# **DETAIL NOTE**

#### 1.0 Introduction

**Maharashtra State Road Development Corporation Limited (MSRDC) -** Project Proponent has been entrusted with the development of Access Controlled Super Communication Expressways in Eastern Maharashtra. MSRDC has proposed Expressway into three different Packages falling in Nagpur Revenue Divisions as under,

**1.** Package I: Construction of Nagpur - Gondia Access Controlled Super Communication Expressway Starting at Gavasi in Nagpur District and ends at Lodhi Tola in Gondia district (Ch. 0.000 to Ch. 144.807). In addition to the main alignment two feeder routes are included in Package I i.e., Gondia Bypass (Ch. 0.000 to Ch. 13.744) and Tiroda Feeder Route (Ch. 0.000 to Ch. 3.826).

#### The overall length of Package I is 162.377 Km.

2. Package – II construction of Bhandara-Gadchiroli Access Controlled Super Communication Expressway starts Sawarkheda Interchange of Nagpur-Gondia Expressway to Gadegaon on National Highway NH-53(B) leading to Raipur (Ch. 0.000 to Ch. 24.705) and Borgaon Interchange of Sawarkheda – Gadegaon (Ch. 0.00 to Ch. 69.536) link to Kinhi village on NH 353D.

The overall length of Package-II including the Connector is approx. 94.224 km

3. Package – III Construction of Nagpur- Chandrapur Access Controlled Super Communication Expressway starts from Seldoh Interchange of Hindu Hrudaysamrat Balasaheb Thackeray Maharashtra Samruddhi Mahamarg to Navegaon More, Ghatkul (Ch. 0.000 to Ch. 191.315). In addition to the main alignment, one more alignment of Ghugus Interchange to Chandrapur connector (Ch. 0.000 to Ch. 11.969) is included in Package III.

The overall length of the package III including the connector is approx. 203.284 Km

<u>The proposed project is for Package I: Starting from Nagpur to Gondia.</u> As per Environment Impact Assessment (EIA) Notification dated 14<sup>th</sup> September 2006, and its amendments until date, the proposed project falls under 'Category A' with activity number 7(f). This is due to applicability of General Condition i.e., the proposed Project activity is falling within 5 km of the Notified Navegaon-Nagzira Tiger Reserve vide Notification S.O.612(E) dated 25th February 2016 and also the proposed alignment is within 5 km of the Madhya Pradesh-Maharashtra Border.

Accordingly, the application was submitted for obtaining Terms of References (ToR) for Prior Environmental Clearance for Package I. The project was recommended in the 347<sup>th</sup> EAC Infra-1 meeting held on 28<sup>th</sup> November 2023. The project was accorded ToR vide TOR Identification No. TO23A3602MH5949917N dated 28<sup>th</sup> December 2023. However, then a TOR amendment application was submitted and revised TOR letter was received vide TOR Identification No. TO24A3602MH5751595A dated 15<sup>th</sup> October 2024 (copy of original TOR & Amendment of TOR is enclosed as *Annexure 1*).

## 2.0 **Project Location**

The proposed project alignment passes through 110 villages of Eight (8) Talukas viz. Nagpur Rural, Umred, Kuhi, Mauda, Bhandara, Mohadi, Tiroda, and Gondia of three (3) districts of Nagpur, Bhandara and Gondia in the State of Maharashtra.

The Google Earth Imagery of the project is as shown in **Figure 1** and Toposheet Map of the project site & study area is as shown in **Figure 2**.

The details of the area and length in each of the village are as provided in Table 1.



Figure 1: Location Map of the Project Site



Figure 2: Toposheet Map of the Project Site & Study Area

CONVENTIONAL SYMBOLS

In bridge; with distance stone	÷	and the second second	_
importance	Tel	-	-
ccording to importance	_	-	_
Pack-track with pass. Fool-path			
defined. Canal	3-	>	-
earthwork. Weiz			
with island & rocks. Tidal river	2		100
amp. Reeds.	100 12	1.454	-2
II. Spring. Tanks: perennial; dry		+ 0.	0.
nk. Broken ground	-	2	200
e; single with station; under constr	·		
ie; single with distance stone; do .		20 45	
Cutting with tunnel		0 -1	2.3.
ocky slopes. Cliffs	02	3	SAA.
hills(permanent). (3)dunes(shifting	1 1	2	3
leserted. Fort.	-17-	×	53
lower. Antiquities.		л I	Gast
que lidglih. Tomb. Graves		A 11	8 .0.
lighted; unlighted. Anchorage	1 4	4 4	4
orub		1	100
n. Coniler. Bamboo. Other trees	Q 8.1 .		4 15
rveyed tree.			0
undemarcated			
taheil or täluk; forest			
located			
point; approximate	△200	.200	.200
canal	. BM 63-3	.BM 63-3	-42
	1		
plow. Circuit house. Police station	n	n	
ved; protected.	C07	RF	PF
kcality or tribal.	KIKRI		NĂGA
ry: Hospital / Dispensary		+	
le		2	
	1.1		

#### NAME OF THE PROJECT **Construction of Nagpur-Gondia Access** Controlled Super Communication Expressway, Package I

MAP OF 10 KM RADIUS STUDY AREA ON SOI TOPOSHEET Toposheet No: 550/4, 550/8, 550/11, 550/12,550/15, 550/16, 55P/1, 55P/5, 55P/9, 55P/10,55K/16, 55L/13, 64C/2, 64C/3, 64C/6, 64C/7



