Environmental Monitoring Report

Project Number: 37143-033
May 2017
Part B: Annexures

Period: January 2016 – December 2016

IND: North Eastern States Roads Investment Program (Project 2)

Subproject: Improvement and Upgradation of Serchhip – Buarpui Road (Mz02) Project 2 Road in State of Mizoram

Submitted by

Project Implementation Unit, Government of Mizoram, Aizwal

Asian Development Bank

Sl no. 2

Date :-
Buarpui Project

NO OBJECTION FOR DUMPING AREA

I, P.U. NGHAKMAWIA S/o. R. AWLNUMA ....Age........

Village Thenzawl...... Dist. Serchhip Mizoram.

Declare that M/s Tantia Construction Limited may be used My Land as a disposal of Earth cutting for Serchhip to Buarpui Road project (MZ02).

In my Land Ram Patta No. 60680/1/20/159 dated 02/02/2011.

And I will no further claim for my above dumping land, chainage from 9+210...M to 9+250...M.

NGHAKMAWIA

Acceptance Signature

(VANLALZAHNA)

VCP Signature

President
Village Council
[illegible]

TCL Signature

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SL No : 1

Date :-

Buarpui Project

NO OBJECTION FOR DUMPING AREA

I, Vanlalruala S/o Huapuia Age. 85.

Village. Thenzol Dist. Serchhip Mizoram.

Declare that M/s Tantia Construction Limited may be used My Land as a disposal of Earth cutting for Serchhip to Buarpui Road project (MZ02).

In my Land Ram Patta No. .....dated.....

And I will no further claim for my above dumping land, chainage from.....M to .....M.

(VANLALZAUVA)
VCP Signature

VANLALRUATA
Acceptance Signature

President
Village Council
Thenzol

TCL Signature

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NO OBJECTION FOR DUMPING AREA

CONTRACTOR'S NAME : TANTIA CONSTRUCTION LIMITED

PROJECT NAME:- MZ02 SERCHHIP TO BUARPUI ROAD IN THE STATE OF MIZORAM) (PROJECT-2

WORKING SITE THENZAWL TO BUARPUI

SL.NO.	DATE	CHAINAGE		LENGTH (m)	REMARK'S
		FROM	TO		
1	16-11-2015	12990	13060	70	PART-II
2	16-11-2015	13320	13340	20	PART-II
3	16-11-2015	13450	13490	40	PART-II
4	16-11-2015	13540	13570	30	PART-II
5	16-11-2015	13600	13650	50	PART-II
6	16-11-2015	13760	13780	20	PART-II
7	16-11-2015	13820	13850	30	PART-II
8	16-11-2015	14310	14360	50	PART-II
9	16-11-2015	14390	14460	70	PART-II
10	16-11-2015	14570	14620	50	PART-II
11	16-11-2015	14630	14700	70	PART-II
12	16-11-2015	14900	14950	50	PART-II
13	16-11-2015	15010	15060	50	PART-II
14	16-11-2015	15760	15810	50	PART-II
15	16-11-2015	16260	16300	40	PART-II
16	16-11-2015	16430	16470	40	PART-II
17	16-11-2015	16560	16610	50	PART-II
18	16-11-2015	17680	17710	30	PART-II
19	16-11-2015	18750	18800	50	PART-II

TANTIA CONSTRUCTIONS LIMITED KOLKATA

(VANLALZAWNA)

President
Village Council Co...

The

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Sr -7 ✓

Date :- 31/10/15
~~Buarpui~~ Project mal-

Part I

NO OBJECTION FOR DUMPING AREA

I R. chhuntluanga S/o T. HANGHLIRA Age. late

Village Saiham Dist Aizawl Mizoram.

Declare that M/s Tantia Construction Limited may be used My Land as a disposal of Earth cutting for Serchhip to Buarpui Road project (MZ02).

In my Land Ram Patta No. .....dated.....

And I will no further claim for my above dumping land, chainage from 80+190M to 80+010.M. = 90mts

Zhingle
(ZOHMINGSIAMA)
VCP Signature
President
Village Council/Court
Saiham, Aizawl District

R. Chhuntluanga 31/10
Acceptance Signature
(Landowner)

Cutting Area. 13 to 15 Km Dumping on A21-Lungleiba

TCL Signature

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SL-8-1

Date :- 31-10-15
Buarpui Project mat

Part I

NO OBJECTION FOR DUMPING AREA

R. Lal Chhuntelunga S/o Thanglira Age 58

Village Sailam Dist Aizawl Mizoram.

Declare that M/s Tantia Construction Limited may be used My Land as a disposal of Earth cutting for Serchhip to Buarpui Road project (MZ02).

In my Land Ram Patta No. ..... dated.....

And I will no further claim for my above dumping land, chainage from 80+130 M to 80+140 M. = 10 mt

80+130 to 80+140 = 10 mt

ZOHMINGLIANA
VCP Signature

President
Village Council/Court
Sailam, Aizawl District

R. Chhuntunga
Acceptance Signature
(Land owner)

TCL Signature

Cutting Area 1370 is Dumping on A-21 Land to Road

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TANTIA CONSTRUCTIONS LIMITED

Our Ref: TCL/TZL/ADB-PWD/2015-16 / 1649 A2 (69)
Date: 10-06-2015

The Team Leader
Project office – Aizawl
M/s MSV International Inc.
H.No. U/12/A, Laipuitlang,
Aizawl ,Mizoram.

AIZAWL OFFICE COPY

Sub: - *Appointment of Qualified Environment specialist for implement of EMP.*

Name of work: Improvement & Up-gradation of Road Section "Serchhip-Buarpui (MZ 02)" (Project 2 Roads in the State of Mizoram). Contract No. PIU/NESRIP/MZ02/CSC/2014 .

Dear sir,

We wish to confirm the appointment of *M/S MIZORAM ENVIRONMENTAL CONSULTANTS , GOVT ZIRTIRI RESIDENTIAL SCIENCE COLLEGE , AIZAWL PIN.796007 , MIZORAM,* for the implementation of EMP for the project . They will be conducting tests as per the requirement of the contract and will submit reports as per your guidelines.

This is for favour of your information please.

Thanking you.

Yours faithfully
for Tantia Constructions Ltd.

(B. L. AIRSARIA)
Director ,Business Development.)

COPY TO: The Project Director, PWD - for favour of information please.
SIPMIU,
Tuakhuahtlang
Aizawl – 796 001 (Mizoram)

24/6/15
Received
PIU, PWD
Tuikhuahtlang

MSV INTERNATIONAL INC. AIZAWL
Received 24/6/15

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MIZORAM ENVIRONMENTAL CONSULTANTS

MONITORING DATA

1. NOISE LEVEL

1). The noise survey was carried out on 14-15 August, 2015 between 12:30 - 03:30 pm.

2). Location:

The ambient noise measurement was carried out within the area of Base Camp, Tantia Construction Ltd. near R. Mat

3). Instrumentation

Noise Level Meter: Model SI-4010, LUTRON ELECTRONIC ENTERPRISE CO., LTD

4). Weather Condition: The sky was cloudy and with light wind during measurement.

Rainfall	Temp (Max)	Temp (Min)	Cloud Cover	Precipitation (Max)	Precipitation (min)	Wind speed	Wind direction
4 mm	29°C	20° C	82%	99	59	2 km/h	South East

5). Method

The DSLM was placed at a height of 0.5m above ground. The device was positioned 3 m away from Base Camp Office (Mat River Camp), near the Hot-Mix plant and vehicle parking area.

The device was calibrated immediately prior to, and after readings were taken. Noise measurement was conducted for two sites. The Leq (15 min), L10 and L90 were recorded.

6). Result: The background noise levels recorded during the survey are shown below.

