

# Environmental and Social Monitoring Report

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Third Quarterly Report  
(July 2015 – September 2015)

## India: Jaipur Metro Rail Line 1-Phase B Project

Prepared by Jaipur Metro Rail Corporation Limited for the Asian Development Bank.

## **CURRENCY EQUIVALENTS**

(as of 30<sup>th</sup> September 2015)

Currency unit	-	Indian Rupee (INR)
INR 1.00	=	\$ 0.01526
\$1.00	=	INR 65.53

## **ABBREVIATIONS**

ADB	-	Asian Development Bank
ADF	-	Asian Development Fund
CEC	-	Continental Engineering Corporation
CSC	-	Construction Supervision Consultant
ES	-	Environmental Specialist
DMRC	-	Delhi Metro Rail Corporation
EMP	-	Environmental Management Plan
EA	-	Execution Agency
EIA	-	Environmental impact Assessment
EARF	-	Environmental assessment and review framework
ESMS	-	Environmental and social management system
EMR	-	Environmental Monitoring Report
GPR	-	Ground penetrating radar
HSO	-	Health and Safety Officer
IEE	-	Initial environmental examination
IPP	-	Indigenous People Plan
JMRC	-	Jaipur Metro Rail Corporation
PAM	-	Project Administration Manual
PCAG	-	Public Consultation and Addressing of Grievances
RP	-	Resettlement Plan
SHE	-	Safety Health & Environment Management Plan
SPS	-	Safeguard Policy Statement
VMR	-	Vibration Monitoring Results

## **WEIGHTS AND MEASURES**

km	-	Kilometer
m	-	Meter

## **NOTES**

In this report, "\$" refers to US dollars

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## EXECUTIVE SUMMARY

1. This report is the 3<sup>rd</sup> quarterly report on environmental and social safeguards compliance of the Jaipur Metro Rail Line -1 Phase B Project. It covers the period from July 2015 to September 2015. Line 1-Phase B of the project includes construction of 2.3 km underground portion from Chandpole to Badi Chaupar, with two stations. Line 1–Phase B is being financed by ADB and expected to be completed by March 2018 at a cost of INR 1126 crore.

2. Jaipur Metro Rail Corporation (JMRC) is the Executing Agency for the Project. The sole civil works contract package under the project was awarded to Continental Engineering Corporation (CEC) in September 2013. The General Consultant overseeing the design and supervision of physical works is Delhi Metro Rail Corporation Limited (DMRC). Progress in construction works as of September 2015 are: i) TBM 1 crossed Chandpole gate and has completed tunnelling of approximate 130 m ii) TBM 2 has been commissioned and initial drive is in progress in the month of September iii) Chandpole Gate is being closely monitored through various instruments namely Prism, Pavement Settlement Markers, Multi Point Borehole Extensometer, Crack Meter, Automatic Deformation Monitoring System, vibration level monitors iv) After detailed documentation of second layer of Water tank at Chhoti Chaupar, station work using cut & cover method has already begun (v) Traffic Block at Chhoti Chaupar was opened on 10.07.2015 (Chandpole Side) and 19.08.2015 (Tripolia Side) vi) Traffic blocked at Badi Chaupar (Tripolia Side) with one way still open for movement of general traffic, this is with permission of Traffic Police, Jaipur and as per consensus with Business community vii) Dismantling of Badi Chaupar Water tank has been approved by Heritage consultant and very soon the dismantling work will begin. As of September 2015, total physical and financial accomplishment are about 24.33% and 14.8% respectively. The contract has achieved physical 13.33% and financial 3.8% progress during this reporting quarter ending September 2015.

3. The key achievement of this reporting period was crossing of TBM 1 underneath Chandpole gate. The gate sustained no damage during the tunneling process. Extra precautions had been taken to ensure no mishap happens during the tunneling process. 12 prisms had been installed on both sides of the gate to keep a check on the vibrations with monitoring the reading every hour. Additionally, 10 crack meter and six strips of glass have also been put on the gate to receive any information if the cracks widen. Moreover, eight Multi Point Borehole Extensometer (MPBX) have been installed at the depth of 2.5 meter and 5 meter. The initial drive of TBM-2 was also during the last quarter. It is expected that the TBM-2 will pass through the Chandpole gate in this the next quarter.

4. The environmental and social safeguards of the project are being implemented in compliance with the loan covenants, project agreement and contractor is complying with the proposed mitigation measures described in the Environmental Management Plan (EMP); Safety, Health and Environment (SHE) Manual and the contract specifications. The implementation of environmental and social safeguards are being monitored at Project Management and General Consultant (GC) level. With exception of few issues the project is being implemented in compliance with project requirements.

5. A baseline study carried out on heritage structures located in the project area found that 6% of the structures are in critically unstable condition and need immediate remedial measures, 56% are in partly unstable condition and require remedial measures before tunneling works begin and 38% are in stable condition. These conditions of the structures

have prevailed for the past few decades and are not related to the project. Till the reporting period of report i.e. up to September 2015 no changes in the condition of structures were reported.

6. A re-evaluation of the structural stability of the shops along the metro route alignment from Chandpole gate to Chhoti Chaupar was conducted by the Joint committee comprising of officials from JMRC, DMRC and M/s CEC. The list of structures requiring immediate action was submitted to Jaipur Nagar Nigam, so that to ensure no damage during the tunneling work. Preventive measures like propping of the verandahs and the repair of shops along the above length will be taken care off during the tunneling work.

7. For structures located around the Chaupars(station sites) where construction works are ongoing proactive measures of providing propping support to unstable structures is being carried out by the contractor under instructions of the 'engineer' (General Consultants). In addition regular monitoring of weak structures through installation of crack, tilt and vibration meters and building settlement markers is also being done.

8. The project has minor social and resettlement impacts such as the acquisition of a strip of private land (10 by 10 meters) outside Chandpole station and at the tunnel construction start point, as the shops (3 Shopkeepers) on that strip are blocking traffic. JMRC identified and acquired land from the government of Rajasthan across the street to relocate these three shops affected. Shop and land owners have been consulted and have agreed to relocate. The construction of alternative shops has already been completed by the affected shopkeepers and the process of shifting will soon begin. When the work of Phase 1B started it was found that 6 temples were falling in the station box area of Chhoti Chaupar and Badi Chaupar where digging is necessary for construction of stations, hence this required immediate relocation. For the purpose of smooth construction work and traffic flow around the construction site, JMRC in consultation with local agencies prepared traffic diversion plan. The numbers of temples falling in the area of entry/exit structures and traffic diversion were finalized and 7 additional temples i.e three at Chhoti Chaupar and four at Badi Chaupar were identified which were falling in the design of entry/exit structure and traffic diversion scheme. Necessary measures were taken for relocation of such identified temples. 6 Temples of Chhoti Chaupar have already been relocated to Old Atish market with proper rituals. 7 temples of Badi Chaupar will be relocated to Tanwar Ji Ka Nauhra or will be allotted plots in the government scheme with mutual consent.

9. Civil Administration and JMRC has ensured round the clock availability of Rescue team consisting of Ambulance, Civil defence, Earth moving Machines & Crane, staff from Jaipur Discom and PHED. This is to ensure quick response to any problem which may arise during construction.

10. On excavation, undertaken at Chhoti Chaupar under supervision of Heritage consultant M/s Abha Narain Lambh Associates, another layer of kund was discovered which also revealed 4 historic tunnels which were laid as water inlet and outlet channels to the kund functioning at that time. At some point these channels were left defunct when infrastructure services were being laid in the city criss crossing under the roads. One of the tunnels in the north direction has been unearthed all the way up to 80 metres and one can walk through the tunnel. Complete documentation, videography and photography has been conducted with a view of recreating it at later stage. Complete documentation of the all layer of tank found at Chhoti Chaupar and Badi Chaupar have been completed so as to recreate them at later stage.

11. The construction works are proceeding in accordance with the provisions of the EMP such as review of monitoring report format, regulatory compliance action plan and camp layout review and approval by the GC. The environmental monitoring plan is successfully being implemented by the JMRC through an independent instrumentation company engaged by executing agency with the approval of 'Engineer'.

12. JMRC and DMRC officials have regularly been meeting with the local people and business associations in the project area to inform them about the construction works. Measures have been taken to address concerns of the local businesses such as stopping of work and providing proper pathways for customers during festivals. All reports and information on the project is disclosed on the JMRC website. In addition JMRC has a full-time Public Relation Officer dealing with media/press issues and also maintains a facebook page and twitter account for disclosing project information and responding to queries and concerns from the general public. In spite of all these measures, some members of the public are still concerned about the impacts of the project on structures and the cultural value of Jaipur city. To deal with this JMRC will conduct another round of consultation with concerned stakeholders to clearly explain the precautionary measures being taken to protect the heritage structures particularly to people who do not have access to the internet.

13. Various proactive measures are being taken to implement project in compliance with requirements, prevent damages to heritage structures, coordinate with relevant agencies, communicate with the public and address grievances of the local public. Areas such as public communications, documentation and reporting need further enhancement.

14. The actions recommendations during previous monitoring period have been implemented. There were no significant environmental impacts observed during the reporting period and a few short-comings on follow-up with regulatory agencies, regular technical support by supervision consultant's environmental expert, public communications, documentation and reporting were observed for which necessary corrective measures have to be taken.





## I. INTRODUCTION

### A. Purpose of the Report

15. The objective of environmental monitoring is to allow ADB and the Jaipur Metro Rail Corporation (JMRC) gather information to: i) evaluate the environmental management plan (EMP) progress by establishing compliance status, ii) detect and correct non-conformances, iii) identify unanticipated impacts and implement necessary mitigation measures, and iv) provide evidence to support enforcement of penalty provisions of the civil works contract to deter non-compliance.

16. Environmental monitoring and disclosure of quarterly or semi-annual monitoring reports is an ADB requirement for environmental category-A projects like Jaipur Metro Rail Line-1 Phase B. Environmental monitoring is part of project implementation process to be complied by both ADB and JMRC. The preparation and submission of the quarterly or semi-annual monitoring reports is the responsibility of JMRC while supervision to provide guidance is the role of ADB.

17. As many sensitive heritage structures of the Pink City exist above the metro underground alignment it was agreed during project preparation that quarterly environmental monitoring reports will be prepared and disclosed for this project. However, since tunneling works which is the key activity that poses risk to the heritage structures have not begun until March 2015 and significant physical construction works start only in July 2015, it was agreed with ADB that first monitoring report will be submitted for a six month period. Accordingly first semi-annual monitoring report (July 2014 – December 2014) has been submitted to ADB and disclosed on ADB and JMRC websites. First quarterly monitoring report (Jan 2015 – March 2015) and Second quarterly monitoring report (April 2015-June 2015) has also been submitted to ADB and disclosed on ADB and JMRC websites. This report is the third quarterly environment and social monitoring report for reporting period July 2015 to September 2015.

### B. Project Description

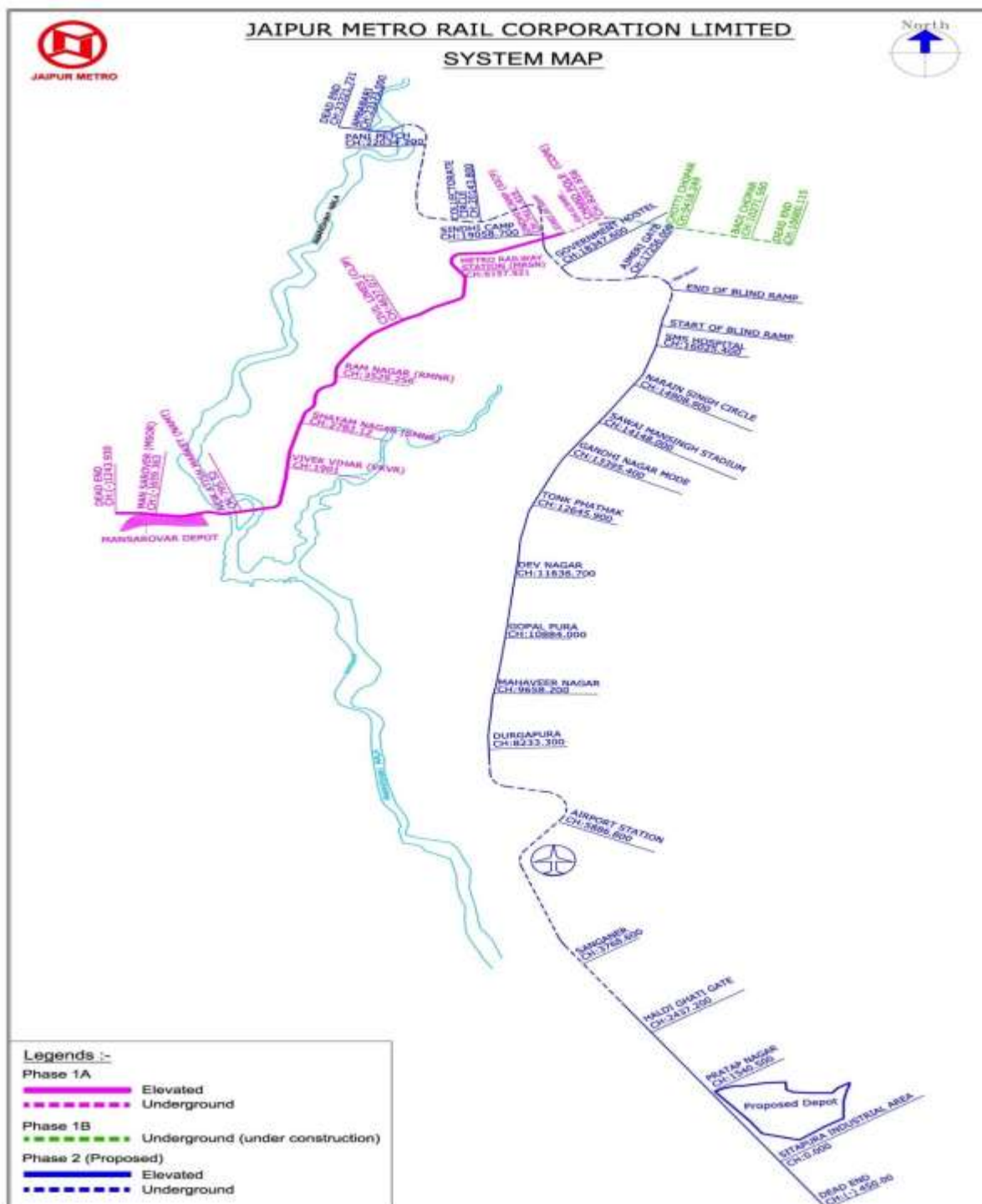
18. Jaipur, the capital of the Indian state of Rajasthan, is one of the fastest growing cities in India. The fast paced industrial and commercial development has resulted in a steep rise in travel demand, but the city's existing public transport infrastructure is inadequate in terms of capacity and service. With the growing economy, passengers are shifting to private modes of transport, as evident in the rise in vehicle ownership, aggravating congestion and pollution. The modal share for public transport was 19% in 2009—one of the lowest in cities with more than 3 million inhabitants in India<sup>1</sup>.

19. In 2009, Jaipur Development Authority developed a comprehensive mobility plan, seeking to provide an overall transport plan, up to 2031, that emphasizes the preeminence of public transport for the movement of people, not just vehicles, and integrating land use with transport networks. The plan recommended, among others, the development of high capacity metro lines along the east–west corridor of 12 km from Mansarovar to Badi Chaupar, and the north–south corridor of 23 km from Ambabadi to Sitapura. In January 2010, the government of Rajasthan established the Jaipur Metro Rail Corporation (JMRC) to implement the metro rail lines. Line 1- Phase A (9.7 km elevated portion from Mansarovar to Chandpole) and Line 1-Phase B (2.3 km underground portion from Chandpole to Badi Chaupar, with two stations).

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<sup>1</sup><http://www.adb.org/sites/default/files/project-document/79730/46417-001-rrp.pdf>

20. Line 1 – Phase B is being financed by ADB and expected to be completed by March 2018 at a cost of Rs. 1126 Crore<sup>2</sup>. Figure 1 show the system map of the Project.



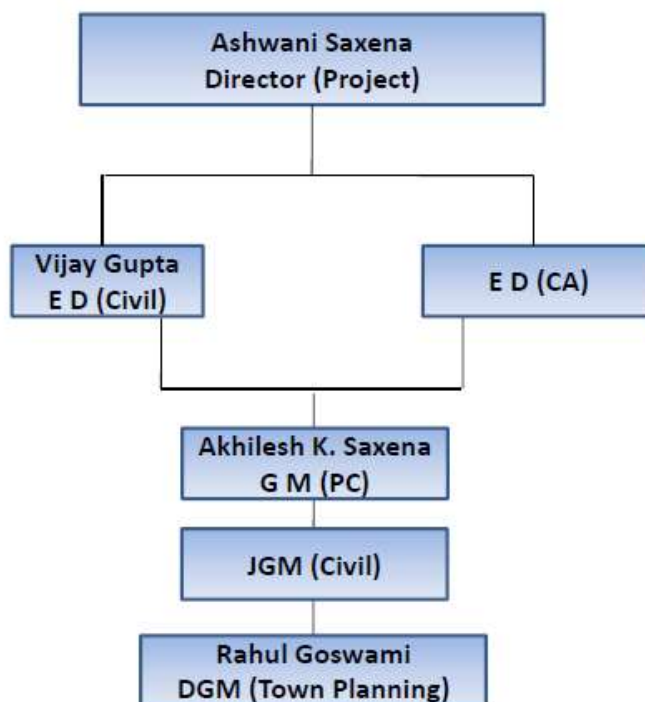
Source: JMRC

### Figure 1. JMRC Project System Map

<sup>2</sup><https://www.jaipurmetrorail.in/Present%20Status>

### C. Project Implementation Arrangement

21. The Government of Rajasthan acting through the Urban Development and Housing Department and Jaipur Metro Rail Corporation (JMRC) is the executing agency of the Project. JMRC has established an environment safeguard cell to look after implementation and monitoring of the safeguards measures associated with the Project. It constitute six officials of JMRC. Organization structure of Safeguards Cell is show in Figure 2.



**Figure 2: Organization Structure of Safeguards Cell of JMRC**

### D. Project Implementation Progress

22. As of September 2015, total physical and financial accomplishment are about 24.33% and 14.8%, respectively. The status of various construction activities is provided in the Table 1. Photolog demonstrating the progress of works is provided in Appendix 1.

**Table 1: Status of Construction Works as of September 2015**

S.N.	Activities	Location		Status	
1	<b>Earthworks:</b>  Earthwork is to be done for construction of Launching shaft at Chandpole, construction of underground stations at Chhoti Chaupar and Badi Chaupar by cut & cover method. During the tunneling earth will be	Location	Estimated quantity (in cum)	Location	% Completion
		Chandpole	8000	Chandpole	100%
		Chhoti Chaupar	120000	Chhoti Chaupar	12%
		Badi Chaupar	120000	Badi Chaupar	0%

S.N.	Activities	Location		Status																							
	excavated with Tunnel Boring Machine (TBM).	Tunnelling Work	180000	Tunnelling Work	2.01%																						
		Cut & cover	60000	Cut & cover	0%																						
2	<b>Spoils Disposal:</b> <table><tr><td>Location</td><td>Estimated quantity *(in cum)</td></tr><tr><td>Chandpole</td><td>8000</td></tr><tr><td>Chhoti Chaupar</td><td>108000</td></tr><tr><td>Badi Chaupar</td><td>108000</td></tr><tr><td>Tunnelling Work</td><td>180000</td></tr><tr><td>Cut &amp; cover</td><td>60000</td></tr></table> <p><i>*Estimated quantity of soil which will be disposed during complete project duration</i></p>	Location	Estimated quantity *(in cum)	Chandpole	8000	Chhoti Chaupar	108000	Badi Chaupar	108000	Tunnelling Work	180000	Cut & cover	60000	1. Sumel 2. Govindpura/Ropada 3. Mathuradaspura 4. Langariyawas		<p>➤ Jaipur Development Authority has allotted following soil disposal sites vide letter dated 01.09.2014</p> <p>1. Sumel 2. Govindpura/Ropada 3. Mathuradaspura</p> <p>➤ Jaipur Nagar Nigam has allotted following soil disposal sites vide letter dated 08.09.2014:</p> <p>1. Langariyawas</p> <p>➤ Spoil disposed at different disposal sites during the reporting period is as under:</p> <table><tr><td>Location</td><td>Estimated quantity (in cum)</td></tr><tr><td>Sumel</td><td>8000</td></tr><tr><td>Govindpura/Ropada</td><td>0</td></tr><tr><td>Mathuradaspura</td><td>16000</td></tr><tr><td>Langariyawas</td><td>0</td></tr></table>		Location	Estimated quantity (in cum)	Sumel	8000	Govindpura/Ropada	0	Mathuradaspura	16000	Langariyawas	0
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Langariyawas	0																										
3	<b>Vegetation and Plant Clearing:</b> <p>Some trees are coming in the metro route in launching shaft at Chandpole, station box and in entry exit at Chhoti Chaupar and Badi Chaupar. These trees are to be cut or relocated with the prior approval of District Collector.</p>	<ul style="list-style-type: none"><li>Location of the trees as per survey which are to be cut or located as under:<table><tr><td>Location</td><td>Trees</td></tr><tr><td>Metro route</td><td>90</td></tr><tr><td>Entry/Exit at Chhoti Chaupar &amp; Badi Chaupar</td><td>35</td></tr><tr><td>Ancillary Building area at Chhoti Chaupar</td><td>20</td></tr></table></li><li>The tree species include Gulmohar, Banyan tree &amp; Pipal tree.</li><li>The trees are being transplanted at Ghat ki Guni, Sylvan Biodiversity</li></ul>		Location	Trees	Metro route	90	Entry/Exit at Chhoti Chaupar & Badi Chaupar	35	Ancillary Building area at Chhoti Chaupar	20	<p>Details of trees cut or transplanted is as under:</p> <table><tr><td>Location</td><td>Trees</td></tr><tr><td>Metro route</td><td>52</td></tr><tr><td>Entry/Exit at Chhoti Chaupar &amp; Badi Chaupar</td><td>32</td></tr><tr><td>Ancillary Building area at Chhoti Chaupar</td><td>10</td></tr></table>		Location	Trees	Metro route	52	Entry/Exit at Chhoti Chaupar & Badi Chaupar	32	Ancillary Building area at Chhoti Chaupar	10						
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S.N.	Activities	Location	Status																																																
		forest Agra road Jaipur & Ram Niwas Bagh, JDA Jaipur																																																	
4	<p><b>Utility Shifting:</b></p> <p>Utility shifting is an important activity for underground station work.</p> <p>Underground electric cables, water supply lines and telecom lines are to be realigned at Chandpole for launching shaft and underground station at Chhoti Chaupar and Badi Chaupar.</p>	<table><tr><td colspan="2"><b>Chandpole – Launching shaft</b></td></tr><tr><td>Electric cables</td><td></td></tr><tr><td>Water supply lines</td><td></td></tr><tr><td>Telecom lines</td><td></td></tr><tr><td colspan="2"><b>Chhoti Chaupar</b></td></tr><tr><td>Electric cables</td><td></td></tr><tr><td>Water supply lines</td><td></td></tr><tr><td>Telecom lines</td><td></td></tr><tr><td colspan="2"><b>Badi Chaupar</b></td></tr><tr><td>Electric cables</td><td></td></tr><tr><td>Water supply lines</td><td></td></tr><tr><td>Telecom lines</td><td></td></tr></table>	<b>Chandpole – Launching shaft</b>		Electric cables		Water supply lines		Telecom lines		<b>Chhoti Chaupar</b>		Electric cables		Water supply lines		Telecom lines		<b>Badi Chaupar</b>		Electric cables		Water supply lines		Telecom lines		<p>Status during reporting period is as under:</p> <table><tr><td colspan="2"><b>Chandpole – Launching shaft</b></td></tr><tr><td>Electric cables</td><td>100%</td></tr><tr><td>Water supply lines</td><td>100%</td></tr><tr><td>Telecom lines</td><td>100%</td></tr><tr><td colspan="2"><b>Chhoti Chaupar</b></td></tr><tr><td>Electric cables</td><td>100%</td></tr><tr><td>Water supply lines</td><td>100%</td></tr><tr><td>Telecom lines</td><td>100%</td></tr><tr><td colspan="2"><b>Badi Chaupar</b></td></tr><tr><td>Electric cables</td><td>100%</td></tr><tr><td>Water supply lines</td><td>W.I.P.</td></tr><tr><td>Telecom lines</td><td>95%</td></tr></table>	<b>Chandpole – Launching shaft</b>		Electric cables	100%	Water supply lines	100%	Telecom lines	100%	<b>Chhoti Chaupar</b>		Electric cables	100%	Water supply lines	100%	Telecom lines	100%	<b>Badi Chaupar</b>		Electric cables	100%	Water supply lines	W.I.P.	Telecom lines	95%
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5	<p><b>Traffic Management and Diversion:</b></p> <p>For the construction of launching shaft at Chandpole, underground stations at Chhoti Chaupar and Badi Chaupar, traffic is to be diverted.</p> <p>Project specific traffic management plan has been developed and the same has been approved by Jaipur Traffic Authority.</p>	<p><b>Chandpole Launching Shaft</b></p> <p>Traffic from Station Road to Jhotwara Road has been diverted via Pareek College Road.</p> <p><b>Chhoti Chaupar</b></p> <p>Direct access from Chandpole Bazar to Tripolia Bazar. Traffic is diverted via Nahargarh Road – Gangauri Bazar – Cheeni Ki Burj.</p> <p><b>Badi Chaupar</b></p> <p>Traffic Diversion Plan is under preparation</p>	<p><b>Chandpole Launching Shaft</b></p> <p>Traffic Management &amp; diversion is continuing.</p> <p><b>Chhoti Chaupar</b></p> <p>Traffic Management &amp; diversion is continuing. Traffic block at Chhoti Chaupar was opened for general traffic movement on 10.07.2015 and 19.08.2015.</p> <p><b>Badi Chaupar</b></p> <p>Traffic Diversion Plan has been prepared and approved by Traffic Police. JMRC has now blocked the traffic at Badi Chaupar (tripolia side) with permission from Traffic Police. One sided 7.5 m lane has been left for movement of general traffic.</p>																																																
6	<p><b>Launching shaft:</b></p> <p>Launching shaft is to be constructed for tunnel boring machine. A launching shaft has diaphragm wall/concrete wall and it is built to be</p>	Chandpole	Launching shaft work has been completed.																																																

