



UTTAR PRADESH METRO RAIL CORPORATION LIMITED

Tender LKE (02)-02: “Design, Manufacturing, Supply, Installation, Testing and Commissioning of Heavy Duty Machine Room Less Elevators and Heavy Duty Escalators including Maintenance during 2 Year Defect Liability Period (DLP) and 01 (one) year comprehensive Annual Maintenance beyond DLP Period for Lucknow, Kanpur & Agra Mass Rapid Transit System Project under the Contract LKE (02)-02”.

TENDER NO: LKE (02)-02

TENDER DOCUMENTS

VOLUME 4

CONDITION OF CONTRACT ON SAFETY, HEALTH & ENVIRONMENT (SHE)

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PART – I: SHE MANAGEMENT

1.0 General

1.1 Scope

- 1.1.1 This document defines the principal requirements of the Employer on Safety, Health and Environment (SHE) associated with the contractor / sub-contractor and any other agency to be practiced at construction worksites at all time.

1.2 Definition /languages

1.2.1 In this document

- i) The use of 'shall' indicates a mandatory requirement.
- ii) The use of 'should' indicates a guideline that is strongly recommended.
- iii) The use of 'may' indicates a guideline that is to be considered.
- iv) 'SHE' means Safety, Health and Environment.
- v) Employer means Uttar Pradesh Metro Rail Corporation Ltd. (UPMRC)
- vi) BOCWA means Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996
- vii) BOCWR means Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998
- viii) UPBOCWR means Uttar Pradesh Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules, 2009
- ix) DG means Director General of Ministry of Labour, Govt. of India.
- x) CIIBC means Chief Inspector of Inspection of Building and Other Construction of Govt. of Uttar Pradesh.

1.3 Application of this document

- 1.3.1 This document applies to all aspects of the contractor's scope of work, including all aspects conducted by sub-contractors and all other agencies. There shall be no activity associated to the contract, which is exempted from the purview of this document.

1.4 Purpose of this document

- 1.4.1 The objective of these guidelines is to ensure that adequate precautions are taken to avoid accidents, occupational illness and harmful effects on the environment during construction.
- 1.4.2 This document:

- i) Describes the SHE interfaces between Employer and the Contractor.
- ii) Details the processes by which the contractor shall manage SHE issues while carrying out the work under the contract.
- iii) Describes by reference, the practices and procedures as given in the Employer Project Safety, Health & Environment manual for best SHE performance.

1.4.3 These requirements shall be read together with Employer Project Safety Manual & Environment Manual, ISO 45001-2018, Occupational Health and Safety Management System and ISO 14001: 2015 Environmental Management Systems. Definition of key terms used in these requirements related to ISO 45001 and ISO 14001 standards are found in Employer's Project SHE Manual.

2.0 'SHE' Targets and Goals

2.1 The SHE targets, goals and aim for the Works are to achieve:

- i) Zero total recordable injuries.
- ii) Zero reportable environmental incidents
- iii) All personnel inducted in accordance with the approved contractor SHE plan
- iv) Total compliance of conducting inspections and audits as per approved SHE plan
- v) 100% incident recording and reporting
- vi) 100% adherence of usage of appropriate PPEs at work.
- vii) Executing construction work with least disturbance to the environment, adjoining road users and traffic.

3.0 Compliance

3.1 Memorandum of Understanding (MOU)

3.1.1 A Memorandum of Understanding placed at **Appendix No.: 1** shall be executed before the award of contract by the contractor with regard to various provisions on Safety, Health and Environment to be practiced during the construction work.

3.2 Employer's SHE Policy and Management Systems

3.2.1 The construction works shall be undertaken in accordance with Employer's SHE Policy and Management Systems as amended from time to time provided in Project SHE Manual.

3.3 Indian statutory requirements

3.3.1 Primary statutory regulations

3.3.1.1 Contractor shall develop thorough understanding about Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996, Central Rules 1998, Uttar Pradesh Govt. Rules, Building and Other Construction Workers' Welfare Cess Act, 1996 and Central Rules, 1998 and Uttar Pradesh Building Construction Workers' Welfare Board Rules and Environmental Protection Act 1986 and Rules 1986 not only to satisfy the Inspectors' perspective but the use of legislation as the strong tool for effective SHE management at construction worksites. Contractor is strongly advised to practice the principle of voluntary compliance.

3.3.1.2 In order to facilitate the contractor for better understanding on the various provisions of the above Act and Uttar Pradesh Govt. Rules, a tabulated information highlighting the Sections/Rules referring to the corresponding registration of contractors, maintenance of registers and records, hours of work and wages, welfare, medical facilities and safety requirements are given in **Appendix No.: 2**. It is an indicative one and not a limiting list.

3.3.2 In addition, the construction works shall be undertaken in accordance with all applicable legislation and Indian statutory requirements listed below but not limiting to:

- i) Indian Electricity Act 2003 and Rules 1956
- ii) National Building Code, 2005
- iii) Factories Act, 1948, Uttar Pradesh Factories Rules.
- iv) Motor Vehicles Act as amended in 1994 and The Central Motor Vehicles Rules, 1989.
- v) Indian Road Congress Code IRC: SP: 55-2001 'Guidelines on Safety In Road Construction Zones.
- vi) The Petroleum Act, 1934 and Rules 1976
- vii) Gas Cylinder Rules, 2003
- viii) Indian Explosives Act. 1884, along with the Explosives substance Act 1908 and the Explosives Rules 1983
- ix) The (Indian) Boilers Act, 1923
- x) The Public Liability Insurance Act 1991 and Rules 1991
- xi) Minimum Wages Act, 1948 and Rules 1950

- xii) Contract Labour Act, 1970 and Rules 1971
- xiii) Child Labour (Prohibitions & Regulations) Act, 1986 and Rules 1950
- xiv) Environment Protection Act, 1986 and Rules 1986
- xv) Air (Prevention and control of Pollution) Act, 1981
- xvi) Water (Prevention and Control of Pollution) Act, 1974
- xvii) The Noise Pollution (Regulation & Control) Rules, 2000
- xviii) Notification on Control of Noise from Diesel Generator (DG) sets, 2002 and Amended up to 2016.
- xix) Recycled Plastic Usage Rules, 1998
- xx) Notification, Central Ground Water Board, Act January 1997
- xxi) Manufacture, Storage & Import of Hazardous Chemicals Rules, 1989
- xxii) The Hazardous Waste (Management & Handling) Rules, 1989
- xxiii) The hazardous and other Waste (Management and Trans boundary Movement) Rules, 2016.
- xxiv) Uttar Pradesh Tree Preservation Act
- xxv) Batteries (Management and Handling) Rules, 2016.
- xxvi) Fly ash utilization notification, Sept 1999 as amended in August 2003
- xxvii) Guidelines of Uttar Pradesh Urban Arts Commission and Central Vista Committee
- xxviii) BS 6164:2011 - Code of practice for health and safety in tunneling in the construction industry
- xxix) E-Waste (Management) Rules, 2016.
- xxx) The Bio-Medical Waste Management Rules, 2016
- xxxi) The Construction & Demolition Waste Management Rules, 2016
- xxxii) Amended Notification (From MOEF) on Construction and Demolition Waste Management 2017

3.3.3 Workman Compensation Act, 1923 along with allied Rules

3.3.3.1 The contractor shall ensure that all his employees / workmen are covered under 'Workmen Compensation Act' and shall pay compensation to his workmen as and when the eventuality for the same arises.

3.3.4 Notwithstanding the above Act/Rules, there is nothing in those to exempt the contractor from the purview of any other Act or Rule in Republic of India for the safety of men and materials.

- 3.3.5 If the requirements stated in this document are less stringent than or in conflict with the country's applicable legislation, the latter shall apply.

3.4 International Standards, Guidelines & ISO Certifications

- 3.4.1 The works should be undertaken in accordance with the applicable international guidelines, standards and specifications on SHE and every contract shall aim to achieve ISO certifications listed below during the currency of the contract:

ISO 45001-2018: Occupational Health and Safety Management System.

ISO14001-2015: Environmental Management Systems.

During the construction phase, any new / update version of the mentioned standards release, Contractor shall follow the new version.

- 3.4.2 The process of certification shall start immediately after the award of the work and complete within 10 months. Towards this, the contractor shall undertake the required steps including appointment of ISO consultant for obtaining the certification on Occupational Health and Safety Management System and Environment Management System.

- 3.4.3 In case of failure on the part of the contractor, the Employer at the cost of the contractor shall do the same or impose suitable penalty on the contractor.**

4.0 Contractor SHE and Environmental Policy and Plan

- 4.1** The contractor as per Section 39 of the BOCW Act shall formulate a SHE policy and get it approved by Head/CIIBC respectively and display it at conspicuous places at work sites

in Hindi and a local language understood by the majority of construction workers. In order to enhancing the environmental management system and to achieve improvements in overall environmental performance, Contractor shall formulate a project Environmental policy and display it at conspicuous places at work sites in Hindi and a local language understood by the majority of construction workers.

- 4.2** Within 4 weeks of the notification of acceptance of the tender, the Contractor shall submit a detailed and comprehensive Contract specific SHE and Environmental Plan. The SHE and Environmental Plan shall include detailed policies, procedures and regulations which, when implemented, will ensure compliance of the contract provisions. The SHE Plan shall include the following but not be restricted to:
- i) A statement of the Contractor's policy, organization and arrangements for SHE
 - ii) The name(s) and experience of person(s) within the Contractor's proposed

management who shall be responsible for coordinating and monitoring the Contractor's SHE performance;

- iii) The number of SHE staffs who shall be employed on the Works, their responsibilities, authority and line of communication with the proposed Contractor's agent;
- iv) A statement of the Contractor's policy and procedures for identifying and estimating hazards, and the measures for addressing the same;
- v) A list of SHE hazards anticipated for this Contract and sufficient information to demonstrate the Contractor's proposals for achieving effective and efficient health and safety procedures;
- vi) A description of the SHE training courses and emergency drills which shall be provided by the Contractor, with an outline of the syllabus to be followed;
- vii) Details of the safety equipment which shall be provided by the Contractor, including personal protective equipment;
- viii) A statement of the Contractor's policy and procedures for ensuring that Contractor's Equipment used on the Project Site are maintained in a safe condition and are operated in a safe manner;
- ix) A statement of the Contractor's policy and procedures for ensuring that sub-contractors comply with the Contractor's safety plan;
- x) A statement of the Contractor's disciplinary procedures with respect to SHE related matters, and
- xi) A statement of the Contractor's procedure for reporting and investigating accidents, dangerous occurrences or occupational illnesses

The Environmental Plan Shall Include the following but not be restricted to:

- i) The Environmental Policy of the Contractor is clearly defined in the Site Environmental Plan, which, inter-alia, commits the Contractor to follow national and state environmental legislation, regulations and requirements of ISO14001: 2015.
- ii) Procedures for carrying out Aspect/Impact analysis of contractor's proposed works and their effect on environment.
- iii) Procedures for setting up Objectives and Targets commensurate with Employer's requirement on Environment and Employer Environmental Management Manual and how these shall be met.
- iv) Procedures for offering environmental training and methods for promoting environmental awareness amongst his employees.

- v) Operational Control Procedures to meet contractual requirements. (For Air, Water, Noise, Waste Resource Conservation, Monitoring, Man powers, results)

4.3 The Contractor shall, from time to time and as necessary are required by the Employer to produce supplements to the Safety and Environmental Plan such that it is at all times a detailed, comprehensive and contemporaneous statement by the Contractor of his site safety, industrial health and environment obligations, responsibilities, policies and procedures relating to work on Site. Any and all submissions of supplements to the SHE and Environmental Plan shall be made to the Employer in accordance with the agreed procedures.

4.4 If at any time the Safety and Environmental Plan is, in the Employer's opinion, insufficient or requires revision or modification to ensure the security of the Works and the safety of all workmen upon and visitors to the Site, the Employer may instruct the Contractor to revise the SHE and Environmental Plan and the Contractor shall within 7 days submit the revised plan to the Employer for review.

4.5 Any omissions, inconsistencies and errors in the Safety and Environmental Plan or the Employer's acceptance or rejection of the SHE and Environmental Plan and/or supplements thereto shall be without prejudice to the Contractor's obligations with respect to site safety, industrial health and environment and shall not excuse any failure by the contractor to adopt proper and recognized safety practices throughout the execution of the Work.

4.6 The Contractor shall adhere to the SHE and Environmental Plan and shall ensure, as far as practically possible, that all sub-contractors of all tiers require that contracting parties each have a copy of the Site SHE and Environmental Plan and comply with its provisions.

4.7 The details of contents to be covered in the site SHE plans are given in **Appendix No.: 3** and the details of contents to be covered in the site Environmental plan are given in Appendix No.: 18.

5.0 Designer's role

5.0 Designer's role in Safety, Health and Environment

5.1 Designer's primary role includes to minimize the risk to health and safety of those who are going to construct, maintain, clean, repair, dismantle or demolish the structures and anyone else like adjoining road users/general public, who might be affected by

the work.

5.2 General philosophy

5.2.1 When considering health and safety in designer's work, they shall be expected to do what is reasonable at the time the design is prepared. It may be possible for hazards, which cannot be addressed at the feasibility stage to be looked at during detailed design. In deciding what is reasonably practicable, the risk to health and safety produced by a feature of the design has to be weighed against the cost of excluding the feature. The overall design process does not need to be dominated by a concern to avoid all risks during the construction phase and maintenance. However, a judgement has to be made by weighing upon consideration again stand others other cost is counted not just in financial terms, but also those of fitness for purpose, aesthetics, build ability or environmental impact. By applying these principles, it may be possible to make decisions

at the design stage, which will avoid or reduce risks during construction work. In many cases, the large number of design considerations will allow a number of equally valid design solutions. What is important is the approach to the solutions of design problems. This should involve a proper exercise of judgement, which takes account of health and safety issues.

5.3 Hierarchy of Risk / Impact Control

5.3.1 Designers shall need, so far as reasonably practicable, to avoid or reduce risks by applying a series of steps known as the hierarchy of risk control or principles of prevention and protection. The steps to be adopted shall include the following:

- i) consider if the hazard can be prevented from arising so that the risk can be avoided (e.g., alter the design to avoid the risk);
- ii) if this cannot be achieved, the risk should be combated at source (e. g.,, ensure the design details of items to be lifted include attachment points for lifting);
- iii) failing this, priority should be given to measures to control the risk that will protect all people;
- iv) only as a last resort should measures to control risk by means of personal protection be assumed (e. g., use of safety harnesses).

5.4 Duty to provide health and safety risks in the drawing it self

5.4.1 In case of situations where the designers have carried out the design work and concluded that there are risks, which was not reasonably practicable to avoid,

detailed information shall be given about the health and safety risks, which remain. This information needs to be included with the design to alert others to the risks, which they cannot reasonably be expected to know. This is essential for the parties who have to use the designing formation.

- 5.4.2 If the designers' basic design assumptions affect health or safety, or health and safety risks are not obvious from the standard design document, the designer shall provide additional information. The information shall include a broad indication of the assumptions about the precautions for dealing with the risks. The information will need to be conveyed in a clear manner; it shall be included on drawings, in written specifications or outline method statements. The level of detail to be recorded will be determined by the nature of the hazards involved and the associated level of risk.
- 5.5 Employer's approval
 - 5.5.1 Every structure like scaffold, false work, launching girder, earth retaining structures, any kind of temporary supporting structures etc. shall have its design calculations included in the method statements in addition to health and safety risks. Employers' designer or his approved proof check consultants as applicable as per the contract conditions shall approve all these designs / drawings prior to start the activity. Due to any reasons the actual arrangement at work front is getting changed from the approved drawing, the revised condition shall be approved (prior to execute) by the Employers' designer or his approved proof check consultants as applicable as per the contract condition.
 - 5.5.2 The Contractor shall prepare a detailed Method Statement of each and every activity at project along with Hazards associated & risks assessment and submit to Employer for its approval well in advance of the actual execution of the activity. This document shall be revised & seek for Employer's approval when there is change of methodology in line with the site condition, resource availability, design change etc. Also, all the work permits & checklists formats of the contractor shall get prior approval from the Employer before implementation.
- 5.6 Any non-standard structures like trestles made up of re-bars or structures which are very old, corroded, repaired for many times etc. for which no design calculations can be made accurately from any national standards, shall not be allowed to be used at sites even for short duration.
- 5.7 If any of the above-mentioned clauses are not adhered penalty shall be imposed

depending upon the gravity of the unsafe act and or condition

6.0 Contractor SHE Organization

6.1 Education and Experience

6.1.1 The contractor shall appoint the required SHE personnel as prescribed in General Instruction **attached as Appendix 5** (enclosed at the end) based upon the statutory requirement and establish the safety organization based upon the contract value. The minimum educational qualification and the work experience are given in General Instruction **attached as Appendix 6**.

6.1.2 In order to effectively interact on labour welfare matters with the Employer and the statutory authorities enforcing the labour welfare legislations every contractor shall employ a full time Labour Welfare Officer duly qualified and experienced as per clause 6.1.1.

6.2 Conduct and competency

6.2.1 The conduct and functioning of the contractor SHE personnel shall be monitored by the Employer. Any default or deficiency shall attract penalty as per details given under penalty clause **56.0** of this document.

6.2.2 The Contractor shall ensure that all personnel are competent to perform the job assigned to them. In the event that the Contractor is unable to demonstrate the competency of any person whose activities can directly impact on the Works' SHE performance, the Employer shall remove that person from the site without any procedural formalities.

6.3 Approval from Employer

6.3.1 The name, address, educational qualification, work experience and health condition of each personnel deployed for SHE jobs shall be submitted to the Employer in the format prescribed for the purpose for comments and approval well before the start of the work. Only on approval by the Employer these personnel are authorized to work. In case any of the SHE personnel leaves the contractor the same shall be intimated to the Employer. The contractor shall recruit new personnel and fill up the vacancy.

6.4 Responsibility of SHE personnel

6.4.1 For all works carried out by the contractor and his sub-contractors, the responsibility

of ensuring the required SHE manpower lies with the main contractor only. The minimum required manpower indicated by the Employer includes the sub-contractors' work also. It shall be the responsibility of the main contractor to provide required SHE manpower for all the works executed by all contractors. Necessary conditions shall be included in all sub-contract documents executed by the main contractor.

6.5 Employment status of SHE personnel

6.5.1 No contractor shall engage SHE manpower from any outsourcing agencies in which case the effectiveness would be lost. All SHE manpower shall be on the payroll of the main contractor only and not on the payroll of any subcontractor or outsourcing manpower agencies etc. This condition does not apply to positions like traffic marshals who are engaged almost on a daily requirement basis.

6.6 Reporting of SHE personnel

6.6.1 All SHE personnel are to report to the Chief SHE Manager who shall report directly to the Chief Project Manager. The Employer shall monitor adherence to this procedure at all times. In case of non-adherence penalty shall be levied as indicated in the penalty clause.

6.7 **Inadequate SHE personnel**

6.7.1 **In case if the contractor fail to provide the minimum required manpower as illustrated in General Instruction attached as Appendix 5, or fail to fill up vacancies created within 14 days, the same shall be provided by the Employer at contractor's cost. Any administrative expenses involved to provide the same like paper advertisement or manpower consultant charges, etc shall also be at the cost of contractor.**

6.8 Prohibition of performance of other duties

6.8.1 No SHE personnel shall be required or permitted to do any work which is unconnected to, inconsistent with or detrimental to the performance of the SHE duties for respective category mentioned in General Information attached as Appendix5

6.9 Facilities to be provided to SHE personnel

6.9.1 As per schedule VIII of BOCWR, the contractor shall provide all SHE personnel with

such facilities, equipment and information that are necessary to enable him to dispatch his duties effectively.

- 6.9.2** The minimum Employer's requirements of such facilities / equipment to be provided for SHE personnel are given in the General Instruction **attached as Appendix7.**

6.10 Availability of SHE personnel:

The contractor shall ensure the availability of trained, competent & experienced SHE personnel at each work front. SHE personnel shall report to the project within a reasonable period once approval from the Employer. Contractor shall notify / take approval from the Employer for de-mobilization of any SHE personnel from the project till issuance of 'Take over certificate'.

In case of failure on the part to follow, Employer shall initiate to impose penalty.

7.0 Contractor SHE Committee

- 7.1** All employees should be able to participate in the making and monitoring of arrangements for safety, industrial health and environment at their place of work. The establishment of site SHE committees in which employees and Contractor and sub- contractor management are represented can increase the involvement and commitment of employees. The contractor shall ensure the formation and monitor the functioning of contractor SHE committees.

7.2 Terms of Reference

7.2.1 The Terms of Reference for the committee shall be as follows;

- i) To establish company safety and environmental policies and practices
- ii) To monitor the adequacy of the contractor's site SHE plan and ensure its implementation
- iii) To review SHE training
- iv) To review the contractor's monthly Safety and environmental report.
- v) To identify probable causes of accident and unsafe practices in building or other construction work and to suggest remedial measures.
- vi) To stimulate interest of Employer and building workers in safety by organizing safety week, safety competition, talks and film-shows on safety, preparing posters or taking similar other measures as and when required or as necessary.
- vii) To go round the construction site with a view to check unsafe practices and

detect unsafe conditions and to recommend remedial measures for their rectifications including first-aid medical and welfare facilities.

- viii) Committee team members should perform a site inspection before every committee meeting and to monitor, SHE inspection reports.
- ix) To bring to the notice of the Employer the hazards associated with use, handling and maintenance of the equipment used during the course of building and other construction work
- x) To suggest measures for improving welfare amenities in the construction site and other miscellaneous aspect of safety, health and welfare in building or other construction work.
- xi) To look into the health hazards associated with handling different types of explosives, chemicals and other construction materials and to suggest remedial measures including personal protective equipment.
- xii) To review the last safety committee meeting minutes and to take action against persons/sub-contractors for non-compliance if any.
- xiii) To review environmental aspect and impact, mitigation measures taken at site.

7.3 Within 14 days of award of contract, the SHE committee shall be constituted and notification regarding the same shall be communicated to the members and employees.