SN	DISTRICT	TALUKA	VILLAGE NAME	TOTAL GUT NUMBER	ACQUIRE D AREA (HA)	PRIVATE LAND (HA)	GOVT LAND (HA)	FOREST LAND (HA)
		"LANE	DIA (PACKA E SUMMAD	GE- 1)				
1		LA	GAWASI	LLAGE WIS	0 9944	1 0.0324	0.9620	0.0000
2			PANJARI BK	5	2.2846	2.2590	0.0256	0.0000
3			RUI	27	30.7217	30.0529	0.6687	0.0000
4			WARODA	10	11.2342	11.0925	0.1417	0.0000
5	NAGPUR	NAGPUR	PEWTHA	20	10.2725	10.0241	0.2484	0.0000
6	initial en	RURAL	KHARSOLI	16	16.6670	16.3615	0.3055	0.0000
7			PILKAPAR	19	12.7168	11.1175	1.5993	0.0000
8			NAWEGAON	10	9 7904	9 7051	0.7262	0.0000
10			NIMBHA	10	5.9652	5.9652	0.0000	0.0000
				156	118.7800	114.0174	4.7626	0.0000
1	NACDUD		PACHAGAON	63	33.4912	28.3275	5.0449	0.1189
2	NAOFUK	UWIKED	SURGAON	28	19.2910	18.4899	0.8011	0.0000
				91	52.7822	46.8174	5.8460	0.1189
1			WADEGAON	22	17.9259	15.1108	2.8151	0.0000
3			LANJALA	22	21.0016	20.6634	0.3382	0.0000
4			DIPALA	13	0.7861	8.0930	0.2048	0.0000
6			NAWARGAON	9	7 1156	7 0048	0.1108	0.0000
7			CHITAPUR	2	4.6807	4.6807	0.0000	0.0000
8			TARNI	47	26.2625	24.4660	1.7965	0.0000
9			MANGLI	24	16.2571	15.4153	0.8418	0.0000
10			MALNI	18	7.1938	6.1114	1.0824	0.0000
11			CHANODA	46	26.1673	25.5209	0.6465	0.0000
12			AKOLI	10	8.4851	7.9493	0.5358	0.0000
13			SAWLE KHOPADI	15	15.1052	12.8392	0.3240	2.6881
15	NAGPUR	KUHI	KUHI	11	10.0135	2 5082	0.0000	7 5053
16			BODKHIPETH	44	18.8655	17.5201	0.8186	0.5268
17			PANDEGAON	42	12.9699	12.6997	0.2702	0.0000
18			NEWARI	37	18.0738	16.5566	1.5171	0.0000
19			SALWA	43	18.3426	17.3936	0.9490	0.0000
20			BHIWKUND	13	5.7352	5.7352	0.0000	0.0000
21			DEOLIKALA	14	8.6284	8.1467	0.4818	0.0000
22			KHURSAPAR	30 26	10.2014	15.3479	0.9134	1 9//9
23			AMTI	1	0.6199	0.6199	0.0000	0.0000
25			SAWARKHEDA	25	28.2491	27.8691	0.2878	0.0921
26			RAJOLA	55	31.1821	29.8995	1.2826	0.0000
27			KANHERI KH	14	9.9686	8.0243	1.9444	0.0000
				636	376.3273	342.9221	20.4732	12.9320
1	NAGPUR	MAUDA	KOTEGAON	20	14.9823	11.6195	3.3628	0.0000
1			KONDHI	17	14.9823 18.7740	11.0195	<b>3.3028</b>	0.0000
2			PARSODI	43	21 0400	19.4452	1.0734	0.0000
3			RAJEDAHEGAON	30	19.8415	19.1071	0.7344	0.0000
4			NANDORA	2	0.0928	0.0927	0.0001	0.0000
5			THANA	30	10.2849	7.2382	3.0317	0.0150
6	BHANDA		SHAHAPUR	45	13.7807	8.9679	3.8361	0.9767
7	RA	BHANDARA	GOPIWADA	84	30.4957	28.8034	1.6923	0.0000
8			NAWEGAON	15	4.2916	3.2632	1.0285	0.0000
9				27	13.4882	0.0000	13.4882	0.0000
10			GUNJEPAK	2/	14.3380	0.6165	0.9987	1.4607
12			TAWEPAR	32	17 1599	12.6825	1.6416	2.8358
13			RAINI	13	6.6147	6.4453	0.1693	0.0000