S.N.	Activities	Location	Status																																
	<p>permanent. Once the access shaft is completed, Tunnel Boring Machine will be lowered to the bottom and excavation will start. Launching shaft is the main entrance &amp; exit of the tunnel until project is complete.</p> <p>Launching shaft is rectangular in shape and constructed with reinforce cement concrete M50 grade. Walls of launching shaft are 800 mm thick. Dimension of launching shaft at Chandpole is 24m X 20m and a depth of 14m.</p>																																		
7	<p><b>Tunnel Boring Machine</b></p> <p>Tunnel boring machine will be used in excavating and advancing tunnels through any type of ground strata for the complete tunnelling work.</p> <p>The underlying principle of the EPB method is that the excavated soil or muck itself is used to provide continuous support to the tunnel face by balancing earth pressure against the forward pressure of the machine.</p> <p>As the shield advances at the face, the cutter head on the TBM rotates through the earth. The excavated soil is then mixed together with a special foam material that actually alters its viscosity or thickness and transforms it into flowing material. The use of a foaming agent to break down muck into a liquefied form provides some obvious benefits. The muck is then stored and controlled in a pressurized chamber located inside the cutter head, and is used to apply support and balance pressure to the tunnel face during the</p>	<p>The main activities of these TBMs are as under:</p> <table><tr><th colspan="2">TBM 1</th></tr><tr><td>Refurbishment</td><td></td></tr><tr><td>Lowering in launching shaft</td><td></td></tr><tr><td>Tunneling work</td><td>3750 meter</td></tr><tr><th colspan="2">TBM 2</th></tr><tr><td>Refurbishment</td><td></td></tr><tr><td>Lowering in launching shaft</td><td></td></tr><tr><td>Tunneling work</td><td>3750 meter</td></tr></table>	TBM 1		Refurbishment		Lowering in launching shaft		Tunneling work	3750 meter	TBM 2		Refurbishment		Lowering in launching shaft		Tunneling work	3750 meter	<table><tr><th colspan="2">TBM 1</th></tr><tr><td>Refurbishment</td><td>100%</td></tr><tr><td>Lowering in launching shaft</td><td>100%</td></tr><tr><td>Tunneling work</td><td>3% (113 m) tunneling completed.</td></tr><tr><th colspan="2">TBM 2</th></tr><tr><td>Refurbishment</td><td>100%</td></tr><tr><td>Lowering in launching shaft</td><td>100%</td></tr><tr><td>Tunneling work</td><td>Initial drive commenced</td></tr></table>	TBM 1		Refurbishment	100%	Lowering in launching shaft	100%	Tunneling work	3% (113 m) tunneling completed.	TBM 2		Refurbishment	100%	Lowering in launching shaft	100%	Tunneling work	Initial drive commenced
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S.N.	Activities	Location	Status
	<p>excavation process. The foam acts as a lubricant that conditions the soil to a suitable fluidity, in effect reducing the risk of clogging in the pressurized chamber head or muck storage area.</p> <p>A screw conveyor then removes excess fluidized muck in controlled volumes from behind the cutter head and in front of the "Pressure bulkhead", synchronizing the screw conveyor with the actual speed of the tunnel boring machine, and equalizing the actual volume of soil travelling into and out of the machine and establishes earth pressure balance during excavation, thereby also reducing the risk of surface or ground settlement. The performance of the EPBV machine, however, largely depends on the actual properties of the excavated muck. The soil may be coarse sands, gravel or stiff clays.</p> <p>The EPB TBM also has the unique capability of placing a continuous ring of segment liners from within the tail shield of the machine inside the tunnel as it advances. These concrete segments provide critical additional reinforcement and support and accomplish all tunnel construction in one pass.</p> <p>Tunnelling works from Chandpole to BadiChaupar will be done by the two TBMs.</p> <p>Diameter of the cutting head of TBM is 6.55 meter. The tunnel size is of 5.60 meter internal diameter.</p>		
8	<b>Segment casting:</b>		

S.N.	Activities	Location	Status																																												
	Internal lining of the tunnel will be done by precast reinforced cement concrete segments. The segments are to be constructed with M 50 concrete having outer diameter of 6.35 meter. One ring comprises 6 segments.	Segment casting will be done at casting yard in Bhankarota. <table><tr><td>Rings</td><td>3200 (19200 segments)</td></tr></table>	Rings	3200 (19200 segments)	Rings casted are as under: <table><tr><td>Rings</td><td>29% (925)</td></tr></table>	Rings	29% (925)																																								
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9	<b>Guide wall and D wall at Chhoti Chaupar &amp; Badi Chaupar stations:</b>  For the construction of D-Wall initially guide walls are constructed so as to keep the D-Wall in proper alignment.  Guide walls are constructed with reinforce cement concrete of M20 grade. The thickness of guide wall is about 600 mm and depth is 1.5 m.  Diaphragms walls are constructed with reinforce cement concrete of M35 grade. The thickness of diaphragms wall is about 800 mm and depth is about 26 m.	<table><tr><td>Location</td><td>Length (m)</td></tr><tr><td colspan="2"><b>Chhoti Chaupar</b></td></tr><tr><td>Guide Wall</td><td>590</td></tr><tr><td>D-Wall</td><td>590</td></tr><tr><td colspan="2"><b>Badi Chaupar</b></td></tr><tr><td>Guide Wall</td><td>590</td></tr><tr><td>D-Wall</td><td>590</td></tr></table>	Location	Length (m)	<b>Chhoti Chaupar</b>		Guide Wall	590	D-Wall	590	<b>Badi Chaupar</b>		Guide Wall	590	D-Wall	590	<table><tr><td>Location</td><td>% Completion</td></tr><tr><td colspan="2"><b>Chhoti Chaupar</b></td></tr><tr><td>Guide Wall</td><td>93%(548)</td></tr><tr><td>D-Wall</td><td>72%(425)</td></tr><tr><td colspan="2"><b>Badi Chaupar</b></td></tr><tr><td>Guide Wall</td><td>33%(194)</td></tr><tr><td>D-Wall</td><td>0</td></tr></table>	Location	% Completion	<b>Chhoti Chaupar</b>		Guide Wall	93%(548)	D-Wall	72%(425)	<b>Badi Chaupar</b>		Guide Wall	33%(194)	D-Wall	0																
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10	<b>Roof Slabs at Chhoti Chaupar &amp; Badi Chaupar Station</b>  Stations are to be constructed with top down method. Top slab, roof slab, concourse slab & base slab are to be constructed.	<table><tr><td>Location</td><td>Area (sqm)</td></tr><tr><td colspan="2"><b>Chhoti Chaupar</b></td></tr><tr><td>Top slab</td><td>4600</td></tr><tr><td>Roof slab</td><td>7000</td></tr><tr><td>Concourse</td><td>7000</td></tr><tr><td>Base slab</td><td>7000</td></tr><tr><td colspan="2"><b>Badi Chaupar</b></td></tr><tr><td>Top slab</td><td>4600</td></tr><tr><td>Roof slab</td><td>7000</td></tr><tr><td>Concourse</td><td>7000</td></tr><tr><td>Base slab</td><td>7000</td></tr></table>	Location	Area (sqm)	<b>Chhoti Chaupar</b>		Top slab	4600	Roof slab	7000	Concourse	7000	Base slab	7000	<b>Badi Chaupar</b>		Top slab	4600	Roof slab	7000	Concourse	7000	Base slab	7000	<table><tr><td>Location</td><td>Area (sqm)</td></tr><tr><td colspan="2"><b>Chhoti Chaupar</b></td></tr><tr><td>Top slab</td><td>3696</td></tr><tr><td>Roof slab</td><td>0</td></tr><tr><td>Concourse</td><td>0</td></tr><tr><td>Base slab</td><td>0</td></tr><tr><td colspan="2"><b>Badi Chaupar</b></td></tr><tr><td>Top slab</td><td>0</td></tr><tr><td>Roof slab</td><td>0</td></tr><tr><td>Concourse</td><td>0</td></tr><tr><td>Base slab</td><td>0</td></tr></table> Top slab work at Tripolia & Chandpole side is under progress and it is expected to get complete by end of December.  D-wall construction at Chhoti Chaupar is under progress.	Location	Area (sqm)	<b>Chhoti Chaupar</b>		Top slab	3696	Roof slab	0	Concourse	0	Base slab	0	<b>Badi Chaupar</b>		Top slab	0	Roof slab	0	Concourse	0	Base slab	0
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S.N.	Activities	Location	Status																																								
			Road restoration for allowing traffic movement at Chhoti Chaupar has been completed and it has been opened to public.  Excavation of roof slab at Tripolia side has started.																																								
11	<b>Establishment of construction camp:</b>  ➤ A construction camp for labourers has been established near to casting yard area in November 2014.	Casting Yard, Bhankrota <table><tr><td>Number of blocks</td><td>9</td></tr><tr><td>Total Camp Area</td><td>6227 sq.m</td></tr><tr><td>Capacity</td><td>9X48</td></tr><tr><td colspan="2"><b>Facilities to be provided</b></td></tr><tr><td>Bathing room</td><td></td></tr><tr><td>Dining room</td><td></td></tr><tr><td>urinal&amp; toilet</td><td></td></tr><tr><td>Drinking water with cooling facility</td><td></td></tr><tr><td>fans</td><td></td></tr><tr><td>playground</td><td></td></tr></table>	Number of blocks	9	Total Camp Area	6227 sq.m	Capacity	9X48	<b>Facilities to be provided</b>		Bathing room		Dining room		urinal& toilet		Drinking water with cooling facility		fans		playground		Completed. <table><tr><td>Number of blocks</td><td>9</td></tr><tr><td>Area of each block</td><td>692sqm</td></tr><tr><td>Workers staying</td><td>190</td></tr><tr><td colspan="2"><b>Facilities installed</b></td></tr><tr><td>Bathing room</td><td>yes</td></tr><tr><td>Dining room</td><td>yes</td></tr><tr><td>urinal&amp; toilet</td><td>yes</td></tr><tr><td>Drinking water with cooling facility</td><td>yes</td></tr><tr><td>fans</td><td>yes</td></tr><tr><td>playground</td><td>yes</td></tr></table>	Number of blocks	9	Area of each block	692sqm	Workers staying	190	<b>Facilities installed</b>		Bathing room	yes	Dining room	yes	urinal& toilet	yes	Drinking water with cooling facility	yes	fans	yes	playground	yes
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12	<b>Other Facilities:</b>  ➤ Batching Plant, ➤ Laboratory, ➤ RO Plant ➤ Chiller Plant ➤ Diesel Generating Set ➤ Briquette Boiler	Following facilities are provided at casting Yard, Bhankrota: <table><tr><td>Item</td><td>Capacity</td></tr><tr><td>Batching Plant</td><td>(i) 30 cum/hr (ii) 60 cum/hr</td></tr><tr><td>Quality Control Laboratory</td><td>Installed</td></tr><tr><td>RO Plant</td><td>2 kl/hr</td></tr><tr><td>Chiller Plant</td><td>100 TR</td></tr><tr><td>Diesel Generating Set</td><td>500 KVA</td></tr><tr><td>Briquette Boiler</td><td>2 TPH</td></tr></table>	Item	Capacity	Batching Plant	(i) 30 cum/hr (ii) 60 cum/hr	Quality Control Laboratory	Installed	RO Plant	2 kl/hr	Chiller Plant	100 TR	Diesel Generating Set	500 KVA	Briquette Boiler	2 TPH	Completed.																										
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13	<p><b>Establishment and operation of quarry/ borrow area:</b></p> <p>For the construction work following material is sourced:</p> <div><p>➤ Sand</p><p>➤ Aggregate</p><p>➤ Cement</p><p>➤ Steel</p></div>	<p>Quarry area and borrow area of construction material is as under:</p> <table><tr><th>Material</th><th>Quarry / borrow area</th></tr><tr><td>Sand</td><td>Banas</td></tr><tr><td>Aggregate</td><td>Shakun, Lakher</td></tr><tr><td>Cement</td><td>Lafarge</td></tr><tr><td>Steel</td><td>SAIL, VIZAG,TATA</td></tr></table>	Material	Quarry / borrow area	Sand	Banas	Aggregate	Shakun, Lakher	Cement	Lafarge	Steel	SAIL, VIZAG,TATA	<p>Volume of the material extracted is as under:</p> <table><tr><th>Material</th><th>Volume (MT)</th></tr><tr><td>Sand</td><td>6288</td></tr><tr><td></td><td>28696.51*</td></tr><tr><td>Aggregate</td><td>8004</td></tr><tr><td></td><td>26241.68*</td></tr><tr><td>Cement</td><td>1590</td></tr><tr><td></td><td>8041.46*</td></tr><tr><td>Steel</td><td>849.55</td></tr><tr><td></td><td>2448.15*</td></tr></table> <p>* Up to date quantity</p>	Material	Volume (MT)	Sand	6288		28696.51*	Aggregate	8004		26241.68*	Cement	1590		8041.46*	Steel	849.55		2448.15*
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## II. COMPLIANCE TO SAFEGUARDS PROVISIONS IN AGREEMENTS UNDER THE PROJECT

### A. Compliance to Loan Agreement

23. The environmental and social safeguard requirements are explicit provided in the Loan Agreement 3062-IND between ADB and State of Rajasthan through the Urban Development and Housing Department (UDH) and Jaipur Metro Rail Corporation (JMRC). These loan agreement provisions and compliance status are provided in Table 2.

**Table 2: Status of Compliance to Environmental Provisions of the Loan Agreement**

S.N.	Environmental Provision	Compliance Status
1	<b>Schedule 4. Item 7(a):</b> <u>Conditions for awards of contracts, commencement of Works</u>  7. As condition for award of any contract under the project the EA shall ensure the following:  a. JMRC shall not award any Works contract which involves environmental impacts until JMRC incorporated the relevant provisions from the EMP and SHE into the Works contract,	Complied.  SHE (Safety, Health and Environment) Manual and Environmental Management Plan (EMP) is a part of bidding document. Section 6 of Contract Agreement includes condition of contract on SHE and EMP, requiring the Contractor to implement the EMP and comply with requirements of SHE.
2	<b>Schedule 4. Item 8:</b> <u>Conditions for award of contracts; commencement of Works</u>  8. "As a condition for commencement of Works	Complied.  The project did not require

	contract under the Project which involves environmental impacts and if it requires environmental clearances, the State through the JMRC shall ensure that the final approval of environmental clearances including the EIA, SHE, from appropriate <i>authority</i> has been obtained.”	environmental clearance, as railways including metro projects in India are not included in the EIA Notification 2006 of GoI.
3	<p><b>Schedule 5. Item 3:</b></p> <p><u>Environment</u></p> <p>3. “The Borrower shall ensure or cause the State through JMRC to ensure that the preparation, design, construction, implementation, operation and decommissioning of the Project facilities comply with (i) all applicable laws and regulations of the Borrower and State relating to environment, health, and safety including SHE; (ii) the Environmental Safeguards; and (iii) all measures and requirements set forth in the EIA and the EMP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report.”</p>	<p>Being complied.</p> <ul style="list-style-type: none"> <li>➤ Requirements on permits and clearance are being followed.</li> <li>➤ SHE is strictly being complied with.</li> <li>➤ Requirements of EIA and EMP are being implemented.</li> </ul>
4	<p><b>Schedule 5. Item 4(a):</b></p> <p><u>Land Acquisition and Involuntary Resettlement</u></p> <p>4 (a) Where the need arises, the Borrower shall ensure or cause the State through JMRC to ensure that all land and all rights-of-way required for the Project, and all Project facilities are made available to the Works contractor in accordance with the schedule agreed under the related Works contract and all land acquisition and resettlement activities are implemented in compliance with (i) all applicable laws and regulations of the Borrower and State relating to land acquisition and involuntary resettlement; (ii) the Involuntary Resettlement Safeguards; and (c) all measures and requirements set forth in the respective RP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report.</p>	<p>Being complied.</p> <p>All land acquisition and resettlement activities are implemented as per provisions of Indian Law.</p>
5	<p><b>Schedule 5. Item 4 (b)</b></p> <p><u>Land Acquisition and Involuntary Resettlement</u></p>	

	<p>4 (b) Without limiting the application of the Involuntary Resettlement Safeguards, or the RP, the Borrower shall ensure or cause the State through JMRC to ensure that no physical or economic displacement takes place in connection with the Project until: (a) compensation and other entitlements have been provided to affected people in accordance with the RP; and (b) a comprehensive income and livelihood restoration program has been established in accordance with the RP.</p>	<p>Being complied.</p> <p>Compensation and other entitlements are being provided to affected people in accordance with applicable laws by JMRC.</p>
6	<p><b>Schedule 5. Item 5</b></p> <p><u>Indigenous Peoples</u></p> <p>5. Where the need arises, the Borrower shall ensure or cause the State through JMRC to ensure that the preparation, design, construction, implementation and operation of the Project, and all Project facilities comply with (a) all applicable laws and regulations of the Borrower and the State relating to indigenous peoples; (b) the Indigenous Peoples Safeguards; and (c) all measures and requirements set forth in the respective IPP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report.</p>	<p>Not applicable.</p> <p>No issues on Indigenous peoples have arisen during the reporting period.</p>
7	<p><b>Schedule 5. Item 6(a) &amp; 6(b)</b></p> <p><u>Human and Financial Resources to Implement Safeguards Requirements</u></p> <p>6 (a) "The Borrower shall ensure or cause the State through JMRC to ensure that all necessary budgetary and human resources to fully implement the EMP, and the RP and the IPP as required"</p> <p>6 (b) "The Borrower shall ensure or cause the State through JMRC to ensure that at least one expert each is designated to supervise implementation of the EMP, and the RP and the IPP as required"</p>	<p>Being complied.</p> <ul style="list-style-type: none"> <li>➤ Safeguards cell comprising of 06 officers has been established in JMRC since 2013.</li> <li>➤ A JV of M/s Abha Narain Lambah Associates and M/s Shashank Mehendale &amp; Associates has been engaged as Heritage Consultant through ICB.</li> <li>➤ The Heritage Consultant is to monitor the heritage structures lying along the metro route of Phase 1B.</li> <li>➤ JMRC has also engaged 3 senior Archaeological Consultants to supervise the excavation of Chhoti</li> </ul>

		<p>Chaupar and Badi Chaupar.</p> <ul style="list-style-type: none"> <li>➤ Safeguards experts are part of the PMC (DMRC) team and civil works contractor team.</li> <li>➤ Adequate budget allocation has been made for implementation of safeguards activities.</li> </ul>
8	<p><b>Schedule 5. Item 7(a)</b></p> <p><u>Safeguards – Related Provisions in Bidding Documents and Works Contracts.</u></p> <p>7 (a) “comply with the measures and requirements relevant to the contractor set forth in the EIA, the EMP, SHE, the RP and the IPP as applicable (to the extent they concern impacts on affected people during construction), and any corrective or preventative actions set out in a Safeguards Monitoring Report.</p>	<p>Being complied.</p> <p>Safeguards experts are part of the PMC (DMRC) and civil works contractor teams are implementing safeguard measures. Adequate budget allocation is being made for implementation of safeguards activities.</p>
9	<p><b>Schedule 5. Item 7(b)</b></p> <p><u>Safeguards – Related Provisions in Bidding Documents and Works Contracts.</u></p> <p>7 (b) “make available a budget for all such environmental and social measures”</p>	<p>Being complied.</p>
10	<p><b>Schedule 5. Item 7(c)</b></p> <p><u>Safeguards-Related Provisions in Bidding Documents and Works Contract.</u></p> <p>7 (c) “provide the JMRC with a written notice of any unanticipated environmental, resettlement or indigenous peoples risks if any, or impacts that arise during construction, implementation or operation of the Project that were not considered in the EIA, the EMP, and the RP and the IPP if any;”</p>	<p>Being complied.</p> <p>Appropriate measures are being and will be taken to address these issues, as they arise.</p>
11	<p><b>Schedule 5. Item 8(a)</b></p> <p><u>Safeguards – Related Provisions in Bidding Documents and Works Contracts.</u></p> <p>8 (a) submit quarterly Safeguards Monitoring Reports to ADB and disclose relevant</p>	<p>Being complied.</p> <p>First semi-annual report for July 2014</p>

	<p>information from such reports to affected persons promptly upon submission”</p>	<p>to December 2014 has already been disclosed on ADB and JMRC website.</p> <p><a href="https://www.jaipurmetrorail.in/pdf/First%20Environment%20and%20Social%20Monitoring%20Report.pdf">https://www.jaipurmetrorail.in/pdf/First%20Environment%20and%20Social%20Monitoring%20Report.pdf</a></p> <p>1<sup>st</sup> quarterly report (January 2015- March 2015) on environmental and social safeguards compliance has been already been uploaded on ADB and JMRC website.</p> <p><a href="https://www.jaipurmetrorail.in/pdf/2015_07_16%20First%20Quarterly%20Env%20and%20Social%20Monitoring%20Report_Jan_March%202015.pdf">https://www.jaipurmetrorail.in/pdf/2015_07_16%20First%20Quarterly%20Env%20and%20Social%20Monitoring%20Report_Jan_March%202015.pdf</a></p> <p>2<sup>nd</sup> quarterly report (April 2015 – June 2015) on environmental and social safeguards compliance has also been uploaded on ADB and JMRC website.</p> <p><a href="https://www.jaipurmetrorail.in/pdf/26820151720234Second%20Quarterly%20Environment%20and%20Social%20Monitoring%20Report_Apr%20to%20June.pdf">https://www.jaipurmetrorail.in/pdf/26820151720234Second%20Quarterly%20Environment%20and%20Social%20Monitoring%20Report_Apr%20to%20June.pdf</a></p> <p>This is the 3<sup>rd</sup> quarterly report (July 2015 – September 2015) on environmental and social safeguards compliance</p>
12	<p><b>Schedule 5. Item 8(b)</b></p> <p><u>Safeguards – Related Provisions in Bidding Documents and Works Contracts.</u></p> <p>8 (b) “if any unanticipated environmental and/or social risks and impacts arise during construction, implementation or operation of the Project that were not considered in the EIA, the EMP, SHE, and RP and IPP as applicable, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan.</p>	<p>Being complied.</p>
13	<p><b>Schedule 5. Item 8(c)</b></p> <p><u>Safeguards – Related Provisions in Bidding Documents and Works Contracts.</u></p> <p>8 (c) Report any breach of compliance with the measures and requirements set forth in the</p>	<p>Being complied.</p>

	EMP, SHE and the RP or the IPP if any, promptly after becoming aware of the breach.	
14	<p><b>Schedule 5. Item 9</b></p> <p>9. The Borrower shall ensure or cause the State through JMRC to ensure that no proceeds of the Loan under the Project are used to finance any activity included in the list of prohibited investment activities provided in Appendix 5 of ADB's Safeguard Policy Statement (2009).</p>	Being complied
15	<p><b>Schedule 5. Item 10</b></p> <p><u>Other Social Measures</u></p> <p>10. The EA shall ensure that civil works contracts under the Project follow all applicable labor laws of the Borrower and State and that these further include provisions to the effect that contractors; (i) carry out HIV/AIDS awareness programs for labor and disseminate information at worksites on risks of sexually transmitted diseases and HIV/AIDS as part of health and safety measures for those employed during construction; and (ii) follow and implement all statutory provisions on labor (including not employing or using children as labor, equal pay for equal work), health, safety, welfare, sanitation, and working conditions. Such contracts shall also include clauses for termination in case of any breach of the stated provisions by the contractors.</p>	<p>Complied.</p> <ul style="list-style-type: none"> <li>➤ Various awareness programmes have been conducted during the reporting period.</li> <li>➤ HIV/AIDS awareness programmes are conducted on regular basis.</li> <li>➤ Monthly environmental training, physical training and general housekeeping training are conducted in line with India Government's Swachha Bharat Abhiyan.</li> </ul> <p>Details of Awareness Programs and Meetings are provided in <b>Appendix 2</b></p>
16	<p><b>Schedule 5. Item 11</b></p> <p>11. The EA shall ensure the safety and status of the heritage sites and structures involved in the Project site at its own cost and in this regard ensure all appropriate steps included as detailed in the PAM.</p>	<p>Being complied.</p> <ul style="list-style-type: none"> <li>➤ In the bidding document, provision was made to conduct Baseline Building condition survey, wherein the structural stability of structures lying on 30 m on either side of the route alignment of Phase 1B was recorded so as to help monitor any changes which may occur during construction.</li> <li>➤ JMRC through CEC (AIMIL) got the</li> </ul>

		<p>Building Condition Survey before commencement of work at site.</p> <ul style="list-style-type: none"> <li>➤ For the purpose of monitoring heritage structures along with the metro route alignment of Phase 1B, JMRC has engaged Heritage Consultant M/s Abha Narain Lambah Associates and M/s Shashank Mehandale &amp; Associates (JV).</li> <li>➤ Mitigation and preventive measures are being taken up by M/s CEC in order to avoid any damage.</li> </ul>
17	<p><b>Schedule 5. Item 12</b></p> <p><u>Gender</u></p> <p>12. The EA shall ensure that the Project is undertaken in conformity with the stakeholder communication strategy as agreed between ADB, the Borrower, State, and JMRC and referred in the PAM.</p>	Being complied.

## B. Compliance to Project Administration Manual

24. The Project Administration Manual<sup>3</sup> (PAM), describes how the JMRC will implement the project and deliver the results on time, with quality, within budget, and in accordance with government and Asian Development Bank (ADB) policies and procedures. The PAM is mandatory and serves as the main document describing implementation details. The status of implementing the safeguards requirements set out in PAM are provided in Table 3.

