प्रपत्र-21

GEOTECHNICAL INVESTIGATION REPORT

FOR

"PREPARATION OF DPR FOR DEVELOPMENT OF ECONOMIC CORRIDORS, INTER CORRIDORS, FEEDER ROUTES AND COSTAL ROADS TO IMPROVE THE EFFICIENCY OF FREIGHT MOVEMENT IN INDIA UNDER BHARATMALA PARIYOJANA (LOT-4/PACKAGE-2) FOR THE STRETCHES OF KOTDWAR BYPASS

SUBMITTED TO:

UPHAM INTERNATIONAL CORPORATION

1101 B, 11th Floor, Tower A-II, Corporate Park Plot No. 7A/1, Sector – 142, Noida 201301, Uttar Pradesh

PREARED AND SUBMITTED BY:

KUNIKA GEOTECHNICAL SERVICES PVT LTD

(AN IS0 9001-2015 CERTIFIED COMPANY)

F – 7, 1103, SUPER TECH ECO VILLAGE – I, GREATER NOIDA WEST, UTTAR PRADESH, kgsindia@yahoo.com, Ph. No. 8750787882, 7011416334

परियोजना निदेशक / Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
पी०आई०यू० नजीबाबाद, जिला-बिजनौर (यू.पी.)
PIU- Najibabad, Distt.-Bijnor (U.P.)

वन प्रभागाधिकारी
वन प्रभाग, कोटद्वार

CONTENTS

परियोजना निदेशक /Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
पी०आई०यू० नजीबाबाद, जिला-बिजनौर (यू.पी.)
PIU- Najibabad, Distt.-Bijnor (U.P.)

56

REPORT ON GEOTECHNICAL INVESTIGATION FOR BHARATMALA PARIYOJANA (LOT-4/PACKAGE-2) KOTDWAR BYPASS

1.0 INTRODUCTION:

The client, NHAI, has undertaken a project of "Consultancy Services for Preparation of DPR for development of economic corridors, inter corridors, feeder routes and costal roads to improve the efficiency of freight movement in India under Bharatmala Pariyojana (Lot-4/Package-2) for the stretches of Development of Kotdwar Bypass.

1.1 **M/s NHAI**, have entrusted the work to **M/s UPHAM International Corporation.**

1.2 **M/s UPHAM International Corporation** have entrusted the work of sub soil investigation at structure locations to **M/s Kunika Geotechnical Services Pvt. Ltd. (KGSPL),** F – 7, 1103, Super Tech Eco Village – I, Greater Noida West.

1.3 KGSPL carried out the field - work during July - August, 2021. Field identification tests and some in situ strength tests as well as laboratory tests on soil samples were carried out.

1.4 All the field work and laboratory tests were conducted as per the IS specifications and instructions of client. This report is based on the data collected during the field work and laboratory testing on collected soil samples.

2.0 DETAILS OF SITE :

2.1 The details of the site & test location for the proposed project are shown in the figure.

3.0 SCOPE OF WORK:

The scope of work provided to us for this project was limited to the following:-

3.1 Mobilizing necessary plant, equipment and personnel to the project site, setting up the equipment, shifting of the equipment from one test location to another location, carrying out the field investigations on land and demobilization on completion of work.

3.2.2 Making 150mm diameter bore holes at various locations in all types of soil or rock stratum using suitable approved method of boring at the specified locations to be given at site by the Engineer-in-Charge up to desired depths

3.2.3 Conducting standard penetration tests in the bore holes at 1.50 m interval in depth &at every change of strata, whichever is earlier as per specifications / instructions of Engineer-in-Charge.

3.2.4 Collecting undisturbed soil samples from bore holes at 3.00 m interval in depth or at every change of strata, whichever is earlier as per specifications.

3.2.5 Collecting disturbed soil samples from bore holes at regular interval and at every identifiable change of strata to supplement the boring records.

3.2.6 Collecting Rock core samples from the borehole at regular intervals.

3.2.7 Recording the depth of ground water table in all the bore holes if observed up to the depth of exploration during boring work as per specifications & withdrawing the casing pipe.