Monitoring Location		Tantia constructions Ltd. Base camp (Mt River Camp
Description of Location		12 kms from Serchhip Zero Point
Date of Monitoring		15 Aug 2105
Measurement Start Time		12:30 to 3:30 pm
Measurement Time Length		15 min/ location
Results	L90	70 -74 db
	L10	60 65db
Source of noise: a) Major Construction Noise b) Crusher, Hot-mix Plant installation under process c) Other noise like High Volume Air Sampler, automobiles, Up- stream river, etc		

Note:

1. Peak level (noise from High Volume Air Sampler and HMV / Truck)
2. Minimum level detected: 62-65 dB

2. WATER QUALITY MEASUREMENT

Instrument: Water Quality (Potable Water Analyser Kit; Model PE 148)

Turbidity	:	5 NTU.
EC	:	258
pH	:	7.8
DO	:	7.5 ppm
Temperature:		Upstream 24°C a
		Down Stream 24°C
		Stock point water tank 28°C

3. AIR QUALITY MEASUREMENT

Instrument: High Volume Air Sampler (Manufactured by NEERI, India)

Weighing Instrument: Digital Balance (Wensar Model T14)

PM_{10}	:	40 $\mu g/m^3$
$PM_{2.5}$	:	20 $\mu g/m^3$
NOx	:	< 30 $\mu g/m^3$
SOx	:	<40 $\mu g/m^3$

TANTIA CONSTRUCTIONS LIMITED

2016

SECOND REPORT

MONITORING REPORT OF

IMPACT ON AIR, WATER AND NOISE QUALITY DUE TO ROAD CONSTRUCTION OF Serchhip to Buarpui via Thenzawl Corridor

(MZ02)

MIZORAM ENVIRONMENTAL CONSULTANTS M.E.C

Submitted by
Mizoram Environmental Consultants(MEC)

MEC Monitoring Team:

Prof. Lalnundanga	-	Team Leader, MEC
Mr. Lalrinmawia	-	Managing Director, MEC, & Environmental Expert
Mr. Laltanpuia	-	Environmental Expert
Dr. R. Lalengmawia	-	Environmental Expert
Mr. Zohmangaiha		Field Assistant
Mr. Imanuel Lianzama		Field Assistant
System Assistant	-	R. Rodinmawia
Local Informant	-	Lalropuia

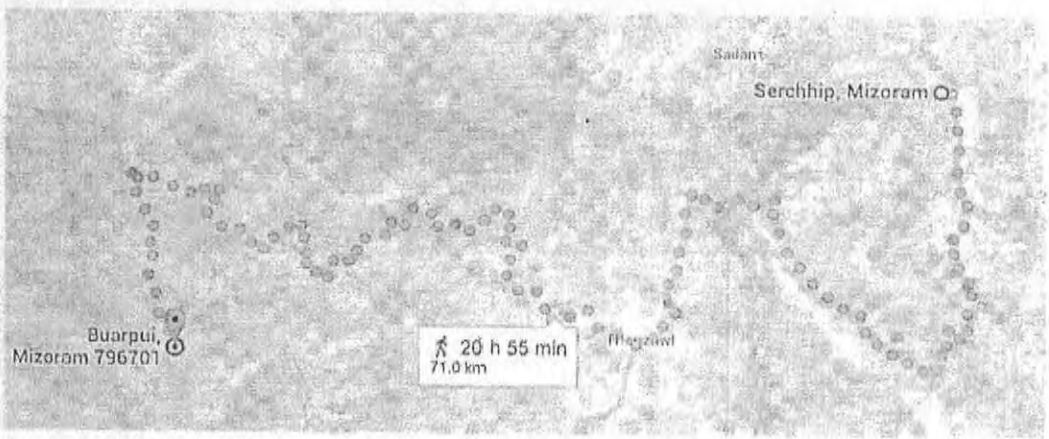
MIZORAM ENVIRONMENTAL CONSULTANTS
Govt. ZirtiriResidential Science College (MZU)
Aizawl, Mizoram – 796001
Email : mecmizoram@gmail.com /lrmawia@gmail.com
Phone : 0389 -2423948, 0389-2341102 (Fax),
Mobile: 0943614 6274/0524/2176, 09436196952

(LALRINMAWIA)
Managing Director
Mizoram Environmental Consultants (MEC)
Aizawl : Mizoram

SECOND MONITORING REPORT OF IMPACT ON AIR, WATER AND NOISE QUALITY DUE TO ROAD CONSTRUCTION OF SERCHHIP TO BUARPUI VIA THENZAWL CORRIDOR

1. DATE OF VISIT : 25th – 26th March, 2016 (Construction Stage)

2. AREA MONITORED : Tantia Construction Ltd.Base Camp at Mat River, Thenzawl Road.



3. PARTICIPANTS FROM TANTIA CONSTRUCTION LTD.:

1. Sudhir Kumar Pathak - Safety & Environmental Officer
2. Vijay - Material Engineer
3. MSV Consultants - MSV International Inc

1. BRIEF INTRODUCTION

The proposed Project road section (MZ02) (henceforth mentioned as the project) between Serchhip to Buarpui, proposed for improvement and upgradation has been dividedinto two sections. These are Part I: Serchhip to Thenzawl (15 km) and Part II: Thenzawl to Buarpui (40 km). In total, the project included improvement and upgradation of 55 km of existing road section.

The project road takes off from NH54 at Sailiamkawn intersection (Km 114.200 near Serchhip) and ends at Sialsuk junction on state highway (length 15.2 km). The second part of the road takes off from km 82 of Aizawl-Lunglei state highway at Thenzawl and ends at Buarpui (length 39.8 km). The total length of the road Project therefore spans a distance of 55 km. The vegetation of the entire corridor is subtropical forest which is partially degraded.

Since the area falls under Indo-Myanmar biodiversity hotspot, occurrences of certain species which having ethnobotanical importance are known to be present.

2. WEATHER CONDITION

The following data were observed and recorded during the period of monitor:-

Wind Speed/velocity	:	3mph
Wind direction	:	South-west
Cloud cover	:	10%
Precipitation (Average humidity)	:	72%
Rainfall	:	nil
Latitude& Longitude	:	23° 18.524` N, 92° 48.563`E
Temperature	:	29°C

MONITORING OF AIR QUALITY

Introduction

This section presents the results and comments for the monitoring of air quality impacts during construction phase of the project. The measurements are taken by spot visits and various sampling techniques. Experiments and samplings are carried out wherever standard methods are available. The following instruments are used for monitoring the chosen parameters.

Instrumentation and Methodology

High Volume Air Sampler (manufacturer – Lawrence Mayo Pvt. Ltd., Kolkata) is used for measuring the particulates and gases. The high volume sampler or Respirable Dust Sampler (HVS attached with cyclone separator) is be capable of drawing air through a portion of a clean glass fibre of 20 cm × 25 cm size with an effective area approximately 400 cm^2 at a flow rate of 1 m^3/min with a permissible variation of 0.3 m^3/min over 24 h. The sampling sites are strategically selected at five (5) pre-defined sites. These sampling sites represent point sources.

The parameters initially selected for study are - SPM, RPM, SO_2, NOx, CO and Pb. Gravimetric methods are use for measuring particulate matters. Pre-weighed Glass Fibre filter paper (Whatman GF/2) is used for collecting SPM. A pre-weighed RPM cup is used for measuring the respirable particulates. The Air Sampler is placed at the selected sites and allowed to run for 4 hours. The following table shows ambient Air Quality standards in India.

The standards for air quality prescribed by **Central Pollution Control Board (CPCB)** in India is given below:

Location	SPM	SOx	NOx
Industrial and Mixed Areas	500$\mu g/m^3$	120$\mu g/m^3$	120$\mu g/m^3$
Residential and Rural Areas	200$\mu g/m^3$	80$\mu g/m^3$	80$\mu g/m^3$
Sensitive Areas	100$\mu g/m^3$	30$\mu g/m^3$	30$\mu g/m^3$

Sampling period: The Sampling period and rate of sampling, with the type of sampling programme as described in 'Guidelines for Ambient Air Quality Monitoring' (CPCB, 2003) given below is followed. Normally the sampling periods are 30 minutes, one hour, one to four hours and eight hours depending upon the expected concentration of the pollutant, its nature and the investigation patterns. Based on practical experience the air sampling rates with respect to sampling period are as follows:

Type	Period of Sampling	Rate of Sampling (Lit/min.)
1	30 minutes	2
2	1 hour	1
3*	1-4 hours	0.5
4	8 hours	0.2-0.5
5	8-24 hours	0.1-0.2 9.4

*In this study, Type 3 programme is followed for sampling period.

Sample collection: 20 ml of ice-preserved absorbing media is placed in the impinger and the instrument is operated as per the selected sampling period and rate of sampling (Lit/min.). After completion of the sampling, the impingers are removed and sample volume is measured. Measurements for RPM and SPM are immediately taken as soon as the samples are ready. All other measurements are done at the Laboratory. Standard spectrophotometric methods are essentially followed.

