 311 grams	11-D600	Each	2
10	Platform balance 150 kg	11-D690/A	Each	1
11	Electronic precision balance	11-D629/Z	Each	1
12	Digital top pan balance 30 kg x 1 gram capacity with cradle	11-D612/A, D627/C	Each	1
13	Wall clock	-	Each	1
14	Stop watch	86-D1231	Each	1
15	Vernier caliper	86-D1652	Each	1
16	Thermometer, general, 0°C - 200°C	86-D1202		2
17	Maximum - minimum thermometer	86-D1215	Each	1
18	Sampling tools, complete set	40-T10/A	Each	1
19	Tongs	86-D1455	Each	2
20	Desicator	86-D1110	Each	1
21	Beaker, pyrex, 250 ml	86-D1073	Each	2
22	Beaker, pyrex, 600 ml	86-D1074	Each	2
23	Beaker, pyrex, 1,000 ml	86-D1075	Each	2
24	Funnel, 250 ml	86-G001	Each	2
25	Funnel, 500 ml	86-G002	Each	2
26	Volumetric flask, 100 ml	86-D1059	Each	2
27	Volumetric flask with stopper, 250 ml	86-D1060	Each	2
28	Volumetric flask with stopper, 500 ml	86-D1061	Each	2
29	Volumetric bottle flask, 250 ml	86-D1050	Each	2
30	Volumetric bottle flask, 500 ml	86-D1051	Each	2
31	Wash bottle, 100 ml	86-D1535	Each	2
32	Wash bottle, 250 ml	86-D1536	Each	2
33	Wash bottle, 500 ml	86-D1537	Each	2
34	Specific gravity bottles 100 ml (86D-1127)	86-D1003	Each	1
35	Graduated cylinder, 100 ml	86-D1004	Each	2
36	Graduated cylinder, 250 ml	86-D1006	Each	2

SR. No.	EQUIPMENT DESCRIPTION	MODEL No. / Make	UNIT	QTY
37	Graduated cylinder, 1,000 ml	86-D1092	Each	2
38	Reagent bottle stoppered, 2 litre	86-D1332	Each	2
39	Aluminium cans with cover, 2" diameter	86-D1333	L.S	*
40	Aluminium cans with cover, 3" diameter	86-D1334	L.S	*
41	Scoop	86-D1602	Each	2
42	Brush, fine	86-D1671	Each	1
43	Wire brush, coarse	86-D1670	Each	1
44	Wire brush, fine	86-D1673	Each	1
45	Bucket, 12 litre		Each	2
46	Trolly	86-D1703	Each	1
47	Shovel, large		Each	1
48	Pickaxe		Each	1
49	Sample splitter, coarse	15-D437	Each	1
50	Sample splitter, fine	15-D433	Each	1
51	Sieve shaker for 8" diameter sieve, motorised	15-D407	Each	1
52	Tin pan/tray, 12" x 12" x 2"		Each	4
53	Tin pan/tray, 16" x 16" x 3"		Each	4
54	Tin pan/tray, 24" x 16" x 3"		Each	4
55	Tin pan/tray, 20" x 16" x 4"		Each	4
56	Mortar porcelain, 200 mm diameter with rubber covered pestle	15-D1180	Each	1
<b>B.</b>	<b>COARSE AND FINE AGGREGATES SIEVE ANALYSIS</b>			
	<b>Sieve set 8" diameter:</b>			
1	1 inch	15-D110/2	Each	3
2	3/4 inch	15-D112/2	Each	2
3	1/2 inch	15-D115/2	Each	2
4	3/8 inch	15-D117/2	Each	2
5	No. 4 (4.74 mm)	15-D122/2	Each	2
6	No. 8 (2.36 mm)	15-D126/2	Each	2
7	No. 10 (2.00 mm)	15-D127/2	Each	3
8	No. 16 (1.18 mm)	15-D130/2	Each	2
9	No. 30 (0.60 mm)	15-D134/2	Each	2
10	No. 40 (0.425 mm)	15-D136/2	Each	3
11	No. 50 (0.300 mm)	15-D138/2	Each	2
12	No. 80 (0.180 mm)	15-D141/2	Each	1
13	No. 100 (0.150 mm)	15-D142/2	Each	2
14	No. 200 (0.075 mm)	15-D146/2	Each	3
15	Wet washing No. 200	15-D160/2	Each	3
	<b>Sieve set 12" diameter:</b>			