परियोजना निदेशक / Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
पी०आई०यू० नजीबाबाद, जिला-बिजनौर (यू.पी.)
PIU- Najibabad, Distt.-Bijnor (U.P.)

57

वन क्षेत्राधिकारी
कोटद्वार रेंज, कोटद्वार
वैनसडौन वन प्रभाग कोटद्वार

3.3 Conducting the following laboratory tests on selected disturbed / undisturbed soil samples/rock samples collected from various bore holes / test locations :-

1. **Soil Samples**
   - (a) Sieve Analysis.
   - (b) Hydrometer Analysis
   - (c) Specific Gravity
   - (d) Moisture Content
   - (e) Dry Density
   - (f) Atterberg Limits
   - (g) Direct Shear Test
   - (h) Triaxial Shear Test
   - (i) Consolidation Test

2. **Rock Samples**
   - (a) Density Tests
   - (b) Water Absorption and Porosity
   - (c) Determination of Specific Gravity
   - (d) Unconfined Compression Test
   - (e) Carry out Point Load Index.

3.4 Preparation and submission of report in three copies.

4.0 FIELD INVESTIGATIONS:

4.1 Necessary plant, equipment and personnel for conducting the requisite field work were mobilized to the site. These were shifted from one test location to another location during execution of the field work and demobilized on satisfactory completion of the entire field work.

4.2 Five bore holes carried out were first marked on the ground surface as per the layout given to us by the Engineer-in-Charge.

4.3 All bore holes were bored at this site as per IS: 1892-1979. Casing as required was used to retain the bore holes.

4.3.1 Standard penetration tests were conducted in the above bore hole at every 1.50 m interval & at change of strata as per specifications / instructions of Engineer-in-Charge. The bore was cleaned up to the desired depths. Standard split spoon sampler attached to lower end of 'A' drill rods was driven in the bore holes by means of standard hammer of 63.5 Kg. falling freely from a height of 75 cm. The sampler was driven 45 cm as per specifications & the numbers of blows required for each 15 cm penetration were recorded. The numbers of blows for the first 15 cm penetration were not taken into account. This was considered as seating drive. The numbers of blows for next 30 cm penetrations were designated as SPT 'N' value. Wherever the total penetration was less than 45 cm, the number of blows & the depth penetrated is incorporated in respective bore logs. Disturbed soil samples obtained from standard split spoon sampler for all the above standard penetration tests were collected in polythene bags of

परियोजना निदेशक / Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
पी०आई०यू० नजीबाबाद, जिला-बिजनौर (यू०पी.)
PIU- Najibabad, Distt.-Bijnor (U.P.)

वन क्षेत्राधिकारी
कोटद्वार रेंज, कोटद्वार
लैन्सडौन वन प्रभाग

suitable size. These samples were properly sealed, labelled, recorded and carefully transported to the laboratory for testing.

4.3.3 When rebound or refusal was resulted during SPT attempt, the drilling bit was changed to TC (tungsten carbide) or diamond and core recovery, RQD (rock quality designation) both were measured.

4.3.4 Undisturbed soil samples were collected from the bore hole at every 3.00 m interval in depth & at change of strata as per sampling specifications, in thin walled sampling tubes of 100 mm dia. and 450 mm length fitted to an adopter with ball and socket arrangement. These sampling tubes after retrieval from the bore holes were properly waxed and sealed at both ends. These were carefully labeled and transported to the laboratory for testing. Undisturbed soil samples wherever slipped during lifting, were duly marked in the field bore logs as well as in the soil profile.

4.3.5 Rock cores were also collected from the boreholes at suitable depths/intervals to supplement the boring records. These samples were collected in core boxes of suitable sizes. These samples were properly sealed, labeled, recorded & carefully transported to the laboratory for testing.

4.3.6 Disturbed soil samples were also collected from the bore hole at suitable depths/intervals to supplement the boring records. These samples were collected in polythene bags of suitable size. These samples were properly sealed, labeled, recorded & carefully transported to the laboratory for testing.