**Table 3: Compliance to PAM**

SN	Details	Compliance Status
1.	<p><b>Section VII.</b></p> <p><b>Safeguards</b></p> <p><b>40. Implementation of SHE and EIA.</b></p> <p>The safeguards cell within JMRC will coordinate and ensure that all environment safeguard requirements under the project are met. The SHE and EIA report including site specific EMP will be included in the contract documents. The contractors must include in their bid adequate budget for implementation of all items in the SHE and EIA. The safeguards cell through the project management consultant (Delhi Metro Rail Corporation) will monitor and report on the</p>	<p>Being complied.</p> <p>Sample monthly monitoring report is provided in <b>Appendix 3.</b></p>

<sup>3</sup><http://www.adb.org/sites/default/files/project-document/79731/46417-001-pam.pdf>



SN	Details	Compliance Status
	environmental compliance of contractors with the SHE and EIA and ensure proper implementation of the grievance and redress mechanism. Key implementation activities for each stage of the project are as follows:	
2.	<p><b>(i)Pre-construction:</b></p> <p>All contractors will complete the following activities no later than 30 days from the issuance of Notice to Proceed:</p> <ol style="list-style-type: none"> <li>1. Submit appointment letter and resume of the Contractor's Health and Safety Officer (HSO) who will be the on-site focal person for environment safeguards;</li> </ol>	<p>Being complied.</p> <p>HSO's CV was submitted on 9 May 2014 and it was approved was GC 15 May 2014.</p>
	<ol style="list-style-type: none"> <li>2. HSO will engage CSC-Environment Specialist, and JMRC safeguards cell to a meeting to discuss in detail the SHE and EIA seek clarification and recommend corresponding revisions if necessary;</li> </ol>	<p>SHE and EIA have been discussed in detail by HSO with CSC-Environment Specialist, and JMRC safeguards cell. Details of meetings provided in <b>Appendix 2.</b></p>
	<ol style="list-style-type: none"> <li>3. HSO will request CSC-ES copy of monthly monitoring formats and establish deadlines for submission;</li> </ol>	<p>Formats for Monthly Monitoring Report has been finalize with CSC-Environment Specialist. Monitoring report is being sent on monthly basis in prescribed format.</p> <p>Sample monthly report is provided in <b>Appendix3.</b></p>
	<ol style="list-style-type: none"> <li>4. HSO will submit for CSC-ES approval an action plan to secure all permits and approvals needed during construction stage such as for operation of crushers and hot mix plants, transport and storage of hazardous materials, waste disposal sites, use of ground water etc.</li> </ol>	<p>HSO has submitted plan and action is being taken accordingly.</p>
	<ol style="list-style-type: none"> <li>5. HSO will submit for approval of CSC-ES the construction camp layout before its establishment where camps are required, and</li> </ol>	<p>Camp has been constructed as per approved layout diagram <b>Appendix 5.</b></p>
	<ol style="list-style-type: none"> <li>6. Before start of construction, the contractor will post signs in and around the construction site with information on the names, positions, contact numbers, and addresses of key people for receiving grievances</li> </ol>	<p>Adequate relevant signage has been displayed. Photolog is in <b>Appendix 1.</b></p>
3.	<p><b>(ii)Construction:</b></p> <p>The JMRC safeguards cell through the PMC will monitor the Contractor's compliance to the SHE</p>	<p>Being complied.</p>

SN	Details	Compliance Status
	and EIA. In case of non-conformances, the safeguards cell will recommend corrective measures and ensure their timely implementation. If any unanticipated impacts become apparent, the safeguards cell will inform ADB. If required the EIA report will be updated, and mitigation measures and resources to address the new impacts will be identified	
4.	<p><b>(iii)Post-construction:</b></p> <p>The safeguards cell through the PMC will certify works completed in accordance with SHE and EIA and ensure all construction sites are satisfactorily rehabilitated and restored or otherwise recommend withholding of payments</p>	<p>Not yet due.</p> <p>Will be done in accordance with SHE &amp; EIA.</p>
5.	<p><b>41. PMC Environmental Specialist:</b></p> <p>JMRC will ensure PMC (Delhi Metro Rail Corporation) to provide an Environmental Specialist who will, full time during construction, to monitor compliance by the contractor to the SHE and EIA in support of JMRC safeguard cell. The key qualification and experience consist of (a) minimum of a Master's Degree in Environmental Impact Assessment (EIA) or Environmental Engineering or related subjects; and (b) experience of minimum of 5 years of working experience in conducting Environmental Assessments, implementing and/or supervising environment management activities in infrastructure projects. The objective is to ensure contractor's compliance to the Safety Health and Environment (SHE) Guidelines and EIA in accordance with the requirements of the ADB Safeguard Policy Statement (SPS) 2009 as well as relevant policies of the Government of India. The main output is the Quarterly monitoring report during the construction period. The responsibilities include:</p>	<p>Partially complied.</p> <p>Mr. S.A. Verma, Sr. AGM/DMRC/Delhi is designated by PMC as its Environmental Specialist to monitor compliance by the Contractor for SHE and EIA. His assistants are doing full time monitoring in Jaipur.</p>
6.	<ul style="list-style-type: none"> <li>Review EIA report including site specific EMP and SHE guidelines to understand the environmental issues in the project area and mitigation and monitoring requirements of the project.</li> </ul>	<p>Complied.</p> <p>EIA, EMP and SHE guidelines have been reviewed.</p>
	<ul style="list-style-type: none"> <li>Update the site specific EMP if there are any significant changes in the project scope or environmental conditions to incorporate all new environmental issues and mitigation measures</li> </ul>	<p>Being complied.</p> <p>EMP will be updated as per requirements.</p>
	<ul style="list-style-type: none"> <li>Prepare monitoring checklists/ templates for</li> </ul>	<p>Complied.</p>

SN	Details	Compliance Status
	daily or weekly monitoring on implementation of the SHE and site specific EMP by the contractor.	Site specific monitoring checklists/ templates for daily or weekly monitoring on implementation of the SHE and EMP has been prepared.
	<ul style="list-style-type: none"> <li>Organize a consultation meeting with JMRC safeguards cell, contractors Health and Safety Officers (HSO), Site Engineer and Heritage Expert before the start of physical works to clarify roles and responsibilities of each party. After start of physical works organize a coordination meeting at least every quarter to provide updates, clarify and follow up on pending issues etc.</li> </ul>	<p>Being complied.</p> <p>A consultation meeting between JMRC's Safeguard Cell, Contractor, Health and Safety Officers (HSO), Site Engineer and Heritage Expert held before the start of physical work to clarify roles and responsibilities of each party.</p> <p>Coordination meetings in between JMRC's Safeguard Cell, Contractors, Health and Safety Officers (HSO), Site Engineer and Heritage Expert are being held regularly.</p>
	<ul style="list-style-type: none"> <li>Where necessary organize technical training programs to enhance the field level staff's understanding on environmental issues such as health impacts of dust and noise, waste/debris disposal and management, safety issues etc.</li> </ul>	<p>Being complied.</p> <p>Environmental training programs are conducted on regular basis. The training is conducted by contractor's HSO. If required additional training will be provided by third party agencies on environmental issues. Details of training sessions are provided in <b>Appendix 2</b>.</p>
	<ul style="list-style-type: none"> <li>Monitor implementation of the SHE and site specific EMP by the contractor on a daily or weekly basis. In doing so complete the daily or weekly monitoring checklists.</li> </ul>	<p>Being complied.</p> <p>Monitoring of implementation of SHE and site specific EMP are being done by Contractor's HSO on regular basis. SHE meeting is held with participation from JMRC, DMRC and Contractor and sub-contractors to ensure compliance and implementation of SHE requirements and EMP.</p>
	<ul style="list-style-type: none"> <li>Provide site based technical advice to the contractors where necessary during construction activities</li> </ul>	Site based technical advice to the contractors is being given by DMRC experts.
	<ul style="list-style-type: none"> <li>Co-ordinate with the contractor's site engineers on monitoring and data collection on noise and vibration generated during tunnelling works and operation of heavy machinery</li> </ul>	PMC's environment team is coordinating with contractor's site engineers on monitoring and data collection on noise and vibration

SN	Details	Compliance Status
		generated during operation of heavy machinery. It will also be monitored during tunnelling works.
	<ul style="list-style-type: none"> <li>Coordinate with the Heritage Expert on getting data on monitoring and status of heritage structures above ground.</li> </ul>	PMC's environment team is coordinating with the Heritage Expert on getting data on monitoring and status of heritage structures above ground.
	<ul style="list-style-type: none"> <li>Facilitate the functioning of the Grievance Redress Mechanism and maintain proper records of all environment related grievances and details on how they were addressed.</li> </ul>	A system is in place to facilitate the functioning of the Grievance Redress Mechanism and maintain proper records of all environment related grievances and details on how they are addressed.
	<ul style="list-style-type: none"> <li>Prepare quarterly Environmental Monitoring reports based on monitoring site visits, completed checklists and quarterly meetings for submission to JMRC safeguards cell and ADB. Amongst other environment safeguard issues, the monitoring report must cover: <ul style="list-style-type: none"> <li>➤ compliance to the SHE and site specific EMP by the contractor</li> <li>➤ vibration monitoring activities conducted by contractor's engineers</li> <li>➤ grievances redress mechanism</li> <li>➤ monitoring and status of heritage sites above ground</li> </ul> </li> </ul>	<p>Noted for compliance.</p> <ul style="list-style-type: none"> <li>➤ For compliance of the SHE and site specific EMP by the contractor regular visit is being done by the Environmental team of CSC.</li> <li>➤ For monitoring of the vibration during the construction instrumentation has been done by M/s CEC as per approval given by CSC. The monitoring will be done by a third party agency i.e. M/s. AIMIL.</li> <li>➤ Grievances redress mechanism is in place.</li> <li>➤ For monitoring the status of heritage site above the ground a Heritage Consultant i.e. M/s Abha Narain Lambah Associates and M/s Shashank Mehendale and Associates (JV) has been appointed by JMRC. During the tunneling the team of heritage consultant will be at site to monitor the status of buildings and heritage structures along the metro route.</li> </ul>
7.	<p><b>42. Monitoring of Heritage Structures</b></p> <p>JMRC through DMRC will retain at its own cost the current Heritage architect as the Heritage site expert during construction of the underground</p>	<p>Being complied.</p> <ul style="list-style-type: none"> <li>➤ JMRC through competitive bidding has engaged heritage</li> </ul>

SN	Details	Compliance Status
	<p>metro section. The expert will be responsible for conducting a baseline survey of heritage sites above the metro alignment and conducting regular monitoring of the status of the heritage sites throughout the construction period. The expert will be responsible for coordinating necessary procedures if any historical/traditional artifacts are found during tunneling works. He/she will also provide advice on technical measures during construction to prevent damages to the heritage structures. In the event of any damage to a heritage structure he/she will immediately alert JMRC and recommend appropriate mitigation or restoration measures. Key outputs are: (a) Monthly monitoring report; (b) No damage on heritage structures; and (c) in the event of damage, implementation of immediate restoration and mitigation measures. The main responsibilities are:</p>	<p>consultant M/s Abha Narain Lambah Associates and M/s Shashank Mehendale &amp; Associates (JV) to monitor the heritage structures lying along the metro route of Phase 1B.</p> <ul style="list-style-type: none"> <li>➤ JMRC has also engaged 3 senior Archaeology Consultants to supervise the excavation of Chhoti Chaupar and Badi Chaupar.</li> <li>➤ Heritage Consultant got conducted Baseline survey for existing building's condition along the metro route and has submitted Building Inventory report.</li> <li>➤ Structural survey of buildings along the metro route has also conducted and submitted report, wherein they categorized buildings under 3 categories             <ol style="list-style-type: none"> <li>1. Unstable Structures requiring preventive propping and immediate demolition/evacuation.</li> <li>2. Part of structure unstable requiring propping &amp; partial replacement /demolition.</li> <li>3. No major instability.</li> </ol> </li> </ul> <p>These reports have been shared with ADB and concerned local agency who will be further taking necessary action.</p> <p>A re-evaluation for the structural condition of the shops along Chandpole launching site (from Chandpole gate to Chhoti Chaupar) was conducted by the Joint team of JMRC, DMRC and M/s CEC engineers. Preventive measures like propping of the verandahs and the shops along the above length have been taken by contractor. The consolidated list of unstable structures requiring immediate</p>

SN	Details	Compliance Status
		attention will be further shared with local agency (Jaipur Municipal Corporation) for further course of action. Copy of letter at <b>Appendix 8</b>
8.	<ul style="list-style-type: none"> <li>At least one month before the start of construction activities conduct a baseline survey of all heritage structures above the metro alignment and record detailed information including, but not limited to: list of heritage structures with details on location and distance from the metro alignment, exact height of structures above ground, existence of cracks/damages prior to start of construction, detailed photographs etc.</li> <li>Monitor the condition of the heritage structures on a monthly basis throughout the construction period and compare the status with the baseline status to ensure that there are no changes from the baseline condition.</li> <li>Coordinating necessary procedures if any historical/traditional artifacts are found during tunnelling works.</li> <li>Provide advice on technical measures during construction to prevent damages to the heritage structures.</li> <li>In the event of observation in any damage to any heritage structure/s immediately alert JMRC and recommend appropriate mitigation or restoration measures.</li> <li>Provide technical advice on and supervise the mitigation or restoration activity.</li> <li>Prepare a monitoring report on a monthly basis to record activities implemented and monitoring findings and submit to JMRC safeguards cell as well the Environmental Specialist. Findings of the report will be included in the quarterly environmental monitoring report that will be prepared by the environmental specialist.</li> </ul>	<p>Complied.</p> <ul style="list-style-type: none"> <li>Before the start of construction activity, Building Condition Survey of all structure along the metro route with photograph of existing cracks and damages was conducted by CEC through AIMIL.</li> <li>Before the start of construction activity, Baseline Survey of all the structure along the metro route with detailed photographs was conducted by Heritage Consultant i.e. M/s Abha Narain Lambah Associates and M/s Shashank Mehendale and Associates (JV).</li> <li>Based on the reports and survey submitted by Heritage consultant, CEC is regularly monitoring status of buildings and the status is reported through daily and weekly reports.</li> <li>Heritage Consultant entrusted to advice on measures during construction to prevent damages to the heritage structures.</li> <li>Heritage Consultant is submitting monitoring report on monthly basis to record activities implemented and monitoring findings to JMRC. <b>Appendix 6</b></li> </ul>
9.	<p><b>Section VII- Safeguards</b></p> <p><b>b) Social – Involuntary resettlement.</b></p> <p>44. If any changes or additional land requirements or involuntary resettlement impacts are identified, a resettlement plan will be prepared in accordance with the ADB <i>Safeguard Policy Statement (2009)</i> and the same is further approved by ADB before award of related civil works contract and implemented before</p>	<p>Being complied.</p> <p>When the work of Phase 1B started it was found that 6 temples falling in the station box area of Chhoti Chaupar and Badi Chaupar where digging is necessary for construction of stations, hence this required immediate relocation. For the</p>

SN	Details	Compliance Status
	commencement of the relevant section of the civil works contract as applicable.	purpose of smooth construction work and traffic flow around the construction site, JMRC in consultation with local agencies got prepared Traffic diversion plan. The numbers of temples falling in the area of entry/exit structures and traffic diversion were finalized and 7 additional temples i.e. three at Chhoti Chaupar and four at Badi Chaupar were identified which were falling in the design of entry/exit structure and traffic diversion scheme. Necessary measures were taken for relocation of such identified temples. 6 Temples of Chhoti Chaupar have already been relocated at Old Atish market. 7 temples of Badi Chaupar will be relocated to Tanwar Ji Ka Nauhra and other location. Civil structure of 3 temples out of 7 temples of Badi Chaupar has already been constructed at Tanwar Ji Ka Nauhra. Other 4 temples have opted for plots in the Government schemes.
10	<p><b>Section VII - Safeguards</b></p> <p><b>c) Social – Indigenous people</b></p> <p>45. In case of any adverse impacts if identified during implementation on indigenous people, the JMRC will ensure that the Indigenous Peoples Plan (IPP) is prepared in accordance with the ADB <i>Safeguard Policy Statement (2009)</i> and the same is further approved by ADB before award of related civil works contract and implemented before commencement of the relevant section of the civil works contract as applicable.</p>	Not Applicable.
11	<p><b>Section VIII - Gender and Social Dimensions</b></p> <p><b>47 Gender consultation and participation</b></p> <p>Meaningful consultations that are gender inclusive and responsive will be carried out as early as in the project preparation stage and will be carried out on an ongoing basis throughout the project cycle.</p> <p>JMRC shall ensure that the bidding documents provide clauses to ensure that all civil works contractors comply with labor laws by not employing child labor; encouraging the employment</p>	<p>Complied.</p> <p>This provision is a part of the bidding document.</p>

SN	Details	Compliance Status
	of the poor, particularly women; and not offering different wages to men and women on work of equal value.	
12	<b>Section VIII - Gender and Social Dimensions</b> <b>49. HIV and AIDS</b> JMRC will ensure that all civil works contractors (i) carry out awareness programs for labor on the risks of sexually transmitted diseases/AIDS and human trafficking; and (ii) disseminate information at worksites on the risks of sexually transmitted diseases and HIV/AIDS as part of health and safety measures for those employed during construction. Contracts for the project will include specific clauses on these undertakings, and compliance will be strictly monitored by JMRC.	Complied.  Periodically awareness about HIV/AIDS is discussed in morning tool box talk and apart from this the medical officer visits the labour camp and explains the risk of sexually transmitted disease on periodic basis. <b>Appendix 2.</b>
13	<b>Section VIII - Gender and Social Dimensions</b> <b>50. Health.</b>  JMRC shall ensure that contractors provide adequately for the health and safety of construction workers and further ensure that bidding documents include measures on how contractors will address this, including an information and awareness raising campaign for construction workers on sexually transmitted diseases, HIV/AIDS, and human trafficking.	Complied.  Various type of awareness programme has been conducted during this period. Apart from this monthly environmental training, physical training and general housekeeping training are conducted in line with India Government's Swach Bharat Abhiyan.
14	<b>Section VIII - Gender and Social Dimensions</b> <b>51. Labor</b>  JMRC shall ensure that: <ul style="list-style-type: none"> <li>i. civil works contractors comply with all applicable labor laws and regulations, do not employ child labor for construction and maintenance activities, and provide appropriate facilities for women and children in construction campsites;</li> <li>ii. people directly affected by the projects are given priority to be employed by the contractor;</li> <li>iii. contractors do not differentiate wages between men and women for work of equal value; and</li> <li>iv. specific clauses ensuring these will be included in bidding documents. The construction supervision consultants monitor the provisions.</li> </ul>	Complied. <ul style="list-style-type: none"> <li>➤ Civil work contractor is complying with all applicable labour laws and regulations.</li> <li>➤ No child labour is employed.</li> <li>➤ Preference is being given to people directly affected by the project.</li> <li>➤ Complying with equal remuneration Act.</li> <li>➤ Specific clause for ensuring labour law etc. has been included</li> </ul>



SN	Details	Compliance Status
		in the bidding document.
15	<p><b>Section IX - Performance Monitoring, Evaluation, Reporting and Communication</b></p> <p><b>B. Monitoring.</b></p> <p><b>Disclosure of Environmental Assessments and Monitoring Reports</b></p> <p>ADB and JMRC will disclose on their respective websites the EIA Report. The quarterly monitoring reports will also be disclosed on the ADB website.</p>	<p>Being complied.</p> <p>EIA report has already been disclosed on ADB and JMRC websites. The link to JMRC site is given below:</p> <p><a href="https://www.jaipurmetrorail.in/pdf/EIA_Final_April_2014.pdf">https://www.jaipurmetrorail.in/pdf/EIA_Final_April_2014.pdf</a></p> <p>First Semi Annual Monitoring Report has been disclosed on the websites of ADB and JMRC.</p> <p><a href="https://www.jaipurmetrorail.in/pdf/First%20Environment%20and%20Social%20Monitoring%20Report.pdf">https://www.jaipurmetrorail.in/pdf/First%20Environment%20and%20Social%20Monitoring%20Report.pdf</a></p> <p>1st Quarterly Monitoring Report (January 2015 - March 2015) on environmental and social safeguards compliance has been already been uploaded on ADB and JMRC website.</p> <p><a href="https://www.jaipurmetrorail.in/pdf/2015_07_16%20First%20Quarterly%20Env%20and%20Social%20Monitoring%20Report_Jan_March%202015.pdf">https://www.jaipurmetrorail.in/pdf/2015_07_16%20First%20Quarterly%20Env%20and%20Social%20Monitoring%20Report_Jan_March%202015.pdf</a></p> <p>2<sup>nd</sup> quarterly report (April 2015 – June 2015) on environmental and social safeguards compliance has also been uploaded on ADB and JMRC website.</p> <p><a href="https://www.jaipurmetrorail.in/pdf/26820151720234Second%20Quaterly%20Environment%20and%20Social%20Monitoring%20Report_Apr%20to%20June.pdf">https://www.jaipurmetrorail.in/pdf/26820151720234Second%20Quaterly%20Environment%20and%20Social%20Monitoring%20Report_Apr%20to%20June.pdf</a></p> <p>This is the 3<sup>rd</sup> quarterly report (July 2015 – September 2015) on environmental and social</p>

SN	Details	Compliance Status
		safeguards compliance
16	<p><b>Section IX - Performance Monitoring, Evaluation, Reporting and Communication</b></p> <p><b>B. Monitoring</b></p> <p><b>55. Safeguards monitoring - Resettlement</b></p> <p>If impact is identified during project implementation, a monitoring system will be established based on the ADB <i>Safeguard Policy Statement (2009)</i> and Government of India regulations.</p>	<p>Being complied.</p> <p>All resettlement and relocation issues will be settled on mutually agreed terms.</p>
17	<p><b>Section IX - Performance Monitoring, Evaluation, Reporting and Communication</b></p> <p><b>B. Monitoring</b></p> <p><b>56. Indigenous People</b></p> <p>If impact is identified during project implementation, a monitoring system will be established based on the ADB <i>Safeguard Policy Statement (2009)</i> and Government of India regulations.</p>	<p>No impact is identified.</p>
18	<p><b>Section IX - Performance Monitoring, Evaluation, Reporting and Communication</b></p> <p><b>B. Monitoring</b></p> <p><b>58. Grievance Redress Mechanism</b></p> <p>Grievances related to the implementation of the project, particularly regarding the land acquisition and R&amp;R will be acknowledged, evaluated, and responded to the complainant with corrective actions. Any grievance regarding the land acquisition and R&amp;R is received by OSD (Land), JMRC and is addressed through the decision of the "Negotiation Committee".</p>	<p>Being complied</p> <p>JMRC regularly conducts meetings with project affected people and maintains proper documentation to track their redressal. The details are at Table 12 in this report.</p>

### C. Compliance to the Civil Works Contract Agreement

25. The contractor is liable to comply with the safeguards clauses included in the contract agreement. Table 4 below provides an update on the status of safeguards compliance by the civil works contractor.

**Table 4: Compliance to the safeguards Clauses of the Civil Work Contract**

S.N.	Description	Compliance Status
1	GCC Sub Clause 4.8	

S.N.	Description	Compliance Status
	<p><b>Safety Procedures</b></p> <p>The Contractor shall:</p> <ul style="list-style-type: none"> <li>a) comply with all applicable safety regulations,</li> <li>b) take care for safety of all persons entitled to be on the Site,</li> <li>c) use reasonable efforts to keep the Site and Works clear of unnecessary obstruction so as to avoid danger to these persons,</li> <li>d) provide fencing, lighting, guarding and watching of the Works until completion and taking over under Clause 10 [Employer's Taking Over], and</li> <li>e) Provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and the owners and occupiers of adjacent land.</li> </ul>	<p>Being complied.</p> <p>Contractor is taking adequate measures to comply with regulations on safety of workers.</p>
2	<p><b>GCC Sub-Clause 6.7</b></p> <p><b>Health and Safety</b></p> <p>The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the Site and at any accommodation for Contractor's and Employer's Personnel, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.</p> <p>The Contractor shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to Issue instructions and take protective measures to prevent accidents. Throughout the execution of the Works, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority.</p> <p>The Contractor shall send, to the Engineer, details of any accident as soon as practicable after its occurrence. The Contractor shall</p>	<p>Being complied.</p> <p>Contractor is taking adequate measures as per the provision of SHE, which is also a part of bidding document.</p> <p>HSO is also working as accident prevention officer.</p> <p>Being complied.</p>

S.N.	Description	Compliance Status
	maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the Engineer may reasonably require.	
	<p><b>PCC Sub-Clause 4.8 and 6.7</b></p> <p><b>Safety Procedures and Health &amp; Safety</b></p> <p>“The Contractor shall throughout the execution of the Works including the carrying out of any testing, commissioning (including Integrated Testing and Commissioning), or remedying of any defects:</p> <ul style="list-style-type: none"> <li>(a) take full responsibility for the adequacy, stability, safety and security of the Works, Plant, Rolling Stock, Contractor's Equipment, Temporary Works, operations on Site and methods of manufacture, installation, construction and transportation;</li> <li>(b) have full regard for the safety of all persons on or in the vicinity of the Site (including without limitation persons to whom access to the Site has been allowed by the Contractor), comply with all relevant safety regulations, including provision of safety gear, and insofar as the Contractor is in occupation or otherwise is using areas of the Site, keep the Site and the Works (so far as the same are not completed and occupied by the Employer) in an orderly state appropriate to the avoidance of injury to all persons and shall keep the Employer indemnified against all injuries to such persons;</li> <li>(c) provide and maintain all lights, guards, fences and warning signs and watchmen when and where necessary or required by the Engineer or by laws or by any relevant authority for the protection of the Works and for the safety and convenience of the public and all persons on or in the vicinity of the Site; and</li> <li>(d) where any work would otherwise be carried out in darkness, ensure that all parts of the Site where work is being carried out are so lighted as to ensure the safety of all persons on or in the vicinity of the Site and of such work.</li> </ul> <p>Contractor is required to take note of all the</p>	<p>Being complied.</p> <p>Adequate health and safety measures are being implemented as per the provision of SHE, which is also a part of bidding document.</p>

S.N.	Description	Compliance Status
	<p>necessary provisions in Employer's Safety, Health and Environment Manual (SHE Manual) and the Contractor's price shall be inclusive of all the necessary costs to meet the prescribed safety standards.</p> <p>Precaution shall be taken by the Contractor to ensure the health and safety of his staff and labour. The Contractor shall, in collaboration with and to the requirements of the local health authorities, ensure that medical staff, first aid facilities, sick bay and ambulance service are available at the accommodation and on the Site at all times, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics. The Contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as per the Engineer's requirement and will ensure complete compliance with relevant clauses of Employer's Health, Safety and Environment Manual (SHE Manual).</p> <p>The Contractor's Site Safety Plan shall be developed from his Outline Safety Plan as per Employer's Requirements and SHE Manual of the Employer. The Contractor shall appoint a member of his staff at the Site to be responsible for maintaining the safety, and protection against accidents, of personnel on the Site. This person shall be qualified for his work and shall have the authority to issue instructions and take protective measures to prevent accidents.</p>	
	<p><b>Safety Precautions</b></p> <p>Within 8 weeks of the date of Notice to Proceed, the Contractor shall submit a detailed and comprehensive contract-specific Site Safety Plan based on the Employer's Safety, Health and Environmental Manual (SHE Manual). The Contractor is required to make himself aware of all the requirements of the Employer's Safety, Health and Environmental Manual in this regard and comply with them. The Site Safety Plan shall include detailed policies, procedures and regulations which, when implemented, will ensure compliance with Sub-Clauses 4.8 and 6.7 of the General Conditions of Contract.</p>	<p>Being complied.</p> <p>Contractor has submitted site specific Safety plan and the same have been approved by CSC.</p>

S.N.	Description	Compliance Status
	<p><b>GCC Sub-Clause 4.18</b></p> <p><b>Protection of the Environment</b></p> <p>The Contractor shall take all reasonable steps to protect the environment (both on and off the Site) and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operations.</p> <p>The Contractor shall ensure that emissions, surface discharges and effluent from the Contractor's activities shall not exceed the values indicated in the Employer's Requirements, and shall not exceed the values prescribed by applicable laws.</p>	<p>Being complied.</p>
	<p><b>PCC Sub-Clause 4.18</b></p> <p><b>Protection of the Environment</b></p> <p>The Contractor shall be responsible and liable for any stoppage, closure or suspension of the works due to any contravention of statutory requirements relating to the protection of the environment and shall indemnify and keep indemnified the Employer in this regard.</p> <p>The Contractor's Site Environmental Plan shall be developed from his Employer's Safety, Health and Environmental Manual (SHE Manual), as per the Employer's Requirements and Special Conditions of Contract. Nothing extra shall be payable to the Contractor on this account and his Bid price shall be inclusive of expenditure required to be incurred for working as per SHE Manual.</p> <p>Outline Environmental Plan means the environmental plan forming part of the Tender, setting out, in summary form, the Contractor's proposed means of complying with his obligations in relation to environmental quality. Site Environmental Plan means the site environmental plan including all supplements thereto, or any amended or varied version thereof, as submitted by the Contractor in accordance with Employer's Safety, Health and</p>	<p>Being complied.</p>

S.N.	Description	Compliance Status
	<p>Environmental Manual (SHE Manual), this Clause and which has received the Engineer's consent. The Site Environmental Plan shall include detailed policies, procedures and regulations which, when implemented, will ensure compliance with this Clause. The Contractor is required to make himself aware of all the requirements of the Employer's SHE Manual in this regard and comply with them.</p> <p>Within 8 weeks of the date of the Notice to Proceed, the Contractor shall submit a detailed and comprehensive Site Environmental Plan based on the Employer's Safety, Health and Environmental Manual (SHE Manual), and shall include such further material, which the Contractor considers necessary and relevant.</p> <p>Upon the Engineer notifying his consent to the Site Environmental Plan, or any supplemental part thereof, the Contractor shall adhere to the principles and procedures contained in such document save to the extent that the Engineer may give his consent to any amended or varied version thereof.</p> <p>The Contractor shall provide all necessary access, assistance and facilities to enable the Engineer and the Employer to monitor and conduct tests to verify that the Site Environmental Plan is being properly and fully implemented."</p>	

### III. COMPLIANCE TO THE ENVIRONMENTAL MANAGEMENT PLAN

26. The environmental management plan (EMP) for the project was provided in Annexure 4 of the EIA report and also attached to the contract documents. As per EMP, five (05) environmental management activities were required to be implemented during the pre-construction stage (PC 1 – PC5); ten (10) activities are required to be implemented during the construction stage (C1.0 – C1.4, C.1.4.1 and C2 – C6); and three (03) activities are required to be implemented during the operation stage (O1 – O3). The following Table 5 lists out the status of activities during the pre-construction and construction stage as of September 2015.