SR. No.	EQUIPMENT DESCRIPTION	MODEL No. / Make	UNIT	QTY
16	3 inch (75 mm)	15-D102/3	Each	2
17	2 1/2 inch (63 mm)	15-D103/3	Each	2
18	2 inch (50 mm)	15-D105/3	Each	2
19	1 1/2 inch (38 mm)	15-D107/3	Each	2
20	1 inch (25 mm)	15-D110/3	Each	2
21	3/4 inch (19 mm)	15-D112/3	Each	2
22	1/2 inch (12.5 mm)	15-D115/3	Each	2
23	3/8 inch (9.5 mm)	15-D117/3	Each	2
24	No. 4 (4.74 mm)	15-D122/3	Each	2
	<b>Sieve set 18" diameter:</b>			
25	3 inch (75 mm)	15-D102/45	Each	2
26	2 1/2 inch (63 mm)	15-D103/45	Each	2
27	2 inch (50 mm)	15-D105/45	Each	2
28	1 1/2 inch (38 mm)	15-D107/45	Each	2
29	1 inch (25 mm)	15-D110/45	Each	2
30	3/4 inch (19 mm)	15-D112/45	Each	2
31	1/2 inch (12.5 mm)	15-D115/45	Each	2
32	3/8 inch (9.5 mm)	15-D117/45	Each	2
33	No. 4 (4.74 mm)	15-D122/45	Each	2
34	Pan	15-D152/2 /3/45	Each	2
35	Cover	15-D152/2 /3/45	Each	2
36	Large Capacity Sample Splitter	15-D430	Each	1
37	Sample Splitter	15-D437	Each	1
<b>C.</b>	<b>ATTERBERG LIMITS</b>			
1	Liquid limit test set with all accessories	22-T32/AP	Each	1
2	Mixing Dish	86-D1172	Each	2
3	Moisture Tin	86-D1330	Each	10
4	Spatula	86-D1630	Each	2
5	Plastic limit test set with all accessories	22-T41	Each	1
<b>D.</b>	<b>SAND EQUIVALENT</b>			



<b>SR. No.</b>	<b>EQUIPMENT DESCRIPTION</b>	<b>MODEL No. / Make</b>	<b>UNIT</b>	<b>QTY</b>
1	Apparatus complete	22-T50/A	Set	1
<b>E.</b>	<b>COARSE AND FINE AGGREGATE UNIT WEIGHT</b>			
1	Density basket, brass	11-D612	Each	1
2	Sand absorption cone and tamper	47-D440	Each	1
3	Pycnometers	47-D441	Each	2
4	Specific gravity bottle	86-D1125	Each	1
5	Specific gravity bottle	86-D1126	Each	1
6	Specific gravity bottle	86-D1127	Each	1
<b>F.</b>	<b>ABRASION</b>			
1	Los Angeles abrasion machine with abrasion charges set	48-D500	Each	1
<b>G.</b>	<b>COARSE AND FINE AGGREGATE SOUNDNESS</b>			
1	Distilled water	-	L.S.	*
2	Sodium sulphate solution	-	L.S.	*
<b>H.</b>	<b>AGGREGATE FLAKINESS AND ELONGATION</b>			
1	Flakiness sieve test set	47-D415		1
2	Thickness Gauge	47-D540		1
3	Length Gauge	46-D541		1
<b>I.</b>	<b>MODIFIED COMPACTION</b>			
1	Straight edge	34-T99	Each	1
2	Scoop	86-D1601	Each	1
3	Scoop	86-D1602	Each	1
4	Mixing spoons	35-T143	Each	1
5	Sample ejector	16-T80	Each	1
6	Modified compaction hammer, 10 lbs	33-T76	Each	2
7	Modified compaction mould, 6" diameter	33-T71	Each	2
8	Modified compaction mould, 4" diameter	33-T70	Each	2
9	Preparation knife	Local	Each	1
10	Wooden hammer	Local	Each	1
11	Spatula	Local	Each	1
12	Mixing tray, 24" x 24" x 3"	Local	Each	*
<b>J.</b>	<b>LABORATORY CBR</b>			
1	Soaking, tank 60" x 120" x 24"	Local	Each	1
2	CBR mould, 6" diameter with collars, plate, screws	34-T90	Each	9
3	Filter Paper	86-D1800	L.S.	*