7.4 Site SHE Committee meeting shall be conducted at least once in a **month** with the minimum members listed below:

Chairman	Project Manager
Secretary	SHE Manager (In-charge)

Members	<ul style="list-style-type: none"> i) Labour Welfare Officer ii) In charge of plant and machinery iii) In charge of site electrics iv) In charge of stores. v) Senior Managers/ Engineers heading different sub functions. vi) Sub – contractor’s representative vii) Labour Contractor’s representative viii) Workers’ representative ix) Co-contractor representative. x) SHE staffs xi) Environmental Manager / Engineer
Employer’s Representatives	Employer SHE in charge and other representatives

7.5 Construction SHE Committee meeting shall be conducted at least once in a **week** with the minimum members listed below:

Chairman	Project Manager
Secretary	SHE Manager (In-charge)
Members	<ul style="list-style-type: none"> i) Labour Welfare Officer ii) In charge of plant and machinery iii) In-charge of site electrics iv) Senior Managers / Engineers heading different sub functions v) Sub- Contractor’s representative vi) Labour contractor’s representative

7.6 Co-contractors ‘participation

7.6.1 In case of depot, station and other contiguous areas where more than one main contractor is working together, the Employer shall instruct the other contractors to join for the monthly SHE committee meeting of the main civil contractor, so as to discuss and decide about the common provision of security, lighting, toilet, drinking

water etc. and sharing the maintenance cost of the same etc.

7.6.2 The general principle for sharing the cost shall be either based on the contract value of works executed at the contiguous area or the daily average number of workmen employed by each contractor in the contiguous area.

7.7 Minimum time between two monthly SHE Committee meetings

7.7.1 A minimum period of **21 days** shall be maintained between any two SHE monthly committee meetings.

7.8 Agenda

7.8.1 The Secretary shall circulate the agenda of the meeting at least seven working days in advance of the scheduled date of the meeting to all members.

7.8.2 The agenda should broadly cover the following:

- i) Confirmation of minutes
- ii) Chairman's review/overview of site SHE performance /condition
- iii) Previous month SHE statistics
- iv) Incident and Accident Investigation / dangerous occurrence / near miss report
- v) Site Safety and environmental inspection
- vi) Sub-contractors' SHE issues
- vii) Safety and environmental presentation by Members
- viii) Environmental Monitoring results and mitigation measures
- ix) Materials (Including Waste) Managements
- x) Report from Employer
- xi) Matters a rising
- xii) Any other business

7.9 Minutes of the meeting

7.9.1 The Minutes of the meeting shall be prepared and sent to all members within 2 working days preferably by mail/fax followed by hardcopy. Safety Committee meeting minutes shall also be displayed in the notice board for wider publicity to all concerned.

7.10 Disciplinary Action

- 7.10.1 The chairman shall inform the members of any outstanding issues in the meeting and in case of repeated offence/ non-compliance by some members or other co/sub-contractors and propose suitable disciplinary action including provisions of monetary penalty as per the relevant contract clauses, the Employer shall ensure that the same is implemented.

8.0 ID Card and First day at work, SHE orientation training

- 8.1 The Contractor shall ensure that all personnel working at the site receive an induction SHE trainings explaining the nature of the work, the hazards that may be encountered during the site work and the particular hazards attached to their own function within the operation.
- 8.2 **All personnel shall be issued a photo identity card of size 85mm x 55mm duly signed by the authorized representative of the contractor before they are engaged for any work as per the format given in the General Instruction attached as Appendix9**
- 8.3 Contractor shall also issue personnel SHE handbook in a language known to the workers, which provides information on SHE and emergency procedures that all personnel working on contract are required to know and the need to follow. Contractor shall ensure that this is distributed, and its content introduced to all personnel working at the site.

9.0 SHE Training

- 9.1 The behavior of people at all levels of the contractor is critical for SHE performance.
- 9.2 The contractor shall organize quality SHE training to engage Managers, supervisors and other personnel in behavioral change and improve safety performance.
- 9.3 The Contractor shall analyze the training requirements for all the employees and initiate a training program to demonstrate that all persons employed, including subcontractors, are suitably qualified, competent and fit. This will include:
- i) Detailed Job descriptions for all personnel, to include their specific SHE responsibilities
 - ii) Specification of qualifications, competency and training requirements for all personnel

- iii) Assessment and recording of training needs for all personnel, including subcontractors' employees in the workforce, vendor representatives and site visitors
- iv) A system for assessing new hirers e.g., previous training
- v) A means of confirming that the system is effective
- vi) A matrix and schedule of training requirements, covering general, task-specific and SHE-related training, showing the training frequency and interval between refresher courses
- vii) Timely, competent delivery of training courses

9.4 The contractor shall arrange behavioral-based training programs for all the executives to identify, recognize and eliminate unsafe act and unsafe conditions. In addition, contractor shall arrange Lifting supervisor certification training, Defensive driving training, drivers/operator certification training etc.

9.5 The minimum Employer's requirement of training needs for various categories of employees - not limited to (Managers from all department / engineers of all department / supervisors / workers like operator, driver, rigger, gas cutter, welder, driller, mechanics, khalasi, carpenter, scaf folder, signalman, traffic Marshall, security, concrete gang, electrician, auto electrician, mason, reinforcement workers, fitter, stressing workers, radiographer, chipper, paramedic, doctor, helper, surveyor, grinder etc. are given as per the following lists (not limited to):

- i. Defensive driving from Employer's approved institute
- ii. Certified lifting supervisor
- iii. Certification training for driver / operator by TPI agency
- iv. Heavy erection / materials lifting & lowering (including tandem lifting)
- v. Material handling (mechanical & manual)
- vi. Electrical safety
- vii. Certified scaf folder training from Employer's approved agency
- viii. Working at height
- ix. Safety during pre-stressing & post stressing (including at height)
- x. Gantry crane operation / Pick & carry crane operation / hydraulic & mechanical crane / lifting by hydraulic jack & mac-alloy bar / Monkey hoist operation / Derrick pole / Chain pulley block / Winch operation / EOT crane operation / Parapet lifting gantry etc.
- xi. Safe operation of Sky lift / scissor lift / RRV / Manual & mechanical material

shifting trolley / concrete boom placer / concrete pump / wood cutting machine / Bar bending & cutting machine / fork lift / vertical ladder trolley / excavator / JCB / Road Roller / Vibro-hammer / plate compactor / stone cutting machine / mobile tower crane / mobile scaffold etc.

- xii. Safe operation of all kinds of portable power / hydraulic / pneumatic tools.
- xiii. Tunnel boring machine / Launching Girder operation
- xiv. Underground locomotive operation
- xv. Tunnel / shaft access control system
- xvi. Heavy materials transportation through general public road
- xvii. Confined space entry
- xviii. Communication / ventilation / illumination inside tunnel
- xix. Housekeeping
- xx. Underground / overhead utility diversion
- xxi. Excavation (underground station building including concourse & platform slab, cable laying, Pile cap, Building construction, UG water reservoir/ pump room)
- xxii. Pilling
- xxiii. Construction of Diaphragm wall
- xxiv. Traffic Management
- xxv. Working adjacent to HT line
- xxvi. Working nearby / over railway line / river
- xxvii. OHE erection & fixing
- xxviii. General Hot work like welding / gas cutting, grinding, grousing (including inside confined space i.e., tunnel, pipes etc.)
- xxix. Work with compressed air
- xxx. Cable laying inside trench along the public road (including Horizontal Directional Drilling machine method)
- xxxi. Cable laying on the viaduct & underground station
- xxxii. Working adjacent to HT line

- xxxiii. Transformer lifting, shifting & positioning at RSS building / Depot / ASS
- xxxiv. Block Masonry work
- xxxv. PEB erection at stations
- xxxvi. CLC construction
- xxxvii. MSDS of chemicals
- xxxviii. First aid
- xxxix. Casting of I Girder deck slab, station slab over live traffic road.
- xl. Repair / modification works on Radio tower at height
- xli. Reinforcement cutting, binding shifting & stacking

- xlii. Carpentry & Shuttering
 - xliii. Painting
 - xliv. Emergency preparedness in underground station & tunnel and elevated stations & viaduct
 - xliv. Work permit system
 - xlvi. Health Fitness
 - xlvi. MSDS Training to New workers
 - xlvi. Waste oil handling, storage and disposal
 - xlix. Cement Handling and Storage
 - I. Sapling plantation and its consequences.
 - li. Fuel Handling and Storage
 - lii. Handling & storage of Hazardous chemicals
 - liii. Noise pollution problems on health
 - liv. Water Management and Spill Control.
 - Iv. Energy Management.
 - Ivi. Dust mitigation and its control.
 - Ivii. Waste management and disposal (hazardous and non-hazardous)
 - Iviii. Environmental pollution and its consequences
 - lix. Personal Health & Hygiene Awareness viz. HIV / AIDS, Dengue etc.
 - Ix. Prevention & Treatment of Dengue and Malaria
- 9.6 The refresher-training programme to all employees shall be conducted once in six months.**
- 9.7 Toolbox talk as given in the Employer's Project SHE manual shall be conducted to all high-risk work men every day.**
- 9.8 Daily Safety Oath as given in Project SHE manual shall be taken by every employee including workman without fail.**
- 9.9 All vehicle drivers including Hydra operators shall be trained on defensive driving at any reputed institute with prior approval of employer. All vehicle drivers shall also undergo refresher training on defensive driving provided by the same institute once in 6months.**
- 9.10** All the above listed training programmes except at clause **9.11** shall be organized by the contractor only after taking approval from the Employer for the training faculty / organization, content and durations.
- 9.11 In case of failure on the part of the contractor to provide all the above-mentioned**

training programs to all employees in time, the same shall be provided by the Employer through accredited agencies if required by formulating a common scheme to all contractors. Any administrative expenses and training fee towards the same shall be at the cost of the contractor.

10.0 SHE Inspection

10.1 The contractor shall evolve and administer a system of conducting SHE inspections and other risk management analysis on a periodical basis.

10.2 The purpose of SHE inspection is to identify any variation in construction activities and operations, machineries, plant and equipment and processes against the SHE Plan and its supplementary procedures and programs.

10.3 Following SHE inspections program shall be adopted.

- i) Planned General Inspection
- ii) Routine Inspection
- iii) Specific Inspection
- iv) Other Inspection

10.3.1 Planned General Inspection

10.3.1.1 Planned general inspections are performed at predetermined intervals and it usually involves the representation from both Contractor and the Employer.

10.3.1.2 Inspections that will be classified under this inspection program are:

- i) Monthly contractor and subcontractors site safety committee Inspection.
- ii) Weekly safety and environmental inspection by construction supervisors (Contractors and Sub- contractors).
- iii) Daily safety inspection by contractor site SHE team.

10.3.2 Routine Inspection

10.3.2.1 Routine inspections are often referring to the inspection of work site, equipment and temporary structures performed by site and equipment operators and temporary structure erectors.

Inspections that will be classified under this inspection program are:

- i) Daily Inspection of plant and equipment by operator
- ii) Weekly Inspection of scaffold by scaffolding supervisor

- iii) Monthly Inspection of electrical hand tools by competent electrical supervisor
- iv) Quarterly Inspection of temporary electrical systems by competent electrical supervisor
- v) Half-yearly inspection of lifting machinery, lifting appliances, equipment and gears by Govt. approved competent person.
- vi) Weekly Environmental Inspection of Batching Plant by Environmental Manager.

10.3.2.2 The list mentioned above is not exhaustive. Contractor may add additional categories. Contractors' Site SHE Manager will ensure that a system of routine inspections is carried out periodically to all plants, equipment, powered tools and any other temporary structures that will pose a hazard to operators and workmen.

10.3.3 Specific Inspection

10.3.3.1 Specific inspections are performed on activities without a predetermined date. Competent supervisors usually perform inspections for ensuring an activity whether it is executed in accordance to a general set of rules; method statement submitted or developed procedures.

The following are examples that will be commonly performed as required on the construction site:

- i) Inspection performed before a heavy lifting operation.
- ii) Inspection performed before and after the entry of person into a confined space.
- iii) Inspection performed before and after a welding and gas cutting operation.
- iv) Inspection of formwork before concreting by form work etc.

The list mentioned above is not exhaustive. The contractor shall ensure that a competent supervisor inspects all high-risk processes and activities.

10.3.4 Other Inspection

Other inspections include the following:

- i) Mandatory Inspections by Labour Department of Government.
- ii) Employer site SHE management team

10.3.5 The contractor shall prepare all required safety inspection checklist for all activity operations and equipment. Checklists will be prepared based on the Indian

standards, rules and regulations and Employer's requirements. The formats provided in the Project SHE manual may be referred.

- 10.3.6 All inspection records and reports will be properly kept and filed for audit purpose. Inspection reports of Planned General Inspection and Routine Inspection will be used for discussion during Safety Committee Meetings.

10.4 SHE Non-Conformity Notice (NCN):

- a) Non-conformance notice shall be issued to the Contractor by Employer to fix when there is/are non-compliances / violations (high potential risk, deviation from design / drawing / method statement / risk assessment / Employer's instruction) observed at site activities.
- b) NCR shall be issued to fix any non-compliances in the process by the contractor internally.
- c) NCN shall be closed within seven days of issuance / receiving after the non-conformities are rectified and complied in accordance with the relevant standards / processes.

11.0 SHE Audit

11.1 General

- 11.1.1 The purpose and scope of SHE audit is to assess potential risk, liabilities and the degree of compliance of construction Safety, Health & Environmental plan and its supplementary procedures and programs against applicable and current SHE legislation regulations and requirements of the employer.

- 11.1.2 Project Manager holds the ultimate responsibility in ensuring implementation of SHE audit program during the construction work.

11.2 Monthly Audit Rating Score (M A R S)

- 11.2.1 Monthly Audit Rating Score (MARS) will be performed once in a month. A team consisting of Project manager and Employer representative based on the pre-designed score-rating format will conduct it. The details of the pre-designed monthly audit score rating formats are given in the Project SHE manual.**

- 11.2.2 This Monthly SHE Audit Rating Score (MARS) report will enable the Employer to evaluate the general compliance by the Contractor with the Conditions of Contract, the Employer's Project SHE Manual and the Contractor's site specific SHE Plan.

11.2.3 Monthly Audits will be conducted in accordance with Employer Guidelines. The Project Manager accompanied by the Employer's representatives shall carry out the Audit. The Contractor's senior manager and SHE in-charge should also be invited to attend.

11.2.4 Timing

The Monthly Audit Rating Score (MARS) should be conducted at least 7 days prior to the scheduled date of Monthly SHE Committee meeting.

11.2.5 Evaluation

11.2.5.1 The numerical scoring has been weighed on a 1-10 scale. The audit team will use their observations noted in evaluating the points to be awarded against each of the elements of the audited section. Wherever some topics and sub-topics are not applicable the score rating need not be given. The overall audit ratings shall be achieved by:

$$\text{Overall Audit rating} = \frac{\text{Actual Score Achieved}}{\text{Maximum Possible Score}} \times 100$$

11.2.5.2 The criticality of the required actions for the respective sections of the Audit will be classified:

Sl. No.	Score	Description	Action
1	< 60%	Immediate	Require Contractor to rectify within 24 hours
2	< 75%	Improvement Necessary	Contractor rectification within 7 days and confirmed in writing to Employer
3	< 90%	Improvement Desirable	Contractor rectification within one month and confirmed in writing to Employer

11.2.6 Report

A copy of each Audit Report will be sent to Employer and to all subcontractors, with whom it will then be discussed in detail at the Monthly SHE Committee Meeting in order to ensure that any corrective actions are agreed upon.

11.2.7 For a particular month if the project scoring is less than 75%, 2% of IPC of the monthly invoice of the Contractor shall be withheld for immediate corrective action on the

shortfall areas.

11.3 Monthly Electrical Safety Audit

11.3.1 A team comprising of contractor's senior SHE (Electrical) engineer and Employer's representative shall conduct monthly electrical safety audit covering the following and submit the report to Employer.

- i) Electrical accidents investigation findings and remedy
- ii) Adequacy of power generation and power requirements
- iii) Power distribution and transmission system in place
- iv) Updated electrical single line diagram showing the current condition of power source and distribution including the IP44 DBs arrangement.
- v) Electrical protection devices – selection, installation and maintenance.
- vi) Earth or ground connection and earth pit maintenance details
- vii) Education and training of electrical personnel undertaken
- viii) Routine electrical inspection details
- ix) Electrical maintenance system and register.
- x) Name plate details of major electrical equipment
- xi) Classified zones in the site, if any.

11.4 External SHE Audit

11.4.1 Contractor shall arrange Quarterly External SHE audits for internal review of project's compliance with contract conditions. This audit shall be conducted by external agencies that are competent with ISO qualified auditors with prior approval of the Employer. The report of audit shall be shared with Employer. The cost of such audit shall be deemed to include in contract price.

In addition, Employer may conduct its own Quarterly SHE Audits (at Employer's cost) of project through external SHE Audit team. The contractor shall extend all necessary assistance to audit team to enable performance of Audits. Contractor shall comply with the observations brought out in SHE Audits.

11.4.2 Areas of competence of Audit team

11.4.2.1 Practical understanding of BOCW Act and Rules, statutory requirements on health/medical and welfare of workmen, construction hazards and its prevention and control, traffic management, electrical safety, rigging, safety of construction equipment and environment management.

11.4.2.2 Audit shall be conducted as per the guidelines of ISO, ILO, and national standards. Audit report shall also be presented as per the above formats.

11.4.3 External SHE audit shall be conducted on a quarterly basis throughout the currency of the contract.

11.4.4 Targets of SHE Audit:

The contents and coverage of the external audit shall include the following items.

11.4.4.1 SHE management:

- i) Organization
- ii) Communication and Motivation
- iii) Time office
- iv) Inspection
- v) Emergency preparedness
- vi) Budgetal location
- vii) Education and Training
- viii) Work permit system

11.4.4.2 Technical:

- i) Building and Structure
- ii) Construction operational safety
- iii) Material safety
- iv) Hand tools and Power tools
- v) Electrical system
- vi) Safety Appliances
- vii) Fire prevention and control
- viii) Housekeeping
- ix) Maintenance and Machinery safety
- x) First-aid and Medical Facilities
- xi) Welfare measures
- xii) Environmental Management

11.4.5 Audit Documents:

11.4.5.1 Contractor shall make the below listed documents available for the review by the Audit team.

- i) **SHE policy**
- ii) **SHE manual**
- iii) **SHE Rules and Regulation**
- iv) **SHE organization chart**
- v) **Annual SHE objectives /programs**
- vi) **Accident / near miss statistics and analysis**
- vii) **SHE Training program / records for all personnel**
- viii) **Operating manuals and maintenance manual of all equipments**
- ix) **Safe worthiness certificates of all lifting appliances and gears**
- x) **Medical fitness record for all personnel**
- xi) **Risk identification, assessment and control details**
- xii) **Environmental management reports**
- xiii) **Emergency management records including mock drill**

11.4.6 Audit Preparation:

- i) Audit team members are required to gather information by observations through interviews and by checks of hardware and documentation.
- ii) Audit team shall prepare checklist to cover all parts based on SHE legislations rules and regulations and Employer requirements.
- iii) Audit team members shall verify the facts and findings leading to the identified gaps and weakness.
- iv) Audit leader has overall responsibility for reaching a conclusion.

11.4.7 Reporting:

11.4.7.1 Audit report shall be prepared and directly sent to the Employer within 7 days of conducting the audit with a copy to the contractor.

11.4.8 Report contents:

- i) Executing summary - based on the finalized checklists as written the findings to the Employer by the audit team members, the audit leader will compile a concise and accurate summary of observations and findings.
- ii) Introduction - this will contain basic information regarding the facilities or organization audited, the specific audit dates (inclusion of those for

preparation and post-audit activities).

- iii) Principal positive findings - This will contain the summary of positive aspects as observed by the auditors. It will also contain highlights of those issue, which may warrant dissemination as best practice regarding methodology used or achievement.
- iv) Audit Findings - All audit findings as detailed in the audit checklists shall be grouped together as priority 1 and 2 as detailed below in a separate listing.
 - a) Priority 1: Actions to rectify gaps or weakness should generally be implemented within two-weeks' time, if risk potential is high or unacceptable.
 - b) Priority 2: Actions should be generally implemented or rectified with a maximum of 3 – 4 weeks, if not rectified would create a likelihood of minor injury or business loss.

11.4.9 Conformity Report & Action by Employer

11.4.9.1 The auditor shall inspect the site after 14 days of conducting initial audit for checking the adequacy of implementation of items maintained under priority 1 by the contractor and shall submit a conformity / non-conformity report to the Employer with a copy to the contractor.

11.4.9.2 The auditor shall again inspect after 28 days of conducting initial audit for checking the adequacy of implementation of items mentioned under priority 2 by the contractor and shall submit a conformity / non-conformity report to the Employer with a copy to the contractor.

11.4.9.3 In case of non-conformity of items mentioned by auditor, the Employer shall take necessary steps including stoppage of work and or imposing any penalty for getting the it emimplemented.

11.4.10 Failure of contractor to conduct External SHE Audit

11.4.10.1 **If the contractor fails to conduct the external SHE audits in time, the Employer at the cost of contractor shall get it done.**

12.0 SHE Communication

12.1 The contractor shall take every effort to communicate the Safety, Occupational health and Environment management measures through posters campaigns /

billboards / banners / glow signs being displayed around the work site as part of the effort to rise safety awareness amongst to the work force. Posters should be in Hindi, English and other suitable language deemed appropriate. Posters / billboards / banners/ glow signs should be changed at least once in a month to maintain the impact.

12.2 The contractor shall also observe important days as listed in General Instruction attached as **Appendix 10** and printing and displaying safety signage and posters as listed in General Instruction attached as **Appendix 11**.

12.3 The list indicated are the minimum requirements of the Employer and the contractor is encouraged to further the SHE communication activities by formulating suitable reward schemes for safety performers and any other activities, which deem fit for the purpose.