The following equation is used for the calculation of gaseous pollutants in the ambient air.

$$\text{Concentration } (\mu g/m^3) = \frac{(A-B) \times G.F \times Tv \times 1000}{T \times Fr \times Va}$$

A = Absorbance of exposed sample

B = Absorbance of reagent blank solution

G.F = Graph factor of the concerned pollutant. (µg/abs.)

Tv = Total volume of the exposed sample (ml)

1000 = Conversion factor from litres to m^3

T = Total sampling time (min.)

Fr = Sampling flow rate (Litre/min.)

Va = volume taken for analysis (ml)

Note: T x Fr is equal to total volume of air in litres. The concentration of the gaseous pollutants can also be expressed in µg/Nm3 after correcting the total volume of air at 25o C temperature and 760 mm Hg pressure.

1. Result:

Sampling Station	SPM (per m^3)	RPM (per m^3)	SOx		NOx		Remarks
			Absorb-ance (nm)	Concen-tration (per m^3)	Absorb-ance (nm)	Concen-tration (per m^3)	
Tantia Base Camp at Mat River	500 µg	400 µg	0.054	40 µg	0.032	55 µg	Sampling period used : 4 hrs

Inference

All the measured values of air quality parameters showed values below harmful level as described by the National Ambient Air Quality Standards (NAAQS). It can be inferred that during the period of investigation, the ambient air quality of the sampling site has exhibited levels of air quality with adequate margin of safety to protect public health, vegetation and property.

The result obtained may be attributed to the prevailing condition of weather during monitoring as mentioned above. No excavation work is in progress near the base camp and the hot-mix plant is not yet in service.

Recommendation

It is recommended that utmost care and management strategy must be enforced to maintain this ambient air quality, as far as practicable. In future, even during peak construction activities, strict protocols must be laid down to protect a clean ambient atmosphere.

MONITORING OF WATER QUALITY

Introduction

This section presents the results and comments for the monitoring of water quality impacts during construction phase of the project.

Primary water quality criteria for different uses have been indentified based on the concept of "Designated Best Use" (DBU) used in India for classification of surface water is adopted as reference for study of water quality as given below:

Designated Best Use	Class	Criteria
Drinking water source without conventional treatment but after disinfentions	A	1. Total coliform organisms MPN/100 ml shall be 50 or less 2. pH between 6.5 – 8.5 3. DO 6 mg/l or less 4. BOD 2 ml/l or less 5. TDS 500 mg/l 6. Total Hardness 300 mg/l 7. Iron 0.3 mg/l 8. Flouride 1.5 mg/l 9. Chloride 250 mg/l
Outdoor bathing (organized)	B	1. Total coliform organisms MPN/100 ml shall be 500 or less 2. pH between 6.5 – 8.5

		3. DO 5 mg/l or less 4. BOD 3 ml/l or less 5. Flouride 1.5 mg/l
Drinking water source with conventional treatment followed by disinfection	C	1. Total coliform organisms MPN/100 ml shall be 5000 or less 2. pH between 6 – 9 3. DO 4 mg/l or less 4. BOD 3 ml/l or less 5. Iron 50 mg/l 6. Flouride 1.5 mg/l 7. Chloride 600 mg/l
Propagation of wild life, fisheries	D	1. pH between 6.5 – 8.5 2. DO 4 mg/l or less 3. Free ammonia (as N) 1.2 mg/l or less 4. EC 1μ mhos/cm
Irrigation, industrial cooling, controlled waste disposal	E	1. pH between 6.0 – 8.5 2. EC less than 2250μ mhos/cm 3. Sodium absorption ratio less than 26 4. Boron less than 2 mg/l

Equipments

The following equipments/instruments were used for monitoring water quality :

Sl. No.	Parameters	Instruments/Equipments
1.	Ambient temperature	(i) Digital Thermo-hygrometer (range – 50°C – 280°C (ii) Digital stem thermometer (range – 10°C – 200°C

2.	pH	Portable Digital pH meter
3.	Water quality (physical)	(i) Water Analyzer PE – 138 (ELICO) (ii) Deluxe Water & Soil Analysis Kit (EI Product – model 191 E)
4.	Software	(i) SPSS version 7.5 (ii) MS office XP (iii) ACD Fotocanvas 2.0

Result

Sample	°C	pH	EC	Tur-bidity	TDS	DO	Hard-ness	F	NO_3	SO_4	Fe	TC
Base Camp	22	6.9	65	7	84.2	6.9	77	0.6	26	161	1.0	<50
Mat River	23	6.7	67	10	120.3	6.8	79	0.5	62	163	1.5	100

Comments

The two sampling sites are strategically chosen to represent a running water used for drinking (Sample 1: Base Camp water) and another source which is used for other purposes other than drinking (Sample 2: Mat river). It was found that Sample 1 conforms to drinking water standards while Sample 2 does not meet up to the standards with respect to certain parameters. For instance, the physical appearance was highly coloured during the sampling period. This observation was confirmed by the turbidity reading which was recorded at 26 NTU. In addition, the amount of NO_3 present was detected to be more than the desired drinking water standard which could be attributed to influx of

nitrogenous wastes into the pond as a result of natural as well as anthropogenic activities. The Total Coliform level as measured using MPN is 100, which suggests contamination from human activity or animals that frequent the pond. It is concluded that the overall water quality of both Samples studied in this report are satisfactory.

AMBIENT NOISE MONITORING

Introduction

This section provides information on typical levels generated by various construction equipments and provides guidance on assessment of noise from the construction activities related to transit facilities. It should be noted that the level of noise analysis should be commensurate with the type and scale of the project, and the presence of noise-sensitive land uses in the construction zone.

Ambient Air Quality Standards in respect of Noise

Area Code	Category of Area/Zone	Limits in dB(A) Leq *	
		Day Time	NightTime
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

Note :

a. Day time shall mean from 6.00 a.m. to 10.00 p.m.

b. Night time shall mean from 10.00 p.m. to 6.00 a.m.

c. Silence zone is defined as an area comprising not less than 100 metres around hospitals, educational institutions and courts. The silence zones are zones which are declared as such by the competent authority.

Result

The following table shows the observations recorded during monitoring:

Sl. No.	Time Interval (min)	Minimum (dB)	Maximum (dB)	Remark
1	0	67	72	
2	4	65	68	
3	8	58	64	
4	12	63	79	
5	16	52	69	
6	20	56	70	
7	24	62	71	
8	28	63	79	
9	32	52	69	
10	36	65	79	
11	40	59	69	
12	44	52	70	
13	48	56	71	
14	52	62	79	
15	56	52	78	
16	60	56	70	

L_{90} = 72 – 79 db

L_{10} = 60 – 65 db

1. Peak level (noise from High Volume Air Sampler and HMV /Truck vehicles/Generator) = 79dB
2. Minimum level detected = 60-65 dB

Comments

The ambient noise level observed during the monitoring visit as given in the above table can be summarized that the ambient noise detected does not cause much concern since the readings (average noise level detected 52 – 79 dB) is within acceptable level. The higher noise levels recorded by the instrument arose from the noise generated by occasional passing of Heavy motor vehicles, as well as Air Sampler machine which was in operation nearby

PHOTO PLATE

Plate – 1

Envirotech high volume air Sampler.

Department for Scientific and Industrial Research (DSIR):

Recognized by DSIR & National Physical Laboratory (NPL)

Fig. Noise Meter , Water Analyzing kit and BOD Bottle, etc

Lutron ISO 9001 certified manufacturer- Lutron Electronic Enterprise Co., Ltd.

And Water Analizing Kit (Digital)

WHEREAS, by an Agreement of Lease Between the Lessor and the Lessee, the Lessor has granted to the Lessee a Lease for a Plot of Land measuring approx ___ Bigha , covered by the VC Pass No.115, Extended Land from Blasting House towards western boundary of his to south side up to Pwd-Pitch Road (Sialsuk – Thenzawl Road) Side more particulars of which is described in the schedule below to establish for all Camp, hutment for staff and labour, Hume Pipe factory, Collection of Boulder and other machinery and construction materials , and Lessees and the Lessor , more fully described in the Schedule therein for a period of 4 (Four) years commencing on 1st Jamuary 2014 and ending on 31st December 2017 on certain terms and conditions .

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:-

1. That, the period of Lease is for a period of of 4 (Four) years commencing on 1st Jamuary 2014 and ending on 31st December 2017.