Table 1: Details of Land Acquisition Area in Each Village

SN	DISTRICT	TALUKA	VILLAGE NAME	TOTAL GUT NUMBER	ACQUIRE D AREA (HA)	PRIVATE LAND (HA)	GOVT LAND (HA)	FOREST LAND (HA)
14			PANDRABODI	36	18.3679	17.8675	0.5004	0.0000
15			SHIRSI	129	26.6126	23.6997	2.9129	0.0000
10			DABHA	58	0.7217	0.7217	2.6084	0.0000
18			LAWESHWAR	29	16.6529	15.8390	0.8139	0.0000
19			KOTHURNA	94	25.2736	23.8004	1.4732	0.0000
20			KHAIRI	51	16.0215	15.7703	0.2512	0.0000
-				764	289.8109	247.9376	36.5851	5.2882
1			PANJARA(BUTHALI BETALA	<u> </u>	1.1282	0.4930	0.6353	0.0000
3			ROHA	92	3 0892	3 0892	0.0000	0.0000
4			GHATKURODA	38	15.1878	8.5748	6.6130	0.0000
5	BHANDA	MOUADI	MUNDHAR BK	49	13.1893	11.1443	2.0450	0.0000
6	RA	MOHADI	AMUNDHARI KH	48	9.9131	9.0444	0.8687	0.0000
7			KARDI	65	22.2835	20.3700	1.9011	0.0124
8			USARIPAR	52	14.6293	13.3208	1.3085	0.0000
9			IAMBHALADANI	39	23.0371	20.5465	1.4627	1.0279
10			JAMDIIALAI ANI	420	133.6027	114.8572	17.7053	1.0403
1			MANORA	53	24.3330	23.4464	0.8866	0.0000
2			KESALWADA	15	4.7536	3.8873	0.8663	0.0000
3			YADAMEKOT	54	22.5817	18.6683	0.7247	3.1888
4			PANJARA	89	16.2132	13.3837	2.3795	0.4499
5			SARANDI	46	26.2356	15.5151	2.5701	8.1504
0 7				63	16 5089	10.6088	0.4287	0.0000
8			BELATI BK.	76	23.5220	22.5146	1.0074	0.0000
9			BELATI KH.	29	15.0256	9.7814	0.8770	4.3672
10	GONDIA	TIRODA	KEWALEWADA	35	6.5123	4.8516	1.6607	0.0000
11			CHIRKHANI	78	19.9254	16.9286	1.1416	1.8552
12			BHURATOLA	37	10.3074	9.6657	0.6418	0.0000
13			VALDONGARI KARTI BK	135	42.3908	35.8239	0.1285	0.0000
15			BERDIPAR	24	6.0629	6.0629	0.0000	0.0000
16			DABBETOLA	63	18.7361	17.9196	0.8165	0.0000
17			SONEGAON	58	21.1327	17.5640	0.2185	3.3502
18			NAHARTOLA	19	5.8998	5.7995	0.1003	0.0000
19			BODA	116	33.5905	32.6056	0.9850	0.0000
1			DAWNIPADA	87	26 3521	25 4801	0.8720	23.9541
2			PIPARTOLA	16	5.9136	5.4814	0.4323	0.0000
3			DEUTOLA	63	13.0821	12.3019	0.7802	0.0000
4			SONPURI	53	21.1820	16.7130	1.1984	3.2706
5			NILA GONDI	69	21.0930	19.8190	1.2740	0.0000
6			RATNARA	94 57	24.1101	22.6917	1.4184	0.0000
8	GONDIA	GONDIA	PANDHARABODI	62	22.1898	21 1213	0.4700	0.0000
9	GOILDIN	GOILDIN	LOHITOLA	58	8.5545	7.8887	0.6658	0.0000
10			LODHI TOLA	50	14.7112	12.8933	1.8180	0.0000
11			NAWATOLA	2	0.1170	0.0784	0.0386	0.0000
12			GHIWARI	36	10.7027	10.6025	0.1002	0.0000
13			LODHI TOLA	85	20.1444	17.9694	1.6123	0.5627
14			TALBI IULA SAWADI	0	0.8919	0.7928	0.0992	0.0000
15			SAWAN	10	2.1704	1.5207	1.2073	0.0000
				756	212.9622	191.0759	18.0530	3.8333
	Nagp	our-Gondia - Mai	n Alignment	3870	1526.7375	1349.5226	130.0481	47.1667
			" LAND AQUISITION	FOR GONDI	A BYPASS			
		LA	AND BIFURCATION - VI	LLAGEWIS	E SUMMAR	Y"		

SN	DISTRICT	TALUKA	VILLAGE NAME	TOTAL GUT NUMBER	ACQUIRE D AREA (HA)	PRIVATE LAND (HA)	GOVT LAND (HA)	FOREST LAND (HA)	
1			LOHARA	9	1.0306	1.0306	0.0000	0.0000	
2			RATNARA	2	0.1420	0.1420	0.0000	0.0000	
3			PANDHARABODI	55	9.8035	7.9633	0.8047	1.0355	
4			HIWARA	19	9.0562	5.0729	2.4890	1.4943	
5				BHAGWATTOLA	27	4.2395	3.7385	0.5010	0.0000
6	GONDIA	GONDIA	DHAKNI	70	12.3873	11.3025	1.0848	0.0000	
7			LODHITALA (DHAPEWADA)	19	2.0010	2.0010	0.0000	0.0000	
8				PINDKEPAR	26	7.7043	6.2926	1.4117	0.0000
9					RAPEWADA	13	3.8769	3.7854	0.0915
10			KARANJA	46	11.6034	8.0638	2.0643	1.4753	
		Gondia Bypa	ISS	286	61.8448	49.3925	8.4472	4.0051	
		" LA	LAND AQUISITION FO ND BIFURCATION - VI	R TIRODA ( LLAGEWIS	CONNECTO E SUMMAR	R Y"			
1			PALDONGARI	36	7.2564	5.5904	0.5482	1.1178	
2	GONDIA	TIRORA	JAMUNIYA	52	8.2676	5.0077	0.9690	2.2909	
3			KACHEWANI	7	1.6239	0.2339	1.3906	0.0006	
		Tiroda Conne	ctor	95	17.1479	10.8320	2.9078	3.4093	
	Nagpur Gondia Package I including Connectors				1605.7302	<b>1409.7471</b>	<b>141.4031</b>	<b>54.5812</b>	

Source: Land records by Monarch

\*\*Note: Forest land to be diverted may be changed during Forest Clearance process

## 3.0 **Project Description**

The salient features of the proposed project are as tabulated below in Table 2.