<b>SR. No.</b>	<b>EQUIPMENT DESCRIPTION</b>	<b>MODEL No. / Make</b>	<b>UNIT</b>	<b>QTY</b>
4	Swell Plates	34-T92	Each	9
5	Surcharge weights	34-T94	Each	18
6	Surcharge weights, slotted	34-T95	Each	2
7	Tripod attachment	34-T93	Each	9
8	Dial indicator	86-D1256	Each	9
9	Spacer, disc	34-T91	Each	2
10	CBR loading press, hydraulic, motorized	34-T105	Each	1
11	Proving ring, 2,000 lbs	82-T1002	Each	1
12	Proving ring, 6,000 lbs	82-T1007	Each	1
13	Proving ring, 13,000 lbs	82-T1009	Each	1
<b>K.</b>	<b>FIELD DENSITY</b>			
1	6 inches sand density cone apparatus (Complete Set)	35-T130	Each	3
2	Spoon	Local	Each	2
3	Plastic bags	Local	L.S	*
4	Chisel, 12"	Local	Each	2
5	Hammaer, 2.5 lbs	Local	Each	2
6	Field balance	11-D608	Each	2
7	Speedy moisture tester	19-T24	Each	2
8	Nuclear density guage, Troxler XFL		Each	1
9	Sieve No. 30 (0.60 mm)	15-D136/6	Each	2
<b>L.</b>	<b>BITUMEN</b>			
1	Bitumen penetration test, penetrometer (Complete Set)	81-B100/A	Set	1
<b>M.</b>	<b>ASPHALT</b>			
1	Marshall stability compressive machine (with all Accessory)	76-B29A	Each	1
2	Marshall compaction hammer	76-B58	Each	1
3	Marshall specimen mould holder	76-B56/B	Each	1
4	Marshall breaking head	76-B33	Each	1
5	Marshall flow mete	76-B34	Each	1
6	Marshall mixing apparatus	16-B72	Each	1
7	Water bath (thermostatic) controlled to 60°C	76-B66/S	Each	1
	<b>Bituminous extractor apparatus</b>	75-B23/A		
1	Filter disc	75-B22/1	L.S.	*
2	Mixing bowl (steel)	75-B22/2	Each	1
3	Asphalt oven	81-B160	Each	1
4	Vacuum pycnometer	75-D1122	Each	1
5	Extractor for slability mould	76-B57/B5	Each	1
6	Stability mould with collar	76-B57	Each	6

SR. No.	EQUIPMENT DESCRIPTION	MODEL No. / Make	UNIT	QTY
7	Compaction pedestal	76-B59	Each	1
8	Hammer Guide	76-B59/1	Each	1
9	Pavement core drill with 4" diameter core	83-D202	Each	1
10	Core bit, 4" diameter	83-D322/1	Each	4
11	Expendor Set	83-D312/1	Drum	*
12	Thermometer, metallic 350°C		Each	4
13	Hubbard-Carmick specific gravity bottle	86-D1115	Each	1
<b>M.</b>	<b>CONCRETE AND CEMENT</b>			
1	Compressive strength machine, heavy duty, 2000 KN	50-C52/B	Each	1
2	Steel scale	-	Each	2
3	Curing tank with temperature control	-	Each	1
4	Cement mould brush	-	Each	2
5	Laboratory concrete mixer	55-C196/1	Each	1
6	Concrete vibrator	55-C162/A	Each	1
7	Concrete tray	86-D1305/1	Each	*
8	Air meter complete	54-C170/D	Set	1
9	Cylinder mould, heavy duty, 6" diameter	54-C118/D	Each	9
10	Cylinder capping apparatus	54-C121/21	Each	1
11	Concrete capping compound	54-C121/1	Kg	*
12	Laboratory warming pot	54-C121/4	Each	1
13	Slump test cone	54-C149/A	Set	2
14	Tamper	55-C140	Each	1
15	Vibrating table	55-C161	Each	1
16	Concrete micrometer		Each	1
17	Vicat apparatus Complete set	63-L28/1	Set	1
18	Steel straight edge		Each	2
19	Hand gloves, rubber		Pair	*
20	Trowel triangular blade		Each	2
21	Cement cube mould	65-L80/A	Each	2

\* As per requirement

#### 9.2.4 ENGINEER'S VEHICLES

##### A General

The Contractor shall provide, for specified times period (s) as per Bill No. 7, on instruction of the Engineer and make available at all times for the exclusive use of the Engineer and his staff, the following new vehicles. Vehicles details are provided in Bill No. 7, as specified in contract packages.