4.3.7 The depth of ground water table was checked / measured in the bore hole during the boring activity.

4.3.8 **Summary of Borehole:**

Structure Type	New Chainage	Span-Arrangement	No. of Bore Hole	Boring Length (m)	Total Boring Length (m)	Location
ROB	0+011	15m+1x48m+15m	1	15	15	At P2 location (0+035)
MJB	1+300	5x30m	1	15	15	At P2 location (1+285)
Elevated		--	1	15	15	BH-1, 2+300
Elevated		--	1	15	15	BH-1,5+760
Elevated		--	1	15	15	BH-2,5+945

5.0 LABORATORY INVESTIGATIONS:

5.1 The following laboratory tests were conducted on selected soil samples recovered from various bore hole / test locations: -

5.1 GRAIN SIZE ANALYSIS

For this purpose an oven dry pulverized soil sample is sieved through the set of sieves 20mm, 10mm, 4.75mm, 2.0mm, 1.0mm, 600micron, 300micron, 150micron and 75micron. The amounts of soil retained on each sieve are noted down. The %

retained, cumulative % retained and % passing are computed by these retained weights. If the % passing 75 micron sieve is appreciable, Hydrometer method is used to find the % fraction of particle sizes from 75micron to 2micron.

5.2 LIQUID LIMIT

For liquid limit, Casagrande apparatus is used. For this test air dry soil sample passing 425micron is taken and mixed with distilled water to give a stiff and homogeneous paste and is left for sufficient time for maturing in an air tight container. A portion of the above paste is kept in the cup of Casagrande apparatus, a groove is cut with groove cutting tool and blows are imparted by turning the handle at the rate of 2 revolutions per second. The numbers of blows are counted till the continuous contact of the bottom of the groove occurs. Few quantity of soil from the close portion of the groove after the contact occurs, are taken and its water content is determined by oven drying method.

The liquid limit (w_L) is computed by the equation.

$w_L = w_N(n/25)e$

Where w_N =water content (% corresponding to n blows)

e=0.092 for soils with $w_L<50$

=0.12 for soils with $w_L>50$

5.3 PLASTIC LIMIT

For this test sample is prepared in the same way as for liquid limit test. A ball is formed of sub sample weighting about 5 gm. This ball is rolled between the fingers of one hand and the glass plate with pressure sufficient to reduce the mass into a thread of about 3mm in 5 to 10 complete forward and back movements. When a diameter of 3mm is reached, soil is again remolded into a ball. The process of rolling and remolding is repeated until the thread a start just crumbing at a diameter of 3mm.The crumbled thread is immediately transferred to an air tight container for determination of its moisture content by oven drying method.

This water content is termed as plastic limit. (w_p)

5.4 PLASTICITY INDEX

The plasticity index Ip is given by

$I_p = w_L - w_p$

5.5 WATER CONTENT

For this test the soil sample of known quantity (w_m) is taken in a container.

The container with this soil sample is placed in an oven for drying at 105-110°c for 16-24 hours. After drying the dry sample is again weighed to determine the dry weight of sample (w_d)

परियोजना निदेशक /Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
पी०आई०यू० नजीबाबाद, जिला-बिजनौर (यू.पी.)
PIU- Najibabad, Distt.-Bijnor (U.P.)

The moisture content is computed by the following equation:

$w_N = (w_m - w_d)/ w_d$

5.6 DRY DENSITY & BULK DENSITY

For determination of bulk density, a sample of known volume 'V' is extracted from the undisturbed sample. Its bulk weight 'W' and moisture content 'w_N' is determined by oven drying method.

The bulk density is determined by following equation

$\gamma_b = W/V$ and dry density $\gamma_d = \gamma_b /(1+w_N)$

5.7 SPECIFIC GRAVITY

The specific gravity of soil sample is determined by density bottle method. For this test 5-10g (w_2) sample of oven dry, cool soil is taken in 50ml capacity density bottle and its weight is noted down. The soil is covered with distilled water and left for sufficient period for suitable soaking. The entrapped air is removed by vacuum. The soil in bottle is filled full with water and its weight is noted down as w_3. The mass of empty bottle (w_1) and bottle with full distilled water also noted (w_4).

The specific gravity is found by the following equation.