## Table 2: Salient Features

1	Total	162.377 km
	Length	
	proposed	
2	State	Maharashtra
3	District	Nagpur, Bhandara and Gondia
4	Talukas	The proposed alignment will pass through Nagpur Rural, Umred, Kuhi,
		Mauda, Bhandara, Mohadi, Tiroda, and Gondia Talukas. i.e. 8 talukas
5	Terrain	Mostly plain and hilly at some places
6	Seismic	II as per IS 1893 (Part 1) : 2002
	Zone	
7	Land Use	The alignment is passing through plain terrain. The predominant land use
		along the alignment is agricultural followed by residential & commercial and
		mix (built up) land use.
8	RoW	100m except at Interchanges and 45m at Gondia Bypass and Tiroda Feeder
		Connector
9	Total Area	Total Land Acquisition: 1605.7314 ha
	of Land	Government Land: 141.4031 ha
	Acquisition	Private Land: 1409.7471 ha
		Forest Land: 54.5812 ha
		(Source: Land records by Monarch; **Note: Forest land to be diverted may be

		changed of	during Fores	t Clearance p	rocess)				
10	Main	Gavasi Interchange to Lodhi Tola:							
	Carriageway	Nagpur to Bhandara Expressway (CH.0+000 to CH 71+200, ROW 100m, 3 +3							
	(Proposed)	lanes	lanes						
		Bhandara	to Gondia (	CH.71+200n	n to CH 144+807	), ROW 100m, 2	+2 lanes		
		<u>Gondia B</u>	ypass:						
		Lohari to	Karanja (Cl	H 0+000 to C	H 13+744) ROW	45m, 2+2 lanes			
		Tiroda Fe	eder Route:			DOW 45 0	0.1		
11	Interchange	Paldonag 8 location	ari to Kache	wani (CH 0+	000 to CH 3+826	), ROW 45m, 2+	-2 lanes		
11	merenange		$\frac{1}{Ch} \frac{1}{0}$	1	Comosi				
		IC-1	Ch. $11+51$	0	Dawasi				
		IC-2	CII. $11+31$	5	Thomas				
		IC-5	Cn. 58+50	5	Thana				
		IC-4	Ch. 72+57	5	Shirsi				
		IC-5	Ch. 100+9	31	Panjara				
		IC-6	Ch. 114+5	41	Paldongari				
		IC-7	Ch. 137+2	.28	Lohari				
		IC-8	Ch. 144+8	307	Sawari	1	_		
12	No. of	Part	ticulars	Nagpur -	Gondia	Tiroda	Total		
	Structures	Major B	idaa		Bypass	Connector	15		
		Minor B	ridges	56	3		63		
		Flyovers	liuges	14	0	0	14		
		Interchar	nge	11	0	0			
		Flyovers	0	12	0	0	12		
		Animal U	Jnderpass	8	0	0	8		
		CUP/PU	Р	101	0	0	101		
		Canal Cr	ossing	67	1	3	71		
		VUP/VC	P/LVUP	89	0	0	89		
		ROB		3	3	0	6		
		Box Culv	verts	30	5	0	35		
		Culvert (	Portal	7	0	0	7		
		Type)	•	16		0	1(		
		Dina Cro	rossing	10	0	0	10		
12	Doinwotor	Pipe Cro Doinwoto	ssing r hornocting	y shall he d		$\frac{0}{\text{SD}}$ 50 2012 c	10		
15	Harvesting	Ministry	r naivesiing Circular no	S Shall be us NHAI/TIC/V	IP Ref/ 2012 date	of 26th October	2015		
	System	iviinisti y					2015.		
14	Toll Plaza	Closed L	oop system a	adopted for th	is corridor.				
		Toll Tok	ens issued/v	ehicle registe	ered at Entry Poi	nt and Toll dedu	ucted from		
		Fast tag a	t Exit Point	based on Tra	vel Distance.				
		at the Ent	ry point 2 la	nes of 3.50m	and 2 lanes of 4.	50m for OSV are	e proposed		
		at the Exi	t point 3 lan	es of 3.50m a	and 2 lanes of 4.5	Im for OSV are	proposed		
15	Construction	30 month	S						
16	Period Employment	Anner	2025 during -	oonstmatia	and anney 50	lumina anarotica	phase (for		
10	Employment	Approx.	2023 during	construction	and approx. 50 (	uning operation	phase (for		
17	Total Civil	12134 08	Cr						
1/		12137.00	<b>U</b> 1						

	Cost	
18	Total Capital	21670.03. Cr
	Cost	
	(including	
	LA and	
	Utility	
	Shifting,	
	etc.)	
19	R&R Plan	The R&R compensation activities shall be accomplished in consonance with
		Maharashtra Highways Act, 1955. Provisions of R&R Plan in Maharashtra
		Highways Act form the basis for Right to Fair Compensation and
		Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
		The budget is already included in the land acquisition portion for the same.

The typical cross-section of the proposed alignment is as shown in Figure 3.

