



EXECUTIVE SUMMARY (Project Report)

E-1 INTRODUCTION

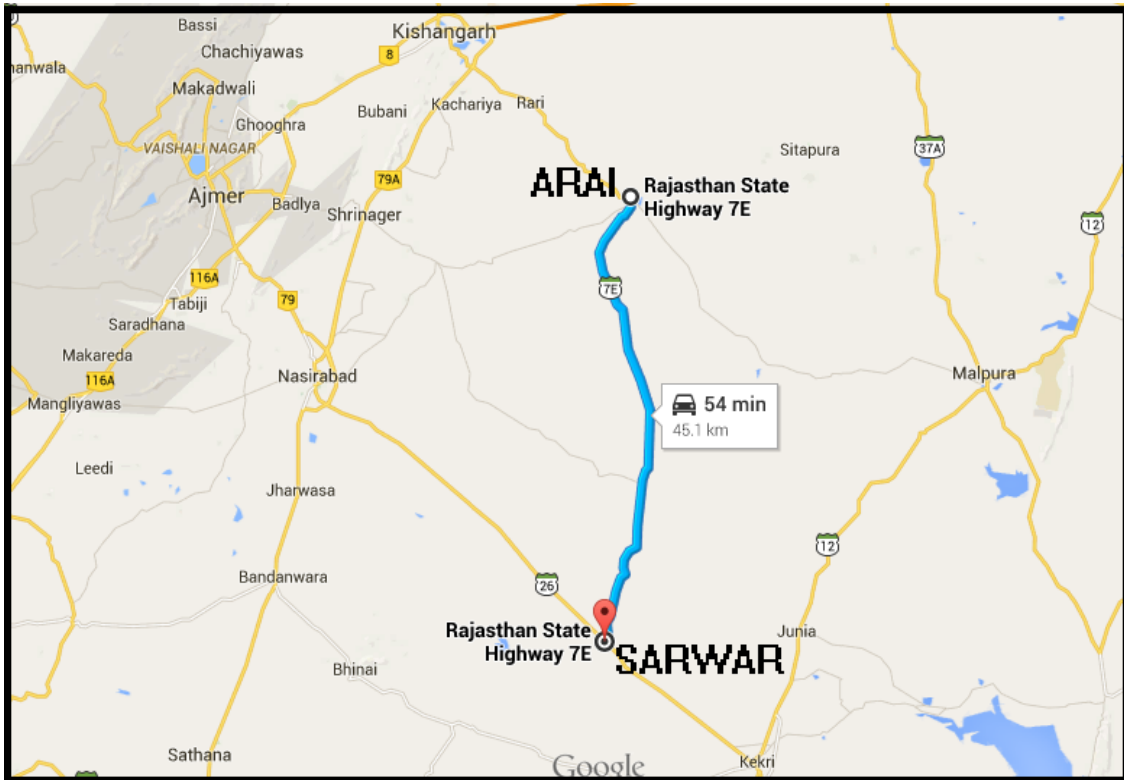
This Final Feasibility Report (FFR) is submitted in accordance with the requirements of ToR of the study ‘Consultancy services for preparation of feasibility report of Two-Laning of km 0.000 to km 44.260 of SH-7E comprising the section from Arai to Sarwar (the “Highway IV”) Package – 12 initiated by Rajasthan PWD, PPP division and assigned to **CEMOSA AVANZA PCPL CONSORTIUM**.

Govt. of Rajasthan has announced development of 20,000 Kms highways during next 5 years. Projects and schemes are being identified for implementation. This is the 8th (KD8) of 9 required deliverables, earlier 7 reports – Inception Report, Supplementary Inception Report, Report on Alignment and First Traffic Survey, Report on Land Plan Schedule and Utility Relocation, Report on Indicative GAD of Structures, Report on Environment, Social Impact Assessment and Draft Feasibility Report have been submitted.

E-2 DESCRIPTION OF PROJECT ROAD

E-2.1 General

Project Road starts from Arai at Ajmer-Malpura road junction and end at Sarwar SH-26 junction. The Project Road passes through important Villages/towns like Lamba, Ankodiya, Jorawarpura, Kasheer, Borada, Dhanwa, Fatehgarh, Indrapura, Dhaultapura. The Total length of this road is **44.331** kilometres.