The Contractor shall provide safe, experienced and competent drivers with the approval of the Engineer for all the vehicles. Each driver shall be responsible for the vehicle allocated to him for the duration of the Contract. The Contractor shall promptly replace any driver who, in the Engineer's opinion, is not satisfactory.

The Contractor shall provide vehicle within 15 days of receipt of such Engineer's instruction. For failure to provide said vehicles within the prescribed period of time, the Contractor will pay penalties to the Employer at the rate of Rs. 2,000/= per day for each vehicle not provided.

**B Maintenance of Vehicle:**

The Vehicles shall be registered, taxed, comprehensively insured, fuelled, repaired, serviced and maintained by the Contractor for the duration of the Contract in the following manner:

- i) Temporary replacement of vehicles if any vehicle be not in a road worthy condition until such vehicle is repaired and returned for use.
- ii) Maintenance, cleaning, repairs and servicing of the vehicles according to manufacturers recommendations and garaging, replacement of the tyres, batteries etc. whenever necessary and as required / directed by the Engineer / The Engineer.
- iii) Supply of necessary POL, Gas etc. (for project's use only).
- iv) Procurement and maintaining the validity of vehicles registration and insurance policies. Comprehensive insurance policy including theft, fire (covering a qualified driver authorized by the Engineer together with authorized passenger's liability cover). The policies and license shall be valid till the end of the project.
- v) If the Contractor fails to maintain the vehicles to the satisfaction of the Engineer or otherwise fails to comply fully with this section, the Engineer may withhold payment under this section, as he considers necessary. The Contractor shall bear all costs that may arise including delays due to failure of the Contractor to comply with this section.

**C Ownership Of Vehicles After Completion:**

The Engineer's vehicles shall remain the property of the Contractor and shall be handed over back to him at the end of specified period (s).

**D Measurement & Payment:**

Payment for the provision and maintenance of each vehicle shall be made in the manner stated below:

These payments shall be for the provision of vehicles and their maintenance , including drivers , fuel, lubricants , repairs, all insurance , taxes and every thing necessary to satisfy the requirements of this section.

<b>Pay Item No.</b>	<b>Description</b>	<b>Unit of Measurement</b>
-------------------------	--------------------	----------------------------

SS-9.2.4(a)	Provide Engineer's Vehicles	
-------------	-----------------------------	--

	Vehicles as per Bill No. 7	Month
--	----------------------------	-------

SS-9.2.4(b)	Maintenance of Engineer's Vehicles	
-------------	------------------------------------	--

	Vehicles as per Bill No. 7	Month
--	----------------------------	-------

### **9.3 ENGINEER’S SITE FACILITIES**

#### **9.3.1 FIELD ACCOMMODATION**

##### **A. GENERAL**

The Contractor shall provide, for the whole contract duration, field office cum residential accommodation for the Engineer’s field staff in a rented building to be hired by the Contractor for this purpose. The location and construction of the rental accommodation shall be approved by the Engineer. The accommodation shall comprise of an office room, three residential rooms, 2 toilets and a kitchen of appropriate sizes.

The rental accommodation shall have sound, adequate weather proof construction with adequate structural capacity and effective drainage and sanitation.

The Contractor shall maintain, for the whole contract duration, the field accommodation including the repair and/or replacement of any item contained therein and in addition shall supply all materials as stipulated therein, including light bulb, fluorescent tubes, supply of water and electrical power, gas, telephone, office consumable and items and other services as hereinafter specified. The Contractor shall pay for all the utility bills.

The Contractor shall provide all necessary janitorial services for the facility. The services shall include floor cleaning, servicing and cleaning toilets, window washing, etc. Janitorial services shall be performed on a daily basis.

The Contractor shall maintain the accommodation in a neat and attractive manner and provide daily garbage and trash collection and disposal.