For 6 Lane







For 4 Lane







For Connectors





#### Figure 3: (Typ.) Cross Section of Proposed Alignment

Source: MSRDC (PP) and Monarch (DPR Consultant)

Project Schedule & Cost	:	The proposed project is scheduled to be completed within 30 months after Environment Clearance (EC) and other statutory approvals are granted. The estimated cost of the project is Rs. 21670.03 Crores. The budget for Environment Protection for the proposed project is $\sim 286$ Crores.
<u>Resource</u>		
<b>Requirements</b>		
Land	:	The proposed project will be executed on a total land area of ~1605.7314 Ha which is being acquired by MSRDC, Government of Maharashtra.
Water	:	The domestic water requirement will be approximately $91.13 \text{ m}^3/\text{day}$ (i.e. 45 lpd for 2025 labours). Additional water of ~1350 m <sup>3</sup> /day will be required for dust suppression & construction activities. The water will be sourced from nearby surface water sources such as Kanhan River, Sur River & Wainganga River with prior consent from the Authorities having Jurisdiction.
Power	:	LSD D.G sets will be used for power for onsite construction and labour camps, wherever grid supply is not available.
Manpower	:	The manpower envisaged is approximately 2025 for the proposed project.

#### 4.0 Description of the Environment

As per the EIA Guidance Manual for Highways (MoEF&CC, February 2010), a study area of 15 km radius from the proposed alignment was considered for secondary data collection. Primary data has been collected within 500 meters on either side of the proposed alignment. Baseline environment monitoring was carried out for the period of October 2023 to December 2023.

*Topography, Land use& its Classification* – The topography around the project site is mostly plain and hilly at some places.

The land use and land cover of the study area was analyzed based on multispectral satellite imagery reveals that Agriculture is the highest category of Land Use accounting as much as 44.17% (474.96 km<sup>2</sup>) of the total area followed by Built-Up 26.55% (285.53 km<sup>2</sup>) & the least Land Use Class was represented by Mining 1.34% (14.37 km<sup>2</sup>). Of the Land Cover Classes, Waste land was the major Land Cover Class which accounted to 22.96% (246.85 km<sup>2</sup>) followed by Forest which accounted to 3.59% (38.65 km<sup>2</sup>) and one feature viz. Water bodies which comprised of River/Stream as Land Cover & Lake/Reservoir/Tank/Canal as land use accounted to 1.40% (15.02 km<sup>2</sup>).

<u>Soil</u> - The soil quality was monitored at eighteen (18) locations within the study area. Some of the important soil parameters are summarised in the below table;

Parameter	Value
pH	7.224 - 8.29
Nitrogen mg/kg	73.5 - 101.5
Phosphorus mg/kg	23.43-25.7
Potassium mg/kg	36.04 - 56.18

Parameter	Value
Organic Carbon %	1.3 - 1.9

As per the Chemical Classification of Soil Quality by ICAR, the soils in study area come under moderate to highly productive, whereas as per Levels of Soil Fertility by Tondon H.L.S, the soils in study are can be classified under high fertile category.

<u>Ambient Air Quality</u> - The Ambient Air quality was monitored at eighteen (18) locations for parameters such as  $PM_{10}$ ,  $PM_{2.5}$ , NOx, SO<sub>2</sub>, CO in the study area.

Para	meter	A1	A2	A3	A4	A 5	A6	A7	A8	A9
PM <sub>2.5</sub>	Min.	24.00	28.45	29.87	27.91	25.73	29.91	25.58	26.47	31.91
$(\mu g/m^3)$	Max.	33.80	40.25	41.67	39.31	36.33	41.91	35.78	37.17	44.71
	Average	27.42	32.65	34.04	32.01	29.49	34.11	29.18	30.47	36.41
	98 %ile	33.50	39.85	41.27	38.91	35.93	41.51	35.48	36.77	44.31
<b>PM</b> <sub>10</sub>	Min.	56.30	67.25	69.57	64.71	60.23	69.71	59.18	61.37	74.01
$(\mu g/m^3)$	Max.	68.00	83.05	85.37	77.91	72.63	84.11	71.38	73.87	89.41
	Average	61.53	74.15	76.49	70.61	65.77	76.21	64.68	66.67	80.91
	98 %ile	67.90	82.25	84.57	77.81	72.53	84.01	71.28	73.77	89.31
SO <sub>2</sub>	Min.	5.80	6.75	7.67	5.41	4.43	7.61	6.78	5.07	8.51
$(\mu g/m^3)$	Max.	12.00	14.25	15.17	13.41	11.93	15.21	13.18	12.57	16.51
	Average	9.88	11.65	12.53	10.71	9.41	12.51	10.88	9.77	13.61
	98 %ile	12.00	14.25	15.17	13.31	11.83	15.21	13.18	12.47	16.41
NO <sub>X</sub>	Min.	17.90	21.25	23.07	21.21	19.33	22.41	19.28	20.07	24.11
$(\mu g/m^3)$	Max.	23.90	28.35	30.17	27.81	25.63	29.61	25.28	26.37	31.71
	Average	19.83	23.45	25.31	23.41	21.35	24.71	21.28	22.07	26.61
	98 %ile	23.20	27.55	29.37	27.21	24.93	28.91	24.68	25.77	31.01
СО	Min.	0.52	0.83	0.72	1.02	0.34	0.36	0.73	0.85	0.72
mg/m <sup>3</sup>	Max.	0.94	1.25	1.12	1.44	0.76	0.76	1.13	1.27	1.09
	Average	0.77	1.05	0.98	1.31	0.59	0.61	0.98	1.07	1.01
	98 %ile	0.90	1.25	1.07	1.41	0.73	0.71	1.08	1.27	1.11