E-2.2 Terrain

The terrain along the highway is plain/ rolling terrain.

E-2.3 Right of Way

The width of existing right of way (ROW) varies from 5m to 26m. The development along the road has been uncontrolled. Therefore, at certain locations encroachment within ROW has been observed in the form of shops, hotels, Dhābas and various other commercial establishments.

E-2.4 Existing Alignment

The existing road geometry by large satisfies the codal requirements of Indian Roads Congress. There are few sharp curves which have been designed for 80/100 KMPH. The alignment has been studied, based on physical features and other Constraints at site viz. Land acquisition, utilities, construction activities, presence of religious structures etc,

E-2.5 Existing Carriageway

Intermediate lane, Single lane and two lane carriageways with 1.0m to 1.5m earthen shoulder exists at various sections of the project road.

S.No.	Description	Length (Km)
1	3.5m wide carriageway	7.480
2	5.5m wide carriageway	34.951
3	7.0m wide carriageway	1.900
	Total	44.331

E-2.6 Existing Pavement

Pavement Composition: The existing pavement consists of bituminous layers, WBM and granular sub base.

Entire length of the road has bituminous surface except (built up sections). 35% of project road length is in good condition, 48% in fair condition and 17 % in poor condition.

E-2.7 Settlements

The Project Road passes through important Villages/towns like ChotaLamba, Ankodiya, Jorawarpura, Kasheer, Borada, Dhanwa, Fatehgarh, Indrapura, Dhaultapura.


E-2.8 Culverts

There are 44 Slab & 35 Pipe culverts on the project road.

E-2.9 Bridges

There is no major bridge in the entire stretch of the project Highway. One minor bridge exists at the following locations:

- 1) At Design Chainage 35+675


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E-2.10 Causeways

There is one causeway exist on the project road.

E-2.11 Flyovers/Underpasses

No RUB, ROB and at-grade railway level crossing exists in the Project Highway.

E-2.12 Bypasses

There are no congested villages/Towns in Project Highway which may require construction of Bypass.

E-3 SURVEY AND INVESTIGATION

E-3.1 Topographic Survey

Detailed Topographical Survey to generate Digital Terrain Model of the defined Project Highway has been done. Main control points by DGPS, Subsidiary control points by Total Station and height control by Digital Level are established.

E-3.2 Soil, Pavement Investigation

In field investigation for existing sub-grade, test pits of size 1.0m x 1.0m were excavated up to the sub-grade level. The general observations noted during the field investigation at each test pit are reported below.

- Details of pavement composition
- Visual identification of sub-grade soil
- Field dry density (FDD) of the sub-grade with Core cutter method
- Field moisture content (FMC)

FDD & FMC

The FDD and FMC values vary from 1.61 to 1.74 g/cc and 9 to 12.5% respectively.

Laboratory Tests on Existing Sub-grade (Main Carriageway)

The following laboratory tests were carried out on the disturbed soil samples of test pits.


- Particle size analysis
- Liquid Limit and Plasticity Index
- CBR test in 4 days (96 hours) soaked conditions at three energy levels corresponding to 10, 35 & 65 blows of heavy compaction rammer. The CBR varies from 12.3% to 14.5 %.

Existing Pavement Composition

The existing pavement crust consists of bituminous layers, granular layers and sub-grade soil. Total thickness of the flexible section of the pavement varies from 110mm to 470mm.

The thickness of bituminous surface varies from 20mm to 110mm.

Pavement Deflection and sub grade strength: The BBD values vary between 1.345mm to 2.368mm deflection along the Project Highway.


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E-4 TRAFFIC ANALYSIS

The primary traffic surveys were conducted in February 2015 and April 2015. The data collected have been analysed. The ADT, tollable and non-tollable traffic was calculated.

E-4.1 Homogeneous Section

Section	From	En-route	To	Length
Section-1	Arai	Jorawarpur	Kasheer	21.1Km
Section-2	Kasheer	Borada	Sarwar	23.2 Km

Location (km)	Tollable traffic (PCUs)	Non-tollable traffic (PCUs)	Total traffic (PCUs)
Km 15+800	712	446	1158
Km 27+800	3102	1102	4204

E-5 IMPROVEMENT PROPOSALS

E-5.1 Road Works

E-5.1.1 Land Acquisition

Land Acquisition is taken for 16m ROW in rural section (open area) and 12m ROW in urban section (habitation area). Land required for 16/12m ROW is 1.9289 Ha.