##### **B FURNITURE AND EQUIPMENT FOR THE FIELD ACCOMMODATION**

The Contractor shall, in addition to normal stationery requirements, provide suitable furnishings and equipment complying at least to the following list and as per the approval of the Engineer. All furnishings and equipment are for the exclusive use of the Engineer’s field staff.

<b>Quantity (Nos)</b>	<b>Item</b>
<b>i) Office</b>	
1	- Lockable metal filing cabinets for drawings (1.0.x 0.80 x 0.75 m) with 4 no. drawers.
1	- Metal filing cabinets with 4 no. lockable drawers
As Reqd.	- Metal waste baskets
3	- Standard good quality office desks
6	- Standard office chairs
1	- Display boards
3	- Standard size staplers
1	- Heavy duty stapler

3	-	Paper hole punches
As Reqd.	-	Pencil sharpeners
1	-	Pencil sharpeners, desk mounted
3	-	Calculators, Casio (Scientific) latest model
3	-	Plastic trash containers, 50 cm diameter. minimum by 75 cm high
6	-	Construction hard hats
1	-	Digital camera Sony or equivalent
2	-	Mobile Phones (Nokia) with accessories (monthly maximum limit of phone bills shall be Rs. 2000 for each phone)
-	-	Generator set of adequate capacity for standby power supply

**ii) Kitchen**

1	-	Single Stainless Steel Sink with Drainboard.
1	-	Electric Refrigerator, 0.40 cu.m capacity with separate freezer compartment, self defrost type.
1	-	Gas stove
2	-	Thermic jugs
1 Set	-	Pots, cups, saucers, water glasses, spoons and serving trays adequate for 10 persons
1 Set	-	Glassware, cutlery, crockery, kitchen utensil etc.
1.	-	Exhaust fan

**iii) Toilet 2 Nos.**

2	-	Water closets, Eastern Style
2	-	Wash basins with mirror
2	-	Exhaust fan
	-	Towel holder

**iv) Residence**

3		Single bed with mattress and pillow
3		Wardrobe
3		Chairs
3		Table
As Reqd.		Linen, blankets, towel, curtains etc
2		Air conditioners
1		TV 26" and Refrigerator

The Contractor shall maintain the facility in proper manner all to the satisfaction of the Engineer/ Resident Engineer.

All furnishing, fittings, equipments shall remain the property of the Contractor on completion of the Works. The rental building shall be handed over to its owner.

## **C MEASUREMENT & PAYMENT**

Providing, furnishing, equipping and maintaining the field accommodation shall be measured and paid month wise.

<b>Pay Item No.</b>	<b>Description</b>	<b>Unit of Measurement</b>
SS-9.3.1(a)	Provide, equip and furnish Field Accommodation	Month
SS-9.3.1(b)	Maintain Field Accommodation	Month

## **9.3.2 ENGINEER'S FIELD LABORATORY**

### **A GENERAL**

The Contractor shall provide and maintain field laboratory for the whole contract duration for the exclusive use of the Engineer's field staff for testing. The field laboratory shall be housed in a rented room of size as required for keeping the field testing equipment and performing the required testing at site. The field laboratory shall be located adjacent to the field accommodation. and fully equipped with all utilities, furniture, apparatus and fittings appropriate to such use.

Outside the laboratory water tanks shall be constructed for curing concrete samples.

The field laboratory shall have a regular and dependable supply of water, gas and electricity available throughout 24 hours of each day. Payment of utility bills such as for electricity, gas, water supply and drainage will be the responsibility of the Contractor.

The Contractor shall provide qualified materials technicians and qualified laboratory helpers as deemed necessary by the Engineer to assist in operating the laboratory.

The Contractor shall maintain the field laboratory including the repair and / or replacement of any item. The Contractor shall maintain the laboratory and testing equipment in a satisfactory working condition at all times to enables the Engineer's staff to test the materials and workmanship of the works during construction. whenever required, damaged testing equipment shall be replaced by the Contractor and consumable goods shall be supplied in sufficient quantities when ordered by the



Engineer for the sole use of testing the construction works. The Contractor shall meet all operating expenses.

The Contractor shall provide for the Engineer's Field Laboratory necessary furnishings like chairs, working tables, cabinets etc.

The Field Laboratory fittings, equipments including testing equipment and furnishings shall remain the property of the Contractor on completion of the works. The rental building shall be handed over back to its owner.