Parameter		A 10	A 11	A 12	A13	A 14	A 15	A 16	A 17	A 18
DN (	Min.	25.88	27.02	27.36	24.64	21.23	24.25	28.85	31.96	29.98
$(u_{\alpha}/m^{3})$	Max.	36.58	39.02	39.36	35.34	31.93	34.95	33.25	36.36	33.58
(µg/m)	Average	29.78	31.22	31.56	28.44	25.13	28.05	30.75	33.86	31.48
	98 %ile	36.18	38.62	38.96	34.94	31.53	34.55	33.25	36.36	33.58
рм	Min.	60.78	63.52	65.86	58.24	53.53	57.85	66.05	74.06	70.48
$(u_{a}/m^{3})$	Max.	73.28	77.92	80.26	70.74	66.03	70.35	76.45	84.46	79.18
(µg/m)	Average	65.98	70.02	72.36	63.84	58.93	63.45	69.95	77.96	73.68
	98 %ile	73.18	77.82	80.16	70.64	65.93	70.25	76.15	84.16	78.88
SO <sub>2</sub>	Min.	4.48	6.02	6.36	4.54	2.43	4.15	6.95	7.96	7.58
$(\mu g/m^3)$	Max.	11.98	13.62	13.96	12.04	9.93	11.65	14.55	15.56	13.98
	Average	9.28	10.92	11.26	9.54	7.33	9.15	11.75	12.76	11.68

	98 %ile	11.88	13.62	13.96	11.94	9.83	11.55	14.45	15.46	13.88
<b>NO<sub>X</sub></b> (μg/m <sup>3</sup> )	Min.	19.48	19.52	19.86	18.24	14.83	17.85	21.75	23.86	22.08
	Max.	25.78	26.72	27.06	24.54	21.13	24.15	26.25	28.36	25.98
	Average	21.48	21.82	22.16	20.24	16.83	19.85	23.55	25.66	23.58
	98 %ile	25.18	26.02	26.36	23.94	20.53	23.55	26.05	28.16	25.78
CO (mg/m <sup>3</sup> )	Min.	0.26	0.84	0.16	1.37	0.31	0.98	0.97	0.93	0.70
	Max.	0.68	1.24	0.56	1.79	0.73	1.40	1.11	1.07	0.84
	Average	0.58	1.12	0.46	1.64	0.63	1.25	1.05	1.06	0.78
	98 %ile	0.68	1.22	0.56	1.74	0.73	1.35	1.15	1.06	0.88

In general, the ambient air quality is satisfactory with respect to all major pollutants. The 98<sup>th</sup> percentile values of all pollutants were found to be below NAAQS, 2009 and its further amendments.

<u>Noise Quality</u> - The noise quality was monitored at eighteen (18) locations in the study area during the study period.

Category	Leq daytime	Leq night time	Daytime Standard	Night time Standard
Residential	52.4	40.8	55	45
Commercial	68.2	57.4	65	55
Industrial	51.8	41.3	75	70

The noise quality in the study area except around the commercial locations was found to be satisfactory in the residential & industrial areas.

<u>*Water Quality*</u> - Surface water samples were collected once during the study period at eight (8) locations to assess the baseline water quality in the study area. The samples were compared with the CPCB's surface water classification and they conform to 'Class E' Water Quality Criteria. Some of the important parameters are summarized in the below table;

Parameter	Value
рН	6.84 - 7.58
Dissolved Oxygen mg/l	4.08 - 6.46
Biochemical Oxygen Demand mg/l	5.51 - 8.0
Total Coliform No./100ml	Absent
E- Coli No./100 ml	Absent

Ground water samples were collected from eighteen (18) locations to assess the existing groundwater quality of the study area during the study period. The physico-chemical characteristics of Ground water are confirming to permissible limits of drinking water standards, prescribed in IS: 10500 (2012) (Test Characteristics for Drinking Water) and suitable for consumption. Some of the important parameters are summarized in the below table;

Parameter	Value
рН	7.22 - 8.05
Turbidity NTU	<0.1

Total Dissolved Solids mg/l	446 - 596
Total Hardness as CaCO3 mg/l	221-390
Alkalinity	254 - 311
Fluoride as F mg/l	0.43 - 0.76
Nitrate as NO <sub>3</sub> mg/l	1.01 - 1.54

#### **Biotic Environment**

#### Project Site and surrounding- Flora & Fauna

The area in and around proposed alignment prevailed varied terrain features such as hills, hillocks, mounds, scrub lands, vegetated areas, depressions, plantations & agricultural fields. The observed in vegetation in study area was by virtue of natural vegetation & plantations in some locations.

*Flora:* 213 plant species, which comprised of 19 herb species,20 species of grasses 15 climber species, 28 shrub species & 131 tree species.

*Fauna:* 58 bird species, 4 reptile & 7 mammal species were recorded in & within immediate vicinity of proposed alignment.

*Species of concern category* – The observed bird, reptile & mammal species are common & abundantly wide spread across the Vidharbha Region. *Herpestes Edwardsii* (Indian grey mongoose) a mammal species is the only Schedule I species observed during survey. While Nilgai Scat (droppings) were recorded. Out of 58 bird's species recorded, 48 falls under Schedule II & 6 species under Schedule I of WPA 2022. Only 1 amphibian i.e. *Hoplobatrachus Tigerinus* (Bull frog) is assessed as near threatened as per IUCN red data list. All the species recorded in and around the project site are very common in the Vidharbha region

#### Study area Flora & Fauna

*Flora:* 306 plant species, which comprised of 67 herb species, 36 climber species, 44 shrub species, 22 grass species & 137 tree species.