Table 5: Status of Compliance to the EMP

SN	Activity	Mitigation measures	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
<b>PRE-CONSTRUCTION STAGE</b>					
PC1	Contractor Preparatory Works (Upon issuance of Notice to Proceed)	The Contractor will complete the following activities no later than 30 days upon issuance of Notice to Proceed			
		1) Submit appointment letter and resume of the Contractor's Health and Safety Officer (HSO) and environmental focal person to CSC.	Yes. Mr. Ramaraju has been appointed as Contractor's HSO and he is working full time on site. CV were submitted to CSC.		
		2) HSO will engage CSC-Environment Specialist to a meeting to discuss in detail the EMP, seek clarification and recommend corresponding revisions if necessary	Yes. EMP and SHE have been discussed with CSC-Environment Specialist.		
		3) HSO will request CSC-ES copy of monthly monitoring formats and establish deadlines for submission.	Yes. Formats and schedule of monthly monitoring reports has been finalized. Sample attached in <b>Appendix 3 &amp; 4.</b>		
		4) HSO will submit for CSC-ES approval an action plan to secure all permits and approvals needed to be secured during construction stage which include but not limited to-	Yes.		
		i). operation of crushers and hot mix plants,	Partial. No crushers and hot mix plant established by contractor. However the permit for the	Initial application for permit to establish batching plant was applied with State Pollution Control Board on 19.06.2015.	Action plan for securing permits and approvals is still under preparation



SN	Activity	Mitigation measures	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
			batching plant has not been secured yet.		
		ii) transport and storage of hazardous materials (e.g. fuel, lubricants, explosives),	Yes		
		iii) waste disposal sites and disposal management plan,	No, under process	Application for securing consent for storing hazardous waste at site will be processed once approval for establishing batching plant is obtained.	Revised application form will be submitted to Pollution control board by Contractor
		iv) temporary storage locations,	Yes		
		v) water use, and	Permission has been obtained from state authority for extraction of ground water for drinking purpose at Chhoti Chaupar.	Application for extraction of ground water for construction purpose will be submitted to authority in the first week of November.	Action plan for securing approvals to be submitted by contractor.
		vi) emission compliance of all vehicles.  Arrangements to link with government health programs on hygiene, sanitation, and prevention of communicable diseases will also be included in the action plan.	Yes.		
		5) HSO will submit for approval of CSC-ES the construction camp layout before its establishment.	Yes, Construction camp has been established as per approved layout plan.		
PC2	Coordinate with the Jaipur Development Authority on Traffic	The Contractors will discuss and coordinate the implementation of the traffic re-routing scheme particularly in Chhoti Chaupar and Badi Chaupar when it starts the cut and cover activities and the hauling and disposal of excavated materials to the	Yes, Proper traffic management plan is in place in coordination with		

SN	Activity	Mitigation measures	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
	Management Plan to avoid nuisance from traffic congestion	<p>Ambabari village.</p> <p>At the minimum, the traffic management plan will have the following components: construction traffic, ensuring access to properties, accommodating pedestrians, parking, access by construction vehicles, faulty traffic lights and problem interchanges, use of public roads, parking provision during construction, use of residential streets and traffic diversion due to temporary road closures, and construction and use of temporary access roads.</p>	government agencies.		
PC3	Community Liaison to avoid complaints and/or address complaints if any	<p>To ensure that ongoing feedback is provided on the progress of the JMRP together with feedback on the environmental management performance of the project.</p> <p>Contractor will provide a minimum of two (2) weeks notification to directly affected residents, businesses and other relevant groups of the intended construction commencement date. In providing a mechanism for communication between the contractor and the community and informing the public of construction details (timing, expected impacts), the concessionaire will undertake consultation and information activities.</p>	Yes		
PC4	Ground staking to address chance find of artifacts	<p>At least 30 days before the start of tunneling, the Contractor with supervision from the Archeology Department will employ a ground penetrating radar (GPR), detect the presence of buried artifacts along the tunnel alignment.</p> <p>The Contractor, in behalf of the JMRC, will coordinate with the Archeology Department to designate an on-site representative during the entire duration of the project.</p>	<p>Yes.</p> <p>GPR survey has already been submitted and has been uploaded on JMRC website.</p> <p><a href="https://www.jaipurmetrorail.in/pdf/2015.04.16%20GPR%20Received%20from%20CEC.pdf">https://www.jaipurmetrorail.in/pdf/2015.04.16%20GPR%20Received%20from%20CEC.pdf</a></p>		

SN	Activity	Mitigation measures	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
			JMRC is coordinating with Archeology Department for excavation work.		
PC5	Briefing on working near heritage resource to avoid damages to heritage resources and avoid cultural conflicts	<p>All workers will undergo a briefing with the Archeology Department to ensure safeguarding of heritage resource and cultural/religious practices.</p> <p>A proof of compliance to this requirement to include the name of participants and date and location of briefing will form part of the monthly report to the CSC.</p>	<p>Yes.</p> <p>Briefing is being carried out by the Archaeological Consultant namely Mr. R.D. Singh, Dr. S.K. Sharma and Mr. P.K. Jain engaged by JMRC on regular basis.</p>		
<b>CONSTRUCTION STAGE</b>					
C1.0	Avoid damage to the following heritage resources during tunnel boring namely Chandpole Gate, IsarLat, Jantar Mantar, Hawa Mahal, Chhoti Chaupar, and Badi Chaupar.	No heritage resources are inadvertently damaged during construction.	<p>Yes.</p> <p>No heritage resources are inadvertently damaged during construction.</p>	Complying through instrumentation & online monitoring of structures of historic importance.	
C1.1	To avoid ground settlement under the Chandpole Gate during tunnel boring	<p>The contractor will ensure that no inadvertent damage is incurred to the Chandpole gate.</p> <p>Estimated settlement under the Chandpole gate is less than 5mm. The contractor will ensure that the design value is not exceed and the trigger value = 3.5mm and Allowable value = 4.2 meters are implemented.</p>	<p>Yes.</p> <p>➤ Under passing scheme prepared by M/s Omikron Kappa, of Greece, structural consultant of M/s CEC has been</p>		

SN	Activity	Mitigation measures	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
		<p>Tilt meters will be installed at key positions on the gate to ensure the 2/1000 design value is observed with trigger and allowable values of 1.4/1000 and 1.7/1000, respectively</p> <p>Crack meters will be installed at key positions to ensure design value of 3.0mm is not exceeded with 2.1mm trigger value and 2.5 mm allowable value</p> <p>The contractor will immediately cease all operation if any of the trigger values are breached. The CSC will advise the contractor mitigation measures and practices to control settlement, tilt, and cracks to include but not limited to structural reinforcement and operation parameters of the TBM.</p> <p>The contractor will ensure that no structural damage is incurred and cosmetic damages are repaired under the supervision and control of the Jaipur Archeology Department.</p>	<p>proof checked by M/s Ayesa of Spain.</p> <p>➤ Structural consultant of Heritage consultant has also given his comments on the underpassing scheme of M/s CEC.</p> <p>➤ Under passing scheme of Chandpole gate has also been proof checked by IIT Delhi.</p> <p>➤ Work will be done as per approved method statement &amp; GCC</p>		
C1.2	To avoid cosmetic and structural damages to the structures along the underground metro alignment along Chandpole Bazar and Tripola Bazar due to vibration from the tunnel boring machine	Expected vibration at the Chandpole Gate during tunneling is 0.682 mm/s which is lower than internationally accepted 5mm/s. However, to be on the safe side and as practice in DMRC, the Contractor is to ensure that vibration levels at the Chandpole Gate foundation will not exceed 2.0 mm/s	<p>Not yet due.</p> <p>Online monitoring will be done when the TBM will pass through the Chandpole Gate.</p>		

SN	Activity	Mitigation measures	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
C1.3	To minimize surface noise from excavating equipment in Chhoti and Badi Chaupar and avoid disturbance to patients in the Pink City Hospital near Chandpole, Chaudhary Hospital, Maharaja School at the corner of Chhoti Chaupar. To avoid damage and nuisance to Jantar Mantar, and Hawa Mahal.	<p>The contractor will ensure that noise from construction activities does not result to exceedances of relevant limits prescribed in the Indian Ambient Air Quality Standards for Commercial Area and Silence Zone. Mitigation measures to be implemented by the Contractors are:</p> <ol style="list-style-type: none"> <li>1) liaise with local residents on how to best minimize construction noise along the Chhoti and Badi Chaupars.</li> <li>2) local residents and shop owners should be informed of the nature and duration of intended activities prior to commencement and kept updated as to changes in the management and mitigation plan</li> <li>3) equipment compounds will be located off-site</li> <li>4) noise barriers will be installed at critical work areas particularly around the Chaupars</li> <li>5) enclose especially noisy activities if above the noise limits</li> <li>6) employ transportable noise screens between noise sources and identified noise sensitive areas for the duration of noisy construction activities</li> <li>7) maximize the possibility of scheduling noisy activities at the same time to minimize the duration of exposure</li> </ol> <p>Noise from vehicles particularly for hauling of excavated materials to the dump site will be controlled through strict adherence to operating and maintenance instructions, routing of heavy vehicles way from noise sensitive areas whenever possible, conform with speed limits, and construction vehicles will only use routes specified in the traffic management plan.</p>	<p>Yes,</p> <p>Only newly manufactured equipment &amp; regular servicing of equipment is being used in construction.</p> <p>Noise monitoring is being done and necessary mitigation measures are taken as required.</p>		
C1.4	To ensure careful demolition and	The project calls for the demolition of the Chhoti and Badi Chaupar and its restoration to its original condition as a requirement from Jaipur	<p>Yes,</p> <p>➤ JMRC through competitive</p>		

SN	Activity	Mitigation measures	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
	proper restoration of Chhoti and Badi Chaupars	Development Authority. The demolition and restoration will be under the supervision and control of these agencies.	<p>bidding has engaged heritage consultant M/s Abha Narain Lambah Associates and M/s Shashank Mehendale &amp; Associates (JV) to monitor the heritage structures lying along the metro route of Phase 1B.</p> <p>➤ JMRC has also engaged 3 senior Archaeology Consultants to supervise the excavation of Chhoti Chaupar and Badi Chaupar.</p> <p>➤ The work will be done as per approved method statement. Also the work will be done under the supervision of said agencies.</p>		
C1.4.1	To address Chance heritage finds during the cut and fill operations	Please refer to FIDIC Sec. 4.24 Fossils. Recording (including chain of custody) will be made by the contractor to be validate by the CSC, and expert verification will be made by the Jaipur Archeology Department. Temporary work stoppage in the immediate area of the chance find for up to 72 hours to allow for the on-site	<p>Yes</p> <p>During the excavation of Chhoti Chaupar, Gomukhs were extracted &amp; were</p>		

SN	Activity	Mitigation measures	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
		representative of Archeology Department to visit the site to make an assessment and provide instructions. Work in the areas adjacent to the chance find will continue as provided in the detailed design.	handed over to Archeological & Museum Dept., Government of Rajasthan. Similar practice will be undertaken during Badi Chaupar		
C2	To avoid the following issues from spoil disposal activities: generation of sediment laden runoff from the work site during monsoon; Contamination of disposal sites from construction debris; Community hazard of uncollected and improperly disposed materials.	<p>A spoil management plan will be implemented that details the location of spoil disposal sites, transporting soil, and disposing of soil. The Contractor will perform the following:</p> <ol style="list-style-type: none"> <li>1) disposed spoils on permitted sites as instructed by the JMRC</li> <li>2) ensure the adequacy of the disposal site to handle the volume of spoils the will be generated</li> <li>3) Prepare, submit and seek approval from the CSC a spoil dump plan that provides the: i) dump size, layout, and form, ii) means of controlling water and wind erosion, iii) measures to prevent spoil dump contamination, vehicular, and public access.</li> <li>4) Explore the possibility of using spoil materials to rehabilitate borrow pits to</li> <li>5) All hauling vehicles should be maintained at an acceptable working order and serviced regularly</li> <li>6) Haul vehicles should be routed away from noise sensitive areas</li> <li>7) Speed limit in built up areas is 40 km/h</li> <li>8) All haul vehicles should be covered or soil sprayed with water before leaving the site specially during windy condition</li> <li>9) Spoil dumps shall have slopes no steeper than 1V:2.5H</li> <li>10) Final shaping, top soiling, and immediate revegetation</li> </ol>	<p>Yes,</p> <p>Are being disposed in the approved area only.</p> <p>All other conditions are also being fulfilled.</p>		

SN	Activity	Mitigation measures	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
		11) No vehicles are to be allowed to enter in revegetated spoils dump			
C3	To avoid depletion of groundwater and competition with existing groundwater users due groundwater Extraction for the construction works	<p>The Contactor shall secure permission for groundwater extraction from CGWA pertinent groundwater authorities before establishing borewells.</p> <p>Water conservation and recycling will be observed in all aspects of constructions to include water main breaks, watering roads for dust control, spraying concrete, equipment cleaning and site clean-up.</p>	Partial,	Application under preparation	
C4	To avoid nuisance from temporary damage or shifting in utilities particularly buried water pipes and electrical lines and disruption of essential services	<p>The Contractor will ensure that the public will be minimally affected when constructing in close proximity to essential services through:</p> <ol style="list-style-type: none"> <li>1) coordinate and secure necessary permits for utility shifting with the Jaipur Development Authority and other service utility agencies to locate al services prior to construction in any particular area</li> <li>2) inform residents of planned interruptions through local media, fliers, and public address system</li> <li>3) all planned interruptions schedules will be submitted to the safeguards cell JMRC no later than 10 working days before the interruption</li> <li>4) all affected landowners, tenants, institutions, and businesses to be notified in writing prior to commencement and kept updated in changes of schedule</li> <li>5) in the event of unforeseen disruptions, the contractor will take all reasonable actions to have the service promptly restored</li> <li>6) relevant utility agencies will be informed of the construction proximity to essential service line</li> </ol>	<p>Yes,</p> <p>Care is taken to avoid inconvenience to uses by shifting as per instruction of concerned authorities.</p>		



SN	Activity	Mitigation measures	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
		<p>and be kept on standby in the event of unforeseen disruption</p> <p>All unplanned interruption will be immediately reported to the safeguards cell within 24 hour through an incident report.</p>			
C5	To address occupational health and safety issues of the construction workers and local community	The contractor will comply with the occupational health and safety requirements as provided in SHE.	Yes		
C6	Implementation of Cleanup Operations and Restoration and Rehabilitation	Contractor shall prepare site restoration plans, which shall be subject for review and approval by the CSC, JMRC Safeguard Cell, Jaipur Development Authority and the Archeology Department to ensure consistency with zoning and town plans. The clean-up and restoration operations are to be implemented by the Contractor prior to demobilization. All spaces excavated and not occupied by the foundation or other permanent works shall be refilled with earth up to surface of surrounding ground.	Not yet due.		

#### **IV. ACTIVITIES UNDERTAKEN FOR PROTECTION AND MONITORING OF HERITAGE STRUCTURES**

##### **A. Findings in Badi Chaupar and Chhoti Chaupar**

27. Under Jaipur Metro Rail Project Phase 1B, an underground Metro line is under construction from Chandpole to Badi Chaupar. While Metro tunnel will be constructed using Tunnel Boring Machines, the two underground Metro Stations at Chhoti Chaupar and Badi Chaupar will be constructed by cut and cover method, requiring excavation from top to bottom.

28. To enable construction of underground stations at Chhoti Chaupar and Badi Chaupar, the dismantling of existing Chaupars and excavation underneath was necessary. In this regard, historical background of Chaupars was studied and after detailed discussion it was decided that digging at Chaupars will be done with utmost care and heritage elements, if any, will be handed over to Albert Museum for safe keeping.

29. Careful dismantling and excavation of Chhoti Chaupar and Badi Chaupar was done. During the excavation, an old water tank was found under each Chaupar which were shown to the Joint Committee on Metro and Monumental Heritage consultant and also to the renowned heritage consultant Ms. Abha Narain Lambah.

30. After seeing the water tank found at Chhoti Chaupar, which was unearthed first, heritage consultant M/s Abha Narain Lambah Associates submitted a report with following recommendations :-

- (a) To undertake detailed measured drawings survey, photographs and video documentations to create thorough and accurate database for future.
- (b) Excavation under supervision of professional experienced archaeologist, preferably retired archaeologist from ASI.
- (c) Proper documentation numbering of historical elements.
- (d) As the in-situ restoration is not possible therefore, reconstruction should be undertaken under the supervision of archaeologist
- (e) Artifacts like Gomukhs may be kept in custody of State Archaeology department.

31. State Government also asserted over the recommendations made by Heritage Consultant.

32. Thereupon, dismantling of old water tank was done under the supervision of Shri R D Singh, Dr. S K Sharma and Shri P K Jain, archaeology/restoration experts specially engaged by JMRC for the purpose. As agreed, 8 Gomukhs of Chhoti Chaupar were handed over to Superintendent, Albert Hall Museum, Department of Archaeology and Museums, GoR.

33. During the dismantling, the above-named archaeology/restoration experts of JMRC observed that two 'masonry nullahs' were crossing under the tank. As advised by them, further excavation was carried out and some more steps and a second bottom of the tank were found as a lower layer. Detailed documentation of the 'masonry nullahs', steps and second bottom of the tank has been done.

34. Site was inspected by the key expert of heritage consultants, M/s. Abha Narain Lambah Associates and reported that the site and historic records both reveal two layers of historic layering in the Chaupars, an older 18th century layer with a deeper tank and more steps, and a later 19th century layer with a central fountain and marble *goumukhs* lining the edge of the tank.

35. The consultant observed that the present design of the station at Chhoti Chaupar has been kept well below the ground to accommodate the reinstating of the water tank, even if it is reconstructed to the lower, 18th century layer. There is thus in the station design, adequate flexibility to reinstate the tanks as per historic levels.

36. On excavation work being undertaken at Chhoti Chaupar, it was revealed that there are 4 historic tunnels in which were laid as water inlet and outlet channels to the kund functioning at that time. At some point these channels were closed when infrastructure services were being laid in the city criss crossing under the roads. One of the tunnels in the north direction has been unearthed all the way upto 80 metres and one can walk through the tunnel. The other tunnels are in the process of being excavated.

37. The tunnels would probably connect to Jal Mahal or the Talkatora reservoir and is in a well preserved state with arched masonry and lime plastered lined walls. It has also been instructed in the site meetings to keep the rubble masonry for future use and stack the usable material properly.

38. It has been decided to explore the possibility of re-aligning the exit staircase in a manner without disturbing the function of the station designed to pass through the tunnel and expose the commuters and public to an important layer of history which has been lying buried for so many years. The Heritage consultant's detailed report is attached herewith as **Appendix-6**.

39. Consultant also opined that retaining the tunnel within the station box is not feasible; it would be worthwhile to explore the possibility of recreating architectural drawings and graphic models of these tunnels along the exhibit display within the concourse.

40. As of now on the basis of approved traffic diversion plan and construction process plan, Chhoti Chaupar will be refilled so as to proceed with the construction work of station area at Chhoti Chaupar.



41. JMRC in consultation with its Heritage consultant and Archaeology consultants gave in principle approval to engineer for developing provision of a covered space around the recreated water tank (under road level) which in turn will be used as Art gallery/display area. Engineer has advised to ensure that the entry/exit structures which will be constructed over ground at chaupars should be in line with vernacular architecture of Jaipur and must merge with the surrounding.

42. JMRC is getting the design of both the Chaupars in such a manner that they will become spectacular world class urban plazas revealing the historic layering of Jaipur.

43. For Badi Chaupar, the dismantling plan has been approved by heritage consultant, complete documentation, photography, videography & drawings have been done for badi chaupar excavated tank and JMRC has already taken approval from Heritage consultant for dismantling of Badi Chaupar for further construction work. The dismantling work of Badi Chaupar will begin soon.

## **B. D-Wall Construction**

44. The D-walls (Diaphragm Walls) act as a structural member for the station box. Prior to the commencement of the D-walls, the utilities are diverted. The construction of D-walls is executed through grabbing machines after completion of the guide wall which act as the guide for the excavation. During the operations the grabbing machines removes the soil, the soil is stabilized using Polymud to avoid the collapse of soil. After reaching the desired level, the grabbing operations are stopped and the reinforcement cage is lowered into the excavated area and concrete is poured through tremie.

45. To monitor the impact of the operations we have provided tilt meters, crack meter and settlement meters to measure the impact and report any abnormality in the reading. Apart from the above, to protect the existing verandahs, we have done the propping and jacking and also in the shops identified as critical.

46. The top slab work including D-Wall construction, plunge column at Chandpole side of Chhoti Chaupar station area is planned to be completed and the traffic blockade will be opened for public in the first week of July 2015. The construction of D-Wall is going on towards Tripoliya side and will be completed by end of next month i.e. July 2015

## **C. Chandpole Gate Tunnel Underpass Scheme**



47. Chandpole Gate is coming right in the center of alignment, attracting maximum settlement, but original drawings relating to its foundation were not available. Therefore, the foundation of Chandpole Gate has been physically examined by a team of engineers, by making several trial pits around the gate.

48. For the determination of the structure's foundation, special survey was carried out by CEC and nine trial pits were executed in certain locations near the gate.

49. The foundation of Chandpole Gate has been found to be in a sound condition which can sustain the impact of tunnel-making underneath.

50. To assess the ground settlement due to tunneling by TBM & its effect on structural safety of Chandpole Gate, a detailed 3D analysis has been carried out by M/s Omikron Kappa – Indus Consultrans JV and a detailed report submitted.

51. As per this report, considering that Chandpole gate is in category “Slight” according to the pre-condition survey, “negligible” damage is expected for settlements <6.7mm and angular distortion <1/750. As already derived from the 3D analysis, the maximum calculated settlements and angular distortion are 5mm and 1/1200 respectively, values which are related with “negligible” damage even in the case of “High” vulnerable structures.

52. Considering all the above, a set of values were established for the displacement and deflection of the Chandpole Gate, as presented in the following table.

Measurement	Trigger Level	Alarm Level	Limit values
Settlements	4mm	5mm	6mm
Angular Distortion	1/1400	1/1200	1/1000

53. On the advice of Archaeology & Museums Department, the work of further examination/proof check of underpassing scheme of Chandpole Gate was assigned to Indian Institute of Technology (IIT) Delhi. After conducting the proof check of underpassing scheme of Chandpole Gate, IIT Delhi has reported that analysis and other details given in the report are in order. The scheme of Chandpole Gate underpassing by Tunnel Boring Machines is considered safe as it will have no impact on the stability of existing Chandpole Gate.