$G=w_2-w_1/[(w_2-w_1)-(w_3-w_4)]$

5.8 DIRECT SHEAR TEST

For this test shear box test apparatus is used. The prepared specimen from remolded/undisturbed sample is placed carefully in the box. The plain grid is kept on top of the specimen with its serrations at right angles to the direction of shear. The upper porous stone is placed on the grid and loading pad on the stone. The box with specimen is gently placed in the container (water jacket). The specimen is submerged with water. The container is mounted with the shear box and the specimen inside, on the shearing machine. The upper part of the box is so adjusted that it touches the proving ring. The jack is brought forward to bear up against the box container. The proving ring dial gauge is set to read zero.

The steel ball is placed in the recess of loading pad. The loading yoke is set in contact with steel ball on loading pad. Vertical displacement dial gauge to read zero in contact with the top of the yoke. The normal load is applied and any change in thickness of specimen is recorded. Shear displacement dial gauge is also set to read zero.

परियोजना निदेशक /Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
पी०आई०यू० नजीबाबाद, जिला-बिजनौर (यू.पी.)
PIU- Najibabad, Distt.-Bijnor (U.P.)

वन क्षेत्राधिकारी
कोटद्वार रेंज, कोटद्वार
चैलडौन वन प्रभाग कोटद्वार

The locking screw is now removed and two parts of the shear box are separated by advancing the spacing screws. The specimen is sheared at constant rate of strain. The readings of the proving ring dial gauge are noted down every 15 seconds for the first one minute and then every 30 seconds thereafter. The reading of change in the thickness dial gauge and shear displacement dial gauge are also recorded at the same time interval. The test is continued until the specimen fails. The specimen is assumed to fail when the proving ring dial gauge starts receding or at shear displacement of approximately 15% of the length takes place.

The soil is removed from the box and test is repeated on the identical specimen under increased normal load. For consolidated undrained test the specimen is prepared and set in the apparatus as above and after submergence, the specimen is allowed to consolidate fully under normal loads. The specimen is then sheared as in undrained test. At the end of the test, the specimen is removed and its final water content is determined. The test is repeated on other identical specimen in similar way under increasing normal loads. For drained test, after completion of consolidation under a particular normal load, specimen is sheared at a slow rate to allow the pore water pressure inside the specimen may be drained out ie completely dissipated. Final water content of failed specimen is determined. The test is repeated on other identical specimen after consolidation under increasing normal loads.

5.9 TRIAXIAL SHEAR TEST

For this test Triaxial Shear Test apparatus with pore pressure measurement apparatus is used. The porous disc or plain disc, depending on the test conditions is placed on the pedestal of the triaxial cell. The specimen is placed centrally on the disc. A correct size membrane is fitted inside the stretcher with ends of membrane folded over those of the stretcher. Vacuum is applied to stretch the membrane to the inside surface of the stretcher is carefully slipped around the specimen kept on the pedestal. The vacuum on the membrane is released. Its bottom part is rolled down into the pedestal. Depending on the type of test porous or plain disc is placed on the top of the specimen and then pressure pad is placed. The top part of membrane is rolled on to the pressure pad. Now the stretcher is removed and ends are sealed with 'O' rings. With the properly sealed specimen placed centrally on the pedestal, the cell is assembled, keeping the loading piston initially clear of the pressure pad of the Specimen. The assembly is placed in the loading frame. For unconsolidated untrained test, the bottom drainage valve (BDV) and top drainage valve (TDV) of cell, is closed and air release valve (ARV) is opened. The cell is filled with water through the cell water valve CWV. ARV is closed when water begins to escape through it. The cell pressure is raised to the desired valve and kept constant till the end of the test.

If initially unsaturated specimen is to be saturated before the test, the specimen is mounted in the cell with porous disc. The specimen is saturated by back pressure saturation method. When the cell pressure is applied, the load piston rises upward, the loading machine is operated at the anticipated rate to bring the load piston slightly above the pressured pad of the specimen and the load measuring dial gauge on

परियोजना निदेशक / Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
पी०आई०यू० नजीबाबाद, जिला-बिजनौर (यू.पी.)
PIU- Najibabad, Distt.-Bijnor (U.P.)