*Fauna:* 82 bird species, 26 mammal species, 12 reptilian species were recorded from study area. *Species of concern category* - 1 Near Threatened bird species viz. (*Mycteria Leucocephala* - Painted Stork) which are a resident species, 2 reptilian species viz. *Python Molurus* (Rock Python) and *Varanus Bengalensis* (Indian monitor lizards), 6 Vulnerable species of mammals viz. *Macaca Radiate* (Bonnet macaque), *Cervus Unicolour* (sambhar), *Melursus Ursinus* (Sloth bear), *Tetraceros Quadricornis* (Four-horned Antelope) and *Bos Garus* (Indian bison) were recorded in study area from primary study and from interaction with locals. However, no mammal sighted in RoW of proposed alignment & nearby surrounding areas

#### Socio-Economic Environment

The socio economics of study area was studied through primary and secondary survey. The socio-economic aspects of the study area is summarised in the table given below;

Parameters	Study area (10 km)
Total No. of Villages	110
Total no. of Households	32,241

Total Population	1,42865
Sex ratio	975
SC/ST population	15.59% (SC) & 5.68% (ST)
Literacy Rate	75.38

Source: Primary Census Abstract 2011, Nagpur, Bhandara & Gondia District, State Maharashtra

In the study area, education is available from pre-primary School to Senior Secondary School but for further education people have to travel about 3-15 km. The highest educational level in the study area is up to 12th class. The scope for higher and technical education is available only at the district place and only few people are able to take benefits of these educational institutions. The proposed alignment will pass through 110 villages, of which (30) thirty have health facilities. However, eighty (80) villages in the study areas were lacking in medical facilities. The main water supply in the surveyed villages is through tap water, hand pump, well and bore well. All villages are availing electricity facility for all-purpose.

## 5.0 Anticipated Environment Impacts and Mitigation Measures

*Construction Phase*: The proposed project is a green field project. The construction involves minimum ground clearing, as the profile of the proposed alignment will match the natural topography to the extent feasible. The construction phase of the proposed project will be of shorter duration for about 30 months only.

The potential impacts will be localised, very limited and insignificant due to the construction activity like fugitive dust, noise during excavation, civil works, operation of construction equipment's, storage & handling of construction material, surface water runoffs, etc.

These impacts shall be minimised by providing appropriate storage for construction material, provision of acoustic barriers and enclosures for high noise generating equipment, fugitive dust control by water sprinkling on road used by vehicles, construction activities shall be avoided during night time, surface runoff shall be checked for contaminations such as oil & grease by routing the surface runoffs in small bunds around the construction areas, all hazardous & non-hazardous material shall be handled as per statutory requirements.

Further except for the identified trees to be felled in 100 m ROW, the proposed project activities does not alter the surrounding the surrounding biotic environment in whatsoever manner. If pilling activity is to be done in river bed, this may lead to rise in suspended solids which may render the bottom waters turbid. However such effect will be temporal & original contours will be restored after cease of construction activity at river bed.

Therefore, the impacts during construction phase is to be short term, reversible, localised and are not expected to contribute significantly.

*Operational Phase*: The potential environmental impacts due to the proposed project have been assessed in detail. These includes impact on air quality, noise, water quality, solid waste, ecology and socio economics, etc. The modelling and analysis of the data indicate that the predicted impacts are minimal and are within the prescribed norms and standards. Comprehensive mitigation measures have been incorporated in the environment management plan to ensure that the environmental quality is protected and enhanced. These have been summarised in below table.

## Air Environment:

The following probable sources are identified in operation phase:

> Vehicular emissions from vehicles plying on the constructed road

The prediction of the Ground Level Concentrations (GLC's) due to emissions of pollutants such as PM,  $SO_2$ , NOx and CO from the operation phase has been computed by A CALINEpro. CALINE3 based CO model with queuing and hot spot calculations and with a traffic model to calculate delays and queues that occur at signalized intersections.

The resultant modelled (incremental) concentrations for all the pollutants (PM,  $SO_2$ , NOx and CO) have been found to remain within the corresponding National Ambient and Air Quality Standards (NAAQS). Mitigation measures will be in place to minimize potential adverse impacts of air emissions on health of receptors. In view of this, the atmospheric emissions during the operation phase are anticipated to be localised and the impact significance is assessed as negligible.

#### Mitigation Measures

- ➢ BS-IV or higher version accommodating engines shall be adopted in future, however modelling is been performed considering emission factors for BS-II version vehicles.
- > Roads shall be maintained regularly to avoid dust emissions
- > Tree plantation shall be done to avoid dispersion of particles
- Native trees with higher APTI (Air Pollution Tolerance Index) value shall be planted

#### Noise Environment

Noise generating sources are due to the following activities:

During operation phase/ after completion of road construction work, the major source of noise will be due to Vehicular movement by vehicles using the road.

The prediction of ambient noise from the proposed project was carried out using software tool "dhwani PRO". The anticipated noise generation by vehicles plying on the road will be 45 dB (A).

The distance wise drop down in anticipated cumulative noise from road in operational phase will be as given in following table.

Sr. No.	Distance in meters from alignment boundary	Noise in dB(A)
1	100	51.04
2	200	48.61
3	300	45.14
4	400	42.21
5	500	38.17

Thus, these noise levels will remain well within acceptable limits and will not have any impact outside the boundary from the proposed project.