## **B Sampling**

It shall be the responsibility of the Contractor to take samples as required by the Engineer's staff and to provide all necessary transport, labour, tools, containers, wrappings and so forth for uplifting and dispatching samples to the Engineer's Field or Base Laboratory.

## **C Tests**

The Engineer's Field Laboratory shall be equipped to perform the following in-house tests :

<b>TEST DESIGNATION</b>	<b>AASHTO</b>
Moisture content test by oven drying Atterberg limits	T-89 & T-90
Moisture density relationship of soils (modified method)	T-180, Method B and D
Sieve analysis of soils and aggregate and mineral filler	T-88, T-27 and T-37
In-place density by sand cone method (with 15.25 cms and 30.5 cms cone)	T-191
Concrete slump	T-119

If any additional testing is required other than mentioned above, the Contractor shall provide all assistance to conduct the test. The cost of all such tests shall be born by the Contractor.

## **D Equipment**

The Contractor shall provide new laboratory equipment as noted in the list Equipment for the Engineer's Field Laboratory included herein. The equipment shall be purchased from Messrs Controls, or from equivalent international suppliers, all to the approval of the Engineer.

The Contractor shall submit a complete list of the equipment, apparatus and supplies he proposes to furnish for the Engineer's Field Laboratory. The list shall include the manufacturer's name and descriptive literature.

Additional equipment and materials shall be supplied by the Contractor at no additional cost as and when required by the Engineer to perform any test relevant to the Works.

### EQUIPMENT FOR THE ENGINEER'S FIELD LABORATORY

SR. No.	EQUIPMENT DESCRIPTION	CONTROLS MODEL No.	UNIT	QTY
<b>A.</b>	<b>GENERAL EQUIPMENT</b>			
1	Laboratory oven, capacity 100 litre	10-D1390	Each	1
2	Gas burner, two flames	999-G/S	Each	1
3	Heavy duty balance, 20 kg.	11-D610	Each	1
4	Triple beam balance, 2,610 grams	11-D605	Each	1
5	Cent-O-Gram balance, 311 grams	11-D600	Each	2
6	Platform balance 150 kg	11-D690/A	Each	1
7	Electronic precision balance	11-D629/Z 11-D612/A,	Each	1
8	Digital top pan balance 30 kg x 1 gram capacity with cradle	D627/C	Each	1
9	Graduated cylinder, 100 ml	86-D1004	Each	2
10	Aluminium cans with cover, 2" diameter	86-D1333	L.S	*
11	Scoop	86-D1602	Each	2
12	Brush, fine	86-D1671	Each	1
13	Wire brush, coarse	86-D1670	Each	1
14	Shovel, large	15-D407	Each	1
15	Sieve shaker for 8" diameter sieve, motorised		Each	1
16	Tin pan/tray, 12" x 12" x 2"		Each	4
17	Tin pan/tray, 16" x 16" x 3"		Each	4
18	Tin pan/tray, 24" x 16" x 3"		Each	4
19	Tin pan/tray, 20" x 16" x 4"	15-D1180	Each	4
20	Mortar porcelain, 200 mm diameter with rubber covered pestle		Each	1
<b>B.</b>	<b>COARSE AND FINE AGGREGATES SIEVE ANALYSIS</b>			
	<b>Sieve set 8" diameter:</b>			
1	1 inch	15-D110/2	Each	3
2	3/4 inch	15-D112/2	Each	2
3	1/2 inch	15-D115/2	Each	2
4	3/8 inch	15-D117/2	Each	2