13.0 SHE Submittals to the Employer

13.1 The contractor's SHE management should send the following reports to the Employer periodically:

- i) Daily Reporting of total no of workmen (as given in Clause **13.2**)
- ii) Monthly SHE Report (as given in Clause **13.3**)
- iii) Monthly Environmental Report (as given in Clause **13.3.2**)
- iv) SHE Committee Meeting Minutes (as given in Clause **7.9.1**)
- v) SHE (including Environmental issues) Inspection Reports (conducted by Employer / jointly Employer & contractor)
- vi) SHE Audit Reports
 - a) Monthly Audit Rating Score (MARS) report
 - b) External SHE Audit
 - c) Electrical Safety Audit
 - d) Any specific/special audit conducted by Employer
- vii) Air and Noise Quality monitoring report
- viii) Report for waste Management (storage and disposal)

13.2 Daily Reporting of total no of workmen

13.2.1 The contractor shall report to the Employer the total no of workmen engaged by all including any subcontractor within 2 hours of starting of any shift in any day. This reporting shall be the primary duty of the Chief SHE Manager of the contractor and reporting shall be through tele-fax / email. The onus of checking the receipt of the same by the Employer lies with the contractor. If the information is not received or received more than 2 hrs after starting of the shift, penalty shall be levied as per relevant clause.

13.3 Monthly SHE Report

13.3.1 The contractor shall prepare a monthly SHE reports consisting of the following and submit 3 copies within 7th of next month to the Employer as specified in the Project SHE manual.

- i) Monthly man-hour details as specified in the Project SHE manual
- ii) Monthly accident / incident details as specified in the Project SHE manual
- iii) SHE committee details
- iv) Details of SHE training conducted in the month
- v) SHE Inspection
- vi) SHE internal / external (by employer) audit details like electrical audit, any special / specific audits like height work / scaffold / temporary supporting structures, monsoon preparedness, plant & machineries, emergency preparedness, heavy structures (pre & post erection) etc.
- vii) SHE Communication activities under taken in the month indicating the number of posters displayed and balance availability in stock.
- viii) Air quality / Noise monitoring details
- ix) Toolbox talks details
- x) PPE details: Quantity purchased, issued to the workmen and stock available.
- xi) Details on IP 44 panel boards, lighting poles, welding and cutting equipments, Ladders, Hoists, tools & tackles.
- xii) Monthly Lux meter study results
- xiii) Housekeeping
- xiv) Barricade maintenance details
- xv) No of critical excavations
- xvi) Health & Welfare activities
- xvii) Safety walk conducted by Contractors' Project Manager in the month
- xviii) SHE Activities Planned for next month

xix) Induction Training records with photographic evidence

13.3.2 The contractor shall prepare a monthly SHE & Environmental report consisting of Appendix No.: 19 and submit 3 copies within 7th of next month to the Employer as specified in the Project Environmental manual.

14.0 Accident reporting and investigation

14.1 Reporting to Employer

14.1.1 **All accidents (Fatal + LTI), near miss cases, road traffic incidents, Environmental accidents and dangerous occurrences shall immediately be informed verbally to the Employer. This will enable the Employer to reach to the scene of accident / dangerous occurrences to monitor/assist any rescue work and/or start conducting the investigation process so that the evidences are not lost.**

14.1.2 **Reports of all accidents (fatal / injury), near miss cases, road traffic incidents, environmental incidents and dangerous occurrences shall also be sent within 24 (as Preliminary Incident report) and within 72 hours (as Final Incident investigation report) hours as per format provided in the Employer's Project, SHE manual.**

14.1.3 **No accident / dangerous occurrences are exempted from reporting to the Employer.**

14.1.4 **Any willful delay in verbal and written reporting to the Employer shall be penalized as per relevant clause.**

14.2 Reporting to Govt. organizations

14.2.1 In addition to the above verbal and written reporting to the Employer, as per relevant Rule of BOCWR, notice of any accident to a worker at the building or construction site that:

- a) causes loss of life; or
- b) disables a worker from working for a period of 48 hours or more immediately following the accident;
- c) shall forthwith be sent by telegram, telephone, fax, or similar other means including special messenger within four hours in case of fatal accidents and 72 hours in case of other accidents, to:
 - i) the Regional Labour Commissioner (central), wherein the contractor has registered the firm/work
 - ii) the board with which the worker involved was registered as a beneficiary;

- iii) Director General and
- iv) the next of kin or other relative of the worker involved in the accident;

14.2.2 Further, notice of accident shall be sent in respect of an accident which

- (a) causes loss of life; or
- (b) disables the injured worker from work for more than 10 days to
 - i) the officer-in-charge of the nearest police station;
 - ii) the District Magistrate or, if the District Magistrate by order so desires, to
 - iii) the Sub-Divisional Magistrate

14.2.3 In case of an accident-causing minor injury, first-aid shall be administered, and the injured worker shall be immediately transferred to a hospital or other place for medical treatment.

14.2.4 Where any accident-causing disablement that subsequently results in death, notice in writing of such death, shall be sent to the authorities mentioned in clause **14.2.1** and **14.2.2** above within 72 hours of such death.

14.2.5 Reporting of dangerous occurrences:

14.2.5.1 The following classes of dangerous occurrences shall be reported to the Inspector having jurisdiction, whether or not any disablement or death caused to the worker, namely:

- (a) collapse or failure of lifting appliances, or hoist, or conveyors, or similar equipment for handling of building or construction material or breakage or failure of rope, chain or loose gears; or overturning of cranes used in construction work;
- (b) falling of objects from height;
- (c) collapse or subsidence of soil, tunnel, pipe lines, any wall, floor, gallery, roof or any other part of any structure, launching girder, platform, staging, scaffolding or means of access including form work;
- (d) explosion of receiver or vessel used for storage of pressure greater than atmospheric pressure, of any gas or gases or any liquid or solid used as building material;
- (e) fire and explosion causing damage to any place on construction site where building workers are employed;
- (f) spillage or leakage of any hazardous substance and damage to their container;

- (g) collapse, capsizing, toppling or collision of transport equipment;
- (h) leakage or release of harmful toxic gases at the construction site;

14.2.6 In case of failure of launching girder, lifting appliance, loose gear, hoist or building and other construction work, machinery and transport equipment at a construction site, such appliances, gear, hoist, machinery or equipment and the site of such occurrence shall, as far as practicable, be kept undisturbed until inspected by the Authorities;

14.2.7 Every notice given for fatal accidents or dangerous occurrences shall be followed by a written report to the concerned Authorities under relevant Section of BOCWA and the Director General in the specified Form of BOCWR.

14.3 Accident investigation

14.3.1 General

14.3.1.1 Investigations should be conducted in an open and positive atmosphere that encourages the witnesses to talk freely. The primary objective is to ascertain the facts with a view to prevent future and possibly more serious occurrences.

14.3.1.2 Accidents and Dangerous Occurrences which result in death, serious injury or serious damage must be investigated by the Contractor immediately to find out the cause of the accident/occurrence so that measures can be formulated to prevent any recurrence.

14.3.1.3 Near misses and minor accidents should also be investigated by the Contractor as soon as possible as they are signals that there are inadequacies in the safety management system.

14.3.2 Procedure of incident investigation

14.3.2.1 It is important after any accident or dangerous occurrence that information relating to the incident is gathered in an organized way. The following steps shall be followed;

- a) take photographs and make sketches
- b) examine involved equipment, work piece or material and the environmental conditions
- c) interview the injured, eye-witnesses and other involved parties
- d) consult expert opinion where necessary
- e) identify the specific contractor or sub-contractor involved.

14.3.2.2 Having gathered information, it is then necessary to make an analysis of incident

- a) establish the chain of events leading to the accident or incident
- b) find out at what stage the accident took place
- c) consider all possible causes and the interaction of different factors that led up to the accident and identify the most probable cause The cause of an accident should never be classified as carelessness. The specific act or omission that caused the accident must be identified.

14.3.2.3 The next stage is to proceed with the follow-up action

- a) report on the findings and conclusions
- b) formulate preventive measures to avoid recurrence
- c) publicize the findings and the remedial actions taken

14.4 Employers' independent incident investigation

14.4.1 In case of fatal / dangerous occurrence the Employer shall also conduct independent investigation. Contractor and his staff shall extend necessary co-operation and testify about the accident.

14.4.2 The contractor shall take every effort to preserve the scene of accident till the Employer completes the investigation.

14.4.3 All persons summoned by the Employer in connection to witness recording shall obey the instructions without delay. Any willful suppression of information by any person shall be removed from the site immediately and / or punishable as per relevant penalty clause.

15.0 Emergency preparedness plan

15.1 The Contractor shall prepare an Emergency Response Plan as an independent document for all work sites. The plan shall integrate the emergency response plans of the Contractor and all other subcontractors. The Emergency Response Plan shall detail the Contractor's procedures, including detailed communications arrangements, for dealing with all emergencies that could affect the Site. This include where applicable, injury, sickness, evacuation, fire, chemical spillage, severe weather and rescue.

15.2 The contractor shall ensure that an Emergency Response Plan is prepared to deal

with emergencies arising out of (not limited to):

- i) Fire and explosion
- ii) Collapse of lifting appliances and transport equipment
- iii) Collapse of building, sheds or structure etc.
- iv) Gas leakage or spillage of dangerous goods or chemicals
- v) Bomb threatening, Criminal or Terrorist attack
- vi) Drowning of workers
- vii) Landslides getting workers buried floods, Earthquake, storms and other natural calamities.
- viii) Environmental Emergency (Spillage and Pollution)
- ix) Electrocution
- x) Huge water ingress inside the tunnel
- xi) Fall of heavy materials during erection / lowering
- xii) Fall of personnel from height
- xiii) Pandemic situation (Like Covid-19 Or any such situation arises in future)

15.3 Arrangements shall be made for emergency medical treatment and evacuation of the victim in the event of an accident or dangerous incident occurring, the chain of command and the responsible persons of the contractor with their telephone numbers and addresses for quick communication shall be adequately publicized and conspicuously displayed in the work place. The contractor must ensure to arrange upgraded / latest emergency rescue equipment / appliances to cater the different emergency situations. In this regard, Employer's recommendation shall be treated as final and to be followed / implemented.

15.4 Contractors shall require to have tie-up with well-equipped reputed hospitals having facilities of MRI, CT scan, Ultrasound, Blood Bank, specialist Doctors like neurosurgeon, orthopedic as mandatory requirement and fire stations located in the neighborhood for attending to the casualties promptly and emergency vehicle kept on standby duty during the working hours for the purpose.

15.5 Contractor shall conduct an onsite emergency mock drill once in every month for all his workers and his subcontractor's workers.

15.6 It shall be the responsibility of the contractor to keep the Local Law & Order Authorities informed and seek urgent help, as the case may be, so as to mitigate the consequences of an emergency. Prompt communication to Employer,

telephonically initially and followed by a written report, shall be made by the contractor.

16.0 Experts / Agencies for SHE services

16.1 Contractors may utilize the services of experts/agencies empaneled under relevant Rule of BOCWR and relevant Rule of RBOCWR for the purpose of training, internal audit and any other SHE services with prior approval of the Employer.

16.2 As an aide to contractors, a list of experts/agencies and the offered service are given in General Instruction attached as **Appendix 12** for ready reference. In addition to it if the contractor would like to use any expert/agencies' services for any SHE activities the same can also be allowed provided that they are competent and meet to the general requirements of Employer. In every case prior approval of the Employer is mandatory.

PART – II: SAFETY

17.0 Housekeeping

- 17.1** Housekeeping is the act of keeping the working environment cleared of all unnecessary waste, thereby providing a first-line of defense against accidents and injuries.
- 17.2** Contractor shall understand and accept that improper housekeeping is the primary hazard in any construction site and ensure that a high degree of housekeeping is always maintained. Indeed "Cleanliness is indeed next to Godliness"
- 17.3** Housekeeping is the responsibility of all site personnel, and line management commitment shall be demonstrated by the continued efforts of supervising staff towards this activity.
- 17.4** General Housekeeping shall be carried out by the contractor and ensured at all times at Work Site, Construction Depot, Batching Plant, Labour Camp, Stores, Offices and toilets/urinals. Towards this the Contractor shall constitute a special group of housekeeping personnel as per General Instruction attached as Appendix 5. This group shall ensure daily cleaning at work sites and surrounding areas and maintain a register as per the approved format by the Employer.
- 17.5** Adequate time shall be assigned to ensure that good housekeeping is maintained. This shall be carried out by team of housekeeping squad.
- 17.6** The contractor shall be responsible to provide segregated containers for disposal of debris at required places and regular cleaning of the same.
- 17.7** Full height fence, barriers, barricades etc. shall be erected around the site in order to prevent the surrounding area from excavated soil, rubbish etc, which may cause inconvenience to and endanger the public. The barricade especially those exposed to public shall be aesthetically maintained by regular cleaning and painting as directed by the Employer. These shall be maintained in one line and level.
- 17.8** The structure dimension of the barricade, material and composition, its colour scheme, Employer logo and other details shall be in accordance with specifications laid down in tender document.
- 17.9** All stairways, passageways and gangways shall be maintained without any blockages or obstructions. All emergency exits passageways, exits fire doors, break-

glass alarm points, firefighting equipment, first aid stations, and other emergency stations shall be kept clean, unobstructed and in good working order.

- 17.10** Lumber with protruding nails shall be either bent / removed and properly stacked.
- 17.11** All surplus earth and debris are removed/disposed off from the working areas to officially designated dumpsites. Trucks carrying sand, earth and any pulverized materials etc. in order to avoid dust or odor impact shall be covered while moving.
The tyres of the trucks leaving the site shall be cleaned with water, wherever the possibility of spillage on carriageways meant for regular road traffic exists.
- 17.12** No parking of trucks/trolleys, cranes and trailers etc. shall be allowed on roads, which may obstruct the traffic movement.
- 17.13** Roads shall be kept clear and materials like: pipes, steel, sand boulders, concrete, chips and brick etc. shall not be allowed on the roads to obstruct free movement of road traffic.
- 17.14** Water logging or Polymer/Muck spillage on roads shall not be allowed. If Polymer/Muck spillage is observed on road endangering the safety of road users, the contractor shall be penalized as per relevant clause.
- 17.15** Proper and safe stacking of material are of paramount importance at yards, stores and such locations where material would be unloaded for future use. The storage area shall be well laid out with easy access and material stored / stacked in an orderly and safe manner.
- 17.16** Flammable chemicals / compressed gas cylinders shall be safely stored.
- 17.17** Unused/surplus cables, steel items and steel scrap lying scattered at different places within the working areas shall be removed to identified locations(s).
- 17.18** All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified location(s).
- 17.19** Empty cement bags and other packaging material shall be properly stacked and removed.
- 17.20** The Contractor shall ensure that all his sub-contractors maintain the site reasonably clean through provisions related to housekeeping.

18.0 Working at Height

18.1 Definitions

18.1.1 "access" and "egress" include ascent and descent.

18.1.2 "Fragile surface" means a surface, which would be able to fail if any reasonably foreseeable loading were to be applied to it.

18.1.3 "Line" includes rope, chain or webbing

18.1.4 "Personal fall protection" means-

- (a) a fall prevention, work restraint, work positioning, fall arrest or rescue system, other than a system in which the only safeguards are collective safeguards;
- or

18.1.5 rope access and positioning techniques;

18.1.6 "Work at height" means-

- (a) work in any place, including a place at or below ground level;
- (b) obtaining access to or egress from such place while at work, except by a staircase in a permanent workplace,

where, if protective measures were not taken, a person could fall a distance liable to cause personal injury;

18.1.7 "Work equipment" means any machinery, appliance, apparatus, tool or installation for use at work (whether exclusively or not) and includes

- (a) a guard-rail, toe-board, barrier or similar collective means of protection
- (b) a working platform
- (c) a net, airbag or other collective safe guard for arresting falls.
- (d) personal fall protection system
- (e) ladders

18.1.8 "Working platform"

- (a) means any platform used as a place of work or as a means of access to or egress from a place of work;
- (b) includes any scaffold, suspended scaffold, cradle, mobile platforms (scissor lift / sky lift / man lift), man basket, trestle, gangway, gantry and stairway which is used.

18.2 Organization and planning

The contractor shall ensure that work at height is

- i) properly planned for any emergencies and rescue

- ii) appropriately supervised; and
- iii) carried out in a manner, which is reasonably practicable safe.

18.3 The contractor shall ensure that work at height is carried out only when the weather conditions do not jeopardize the health or safety of persons involved in the work.

18.4 Competence

The contractor shall ensure that no person engages in any activity, including organization, planning and supervision, in relation to work at height or work equipment for use in such work unless he is competent to do so or, if being trained, is being supervised by a competent person.

18.5 Avoidance of risks from work at height

The contractor shall ensure that work is not carried out at height where it is reasonably practicable to carry out the work safely otherwise than at height.

18.6 Where work is carried out at height, the contractor shall take suitable and sufficient measures as given below to prevent, so far as is reasonably practicable, any person **falling a distance liable to cause personal injury.**

- (a) his ensuring that the work is carried out
 - (i) from an existing place of work; or
 - (ii) (in the case of obtaining access or egress) using an existing means, complying to the requirements as given in **18.15** where it is reasonably practicable to carry it out safely and under appropriate ergonomic conditions; and
- (b) where it is not reasonably practicable for the work to be carried out in accordance with sub-paragraph (a), his providing sufficient work equipment for preventing, so far as is reasonably practicable, a fall occurring.

18.7 Where the measures taken under clause **18.6** do not eliminate the risk of a fall occurring, every contractor shall

- (a) so far as is reasonably practicable, provide sufficient work equipment to minimize-
 - (i) the distance and consequences; or
 - (ii) where it is not reasonably practicable to minimize the distance, the

consequences, of a fall; and

- (b) Without prejudice to the generality of clause **18.4**, provide such additional training and instruction or take other additional suitable and sufficient measures to prevent, so far as is reasonably practicable, any person falling a distance liable to cause personal injury.

18.8 Selection of 'work equipment' for work at height

- 1) the contractor, in selecting work equipment for use in work at height, shall
 - a) give collective protection measures priority over personal protection measures; and
 - b) take account of
 - i) the working conditions and the risks to the safety of persons at the place where the work equipment is to be used;
 - ii) in the case of work equipment for access and egress, the distance to be negotiated;
 - iii) the distance and consequences of a potential fall;
 - iv) the duration and frequency of use;
 - v) the need for easy and timely evacuation and rescue in an emergency; and
 - vi) any additional risk posed by the use, installation or removal of that work equipment or by evacuation and rescue from it;
- (2) The contractor shall select work equipment for work at height which:
 - a) has characteristics including dimensions which:
 - (i) are appropriate to the nature of the work to be performed and the foreseeable loadings; and
 - (ii) allow passage without risk; and
 - b) is in other respects the most suitable work equipment, having regard in particular to the purposes specified in 18.5 and 18.6.**

18.9 Fragile surfaces

- 18.9.1 The contractor shall ensure that no person at work passes across or near, or working on, from or near, a fragile surface where it is reasonably practicable to carry out work safely and under appropriate ergonomic conditions without his doing so.
- 18.9.2 Where it is not reasonably practicable to carry out work safely and under appropriate ergonomic conditions without passing across or near, or working on,

from or near, a fragile surface, every contractor shall,

- (a) ensure, so far as is reasonably practicable, that suitable and sufficient platforms, coverings, guard rails or similar means of support or protection are provided and used so that any foreseeable loading is supported by such supports or borne by such protection;
- (b) where a risk of a person at work falling remains despite the measures taken under the preceding provisions of this regulation, take suitable and sufficient measures to minimize the distances and consequences of his fall.

18.9.3 Where any person at work may pass across or near, or work on, from or near, a fragile surface, every contractor shall ensure that

- (a) prominent warning notices are so far as is reasonably practicable affixed at the approach to the place where the fragile surface is situated; or
- (b) where that is not reasonably practicable, such persons are made aware of it by other means.

18.10 Falling objects

18.10.1 The contractor shall, where necessary to prevent injury to any person, take suitable and sufficient steps to prevent, so far as is reasonably practicable, the fall of any material or object.

18.10.2 Where it is not reasonably practicable to comply with the requirements of **18.9**, every contractor shall take suitable and sufficient steps to prevent any person being struck by any falling material or object which is liable to cause personal injury.

18.10.3 The contractor shall ensure that no material or object is thrown or tipped from height in circumstances where it is liable to cause injury to any person.

18.10.4 Every employer shall ensure that materials and objects are stored in such a way as to prevent risk to any person arising from the collapse, overturning or unintended movement of such materials or objects.

18.10.5 Danger areas

18.10.6 Without prejudice to the preceding requirements of these Regulations, every contractor shall ensure that

- (a) where a workplace contains an area in which, owing to the nature of the work, there is a risk of any person at work
 - i) falling a distance; or

- ii) being struck by a falling object,
which is liable to cause personal injury, the workplace is so far as is reasonably practicable equipped with devices preventing unauthorized persons from entering such area; and
- (b) such area is clearly indicated.

18.11 Inspection of work equipment

- 18.11.1 The contractor shall ensure that, where the safety of work equipment depends on how it is installed or assembled, it is not used after installation or assembly in any position unless it has been inspected in that position.
- 18.11.2 The contractor shall ensure that work equipment exposed to conditions causing deterioration which is liable to result in dangerous situations is inspected
 - (a) at suitable intervals; and
 - (b) each time that exceptional circumstances which are liable to jeopardize the safety of the work equipment have occurred,to ensure that health and safety conditions are maintained and that any deterioration can be detected and remedied in good time.
- 18.11.3 Without prejudice to paragraph **18.12.1**, the contractor shall ensure that a working platform
 - (a) used for construction work; and
 - (b) from which a person could fall 2 meters or more,is not used in any position unless it has been inspected in that position or, in the case of a mobile working platform, inspected on the site, within the previous 7 days.
- 18.11.4 The contractor shall ensure that the reports of all inspections are properly maintained and shown to the Employer as and when required.
- 18.11.5 In this clause "inspection",
 - (a) means such visual or more rigorous inspection by a competent person as is appropriate for safety purposes;
 - (b) includes any testing appropriate for those purposes,

18.12 Inspection of places of work at height

- 18.12.1 The contractor shall so far as is reasonably practicable ensure that the surface and

every parapet, permanent rail or other such fall protection measure of every place of work at height are checked on each occasion before the place is used.