54. Archaeology & Museums Department, GoR, vide its letter dated 19.06.2015 has issued license under Rule 20 of the Rajasthan Monuments, Archaeological sites and Antiquities Rules, 1968 for construction of twin metro tunnels under Chandpole Gate. The license validity was further extended for 2 months i.e. up to 18.10.2015 by the Archaeology & Museums Department, GoR vide its letter dated 21.08.2015 **Appendix 7**.

## **D. Results of the Ground Penetrating Radar**

### **E.1 Introduction**

55. Ground penetrating radar survey is a non-destructive geophysical method that produces a continuous cross-sectional profile or record of subsurface features, without drilling, probing, or digging. Ground penetrating radar (GPR) profiles are used for evaluating the location and depth of buried objects and to investigate the presence and continuity of natural subsurface conditions and features. It is a high-resolution geophysical method, which is based on the propagation of high frequency electromagnetic waves. The GPR method images structures in the ground that are related to changes in dielectric properties. In sediments, the water content primarily causes the changes in dielectric properties.

56. The equipment used for the scanning includes SIR-3000 (GPR) of Geophysical Survey Systems Inc. (GSSI), USA, 100 MHz paired antenna with other peripherals as shown in the Figure 2.



Figure 2: Equipments used for GPR survey

## E.2 Methodology

57. GPR model SIR-3000 of GSSI, USA was used for the survey along with 100 MHz paired antenna (with fiber optic) for scanning down to depth of 22m or so as it was indicated that the average depth of the tunnel bottom would be around 16m or so. The use of 100 MHz pair antenna provides good resolution down to a depth of 22-25m but it does not provide good resolution in the upper layers where there could be a number of utilities. The resolution within first 5m or so becomes poor using 100 MHz pair antenna alone and therefore, nothing can be inferred down to a depth of 5m. It becomes imperative to use 400 MHz to detect utilities which are normally available within first 3-4m. The same was also demonstrated during the survey. A part of the entire stretch was also taken up for utility survey. The results of the same have also been provided towards the end of the report. As the objective of the work was to scan the subsurface for different litho units down to a depth between 15-22m, 100 MHZ paired antenna was used.

58. The methodology adopted for the study includes:

- Geophysical survey using Ground Penetration Radar (GPR) with 100 MHz paired antennae for subsurface scanning
- Processing and assimilation of GPR surveys using RADAN software of the scans collected using 100 MHz pair antennae

## E.3 Study Area

59. In order to prioritize the scanning work, the entire stretch between Chandpole & Badi Chaupar has been sub-divided into following sectors:

- Sector-1: Along the tunnel alignment for the stretch between Chandpole Metro station to Chhoti Chaupar.
- Sector-2: Chhoti Chaupar Metro station.
- Sector-3: Along the tunnel alignment for the stretch between Chhoti Chaupar to Badi Chaupar.

## E.4 Conclusion

60. Survey using Ground Penetration Radar with 100 MHz paired antenna has provided scanning down to a depth of 22m.

61. The interpretation of all these scans shows that two distinct layers exists upto the scanned depth for the entire stretch between Chandpole and Badi Chaupar. This is depicted in the scans provided at Figure 10 to 27 of the report. The 3-dimensional model (surface and block) provides variation in terms of depth for the two layers. The drill hole core too in the area indicates presence of two layers of silty sand/sandy silt as defined by grain size analysis of the soil as per geotechnical report. A small portion in the entire stretch indicates more reflective zone which could be on account of anomalous material such as presence of metallic substance, high moisture content or an object.

62. A part of the entire stretch was also taken up for utility survey. This indicates the importance of GPR survey for locating utilities before excavating the area. This helps in planning the excavation work without damaging the existing utilities.

63. The summary report of the GPR done for the project is available online at JMRC webportal.

## V. SUMMARY OF ENVIRONMENTAL MONITORING

### A. Summary of Inspection Activities

64. A total of 09 SHE Walk inspections were conducted by the CSC-ES during the reporting period. Further details on the inspections carried out and key findings are provided in Table 6.

**Table 6: Field Inspections carried out during reporting period**

Date of Inspection	Location	Participants	Key Findings
24.07.2015	Chhoti Chaupar	12	Safety & Environment
31.07.2015	Casting yard	14	Safety & Environment
21.08.2015	Chandpole	11	Safety & Environment
28.08.2015	Chhoti Chaupar	15	Safety & Environment
04.09.2015	Chandpole	11	Safety & Environment
11.09.2015	Chhoti Chaupar	19	Safety & Environment
18.09.2015	Casting yard	18	Safety & Environment
25.09.2015	Chandpole	11	Safety & Environment

Note: Sample copy of SHE Walk attached with Appendix.

### B. Monitoring of Cracks, Settlements of Structures

65. The entire area where the stations as well as the tunnels underpasses fall under heritage structures. In order to observe the conditions and behaviors of the structures during the operations, monitoring is being done through instrumentations.

66. **Location and Quantity of Instrument which is installed:** Chandpole area we have installed Inclinator in the D-Wall of Shaft area. In Chhoti Chaupar station area we have installed some building instruments and their quantity is mentioned below.

SN	Instrument Name	Location	Total Quantity
1	Inclinometer	Chandpole Shaft Area	3
2	Tilt Meter	Chhoti Chaupar	35
3	Crack Meter	Chhoti Chaupar	58
4	Optical Target	Chhoti Chaupar	70
4	Building Settlement Point	Chhoti Chaupar	48
5	Pavement Settlement Point	Chhoti Chaupar	12



67. **Monitoring Frequency at Station, C&C and Launching Shaft**

SN	INSTRUMENT	FREQUENCY
1	Inclinometer	Once daily during excavation then once weekly
2	Soil Settlement Marker	Once daily during excavation then once weekly
3	Pavement Settlement Marker	Once daily during excavation then once weekly
4	Crack Meter	Once daily during excavation then once weekly
5	Tilt Meter	Once daily during excavation then once weekly

Note: Monitoring frequency may be changed depending upon whether any deformation is observed.

68. **Inclinometer Model AIM-741 or equivalent:** The purpose of inclinometer monitoring is to observe and monitor any lateral movements within structures or strata and analysis whether remedial works are required to subdue any such movements.

69. **Tilt meter-Model AIM-5410 or equivalent:** Portable tilt meters are mainly used to monitor buildings, structures, utilities, etc. As well as the inclination and rotation of retaining walls, dams, piers, piles, etc. It may also be used to evaluate the performance of bridges, struts and the stability of structures in land slide areas.

70. The EAN-70 portable tilt meter system consists of three components: tilt plate, tilt meter, and readout unit.



71. **Crack meter- Model AIM-100SC or equivalent:** The crack meter is suitable for measuring structured cracks ranging from 0.5 to 100 mm with a hairline cursory mark in two directions i.e. vertical and horizontal. The advantages of this instrument are: reliable and accurate, simple to install, simple to operation and low cost. This is very simple and accurate instrument to monitor the hair crack. The mechanical crack meter is made of polycarbonate transparent sheet with graduated marks. The both sheets will be assembled on crack with the help of fasteners.





72. **Bi- Reflex Target:**



73. The bi-reflex target is one of the surveying equipment to measure deformations and settlements of the structures surrounding the construction site. It is rugged precise and low cost with an accuracy of  $\pm 0.1\text{mm}$ .

**Vibration Monitoring:**

74. **Need for Vibration Monitoring:** The construction of underground rail and road infrastructures in metropolitan and cosmopolitan cities are mostly through developed area under challenging soil conditions. The alignment of structure is passing through densely inhabited areas with many heritage structures falling in the zone of influence of construction activities.

75. Construction vibration sources generate elastic waves in soil and have a wide range of energy, displacement, velocity and acceleration transmitted on the ground. These may be harmful to adjacent and remote structures, sensitive instruments and people. Their effects range from serious disturbance of working conditions for sensitive devices and people, to visible structural damage.

76. It is important to assess the dynamic effect before the beginning of construction activities and at the time of construction. Therefore monitoring of construction vibrations have to be started prior to the beginning of construction works at a site and be continued during construction to provide the safety and serviceability of sound and vulnerable structures.

77. It is required to carry out base line monitoring to determine the Pear Particle Velocity and their respective frequency band that are persisting even before carrying out any construction activities. The recorded values shall form the base line and shall be compared to the corresponding values recorded during construction activities and the influence of construction may be determined accordingly.

### Methodology:

78. **About the Equipment:** The equipment used for monitoring ground vibrations should be able to evaluate the parameters of vibrations in all three planes i.e. Longitudinal, Transverse and Vertical. Kelunji Echo, Seismic Recorder is used for the present monitoring requirement. This equipment can be universally used for many seismic monitoring applications, including earthquake monitoring (permanent or portable installations), structural monitoring, as well as blast and other vibration monitoring.

79. The equipment consists of Geophones and Kelunji Echo Seismic Recorder which is able to monitor the effect of vibration on all three planes. It is equipped with three geophones, capable of picking up signals in all the three planes described above. It is able to perform full field analysis of the event to evaluate the peak pulse velocity, peak frequency, peak acceleration and peak displacement.



80. The Echo is simple to use, easy to install and maintain, and light and robust enough to enable use of single equipment for monitoring different locations of the same structure or different structures. Ethernet based communications such as VSAT, ADSL, and some radios allows easy configuration of networks for data telemetry. GSM, GPRS, CDMA & PSTN are also supported.

81. The core Echo, by using its built-in GPS timing system, can act as a Network Time Server for synchronizing other NTPv4 enabled timing-critical equipment. From this core base, the Echo can be expanded with an internal tri-axial accelerometer, external 3-channel sensor interface, internal PSTN modem, LCD panel, Compact Flash memory, or any combination of these optional modules. Every Echo comes supplied with eqWave software for waveform analysis and manipulation. EqWave runs on most computing platforms that run a Java Virtual Machine, including Windows, Unix, Linux and MacOS X. Echo seismic data is recorded in PC-SUDS file format, stored in a standard file system. A logical hierarchy is implemented for simple copying to PC using a CF-USB reader or via FTP. In telemetry applications, ES & S produces a range of software to compliment the Echo. Collectively known as eqSuite, the programs automatically process Echo data for on-screen display and archiving, raises event alerts, and prepares data for interactive refinement.

**Table 7: Vibration Monitoring**

Station/ Tunnel	Location (Shop/House No.)	Land Mark	Structure Id (BCS)	Category
Chhoti Chaupar	Shop No. 189	In front Corner Column	CP-CC- UP-0071	Very Severe

Station/ Tunnel	Location (Shop/House No.)	Land Mark	Structure Id (BCS)	Category
CP to CC Tunnel	Up Line Wall Design No. 31 Left Wall while entering the wall 30 cm. In & 40 cm. from Corner (near CP-0016)	Chandpole Wall UP	CP-0016	Very Severe
CP to CC Tunnel	Up Line Small Gate near Noor Bhai Pahalwan Shop aprox 3.5 mtr before & 30 cm. in From Small Gate.	Chandpole Gate	CP-CC-DN-0154	Severe
Chhoti Chaupar	Up Line Verandah of Shop No.379 Left Col. From Shop Just before 25 CM. From Left Col. Direction L-R for distance. (RHS Col. Of Shop No. 380).	In front Corner Column	CC-BC-DN-0001	Very Severe

**Photograph of the location where Vibration Monitoring Reading has been taken.**



### **C. Noise Monitoring**

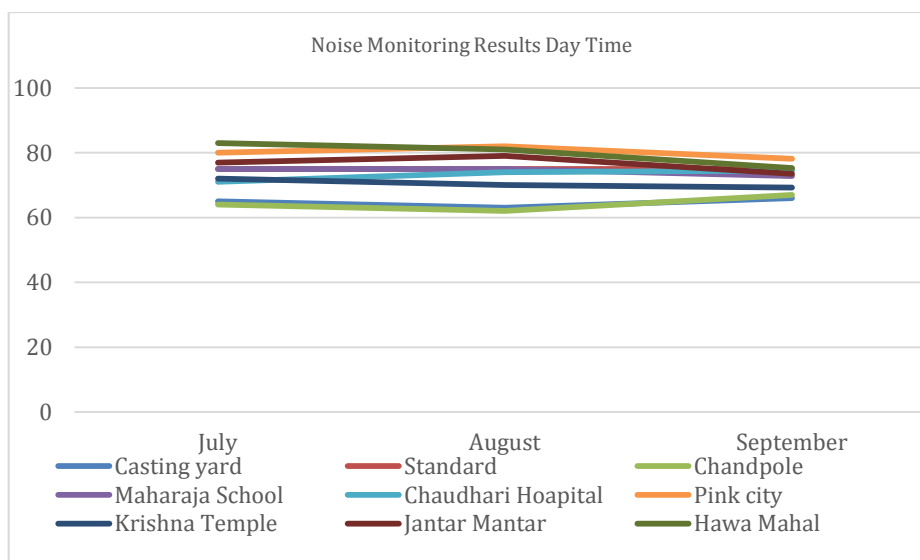
82. Noise level survey was conducted by 3<sup>rd</sup> party M.T. Laboratory at all project sites for Day & Night shifts viz Bhankrota, Chandpole launching shaft Area, Pink City Hospital, Chhoti Chaupar, Maharaja school, Chaudhry Hospital, Krishna temple, Hawa Mahal, and Jantar Mantar for Day & Night shifts.

83. It has been observed from the results that no noise level exceedance was recorded at any site both for day time and night time. In the month of September, 2015 the noise level at Chhoti Chaupar and Pink City were found marginally higher. Results are

summarised in Table 8 and 9 and graphical representation of results are also given below. Complete monitoring reports are provided in Appnedix 7.

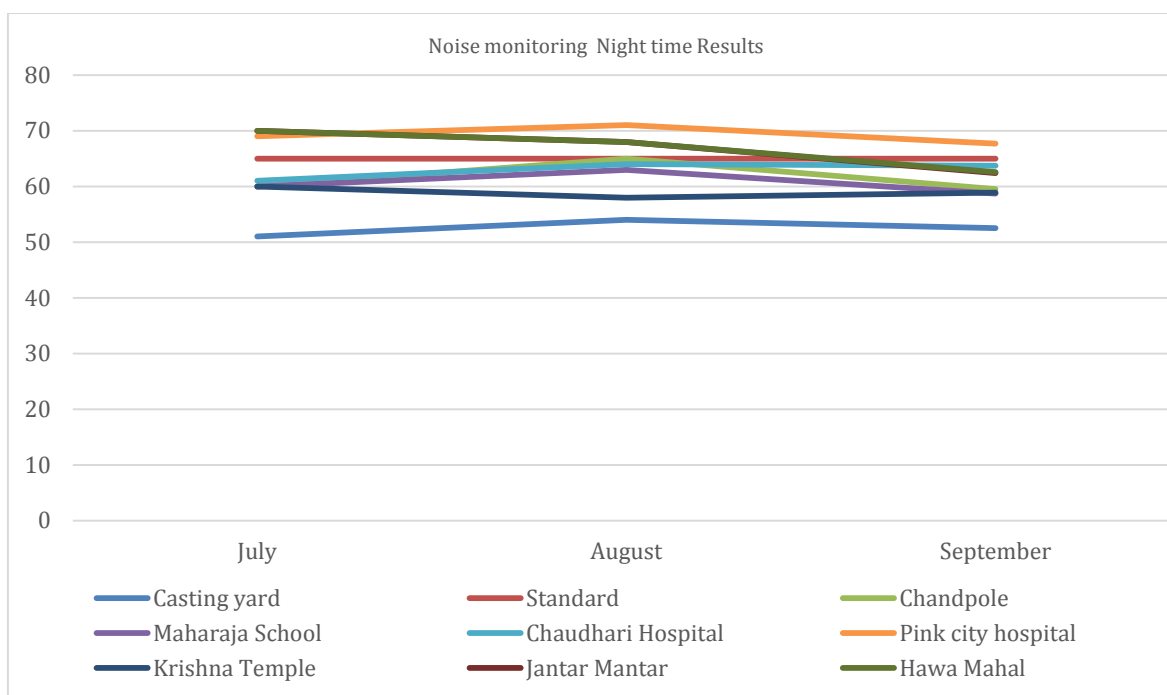
**Table 8: Noise Monitoring Results (Day time)**

Date	Leq Night dB(A)							
	Location							
	Casting Yard	Chand pole	Maharaja School	Chaudhari hospital	Pinkcity Hospital	Krishna Temple	Jantar Mantar	Hawa Mahal
28.07.2015 to 02.08.2015	65	67	75	71	80	72	77	83
23.08.2015 to 31.08.2015	63	72	75	74	82	70	79	81
20.09.2015 to 29.09.2015	66.0	70.1	72.8	74.5	78.1	69.3	73.5	75.3



**Table 9: Noise Monitoring Results (Night time)**

Date	Leq Night dB(A)							
	Location							
	Casting Yard	Chand pole	Maharaja School	Chaudhari hospital	Pinkcity Hospital	Krishna Temple	Jantar Mantar	Hawa Mahal
28.07.2015 to 02.08.2015	51		60	61	69	60	70	70
23.08.2015 to 31.08.2015	54	65	63	64	71	58	68	68
20.09.2015 to 29.09.2015	52.5	59.5	58.7	63.7	67.7	58.9	62.4	62.6



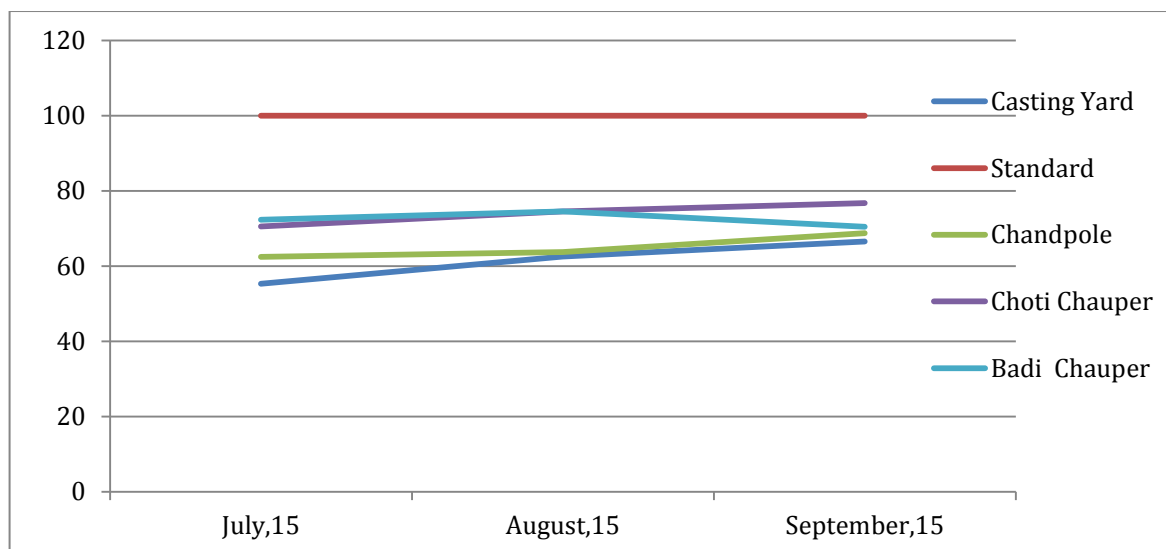
#### D. Air Quality

The ambient status of five major air pollutants viz. Total Suspended Particulate Matter (TSPM); PM<sub>10</sub>, Sulphur Dioxide (SO<sub>2</sub>), Oxides of Nitrogen (NO<sub>x</sub>) and Carbon Monoxide (CO) representing the quality of pollution level have been assessed by monitoring air quality at four locations viz. Casting Yard, Chandpole launching shaft, Chhoti Chaupar & Badi Chaupar. The air quality monitoring results indicate that PM<sub>10</sub> concentration not exceeds the limits specified by CPCB for all sites. However the concentration of PM<sub>10</sub> was within below baseline concentration value of 180 µg/m<sup>3</sup> (2012 monitoring). The reason for higher concentration could be due to soil excavation, movement of construction machineries, and internal roads which was dusty.

84. Air monitoring was carried out for the month of July, August and September. Test results are summarised in Table 10. Complete monitoring reports are given in Appendix 4.

**Table-10: Air Quality Monitoring Results**

Date	PM <sub>10</sub> (Unit µg/m <sup>3</sup> )			
	Location			
	Casting Yard	Chandpole	Chhoti Chaupar	Badi Chaupar
28.07.2015 to 01.08.2015	55.3	62.4	70.5	72.3
25.08.2015 to 28.08.2015	62.5	63.7	74.5	nil
22.09.2015 to 26.09.2015	66.5	68.7	76.7	70.4



85. **Air Pollution Control:** The mitigation measures, which have adopted to reduce the air pollution are: all transportation of construction materials should be covered manner. To minimize dust emission due to handling of aggregate and cement at site, there are two time sprinkling of water on the internal roads. Vehicle speed restriction of 5-10 km/hrs have been followed at site, tyre washing facility have been provided for cleaning of vehicles/tyres at Chandpole exit gate.

#### E. Water Quality

86. Water samples were collected from nearby bore wells during August,2015 to check the quality of the water. Quarterly water analysis results are compared with IS 10500:2012 and found within permissible limited. Results are summarised in Table 11 and monitoring reports are provided in **Appendix 4**.

**Table 11: Water Quality Monitoring Results**

Sr. No	Parameters	Units	Results	
			Casting Yard	Chandpole
1.	pH(at 25 °C)		7.5	7.1
2.	Turbidity	NTU	1.8	2.1
3.	Conductivity	µs/cm	574.00	1476.00
4.	Total Dissolved Solids	mg/L	380.00	980.00
5.	Total Suspended Solids	mg/L	8	12
6.	Oil and Grease	mg/L	Nil	Nil
7.	Dissolve Oxygen	mg/L	8.7	8.1

## VI. SOCIAL AND RESETTLEMENT IMPACTS

### A. Impacts on Structures

#### 1. Shifting of Temples

87. When the work of Phase 1B started it was found that 6 temples falling in the station box area of Chhoti Chaupar and Badi Chaupar where digging is necessary for construction



of stations, required immediate relocation. Three of these temples are at Chhoti Chaupar & another three at Badi Chaupar, as under:

1. Hanuman Mandir (Chhoti Chaupar)
2. Shiv Mandir (Chhoti Chaupar)
3. Rojgareshwar Mandir (Chhoti Chaupar)
4. Shiv Mandir (Badi Chaupar)
5. Ganesh Mandir (Badi Chaupar)
6. Hanuman Mandir (Badi Chaupar)

88. As per the decision taken by High Power Committee chaired by Chief Secretary GoR, an office order was issued on 16.10.2014, that GAD land at Tripolia Bazar i.e. Tanwar Ji ka Nauhra (around 200 mt from Chhoti Chaupar) which has two courtyards admeasuring 542 sqmt and 645 sqmt respectively be handed over to Jaipur Metro Rail Corporation for relocation of 6 temples and development of Two Wheeler Parking, respectively.

89. The possession of the land has already been taken over by JMRC from Public Works Department on 17.11.2014.

90. Necessary measures have been taken for relocation of identified temples and 6 Temples of Chhoti Chaupar have already been relocated at Old Atish market.

**Figure a: Location of Tanwar Ji Ka Nauhra (Land identified for temple relocation)**



91. As the planning and designing of station at Chhoti Chaupar and Badi Chaupar progressed, 7 additional temples were identified which either infringed the entry exit structure or came in mid of the traffic diversion scheme. The detail of the additional temples is as below:

- (i) Barah ling Mahadev (Chhoti Chaupar)
- (ii) Rameshwar Mahadev (Chhoti Chaupar)
- (iii) Bajrangbali Mandir (Chhoti Chaupar)
- (iv) Peepleshwar Mahadev (Badi Chaupar)
- (v) Mahadev Ji/Mataji/Hanuman Mandir (Badi Chaupar)
- (vi) Mahadev Mandir (Badi Chaupar)
- (vii) Mahadev/Hanuman Mandir (Badi Chaupar)

92. Proper documentation and measurement have been taken and recorded for all the temples.

93. On 11.05.2015/12.05.2015, six temples of Chhoti Chaupar were shifted to Old Atish Market and Murti Sthapna was done along with proper ritual ceremony.



94. Current status of the matter related to shifting of 7 temples at Badi Chaupar is as below:

Temple No.	Temple Name	Owner Name	Existing Area (sqmt)	Proposed Shifting to	Area Allocated at new site
1	Shiv Mandir, Sh Gaurishankar ji, On Median towards Chhoti Chaupar	Sh. Jeetendra Vyas	2.747	Tanwar Ji Ka Nauhra	6.25 sqmt (2.5 x 2.5 mt)
2	Dhruv Mukhi Mahaveer Hanuman Mandir, NW Khanda	Sh. Abhishek Sharma	3.781	Ramnagariya Yojana	45 sqmt (Plot No. A363)
3	Ganesh ji Shivalay Mandir, SE Khanda	Sh. Vishnu Kr Sharma	3.132	Rajarampura Awasiya Yojana	45 sqmt (Plot No. 229)
4	Peepleshwar Mahadev, Hanumanji, Ganesh mandir- SW Khanda	Sh. Rajnarayan Vyas	8.02	Tanwar Ji Ka Nauhra	8.00 sqmt (3.2 x 2.5 mt)
5	Mahdev ji, Mataji, Hanuman Mandir- SE Khanda	Sh. Purushotam Bharti	39.97	Tanwar Ji Ka Nauhra	40.0 sqmt (6.325 x 6.325 mt)
6	Mahadev Mandir, Outside Police thana- NE Khanda (Shri Jamneshwar Mahadev Trust)	Sh. Dinesh Vyas	5.096	Ramnagariya Yojana	Combined Plot (Plot A434) 90 sqmt
7	Mahadev/Hanuman Mandir, Outside Police thana- NE Khanda (Shri Amneshwar Mahadev Trust)		4.899	Ramnagariya Yojana	





Ongoing construction work at Tanwar ji Ka Nauhra (Badi Chaupar Temple Shifting)

95. All matters related to compensation and relocation of temples at Chhoti & Badi Chaupar are being dealt with at the level of Collector, Jaipur.

#### **B. Land Acquisition and Resettlement**

96. For the purpose of easing the traffic diversion near Sanjay Circle, Chandpole, JMRC has processed for acquisition of 3 shops located at Sansar Chand Road. Details are given below.