2. That, the rent for the period of 1st January 2014 and ending on 31st December 2017 Is fixed of Rs.2,20,000/- (Two lacs twenty thousand only) and the cheque of Rs.2,20,000/- paid to Lessor in the 1st week of January 2014 as advance .

3. That , The Lessor will not have any claim for sweeping the Land by the Lessee including falling of trees etc and the Lessor will provide necessary permission .

4. That the Lessee will provide 9 cubic metre of 20 MM chips at the residence of the Lessor including the cost of transportation or pay Rs.10000/-(Ten thousand Only) in case the Lessor lifts the material from the camp of Lessee for which the Lessee will not claim any extra charge .

IN WITNESS WHERE OF THE APRTIES HEREUNTO HAVE HEREUNDER SET THEIR HANDS ON THE DAY AND YEAR FIRST ABOVE WRITTEN.

Signed by 10/1/14
Pu.R.Chhuansanga
(Lessor)

In the presence of
1. (ROHMINGLIANA ZOTE)
2.

Signed by
B L Ajitsaria
For and on behalf of
Tantia Constructions Ltd **(Lessee)**

In the presence of
1.
2.

RECEIVED 12 M³ 20mm chips @ Rs. 10000 against Transaction By Ch No - 325070 A/c 09/01/2014 and Rs. 210000/- By Cheque No. 325039 A/c 08/1/14. against RENT for the PERIOD UP TO 31/12/17 AS FIXED in CLAUSE NO - 2 .

Received

मिजोरम MIZORAM 00AA 478411

SECOND SUPPLEMENTARY LEASE DEED

This Second Supplementary Deed of Lease is made on this 01 day of .. January 2013 .

BETWEEN

Mr R. Chhuansanga, S/o. Patea, aged about 47 years, a permanent resident of Sailam, P.O., P.S. & Dist. Aizwal (hereinafter referred to as **"The Lessor"**, which expression unless the same is repugnant to the context shall include the heirs, executors, administrators and assigns of the "The Lessor") and M/s. Tantia Constructions Limited, a Company incorporated under the Companies Act 1956, having its Registered Office at 25/27 Netaji Subhash Road, Kolkata 700 001 and Local Office at D/72 Basic Mual, Ramhlun North, Aizwal 796 001 (hereinafter called **"The Lessee"**, which expression unless the same is repugnant to the context shall include the successors and assigns of "the Lessee").

AND WHEREAS the Lessor has granted the Lessee by Agreement made on 1st day of March 2006, a Lease of the site covered by the VC Pass No. 115 more particularly described in the Schedule below to establish the sub-base Camp by the Lessee for a period of ending on 28th day of February 2009 with the renewal options of the period of Lease to the Lessee.

AND WHEREAS the Parties have extended the period of Lease for a further period commencing on 1st March 2009 and ending on 31st December 2012 vide Supplementary Lease Deed dated 29/02/2009

AND WHEREAS the Parties have agreed to extend the period of Lease for a further period of Five years commencing on 1st January 2013 and ending on 31st December 2017, hereinafter referred to as the **"further extended term"**, by revising the monthly rent payable by the Lessee

1/1/13 .

to the Lessor and pursuant to that the Parties hereunto have agreed to modify the Agreement dated 01/01/2013 and Supplementary Agreement dated 01/01/2013 to the following extent:

1. That the period of Lease is extended for a further period of 5 (five) years commencing on 1st January 2013 and ending on 31st December 2017.

2. That the monthly rent payable for the further extended term shall be Rs.7,500/- (Rupees Seven Thousand Five Hundred only) per month totaling Rs.4,50,000/- (Rupees Four Lac, Fifty Thousand only) for the whole extended period of 5 (Five) years.

3. The total monthly rent payable for the whole extended period of 5 (Five) years amounting to Rs.4,50,000/- shall be paid in two installments as follows.-

   (i) 1st installment of Rs.3,00,000/- shall be paid by Cheque no.039248 Dt.15/12/12
   (ii) 1st installment of Rs.50,000/- shall be paid by Cheque no.039249 Dt.15/12/12

   (iii) 2nd installment of Rs.1,00,000/- shall be paid by Cheque no. Dt.15/12/13

4. In addition to the aforesaid rent, the Lessee shall supply 2 lipper load of stone aggregate of 20mm size to the Lessor free of cost.

5. The Lease Agreement dated 1st March 2006 and the Supplementary Lease Agreement dated 29/02/2009 stands modified to the above extent and all other terms and conditions stipulated in the said Lease Agreement and Supplementary Lease Agreement remains same.

6. The Lease Deed dated 1st March 2006 and the Supplementary Lease Deed dated 29/02/2009 between the Parties shall form part and parcel of this Second Supplementary Lease Agreement.

IN WITNESS WHEREOF THE PARTIES HEREUNTO HAVE HEREUNDER SET THEIR HANDS ON THE DAY AND YEAR FIRST ABOVE WRITTEN.

Signed by
Mr R. Chhuansanga
(Lessor)

In the presence of
1.
2.

Signed by
Mr B L Ajitsaria
For and on behalf of
Tantia Constructions Ltd **(Lessee)**

In the presence of
1.
2.

ANNEXURE –X

GOVERNMENT OF MIZORAM
STATE REFERRAL INSTITUTE
PUBLIC HEALTH ENGINEERING DEPARTMENT
AIZAWL

.....

WATER ANALYSIS REPORT

Sample No. : GS/2015-16/149
Name of Source : Water Sample from 71 CAMP
Detailed Location with Co-ordinates : Thenzawl
Type of Source : Spring
Sample collected by : Staff, Tantia Construction Limited
Sample Collected on : 3.6.2015
Sample Received on : 4.6.2015
Date of Analysis : 4.6.2015
Name of R.D. Block : Tlangnuam

Results of Analysis	B.I.S. Specification for drinking IS-10500 : 2012	
	Requirement (Acceptable limit)	Permissible limit in the absence of alternate source.
1. Physical Characteristics		
1) pH 6.34	6.5 - 8.5	
2) Odour Odourless	unobjectonable	-
3) Taste Tasteless	agreeable	-
4) Colour Colourless	unobjectonable	-
5) Total Dissolved Solids (in mg/l) 36.4	500.0	2000.0
2. Chemical Characteristics (in mg/l)		
1) Total Chloride 17.0	250.0	1000.0
2) Sulphate NIL	150.0	400.0

Analysed by :
Sd/-
(PH. VANLALAWMPUIA)
Lab. Technician

Remarks: Good quality for R.C.C works.

(P.C. BIAKMAWIA)
Chief Chemist,
State Referral Institute
PHED, Mizoram

GOVERNMENT OF MIZORAM
STATE REFERRAL INSTITUTE
PUBLIC HEALTH ENGINEERING DEPARTMENT
AIZAWL

.....

WATER ANALYSIS REPORT

Sample No.	: GS/2015-16/150
Name of Source	: Water Sample from Mat River
Detailed Location with Co-ordinates	: Thenzawl
Type of Source	: River
Sample collected by	: Staff, Tantia Construction Limited
Sample Collected on	: 3.6.2015
Sample Received on	: 4.6.2015
Date of Analysis	: 4.6.2015
Name of R.D. Block	: Tlangnuam

Results of Analysis	B.I.S. Specification for drinking IS-10500 : 2012	
	Requirement (Acceptable limit)	Permissible limit in the absence of alternate source.
1. Physical Characteristics		
1) pH — 6.69	6.5 - 8.5	
2) Odour — Odourless	unobjectonable	-
3) Taste — Tasteless	agreeable	-
4) Colour — Colourless	unobjectonable	-
5) Total Dissolved Solids (in mg/l) — 40.6	500.0	2000.0
2. Chemical Characteristics (in mg/l)		
1) Total Chloride — 14.0	250.0	1000.0
2) Sulphate — NIL	150.0	400.0

Analysed by :
Sd/-
(F. VANLALRUATI)
Lab. Technician

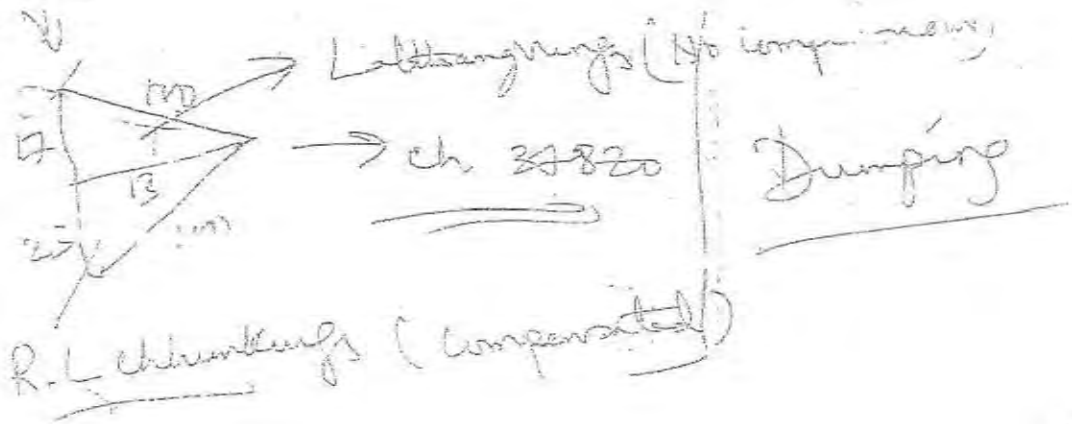
Remarks: Good quality for R.C.C works.