18.13 Duties of persons at work

18.13.1 Any workmen employed by the contractor shall report to the supervisor about any defect relating to work at height which he knows is likely to endanger the safety of himself or another person.

18.13.2 Every workman shall use any work equipment or safety device provided to him for work at height by the contractor, in accordance with

- (a) any training in the use of the work equipment or device concerned which have been received by him; and
- (b) the instructions respecting that use which have been provided to him by the contractor as per the requirements of the Employer

18.14 Requirements for existing places of work and means of access or egress at height Every existing place of work or means of access or egress at height shall

- (a) be stable and of sufficient strength and rigidity for the purpose for which it is intended to be or is being used;
- (b) where applicable, rest on a stable, sufficiently strong surface;
- (c) be of sufficient dimensions to permit the safe passage of persons and the safe use of any plant or materials required to be used and to provide a safe working area having regard to the work to be carried out there;
- (d) possess suitable and sufficient means for preventing a fall;
- (e) possess a surface which has no gap
 - (i) through which a person could fall;
 - (ii) through which any material or object could fall and injure a person; or
 - (iii) giving rise to other risk of injury to any person, unless measures have been taken to protect persons against such risk;
- (f) be so constructed and used, and maintained in such condition, as to prevent, so far as is reasonably practicable-
 - (i) the risk of slipping or tripping; or
 - (ii) any person being caught between it and any adjacent structure;
- (g) where it has moving parts, be prevented by appropriate devices from moving

inadvertently during work at height.

18.15 Requirements for guardrails, toe-boards, barriers and similar collective means of protection

- i) Unless the context otherwise requires, any reference in this section to means of protection is to a guardrail, toe-board, barrier or similar collective means of protection.
- ii) Means of protection shall
 - (a) be of sufficient dimensions, of sufficient strength and rigidity for the purposes for which they are being used, and otherwise suitable;
 - (b) be so placed, secured and used as to ensure, so far as is reasonably practicable, that they do not become accidentally displaced; and
 - (c) be so placed as to prevent, so far as is practicable, the fall of any person, or of any material or object, from any place of work.
- iii) In relation to work at height involved in construction work
 - (a) the top guard-rail or other similar means of protection shall be at least 950 millimeters above the edge from which any person is liable to fall;
 - (b) toe-boards shall be suitable and sufficient to prevent the fall of any person, or any material or object, from any place of work; and
 - (c) any intermediate guardrail or similar means of protection shall be positioned so that any gap between it and other means of protection does not exceed 470 millimetres.
- iv) Any structure or part of a structure which supports means of protection or to which means of protection are attached shall be of sufficient strength and suitable for the purpose of such support or attachment.

18.16 Requirements for all Working Platforms

- i) Every working platform requires a supporting structure for holding it
- ii) Any surface upon which any supporting structure rests shall be stable, of sufficient strength and of suitable composition safely to support the supporting structure, the working platform and any loading intended to be placed on the working platform.
- iii). Stability of supporting structure
Any supporting structure shall
 - (a) be suitable and of sufficient strength and rigidity for the purpose for which it is being used;

- (b) in the case of a wheeled structure, be prevented by appropriate devices from moving inadvertently during work at height;
 - (c) in other cases, be prevented from slipping by secure attachment to the bearing surface or to another structure, provision of an effective anti-slip device or by other means of equivalent effectiveness;
 - (d) be stable while being erected, used and dismantled; and
 - (e) when altered or modified, be so altered or modified as to ensure that it remains stable.
 - (f) Have suitable base plates and properly footed thereby.
- iv). Stability of working platforms
 - A working platforms hall
 - (a) be suitable and of sufficient strength and rigidity for the purpose or purposes for which it is intended to be used or is being used;
 - (b) be so erected and used as to ensure that its components do not become accidentally displaced so as to endanger any person;
 - (c) when altered or modified, be so altered or modified as to ensure that it remains stable; and
 - (d) be dismantled in such a way as to prevent accidental displacement.
- v) Safety on working platforms
 - A working platforms hall
 - (a) be of sufficient dimensions to permit the safe passage of persons and the safe use of any plant or materials required to be used and to provide a safe working area having regard to the work being carried out there;
 - (b) possess a suitable surface and, in particular, be so constructed that the surface of the working platform has no gap
 - i) through which a person could fall;
 - ii) through which any material or object could fall and injure a person; or
 - iii) giving rise to other risk of injury to any person, unless measures have been taken to protect persons against such risk; and
 - (c) be so erected and used, and maintained in such condition, as to prevent, so far as is reasonably practicable
 - i) the risk of slipping or tripping; or
 - ii) any person being caught between the working platform and any adjacent structure.

- (d) possess hand railing properly enclosed,
 - (e) not have any unwanted / extra materials scattered on working platform
- vi) Loading

A working platform and any supporting structure shall not be loaded so as to give rise to a risk of collapse or to any deformation, which could affect its safe use.
- vii) Additional requirements for scaffolding

Strength and stability calculations for scaffolding shall be carried out unless

 - (a) a note of the calculations, covering the structural arrangements contemplated, is available; or
 - (b) it is assembled in conformity with a generally recognized standard configuration.
- viii) Depending on the complexity of the scaffolding selected, a competent person shall draw up an assembly, use and dismantling plan. This may be in the form of a standard plan, supplemented by items relating to specific details of the scaffolding in question.
- ix) A copy of the plan, including any instructions it may contain, shall be kept available for the use of persons concerned in the assembly, use, dismantling or alteration of scaffolding until it has been dismantled.
- x) The dimensions, form and layout of scaffolding decks shall be appropriate to the nature of the work to be performed and suitable for the loads to be carried and permit work and passage in safety.
- xi) While a scaffold is not available for use, including during its assembly, dismantling or alteration, it shall be marked with general warning signs in accordance with and be suitably delineated by physical means preventing access to the danger zone.
- xii) Scaffolding may be assembled, dismantled or significantly altered only under the supervision of a competent person and by persons who have received appropriate and specific training in the operations envisaged which addresses specific risks which the operations may entail and precautions to be taken, and more particularly in
 - (a) understanding of the plan for the assembly, dismantling or alteration of the scaffolding concerned;
 - (b) safety during the assembly, dismantling or alteration of the scaffolding concerned;

- (c) measures to prevent the risk of persons, materials or objects falling;
- (d) safety measures in the event of changing weather conditions which could adversely affect the safety of the scaffolding concerned;
- (e) permissible loadings;
- (f) any other risks which the assembly, dismantling or alteration of the scaffolding may entail.

18.17 Requirements for collective safeguards for arresting falls

- i) Collective safeguard is a safety net, airbag or other collective safeguard for arresting falls
- ii) A safeguard shall be used only if
 - (a) a risk assessment has demonstrated that the work activity can so far as is reasonably practicable be performed safely while using it and without affecting its effectiveness;
 - (b) the use of other, safer work equipment is not reasonably practicable;
 - (c) a sufficient number of available persons have received adequate training specific to the safeguard, including rescue procedures.
- iii) A safeguard shall be suitable and of sufficient strength to arrest safely the fall of any person who is liable to fall.
- iv) A safe guard shall
 - (a) in the case of a safeguard which is designed to be attached, be securely attached to all the required anchors, and the anchors and the means of attachment thereto shall be suitable and of sufficient strength and stability for the purpose of safely supporting the foreseeable loading in arresting any fall and during any subsequent rescue;
 - (b) in the case of an airbag, landing mat or similar safeguard, be stable; and
 - (c) in the case of a safeguard, which distorts in arresting a fall, afford sufficient clearance.
- v) Suitable and sufficient steps shall be taken to ensure, so far as practicable, that in the event of a fall by any person the safeguard does not itself cause injury to that person.

18.18 Requirements for personal fall protection systems

- i) A personal fall protection system shall be used only if
 - (a) a risk assessment has demonstrated that
 - (i) the work can so far as is reasonably practicable be performed

- safely while using that system; and
- (ii) the use of other safer work equipment is not reasonably practicable; and
- (b) the user and a sufficient number of available persons have received adequate training specific to the operations envisaged, including rescue procedures.
- ii) A personal fall protection system shall
 - (a) be suitable and of sufficient strength for the purposes for which it is being used having regard to the work being carried out and any foreseeable loading;
 - (b) where necessary, fit the user;
 - (c) be correctly fitted;
 - (d) be designed to minimize injury to the user and, where necessary, be adjusted to prevent the user falling or slipping from it, should a fall occur; and
 - (e) be so designed, installed and used as to prevent unplanned or uncontrolled movement of the user.
- iii) A personal fall protection system designed for use with an anchor shall be securely attached to at least one anchor, and each anchor and the means of attachment thereto shall be suitable and of sufficient strength and stability for the purpose of supporting any foreseeable loading.
- iv) Suitable and sufficient steps shall be taken to prevent any person falling or slipping from a personal fall protection system.

18.19 Requirements for Ladders

- 1) Every contractor shall ensure that a ladder is used for work at height only if a risk assessment has demonstrated that the use of more suitable work equipment is not justified because of the low risk and
 - i) The short duration of use; or
 - ii) Existing features on site, which he cannot alter.
- 2) Only metal ladders shall be allowed. Bamboo ladders are prohibited.
- 3) Any surface upon which a ladder rests shall be stable, firm, of sufficient strength and of suitable composition safely to support the ladder so that its rungs or steps remain horizontal, and any loading intended to be placed on it.
- 4) A ladder shall be so positioned as to ensure its stability during use
- 5) A suspended ladder shall be attached in a secure manner and so that, with

the exception of a flexible ladder, it cannot be displaced, and swinging is prevented.

- 6) A portable ladder shall be prevented from slipping during use by-
 - i) securing the stiles at or near their upper or lower ends;
 - ii) an effective anti-slip or other effective stability device; or
 - iii) any other arrangement of equivalent effectiveness.
- 7) A ladder used for access shall be long enough to protrude sufficiently above the place of landing to which it provides access, unless other measures have been taken to ensure a firm hand hold.
- 8) No interlocking or extension ladder shall be used unless its sections are prevented from moving relative to each other while in use.
- 9) A mobile ladder shall be prevented from moving before it is stepped on.
- 10) Where a ladder or run of ladders raises a vertical distance of 9 meters or more above its base, there shall, where reasonably practicable, be provided at suitable intervals sufficient safe landing areas or rest platforms.
- 11) Every ladder shall be used in such a way that
 - (a) a secure handhold and secure support are always available to the user; and
 - (b) the user can maintain a safe handhold when carrying a load unless, in the case of a step ladder, the maintenance of a handhold is not practicable when a load is carried, and a risk assessment has demonstrated that the use of a stepladder is justified because of
 - (i) the low risk; and
 - (ii) the short duration of use.
 - (c) Only one person shall be allowed to climb on ladder while other personnel shall hold the bottom portion of the ladder.
- 12) A fixed permanent ladder (available with gantry / batching plant / silo / underground shaft) shall be used in such a way that
 - (a) a secured handhold / back cage and supports are always available for the user;
 - (b) a secured fall arrester is fixed with the ladder in vertical position.

19.0 Overhead protection

All contractors shall provide overhead protections as per relevant Rule of BOCWR

- i) Overhead protection should be erected along the periphery of every building which is under construction and the building height shall be 15m or above after construction.
- ii) Overhead protection shall be minimum 2m wide and the outer edge shall be 150mm higher than the inner edge and an angle not more than 20° to its horizontal sloping into the building.
- iii) Overhead protection shall not be erected more than a height of 5m from the base of the building.
- iv) Areas of inadvertent hazard of falling of material shall be guarded or barricaded or roped-off thereby by the contractor.

20.0 Slipping, Tripping, Cutting, Drowning and Falling Hazards

As per relevant Rule of BOCWR,

- i) All places should be free from dust, debris or similar materials.
- ii) Sharp projections or any protruding nails or similar objects shall be suitably guarded or shall even be avoided to make the place safe to work.
- iii) Contractor shall not allow workmen to work or use platforms, scaffolds/passageways or any walkways, which has water, or oil or similar substances spilt and has a slipping hazard, unless it is cleaned off or covered or sanded or saw dusted or make it safe with any suitable material.
- iv) When workers are exposed to areas where fall into water is possible, the contractor shall provide suitable and adequate equipment for saving the workers from drowning and rescuing from such hazard. If the Employer considers, the contractor shall provide well-equipped boat or launch, manned with trained personnel at the workplace.
- v) Open side or opening where worker, equipment, vehicle or lifting appliance may fall at a building or outside shall be guarded suitably except in places of free access by reasons of nature of work.
- vi) Suitable safety net shall be provided at places of material / man falling is possible in accordance with national standards.

21.0 Lifting Appliances and Gear

- 21.1** (a) Lifting appliances means a crane, hoist machinery, derrick, winch, gin pole, sheer legs, jack, hoist drum, slewing machinery, slewing bearing fasteners, lifting machinery sheaves, pulley blocks, hooks or other equipment used for lifting materials, objects or building workers and lifting gears means ropes, chain slings,

shackles, hooks, lifting lugs, wire ropes, lifting eyebolts and even nuts and other accessories of a lifting appliance.

(b) Use of "Tractor Transmission Type "Pick and Carry Hydra crane

"Tractor Transmission Type" Pick and Carry Hydra crane – 1st Generation model is prohibited at Employer works. Contractor shall mobilize 'Truck Transmission Type' pick and hydra crane – 2nd Generation model or higher version only. Any deviation shall attract contractual penalty.

- 21.2** No machine shall be selected to do any lifting on a specific job until its size and characteristics are considered against:
- i) the weights, dimensions and lift radii of the heaviest and largest loads
 - ii) the maximum lift height, the maximum lift radius and the weight of the loads that must be handled at a time
 - iii) the number and frequency of lifts to be made
 - iv) how long the crane will be required onsite
 - v) the type of lifting to be done (for example, is precision placement of loads important)
 - vi) the type of carrier required (this depends on ground conditions and machine capacity in its operating quadrants: capacity is normally greatest over the rear, less over the side, and non-existent over the front)
 - vii) whether loads will have to be walked or carried
 - viii) whether loads will have to be suspended for lengthy periods
 - ix) the site conditions, including the ground where the machine will be set up, access roads and ramps it must travel, space for erection and any obstacles that might impede access or operation.
- 21.3** The contractor shall ensure that a valid certificate of fitness issued as per clause **21.5** is available for all lifting appliances including synchronized mobile jacks, pre-stressing hydraulic jacks, jacks fitted with launching girders etc. and Employer's approval before inducting to the site. Only after obtaining the approval from the Employer any lifting appliances and gear shall be used.
- 21.4** The laminated photocopies of fitness certificate issued by competent person, the Employers' approval letter, the operators' photo, manufacturer's load chart and competency certificate shall always be either kept in the operator cabin or pasted on the visible surface of the lifting appliances.

- 21.5 All lifting appliances and loose gears shall be clearly marked for its safe working load and identification by stamping or other suitable means.**
- 21.6** The contractor shall also maintain a register containing a system of identification of all tools and tackles, its date of purchase, safe working load, competent person date of examination etc.
- 21.7** Test and periodical examination of lifting appliances and gears
- 21.7.1 All lifting appliances including all parts and gears thereof, whether fixed or movable shall be thoroughly tested and examined by a competent person once at least in every six months or after it has undergone any alterations or repairs liable to affect its strength or stability. Within the validity, if the lifting appliances are shifted to a new site, re-examination by the same competent person for ensuring its safety shall also be done. The valid test certificate copy shall be pasted on the equipment while it is in use at the project for easy reference & identification.
- 21.7.2 Contractors can utilize the services of any competent person as defined in Factories Act, 1948 and approved by Chief Inspector of Factories with the permission of the Employer.
- 21.7.3 All alarms and signals like automatic safe load indicators (SLI), boom angle indicators, boom extension indicators, over lift boom alarm, swing alarm, hydraulic safety valves, mechanical radius indicators, load moment indicators etc. shall be periodically examined and maintained always in working condition
- 21.8** Automatic safe load indicators
- 21.8.1 As stipulated in relevant Rule of UPBOCW Rules, all lifting appliances and gears like cranes, hydras etc, if so constructed that the safe working load may be varied by raising or lowering of the jib or otherwise shall be attached with an automatic indicator of safe working loads approved by Bureau of Indian standards/ International certifying bodies which gives a warning to the operator and arrests further movements of the lifting parts.
- 21.9** Qualification of operator of lifting appliances and of signaler etc.
- 21.9.1 The contractor shall not employ any person to drive or operate a lifting machine-like crane, hydra etc. whether driven by mechanical power or otherwise or to give signals to work as a operator of a rigger or derricks unless she
- i) is above twenty-one years of age and possesses a valid heavy transport

vehicle driving license as per Motor Vehicle Act and Rules.

- ii) is absolutely competent and reliable
- iii) possesses the knowledge of the inherent risks involved in the operation of lifting appliances by undergoing a formal training at any institution of national importance acceptable to Employer
- iv) is medically examined periodically as specified in relevant schedule of BOCW Rules.
- v) possess a valid operator competency certificate from the Contractor duly authorized & signed by contractor's Plant & Machinery in charge and Chief SHE Manager.
- vi) Operators & drivers shall be obtained training & certification from the TPI agencies prior to be posted / engaged at site. This training shall be conducted on half yearly basis as refresh training for them.

21.10 General requirements of appliances

21.10.1 Out of level

21.10.1.1 One of the most severe effects of being out of fit level is that side loads develop in the boom. Because of side loads all mobile cranes lose capacity rapidly as the degree of out-of-level increases and therefore all effort shall be made to prevent such situations.

21.10.2 Boom

- i) The boom is one of the more critical elements of the crane and must be in perfect condition at all time. No boom section with any kind of physically damaged /a bent lattice member shall be allowed.
- ii) All welds shall be crack and corrosion free
- iii) No member of the boom shall be bent
- iv) All telescopic boom shall be free from cracks, rust, flaking or cracked paint, bulges, greases or varnishes
- v) The locking arrangement of all heavy lifting capacity telescopic boom cranes must work properly at the desired locking point as recommended by the manufacturer.

21.10.3 The sweep area (work area) of the construction machinery shall be always free from obstructions.

- 21.10.4 All hydraulic piping and fittings shall be maintained leak proof.
- 21.10.5 The operator cab shall possess good and safe:
- i) structure, windows and wind shield wipers
 - ii) Drivers chair and footrest
 - iii) Control handles
 - iv) Cab instrumentation
 - v) Telecommunication
 - vi) Cab outfitting
 - vii) wind indicator with an adjustable set point shall be in a position representative for the wind on the crane. The indicator shall give continuous information regarding constant speeds and gusts.
- 21.11 Mandatory rigging requirements
- 21.11.1 Rigging shall be done under experienced and qualified rigger only.
- 21.11.2 The primary requirement in rigging shall be to assess the weight of load before attempting any lift.
- 21.11.3 All hooks shall be fitted with Master Rings having certificate of fitness from the competent person, so that the hooks are subjected to balanced vertical loading only.
- 21.11.4 Only four legged slings shall be allowed which includes master link (ring), intermediate master link (ring) if necessary, chain / wire rope sling, sling hook or other terminal fitting.
- 21.11.5 Hand spliced slings up to 32mm diameter shall not be used at site for any lifting purpose.
- 21.11.6 No load shall be slewed over public areas without stopping the pedestrians and road traffic first.
- 21.11.7 Requirements of outriggers
- i) All outriggers shall be fully extended and at all tyres are clear of the ground
 - ii) Heavy duty blocking having large bearing area shall be necessary to prevent sinking off loads
- 21.11.8 All loads shall have tag-lines attached in order to ensure that the load can be

controlled at all times.

- 21.11.9 No close working to any live overhead power line is permitted without the operation of a strict Permit to Work. No work shall be allowed adjacent to deep trench/ excavation /running drains, works can continue by taking appropriate & adequate safety measures only.
- 21.11.10 Minimum lighting is to be ensured at all lifting operations.
- 21.12 Failure to do any of the above shall attract penalty from the Employer as per relevant clause

22.0 Launching Operation

22.1 As launching operation is one of the riskiest jobs, the contractor shall take utmost precaution at all stages like; planning, establishing casing yard, casting segments, transporting segments, fabrication and erection of launching girders, launching of segments, pre-stressing, auto launching of girders and dismantling of launching girders.

22.2 The contractor shall prepare a comprehensive Method Statement for the launching operation, adhering to the SHE conditions laid down in conditions of contract on SHE and project SHE manual. Particular reference shall be made to the provisions on working at height. As the entire process of launching has to be undertaken at an elevated level the safety of workers and the girder is paramount important. The following general guidelines shall be adhered throughout the launching operation.

- i) Necessary 'working platforms' and fall protection anchorage arrangement shall be provided in the launching girder itself.
- ii) Provisions for mounting light fittings shall also be made available in the launching girder.
- iii) The casting yard shall be established ensuring the provision given in clause **38.0**
- iv) The workmen engaged in fabrication of reinforcement, concreting the segment shall be provided with necessary PPEs including compulsory hand protection gloves.
- v) Casting and curing of segment shall be undertaken under the direct supervision of the responsible engineer of the contractor.
- vi) Trucks with valid registration, license, safe worthiness certificate, Employer's approval certificate, and pollution under check certificate shall only be used for transport of segments
- vii) Drivers engaged for driving these trucks, shall be trained once in 6 months at

any reputed institute with prior approval of employer on defensive driving.