Sl.No.	Shop Detail	Name of Shop Owner	Name of Shopkeeper	Area (sq.m)
1	Shekhawat Rajput Dhaba (Part of Shop No. 12)	Mohd. Salim, S/o Yaseen Khan	Mukut Bihari, Satynarayan, S/o Banshilal Mehra	7.49
2	Bharat Cold Drink (Part of Shop No. 12)			3.90
3	Shiv Pan Bhandar (Part of Shop No. 12)		Bihari Lal S/o Nandlal Saini	1.30
4	DCB ATM	Smt. Mamta Kanwar W/o Sohan Singh Shekhawat	DCB Bank	5.46



97. Considering the time required for land acquisition process per new Land Acquisition Act of GOI, it was agreed and decided by JMRC (in consultation and discussion with shop owners) to resettle the shop owners on the other side of the road near Chandpole station (Near Church land). Besides resettling shops, JMRC also agreed to provide assistance during relocation process including any loss of income during the relocation process. Shop owners also agreed that new shops will be rented to same shopkeepers who are currently running these shops.

98. The shopowners have given their consent to the proposal. JMRC is in the process of getting written consents from shopowners and shifting will be done in consultations with shop owners before start of work near these shops.

99. The site selected for relocation of these shops is getting prepared and construction is ongoing. Very soon the shop owners will be given possession of the newly constructed shops.



## **VII. PUBLIC CONSULTATIONS AND ADDRESSING OF GRIEVANCES**

### **A. Public Consultations carried out**

100. Consultations are being held regularly with the local people in the project area including relevant government agencies, the business associations in the project area are such as the Chandpole Bazaar Vyapar Mandal and Tripolia Bazaar Vyapar Mandal.

101. JMRC has taken all possible measures to ensure that following concerns are regularly addressed:

- a) Heritage character of Jaipur
- b) Traffic diversion during construction
- c) Inclusion of all key stakeholders

102. During the period of this report (July 2015-September2015) following consultations were held:

**Table 12: Consultations held during the reporting period**  
**JMRC will edit this**

Date	Venue	Participants	Detail of discussion held	Action Taken
06.07.2015	Chhoti Chaupar	Shopkeepers of Chhoti Chaupar	Discussion with shopkeepers regarding D-Wall work at Chhoti Chaupar	It was informed to shopkeepers that work will be completed very soon and traffic will be opened for public.
10.07.2015	Chhoti Chaupar	Shopkeeper /Representatives from Business Community	Opening of Traffic block at Chhoti Chaupar at Chandpole Side	After completion of work D-wall and Roof slab of Chhoti Chaupar station area Chandpole side, Traffic was opened for general public.
13.07.2015	Tripolia Bazar	Representatives from Tripoliya Bazar shopkeepers	Regarding Roof slab work at Chhoti Chaupar (Tripolia side)	Shopkeepers raised their concern over traffic blockade at Tripolia side. JMRC ensured that traffic will be open as soon the work will be complete.
22.07.2015	Chandpole Vyapar mandal	Shopkeepers	Regarding Tunneling work	Representatives were informed about the plans of tunneling through TBM machine. They were ensured about the measures being taken for safety of heritage structures.
03.08.2015	Badi Chaupar	Local representatives and Business Community	Regarding proposed traffic diversion at Badi Chaupar	The meeting was to address the concerns of Badi Chaupar business community regarding proposed traffic blockade at Badi Chaupar during construction work. They were informed that the traffic expert in coordination with traffic police are planning traffic block at Badi Chaupar.

Date	Venue	Participants	Detail of discussion held	Action Taken
10.08.2015	Tanwar Ji Ka Nauhra	Temple Pujaris of Badl Chaupar	Regarding shifting of temple and construction of temples being constructed at Tanwar Ji Ka Nauhra	To show the site to temples owners and discuss the construction status.
19.08.2015	Tripoliya Bazar	Vyapar mandal Representatives	Opening traffic blockade at Chhoti Chaupar tripoliya side.	Traffic blockade opening at chhoti Chaupar at tripoliya side.

**Note:** The matters related to compensation and relocation of temples at Chhoti & Badi Chaupar are being dealt at the level of Collector, Jaipur and therefore record of such meetings are not available with JMRC.

#### **B. Complaints and Requests Received**

103. During the period of reporting (July to September 2015) no written grievances and requests application was received from the local people in the project area.

### **VIII. UNANTICIPATED SAFEGUARDS ISSUES**

104. **Discovery of new layer of kund and tunnels at Chhoti Chaupar.** After a detailed documentation of tank at Chhoti Chaupar was done. Gaumukhs from Chhoti Chaupar tank were carefully taken out and handed over to Archaeology & Museum Department as per the decision that was taken in the meeting chaired by Hon'ble CM. Then the dismantling of Chhoti Chaupar commenced. The paving stones were removed and kept in old police head quarters for safe storage of these materials till the same are used at the time of recreation of this tank. Further dismantling of this tank was done under the supervision of archeology consultants of JMRC. When the flooring was removed from Chhoti Chaupar tank, a deeper layer of Kund (water tank) was found below the water tank layer with stone paving. This deeper tank is having 7 steps all around and 4 water channels (tunnels) on its four sides.

105. In addition to the earlier levels of a stepped water tank, further excavation work revealed:

- a deeper layer of the square shaped kund measuring 13.1mt x 13.1 mt
- 7 additional steps that run all around the tank
- Four tunnels openings in the cardinal directions, the East (Tripolia bazar) and West (Chandpole) tunnels are arcuated openings, the South side (Kishanpole) tunnel has a flat lintel and the North side opening has a slab at top which is rounded at base.
- Lime concrete finishing on steps.

106. After carefull detailed documentation of the second layer of tank found at Chhoti Chaupar, the tank was refilled for construction and traffic diversion purpose.

107. **Relocation of Chhoti Chaupar temples:** Shifting and Relocation of the 6 temples at Chhoti Chaupar was done by Collector, Jaipur. Assistance were provided by the Police Administration, Civil Defence, Devsthan Department and Jaipur Metro Rail Corporation for smooth shifting and relocation of these temples. After taking consent from the temple owner/trust these 6 temples identified at Chhoti Chaupar were relocated in admeasuring

325 sqmt of land in Old Atish market. Each of the temples have been constructed as per the satisfaction of temple pujaris. The temples were shifted with the ritual procedures as directed by the temple pujaris themselves. The development works in temple premises are being executed.

During the period of reporting (July 2015 to September 2015) no incident or accident were reported at site.

## IX. CONCLUSION

### A. Summarize the overall Progress of Implementation of safeguard Measures<sup>4</sup>

108. The implementation of environmental management measures in this project face some difficulties but it can be concluded that the overall progress of implementing environmental and social safeguard measures show a highly satisfactory level. Table 13 shows a comparative scenario of implementing environmental management measures for each package.

**Table 14: Overall Progress**

Site Safety	Workers Safety	Protection of Environment	Protection of Heritage structures	Statutory Approvals	Filling of Checklists	Overall Rank
1	1	1	2	2	1	2

### B. Problems Identified and Actions Recommended

109. During the previous reporting period (January 2015-March 2015) some of the issues were identified such as consultation and communication with affected communities and shopkeepers, follow-up with regulatory / government agencies to get pending approvals/permits, full time environmental specialist by the CSC, proper documentations and record keeping, and information disclosure. Then DMRC and Contractor were advised to perform their works to comply with environmental regulations and to the mitigation measures and then proper supervision has been given wherever needed.

110. As a result, during the current monitoring period, it has been observed that adequate measures have been taken to minimize the impacts on heritage structures, and consultation and coordination with communities and shopkeepers. Table 15 presents the actions that are proposed in the previous monitoring report and actions taken to address these problems:

**Table 15: Status of Actions suggested in previous Monitoring Report**

Action Recommended	Measures Taken	Remarks
Seek advice from the heritage consultants and also consult the Department of Archaeology (Government of Rajasthan) to preserve heritage structures including	JMRC has engaged three heritage consultants and seeking their advice to preserve heritage	Continuous follow up required during the

<sup>4</sup>Overall sector environmental management progress could be described in qualitative terms or be evaluated based on a ranking system, such as the following:

1. Very Good
2. Good
3. Fair
4. Poor
5. Very Poor

Additional explanatory comments should be provided as necessary.

Action Recommended	Measures Taken	Remarks
ancient water tanks.	<p>structures. The work has been carried out in consultation with heritage consultants.</p> <p>JMRC also consulted Archeological Department to seek their advice and heritage structures are being preserved in coordination with Archeological Department of Rajasthan.</p>	implementation of project.
Follow-up with regulatory / government agencies to get pending approvals/permits.	Conducted several rounds of meeting with both State Pollution Control Board and Central Ground Water Authority regarding consent to establish batching plant and extraction of ground water for construction use respectively. Revised applications will be submitted in the first week of November.	Expedite process to get pending clearance on priority basis.
PMC's environmental specialist to provide technical support and guidance to the contractor and JMRC on full time basis	DMRC has deputed junior expert to the site to provide technical support to contractor and JMRC.	Full time environmental specialist is required at site. JMRC to take action on priority.
Appoint a consultant for community mobilization and more effecting community liaison particularly with regard to heritage issues, safety issues, utility shifting and anticipated temporary suspension of services. He will also facilitate Consultation with concerned stakeholders to clearly explain particularly to people who do not have access to the internet, the precautionary measures being taken to protect the heritage structures and to retrieve the lost layers of history.	<p>A JV of M/s Abha Narain Lambah Associates and M/s Shashank Mehendale &amp; Associates has been engaged as Heritage Consultant through ICB.</p> <p>JMRC has also engaged 3 senior Archaeological Consultants to supervise the excavation of Chhoti Chaupar and Badi Chaupar.</p> <p>These consultants together with JMRC are responsible for maintaining regular communications with communities and stakeholders.</p>	Continuous follow up required.

Action Recommended	Measures Taken	Remarks
Improvements in maintenance of records and reporting of interactions and communication with the stakeholders.	Records of the stakeholder and community interactions are being maintained at Contractor, DMRC and JMRC end.	
Extra precaution will need to be taken during tunneling works under the Chandpole gate	<p>JMRC took extra precautions. Prior to commencing tunneling under Chandpole gate, under passing scheme has been got proof checked with the help of IIT Delhi.</p> <p>Proof checking of under passing scheme/soil stabilization by Geo Consultant before commencement of tunneling work under Chandpole Gate was also done.</p> <p>TBM-1 crossed Chandpole gate safely without any damage to the heritage structure. Same precautions will be taken while TBM-2 will cross the Chandpole Gate.</p>	

111. Finally, according to the field observations and investigations it was able to identify that the most of the environmental requirements are being complied with regulations. Actions such as regular follow up with regulatory agencies to get pending permits; mobilization of full time environmental staff from supervision consultant side, and continuous coordination with shopkeepers and temple authorities to relocate the temples and shops required immediate followup.

## Appendices

1. Photolog
2. Record of SHE Training
3. Sample format of Monthly SHE report
4. Environment Quality Monitoring Report
5. Layout Plan of casting yard and labour camp
6. Monthly status report of heritage consultant.
7. License from A&M Department, GoR
8. Letter to Jaipur Nagar Nigam regarding action towards vulnerable shops



**Appendix 1: Photolog of Progress**

View of tunnel towards Chandpole gate



View of TBM-2



View of TBM-1



Monthly SHE Committee meeting



Tilting of TBM-2 at Chandpole Launching Shaft



French Collum Excavation at Chhoti Chaupar



Soil Excavation for Top slab at Chhoti Chaupar



Noise Monitoring



Air Monitoring Setup





### Appendix 2: Record of SHE Trainings

#### 1. Details of SHE training conducted in the month of July to September, 2015

##### Month of July Training

SN	DATE	LOCATION	TOPIC	No. of person	TRAINING PERIOD
1.	09.07.2015	Casting yard	Importance of PPE	17	0.45 hrs
2.	16.07.2015	Casting yard	Safe use of Ear Muff's	36	0.45 hrs
3.	17.07.2015	Casting yard	Safe use of power tools	25	0.45 hrs
4.	20.07.2015	Casting yard	Training on monsoon elect. Safety	35	0.45 hrs
5.	25.07.2015	Casting yard	Training on bed weather Condition	50	0.45 hrs
6.	03.07.2015	Chandpole	Waste Management system, Methods of storage & disposal of waste	20	1:10 hrs
7.	22.07.2015	Chandpole	CPR Training	29	1hrs
8.	22.07.2015	Chandpole	Confined space safe work procedure	31	½ hrs
9.	04.07.2015	Chhoti Chaupar	Excavation Safety	13	0.45 hrs
10.	14.07.2015	Chhoti Chaupar	Fire fighting	25	0.45 hrs
11.	21.07.2015	Chhoti Chaupar	PPE's	23	0.45 hrs
12.	27.07.2015	Chhoti Chaupar	Power Pack	17	0.45 hrs
13.	29.07.2015	Chhoti Chaupar	Lifting Operation	14	0.45 hrs
14.	24.07.2015	Badi Chaupar	Electrical Safety	08	0.45 hrs

##### Month of August Training

1.	02.08.2015	Casting yard	Mock drill	33	1.45 hrs
2.	05.08.2015	Casting yard	Lifting & rigging	10	0.45 hrs
3.	07.08.2015	Casting yard	Working at height	44	0.45 hrs
4.	12.08.2015	Casting yard	Equipment Safety training	28	0.45 hrs
5.	21.08.2015	Casting yard	Fire fighting	68	0.45 hrs
6.	12.08.2015	Chandpole	Material handling	16	0.45
7.	18.08.2015	Chandpole	Hazardous waste management	04	1.10 hrs

8.	18.08.2015	Chandpole	Insect bite	14	0.45 hrs
9.	20.08.2015	Chandpole	CPR training	38	1.0 hrs
10.	19.08.2015	Chandpole	Height work	10	1:10 hrs
11.	26.08.2015	Chandpole	Electrical Safety	10	1:00hrs
12.	26.08.2015	Chandpole	Lifting operation	20	1:00 hrs
13.	27.08.2015	Chandpole	Welding & Gas cutting	09	0.45 hrs
14.	27.08.2015	Chandpole	Electrical safety	20	0.45 hrs
15.	18/08/2015	Chhoti Chaupar	Right tool for Right Job	40	1.10 Hrs
16.	21.08.2015	Chhoti Chaupar	Working around	15	0.45 HRS
17.	22.08.2015	Chhoti Chaupar	Lifting Rigging	15	0.45 HRS
18.	26.08.2015	Chhoti Chaupar	Working near traffic	05	0.45 Hrs
19.	26.08.2015	Chhoti Chaupar	Hot Work training	22	0.45 Hrs
20.	26.08.2015	Chhoti Chaupar	Safety while Chipping Drilling work	12	0.45 Hrs
21.	28.08.2015	Chhoti Chaupar	Use of PPE's at site	27	0.45 Hrs
22.	31.08.2015	Chhoti Chaupar	Emergency Evacuation plan	16	0.45 Hrs
23.	24.08.2015	Badi Chaupar	Training on right use of PPE'S	08	0.45 Hrs

### Month of September Training



1.	02.09.2015	Casting yard	Mock drill	33	0.45 HRS
2.	02.09.2015	Casting yard	Lifting & rigging	10	0.45 HRS
3.	02.09.2015	Casting yard	Working at height	44	0.45 HRS
4.	02.09.2015	Casting yard	Equipment Safety training	28	0.45 HRS
5.	08.09.2015	Casting yard	BBS	7	0.45 HRS
6.	11.09.2015	Casting yard	Electrical Safety	21	0.45 HRS
7.	14.09.2015	Casting yard	Operation & Operator safety	8	0.45 HRS
8.	14.09.2015	Casting yard	Lifting & Rigging	10	0.45 HRS
9.	19.09.2015	Casting yard	Lifting & Rigging	10	0.45 HRS
10.	21.09.2015	Casting yard	PPE'S	26	0.45 HRS

11.	22.09.2015	Casting yard	EMS	8	0.45 HRS
12.	22.09.2015	Casting yard	Eye wash training	20	0.45 HRS
13.	26.09.2015	Casting yard	Aids Awareness	50	0.45 HRS
14.	03.09.2015	Chandpole	Hot work	20	0.45 HRS
15.	08.09.2015	Chandpole	Height work	25	0.45 HRS
16.	09.09.2015	Chandpole	CPR training	06	0.45 HRS
17.	09.09.2015	Chandpole	Electrical Safety	31	0.45 HRS
18.	10.09.2015	Chandpole	Tunnel Safety	38	0.45 HRS
19.	11.09.2015	Chandpole	Fall Arrester	30	0.45 HRS
20.	15.09.2015	Chandpole	Electrical tools	19	0.45 HRS
21.	16.09.2015	Chandpole	Lifting & Rigging	20	0.45 HRS
22.	22.09.2015	Chandpole	Height work	39	0.45 HRS
23.	23.09.2015	Chandpole	Tunnel Safety	09	0.45 HRS
24.	23.09.2015	Chandpole	Fire prevention	50	0.45 HRS
25.	24.09.2015	Chandpole	Environmental management system	10	0.45 HRS
26.	15.09.2015	Chhoti Chaupar	Fire fighting	23	0.45 HRS
27.	18.09.2015	Chhoti Chaupar	Hazardous identification	10	0.45 HRS
28.	21.09.2015	Chhoti Chaupar	Defensive driving	14	0.45 HRS
29.	22.09.2015	Chhoti Chaupar	Electrical Safety	17	0.45 HRS
30.	24.09.2015	Chhoti Chaupar	Aids awareness training	28	0.45 HRS
31.	24.09.2015	Chhoti Chaupar	Confined space	12	0.45 HRS
32.	25.09.2015	Chhoti Chaupar	Emergency properness	14	0.45 HRS
33.	22.09.2015	Badi Chaupar	Fire extinguisher	20	0.45 HRS
34.	22.09.2015	Badi Chaupar	Work at height	09	0.45 HRS
35.	30.09.2015	Badi Chaupar	Env. Improvement plan	08	0.45 HRS








### Appendix 3: Sample format of Monthly SHE report

## CONTINENTAL ENGINEERING CORPORATION

### MONTHLY SAFETY, HEALTH & ENVIRONMENTAL REPORT SEPTEMBER- 2015

DOCUMENT No. RP/JMRC/SHE/UG1B/PHOF/015  
Revision =00 , Date 06.10.2015

	PREPARED BY	REVIEWED BY	APPROVED BY
Signature :			
NAME :	S.K. Dewedi	GSS Rama Raju	Christopher Mark Cooper
DESIGNATION :	Senior Environment Engineer	Chief SHE Manager	Project leader
DATE :	06 Oct, 2015	06 Oct, 2015	06 Oct, 2015

DESIGN AND CONSTRUCTION OF TUNNEL BETWEEN CHANDPOLE AND BADI CHOUER AND REVERSAL LINE BY SHIELD TBM, UNDERGROUND METRO STATION AT CHOTI CHOUER AND BADI CHOUER BY CUT & COVER METHOD ON EAST-WEST CORRIDOR OF JAIPUR METRO (PHASE 1B) AT JAIPUR, RAJASTHAN, INDIA

CONTRACT NO: JP/EW/1B/C1



## MONTHLY SAFETY, HEALTH &amp; ENVIRONMENTAL REPORT SEPTEMBER, 2015

SHE  
SUBMITTAL

Sl. No.	DESCRIPTION OF ITEMS	PAGE NO.
A.	Index	02
B.	DMRC Observation Compliance Status	03-04
B.	Project Details	05
1.	Monthly Man Hours Details	06
2.	Accident Statistics	07
3.	SHE Committee & Meeting Details	08-11
4.	Safety Training conducted Details	12-20
5.	SHE Inspection & Air Quality / Noise Monitoring details	20-80
6.	SHE Internal Audit details like Electrical Audit etc.	81-105
7.	SHE Communication Activities	106-108
8.	Toolbox talk Details	109-118
9.	PPE details	119-122
10.	Details on IP 44 Panel boards, lighting poles, welding and cutting equipment, Ladder, Hoists,	123-152
11.	Illumination Monitoring Details	153-160
12.	Lifting Tools & Tackles Details	161-166
13.	Housekeeping Details	167-171
14.	Barricades Maintenance Details	172-182
15.	Critical Excavation & Mock drill	183-185
16.	Health & Welfare activities	186-187
17.	SHE Activity's plan for next Month	188
18.	VISITOR	189
19.	Safety Walk	190-203
20.	MARS Audit	204-205

## Appendix 4: Environment Quality Monitoring Report



### M. E. TESTING LABORATORY

(ISO Certified & NABL Accredited Lab.)

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(Rajasthan) INDIA | Phone/Fax: 0141-4048372 | Mob.: 9214045101, 102, 103, 104, 105  
E-mail: me.testinglaboratory@gmail.com

### TEST REPORT

**Description of sample:** Air Monitoring

**Location:** Casting Yard, Bhakrota, Jaipur (Raj.)

**Sampling Period/Sampling Date:** 24 Hours / (22-23/09/2015)

**Kind Attn.:** Mr. Sanjay Kumar Dewedi

**Issued to:**

The Senior Executive Environment,  
Continental Engineering Corporation,  
Old Police head quater, near Jalewi Chowk,  
infront of City Palace, near FRO office, Badi Chouper, Jaipur (Raj.)

**Report No.:** METL/JPR/228/103/2015

**Date of Report:** 26/09/2015

**Date of Receipt:** 24/09/2015

### TEST CERTIFICATE OF AIR MONITORING

**Temp.:** Max. 35°C, Min. 20°C

**Relative Humidity:** 46 %

Date of Sampling	TSPM µg/m <sup>3</sup>	PM <sub>10</sub> µg/m <sup>3</sup>	NO <sub>2</sub> µg/m <sup>3</sup>	SO <sub>2</sub> µg/m <sup>3</sup>	CO µg/m <sup>3</sup>
28-29/07/2015	80.8	66.5	14.2	8.7	0.10
<b>National Ambient Air Quality Standards, 2009 Maximum Limit</b>					
Industrial, Residential, Rural and other area (24 Hours)	---	100	80	80	0.2*, 0.4*
Ecologically Sensitive Area (24 Hours)	---	100	80	80	0.2*, 0.4*

**Where:** \* =Maximum limits for 8 hourly monitoring & \*\* = Maximum limits for hourly monitoring.

**Note:** (i) Test Method used IS: 5182 (Pt-02), IS: 5182 (P-4), IS: 5182 (Pt-06), IS: 5182 (Pt-23), Manual CO Meter & CPCB Manual.

\*\*\*\*\*End of Report\*\*\*\*\*

Page No. 1/1



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**Raddeshyam**  
QM/TM (Chem.)

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E-mail: [me.testinglaboratory@gmail.com](mailto:me.testinglaboratory@gmail.com)

## TEST REPORT

Description of sample: Air Monitoring

Location: Chandpole, CEC Site

Sampling Period/Sampling Date: 24 Hours / (23-24/09/2015)

Kind Attn.: Mr. Sanjay Kumar Dewedi

Issued to:

The Senior Executive Environment,  
Continental Engineering Corporation,  
Old Police head quater, near Jalewi Chowk,  
infront of City Palace, near FRO office, Badi Chouper, Jaipur (Raj.)

Report No. METL/JP/226(106)/2015

Date of Report: 28/09/2015

Date of Receipt: 25/09/2015

## TEST CERTIFICATE OF AIR MONITORING

Temp.: Max. 36°C, Min. 24°C

Relative Humidity: 43 %

Date of Sampling	TSPM µg/m <sup>3</sup>	PM <sub>10</sub> µg/m <sup>3</sup>	NO <sub>2</sub> µg/m <sup>3</sup>	SO <sub>2</sub> µg/m <sup>3</sup>	CO µg/m <sup>3</sup>
29-30/07/2015	80.3	68.7	16.9	9.0	0.13
National Ambient Air Quality Standards, 2009 Maximum Limit					
Industrial, Residential, Rural and other area (24 Hours)	---	100	80	80	02*, 04*
Ecologically Sensitive Area (24 Hours)	---	100	80	80	02*, 04*

Where: \* =Maximum limits for 8 hourly monitoring & \* = Maximum limits for hourly monitoring.

Note: (i) Test Method used IS: 5182 (Pt-02), IS: 5182 (P-4), IS: 5182 (Pt-06), IS: 5182 (Pt-23). Manual CO Meter & CPCB Manual.

\*\*\*\*\*End of Report\*\*\*\*\*

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E-mail : me.testinglaboratory@gmail.com

### TEST REPORT

Description of sample: Air Monitoring

Location: Chotti Chouper, CEC Site.

Sampling Period/Sampling Date: 24 Hours / (24-25/09/2015)

Kind Attn.: Mr. Sanjay Kumar Dewedi

Issued to:

The Senior Executive Environment,  
Continental Engineering Corporation,  
Old Police head quater, near Jalewi Chowk,  
infront of City Palace, near FRO office, Badi Chouper, Jaipur (Raj.)

Report No. METL/JPR/227/102/2015

Date of Report: 28-09-2015

Date of Receipt: 26/09/2015

### TEST CERTIFICATE OF AIR MONITORING

Temp.: Max, 35°C; Min, 24°C

Relative Humidity: 41 %

Date of Sampling	TSPM µg/m <sup>3</sup>	PM <sub>10</sub> µg/m <sup>3</sup>	NO <sub>2</sub> µg/m <sup>3</sup>	SO <sub>2</sub> µg/m <sup>3</sup>	CO µg/m <sup>3</sup>
30-31/07/2015	89.1	76.7	13.8	11.7	0.10
National Ambient Air Quality Standards, 2009 Maximum Limit					
Industrial, Residential, Rural and other area (24 Hours)	---	100	80	80	02*, 04*
Ecologically Sensitive Area (24 Hours)	---	100	80	80	02*, 04*

Where: \* =Maximum limits for 8 hourly monitoring & \* = Maximum limits for hourly monitoring.

Note: (i) Test Method used IS: 5182 (Pt-02), IS: 5182 (P-4), IS: 5182 (Pt-06), IS: 5182 (Pt-23), Manual CO Meter & CPCB Manual.

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E-mail : me.testinglaboratory@gmail.com

### TEST REPORT

Description of sample: Air Monitoring

Location: Badi Chouper, CEC Site

Sampling Period/Sampling Date: 24 Hours / (25-26/09/2015)

Kind Attn.: Mr. Sanjay Kumar Dewedi

Issued to:

The Senior Executive Environment,  
Continental Engineering Corporation,  
Old Police head quarter, near Jalewi Chowk,  
infront of City Palace, near FRO office, Badi Chouper, Jaipur (Raj.)