SR. No.	EQUIPMENT DESCRIPTION	CONTROLS MODEL No.	UNIT	QTY
5	No. 4 (4.74 mm)	15-D122/2	Each	2
6	No. 8 (2.36 mm)	15-D126/2	Each	2
7	No. 10 (2.00 mm)	15-D127/2	Each	3
8	No. 16 (1.18 mm)	15-D130/2	Each	2
9	No. 30 (0.60 mm)	15-D134/2	Each	2
10	No. 40 (0.425 mm)	15-D136/2	Each	3
11	No. 50 (0.300 mm)	15-D138/2	Each	2
12	No. 80 (0.180 mm)	15-D141/2	Each	1
13	No. 100 (0.150 mm)	15-D142/2	Each	2
14	No. 200 (0.075 mm)	15-D146/2	Each	3
15	Wet washing No. 200	15-D160/2	Each	3
	<b>Sieve set 12" diameter:</b>			
16	3 inch (75 mm)	15-D102/3	Each	2
17	2 1/2 inch (63 mm)	15-D103/3	Each	2
18	2 inch (50 mm)	15-D105/3	Each	2
19	1 1/2 inch (38 mm)	15-D107/3	Each	2
20	1 inch (25 mm)	15-D110/3	Each	2
21	3/4 inch (19 mm)	15-D112/3	Each	2
22	1/2 inch (12.5 mm)	15-D115/3	Each	2
23	3/8 inch (9.5 mm)	15-D117/3	Each	2
24	No. 4 (4.74 mm)	15-D122/3	Each	2
<b>C.</b>	<b>ATTERBERG LIMITS</b>			
1	Liquid limit test set with all accessories	22-T32/AP	Each	1
2	Mixing Dish	86-D1172	Each	2
3	Moisture Tin	86-D1330	Each	10
4	Spatula	86-D1630	Each	2
5	Plastic limit test set with all accessories	22-T41	Each	1
<b>D.</b>	<b>MODIFIED COMPACTION</b>			
1	Straight edge	34-T99	Each	1
2	Scoop	86-D1601	Each	1
3	Scoop	86-D1602	Each	1
4	Mixing spoons	35-T143	Each	1
5	Sample ejector	16-T80	Each	1
6	Modified compaction hammer, 10 lbs	33-T76	Each	2
7	Modified compaction mould, 6" diameter	33-T71	Each	2
8	Modified compaction mould, 4" diameter	33-T70	Each	2
9	Preparation knife	Local	Each	1
10	Wooden hammer	Local	Each	1
11	Spatula	Local	Each	1

SR. No.	EQUIPMENT DESCRIPTION	CONTROLS MODEL No.	UNIT	QTY
12	Mixing tray, 24" x 24" x 3"	Local	Each	*
<b>E.</b>	<b>FIELD DENSITY</b>			
1	6 inches sand density cone apparatus (Complete Set)	35-T130	Each	3
2	Spoon	Local	Each	2
3	Plastic bags	Local	L.S	*
4	Chisel, 12"	Local	Each	2
5	Hammaer, 2.5 lbs	Local	Each	2
6	Field balance	11-D608	Each	2
7	Speedy moisture tester	19-T24	Each	2
8	Nuclear density guage, Troxler XFL		Each	1
9	Sieve No. 30 (0.60 mm)	15-D136/6	Each	2
<b>F.</b>	<b>CONCRETE AND CEMENT</b>			
1	Compressive strength machine, heavy duty, 2000 KN	50-C52/B	Each	1
2	Steel scale	-	Each	2
3	Curing tank with temperature control	-	Each	1
4	Cement mould brush	-	Each	2
5	Laboratory concrete mixer	55-C196/1	Each	1
6	Concrete vibrator	55-C162/A	Each	1
7	Concrete tray	86-D1305/1	Each	*
8	Air meter complete	54-C170/D	Set	1
9	Cylinder mould, heavy duty, 6" diameter	54-C118/D	Each	9
10	Cylinder capping apparatus	54-C121/21	Each	1
11	Concrete capping compound	54-C121/1	Kg	*
12	Laboratory warming pot	54-C121/4	Each	1
13	Slump test cone	54-C149/A	Set	2

## E MEASUREMENT AND Payment

Providing, furnishing, equipping and maintaining the field laboratory shall be measured and paid month wise.

Pay Item No.	Description	Unit of Measurement
SS-9.3.2(a)	Provide, equip and furnish Engineer's Field Laboratory	Month
SS-9.3.2(b)	Maintain Engineer's Field Laboratory	Month

### **9.3.3 VEHICLES FOR FIELD STAFF**

#### **A GENERAL**

The Contractor shall provide, for the whole contract duration, the following new vehicle for the exclusive use of the Engineer's field staff:

- Suzuki Mehran or equivalent,  
new and latest model, Air Conditioned and  
fully equipped as per manufacturer's Specifications. 1 No.

The Contractor shall provide safe, experienced and competent driver with the approval of the Engineer for the vehicle. Driver shall be responsible for the vehicle allocated to him for the duration of the Contract. The Contractor shall promptly replace any driver who, in the Engineer's opinion, is not satisfactory.