- viii) Drivers shall also have undergone proper medical examination as per relevant clause mentioned under 'Medical Facilities'.
- ix) The segments shall rigidly secure to the truck with necessary wooden wedges and necessary red indicators/safety tapes provided so that the vehicle is clearly seen by other road users both in day / nighttime.
- x) Every launching girder shall have a responsible engineer on duty all the time.
- xi) All the time from erection to dismantling the area between the two piers wherein launching is in progress shall always be barricaded.
- xii) Unloading of segments from trucks, lifting of segments, shifting of segments, gluing shall be done under the direct supervision of the approved engineer of the contractor.
- xiii) Auto launching shall be done only after approval from the Employer. After every auto launching the stability of launching girder shall be ensured.
- xiv) The vertical deflection of launching girder shall be monitored at all critical stages like with/without loads and after every auto launching.
- xv) A register containing all important operational details from erection to dismantling of launching girders shall be maintained and made available to Employer whenever called for.
- xvi) Test certificate for all lifting gears including Macalloy bars shall be maintained at a location closer to the launching girder itself so that it can be referred during all inspections.
- xvii) Adequate lighting at all time shall be ensured in the entire area of operation.
- xviii) Access to drinking water & toilet shall be ensured to all workmen engaged for launching process.
- xix) Proper access ladders/stairways shall be maintained for safe ascending / descending of workmen /engineers.

22.3 Non-adherence to any of the clauses mentioned above shall be viewed seriously by the Employer and penalty levied as per relevant clause.

23.0 Construction machinery

23.1 Construction machineries may include dumpers and dump trucks, lift trucks and telescopic handlers piling rigs, vibro hammers, rail welding equipment, mobile elevating work platforms, cranes, tipper lorries, lorry loaders, skip wagons, 360° excavators, 180° backhoe loaders, crawler tractors, scrapers, graders, loading

shovels, trenchers, side booms, pavers, planers, chippers, road rollers, locomotives, tankers and bowzers, trailers, hydraulic and mechanical breakers, Tunnel boring machine, manual & mechanical materials shifting trolley, automatic bar bending machine, stone / tiles & wood cutting machine, hydraulic / pneumatic power pack, lathe machine, drilling machine, bench drill machine, concrete cube compression testing machine, baby concrete mixer machine, 10/7 concrete mixer machine, table vibrator, concrete core cutting machine, Monkey hoist etc.

All the Construction machineries shall possess manufacturer's 'operating manual / Safe operating procedures'. These documents shall be submitted to Employer as & when instructed.

Any machineries modified locally must have drawings with designer's / manufacturer approval on its structural integrity, safe worthiness etc. prior to engage.

23.2 Safe worthiness certificate

23.2.1 The contractor shall mobilize construction plant and machinery with their age conforming to **Appendix No 15**. Every such construction equipment shall also be in sound mechanical working condition and certified by either competent person under Factories Act or manufacturers' warranty in case of brand-new equipment or authorized persons / firms approved by Employer before induction to any site.

23.2.2 Every such certificate shall have the date of purchase, main overhauling undertaken in the past, any accident to the equipment, visual examination details, critical components safety check, list of safety devises and its working condition, manufacturer's maintenance checklist, past projects wherein the equipment were used etc. as its minimum content.

23.2.3 All the electrically operated machines shall have 'Emergency stop' switch nearby to the operator to operate in case of emergency. All such machines should be properly grounded / earthed.

23.3 Reverse Horns

23.3.1 **All Vehicles shall be fitted with audible reverse alarms and maintained in good working condition. Reversing shall be done only when there is adequate rear-view visibility or under the directions of a banks man**

23.4 General operating procedures

- i) Drivers entering site shall be instructed to follow the safe system of work adopted on site. These shall be verbal instructions or, preferably, written

instructions showing the relevant site rules, the site layout, delivery areas, speed limits, etc.

- ii) No passengers shall be carried, unless specific seating has been provided in accordance with the manufacturer's recommendations.
- iii) Working on gradients beyond any equipment capability shall not be allowed.
- iv) Prevention of dumper and dump truck accidents should be managed by providing wheel stops at a sufficient distance from the edges of excavations, spoil heaps, pits, etc.
- v) The manufacturer's recommended bucket size must not be exceeded in excavators.
- vi) If excavators operating on a gradient which cannot be avoided, it must be ensured that the working cycle is slowed down, that the bucket is not extended too far in the downhill direction, and that travel is undertaken with extreme caution. A large excavator must never be permitted to travel in a confined area, or around people, without a banks man to guide the driver, who should have the excavator attachment close in to the machine, with the bucket just clear of the ground. On wheeled excavators, it is essential that the tyres are in good condition and correctly inflated. If stabilizing devices are fitted, they should be employed when the machine is excavating.
- vii) When the front shovel of the 180° backhoe loaders is being employed, the backhoe attachment shall be in its "travel" position, with the safety locking device in place.
- viii) When operating the backhoe in poor ground conditions, the stabilizers tend to sink into the surface of the ground, reducing stability. Therefore, frequent checks shall be made for the stability of the machine. The loading shovel should always be lowered to the ground to stabilize the machine when the backhoe is employed.
- ix) The netting operation of the skip wagons should be carried out prior to lifting the skip to reduce the risks of working on the rear platform
- x) If a tractor dozer is employed on clearing scrub or felling trees, it shall be provided with adequate driver protection.
- xi) When two or more scrapers are working on the same job, a minimum distance of at least 25m shall be kept between them.
- xii) In case of hydraulic breakers, hydraulic rams and hoses shall be in good working condition.
- xiii) All the materials shifting trolleys (manual / mechanical) should have braking &

locking arrangements. Also, no manual materials shifting trolley shall be allowed to operate at slope / gradient.

23.5 All wood working machines & other such kind of machines having rotating cutting wheels shall be fitted with suitable guards and devices such as top guard, riving knife, push stick, guards for drive belts and chains, and emergency stop switch easily accessible by the operator.

23.6 Penalty

23.6.1 If any of the above clauses are not adhered, penalty shall be imposed as per relevant clause depending upon the gravity of the unsafe act and or condition.

24.0 Machine and general area guarding

24.1 The contractor shall ensure at the construction site all motors, cogwheels, chains and friction gearing, flywheels, shafting, dangerous and moving parts of machinery are securely fenced or legged. The fencing of dangerous part of machinery is not removed while such machinery is in motion or in use. Also, all open shafts, station cut outs, vehicle/ machine parking adjacent to road, temporary charged electrical supplied systems, transformers etc. shall be properly guarded / fenced.

25.0 Manual lifting and carrying of excessive weight

25.1 The contractor shall ensure at his construction site of a building or other construction work that no building worker lifts by hand or carries overhead or over his back or shoulders any material, article, tool or appliances exceeding in weight as said below as per relevant Rule of BOCWR, unless aided by another building worker or device.

Person	Maximum weight in kg.
Adult man	55
Adult woman	30

25.2 No building worker aided by other building worker shall lift or carry weight higher than or exceeding the sum of total of maximum limits set out for each building worker separately as mentioned in the table above.

26.0 Site Electricity

26.1 Competency of Electrical personnel:

- 26.1.1 The contractor shall employ qualified and competent electrical personnel as specified in general instruction attached as Appendix 5.**
- 26.2 Assessment of power**
 - 26.2.1 The contractor shall assess the size and location of the electrical loads and the manner in which they vary with time during the currency of the contract.
 - 26.2.2 The contractor shall elaborate as to how the total supply is to be obtained / generated. The details of the source of electricity, earthing requirement, substation / panel boards, distribution system shall be prepared and necessary approval from Employer obtained before proceeding of the execution of the job.
 - 26.2.3 The main contractor shall take consideration, the requirements of the sub / petty contractors' electric power supply and arrive at the capacity of main source of power supply from diesel generators.**
 - 26.2.4 As the sub / petty contractors' small capacity generators create more noise and safety hazard, no small capacity diesel generators shall be allowed for whatsoever the type of job to be executed under this contract.**
 - 26.2.5 If any unsafe noise making small capacity diesel generators are found used by sub / petty contractors, the main contractor shall only be penalized.**
- 26.3 Work onsite**
 - 26.3.1 The contractor shall also submit electrical single line diagram, schematic diagram and the details of the equipment for all temporary electrical installation and these diagrams together with the temporary electrical equipment shall be submitted to the Employer's for necessary approval. Failure to do so shall invite penalty as per relevant clause.**
- 26.4 Strength and capability of electrical equipment**
 - 26.4.1 No electrical equipment shall be put into use where its strength and capability may be exceeded in such a way as may give rise to danger.
- 26.5 Adverse or hazardous environments**
 - 26.5.1 Electrical equipment which may reasonably foreseeably be exposed to-
 - (a) Mechanical damage;
 - (b) the effects of the weather, natural hazards, temperature or pressure;

- (c) the effects of wet, dirty, dusty or corrosive conditions; or
- (d) any flammable or explosive substance, including dusts, vapors or gases, shall be of such construction or as necessary protected as to prevent, so far as is reasonably practicable, danger arising from such exposure.

26.6 Distribution system:

26.6.1 The contractor shall provide distribution system for control and distribution of electricity from a main AC supply of 50Hz for typical appliances,

- i) Fixed plant – 400V 3phase
- ii) Movable plant fed via trailing cable over 3.75 kW – 400 3phase
- iii) Installation in site buildings – 230V single phase
- iv) Fixed flood lighting – 230V single phase
- v) Portable and hand tools – 115V single phase
- vi) Site lighting - 115V single phase
- vii) Portable hand lamps – 115V single phase

26.7 Electrical protection circuits

26.7.1 Precautions shall be taken, either by earthing or by other suitable means, to prevent danger arising when any conductor (other than a circuit conductor) which may reasonably foreseeable become charged as a result of either the use of a system, or a fault in a system, becomes so charged. A conductor shall be regarded as earthed when conductors of sufficient strength and current-carrying capability to discharge electrical energy to earth connect it to the general mass of earth.

If a circuit conductor is connected to earth or to any other reference point, nothing which might reasonably be expected to give rise to danger by breaking the electrical continuity or introducing high impedance shall be placed in that conductor unless suitable precautions are taken to prevent that danger.

26.7.2 Appropriate electrical protection shall be provided for all circuits, against overload, short circuit and earth fault current.

26.7.3 The contractor shall provide sufficient ELCBs (maintain sensitivity 30 mA) / RCCBs for all the equipment (including Potable equipment), electrical switchboards, distribution panels etc. to prevent electrical shocks to the workers.

26.7.4 All protection devices shall be capable of interrupting the circuit without damage to any equipment and circuits in case of any fault may occur.

26.7.5 Rating of fuses and circuit breakers used for the protection of circuits should be coordinate with equipment power ratings.

26.7.6 Protection against lightning shall be ensured to all equipment kept in open at sites.

26.8 Cables:

26.8.1 Cables shall be selected after full consideration of the condition to which they shall be exposed and the duties for which they are required. Supply cable up to 3.3 kV shall be in accordance with BS6346.

26.8.2 For supplies to mobile or transportable equipment where operating of the equipment subjects the cable to flexing, the cable shall conform to any of these codes BS 6007 / BS 6500 / BS7375.

26.8.3 Flexible cords with a conductor cross sectional area smaller than 1.5 mm² shall not be used and insulated flexible cable shall conform to BS 6500 and BS7375.

26.8.4 Where low voltage cables are to be used, reference shall be made to BS 7375. The following standards shall also be referred to particularly for underground cables BS 6346 and BS6708

26.8.5 Cables buried directly in the ground shall be of a type incorporating armor or metal sheath or both. Such cables shall be marked by cable covers or a suitable marking tape and be buried at a sufficient depth to avoid their being damaged by any disturbance of the ground. Cable routes shall be marked on the plans kept in the site electrical register.

26.8.6 Cabling passing under the walk way and across way for transport and mobile equipment shall be laid in ducts at a minimum depth of 0.6meters.

26.8.7 Cables that need to cross open areas, or where span of 3m or more are involved, a catenary wire on poles or other supports shall be provided for convenient means of suspension. Minimum height shall be 6 m aboveground.

26.8.8 Cables carrying a voltage to earth in excess of 65V other than supply for welding process shall have metal armor or sheath, which has been effectively earthed and monitored by the contractor. In case of flexible and trailing cables such earthed metal sheath and/or armor should be in addition to the earth core in the cable and shall not be used as the protective conductor.

26.8.9 Armored cables having an over-sheath of polyvinyl chloride (PVC) or an oil resisting and flame-retardant compound shall be used whenever there is a risk of mechanical damage occurring

26.9 Plugs, socket-outlets and couplers:

26.9.1 **The contractor shall ensure plugs, socket-outlets, and couplers available in the construction site as "splash proof" type. The minimum degree of Ingress Protection should be of IP55 in accordance with BS EN60529.**

26.9.2 Only plugs and fittings of the weatherproof type shall be used, and they should be colour coded in accordance with the Internationally recognized standards for example as detailed as follows:

- (a) 110 volts: Yellow.
- (b) 240 volts: Blue.
- (c) 415 volts: Red.

26.10 Connections

26.10.1 Every joint and connection in a system shall be mechanically and electrically suitable for use to prevent danger. Proper cable connectors as per national/international standards shall only be used to connectable.

26.10.2 No loose connections or tapped joints shall be allowed anywhere in the work site, office area, stores and other areas. Penalty as per relevant clause shall be put in case of observation of any tapped joints.

26.11 Portable and hand-held equipment:

26.11.1 The contractor shall ensure the use of double insulated or all-insulated portable electrical hand equipment may be used without earthing (i.e., two core cables), but they shall still be used only on 110V because of the risk of damage to trailing leads.

26.12 Other equipment:

26.12.1 All equipment shall have the provision for major switch/cut-off switch in the equipment itself.

26.12.2 All non-current carrying metal parts of electrical equipment shall be earthed through insulated cable

26.12.3 Isolate exposed high-voltage (over 415 Volts) equipment, such as transformer banks, open switches, and similar equipment with exposed energized parts and prevent unauthorized access.

26.12.4 Approved perimeter markings shall be used to isolate restricted areas from designated work areas and entryways and shall be erected before work begins and maintained for entire duration of work. Approved perimeter marking shall be installed with either red barrier tape printed with the words "DANGER—HIGH VOLTAGE" or a barrier of yellow or orange synthetic rope, approximately 1 to 1.5 meter above the floor or work surface.

26.13 Work on or near live conductors

26.13.1 No person shall be engaged in any work activity on or so near any live conductor (other than one suitably covered with insulating material so as to prevent danger) that danger may arise unless-

- a) it is unreasonable in all the circumstances for it to be dead; and
- b) it is reasonable in all the circumstances for him to be at work on or near it while it is live; and
- c) suitable precautions (including where necessary the provision of suitable protective equipment) are taken to prevent injury.

26.14 Inspection and Maintenance

26.14.1 All electrical equipment should be permanently numbered, and a record kept of the date of issue, date of last inspection and recommended inspection period.

26.14.2 Fixed installations shall be inspected at least at three monthly intervals; routine maintenance being carried out in accordance with equipment manufactures recommendations.

27.0 Lighting:

27.1 The contractor shall provide sufficient site lighting, of the right type and at the right place for it to be properly effective. Lighting ought not to introduce the risk of electric shock. Therefore, 230V supplies should be used for those fittings, which are robustly installed, and well out of reach e.g., flood lighting or high-pressure discharge lamps.

27.2 Selection of Luminaries:

The contractor shall select the luminaries as per the area requirement indicated below:

Type of Lighting	Area of Requirement	Luminaries
Area Lighting	Workmen and vehicles to move about in safely.	i) Shovel type: non-symmetrical ii) Symmetrical or non- symmetrical tungsten halogen

Beam flood lighting	Concentrated light over an area from a relatively great distance.	i) Portable flood light (Conical beam) ii) Wide angle flood (fan shaped beam)
Dispersive lighting	Lighting for indoor	i) Dispersive (Mercury florescent) ii) Cargo cluster
Walkway lighting	Lighting for stairways, ladder ways, corridors, scaffold access	i) Well glass unit ii) Bulkhead unit (tungsten filament)
Local lighting	Lighting on sites and fittings are generally accessible to operatives	i) PAR (Parabolic Aluminized Reflector) lamp cluster ii) Festoons (with or without shades) iii) Adjustable florescent work lamp iv) Portable flood lamp (mounted on own cable drum)

27.3 The contractor shall ensure that luminaries should always be placed so that no person is required to work in their own shadow and so that the local light for one person is not a source of glare for the others. Strongly made clamps should be available for attaching luminaries to poles and other convenient supports.

27.4 Luminaries should be robust, resistant to corrosion and rain proof especially at the point of the cable entry.

27.5 The correct type of lamp for each luminary should always be used and when lamps need to be replaced it shall be in accordance with the supply voltage.

27.6 Lamp holders not fitted with a lamp should be capped off.

27.7 The contractor shall take every effort to illuminate the work site as per the Employer's requirement illustrated in general instruction attached as Appendix-**13**.

28.0 Hand Tools and Power Tools

28.1 General

28.1.1 The contractor is wholly responsible for the safe condition of tools and equipment used by his employees and that of his sub-contractors.

28.1.2 Use of short / damaged hand tools shall be avoided and the contractor shall ensure

all his hand tools used at his worksite are safe to work with or stored and shall also train his employees (including his sub-contractors) for proper use thereby.

28.1.3 All hand tools and power tools shall be duly inspected before use for safe operation.

28.1.4 All hand tools and power tools shall have sufficient grip and the design specification on par with national/international standards on anthropometrics.

28.2 Hand tools

28.2.1 Hand tools shall include saws, chisels, axes and hatches, hammers, hand planes, screw drivers, crow bars, nail pullers and all pneumatic tools etc.

28.2.2 The contractor shall ensure that,

- i) For crosscutting of hardwood, saws with larger teeth points (no. of points per inch) shall be preferred to avoid the saw jumping out of the job.
- ii) Mushroom headed chisels shall not be used in the worksite where the fragments of the head may cause injury.
- iii) Unless hatchet has a striking face, it shall be used as a hammer.
- iv) Only knives of retractable blades shall be used in the worksite.
- v) No screwdrivers shall be used for scraping, chiseling or punching holes.
- vi) A pilot hole shall always be driven before driving a screw.
- vii) Wherever necessary, usage of proper PPEs shall be used by his employees.

28.3 Power tools

28.3.1 Power tools include drills, planes, routers, saws, jackhammers, grinders, sprayers, chipping hammers, air nozzles and drills.

28.3.2 The contractor shall ensure that

- i) Electric tools are properly grounded or / and double insulated.
- ii) GFCIs/ RCCBs shall be used with all portable electric tool operated especially outdoors or in wet condition.
- iii) Before making any adjustments or changing attachments, his workers shall disconnect the tool from the power source.
- iv) When operating in confined spaces or for prolonged periods, hearing protection shall be required. The same shall also apply to working with equipment, which gives out more noise as mentioned in clause **43.0** of this contract document.
- v) Tool is held firmly and the material is properly secured before turning on the tool.

- vi) All drills shall have suitable attachments respective of the operations and powerful for ease of operation.
- vii) When any work / operation needs to be performed repeatedly or continuously, tools specifically designed for that work shall be used. The same is applicable to detachable tool bit also.
- viii) Size of the drill shall be determined by the maximum opening of the chuck in case of drill bit.
- ix) Attachments such as speed reducing screwdrivers and buffers shall be provided to prevent fatigue and undue muscle strain to his workers.
- x) Stock should be clamped or otherwise secured firmly to prevent it from moving.
- xi) Workers shall never stand on the top of the ladder to drill holes in walls / ceilings, which can be hazardous, instead standing on the fourth or fifth rung shall be recommended.
- xii) Electric plane shall not be operated with loose clothing or long scarf or open jacket.
- xiii) Safety guards used on right angle head or vertical portable grinders must cover a minimum of 180° of the wheel and the spindle / wheel specifications shall be checked.
- xiv) All power tools / hand tools shall have guards at their nip points.
- xv) Low profile safety chain shall be used in case of wood working machines and the saw shall run at high rpm when cutting and also correct chain tension shall be ensured to avoid "kickback".
- xvi) Leather aprons and gloves shall be used as an additional personal protection auxiliary to withstand kickback.
- xvii) Push sticks shall be provided and properly used to hold the job down on the table while the heels move the stock forward and thus preventing kickbacks.
- xviii) Air pressure is set at a suitable level for air actuated tool or equipment being used. Before changing or adjusting pneumatic tools, air pressure shall be turned off.
- xix) Only trained employees shall use explosive actuated tools and the tool shall also be unloaded when not in use.
- xx) Usage of such explosive actuated tools shall be avoided in case of places where explosive/flammable vapours or gases may be present.
- xxi) Explosive actuated tools and their explosives shall be stored separately and

be taken out and loaded only before the time of immediate use.

- xxii) Misfired cartridges of explosive actuated tools must be placed in a container of water and be removed safely from the project.
- xxiii) No worker shall point any power operated / hand tool to any other person especially during loading /unloading.

29.0 Welding, Gouging and Cutting

- 29.1** Gas cylinders in use shall be kept upright on a custom-built stand or trolley fitted with a bracket to accommodate the hoses and equipment or otherwise secured. The metal cap shall be kept in place to protect the valve when the cylinder is not connected for use.
- 29.2** Hose clamp or clip shall be used to connect hoses firmly in both sides of cylinders and torches.
- 29.3** All gas cylinders shall be fixed with pressure regulator and dial gauges
- 29.4** Non-return valve and Flashback arrester shall be fixed at both end of cylinder and torch.
- 29.5** Domestic LPG cylinders shall not be used for Gas welding and Cutting purpose.
- 29.6** DCP or CO₂ type Fire Extinguisher not less than 5 kg shall be fixed at or near to welding process zone in an easily accessible location. Fire Extinguisher should confirm to IS 2190:1992.
- 29.7** Use firewatchers if there is a possibility of ignition unobserved by the operator (e.g., on the other side of bulkheads).
- 29.8** Oxygen cylinders and flammable gas cylinders shall be stored separately, at least 6.6 meters (20 feet) apart or separated by a fire proof, 1.6 meters (5 feet) high partition. Flammable substances shall not be stored within 50 feet of cylinder storage areas.
- 29.9** Transformer used for electrical arc welding shall be fixed with Ammeter and Voltmeter and also fixed with separate main power switch.
- 29.10** Welding grounds and returns should be securely attached to the work by cable lugs, by clamps in the case of stranded conductors, or by bolts for strip conductors. The ground cable will not be attached to equipment or existing installations or apparatus.
- 29.11** Use a low voltage open circuit relay device if welding with alternating current in constricted or damp places.
- 29.12** Take precautions against the risk of increased fume hazards when welding with chrome containing fluxed consumables or high current metal inert gas (MIG) or tungsten inert gas (TIG) processes.