(P.C. BIAKMAWIA)
Chief Chemist,
State Referral Institute
PHED, Mizoram

ANNEXURE –XI

DUMPING SITE (MZ02)

No	Name	Address	Location	Contact No	Acquired	
1	R.Lalchuailova(139	Vengchung, Serchhip	Sailiam Kawn	9612369083	Yes	2160 sq m.
2	Liansiama c/o.Robert Laltinchhawna	Kanan Veng, Serchhip	Mualvawm	9862570279	yes	
3	K.H Rohlua	Bazar Veng, Serchhip	Mualvawm	9436146127	Yes	920 sq m.
4	R.L Chhunkunga	Dinthar Veng, Serchhip	Serchhip		Yes	977 sq m.
5	Hmingthanzauva	New Serchhip	Mauphir Ram	8014007340	Yes	1200 sq m.
6	K.H Rohlua	Bazar Veng, Serchhip	Mauphir Ram	9436146127	Yes	180 sq m.
7	Vanlalhriata	Bazar Veng, Serchhip	Zehtet		Yes	6240 sq m.
8	H.L Muanthanga	AOC Veng, Serchhip	Thuhruk Zau	9862726249	Yes	1500 sq m.
9	K.H Rohlua	Bazar Veng, Serchhip	Thiarpui Zau	9436146127	Yes	45628 sq m.
10	C.Lalhmangaihzuala	Farm Veng, Serchhip	Serchhip	9612615336	Yes	6900 sq m.
11	Thanzuala	Vengchung, Serchhip	Serchhip	9862722678	Yes	181 sq m.
12	Ronghingi	Thenzawl, Baza Veng	Pelnte Ram	8413001548	Yes	9020 sq m.
13	Z.D Laithara	Thenzawl, Vengthlang	Kanan Veng	9862328489	Yes	7150 sq m.
14	Lalnghaki	UPC Veng, Thenzawl	Thenzawl	9863622472	Yes	8400 sq m.



ANNEXURE –XII

MIZORAM STATE ROAD CONSTRUCTION DEPARTMENT

Project Name :Improvement &Upgradation of Serchhip to Buarpui Road

(MZ-02,Project -2) in the State of Mizoram (55Km)

Client :- Public Work Department,Mizoram

Consultant :- MSV International Inc.

Contractor :- Tantia Constructions Limited

Summary of Safety Statics Report for the Month of MARCH - 2016

Location:- Thenzawl

Sl. No.	Descriptions Points	Current Month	Remarks
1	Average daily man power engaged.	250	
2	Working hours per man.	8 hrs.	
3	Number of first - aid cases.	1 nos.	
4	Number of medical treatment cases.	x	
5	Number of minor LTIs.	x	
6	Number of major LTIs.	x	
7	Number of near-misses.	x	
8	Number of incidents.	x	
9	Number of fatal injury.	x	
10	Total man hours worked without LTI.	x	
11	Total man days lost due to LTIs(LTI+Major+Fatal).	x	
12	Total cost of accidents.	x	
13	Frequency rate.	x	
14	Severity rate.	x	
15	Incident rate=(No of LTI x 1000/average no of persons employed in concerned month).	x	
16	Cumulative accident incident report=(No of LTI x 1000/daily average man power).	x	
17	Number of tool box meeting conducted.	6 nos.	
18	Number of person exposed to tool box meeting.	100 nos.	
19	Safety committee meeting conducted.		
20	Number of trainings conducted.	3 nos.	

Appendix - 1

NO OBJECTION DUMPING AREA

CONTRACTOR :- TANTIA CONSTRUCTION LIMITED

PROJECT NAME :- MZ02 SERCHHIP TO BUARPUI (PROJECT- 2 ROAD IN THE STATE OF MIZORAM)

WORKING SITE THENZAWL TO BUARPUI

Sl. No.	Date	Chainage		Length	Remarks
		From	To		
1	20-06-15	8420	8570	150	PART II
2	20-06-15	10000	10080	80	PART II
3	20-06-15	10280	10350	70	PART II
4	20-06-15	10760	10840	80	PART II
5	20-06-15	11170	11200	30	PART II
6	20-06-15	11530	11540	10	PART II
7	20-06-15	11720	11770	50	PART II
8	20-06-15	11920	11970	50	PART II
9	20-06-15	12160	12180	20	PART II
10	20-06-15	12210	12240	30	PART II
11	20-06-15	12310	12400	90	PART II
12	20-06-15	12670	12700	30	PART II

06/05/2015

(VANLALZAUVIA)
President
Village Council/Coud
Thenzawl West & Serchhip District

Appendix - 2

NO OBJATION FOR DAMPING AREA

TANTIA CONSTRUCTIONS LTD

PROJECT NAME-SCRCHHIP TO BOURPUI ROAD PART-2

WORKING SIDE THENZAWL TO BOURPUI

SL NO	DATE	CHAINAGE	LENGTH	REMARKS
1	14/04/15	5+360-5+420	60MTR	
2		5+600-5+700	100MTR	
3	27/04/15	6+040-6+060	20MTR	
4		6+330-6350	20MTR	
5		6+730-6+750	20MTR	
6		6+840-6+860	20MTR	
7		7+420-7+440	20MTR	
	7/5/2015			
8		7+720-7+760	40MTR	
9		7+930-7+950	20MTR	
10		8+120-8+140	20MTR	
11		8+680-8+690	10MTR	
12	15/05/15	6+170-6+230	60MTR	RL.ZOLIANA
				9612854046

Appendix - 3

SL.NO 06
Date 27.08.20
Bairabi Project

Part II

NO OBJECTION FOR DUMPING AREA.

I. Lalramhluni Father's name Kapchana
village Thenzawl Dist. Kolasib Mizoram
Declare that M/s Tanlia Construction Co. Limited
may be used my land for as a dumping (Disposal
of Earth) for Kolasib Bairabi road Project
(NH 302) in my land Ram Patta No 606801/10/16(
of 2011 - Periodic Patta. Period for 5 years
vide Govt Letter No K-53011/62/06-REV/Vol-II Dtd
02.05.06
Registration No 160/9/2011 Dtd 15.02.2011.
Memo No C 31021/10/2011-LRC(5) Dtd Kolasib - 15.2.2
Dumping to from . 9070 to 9080 of Part II

Ramhluni

VCP Signature

Acceptance Signature
Land Owner

TCL Signature

Appendix - 4

Sl. No : 5
Date :-
Buarpui Project

NO OBJECTION FOR DUMPING AREA

I R. Sangliana S/o late Pu Thanlawnga Age.....

Village Vangchhak Dist. Serchhip Mizoram.

Declare that M/s Tantia Construction Limited may be used My Land as a disposal of Earth cutting for Serchhip to Buarpui Road project (MZ02).

In my Land Ram Patta No. .....dated.....

And I will no further claim for my above dumping land, chainage from 11330 M to 11530 M. 200 mtrs

VCP Signature

R. Sangliana
Acceptance Signature

TCL Signature

Appendix - 5

Sl. No - 4
Date :-
Buarpui Project

NO OBJECTION FOR DUMPING AREA

I C. Lalmuankima S/o Lalngheinga Age 31
Village Thingsul Dist Serchhip Mizoram.

Declare that M/s Tantia Construction Limited may be used My Land as a disposal of Earth cutting for Serchhip to Buarpui Road project (MZ02).