Report No. METL/JPR/228(101)/2015

Date of Report: 30/09/2015

Date of Receipt: 28/09/2015

### TEST CERTIFICATE OF AIR MONITORING

Temp.: Max. 37°C, Min. 23°C

Relative Humidity: 43 %

Date of Sampling	TSPM µg/m <sup>3</sup>	PM <sub>10</sub> µg/m <sup>3</sup>	NO <sub>2</sub> µg/m <sup>3</sup>	SO <sub>2</sub> µg/m <sup>3</sup>	CO µg/m <sup>3</sup>
30-31/07/2015	82.5	70.4	15.4	9.6	0.12
<b>National Ambient Air Quality Standards, 2009 Maximum Limit</b>					
Industrial, Residential, Rural and other area (24 Hours)	----	100	80	80	02*, 04*
Ecologically Sensitive Area (24 Hours)	----	100	80	80	02*, 04*

Where: \* =Maximum limits for 8 hourly monitoring & \*\* = Maximum limits for hourly monitoring.

Note: (i) Test Method used IS: 5182 (Pt-02), IS: 5182 (P-4), IS: 5182 (Pt-06), IS: 5182 (Pt-23), Manual CO Meter & CPCB Manual.

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E-mail : me.testinglaboratory@gmail.com

### TEST REPORT

**Description of sample:** Noise Monitoring

**Location:** Casting Yard, Bhakrota, Jaipur (Raj.)

**Sampling Period/Sampling Date:** 24 Hours / (22-23/09/2015)

**Kind Attn.:** Mr. Sanjay Kumar Dewedi

**Issued to:**

The Senior Executive Environment,  
Continental Engineering Corporation,  
Old Police head quater, near Jalewi Chowk,  
infront of City Palace, near FRO office, Badi Chouper, Jaipur (Raj.)

**Report No.** METL/JPR/223(104)/2015

**Date of Report:** 26/09/2015

**Date of Receipt:** 24/09/2015

### TEST CERTIFICATE OF NOISE MONITORING

Parameter	Test-Value		Ambient Air Quality Standards in respect of Noise (CPCB), for (Day- 6:00 am to 10:00 pm) for (Night- 10:00 pm to 6:00am )							
	Day	Night	Industrial		Commercial		Residential		Sensitive	
			Day	Night	Day	Night	Day	Night	Day	Night
Noise LeveldB(A)Leq	66.0	52.5	75	70	65	55	55	45	50	40

Protocol Used: IS: 9989-1981

\*\*\*\*\*End of Report\*\*\*\*\*

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E-mail: me.testinglaboratory@gmail.com

### TEST REPORT

Description of sample: Noise Monitoring

Location: Chandpole, CEC Site

Sampling Period/Sampling Date: 24 Hours / (23-24/09/2015)

Kind Attn.: Mr. Sanjay Kumar Dewedi

Issued to:

The Senior Executive Environment,  
Continental Engineering Corporation,  
Old Police head quater, near Jalewi Chowk,  
infront of City Palace, near FRO office, Badi Chouper, Jaipur (Raj.)

Report No. METL/JPR/226(107)/2015

Date of Report: 28/09/2015

Date of Receipt: 25/09/2015

### TEST CERTIFICATE OF NOISE MONITORING

Parameter	Test-Value		Ambient Air Quality Standards in respect of Noise (CPCB), for (Day- 6:00 am to 10:00 pm) for (Night- 10:00 pm to 6:00am )							
	Day	Night	Industrial		Commercial		Residential		Sensitive	
			Day	Night	Day	Night	Day	Night	Day	Night
Noise LevelB(A)Leq	70.1	59.5	75	70	65	55	55	45	50	40

Protocol Used: IS: 9989-1981

\*\*\*\*\*End of Report\*\*\*\*\*

Page No.1/1



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E-mail : [me.testinglaboratory@gmail.com](mailto:me.testinglaboratory@gmail.com)

### TEST REPORT

Description of sample: Noise Monitoring

Report No. METL/JPR/227(103)/2015

Location: Chotti Chouper, Jaipur (Raj.)

Date of Report: 28/09/2015

Sampling Period/Sampling Date: 24 Hours / (24-25/09/2015)

Date of Receipt: 26/09/2015

Kind Attn.: Mr. Sanjay Kumar Dewedi

Issued to:

The Senior Executive Environment,  
Continental Engineering Corporation,  
Old Police head quater, near Jalewi Chowk,  
infront of City Palace, near FRO office, Badi Chouper, Jaipur (Raj.)

### TEST CERTIFICATE OF NOISE MONITORING

Parameter	Test-Value		Ambient Air Quality Standards in respect of Noise (CPCB), for (Day- 6:00 am to 10:00 pm) for (Night- 10:00 pm to 6:00am )							
	Day	Night	Industrial		Commercial		Residential		Sensitive	
			Day	Night	Day	Night	Day	Night	Day	Night
Noise LeveldB(A)Leq	69.3	58.7	75	70	65	55	55	45	50	40

Protocol Used: IS: 9989-1981

\*\*\*\*\*End of Report\*\*\*\*\*

Page No.1/1



**Radheshyam**  
 QM/TM (Chem.)

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(Rajasthan) INDIA | Phone/Fax : 0141-4048372 | Mob.: 9214045101, 102, 103, 104, 105  
E-mail : me.testinglaboratory@gmail.com

### TEST REPORT

Description of sample: Noise Monitoring

Location: Krishna Temple, Jaipur (Raj.)

Sampling Period/Sampling Date: 24 Hours / (21-22/09/2015)

Kind Attn.: Mr. Sanjay Kumar Dewedi

Issued to:

The Senior Executive Environment,  
Continental Engineering Corporation,  
Old Police head quater, near Jalewi Chowk,  
infront of City Palace, near FRO office, Badi Chouper, Jaipur (Raj.)

Report No. METL/JPR/224(113)/2015

Date of Report: 24/09/2015

Date of Receipt: 23/09/2015

### TEST CERTIFICATE OF NOISE MONITORING

Parameter	Test-Value		Ambient Air Quality Standards in respect of Noise (CPCB), for (Day- 6:00 am to 10:00 pm) for (Night- 10:00 pm to 6:00am )							
	Day	Night	Industrial		Commercial		Residential		Sensitive	
			Day	Night	Day	Night	Day	Night	Day	Night
Noise Level dB(A) Leq	69.3	58.9	75	70	65	55	55	45	50	40

Protocol Used: IS: 9989-1981

\*\*\*\*\*End of Report\*\*\*\*\*

Page No. 1/1



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(Rajasthan) INDIA | Phone/Fax : 0141-4048372 | MOB.: 9214045101, 102, 103, 104, 105  
E-mail : me.testinglaboratory@gmail.com

### TEST REPORT

Description of sample: Noise Monitoring

Location: Hawa Mahal, Jaipur (Raj.)

Sampling Period/Sampling Date: 24 Hours / (20-21/09/2015)

Kind Attn.: Mr. Sanjay Kumar Dewedi

Issued to:

The Senior Executive Environment,  
Continental Engineering Corporation,  
Old Police head quater, near Jalewi Chowk,  
infront of City Palace, near FRO office, Badi Chouper, Jaipur (Raj.)

Report No, METL/JPR/224(114)/2015

Date of Report: 24/09/2015

Date of Receipt: 23/09/2015

### TEST CERTIFICATE OF NOISE MONITORING

Parameter	Test-Value		Ambient Air Quality Standards in respect of Noise (CPCB), for (Day- 6:00 am to 10:00 pm) for (Night- 10:00 pm to 6:00am )							
	Day	Night	Industrial		Commercial		Residential		Sensitive	
			Day	Night	Day	Night	Day	Night	Day	Night
Noise LeveldB(A)Leq	75.3	62.6	75	70	65	55	55	45	50	40

Protocol Used: IS: 9989-1981

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Page No.1/1



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(Rajasthan) INDIA | Phone/Fax: 0141-4048372 | MOB.: 9214045101, 102, 103, 104, 105

E-mail : me.testinglaboratory@gmail.com

## TEST REPORT

Description of sample: Noise Monitoring

Location: Pink City Hospital, Jaipur (Raj.)

Sampling Period/Sampling Date: 24 Hours / (25-26/09/2015)

Kind Attn.: Mr. Sanjay Kumar Dewedi

Issued to:

The Senior Executive Environment,  
Continental Engineering Corporation,  
Old Police head quater, near Jalewi Chowk,  
infront of City Palace, near FRO office, Badi Chouper, Jaipur (Raj.)

Report No. METL/JPR/228(102)/2015

Date of Report: 29/09/2015

Date of Receipt: 28/09/2015

## TEST CERTIFICATE OF NOISE MONITORING

Parameter	Test-Value		Ambient Air Quality Standards in respect of Noise (CPCB), for (Day- 6:00 am to 10:00 pm) for (Night- 10:00 pm to 6:00am )							
	Day	Night	Industrial		Commercial		Residential		Sensitive	
			Day	Night	Day	Night	Day	Night	Day	Night
Noise LevelB(A)Leq	78.1	67.7	75	70	65	55	55	45	50	40

Protocol Used: IS: 9989-1981

\*\*\*\*\*End of Report\*\*\*\*\*

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(Rajasthan) INDIA | Phone/Fax : 0141-4048372 | MOB.: 9214045101, 102, 103, 104, 105  
E-mail : [me.testinglaboratory@gmail.com](mailto:me.testinglaboratory@gmail.com)

### TEST REPORT

Description of sample: Noise Monitoring

Report No. METL/JPR/228(103)/2015

Location: Chaudhary Hospital, Jaipur (Raj.)

Date of Report: 29/09/2015

Sampling Period/Sampling Date: 24 Hours / (26-27/09/2015)

Date of Receipt: 28/09/2015

Kind Attn.: Mr. Sanjay Kumar Dewedi

Issued to:

The Senior Executive Environment,  
Continental Engineering Corporation,  
Old Police head quater, near Jalewi Chowk,  
infront of City Palace, near FRO office, Badi Chouper, Jaipur (Raj.)

### TEST CERTIFICATE OF NOISE MONITORING

Parameter	Test-Value		Ambient Air Quality Standards in respect of Noise (CPCB), for (Day- 6:00 am to 10:00 pm) for (Night- 10:00 pm to 6:00am )							
	Day	Night	Industrial		Commercial		Residential		Sensitive	
			Day	Night	Day	Night	Day	Night	Day	Night
Noise LeveldB(A)Leq	74.5	63.7	75	70	65	55	55	45	50	40

Protocol Used: IS: 9989-1981

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(Rajasthan) INDIA | Phone/Fax : 0141-4048372 | Mob.: 9214045101, 102, 103, 104, 105  
E-mail : me.testinglaboratory@gmail.com

## TEST REPORT

Description of sample: Noise Monitoring

Report No. METL/JPR/229(101)/2015

Location: Maharaja Girls School, Jaipur (Raj.)

Date of Report: 30/09/2015

Sampling Period/Sampling Date: 24 Hours / (27-28/09/2015)

Date of Receipt: 29/09/2015

Kind Attn.: Mr. Sanjay Kumar Dewedi

Issued to:

The Senior Executive Environment,  
Continental Engineering Corporation,  
Old Police head quater, near Jalewi Chowk,  
infront of City Palace, near FRO office, Badi Chouper, Jaipur (Raj.)

## TEST CERTIFICATE OF NOISE MONITORING

Parameter	Test-Value		Ambient Air Quality Standards in respect of Noise (CPCB), for (Day- 6:00 am to 10:00 pm) for (Night- 10:00 pm to 6:00am )							
	Day	Night	Industrial		Commercial		Residential		Sensitive	
			Day	Night	Day	Night	Day	Night	Day	Night
Noise LeveldB(A)Leq	72.8	61.7	75	70	65	55	55	45	50	40

Protocol Used: IS: 9989-1981

\*\*\*\*\*End of Report\*\*\*\*\*

Page No.1/1



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(Rajasthan) INDIA | Phone/Fax : 0141-4048372 | Mob.: 9214045101, 102, 103, 104, 105  
E-mail : me.testinglaboratory@gmail.com

### TEST REPORT

Description of sample: Noise Monitoring

Report No. ME/TL/JPR/230(1014)/2015

Location: Jantra Mantra, Jaipur (Raj.)

Date of Report: 30/09/2015

Sampling Period/Sampling Date: 24 Hours / (28-29/09/2015)

Date of Receipt: 30/09/2015

Kind Attn.: Mr. Sanjay Kumar Dewedi

Issued to:

The Senior Executive Environment,  
Continental Engineering Corporation,  
Old Police head quater, near Jalewi Chowk,  
infront of City Palace, near FRO office, Badi Chouper, Jaipur (Raj.)

### TEST CERTIFICATE OF NOISE MONITORING

Parameter	Test-Value		Ambient Air Quality Standards in respect of Noise (CPCB), for (Day- 6:00 am to 10:00 pm) for (Night- 10:00 pm to 6:00am )							
	Day	Night	Industrial		Commercial		Residential		Sensitive	
			Day	Night	Day	Night	Day	Night	Day	Night
Noise LeveldB(A)Leq	73.5	62.4	75	70	65	55	55	45	50	40

Protocol Used: IS: 9989-1981

\*\*\*\*\*End of Report\*\*\*\*\*

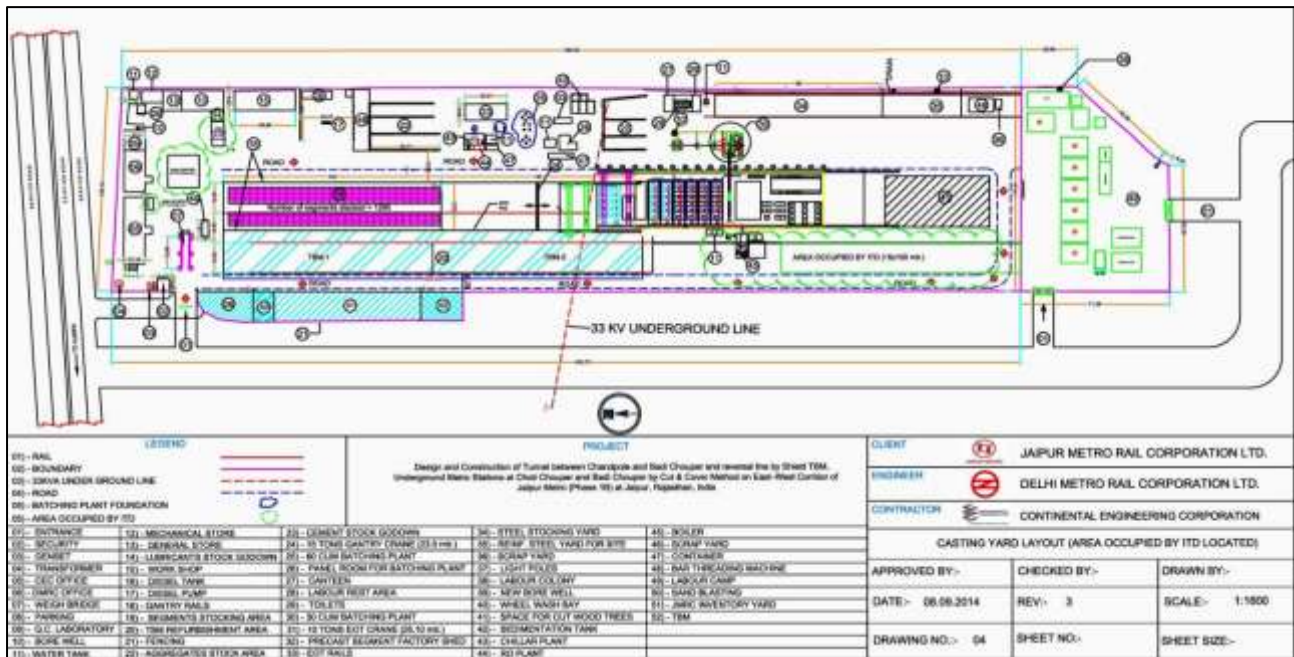
Page No. 1/1



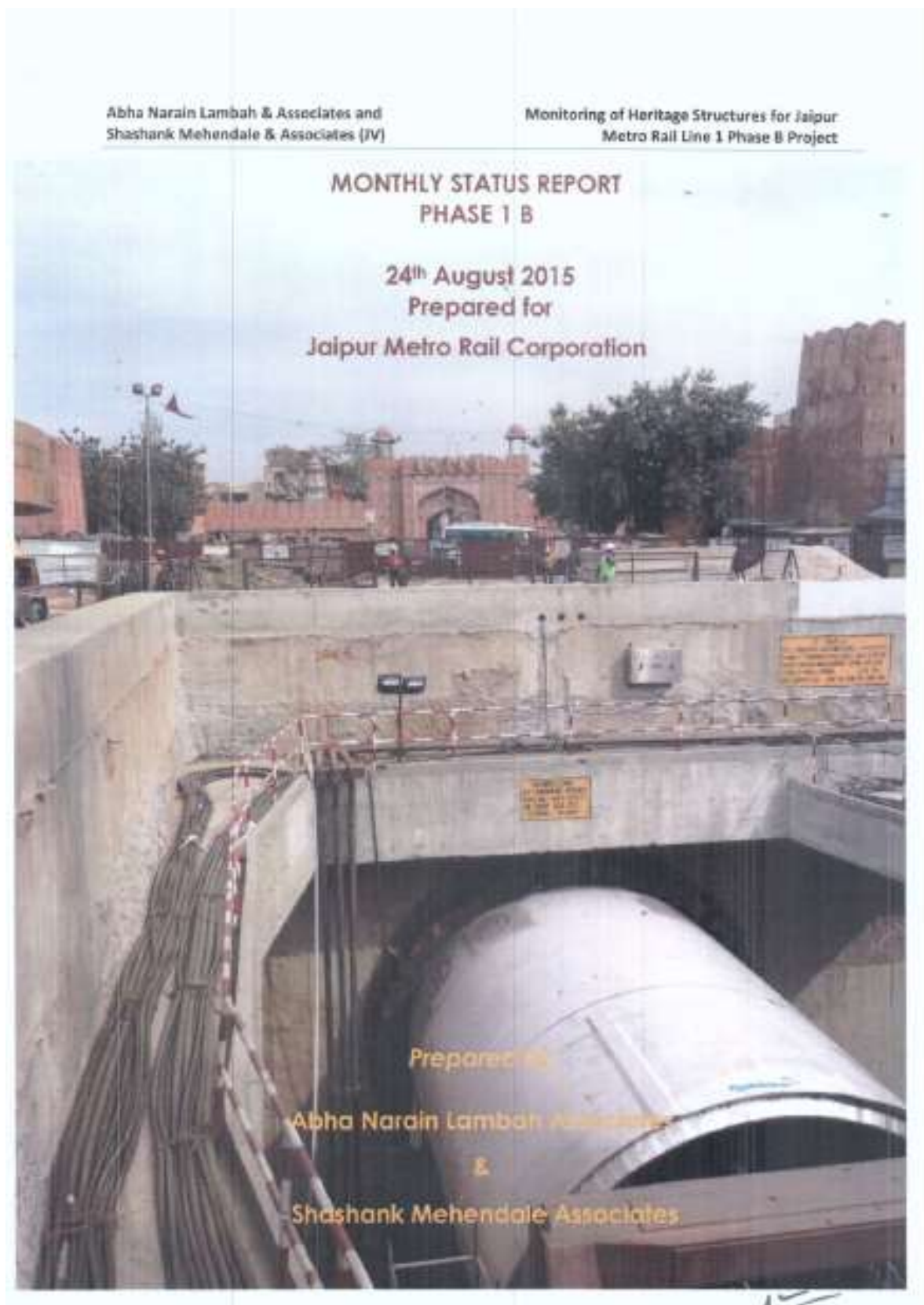
*Authorised Signatory*  
  
**Radheshyam**  
 QM/TM (Chem.)

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## Appendix 5: Layout Plan of casting yard and labour camp





**Appendix-6: Monthly status report by Heritage Consultant**



Abha Narain Lambah & Associates and  
Shashank Mehendale & Associates (JV)

Monitoring of Heritage Structures for Jaipur  
Metro Rail Line 1 Phase B Project

#### Key Experts Visits

- **Mr. Shashank Mehendale**
- 12th Aug 2015 - Site visit to attend Brain Storming Session for issues related to Tunnel Underpass Scheme, Soil stabilisation at Chandpole Gate

A Brain storming session for the issues related with proof checking of underpassing scheme/ soil stabilisation and construction of twin tunnels under the Chandpole Gate was conducted on 12.08.2015 at Jaipur. Tunnel underpass scheme and Finite Analysis was prepared by M/s OKICPL on behalf of M/s CEC was reviewed. Various issues and assumptions related Finite Element Model discussed with representatives from M/s OKICPL, M/s CEC, M/s DMRC and M/s GEOCONSULT and it is agreed that indicated model is fairly representative. It is also decided to have calibration drive to check the effectiveness of model and assumptions considered. Need of Shallow grouting for soil stabilisation under and near the Chandpole Gate structure is debated. M/s GEOCONSULT advised Rathole grouting below for Chandpole Gate foundation.

Daily Monitoring reports of Chandpole Gate and Tunnel Shaft area, from 25<sup>th</sup> July 2015, is reviewed with M/s. JMRC, M/s DMRC and M/s. CEC, and discussed sensor breaching situations and rectified the reasons. Reasons were found to be localised, did not attributed due to tunnelling. It is noticed that 14mm and 18mm are being used as trigger and limit values for monitoring of Chandpole Gate instead of 4mm and 6mm as stated in tunnel underpass scheme. It is agreed to use trigger levels and alarm levels as mentioned in Tunnel underpass scheme.

During site visit it is observed that sensors are mounted on one side of Chandpole Gate Structure so tilt of one side can only be determined. Therefore it is requested to mount sensors to other side of Gate Structure. Chandpole Gate is plastered structure, even a small settlement would cause cracking of plaster, it is requested to M/s. JMRC that number of Crack meters on Chandpole Gate Structure should be looked upon. It is agreed that Heritage consultant (Abha Narain Lambah and Associates) would provide methodology for Plaster Crack repairing, advice about agencies and supervision mechanism by 31<sup>st</sup> Aug 2015.

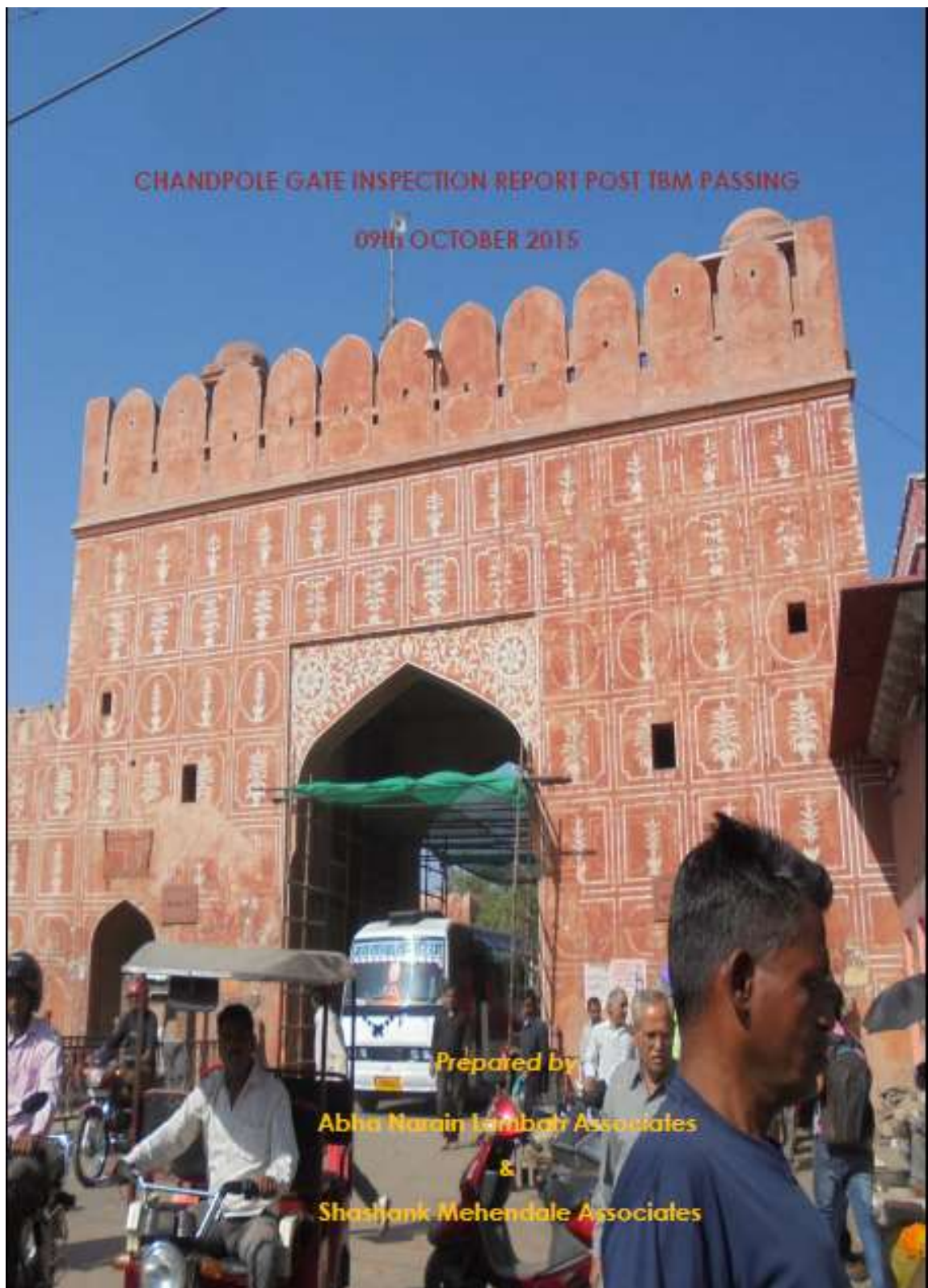
TBM would pass Chandpole Gate and its influence zone during 15<sup>th</sup> Sept 2015 to 22<sup>nd</sup> Sept 2015. For which a war room has been set up to closely monitor the structure during said period. It is agreed that representative(s) from Heritage Consultants would be stationed there for said period.