- 29.13** Avoid being in contact with water or wet floors when welding. Use duckboards or rubber protection.
- 29.14** All electrical installations shall meet the IS: 5571: 1997 and NFPA 70 for gas cylinder storage area and other hazardous areas.
- 29.15** The current for Electric arc welding shall not exceed 300 A on a hand welding operation.

30.0 Dangerous and harmful environment

As per BOCWR Rule,

- i) When internal combustion engines are to be used into a confined space or excavation or tunnel or any other workplace where neither natural or artificial ventilation system is inadequate to keep carbon monoxide below 50ppm, exposure of building workers shall be avoided unless suitable measures are taken and provided by the contractor.
- ii) No worker shall be allowed into any confined space or tank or trench or excavation wherein there is given off any dust, fumes / vapours or other impurities which is likely to be injurious or offensive, explosive or poisonous or noxious or gaseous material or other harmful articles unless steps are carried out by the contractor and certified by the responsible person to be safe.

31.0 Fire prevention, protection and fighting system

- 31.1** The contractor shall ensure that construction site is provided with fire extinguishing equipment sufficient to extinguish any probable fire at construction site. An adequate water supply is provided at ample pressure as per national standard.
- 31.2** Recharging of fire extinguishers and their proper maintenance should be ensured and as a minimum should meet Indian National Standards
- 31.3** All drivers of vehicles, foreman, supervisors and managers shall be trained on operating the fire extinguishers and firefighting equipment.
- 31.4** The contractor shall also give consideration to the provision of adequate firefighting arrangements within the underground and tunneling operations including the provision of Fire Service compatible hose connections and emergency lighting
- 31.5** As per the relevant rules of UPBOCW Rules, all lifting appliances' driver cabin should be provided with a suitable portable fire extinguisher.
- 31.6** Combustible scrap and other construction debris should be disposed off site on a regular basis. If scrap is to be burnt on site, the burning site should be specified and

located at a distance no less than 12 meters from any construction work or any other combustible material.

31.7 Every fire, including those extinguished by contractor personnel, shall be reported to the Employer representatives.

31.8 Emergency plans and Fire Evacuation plans shall be prepared and issued. Mock drills should be held on a regular basis to ensure the effectiveness of the arrangements and as a part of the programme, the Telephone Number of the local fire brigade should be prominently displayed near each telephone onsite.

32.0 Corrosive substances

32.1 As per relevant rule of BOCWR Rules, corrosive substances including alkalis and acids shall be stored and used by a person dealing with such substances at a building / construction site in a manner that it does not endanger the building worker and suitable PPE shall be provided by the contractor to the worker during such handling and work. In case of spillage of such substances on building worker, the contractor shall take immediate remedial measures.

33.0 Demolition

33.1 The Contractor shall ensure that

- i) all demolition works be carried out in a controlled manner along with work permit system and under the management of experienced and competent supervision.
- ii) the concerned department of the Government or local authority be informed, and permission obtained wherever required. Media shall also be informed regarding this concern.
- iii) all glass or similar materials or articles in exterior openings are removed before commencing any demolition work and all water, steam, electric, gas and other similar supply lines are put-off and such lines so located or capped with substantial coverings so as to protect it from damage and to afford safety to the building workers and public.
- iv) examine the walls of all structures adjacent to the structure to be demolished to determine thickness, method of support to such adjacent structures
- v) no demolishing work be performed if the adjacent structure seems to be unsafe unless and until remedial measures like sheet piling, shoring, bracing or similar means be ensured for safety and stability for adjacent structure from collapsing.

- vi) debris / bricks and other materials or articles shall be removed by means of
 - a) chutes
 - b) buckets or hoists
 - c) through openings through floors or
 - d) any other safe means
- vii) no person other than building workers or other persons essential to the operation of demolition work shall be permitted to enter a zone of demolition and the area be provided with substantial barricades.

34.0 Excavation and Tunneling:

34.1 Excavation

34.1.1 The contractor shall ensure

- i) where any construction building worker engaged in excavation is exposed to hazard of falling or sliding material or article from any bank or side of such excavation which is more than one 1.5 m above his footing, such worker is protected by adequate Cover, guarding, piling and bracing against such bank or side.
- ii) where banks of an excavation are undercut, adequate shoring is provided to support the material or article overhanging such bank.
- iii) excavated material is not stored at least 0.65 m from the edge of an open excavation or trench and banks of such excavation or trench are stripped of loose rocks and the banks of such excavation or trench are stripped of loose rocks and other materials which may slide, roll or fall upon a construction building worker working below such bank
- iv) metal ladders and staircases or ramps are provided, as the case may be, for safe access to and egress from excavation where, the depth of such excavation exceeds 1.5 m and such ladders, staircases or ramps comply with the IS 3696 Part 1&2 and other relevant national standards.
- v) trench and excavation are protected against falling of a person by suitable measures if the depth of such trench or excavation exceeds 1.5 m and such protection is an improved protection in accordance with the design and drawing of a professional engineer, where such depth exceeds 4m.
- vi) open deep excavation shall not be left unattended, appropriate safety precautions to be taken if the works has been suspended for certain periods.
- vii) no materials shall allow to keep suspended / loose / unattended at the edge / adjacent of the excavated area/ open shaft etc.

34.2 Tunneling

- 34.2.1 The contractor shall inform in writing to the Director General within 30 days, prior to the commencement of any tunneling work.
- 34.2.2 The contractor shall appoint a responsible person for safe operation for tunneling work as per relevant Rules of BOCWR.
- 34.2.3 The contractor shall ensure
- i) every compressed air system in a tunnel is provided with emergency power supply for maintained continued supply of compressed air as per relevant Rule of BOCWR
 - ii) watertight bulkhead doors are installed at the entrance of a tunnel to prevent flooding.
 - iii) reliable and effective means of communication such as telephone/ EPABX / one to one phone or walkie-talkie are provided and maintained for arranging better effective communication at an excavation or tunneling work as per relevant Rule of BOCWR.
 - iv) all portable electrical hand tools and inspection lamp used in underground and confined space at an excavation or tunneling work is operated at a voltage not exceeding 24V.
 - v) only flame proof equipment of appropriate type as per IS: 5571:2000 and or other relevant national standard is used inside the tunnel
 - vi) petrol or LPG or any other flammable substances are not used, stored inside the tunnel except with prior approval from Employer, and also no oxy-acetylene gas is used in a compressed air environment in excavation or tunneling
 - vii) adequate number of water outlets provided for firefighting purpose, an audible fire alarm and adequate number and types of fire extinguishers are provided and maintained.
 - viii) temperature in any working chamber in an excavation or tunneling work where workers employed does not exceed 29°C as per relevant Rule of BOCWR.
 - ix) all working areas in a free air tunnel are provided with ventilation system as approved by the Director General and the fresh air supplied in such tunnel is not less than 6 m³/ min for each worker employed in tunnel as per relevant Rule of BOCWR.
 - x) no unwanted / scrap materials shall be allowed to stack in tunnels/tunnel shafts/TBM backup gantry.
 - xi) access / egress inside tunnels up to the TBM machine or tunneling works shall

be any kind of obstruction free.

- xii) adequate visual/audible signaling system with skilled banks man for safe movement of locomotives inside the tunnels shall be ensured.
- xiii) An additional supply of at least 3.0 M3 / min. per working kilowatt is recommended for machines with stringent emission controls.

34.3 Warning signs and notices:

34.3.1 The contractor shall ensure that

- i) suitable warning signs or notices, required for the safety of building workers carrying out the work of an excavation or tunneling, shall be displayed or erected at conspicuous places in Hindi and in a language understood by majority of such building workers at such building such excavation or tunneling
- ii) such warning signs and notices with regard to compressed air working shall include
 - a) the danger involved in such compressed Air work
 - b) fire and explosion hazard
 - c) the emergency procedures for rescue from such danger or hazards.

35.0 Work Permit system

35.1 The Contractor shall develop a Work Permit system, which is a formal written system used to control certain types of work that are potentially hazardous. A work permit is a document, which specifies the work to be done, and the precautions to be taken. Work Permits form an essential part of safe systems of work for many construction activities. They allow work to start only after safe procedures have been defined and they provide a clear record that all foreseeable hazards have been considered. Permits to Work are usually required in high-risk areas as identified by the Risk Assessments or communicated / notified by the Employer required for any other specific activities.

35.2 A permit is needed when construction work can only be carried out if normal safeguards are dropped or when new hazards are introduced by the work. Examples of high-risk activities include but are not limited to:

- i) Entry into confined spaces
- ii) Work in close proximity to overhead power lines and telecommunication cables.

- iii) Hot work.
- iv) To dig—where underground services may be located.
- v) Work with heavy moving machinery.
- vi) Working on electrical equipment
- vii) Work with radioactive isotopes.
- viii) Heavy lifting operations and lifting operations closer to live power line

35.3 The permit-to-work system should be fully documented, laying down:

- i) How the system works;
- ii) The jobs it is to be used for;
- iii) The responsibilities and training of those involved; and
- iv) How to check its operation;

35.4 A Work Permit authorization form shall be completed with the maximum duration period not exceeding 12hours.

35.5 A copy of each Permit To Work shall be displayed, during its validity, in a conspicuous location in close proximity to the actual works location to which it applies.

36.0 Traffic Management

36.1 The basic objective of the following guidelines is to lay down procedures to be adopted by contractor to ensure the safe and efficient movement of traffic & external commuters and also to ensure the safety of workmen at construction sites.

36.2 All construction workers should be provided with high visibility jackets with reflective tapes as most of viaduct /tunneling and station works or either above or under right-of- way. The conspicuity of workmen at all times shall be increased so as to protect from speeding vehicular traffic.

36.3 The guiding principles to be adopted for safety in construction zone are to

- i) Warn the road user clearly and sufficiently in advance.
- ii) Provide safe and clearly marked lanes, pedestrian crossings for guiding road users.
- iii) Provide safe and clearly marked buffer and work zones
- iv) Provide adequate measures that control driver behaviour through construction zones.
- v) Provide clearly marked area for road crossing for the construction workers / construction materials shifting / construction machineries movement.

36.4 Legal permission

36.4.1 In all cases, the contractor shall employ proper precautions. Wherever operations undertaken are likely to interfere with public traffic, specific traffic management plans shall be drawn up and implemented by the contractor in consultation with the approval of local police authorities and/or the concerned metropolitan/civil authorities as the case maybe.

36.4.2 Such traffic management plans shall include provision for traffic diversion and selection of alternative routes for transport of equipment. If necessary, the contractor shall carry out road widening before commencement of works to accommodate the extra load

36.5 The primary traffic control devices used in work zones shall include signs, delineators, barricades, cones, pylons, pavement markings and flashing lights.

36.6 The road construction and maintenance signs which fall into the same three major categories as do other traffic signs, that are Regulatory Signs, Warning Signs and Direction (or guidelines) Signs shall only be used. The IRC: 67 (Code of Practice for Road Signs) provide a list of traffic signs. The size, colours and placement of sign shall confirm to IRC:67.

36.7 Regulatory signs

36.7.1 Regulatory signs impose legal restriction on all traffic. It is essential, therefore, that they are used only after consulting the local police and traffic authorities.

36.8 Warning signs

36.8.1 Warning signs in the traffic control zone shall be utilized to warn the drivers of specific hazards that may be encountered.

36.8.2 The contractor shall place detour signage at strategic locations and install appropriate warning signs. In order to minimize disruption of access to residences and business, the contractor shall maintain at least one entrance to a property where multiple entrances exist.

36.8.3 A warning sign as given in general instruction attached as **Appendix 14** shall be installed an at all secondary road which merges with the primary road where the construction work is in progress at sufficient distance before it merges with the primary road so as to alert the road users regarding the 'Metro Work In Progress'.

36.8.4 Materials hanging over / protruded from the chassis / body of any vehicle especially during material handling shall be indicated by red indicator (red light/flag) to indicate the caution to the road users.

36.9 Delineators

The delineators are the elements of a total system of traffic control and have two distinct purposes:

- i) To delineate and guide the driver to and along a safe path
- ii) As a taper to move traffic from one lane to another.

36.9.1 These channelizing devices such as cones, traffic cylinders, tapes and drums shall be placed in or adjacent to the roadway to control the flow of traffic. These should normally be retro-reflectors complying to IRC: 79 - Recommended Practice for Road Delineators.

36.9.2 Traffic cones and cylinders

36.9.2.1 Traffic cones of 500mm, 750mm and 1000mm high and 300mm to 500mm in diameter or in square shape at base and are often made of plastic or rubber and normally have retro-reflectorized red and white band shall be used wherever required.

36.9.3 Drums

36.9.3.1 Drums about 800mm to 1000mm high and 300mm in diameter can be used either as channelizing or warning devices. These are highly visible, give the appearance of being formidable objects and therefore command the respect of drivers.

36.9.4 Barricades

36.9.4.1 Full height fence, barriers, barricades etc. shall be erected around the site in order to prevent the working area from the risk of accidents due to speedy vehicular movement. Same the way barricades protect the road users from the danger due to construction equipment and other temporary structures.

36.9.4.2 The structure dimension of the barricade, material and composition, its colour scheme, Employer logo and other details shall be in accordance with specifications laid down in tender document.

36.9.4.3 All barricades shall be erected as per the design requirements of the Employer, numbered, anchored with bolts & nailing, painted and maintained in good condition and also Barricade in-charge maintains a barricade register In Site. Any damage in the barricade boards due to external vehicle hit / poor handling / construction machineries hit etc. shall be repaired / replaced immediately.

36.9.4.4 All barricades shall be conspicuously seen in the dark/night time by the road users so that no vehicle hits the barricade. Conspicuity shall be ensured by affixing retro reflective stripes of required size and shape at appropriate angle at the bottom and

middle portion of the barricade at a minimum gap of 1000mm. In addition, minimum one red light or red-light blinker or red rope light should be placed at the top of each barricade.

36.9.4.5 The Contractor shall ensure that all the temporary openings in barricade boards for entry / exit of construction machineries are manned with security / traffic Marshall all the time. The openings shall be closed immediately after completion of the activity for which it is opened. The barricade boards openings for entry / exit shall be kept minimum in numbers. The permanent openings shall have soft barricading along with security / Marshall to restrict any unauthorized entry inside the construction zone.

36.9.5 The contractor shall ensure that all his construction vehicles plying on public roads (like dump trucks, trailers, etc.) have proper license to ply on public roads from the State Transport Authority. Drivers holding proper valid license as per the requirements of Motor Vehicles Act shall drive these vehicles

36.9.6 The contractor shall not undertake loading and unloading at carriageways obstructing the free flow of vehicular traffic and encroachment of existing roads by the contractor applying the excuse of work execution.

36.9.7 Tow away vehicle

36.9.7.1 The contractor shall make arrangements keeping tow away van / manpower to tow away any breakdown vehicle in the traffic flow without losing any time at his cost.

36.9.8 Cleaning of roads

36.9.8.1 The contractor shall ensure the cleanliness of roads and footpaths by deploying proper manpower for the same. The contractor shall have to ensure proper brooming, cleaning washing of roads and footpaths on all the time throughout the entire stretch till the currency of the contract including disposal of see pages.

37.0 Work to adjacent railways

37.1 Whenever work is to be conducted in close proximity to the live railways then the following measures shall need to be addressed:

- (a) The rules provided for in the Railway's manual shall be followed.
- (b) No persons are allowed to encroach onto the railway unless specific authority has been given by the owner.
- (c) Adequate protection in accordance with the railway owner's requirements shall be followed. (Provision of Block Inspectors, Flagmen and Lookouts)
- (d) All persons shall wear high visibility clothing at all times.

- (e) Any induction training requirements of the railways shall be strictly observed

38.0 Batching Plant / Casting Yard

- i) The batching plant / casting yard shall be effectively planned for smooth flow of unloading and stacking the aggregates reinforcements and cement, batching plant, transport of concrete, casting the segment, stacking the segment and loading the segments to the trucks. As far as possible the conflicts should be avoided.
- ii) The batching plant / casting yard shall be barricaded and made as a compulsory PPE zone
- iii) If in case of material unloading area is not maintainable as PPE zone, the same shall be segregated properly and made as a non-PPE zone with appropriate barrications.
- iv) Electrical system shall also be suitably planned so that location of diesel generator, if any, location of DBs, routing of cables and positioning of area lighting poles/masts does not infringe on any other utility and pose danger.
- v) Drainage shall be effectively provided, and waste water shall be disposed after proper treatment
- vi) Time office, canteen, drinking water, toilet and rest place shall be suitably located for the easy access to workers. All the facilities shall be properly cleaned and maintained during the entire period of operation.
- vii) Manual handling of cement shall be avoided to a larger extent. Whenever it is absolutely necessary the workmen shall be given full body protection, hand protection and respiratory protection as a basic measure of ensuring better health.
- viii) The PPEs provided to cement handling workmen shall conform to international standards.
- ix) Access roads and internal circulation roads shall be well laid and maintained properly at all-time.
- x) The batching plant operator's cabin shall have proper locking arrangement.
- xi) The operator's control panel shall be fitted with 'Emergency stop' switch.
- xii) The concrete mixer drum lid shall be fitted with 'Auto cut-off' switch to restrict the size of drum lid opening.
- xiii) The materials skip bucket movement area shall be fully fenced along with one lockable door along with 'Auto cut-off' switch.

- xiv) 'Lock out Tag out' system shall be followed for any kind of maintenance / repair works in Batching plant.
- xv) Any conveyor system connected with Batching plan shall have 'Emergency pull cord' arrangement.
- xvi) Surface run-off from batching plants should be discharged into storm drains via adequately designed sand/silt removal facilities such as sand traps silt traps or sediment basins.
- xvii) Requirements designed to protect against surface runoff include the use of sediment traps, settlement ponds, special drainage channels and bunding. Discharges from concrete works will be high in suspended solids and pH. These washings must be settled in a sedimentation pit, and possibly treated to reduce pH before discharge. Oil interceptors should be used where oily wastes are present.
- xviii) Areas within the Site such as batching plants, where there is a regular movement of vehicles shall have an approved hard surface that is kept clear of loose surface material. An approved hard surface includes but not limited to a surface which is not eroded easily during slight winds or during the passage of construction vehicles to cause dust nuisance.
- xix) Non-adherence to any of the above provision shall be penalized as per relevant penalty clause.

39.0 Personal Protective Equipments (PPEs)

39.1 The contractor shall provide required PPEs to workmen to protect against safety and / or health hazards. Primarily PPEs are required for the following protection

- i) Head Protection (Safety helmets)
- ii) Foot Protection (Safety footwear, Gumboot, etc.,)
- iii) Body Protection (High visibility clothing (waistcoat/jacket), Apron, etc.,)
- iv) Personal fall protection (Full body harness, Rope-grab fall arrester, etc.,)
- v) Eye Protection (Goggles, Welders glasses, etc.,)
- vi) Hand Protection (Gloves, Finger coats, etc.,)
- vii) Respiratory Protection. (Nose mask, SCBAs, etc.,)
- viii) Hearing Protection (Ear plugs, Ear muffs, etc.,)

39.2 The PPEs and safety appliances provided by the contractor shall be of the standard as prescribed by Bureau of Indian Standards (BIS). If materials conforming to BIS standards are not available, the contractor as approved by the Employer shall

procure PPE and safety appliances.

39.3 All construction workers should be provided with high visibility jackets with reflective tapes confirming to the requirement specified under BS EN 471: 1994 as most of viaduct /tunneling and station works are executed either above or under right-of-way. The conspicuity of workmen at all times shall be increased so as to protect them from speeding vehicular traffic.

39.4 The contractor shall provide safety helmet, safety shoe and high visibility clothing for all employees including workmen, traffic marshal and other employees who are engaged for any work under this contract as per the following requirement.

All employees of the Contractor including workmen	Traffic marshals
<ul style="list-style-type: none"> i) Hard hat with company Logo ii) Safety boots iii) Hi-visibility waistcoat covering upper body and meeting the following requirements as per BS EN471:1994: <ul style="list-style-type: none"> a) Background in fluorescent orange-red in colour b) Two vertical green strips of 5cm wide on front side, covering the torso at least 500 cm² c) Two diagonal strips of 5cm wide on back in an 'X' pattern covering at least 570cm² d) Horizontal strips not less than 5cm wide running around the bottom of the vertical strip in front and 'X' pattern at back. e) The bottom strip shall be at a distance of 5cm from the bottom of the vest. f) Strips must be retro reflective and fluorescent g) Waistcoat shall have a side adjustable fit and a side and front tear-away feature on vests made of nylon. 	<ul style="list-style-type: none"> i) Hard hat with reflective tape ii) Safety boots iii) Hi-visibility jacket covering upper body and meeting the following requirements as per BS EN 471:1994: <ul style="list-style-type: none"> a) Background in fluorescent orange-red in colour b) Jackets with full-length sleeves with two bands of retro reflective material, which shall be placed at the same height on the garment as those of the torso. The upper band shall encircle the upper part of the sleeves between the elbow and the shoulder; the bottom of the lower band shall not be less than 5cm from the bottom of the sleeve. c) Two vertical green strips of 5cm wide on front side, covering the torso at least 500cm² d) Two diagonal strips of 5 cm wide on back in an 'X' pattern covering at least 570cm² e) Horizontal strips not less than 5cm wide running around the bottom of the vertical strip in front and 'X' pattern at back. f) The bottom strip shall be at a distance of 5cm from the bottom of the vest. g) Strips must be retro reflective and fluorescent.