E-5.1.2 Widening Scheme

Existing projected road having single lane/Intermediate lane/Two lane carriageway and proposal is two lanes with granular shoulder are proposed.

E-5.1.3 Pavement Design

Design period is taken for Improvement proposal for Highway is 8 Years for (wearing course) and 15 years for (Base & Sub-base course). Design Traffic for 8 years is 5 MSA at 10% CBR (effective) that pavements should be designed; as per IRC: 37-2012.


Bituminous Overlay calculations carried out as per IRC-81:1997, the stretches of the project road recommended for strengthening of existing pavement are to be overlaid, the test results of projected highway varies between 1.345mm to 2.368mm (characteristic deflection)

E-5.1.4 Regarding of Stretches

No major regarding is suggested.

E-5.1.5 Utility Shifting

While widening the road, the utility lines located on the new carriageway or widening portion would need shifting, it includes 157 Electrical poles, 170 transformers, around 367 trees are to be cut.


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E-6 SOCIAL IMPACT ASSESSMENT & RESETTLEMENT

A social impact assessment study for the project road as a project component was also carried out to assess the impact on land, structures and population. The finding of the study suggests that 26 structures may be impacted due to proposed road improvement. Out of 26, 15 are residential, 2 resi-commercial, 6 commercial, one is School, one is panchayat and remaining one is police station. All impacted structures are permanent. Total 23 families will be impacted. The social categories of impacted families are 02-Gen, 10-OBC, 10-SC, and 1-ST. Among the all impacted people 4 are woman house hold. There are no tribe communities along the road. About 1.9289 hectares of land has been proposed for acquisition. Out of 1.9289 ha, 0.5855 ha is govt. land and remain 1.3434 ha is private land. RAP is necessary because the total number of affect person is more than 10.

E-7 ENVIRONMENTAL SCREENING OF THE PROJECT

The project road passes through Ajmer district of Rajasthan and many habitations viz. Chotalamba, Akodiya, Ankauriya, Jorawarpura, Kasheer, Borada, Fatehgarh, and Indarpura villages etc. Most of area is plain with loamy sandy and silty soil surface are. Climate of this area is arid to semiarid and at certain places wet & dry ponds are observed. For the drinking and domestic purpose locality is depends upon ground water but at certain places pond water is used for crop irrigation.

There is no wild life sanctuary or national park within the 10 km buffer area but at some locations linear patches of protected forest are observed along the at certain places which are: 1) from km 9.000 to km 10.100 on both sides; 2) from km 16.00 to km 16.350 on RHS; 3) from km 23.350 to km 27.550 on both sides and 4) from km 32.950 to km 32.275 on LHS. This road development project does not attract any specific or general conditions of EIA guidelines 2006 & its amendments (2009 & 2013), Wild Life Protection Act, 1972 but it is come under forest clearance as per provision of Forest Conservation Act, 1980.

A number of 367 trees are coming within the formation width of proposed road alignment (6m to 6.5m as per embankment height) from proposed centerline. As per the guidelines three times tree will be planed as under compensatory plantation. On the basis of the environment study this road widening and strengthen project has no more adverse impacts on local climate except some temporary changes like trees cutting, dust pollution etc. Compensatory tree plantation will be taken to compensate the impact of tree cutting.

E-8 ROAD SAFETY

Provision of road safety measures such as road markings, road signs and safety barriers etc. Have been kept in accordance with IRC: 35-1997, IRC:67-2010 and section 9 of IRC:SP:73-



2007 respectively.

E-9 BUS BAYS/BUS SHELTERS

16 numbers of bus shelters have been proposed in the Project Highway.

E-10 TOLL PLAZAS

One toll plaza is proposed at km 30.050 (Design Chainage) near Borada village.

E-11 PROJECT COST


The Project cost is done as per NH-BSR 2013 Jaipur circle, and escalation is taken @5% per year on the BSR items.

Civil Construction Cost: - 82.28 Cr.

Total Project Cost (TPC):- 94.62 Cr.

E-12 FINANCIAL ANALYSIS

Project is not viable on VGF mode. It can be implemented on any other financial mode (i.e. Annuity or EPC)


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