During site visit to Naval Kishor Temple, additional propping is suggested to cantilever portions and directed same to M/s JMRC and M/s CEC. Further propping provided to verandahs and shops/structures near Diaphragm wall area of Choti Chaupar station is to be checked by M/s. CEC and M/s DMRC, thus can be removed where no distress is observed and where distresses are seen propping should be kept till tunnel crosses Choti Chaupar Station area.



Shashank Mehendale,  
Structural Consultant for Monitoring of Heritage Structures

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**9<sup>th</sup> October 2015 - Site Visit in Jaipur**

The Chandpole gate was inspected on site on 09-10-2015 along with JMRC officials and Conservation Architect. It has been observed that no structural cracks have appeared on the super structure. A few plaster cracks which have existed before the metro works have begun have tell-tales on them to closely monitor. Few of these plaster cracks have expanded marginally and are well within the permissible limit. No new cracks have been observed on site. Hence it is concluded that the impact of the TMC under passing Chandpole gate is negligible. There are older inherent problems with the plaster due to age which are unrelated with the TBM passing and Metro project works. These restoration works can be taken up by the Archaeology Department on a later date for the gate as there is no pressing need of any action required. Also attached is the report by the Structural Consultant on the said matter after observation on site.



Abha Narsin Lambah & Associates and  
Shashank Mehendale & Associates (JV)

Monitoring of Heritage Structures for Jaipur  
Metro Rail Line 1 Phase B Project



No new cracks have been observed on site  
either on exterior or interior.



September - October 2013

4



Older plaster cracks on the terrace walls already being monitored. Some of which have marginally expanded but all within permissible limit.



September - October 2015



Abha Narain Lambah & Associates and  
Shashank Mehendale & Associates (JV)

Monitoring of Heritage Structures for Jaipur  
Metro Rail Line 1 Phase B Project



Older inherent problems with the plaster due to age which are unrelated with the TBM passing.

September - October 2013

6

**Structural Report**

**September 2015 – October 2015**

Site Inspections by M/s Shashank Mehendale & Associates were carried out in this month to monitor the progress of works with JMRC, DMRC and CEC officials.

This report contains:

**Part I:**

A. Executive summary

**Part II:**

A. Introduction.

B. Observations sheets containing Distress Photographs of Chandpole Gate.

**Annexure – Baseline Survey Report of Chandpole Gate**



Chand Pole Gate

September - October 2015

7

**Part I**

**Executive Summary**

- |                        |  |
|------------------------|--|
| a. Immediate Propping. | : No   |
| b. Urgent repairs.     | : No   |
| c. General repairs.    | : Yes  |
| d. Limitations         | : <u>Non availability of Structural &amp; Architectural Drawings</u>   |
| e. Recommendation      | : 1) Rat Hole grouting should be done on priority basis and General repairs as applicable.<br>2) Crack should be repaired as advised by architect.<br>3) After crossing of down tunnel no structural distresses are observed except spalling of loose plaster at some location and certain plaster cracks which need to be attended with architect's advice. |



## Part II

Site Visit Report

## a) Introduction

General Information of Building

Name of the Structure	: "Chand Pole Gate"
Year of Construction	: 1727
Height of Structure	: 10 m
Age	: 287 years.
Repairs History	: Not Known.

Type of building:

- The structure is Load bearing structure in Stone masonry. The main load bearing elements are made of Stone and both sides of main arches, Vault ceilings and filled slabs on it. Walls are plastered with crushed stone and lime mortar from inside.
- The building is a gate structure at old Jaipur walled city, comprises of part Ground + Upper floors.
- Tunnel is built at 7m below the foundation recently using shield TBM.

## a) Observations

Some key observations/ Distresses:

- Rat Holes are observed near Chandpole Gate and need to be filled.
- Column plaster damaged and gap is observed between stones.
- Plaster damaged and stones are exposed.
- Wall plaster is observed and stones are exposed.
- Vertical/ inclined crack is observed on wall.
- Vertical crack is observed on wall running throughout the wall
- Crack is observed running throughout the vault near crown same was documented in earlier report.
- Gate Shutter repairing.
- No settlement signs are observed in plinth.
- No major Structural distresses are observed.



Front Side Elevation from Chandpole Gate Station , Back Side Elevation from Choffi Chaupar Station



Plaster Crack observed above the arch (front side), Previous cracks which are being monitored with Crack meters



Previous cracks which are being monitored with Crack meters



Broken RCC grill, Cracks are being monitored with glass strip to assess widening of cracks



External Plaster damaged and stones are exposed, Internal plaster peeled off near staircase



Plaster peeled off of walls on terrace of Gate Structure, Rat Holes are observed near Gate

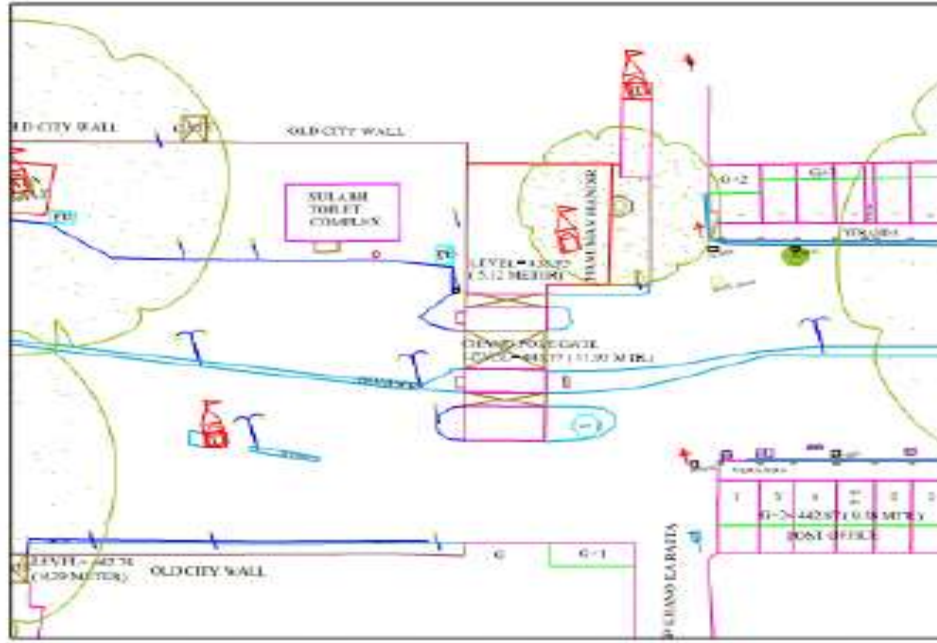
**Annexure I: Baseline Survey Report for Chandpole Gate****This report contains:****Part I:**

B. Executive summary

**Part II:**

C. Introduction.

D. Observations sheets containing Distress Photographs of Chand Pole Gate.

**Chand Pole Gate**

INDEX

Sr. No	Description	Page Nos
1.	Part I: Executive summary	3
2.	Part II: Site Visit Report	4 to 13
3.	Part II: Site Visit Report A. Introduction	4
4.	Part II: Site Visit Report B. Key Observations/ Distresses and site photographs	4
5.	Further Actions	14
6.	Distress Mapping in Elevation	15 - 16



Part IExecutive Summary

f. Immediate Propping.	: No
g. Urgent repairs.	: No
h. General repairs.	: Yes
i. Limitations	: <u>Non availability of Structural &amp; Architectural Drawings</u>
j. Recommendation	: Structure to be monitored using sensors (tilt sensors, crack width measurement sensors etc.) during tunnel excavation

## Part II

Site Visit Report.

## b) Introduction

General Information of Building

Name of the Structure	: "Chand Pole Gate"
Year of Construction	: 1727
Height of Structure	: 10 m
Age	: 287 years.
Repairs History	: Not Known.

Type of building:

- The structure is Load bearing structure in Stone masonry. The main load bearing elements are made of Stone and both sides of main arches, Vault ceilings and filled slabs on it. Walls are plastered with crushed stone and lime mortar from inside.
- The building is a gate structure at old Jaipur walled city, comprises of part Ground + Upper floors.

## b) Observations

Some key observations/ Distresses:

- Recently Reconstructed Wall (as compared with CEC/AIMIL report)
- Wall Plaster damaged, Cavities are formed at wall-ground
- Vegetation growth is observed
- Column plaster damaged and gap is observed between stones
- Cavity is observed on wall.
- Plaster damaged and stones are exposed.
- Peoples are urinating at chandpole gate
- Wall plaster is observed and stones are exposed.
- Vertical/ inclined crack is observed on wall.
- Vertical crack is observed on wall running throughout the wall
- Minaret is damaged and dislocated (Hanumanji Ka Mandir)
- Crack is observed running throughout the vault near crown.
- Seepage/ Dampness is observed inside structure.
- No settlement signs are observed in plinth. As the building is Load bearing masonry structure foundation details are not known. Structural drawings are not available. Hence wall foundations cannot be commented upon.





Front View of Chandpole Gate



Recently Reconstructed Wall (as compared with CEC/AIMIL report)



Wall Plaster damaged. Cavities are formed at wall-ground



Cavities are formed at wall-ground joint.



Vegetation growth is observed



Column plaster damaged and gap is observed between stones



Cavity is observed on wall.



Separation gap/crack is observed between wall and column.



Plaster damaged and stones are exposed.



Peoples are urinating at chandpole gate



Wall plaster is observed and stones are exposed.



Wall plaster is observed and stones are exposed.



Wall plaster is observed and stones are exposed.



Wall plaster is observed and stones are exposed.



Vertical crack is observed on wall





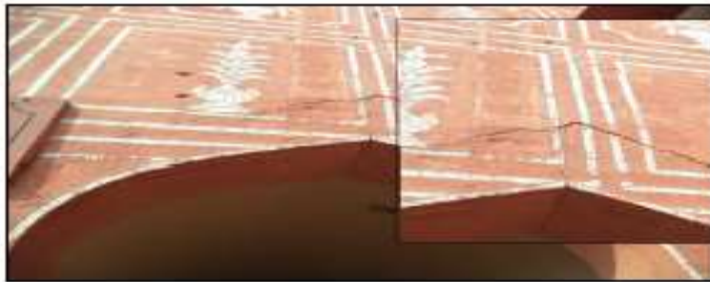
Wall Plaster damaged and stones are exposed.



Vertical/ inclined crack is observed on wall.



Vertical crack is observed on wall running throughout the wall.



Crack is observed on arch/vault



Minaret is damaged and dislocated (Hanumanji Ka Mandir)



Crack is observed running throughout the vault near crown.



Crack is observed running throughout the vault near crown.

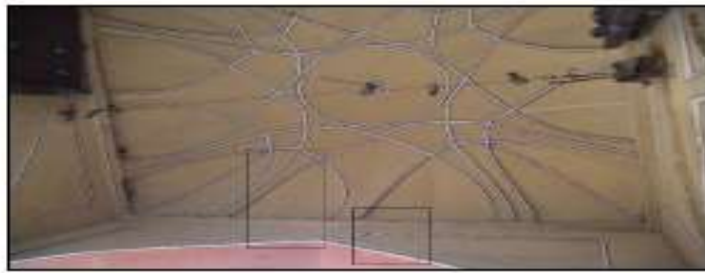


Crack is observed on the vault.



Wall plaster damaged and stones are exposed near gate door.





Crack is observed on the vault.



Seepage / Dampness is observed inside structure.



Wall plaster damaged and stones are exposed.

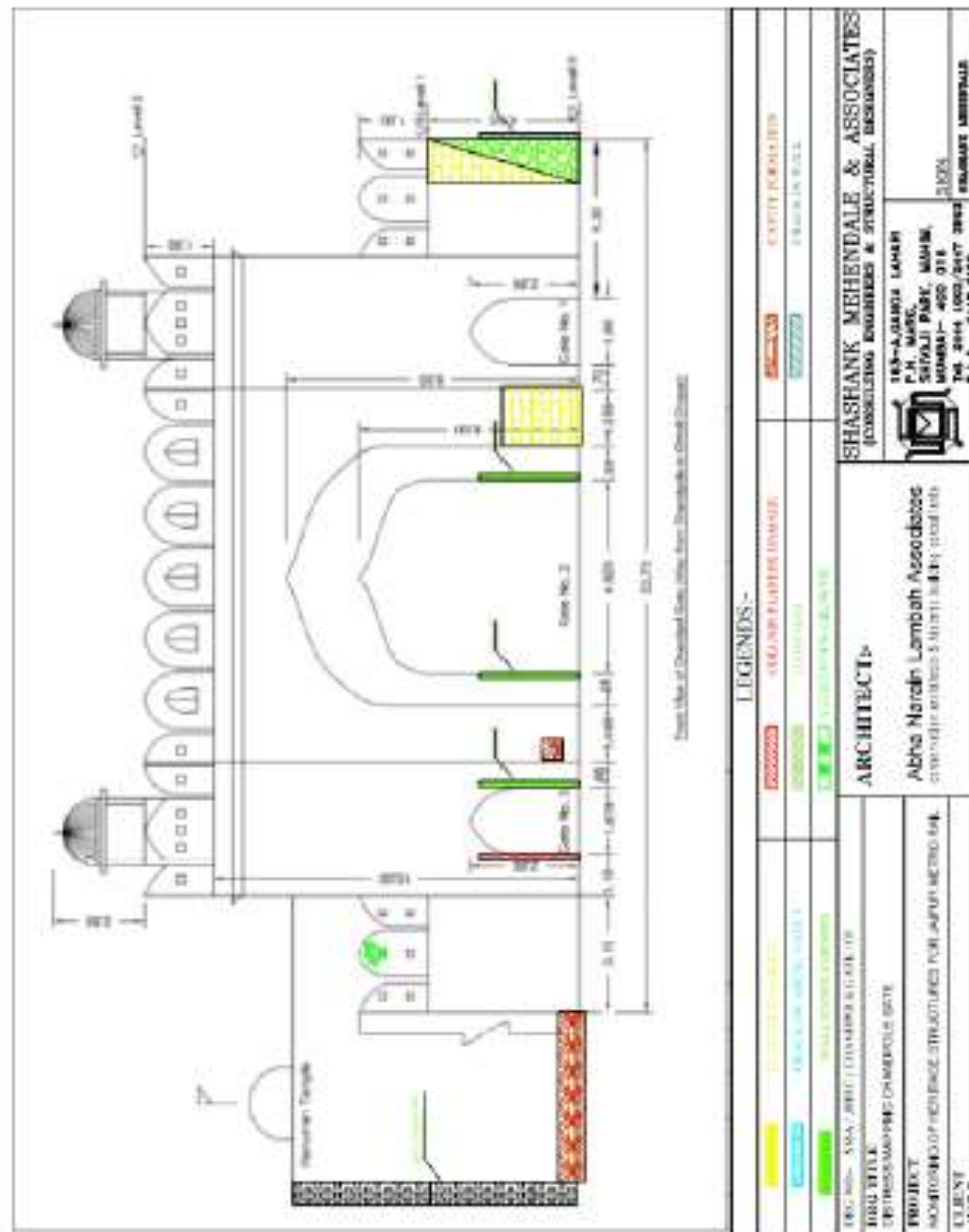
Further Action:

September - October 2015

25

Further actions are required from execution team such as.

- Considering concentric tunnel alignment, soil stabilization requirement should be reviewed.
- Monitoring scheme should be reviewed carefully. Structure to be monitored using sensors (tilt sensors, crack width measurement sensors etc.) during tunnel excavation.
- Cavities are noticed at ground level under wall in foundation, opening out joint and grouting should be done to fill cavities.
- Structure being plastered even minor settlement would result in cracking and thus settlement shall have to be avoided.
- Requirement of propping to slender elements like top canopy should be verified.
- General repairs are required before tunnelling.





## Appendix 7: License from A&amp;M Department, GoR for tunnel work under Chandpole gate

राजस्थान सरकार

कार्यालय निदेशक, पुरातत्व एवं संग्रहालय विभाग, राजस्थान, जयपुर

क्रमांक पु.सं./तक./स्मा./जय.मेट्रो/15/10/42

दिनांक : 21.0.15

श्री अश्विनी सक्सेना,  
निदेशक (प्रोजेक्ट),  
जयपुर मेट्रो रेल कॉर्पोरेशन लिमिटेड,  
खनिज भवन, तिलक मार्ग,  
सी-स्कीम, जयपुर-302005

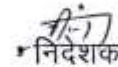
विषय :-Extension of validity of license for construction of twin metro tunnels under Chandpole Gate i.e. within the protected area of Chandpole Gate.

प्रसंग:-आपका पत्र क्रमांक F.7(A-19)JMRC/A&M/2013/3701  
दिनांक 10.07.2015

महोदय,

उपरोक्त विषयान्तर्गत प्रसंगोक्त पत्र के क्रम में संरक्षित स्मारक नगर दीवार, जयपुर स्थित चांदपोल गेट रक्षित क्षेत्र में चांदपोल गेट के नीचे मेट्रो हेतु दो सुरंगों के निर्माण कार्य हेतु इस कार्यालय के पत्रांक 7077 दिनांक 19.06.2015 द्वारा दिये गये लाईसेन्स के निबन्धन संख्या 2 के क्रम में दिनांक 18.10.2015 तक अभिवृद्धि इस शर्त पर की जाती है कि स्मारक को किसी प्रकार की क्षति नहीं पहुँचे एवं लाईसेन्स की समस्त शर्तों तथा विभागीय अधिनियम व नियमों के प्रावधानों की पूर्ण पालना की जाये।

भवदीय,



निदेशक

दिनांक :

क्रमांक पु.सं./तक./स्मा./जय.मेट्रो/15/

प्रतिलिपि सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है :-

1. निजी सचिव, प्रमुख शासन सचिव, कला, साहित्य, संस्कृति एवं पुरातत्व विभाग, राजस्थान, जयपुर।
2. अधीक्षक, पुरातत्व एवं संग्रहालय विभाग, जयपुर वृत्त, जयपुर को भेजकर लेख है कि आप जयपुर मेट्रो द्वारा किये जाने वाले निर्माण कार्यों का समय-समय पर निरीक्षण करें एवं यह सुनिश्चित करें कि स्मारक को किसी प्रकार की क्षति नहीं पहुँचे।

निदेशक

**Appendix 8: Letter to Jaipur Nagar Nigam regarding action towards vulnerable shops  
between Chandpole to Chhoti Chaupar**



**JAIPUR METRO RAIL CORPORATION LIMITED**

Khanij Bhawan, Tilak Marg, C-Scheme, Jaipur-302005  
Website: www.jaipurmetrorail.in Tel. 0141- 2385790, 2385791  
CIN: U60221RJ2010SGC030630

No.F7 (C-62)/JMRC/BCS/2013/3981

Dated: 21.08.2015

Commissioner  
Jaipur Municipal Corporation  
Jaipur.

Sub: List of buildings/structures requiring immediate attention along the route of Jaipur Metro Phase 1B from Chandpole to Badi Chaupar.

Dear Sir,

Please refer to our earlier letter no. F7 (C-62)/JMRC/BCS/2013/1425 dated 26.11.2014 (copy attached as **Annexure 1**) regarding ruinous buildings along the metro route of Jaipur Metro Phase 1B vide which Jaipur Municipal Corporation was requested to initiate necessary action under the Rajasthan Municipal Act, 2009 and issue notice to concerned owners/occupiers asking them to secure or repair the buildings which are in ruinous state. It was further requested therein that if the owner fails to do repairs, then JMC may undertake repairing work, etc. at the cost of owner/occupier as per provisions of the Act to avoid any damage to any inhabitants or passengers.

Accordingly, at the time of construction of Diaphragm Wall in the station box area of Chhoti Chaupar metro station, Commissioner (Hawa Mahal), JMC issued necessary notices to shops which were located around the Chaupar and were in ruinous state.

A meeting under the Chairmanship of Hon'ble Chief Minister, Rajasthan was held on 19.04.2015 in which Mayor and CEO, Jaipur Nagar Nigam were also present. During the meeting JMRC's Heritage consultant M/s Abha Narain Lambah Associates presented the structural condition survey of the buildings located along the alignment of Metro route and highlighted that due to poor state of maintenance and unauthorized construction/modifications, many of these building are unsafe/dangerous for the inhabitants and the moving public. A copy of the MoM is enclosed as **Annexure 2**.

It was advised during the meeting that JMRC shall forward the list of such weak buildings to Jaipur Nagar Nigam, who in turn shall ensure appropriate action to get them repaired by the owners/occupiers as per provisions of the Municipalities Act.





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Tunnelling by Tunnel Boring Machines (TBMs) has already commenced from Chandpole Launching Shaft near Sanjay Circle and will enter the walled city under Chandpole Gate in about a month's time. Over the next one year, tunneling will be done up to Badi Chaupar under the main road of Chandpole Bazar and Tripolia Bazar.

The structural consultant of JMRC M/s Abha Narain Lambah Associates & M/s Shashank Mehendale and Associates (JV) after conducting survey of structural condition of all the building and examining the building condition survey earlier performed by M/s AIMIL, have reported that in the stretch from Chandpole to Chhoti Chaupar there are 39 unstable structures/buildings which require immediate repairs failing which demolition or evacuation and preventive propping may be taken up.

A list of these 39 unstable structures/buildings located between Chandpole gate and Chhoti Chaupar where tunnelling will be first done is as under:

SN	Shop No/ Structure	Remark
Shops/structures recommended for <b>EVACUATION : North Side</b> (Chandpole gate towards Chhoti Chaupar)		
1	28	Slab Stone observed, beam column damaged severely and floor settlement near cracks
2	29	Cracks in wall and floor settlement inside the shop observed
3	30	Shop closed
4	31	Vertical crack in verandah beam, horizontal cracks in slab stone joint
5	35	Shop closed
6	66	Shop closed, some cracks are observed in verandah
7	70	Cracks are observed in slab stone joint , False ceiling is also observed
8	94	Stones observed in Verandah, Cracks in outer wall and Floor settlement is observed
9	100	First floor temple requires special attention
10	110	Vertical and horizontal cracks are observed inside shop
11	152	All walls damaged and masonry observed inside shop
12	189	Shop closed
13	structures above shop no. 2 to 6	Vertical Cracks and First Floor Severely damaged
14	structures above shop no. 7 to 12	Damage inside in several places and cracks are observed in wall





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15	structures above shop no. 13 to 15	Balcony damaged of 3rd floor and inclined crack is observed at wall
16	structures above shop no. 27 to 29	Structure separation joint observed, vertical and horizontal cracks observed
17	structures above shop no. 30 to 31	Vertical/Shear cracks and horizontal cracks also observed
18	structures above shop no. 53 to 58	Horizontal cracks are observed inside shops
19	structures above shop no. 79 to 81	shear and vertical cracks, slab stones observed at many places
20	structures above shop no. 95 to 106	Shear and vertical cracks, slab stones observed at many places and Chajja damaged
21	structures above shop no. 107 to 110	Whole building severely damaged
22	structures above shop no. 129 to 132	Structure separation joint observed, vertical and horizontal cracks observed, floor settlement observed
23	structures above shop no. 162 to 166	Cracks are observed in masonry wall
24	structures above shop no. 173 to 175	Shear Crack in wall
25	structures above shop no. 182 to 185	inclined cracks and peeling of plaster observed
26	structures above shop no. 186 to 188	Shear Crack in wall
Shops/structures recommended for <b>EVACUATION : South Side</b> (Chandpole gate towards Chhoti Chaupar)		
27	456	Plinth Beam Settlement and cracks observed in walls
28	455	Cracks are observed inside shop
29	424	Portion of slab collapsed and cracks observed in slab joint
30	342	Slab stone observed in partition wall and cracks in shop noticed
31	253	Slab of shop partly collapsed and column plaster damaged



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32	structures above shop no. 385 to 387	Cracks in slab and slab stone observed
33	structures above shop no. 393 to 396	Slab collapsed partly and stones exposed and cracks in staircase observed
34	structures above shop no. 424 to 425	Some portion of slab collapsed. Cracks in slab stone joint and adjacent staircase
35	structures above shop no. 431 to 432	Vertical cracks in wall
36	structures above shop no. 439 to 456	wall plaster damaged, stones exposed and cracks in walls
37	structures above shop no. 457 to 463	Plaster damaged and stones exposed and some cracks are also observed
38	structures above shop no. 353 to 354	Parts of shop collapsed, cracks in soffit of cantilever slab
39	structures above shop no. 373	Cracks is observed in beam and wall, slab plaster damaged

You are requested to issue instructions to your concerned Commissioner/ XEN to take urgent necessary action as per the provisions of the Act by examining these 39 shops/structures and issuing notices to concerned occupiers/owners asking them to secure/repair their building. In case the owner fails to repair then JMC may undertake repairing work, etc. at the cost of owner/occupier as per the provisions of the Act to avoid any damage to any inhabitant or passengers. If the buildings/shops are not repaired by the owner/occupiers or the JMC, then these buildings shall have to be dismantled or evacuated and secured by preventive propping as per the advice of structural consultants.

In addition there are 278 shops/structures (141 on north + 137 on south side) which would be requiring preventive propping during the tunnelling work. The list of shops/structures, part of which requires preventive propping is placed at **Annexure 3A & 3B** for north and south side respectively.



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Looking at the unstable condition of verandah structure throughout the stretch between Chandpole Gate to Chhoti Chaupar (North & South side both), as a matter of precaution, structural consultant has suggested preventive propping across all verandah during TBM operation under Chandpole gate to Chhoti Chaupar.

For any further details and technical advice in this regard, our General Manager (Project Coordination) Sh. Akhilesh K. Saxena (Mob: 7728895304) is always available to you and to your concerned officers.

Thanking You,

Encl.: As above.

Yours faithfully

*(Signature)*  
 21/8/15  
 (Ashwani Saxena)  
 Director (Project)

*o/c*

Copy to:

1. PS to CMD, JMRC for kind information of CMD
2. District Collector (Jaipur), Collectorate Office, Bani Park, Jaipur
3. Zonal Commissioner, Hawa Mahal (West), Jaipur Municipal Corporation for urgent attention and necessary action in this regard.
4. Executive Director (CA), JMRC with request to coordinate with Commissioner, Hawa Mahal (West), Jaipur Municipal Corporation
5. Project Director (Jaipur), DMRC, Old PHQ Bldng, Jaleb Chowk, Opp. City Palace
6. M/s Abha Narain Lambah Associates & Shashank Mehendale & Associates (JV), 201 B Wing, Amrit Carter Road, Khar(W), Mumbai-400052

*(Signature)*  
 21/8/15

Director (Project)