#### Mitigation Measures

- Tree plantation is to be proposed along the alignment to minimize the intensity of dissipating noise
- Noise barrier shall be provided on bridges and links close to human habitation

## Water Environment

The road operations do not require any significant water quantity, apart from time to time requirement during works such as maintenance of road. However, as needed water will be sourced from water tankers or from Kanhan River, Sur River & Wainganga River with necessary consents from the jurisdictional authorities. Adequate precautions will be taken and proper withdrawal management plan shall be thoroughly followed.

## Land Environment

Land pollution may take place during the operation phase due to accidental spillage hazardous materials in case are transported/conveyed using the proposed road.

## Mitigation Measures

- Such scenarios will be tackled by District Disaster Management in place & use.
- > Littering of solid wastes on proposed road shall be strictly prohibited.

## **Biotic Environment**

Emissions & Noise – Vehicular emissions & noise generated from vehicles plying on the proposed road, however such emissions will be non-point & non continuous & the concentration of such emissions escaping the proposed road corridor will be extremely minimal and noise generation will be event specific viz. only during passing/ travel course of vehicles at any given point of time. Hence adverse/negative impacts on surrounding biotic environment during road operational phase are not envisaged.

## 6.0 Analysis of Alternatives

Three different alignments were thoroughy studiesnbased on engineering, socio economics, Environmental, Cost & safety aspect. Weightage of parameters within each of the aspect were tabulated and in accordance to the ranking, the said alignment was finalised.

Details of alternative alignment locations have been discussed in details within the EIA Report and the finalised alignment has been discussed and analysed within this EIA Report.

# 7.0 Environmental Monitoring Programme

The Environmental Monitoring Programs are also suggested to provide information on which management decisions may be taken during construction and operational phase. The objective of this program is to evaluate the efficiency of mitigation and enhancement measures, updating the actions & impacts of baseline data and adaptation of additional mitigation measures.

The environmental monitoring cost is estimated based on the length and existing environmental scenario of the proposed project. Environmental monitoring cost of, 6,24,75,000/- during Construction Phase and 1,48,92,000 /-for 10 years during Operation Phase has been allocated.

The sampling, analysis and frequency of environmental attributes including monitoring locations will be as per the guidelines provided by MoEF&CC/CPCB/MPCB. The monitoring shall be carried out by third party laboratories that are accredited by NABL or recognized by MoEF&CC.

## 8.0 Environmental Management Plan

The proposed project will be certified for the internationally accepted Environmental Management System based on ISO-14001, Quality Management and Occupational Health & Safety Management Systems. An environmental monitoring program shall be put in place, periodic review & audits shall be carried out for effective environmental management. The execution team shall have an Environmental Management Cell which shall ensure overall effective implementation of the management plan.

In general, systems shall be in place to ensure compliance with respect to environmental statutory requirements and Environment Policy are strongly adhered to all time.

# 9.0 **Project Benefits**

The proposed expressway will provide better, fast, safe and smooth connectivity for the commuters of Nagpur, Bhandara and Gondia Districts. Smooth and fast-moving traffic will cause only lower emissions thereby reducing pollution levels. Development of the proposed project road will improve the local agriculture and enable farmers to realize better value for their products as well as attract more investment to that region, thus boost economy of the area, state and nation as a whole. The vehicle operating and maintenance cost is expected to go down substantially. The proposed road alignment will also include general amenities like rest areas, etc. as feasible at built-up locations, pedestrian and cattle underpasses, animal underpasses, landscaping and tree plantation, traffic aid post, emergency telecom system, emergency medical aid post, street light at built ups etc. and thus overall facilities to the road users shall improve. People will have increased access to better social and health infrastructure and other services located outside the project area. This will in turn lead to overall improvement of the quality of life of the people residing in the project zone in terms of their economic, social and health status. Growth of local tourism and resultant boost to local economy is also expected due to proposed project.

## **10.0 Project Schedule and Cost**

The proposed project is scheduled to be commissioned within 30 months after Environment Clearance (EC) and other statutory approvals are granted. The estimated cost of the proposed project is Rs. 21670.03 Crores. For protection of environment, it is proposed to spend 286 Crores as capital cost of EMP budget.

## 11.0 Conclusion

This impact assessment study indicates that the overall impact from the proposed project activities will be short term, reversible, localised and are not expected to contribute significantly to the surrounding environment. In addition, with the implementation of the pollution control and the

environment management measures, these anticipated impacts due to construction and operation of the proposed project will be mitigated to reduce it further.

The project proponent will also ensure that the environmental performances of all the activities are monitored throughout execution of the project during both construction and operation phase. The project proponent will report environmental performance and monitoring reports regularly to statutory authorities.

The Project Proponent shall develop systems and procedures for effective environmental management. The effective management system coupled with monitoring of environmental components and efforts for continual improvements will result in exemplary environmental performance.

Based on the EIA study and surveys conducted for the Project, it can be safely concluded that associated potential adverse environmental impacts can be mitigated to an acceptable level by adequate implementation of the measures as stated in the EIA Report. Adequate provisions has been made in the Project to cover the environmental mitigation and monitoring requirements, and their associated costs as suggested in environmental budget. The proposed project shall improve Road efficiency and bring economic growth. In terms of air and noise quality, the project shall bring considerable improvement to possible exposure levels to population.