39.4.1 Colour coding for helmets

Safety Helmet Colour Code (Every Helmet should have the LOGO* affixed /painted)	Person to use
White	UPMRC/ General Consultant staffs
Grey	All Designers, Architect, Consultants, etc.
Violet	Main Contractors (Engineers / Supervisors)
Blue	All Sub-contractors (Engineers /
Red	Electricians (Both Contractor and Sub- contractor)
Green	Safety Professionals (Both Contractor and Sub- contractor)
Orange	Security Guards / Traffic marshals
Yellow	All workmen
White (with "VISITOR" sticker)	Visitors

Note: LOGO*

1. Logo shall have its outer dimension 2"X2" and shall be conspicuous
2. Logo shall be either painted or affixed
3. No words shall come either on Top / Bottom of Logo

Logo of the corresponding main contracting company for their employees and sub-contracting company for their employees shall only be used.

39.5 In addition to the above any other PPE required for any specific jobs like, welding and cutting, working at height, tunneling etc shall also be provided to all workmen and also ensure that all workmen use the PPEs properly while on the job.

39.6 The contractor shall not pay any cash amount in lieu of PPE to the workers/sub-contractors and expect them to buy and use during work.

39.7 The contractor shall at all time maintain a minimum of 10% spare PPEs and safety appliances and properly record and show to the Employer during the inspections. Failing to do so shall invite appropriate penalty as per the provisions of the contract.

39.8 It is always the duty of the contractor to provide required PPEs for all visitors. Towards this required quantity of PPEs shall be kept always at the security post.

40.0 Visitors to site

- 40.1** No visitor is allowed to enter the site without the permission of the Employer. All authorized visitors should report at the site office. Contractor shall provide visitor's helmet (White helmet with visitor sticker) and other PPEs like Safety Shoe, reflective jacket, respiratory protection etc. as per requirement of the site.
- 40.2** All Visitors shall be accompanied at all times by a responsible member of the site personnel.
- 40.3** The contractor shall be fully responsible for all visitors' safety and health within the site.

PART – III: OCCUPATIONAL HEALTH AND WELFARE

41.0 Physical fitness of workmen

- 41.1** The contractor shall ensure that his employees/workmen subject themselves to such medical examination as required under the law or under the contract provision and keep a record of the same
- 41.2** The contractor shall not permit any employee/workmen to enter the work area under the influence of alcohol or any drugs.
- 41.3** The contractor shall ensure the physical fitness of workmen on regular basis. Contractor shall conduct different types of physical exercises during regular tool box talk at different site locations to maintain physical fitness of workmen.

42.0 Medical Facilities

42.1 Medical Examination

- 42.1.1** The contractor shall arrange a medical examination of all his employees including his sub-contractor employees employed as drivers, operators of lifting appliances and transport equipment before employing, after illness or injury, if it appears that the illness or injury might have affected his fitness and, thereafter, once in every two years up to the age of 40 and once in a year, thereafter.
 - i) The Contractor shall maintain the confidential records of medical examination or the physician authorized by the Employer.
 - ii) No building or other construction worker is charged for the medical examination and the cost of such examination is borne by contractor employing such building worker.

- iii) The medical examination shall include: -
 - a) Full medical and occupational history.
 - b) Clinical examination with particular reference to
 - i) General Physique;
 - ii) Vision: - Total visual performance using standard Orth orator like Titmus Vision Tester should be estimated and suitability for placement ascertained in accordance with the prescribed job standards.
 - iii) Hearing: - Persons with normal must be able to hear a forced whisper at twenty-four feet. Persons using hearing aids must be able to hear a warning shout under noisy working conditions.
 - iv) Breathing: - Peak flow rate using standard peak flow meter and the average peak flow rate determined out of these readings of the test performed. The results recorded at pre-placement medical examination could be used as a standard for the same individual at the same altitude for reference during subsequent examination.
 - v) Upper Limbs: - Adequate arm function and grip
 - vi) Spine: - Adequately flexible for the job concerned.
 - vii) Lower Limbs: - Adequate leg and foot concerned.
 - viii) General: - Mental alertness and stability with good eye, hand and foot coordination.
 - ix) Covid-19 related tests as per updated guidelines prescribed by MoHFW/State/Central Govt. as on date.
 - c) Any other tests which the examining doctor considers necessary

42.1.2. If the contractor fails to get the medical examination conducted as mentioned above, the employer will have the right to get the same conducted by through an agency with intimation to the contractor and deduct the cost and overhead charges.

42.1.3 The Contractor shall ensure the availability of qualified / trained Occupational Health Officer / Doctor (Physician) as 12 / 24 hours basis at its site based Occupational Health Centre along with trained & certified paramedic / nursing assistants as per awarded contract value as mentioned in General Instruction.

42.2 Occupational Health Centre

42.2.1 The contractor shall ensure at a construction site an occupational health centre, mobile or static is provided and maintained in good order. Services and facilities as per the scale lay down in relevant Schedule of BOCWR. A construction medical officer appointed in an occupational health center possess the qualification as laid down in relevant Schedule of BOCWR.

42.3 Ambulance van and room

42.3.1 The contractor shall ensure at a construction site of a building or other construction work that a dedicated ambulance van and room are provided at such construction site. Additionally, an arrangement (tie up) is made with a nearby hospital for providing such ambulance van in case of severe / catastrophic incident for transportation of serious cases of accident or sickness of workers to hospital promptly and such ambulance van and room are maintained in good repair and is equipped with standard facilities specified in relevant Schedules of BOCWR.

42.4 First-aid boxes

42.4.1 The contractor shall ensure at a construction site one First-aid box for 100 workers provided and maintained for providing First-aid to the building workers. Every First-aid box is distinctly marked "First-aid" and is equipped with the articles specified in Schedule III of BOCWR.

42.5 HIV/ AIDS prevention and control

42.5.1 The contractor shall adopt the Employer's Policy on "HIV / AIDS Prevention and Control for Workmen Engaged by Contractors" and the copy of the policy is given in **Appendix No.:4.**

42.5.2 The Employer will engage a professional agency for implementing the guidelines laid down in the policy and communicate to the contractor.

42.5.3 The Contractor shall extend necessary support to the appointed agency by deputing the workmen to attend the awareness creation programmes.

42.5.4 The contractor shall also extend necessary organizational support to the appointed agency for the effective implementation of the Employers' workplace policy on HIV/AIDS for workmen of the Contractors.

42.5.5 As laid down in the policy the contractor shall identify peer educators (1 for every 100 workers) and refer them for professional training to the Employers' appointed agency for the purpose.

42.5.6 The peer educators on completion of the training shall serve as the focal point for any information, education and awareness campaign among the workmen

throughout the contract period.

- 42.5.7 The peer educators will be paid a monthly honorarium as fixed by the Employer for rendering his services in addition to his regular duty.
- 42.5.8 The total number of peer educators (1 for 100 workers) shall always be maintained by the contractor.
- 42.5.9 In case if these peer educators leave the contractor by creating vacancy, then the contractor at his own expense train the new replacement peer educator from the Employers' appointed agency for the purpose.
- 42.5.10 It is suggested to the contractor that due care should be taken to select the peer educators from among the group of workmen so that they remain with the contractor throughout the contract period.

42.6 Prevention of mosquito breeding

- 42.6.1 Measures shall be taken to prevent breeding at site. The measures to be taken shall include:
 - i) Empty cans, oil drums, packing and other receptacles, which may retain water shall be deposited at a central collection point and shall be removed from the site regularly.
 - ii) Still waters shall be treated at least once every week with oil in order to prevent mosquito breeding.
 - iii) Contractor's equipment and other items on the site, which may retain water, shall be stored, covered or treated in such a manner that water could not be retained.
 - iv) Water storage tanks shall be provided.
- 42.6.2 Posters in both Hindi and English, which draw attention to the dangers of permitting mosquito breeding, shall be displayed prominently on the site.
- 42.6.3 The contractor at periodic interval shall arrange to prevent mosquito breeding by fumigation / spraying of insecticides. Most effective insecticides shall include SOLFAC WP 10 or Baytex, The Ideal Larvicide etc.

42.7 Alcohol and drugs

- 42.7.1 The contractor shall ensure at all times that no employee is working under the influence of alcohol / drugs which are punishable under Govt. regulations.
- 42.7.2 Smoking at public worksites by any employee is also prohibited as per Govt. regulations.

43.0 Noise

- 43.1** The Contractor shall consider noise as an environmental constraint in his design, planning and execution of the Works and provide demonstrable evidence of the same on Employer's request. The Contractor shall, at his own expense, take all appropriate measures to ensure that work carried out by the Contractor and by his sub-Contractors, whether on or off the Site, will not cause any unnecessary or excessive noise which may disturb the occupants of any nearby dwellings, schools, hospitals, or premises with similar sensitivity to noise.
- 43.1.1 Without prejudice to the generality of the foregoing, noise level reduction measures shall include the following:
- i) The Contractor shall ensure that all powered mechanical equipment used in the Works shall be effectively sound reduced using the most modern techniques available including but not limited to silencers and mufflers.
 - ii) The Contractor shall construct acoustic screens or enclosures around any parts of the Works from which excessive noise may be generated.
- 43.1.2 The Contractor shall ensure that noise generated by work carried out by the Contractor and his sub-Contractors during daytime and night time shall not exceed the maximum permissible noise limits, whether continuously or intermittently, as given in the project SHE Manual. The same may be varied from time to time by and at the sole discretion of the Employer, In the event of a breach of this requirement, the Contractor shall immediately re-deploy or adjust the relevant equipment or take other appropriate measures to reduce the noise levels and thereafter maintain them at levels which do not exceed the said limits. Such measures may include without limitation the temporary or permanent cessation of use of certain items of equipment.
- 43.1.3 The noise monitoring requirements including monitoring locations are given in the Project Environmental Manual.
- 43.1.4 Noise monitoring shall be carried out at noise sensitive receptor locations within 200 feet of the construction site once each week and after a change in construction activity. Construction noise measurements shall coincide with daytime and night-time periods of maximum noise generating construction activities
- 43.1.5 The appropriate parameter for measuring construction noise impacts shall be the equivalent A-weighted sound pressure level (Leq) measured in decibels dB(A) and C-weighted sound pressure level (Lmax) measured in decibels dB(C). The two statistical sound levels L10 and L90; the level exceeded for 10 and 90 percent of the time respectively, shall also be recorded during monitoring. The L90 may be considered as the ambient level into which the L10 as average peak level intrudes. The Lmax, Leq, L10 and L90 values will be reported in the noise measurement form

along with allowable noise limit.

- 43.1.6 When Diesel Generator (DG) Sets are used for operation of equipment and machinery, then Ministry of Environment and Forest notification dated 17th May 2002, issued under Environment Protection Act (Protection) Rules, 1986, and Guidelines for in-use generator sets by NGT 2013 on noise and emission limits shall apply.

43.2 Control Requirements

- 43.2.1 Construction material should be operated and transported in such a manner as not to create unnecessary noise as outlined below:

- i) Perform Work within the procedures outlined herein and comply with applicable codes, regulations, and standards established by the Central and State Government and their agencies.
- ii) Keep noise to the lowest reasonably practicable level. Appropriate measures will be taken to ensure that construction works will not cause any unnecessary or excessive noise, which may disturb the occupants of any nearby dwellings, schools, hospitals, or premises with similar sensitivity to noise. Use equipment with effective noise-suppression devices and employ other noise control measures as to protect the public.
- iii) Schedule and conduct operations in a manner that will minimize, to the greatest extent feasible, the disturbance to the public in areas adjacent to the construction activities and to occupants of buildings in the vicinity of the construction activities.
- iv) The Contractor shall submit to the Employer a Noise Monitoring and Control Plan (NMCP) under contract specific Site Environmental Plan. It shall include full and comprehensive details of all powered mechanical equipment, which he proposes to use during daytime and night time, and of his proposed working methods and noise level reduction measures. The NMCP shall include detailed noise calculations and vibration levels to demonstrate the anticipated noise generation and vibrations by the Contractor.
- v) The NMCP prepared by the Contractor shall guide the implementation of construction activity. The NMCP will be reviewed on a regular basis and updated as necessary to assure that current construction activities are addressed. It may appear as a regular agenda item in project coordination meetings, if noise is an issue at any location in the contract.

43.3 Occupational Noise

- i) Protection against the effects of occupational noise exposure should be provided when the sound levels exceeds the threshold values as provided in Project SHE Manual.
- ii) When employees are subjected to sound levels exceeding those listed in the Table, feasible administrative or engineering controls should be utilized as given in this document and Employer's Project SHE Manual.
- iii) If such controls fail to reduce sound levels within the levels of the table, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table.
- iv) When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. Exposure to different levels for various periods of time shall be computed according to the formula and sample computation as given in project SHE Manual.

43.4 Vibration Level

43.4.1 In locations where the alignment is close to historical / heritage structures, the contractor shall prepare a monitoring scheme prior to construction at such locations. This scheme for monitoring vibration level at such historical / heritage sites shall be submitted to Employer for his approval. This scheme shall include:

- i) Monitoring requirements for vibrations at regular intervals throughout the construction period.
- ii) Pre-construction structural integrity inspections of historic and sensitive structures in project activity.
- iii) Information dissemination about the construction method, probable effects, quality control measures and precautions to be used.
- iv) The vibration level limits at work sites adjacent to the alignment shall conform to the permitted values of peak p velocity as given in article project SHE Manual.

44.0 Ventilation and illumination

44.1 Ventilation

44.1.1 The contractor shall ensure at a construction site of a building or other construction work that all working areas in a free tunnel are provided with ventilation systems as approved by the Head/CIIBC and the fresh air supply in such tunnel is not less than

6m³/min for each building worker employed underground in such tunnel and the free air flow movement inside such tunnel is not less than 9m/min.

44.1.2 The oxygen level shall not be less than 19.5% in the working environment.

44.2 Illumination

44.2.1 The contractor shall take every effort to illuminate the work site as per the Employer's requirement illustrated in general instruction attached as Appendix **13**.

44.2.2 The contractor shall conduct a monthly illumination monitoring by lux meter for all the locations and the report shall be sent to the Employer within 7th of the next month and the same shall be reviewed during the monthly SHE committee meeting.

45.0 Radiation

45.1 The use of radioactive substances and radiating apparatus shall comply with the Govt. regulatory requirements and all subsidiary legislation

45.2 Operations involving ionizing radiation shall only be carried out after having been reviewed without objection by the Employer's representative and shall be carried out in accordance with a method statement.

45.3 each area containing irradiated apparatus shall have warning notices and barriers, as required by the Regulations, conspicuously posted at or near the area.

45.4 Radioactive substances will be stored, used or disposed shall be strictly in accordance with the Govt. Enactments.

45.5 The contractor shall ensure that all site personnel and members of the public are not exposed to radiation.

46.0 Welfare measures for workers

46.1 Latrine and Urinal Accommodation

46.1.1 The contractor shall provide one latrine seat for every 20 workers up to 100 workers and thereafter one for every additional 50 workers. In addition, one urinal accommodation shall be provided for every 100workers. The latrine & urinal shall be provided at each work location.

46.1.2 When women are employed, separate latrine and urinals accommodation shall be provided on the same scale as mentioned above.

46.1.3 Latrine and urinals shall be provided as per Section 33 of BOCWA and maintained as per Rule 243 of BOCWR and shall also comply with the requirements of public health authorities

46.1.4 Moving sites

46.1.4.1 In case of works like track laying, the zone of work is constantly moving at elevated level or at underground level. In such cases mobile toilets with proper facility to drain the sullage shall be provided at reasonably accessible distance.

46.1.5 In case if the contractor fails to provide required number of urinals and latrines or fail to maintain it as per the requirements of Public Health laws, the Employer shall have the right to provide/maintain through renowned external agencies like "Sulabh" at the cost of the contractor.

46.2 Canteen:

46.2.1 In every workplace wherein not less than 250 workers are ordinarily employed the contractor shall provide an adequate canteen conforming to relevant Section of BOCWA, Rule 244 of BOCWR and as stipulated in relevant Rule of BOCWR, the charges for food stuff shall be based on 'no profit no loss' basis. The price list of all items shall be conspicuously displayed in such canteen.

46.3 Serving of tea and snacks at the workplace:

46.3.1 As per relevant Rule of BOCWR, at a building or other construction work where a workplace is situated at a distance of more than 200 m from the canteen provided under Rule of BOCWR, the contractor employing building works shall make suitable arrangement for serving tea and light refreshment to such building works at such place.

46.4 Drinking water

46.4.1 As per relevant Section of BOCWA the contractor shall make in every worksite, effective arrangements to provide sufficient supply of wholesome drinking water with minimum quantity of 5 liters per workman per day. Quality of the drinking water shall conform to the requirements of national standards on Public Health.

46.4.2 While locating these drinking water facilities due care shall be taken so that these are easily accessible within a distance of 200m from the place of work for all workers at all location of worksites.

46.4.3 All such points shall be legible marked "Drinking Water" in a language understood by a majority of the workmen employed in such place and such point shall be situated within six meters of any washing places, urinals or latrines.

46.5 Labour Accommodation

46.5.1 The contractor shall provide free of charges as near as possible, temporary living

accommodation to all workers conforming to provisions of relevant Section of BOCWA. These accommodations shall have cooking place, bathing, washing and lavatory facilities and meeting the requirements as per Covid-19 related updated guidelines issued by MoHFW/Central/State Govt.

46.6 Creches

46.6.1 In every workplace where in more than 50 female workers are ordinarily employed, there shall be provided and maintained a suitable room for use of children under age of 6 yrs., conforming to the relevant provisions of Section of BOCWA.

46.7 The Contactor shall comply all the requirements/guidelines issued by MoHFW/Central/State Govt. related to Covid 19 throughout the currency of contract.

PART - IV: ENVIRONMENTAL MANAGEMENT

47.0 Air Quality

- 47.1** The Contractor shall take all necessary precautions to minimize fugitive dust emissions from operations involving excavation, grading, and clearing of land and disposal of waste. He shall not allow emissions of fugitive dust from any transport, handling, construction or storage activity to remain visible in atmosphere beyond the property line of emission source for any prolonged period of time without notification to the Employer.
- 47.2** The Contractor shall use construction equipment designed and equipped to minimize or control air pollution. He shall maintain evidence of such design and equipment and make these available for inspection by Employer.
- 47.3** If after commencement of construction activity, Employer believes that the Contractor's equipment or methods of working are causing unacceptable air pollution impacts then these shall be inspected, and remedial proposals shall be drawn up by the Contractor, submitted for review to the Employer and implemented.
- 47.4** In developing these remedial measures, the Contractor shall inspect and review all dust sources that may be contributing to air pollution. Remedial measures include use of additional/ alternative equipment by the Contractor or maintenance/modification of existing equipment of the Contractor.
- In the event that approved remedial measures are not being implemented and serious impacts persist, the Employer may direct the Contractor to suspend work until the measures are implemented, as required under the Contract.
- 47.5** Contractor's transport vehicles and other equipment shall conform to emission standards fixed by Statutory Agencies of Government of India or the State Government from time to time. The Contractor shall carry out periodical checks and undertake remedial measures including replacement, if required, so as to operate within permissible norms.
- 47.6** The Contractor shall establish and maintain records of routine maintenance program for internal combustion engine powered vehicles and equipment used on this project. He shall keep records available for inspection by Employer.
- 47.7** The Contractor shall cover loads of dust generating materials like debris and soil being transported from construction sites. All trucks carrying loose material should be covered and loaded with sufficient free- board to avoid spills through the tail board or side boards.
- 47.8** The Contractor shall promptly transport all excavation disposal materials of whatever

kind so as not to delay work on the project. Stockpiling of materials will only be allowed at sites designated by the Employer. The Contractor shall place excavation materials in the dumping/disposal areas designated in the plans as given in the specifications.

- 47.9** The temporary dumping areas shall be maintained by the Contractor at all times until the excavate is re-utilized for backfilling or as directed by Employer. Dust control activities shall continue even during any work stoppage.
- 47.10** The Contractor shall place material in a manner that will minimize dust production. Material shall be minimized each day and wetted, to minimize dust production. During dry weather, dust control methods must be used daily especially on windy, dry days to prevent any dust from blowing across the site perimeter.
- 47.11** The Contractor shall water down construction sites as required to suppress dust, during handling of excavation soil or debris or during demolition. The Contractor will make water sprinklers, water supply and water delivering equipment available at any time that it is required for dust control use. Dust screens will be used, as feasible when additional dust control measures are needed specially where the work is near sensitive receptors.
- 47.12** The Contractor shall provide a wash pit or a wheel washing and/or vehicle cleaning facility at the exits from work sites such as construction depots and batching plants. At such facility, high-pressure water jets will be directed at the wheels of vehicles to remove all spoil and dirt.
- 47.13** The Contractor shall design and implement his blasting techniques so as to minimize dust, noise, vibration generation and prevention fly rock.
- 47.14** Blasting technique should be consistent not only with nature and quantity of rock to be blasted but also the location of blasting.
- 47.15** The contractor shall give preference to explosives with better environmental characteristics.
- 47.16** The Contractor shall protect structures, utilities, pavements roads and other facilities from disfiguration and damage as a result of his activities. Where this is not possible, the contractor shall restore the structures, utilities, pavements, roads and other facilities to their original or better, failing which the rectification/restoration work shall be carried out at the risk and cost of the contractor.
- 47.17** The Air Quality Monitoring and Control Plan (AMCP) in contract-specific Project Environmental Plan prepared by the Contractor shall establish procedures to monitor impact air quality and measures to control air pollution including dust suppression due to construction activities at work sites. This plan shall contain description of activities that will cause degradation in air quality, environmental procedures to manage pollutants, monitoring programme record keeping and reporting.