In my Land Ram Patta No. ....dated.........................

And I will no further claim for my above dumping land, chainage from 10+030 M to 10+100 M.
(Km 10 [illegible])

(VANLALZAWNA)
VCP Signature

[illegible]

Acceptance Signature
Ph 9863291816

TCL Signature

Appendix - 6

Sl. No :-
Date :-
Buarpui Project

NO OBJECTION FOR DUMPING AREA

I, Sri. Nghakmawia S/o. Pawl Rawna Age.....

Village: Thenzawl Dist. Serchhip Mizoram.

Declare that M/s Tantia Construction Limited may be used My Land as a disposal of Earth cutting for Serchhip to Buarpui Road project (MZ02).

In my Land Ram Patta No. Lo.G.Sol/Ser/dated 29/08/2011 159

And I will no further claim for my above dumping land, chainage from 9+280.M to 9+440.M.

(VANLALZAWVA)
VCP Signature

NGHAKMAWIA
Acceptance Signature

President
Village Council/Local
Buarpui Sub-Division Serchhip District

TCL Signature

Appendix - 7

SL no. 2

Date :-

Buarpui Project

NO OBJECTION FOR DUMPING AREA

I, Pu...NGHAKMAWIA S/o.R. RAWLNUMA.............Age........

Village..Thenzawl....... Dist...Serchhip Mizoram.

Declare that M/s Tantia Construction Limited may be used My Land as a disposal of Earth cutting for Serchhip to Buarpui Road project (MZ02).

In my Land Ram Patta No.600804/20/159 dated.02/02/2011.

And I will no further claim for my above dumping land, chainage from.91+210...M to 91+250...M.

(VANLALZAHUNA)

VCP Signature

President
Village Council [illegible]
[illegible]

NGHAKMAWIA

Acceptance Signature

TCL Signature

Appendix - 8

SL No : 1

Date :-

Buarpui Project

NO OBJECTION FOR DUMPING AREA

I, Vanlalruala S/o Huapuia Age. 85.

Village. Thenzol Dist. Serchhip Mizoram.

Declare that M/s Tantia Construction Limited may be used My Land as a disposal of Earth cutting for Serchhip to Buarpui Road project (MZ02).

In my Land Ram Patta No. .....dated.....

And I will no further claim for my above dumping land, chainage from.....M to .....M.

(VANLALZAUVA)
VCP Signature

VANLALRUATA
Acceptance Signature

President
Village Council
Thenzol

TCL Signature

Appendix - 9

NO OBJECTION FOR DUMPING AREA

CONTRACTOR'S NAME : TANTIA CONSTRUCTION LIMITED

PROJECT NAME:- MZ02 SERCHHIP TO BUARPUI ROAD IN THE STATE OF MIZORAM) (PROJECT-2

WORKING SITE THENZAWL TO BUARPUI

SL.NO.	DATE	CHAINAGE		LENGTH (m)	REMARK'S
		FROM	TO		
1	16-11-2015	12990	13060	70	PART-II
2	16-11-2015	13320	13340	20	PART-II
3	16-11-2015	13450	13490	40	PART-II
4	16-11-2015	13540	13570	30	PART-II
5	16-11-2015	13600	13650	50	PART-II
6	16-11-2015	13760	13780	20	PART-II
7	16-11-2015	13820	13850	30	PART-II
8	16-11-2015	14310	14360	50	PART-II
9	16-11-2015	14390	14460	70	PART-II
10	16-11-2015	14570	14620	50	PART-II
11	16-11-2015	14630	14700	70	PART-II
12	16-11-2015	14900	14950	50	PART-II
13	16-11-2015	15010	15060	50	PART-II
14	16-11-2015	15760	15810	50	PART-II
15	16-11-2015	16260	16300	40	PART-II
16	16-11-2015	16430	16470	40	PART-II
17	16-11-2015	16560	16610	50	PART-II
18	16-11-2015	17680	17710	30	PART-II
19	16-11-2015	18750	18800	50	PART-II

TANTIA CONSTRUCTIONS LIMITED KOLKATA

(VANLALZAWNA)

President
Village Council Co...

The

Appendix - 10

Sr -7 ✓

Date :- 31/10/15
~~Buarpui~~ Project mal-

Part I

NO OBJECTION FOR DUMPING AREA

I R. chhuntluanga S/o T. HANGHLIRA Age. late

Village Saiham Dist Aizawl Mizoram.

Declare that M/s Tantia Construction Limited may be used My Land as a disposal of Earth cutting for Serchhip to Buarpui Road project (MZ02).

In my Land Ram Patta No. .....dated.....

And I will no further claim for my above dumping land, chainage from 80+190M to 80+010.M. = 90mts

Zhingle
(ZOHMINGSIAMA)
VCP Signature
President
Village Council/Court
Saiham, Aizawl District

R. Chhuntluanga 31/10
Acceptance Signature
(Landowner)

Cutting Area. 13 to 15 Km Dumping on A21-Lungleiba

TCL Signature

Appendix - 11

SL-8-1

Date :- 31-10-15
Buarpui Project mat

Part I

NO OBJECTION FOR DUMPING AREA

R. Lal Chhuntelunga S/o Thanglira Age 58

Village Sailam Dist Aizawl Mizoram.

Declare that M/s Tantia Construction Limited may be used My Land as a disposal of Earth cutting for Serchhip to Buarpui Road project (MZ02).

In my Land Ram Patta No. ..... dated.....

And I will no further claim for my above dumping land, chainage from 80+130 M to 80+140 M. = 10 mt

80+130 to 80+140 = 10 mt

ZOHMINGLIANA
VCP Signature

President
Village Council/Court
Sailam, Aizawl District

R. Chhuntunga
Acceptance Signature
(Land owner)

TCL Signature

Cutting Area 1370 is Dumping on A-21 Land to Road

Appendix - 12

TANTIA CONSTRUCTIONS LIMITED

Our Ref: TCL/TZL/ADB-PWD/2015-16 / 1649 A2 (69)
Date: 10-06-2015

The Team Leader
Project office – Aizawl
M/s MSV International Inc.
H.No. U/12/A, Laipuitlang,
Aizawl ,Mizoram.

AIZAWL OFFICE COPY

Sub: - *Appointment of Qualified Environment specialist for implement of EMP.*

Name of work: Improvement & Up-gradation of Road Section "Serchhip-Buarpui (MZ 02)" (Project 2 Roads in the State of Mizoram). Contract No. PIU/NESRIP/MZ02/CSC/2014 .

Dear sir,

We wish to confirm the appointment of *M/S MIZORAM ENVIRONMENTAL CONSULTANTS , GOVT ZIRTIRI RESIDENTIAL SCIENCE COLLEGE , AIZAWL PIN.796007 , MIZORAM,* for the implementation of EMP for the project . They will be conducting tests as per the requirement of the contract and will submit reports as per your guidelines.

This is for favour of your information please.

Thanking you.

Yours faithfully
for Tantia Constructions Ltd.

(B. L. AIRSARIA)
Director ,Business Development.)

COPY TO: The Project Director, PWD - for favour of information please.
SIPMIU,
Tuakhuahtlang
Aizawl – 796 001 (Mizoram)

24/6/15
Received
PIU, PWD
Tuikhuahtlang

MSV INTERNATIONAL INC. AIZAWL
Received 24/6/15

Appendix - 13

MIZORAM ENVIRONMENTAL CONSULTANTS

MONITORING DATA

1. NOISE LEVEL

1). The noise survey was carried out on 14-15 August, 2015 between 12:30 - 03:30 pm.

2). Location:

The ambient noise measurement was carried out within the area of Base Camp, Tantia Construction Ltd. near R. Mat

3). Instrumentation

Noise Level Meter: Model SI-4010, LUTRON ELECTRONIC ENTERPRISE CO., LTD

4). Weather Condition: The sky was cloudy and with light wind during measurement.

Rainfall	Temp (Max)	Temp (Min)	Cloud Cover	Precipitation (Max)	Precipitation (min)	Wind speed	Wind direction
4 mm	29°C	20° C	82%	99	59	2 km/h	South East

5). Method

The DSLM was placed at a height of 0.5m above ground. The device was positioned 3 m away from Base Camp Office (Mat River Camp), near the Hot-Mix plant and vehicle parking area.