The Contractor shall provide vehicle within 15 days of receipt of such Engineer's instruction. For failure to provide said vehicle within the prescribed period of time, the Contractor will pay penalties to the Employer at the rate of Rs. 2,000/= per day.

#### **B MAINTENANCE OF VEHICLE:**

The Vehicle shall be registered, taxed, comprehensively insured, fuelled, repaired, serviced and maintained by the Contractor for the duration of the Contract in the following manner:

Temporary replacement of vehicle if vehicle be not in a road worthy condition until such vehicle is repaired and returned for use.

Maintenance, cleaning, repairs and servicing of the vehicle according to manufacturers recommendations and garaging, replacement of the tyres, batteries etc. whenever necessary and directed by the Engineer.

Supply of necessary POL, Gas etc. (for project's work).

Procurement and maintaining the validity of vehicle registration and insurance policies. Comprehensive insurance policy including theft, fire (covering a qualified driver authorized by the Engineer together with authorized passenger's liability cover). The policies and license shall be valid till the end of the project.

If the Contractor fails to maintain the vehicle to the satisfaction of the Engineer or otherwise fails to comply fully with this section, the Engineer may withhold payment under this section, as he considers necessary. The Contractor shall bear all costs that may arise including delays due to failure of the Contractor to comply with this section.

**C OWNERSHIP OF VEHICLES AFTER COMPLETION:**

The vehicle shall remain the property of the Contractor and handed over back to him on the completion of the works.

**D MEASUREMENT & PAYMENT:**

Providing and maintaining the Vehicles shall be measured and paid month wise

<b>Pay Item No.</b>	<b>Description</b>	<b>Unit of Measurement</b>
SS-9.3.3(a)	Provide Vehicle for Engineer's field staff Suzuki Alto VXR (M)CNG (1 No.)	Month
SS-9.3.3(b)	Maintenance of Engineer's field staff Vehicle Suzuki Alto VXR (M) CNG (1 No)	Month

**9.3.4 ENGINEER'S SURVEY EQUIPMENT**

**A GENERAL**

The Contractor shall provide and maintain, for the whole contract duration, survey equipment for the use of the Engineer and his Staff. All the survey equipment shall be new and shall be maintained throughout the Contract duration and replaced by the Contractor free of charge in case of damage or loss howsoever caused. The Contractor shall also arrange calibration of all surveying instruments after every three months.

After the completion of the Works the survey equipment shall remain the property of the Contractor and shall be handed over back to him.

## B Equipment

The Contractor shall provide and maintain the following survey equipment:

No.	DESCRIPTION	
1	Total Station survey units complete	Sokkia SET2010 or Equivalent
	.5” Reading 2” Accuracy, Range with Prism 3.5 km complete with:	
	<ul style="list-style-type: none"> <li>- Built in Data lodger</li> <li>- Main Unit with WA-type Tribrach</li> <li>- BDC 35 Rechargeable Battery X2</li> <li>- CDC 40 Quick charger</li> <li>- 5000 points Built in memory + SDC Memory card (128k byte)</li> <li>- CPT Tubular Compass</li> <li>- Sunshade, Lens Cap, Plumbbob,</li> <li>- Vinyl Cover, Tool Kit, Cable, Belt,</li> <li>- Basic Operation Manual, Carrying Case</li> <li>- Precision Wooden Tripod</li> </ul>	
2	Automatic Level complete with tripod	AL 32 A or equivalent
2	Aluminium Telescopic Tripod	Sokkia PFA1 or equivalent
4	Levelling Staff (local manufacture)	
2	Range Pole Level	Sokkia AP61L or equivalent

3 Steel measuring tape, 50 m long

4 Steel measuring tape, 20 m long

10 Steel measuring tape, 3 m long

**C Consumables**

The Contractor shall provide adequate supplies of expendable materials, such as pencils, rubbers, inks, notebooks, drawing paper, survey pegs, brushes and paints as required by the Engineer.

**D Measurement and Payment**

Providing and maintaining the Survey equipment shall be measured and paid month wise.

<b>Pay Item No.</b>	<b>Description</b>	<b>Unit of Measurement</b>
-----		
SS-9.3.4(a)	Provide Survey Equipment	Month
SS-9.3.4(b)	Maintain Survey Equipment	Month