SA Infrastructure Consultants Pvt. Ltd. India

62

वन प्रभाधिकारी
कोटद्वार रेंज, कोटद्वार
लैन्सडौन वन प्रभाग कोटद्वार

proving ring is set to zero. The piston is brought just in contact with pressure pad by hand operation of the machine. The axial compression dial gauge is mounted and set to read zero. The axial loading is started at constant rate of strain. Simultaneous readings on the load and compression dial gauges are noted down. The test is continued until a recession of the axial load is observed. After failure, the specimen is unloaded by reversing the loading machine, cell pressure is reduced and cell water is drained out after opening the ARV. The cell is dismantled and the specimen is taken out rubber membrane is removed and weight of the failed sample and its water content is determined. The test is repeated on two more identical specimens with increasing cell pressure. For consolidated undrained test, first the specimen is saturated by back pressure saturation. The saturated specimen is then consolidated fully under a cell pressure. After consolidation is complete, the axial load is applied and the test is conducted as for undrained test. The pore pressure developed during the undrained test portion is measured by the pore pressure measuring system. After the completion of test, pore pressure apparatus and mercury control system is disconnected, cell is dismantled and sample is taken outside to determine its weight and final water content. The test is repeated on three identical specimen using increasing cell pressure for consolidation. For consolidated drained test, the specimen is first allowed to consolidate under a confining pressure as in consolidated undrained test. Then sample is failed under drained condition. After consolidation is complete, the axial load is applied and the test is conducted as for undrained test. The pore pressure developed during the undrained test portion is measured by the pore pressure apparatus. After completion of test the pore pressure apparatus. After completion of test the pore pressure apparatus and mercury control system is disconnected, cell is dismantled and sample is taken outside to determine its weight and final water content. The test is repeated on three identical specimens using increasing cell pressure for consolidation.

5.10 CONSOLIDATION TEST

For this test a consolidation test apparatus is used. The porous stones is soaked in water and then wiped away any excess water. One stone is placed in the central seating of the water trough. The guide rings are attached to both ends of the specimen ring and the specimen is gently placed on the porous stone inside the trough of consolidation apparatus with a filter paper against each face of the specimen. Other porous stone is placed on the top of the specimen and then over it the pressure pad and the steel ball is placed. Now the consolidation cell is placed in position on the bed of the loading machine. Counter balanced beam is adjusted into a level position. Settlement dial gauge is mounted and initial dial reading is noted down. An appropriate initial pressure is applied on the specimen and dial readings are recorded at elapsed times (0.25, 1, 2.25, 4, 6.25, 9, 12.25, 16, 20.25, 25, 36, 49, 64 -------). After the final dial reading under the first applied pressure, the specimen is consolidated further under successive higher pressures. Readings of settlement dial gauge are noted down for each increment of pressure as above. Having completed the

परियोजना निदेशक/Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
पी०आई०यू० नजीबाबाद, जिला-बिजनौर (यू.पी.)
PIU- Najibabad, Distt.-Bijnor (U.P.)

वन क्षेत्राधिकारी
कोटद्वार रेंज, कोटद्वार
वैलसर्जन वन प्रभाग कोटद्वार

consolidation of specimen under the maximum pressure, ensuring that water in the trough fully surrounds the specimen, applied pressure is reduced to zero and specimen is allowed to take up water and swell. After 24 hours, final dial gauge reading corresponding to the end of test is noted down. The consolidation cell is removed from the loading machine. The specimen is taken out, cleared off the filter papers, transferred into the container and dried in an oven for determining final water content and weight of soil solids.

6.0 FINDING OF GEOTECHNICAL INVESTIGATION:

The study of bore logs/results of laboratory and other field tests as above from ground level reveal that:-

6.1 At the location

The sub-soil strata: -

LAYER TYPE – I, Boulders with Sand

Chainage (Km.)	Location (Pier/ ABT. No.	Depth of water table (m)
0.035	BH 1, P2 ROB	7.90
1.285	BH 2, P2 MJB	NIL
2.300	BH 1, ELEVATED	NIL
5.760	BH 1, ELEVATED	NIL
5.945	BH 2, ELEVATED	NIL

7.0 PROPOSED DEPTH & TYPE OF FOUNDATIONS

Analysis for allowable bearing capacity on rock has been done by the following three methods.

a) Presumptive values as published in IS 12070, IRC:78

b) Based on rock mass rating (RMR value).

c) Based on UCS value: As per IRC -78 & IS : 8764 - 1998, CL . 7.2

8.0 RECOMMENDATIONS

8.1 The values of net allowable pressure intensity computed based on the above selected soil/ rock parameters are shown below.