The device was calibrated immediately prior to, and after readings were taken. Noise measurement was conducted for two sites. The Leq (15 min), L10 and L90 were recorded.

6). Result: The background noise levels recorded during the survey are shown below.

Monitoring Location		Tantia constructions Ltd. Base camp (Mt River Camp
Description of Location		12 kms from Serchhip Zero Point
Date of Monitoring		15 Aug 2105
Measurement Start Time		12:30 to 3:30 pm
Measurement Time Length		15 min/ location
Results	L90	70 -74 db
	L10	60 65db
Source of noise: a) Major Construction Noise b) Crusher, Hot-mix Plant installation under process c) Other noise like High Volume Air Sampler, automobiles, Up- stream river, etc		

Note:

1. Peak level (noise from High Volume Air Sampler and HMV / Truck)
2. Minimum level detected: 62-65 dB

2. WATER QUALITY MEASUREMENT

Instrument: Water Quality (Potable Water Analyser Kit; Model PE 148)

Turbidity	:	5 NTU.
EC	:	258
pH	:	7.8
DO	:	7.5 ppm
Temperature:		Upstream 24°C a
		Down Stream 24°C
		Stock point water tank 28°C

3. AIR QUALITY MEASUREMENT

Instrument: High Volume Air Sampler (Manufactured by NEERI, India)

Weighing Instrument: Digital Balance (Wensar Model T14)

PM_{10}	:	40 $\mu g/m^3$
$PM_{2.5}$	:	20 $\mu g/m^3$
NOx	:	< 30 $\mu g/m^3$
SOx	:	<40 $\mu g/m^3$

TANTIA CONSTRUCTIONS LIMITED

2016

SECOND REPORT

MONITORING REPORT OF

IMPACT ON AIR, WATER AND NOISE QUALITY DUE TO ROAD CONSTRUCTION OF Serchhip to Buarpui via Thenzawl Corridor

(MZ02)

MIZORAM ENVIRONMENTAL CONSULTANTS M.E.C

Submitted by
Mizoram Environmental Consultants(MEC)

MEC Monitoring Team:

Prof. Lalnundanga	-	Team Leader, MEC
Mr. Lalrinmawia	-	Managing Director, MEC, & Environmental Expert
Mr. Laltanpuia	-	Environmental Expert
Dr. R. Lalengmawia	-	Environmental Expert
Mr. Zohmangaiha		Field Assistant
Mr. Imanuel Lianzama		Field Assistant
System Assistant	-	R. Rodinmawia
Local Informant	-	Lalropuia

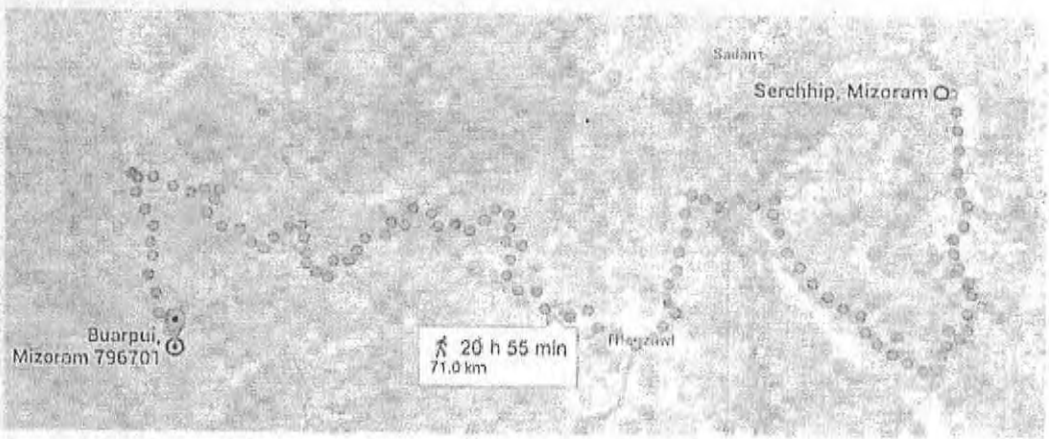
MIZORAM ENVIRONMENTAL CONSULTANTS
Govt. ZirtiriResidential Science College (MZU)
Aizawl, Mizoram – 796001
Email : mecmizoram@gmail.com /lrmawia@gmail.com
Phone : 0389 -2423948, 0389-2341102 (Fax),
Mobile: 0943614 6274/0524/2176, 09436196952

(LALRINMAWIA)
Managing Director
Mizoram Environmental Consultants (MEC)
Aizawl : Mizoram

SECOND MONITORING REPORT OF IMPACT ON AIR, WATER AND NOISE QUALITY DUE TO ROAD CONSTRUCTION OF SERCHHIP TO BUARPUI VIA THENZAWL CORRIDOR

1. DATE OF VISIT : 25th – 26th March, 2016 (Construction Stage)

2. AREA MONITORED : Tantia Construction Ltd.Base Camp at Mat River, Thenzawl Road.



3. PARTICIPANTS FROM TANTIA CONSTRUCTION LTD.:

1. Sudhir Kumar Pathak - Safety & Environmental Officer
2. Vijay - Material Engineer
3. MSV Consultants - MSV International Inc

1. BRIEF INTRODUCTION

The proposed Project road section (MZ02) (henceforth mentioned as the project) between Serchhip to Buarpui, proposed for improvement and upgradation has been dividedinto two sections. These are Part I: Serchhip to Thenzawl (15 km) and Part II: Thenzawl to Buarpui (40 km). In total, the project included improvement and upgradation of 55 km of existing road section.

The project road takes off from NH54 at Sailiamkawn intersection (Km 114.200 near Serchhip) and ends at Sialsuk junction on state highway (length 15.2 km). The second part of the road takes off from km 82 of Aizawl-Lunglei state highway at Thenzawl and ends at Buarpui (length 39.8 km). The total length of the road Project therefore spans a distance of 55 km. The vegetation of the entire corridor is subtropical forest which is partially degraded.

Since the area falls under Indo-Myanmar biodiversity hotspot, occurrences of certain species which having ethnobotanical importance are known to be present.

2. WEATHER CONDITION

The following data were observed and recorded during the period of monitor:-

Wind Speed/velocity	:	3mph
Wind direction	:	South-west
Cloud cover	:	10%
Precipitation (Average humidity)	:	72%
Rainfall	:	nil
Latitude& Longitude	:	23° 18.524` N, 92° 48.563`E
Temperature	:	29°C

MONITORING OF AIR QUALITY

Introduction

This section presents the results and comments for the monitoring of air quality impacts during construction phase of the project. The measurements are taken by spot visits and various sampling techniques. Experiments and samplings are carried out wherever standard methods are available. The following instruments are used for monitoring the chosen parameters.

Instrumentation and Methodology

High Volume Air Sampler (manufacturer – Lawrence Mayo Pvt. Ltd., Kolkata) is used for measuring the particulates and gases. The high volume sampler or Respirable Dust Sampler (HVS attached with cyclone separator) is be capable of drawing air through a portion of a clean glass fibre of 20 cm × 25 cm size with an effective area approximately 400 cm^2 at a flow rate of 1 m^3/min with a permissible variation of 0.3 m^3/min over 24 h. The sampling sites are strategically selected at five (5) pre-defined sites. These sampling sites represent point sources.

The parameters initially selected for study are - SPM, RPM, SO_2, NOx, CO and Pb. Gravimetric methods are use for measuring particulate matters. Pre-weighed Glass Fibre filter paper (Whatman GF/2) is used for collecting SPM. A pre-weighed RPM cup is used for measuring the respirable particulates. The Air Sampler is placed at the selected sites and allowed to run for 4 hours. The following table shows ambient Air Quality standards in India.

The standards for air quality prescribed by **Central Pollution Control Board (CPCB)** in India is given below:

Location	SPM	SOx	NOx
Industrial and Mixed Areas	500$\mu g/m^3$	120$\mu g/m^3$	120$\mu g/m^3$
Residential and Rural Areas	200$\mu g/m^3$	80$\mu g/m^3$	80$\mu g/m^3$
Sensitive Areas	100$\mu g/m^3$	30$\mu g/m^3$	30$\mu g/m^3$

Sampling period: The Sampling period and rate of sampling, with the type of sampling programme as described in 'Guidelines for Ambient Air Quality Monitoring' (CPCB, 2003) given below is followed. Normally the sampling periods are 30 minutes, one hour, one to four hours and eight hours depending upon the expected concentration of the pollutant, its nature and the investigation patterns. Based on practical experience the air sampling rates with respect to sampling period are as follows:

Type	Period of Sampling	Rate of Sampling (Lit/min.)
1	30 minutes	2
2	1 hour	1
3*	1-4 hours	0.5
4	8 hours	0.2-0.5
5	8-24 hours	0.1-0.2 9.4

*In this study, Type 3 programme is followed for sampling period.