परियोजना निदेशक / Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
पी०आई०यू० नजीबाबाद, जिला-बिजनौर (यू.पी.)
PIU- Najibabad, Distt.-Bijnor (U.P.)

वन अधिकारी
कोटद्वार (गढ़), कोटद्वार
लैन्सडौन वन प्रभाग

Chainage (Km.)	Location (Pier/ ABT. No.	Depth of Foundation below existing Ground level (m)	Size of Foundation (m)	Net Safe Bearing Capacity/ Allowable Pressure Intensity (T/m^2)
0.035	BH 1, P2 ROB	4.0 5.0	7mx7m, 8mx8m, 9mx9m	37.5
1.285	BH 2, P2 MJB	4.0 5.0	7mx7m, 8mx8m, 9mx9m	37.5
2.300	BH 1, ELEVATED	4.0 5.0	7mx7m, 8mx8m, 9mx9m	37.5
5.760	BH 1, ELEVATED	4.0 5.0	7mx7m, 8mx8m, 9mx9m	37.5
5.945	BH 2, ELEVATED	4.0 5.0	7mx7m, 8mx8m, 9mx9m	37.5

The effect of ground water table in the bore holes encountered up to the depth of exploration during exploration at site has been considered at existing ground surface for analysis purposes, as it may rise in heavy rainy season or due to unforeseen reason.

CHEMICAL ANALYIS OF SOIL SAMPLES

Chainage (Km)	Location (Pier/ ABT. No.)	pH, (IS 3025–11)	Soluble Sulphate as SO4 (IS 3025 – 24)	Chloride as Cl, (IS 3025–32)
0.035	BH 1, P2 ROB	7.41	0.013 %	0.010 %
1.285	BH 2, P2 MJB	7.45	0.012 %	0.013 %
2.300	BH 1, ELEVATED	7.43	0.011 %	0.010 %
5.760	BH 1, ELEVATED	7.44	0.014 %	0.013 %
5.945	BH 2, ELEVATED	7.49	0.013 %	0.011 %
	Permissible Limit	> 6	0.25 %	0.20 %

CHEMICAL ANALYSIS OF WATER SAMPLES

Chainage (Km)	Location (Pier/ ABT. No.)	pH	Chloride (as Cl) in ppm	Sulphate (as SO_4) in ppm
0.035	BH 1, P2 ROB	7.8	43.5	31.3
1.285	BH 2, P2 MJB	7.7	41.6	32.4
2.300	BH 1, ELEVATED	7.4	43.5	34.5
5.760	BH 1, ELEVATED	7.6	43.8	33.6
5.945	BH 2, ELEVATED	7.4	43.3	32.9
	Permissible Limit	> 6	500	400

SA Infrastructure Consultants Pvt. Ltd.

परियोजना निदेशक /Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
पी०आई०यू० नजीबाबाद, जिला-बिजनौर (यू.पी.)
PIU- Najibabad, Distt.-Bijnor (U.P.)

वन क्षेत्राधिकारी
कोटद्वार रेंज, कोटद्वार
गढ़वाल वन प्रभाग

9.0 CLOSURE

We appreciate the opportunity to submit this Geotechnical Investigation Report. The above recommendations have been made on the basis of in situ tests and laboratory tests conducted on the samples collected from the boreholes bored at the locations given by the client. If during excavation, any unusual or abnormal features are noticed, these may be brought to the attention of geotechnical consultant before proceeding with construction work for further suggestions.

For KUNIKA GEOTECHNICAL SERVICES PVT LTD

SAMIR PANDEY
(DIRECTOR)

परियोजना निदेशक / Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
पी०आई०यू० नजीबाबाद, जिला-बिजनौर (यू.पी.)
PIU- Najibabad, Distt.-Bijnor (U.P.)

वन क्षेत्राधिकारी
कोटद्वार रेंज, कोटद्वार
सहायक वन प्रभाग