Sample collection: 20 ml of ice-preserved absorbing media is placed in the impinger and the instrument is operated as per the selected sampling period and rate of sampling (Lit/min.). After completion of the sampling, the impingers are removed and sample volume is measured. Measurements for RPM and SPM are immediately taken as soon as the samples are ready. All other measurements are done at the Laboratory. Standard spectrophotometric methods are essentially followed.

The following equation is used for the calculation of gaseous pollutants in the ambient air.

$$\text{Concentration } (\mu g/m^3) = \frac{(A-B) \times G.F \times Tv \times 1000}{T \times Fr \times Va}$$

A = Absorbance of exposed sample

B = Absorbance of reagent blank solution

G.F = Graph factor of the concerned pollutant. (µg/abs.)

Tv = Total volume of the exposed sample (ml)

1000 = Conversion factor from litres to m^3

T = Total sampling time (min.)

Fr = Sampling flow rate (Litre/min.)

Va = volume taken for analysis (ml)

Note: T x Fr is equal to total volume of air in litres. The concentration of the gaseous pollutants can also be expressed in µg/Nm3 after correcting the total volume of air at 25o C temperature and 760 mm Hg pressure.

1. Result:

Sampling Station	SPM (per m^3)	RPM (per m^3)	SOx		NOx		Remarks
			Absorb-ance (nm)	Concen-tration (per m^3)	Absorb-ance (nm)	Concen-tration (per m^3)	
Tantia Base Camp at Mat River	500 µg	400 µg	0.054	40 µg	0.032	55 µg	Sampling period used : 4 hrs

Inference

All the measured values of air quality parameters showed values below harmful level as described by the National Ambient Air Quality Standards (NAAQS). It can be inferred that during the period of investigation, the ambient air quality of the sampling site has exhibited levels of air quality with adequate margin of safety to protect public health, vegetation and property.

The result obtained may be attributed to the prevailing condition of weather during monitoring as mentioned above. No excavation work is in progress near the base camp and the hot-mix plant is not yet in service.

Recommendation

It is recommended that utmost care and management strategy must be enforced to maintain this ambient air quality, as far as practicable. In future, even during peak construction activities, strict protocols must be laid down to protect a clean ambient atmosphere.

MONITORING OF WATER QUALITY

Introduction

This section presents the results and comments for the monitoring of water quality impacts during construction phase of the project.

Primary water quality criteria for different uses have been indentified based on the concept of "Designated Best Use" (DBU) used in India for classification of surface water is adopted as reference for study of water quality as given below:

Designated Best Use	Class	Criteria
Drinking water source without conventional treatment but after disinfentions	A	1. Total coliform organisms MPN/100 ml shall be 50 or less 2. pH between 6.5 – 8.5 3. DO 6 mg/l or less 4. BOD 2 ml/l or less 5. TDS 500 mg/l 6. Total Hardness 300 mg/l 7. Iron 0.3 mg/l 8. Flouride 1.5 mg/l 9. Chloride 250 mg/l
Outdoor bathing (organized)	B	1. Total coliform organisms MPN/100 ml shall be 500 or less 2. pH between 6.5 – 8.5

		3. DO 5 mg/l or less 4. BOD 3 ml/l or less 5. Flouride 1.5 mg/l
Drinking water source with conventional treatment followed by disinfection	C	1. Total coliform organisms MPN/100 ml shall be 5000 or less 2. pH between 6 – 9 3. DO 4 mg/l or less 4. BOD 3 ml/l or less 5. Iron 50 mg/l 6. Flouride 1.5 mg/l 7. Chloride 600 mg/l
Propagation of wild life, fisheries	D	1. pH between 6.5 – 8.5 2. DO 4 mg/l or less 3. Free ammonia (as N) 1.2 mg/l or less 4. EC 1μ mhos/cm
Irrigation, industrial cooling, controlled waste disposal	E	1. pH between 6.0 – 8.5 2. EC less than 2250μ mhos/cm 3. Sodium absorption ratio less than 26 4. Boron less than 2 mg/l

Equipments

The following equipments/instruments were used for monitoring water quality :

Sl. No.	Parameters	Instruments/Equipments
1.	Ambient temperature	(i) Digital Thermo-hygrometer (range – 50°C – 280°C (ii) Digital stem thermometer (range – 10°C – 200°C

2.	pH	Portable Digital pH meter
3.	Water quality (physical)	(i) Water Analyzer PE – 138 (ELICO) (ii) Deluxe Water & Soil Analysis Kit (EI Product – model 191 E)
4.	Software	(i) SPSS version 7.5 (ii) MS office XP (iii) ACD Fotocanvas 2.0

Result

Sample	°C	pH	EC	Tur-bidity	TDS	DO	Hard-ness	F	NO_3	SO_4	Fe	TC
Base Camp	22	6.9	65	7	84.2	6.9	77	0.6	26	161	1.0	<50
Mat River	23	6.7	67	10	120.3	6.8	79	0.5	62	163	1.5	100

Comments

The two sampling sites are strategically chosen to represent a running water used for drinking (Sample 1: Base Camp water) and another source which is used for other purposes other than drinking (Sample 2: Mat river). It was found that Sample 1 conforms to drinking water standards while Sample 2 does not meet up to the standards with respect to certain parameters. For instance, the physical appearance was highly coloured during the sampling period. This observation was confirmed by the turbidity reading which was recorded at 26 NTU. In addition, the amount of NO_3 present was detected to be more than the desired drinking water standard which could be attributed to influx of

nitrogenous wastes into the pond as a result of natural as well as anthropogenic activities. The Total Coliform level as measured using MPN is 100, which suggests contamination from human activity or animals that frequent the pond. It is concluded that the overall water quality of both Samples studied in this report are satisfactory.

AMBIENT NOISE MONITORING

Introduction

This section provides information on typical levels generated by various construction equipments and provides guidance on assessment of noise from the construction activities related to transit facilities. It should be noted that the level of noise analysis should be commensurate with the type and scale of the project, and the presence of noise-sensitive land uses in the construction zone.

Ambient Air Quality Standards in respect of Noise

Area Code	Category of Area/Zone	Limits in dB(A) Leq *	
		Day Time	NightTime
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

Note :

a. Day time shall mean from 6.00 a.m. to 10.00 p.m.

b. Night time shall mean from 10.00 p.m. to 6.00 a.m.

c. Silence zone is defined as an area comprising not less than 100 metres around hospitals, educational institutions and courts. The silence zones are zones which are declared as such by the competent authority.

Result

The following table shows the observations recorded during monitoring:

Sl. No.	Time Interval (min)	Minimum (dB)	Maximum (dB)	Remark
1	0	67	72	
2	4	65	68	
3	8	58	64	
4	12	63	79	
5	16	52	69	
6	20	56	70	
7	24	62	71	
8	28	63	79	
9	32	52	69	
10	36	65	79	
11	40	59	69	
12	44	52	70	
13	48	56	71	
14	52	62	79	
15	56	52	78	
16	60	56	70	

L_{90} = 72 – 79 db

L_{10} = 60 – 65 db

1. Peak level (noise from High Volume Air Sampler and HMV /Truck vehicles/Generator) = 79dB
2. Minimum level detected = 60-65 dB

Comments

The ambient noise level observed during the monitoring visit as given in the above table can be summarized that the ambient noise detected does not cause much concern since the readings (average noise level detected 52 – 79 dB) is within acceptable level. The higher noise levels recorded by the instrument arose from the noise generated by occasional passing of Heavy motor vehicles, as well as Air Sampler machine which was in operation nearby

PHOTO PLATE

Plate – 1

Envirotech high volume air Sampler.

Department for Scientific and Industrial Research (DSIR):

Recognized by DSIR & National Physical Laboratory (NPL)

Fig. Noise Meter , Water Analyzing kit and BOD Bottle, etc

Lutron ISO 9001 certified manufacturer- Lutron Electronic Enterprise Co., Ltd.

And Water Analizing Kit (Digital)