- 47.18** Contractor will undertake baseline monitoring for Air Quality to establish background levels. Action Level of the Contractor shall be based on the results of baseline monitoring programme, which will be made available to him.
- 47.19** The National Ambient Air Quality Standards (Notification) 2009, may be referred by the Contractor for Limit Levels of pollutant for ambient air which may be followed in estimating the pollution level caused by Contractor's activities.
- 47.20** The Contractor shall comply with the Indian Government legislation and other State regulations in existence in LUCKNOW, KANPUR & AGRA in so far as they relate to Air pollution control and monitoring.
- 47.21** The Contractor shall deploy suitable no. of Anti-Smog gun with automatic rotation and should be kept at minimum height of 3 mtrs or more with 60 meters water throw range or more to cover maximum area – For casting Yard & Batching Plant.
- 47.22** The Contractor shall deploy suitable no. of Truck mounted mobile Anti-smog gun with minimum water capacity of 10,000 liters of tanker. Apart from smog gun mounted, Truck should have all around water sprinklers at chassis level – Around Viaduct section.
- 47.23** The Contractor shall deploy Suitable no. of Mechanical Broomer (24x7 basis)
- 47.24** In addition to that the contractor shall deploy suitable measures for dust mitigation such as water sprinklers, anti-smog guns, water tanker etc. inside the barricades for environment protection.
- 48.0 Water Quality**
- 48.1** The Contractor shall comply with the Indian Government legislation and other State regulations in existence in Lucknow, Kanpur & Agra insofar as they relate to water pollution control and monitoring. A drainage system should be constructed at the commencement of the Works, to drain off all surface water from the work site into suitable drain outlet.
- 48.2** The Contractor shall provide adequate precautions to ensure that no spoil, wastewater, spills or debris of any kind is pushed, washed, falls or deposited on land adjacent to the site perimeter including public roads or existing stream courses water bodies (Natural /artificial), ground water and drains within or adjacent to the site. In the event of any spoil, wastewater, spills and debris from construction works being deposited or any silt washed down to any area, then all such spoil, wastewater, spills debris or material and silt shall be immediately removed, and the affected land and areas restored to their natural state by the Contractor to the satisfaction of the Employer.
- 48.3** Due to lowering of potable water supplies in Agra and subsequent contamination of ground water, the Contractor is not allowed to discharge water from the site

without the approval of the Employer. The Contractor must comply with the requirements of the Central Ground Water Board for discharge of water arising from dewatering. Any water obtained from dewatering systems installed in the works must be either re-used for construction purposes and this water may subsequently be discharged to the drainage system or, if not re-used, recharged to the ground water at suitable aquifer levels. The Contractor must submit his proposals for approval of Employer, on his proposed locations of dewatering of excavation and collection of water for either construction re- use or recharge directly to aquifers. The Contractor's recharge proposals must be sufficient for recharging of the quantity of water remaining after deduction of water re- used for construction. During dewatering, the contractor shall monitor ground water levels from wells to ensure that draw down levels do not exceed allowable limits. The Contractor will not be permitted to directly discharge, to the drainage system, unused ground water obtaining from the excavation without obtaining approval of Employer or the Agency controlling the system.

- 48.4** The Contractor shall ensure that earth slurry, bentonite/polymers, concrete slurry, chemicals and concrete agitator washings etc. are not deposited in the watercourses but are suitably collected at special designed slurry pit/lagoon and residue disposed off in a manner approved by local authorities.
- 48.5** All water and waste products (surface runoff and wastewater) arising on the site shall be collected and removed from the site via a suitable and properly designed temporary drainage system and disposed off at a location and in a manner that will cause neither pollution nor nuisance.
- 48.6** Any mud slurry from drilling, tunneling, diaphragm wall construction or grouting etc. shall not be discharged into the drainage system unless treatment is carried out that will remove silt, mud particles, bentonite total suspended solid (TSS), total dissolve solid (TDS) and chemicals etc. The Contractor shall provide treatment facilities as necessary to prevent the discharge of contaminated groundwater.
- 48.7** The Contractor shall discharge wastewater arising out of site office, canteen or toilet facilities constructed by him into sewers after obtaining prior approval of agency controlling the system. A wastewater drainage system shall be provided to drain wastewater into the sewerage system.
- 48.8** The bentonite mixing, treatment and handling system shall be established by the contractor giving due regard to its environmental impacts. The disposal of redundant bentonite shall be carefully considered whether in bulk or liquid form. The disposal location will be advised and agreed with the relevant authorities.
- 48.9** The Contractor shall take measures to prevent discharge of oil and grease during spillage from reaching drainage system or any water body. Oil removal /

interceptors shall be provided to treat oil waste from workshop areas etc.

- 48.10** The Contractor shall apply to the appropriate authority for installing bore wells for water supply at site.

49.0 Archaeological and Historical Preservation

- 49.1** The contractor shall seek to accommodate archaeological and historical preservation concerns that may arise due to the construction of the project especially in close vicinity of such areas where such monuments may be located.

- 49.2** The contractor shall consult the Archaeological Survey of India (ASI) and other parties, on the advice of the Employer, to identify and assess construction effects and seek ways to avoid, minimize or mitigate adverse effects on such monuments.

- 49.3** Adverse effects may include reasonably foreseeable effects caused by the construction that may occur later in time, be farther removed in distance or those that alter, howsoever temporarily, the significance of the structure.

50.0 Landscape and Greenery

- 50.1** As far as is reasonably practicable, the Contractor shall maintain ecological balance by preventing deforestation and defacing of natural landscape. In respect of ecological balance, the Contractor shall observe the following instructions.

- 50.2** The Contractor shall, so conduct his construction operations, as to prevent any avoidable destruction, scarring or defacing of natural surroundings in the vicinity of work.

- 50.3** Where destruction, scarring, damage or defacing may occur as a result of operations relating to Permanent or Temporary works, the same shall be repaired, replanted or otherwise corrected at Contractor's expense. All work areas shall be smoothened and graded in a manner to conform to natural appearance of the landscape as directed by the Employer.

- 50.4** A suggested list of trees/shrubs suitable for planting and landscaping is found in Employer's Project SHE Manual.

51.0 Felling of Trees

- 51.1** The contractor shall identify the number and type of trees that are required to be felled as a result of construction of works and facilities related to Lucknow, Kanpur & Agra Metro Project and inform the Employer.

- 51.2** All trees and shrubbery, which are not specifically required to be cleared or removed for construction purposes, shall be preserved and shall be protected from any damage that may be caused by Contractor's construction operations and

equipment. The contractor shall not fell, remove or dispose of any tree or forest produce in any land handed over to him for the construction of works and facilities related to Lucknow, Kanpur & Agra Metro except with the previous permission obtained from the Forest Department.

51.3 The Employer shall arrange permission from the forest department for trees to be felled or transplanted. The Employer will permit the removal of trees or shrubs only after prior approval.

51.4 Special care shall be exercised where trees or shrubs are exposed to injuries by construction equipment, blasting, excavating, dumping, chemical damage or other operation and the Contractor shall adequately protect such trees by used of protective barriers or other methods approved by the Employer. Trees shall not be used for anchorage.

52.0 Fly Ash

52.1 The Employer may require the contractor to use fly ash as a percentage substitution of cement, in concrete for certain structures and works.

52.2 In all such uses of Fly Ash, the contractor shall maintain a detailed record of usage of Fly Ash. The contractor shall also collect related details and provide to the Employer.

52.3 The reporting details on consumption of Fly Ash are found in Employer's SHE Manual.

53.0 Waste

53.1 The contractor is required to develop, institute and maintain a Waste Management Programme (WMP) during the construction of the project for his works, which may include: -

- i) Identification of disposal sites.
- ii) Identification of quantities to be excavated and disposed off.
- iii) Identification of split between waste and inert material
- iv) Identification of amounts intended to be stored temporarily on-site location of such storage.
- v) Identification of intended transport means and route.
- vi) Obtaining permission, where required, for disposal.

53.2 Such a mechanism is intended to ensure that the designation of areas for the segregation and temporary storage of reusable and recyclable materials are incorporate into the WMP. The WMP should be prepared and submitted to the Engineer for approval.

- 53.3** The Contractor shall handle waste in a manner that ensures they are held securely without loss or leakage thus minimizing potential for pollution. The Contractor shall maintain and clean waste storage areas regularly.
- 53.4** Every waste generator shall keep the construction and demolition waste within the premise (not more than 3 days) or get the waste deposited at collection center so made by the local body or handover it to the authorized processing facilities of construction and demolition waste; and ensure that there is no littering or deposition of construction and demolition waste so as to prevent obstruction to the traffic or the public or drains.
- 53.5** Burning of wastes is prohibited. The Contractor shall not burn debris or vegetation or construction waste on the site but remove it in accordance with **50.1** above.
- 53.6** The Contractor shall make arrangement to dispose of metal scrap and other saleable waste to authorized dealer and make available to the Employer on request, records of such sales.
- 54.0 Hazardous Waste Management**
- 54.1** If encountered or generated as a result of Contractor's activity, then waste classified as hazardous under the "The Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016." shall be disposed off in a manner in compliance with the procedure given in the rules under the aforesaid act.
- 54.2** Chemicals classified as hazardous chemicals under "Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 of Environment (Protection) Act, 1986 shall be disposed off in a manner in compliance with the procedure given in the rules under the aforesaid act.
- 54.3** The contractor shall identify the nature and quantity of hazardous waste generated as a result of his activities and shall file a 'Request for Authorization' with Uttar Pradesh Pollution Control Committee along with a map showing the location of storage area.
- 54.4** Outside the storage area, the contractor shall place a 'display board', which will display quantity and nature of hazardous waste, on date. Hazardous Waste needs to be stored in a secure place
- 54.5** It shall be the responsibility of the contractor to ensure that hazardous wastes are stored, based on the composition, in a manner suitable for handling, storage and transport. The labelling and packaging is required to be easily visible and be able to withstand physical conditions and climatic factors.
- 54.6** The contractor shall approach only Authorized Recyclers of Hazardous Waste for disposal of Hazardous Waste, under intimation to the Employer.
- 54.7** Submittal of all environment related documents and records pertaining to

monitoring and trend analysis on key parameters such as but not limited to consumption/efficient use of resources such as energy, water, material such as cement, fly ash, iron and steel, recycle/reuse of waste etc that shall have demonstrated continual improvement in the implementation of Environmental management System. Failure to do so the employer shall impose appropriate penalty as indicated under penalty clause.

55.0 Energy Management

55.1 The contractor shall use and maintain equipment so as to conserve energy and shall be able to produce demonstrable evidence of the same upon Employer's request.

55.2 Measures to conserve energy include but not limited to the following:

- i) Use of energy efficient motors and pumps
- ii) Use of energy efficient lighting, which uses energy efficient luminaries
- iii) Adequate and uniform illumination level at construction sites suitable for the task
- iv) Proper size and length of cables and wires to match the rating of equipment
- v) Use of energy efficient air conditioners

55.3 The contractor shall design site offices maximum daylight and minimum heat gain. The rooms shall be well insulated to enhance the efficiency of air conditioners and the use of solar films on windows may be used where feasible.

PART - V: PENALTY AND AWARDS

56.0 Charges to be recovered from contractor for unsafe act or condition

56.1 Employer has built an image of safety conscious organization meticulously over a period of seven years. Any reportable accident (fatality / injury) results in loss of life and/or property damage. These accidents not only result in loss of life but also damage the reputation of Employer. Most of the accidents are avoidable and caused preliminary due to contractors' negligence. Hence Employer shall recover the cost of damages from the contractors for every reportable incident (fatality /injury).

56.2 In addition, every Employer work site is exposed to public scrutiny as the work is executed just on the right-of-way. Any unsafe act / unsafe condition observed by public further damages our reputation. Because of the non-voluntary compliance of contractors to the condition of contract on SHE and project SHE

and Environmental manual, Employer has been forced to establish safety-enforcing organization. The cost of established such organization is to be recovered from contractors for all observed safety violations at sites.

56.3 The following table indicates the Safety, Health and Environment violation (unsafe act / unsafe condition) and charges to be recovered from contractors.

SL. NO.	TOPIC	UNSAFE ACT/UNSAFE CONDITION	DEDUCTIBLE AMOUNT
1.	SHE Policy & Plan	i) SHE policy a) non-compliance of clause4.1 b) Inadequate cover age not signed c) Not displayed at prominent locations	Rs.5,000 per single violation, compounded to a maximum of Rs.25,000 at any single instance.
		ii) SHE plans: a) Not as per Employers' content and coverage b) Delay in submission c) Not updated as per employer's instruction as per clause4.4 d) Copies not provided to all required supervisors /engineers	Rs.1,00,000 per single violation, compounded to a maximum of Rs.2,00,000 at any single instance.
2.	SHE Organization	i) Not complying to the minimum manpower requirements as mentioned in General Instruction attached as Appendix5 ii) Not filling up the vacancies created because SHE personnel leaving the contractor within 14days. iii) SHE organization not provided with required Audio-visual and other	i) Rs.1,00,000 per month for first month and Rs.2,00,000 for subsequent months ii) Rs.50,000 per month for first month and Rs.1,00,000 for subsequent months
		equipments as per General Instruction attached as Appendix 7 iv) Employing through outsourcing agencies and SHE personal are not in the payroll of the main contractor v) Disobedience / Improper conduct of any SHE personnel. vi) Chief SHE Manager not reporting directly to CPM of contractor. vii) No approval / intimation to Employer for demobilization of SHE personnel	For items iii), iv), v), vi) and vii) Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations

3.	SHE committee	<ul style="list-style-type: none"> i) Failed to formulate or conduct SHE Committee meeting for any month ii) Contractor and Sub-contractor representatives not attending SHE Committee meetings iii) Failed to conduct Site inspection before conducting SHE Committee meeting iv) Failed to send SHE Committee Meeting minutes or Agenda to Employer intime v) Non-adherence of clause7.7.1 vi) Non-adherence of clause7.9 	<ul style="list-style-type: none"> i) Rs.1,00,000 for the first violation andRs.5,00,000 for the subsequent violations ii) Rs.5,000 to the contractor of the member who had not attended the meeting for first violation and Rs.25,000 for subsequent violations. For item iii), iv), v) and vi) Rs.25,000 for first violation and Rs.50,000 for subsequent violations
4.	ID card	<ul style="list-style-type: none"> i) Non-adherence of clause 8.1,8.2and8.3 	Rs.1,00,000 for first violation and Rs.2,00,000 for subsequent violations
5.	SHE Training	<ul style="list-style-type: none"> i) Not complying to the requirements as mentioned in conditions of contract on SHE and project SHE manual with regard to: <ul style="list-style-type: none"> a) Induction training not given b) Supervisor/engineer/manag er training not conducted as per clause9.6 c) Refresher training as per clause 9.7 and 9.11 not conducted d) Tool-box talk not conducted asper clause9.8 e) Skill development training not conducted as clause9.9 f) Daily Safety Oath not conducted as per clause9.10 g) Top management behavior based SHE training conducted 	For item 1 a) to g) Rs.50,000 for first violation on and Rs.1,00,000 for subsequent violations
6.	SHE Inspection	<ul style="list-style-type: none"> i) Not complying to the requirements as mentioned in conditions of contract on SHE and project SHE manual as per clause10.0 ii) Noncompliance of clause10.3.6 	Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations
7.	SHE audits	<p>Internal Audit: MARS& Monthly Electrical Audit</p> <ul style="list-style-type: none"> i) Not conducted as per SHE Plan ii) Report not sent to Employer iii) Action not taken for any month <p>External Audit (Quarterly / Annual)</p> <ul style="list-style-type: none"> iv) Not conducted as per SHE Plan v) Report not sent to employer vi) Action not taken for any quarter 	<p>For item i) to iii) Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations.</p> <p>For item iv) to vi) Rs.1,00,000 for first violation and Rs.2,00,000 for subsequent violations.</p>

8.	SHE Communication	<ul style="list-style-type: none"> i) Important days to be observed for SHE awareness as furnished by employer not observed ii) Posters as furnished by Employer not printed and displayed 	<ul style="list-style-type: none"> i) Rs.10,000 for first violation and Rs.50,000 for subsequent violations ii) 2,00,000 per contract
9.	SHE Submittals	<ul style="list-style-type: none"> i) Noncompliance of clause13.1 ii) Noncompliance of clause13.2 iii) Noncompliance of clause13.3 	<p>For item i) Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations</p> <p>For item ii) and iii) Rs.1,00,000 for first violation and Rs.2,00,000 for subsequent violations</p>
10.	Injury and Incidence reporting	<ul style="list-style-type: none"> i) Fatal incidents ii) Injury/ Lost Time Incidents / dangerous occurrences / Road Traffic incident iii) Abnormal delay in reporting accidents or willful suppression of information about any accidents / dangerous occurrence as per clause14.1.4 iv) Delay in informing about any incidents (Fatal or LTI)/ dangerous occurrences/ Near miscasess / Road Traffic incident v) Non-compliance of the clause14.3 &14.4 	<ul style="list-style-type: none"> i. Rs.5,00,000 for first fatality and Rs.10,00,000 for every subsequent fatality. ii. Rs.1,00,000 for first grievously injured person and Rs.2,00,000 for every subsequent grievously injured person (Grievous Injury as defined by Workmen Compensation Act) iii. Rs.1,00,000 for first violation andRs.2,00,000 for subsequent violations <p>For items iv) and v) Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations</p>
11.	Emergency preparedness Plan	Non-compliance of the clause 15.1,15.2, 15.3, 15.4, 15.5 and 15.6	Rs.1,00,000 for non-compliance of any of the clauses
12.	Housekeeping	<ul style="list-style-type: none"> i) Housekeeping maintenance register not properly maintained up to date ii) Surrounding areas of drinking water tanks / taps not hygienically cleaned/ maintained iii) Office, stores, toilet / urinals not properly cleaned and maintained. iv) Required dustbins at appropriate places not provided / not cleaned. 	Rs.10,000 per single violation Compounded to a maximum of Rs.1,50,000at any single instance

		<ul style="list-style-type: none"> v) Stairways, gangways, passageways blocked. vi) Lumber with protruding nails left as such vii) Openings unprotected viii) Excavated earth not removed within a reasonable time. ix) Truck carrying excavated earth not covered / tyres not cleaned. x) Vehicles / equipments parked / placed on roads obstructing free flow of traffic xi) Unused surplus cables / steel scraps lying scattered xii) Wooden scraps, empty wooden cable drums lying scattered xiii) Water stagnation leading to mosquito breeding 	
3.	Working at Height / Ladders and Scaffolds	<ul style="list-style-type: none"> i) Not using or anchoring Safety Belt ii) Not using Safety Net iii) Absence of life line or anchorage point to anchor safety belt iv) Non-compliance of clause 18.17 v) Using Bamboo ladders vi) Painting of ladders vii) Improper usage (less than 1m extension above landing point, not maintaining 1:4 ratio) viii) Aluminum ladders without base rubber bush ix) Usage of broken / weak ladders x) Usage of re-bar welded ladders xi) Improper guardrail, toe board, barriers and other means of collective protection xii) Improper working platform xiii) Working at unprotected fragile surface xiv) Working at unprotected edges 	Rs.10,000 per single violation Compounded to a maximum of Rs. 1,50,000 at any single instance
14.	Lifting appliances and gear	<ul style="list-style-type: none"> i) Non-availability of fitness certificate as per clause 21.3 ii) Documents not displayed on the machine or not available with the operator as per clause 21.4 iii) Maximum Safe Working Load not written on the machine as per clause 21.5 iv) Non-compliance of 21.6 v) Non-compliance of 21.7 vi) Automatic safe load indicator not provided or not in working condition 	Rs.50,000 per single violation Compounded to a maximum of Rs.5,00,000 at any single instance

		<p>as per clause 21.8</p> <p>vii) Age of the operator less than 21years or without any license and non-compliance of other item as per clause 21.9</p> <p>viii) Non-compliance of 21.10</p> <p>ix) Non-compliance of any of the items mentioned regarding rigging requirements as per clause 21.11</p> <p>x) Failure to submit method statement in case of all critical lifting</p> <p>xi) Person riding on crane.</p> <p>xii) Creating more noise and smoke</p> <p>xiii) Absence of portable fire extinguisher in driver cabin</p> <p>xiv) Fail to guard hoist platform</p> <p>xv) No fencing of hoist rope movement area</p> <p>xvi) Hoist platform not in the horizontal position</p> <p>xvii) Non-compliance of clause 21.1(b)</p>	
15.	Launching operation	Non-adherence of any of the provisions mentioned in clause 22.2	Rs. 50,000 for first violation and Rs.1,00,000 for subsequent violations.
16.	Site Electrical safety	<p>i) Non-compliance of clause 26.1.1</p> <p>ii) Non-compliance of clause 26.2.4, 26.2.5</p> <p>iii) Non-compliance of clause 26.3.1</p> <p>iv) Non-compliance of clause 26.7, 26.8 and 26.9.1</p> <p>v) Non-compliance of clause 26.10 and 26.13</p> <p>vi) Non-compliance of clause 28.3.2</p> <p>vii) Exposed electric lines (fermentative damage) and circuits in the workplace.</p> <p>viii) Inserting of bare wires into the socket</p> <p>ix) Improper grounding for the electrical appliances</p> <p>x) Electrical cables running on the ground</p> <p>xi) Non-compliance clause 27.0</p>	Rs.10,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance
17.	Hand tools and Power tools	i) Non-compliance of clause 28.0	Rs.10,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single
18.	Gas Cutting	<p>i) Wrong colour coding of cylinder.</p> <p>ii) Cylinders not stored in upright position.</p> <p>iii) Flash back arrester, non-return valve and regulator not present or not in working condition.</p>	Rs.10,000 per single violation Compounded to a maximum of Rs.50,000 at any single instance

		<ul style="list-style-type: none"> v) Fail to put cylinders in a cylinder trolley. vi) Damaged hose. vii) Using domestic LPG cylinders viii) Fail to store cylinder 6.6m away from fire prone materials ix) Fail to use hose clamps x) Fire extinguisher not placed in the vicinity during operation 	
19.	Welding	<ul style="list-style-type: none"> i) Voltmeter and Ammeter not working ii) Improper grounding and return path. iii) Damaged welding cable iv) Bare openings in the cable. v) Non-availability of separate switching the transformer vi) Non-availability of main switch control to switch off power to the welding unit. vii) Usage of reinforcement rod as return conductor viii) Damaged holder ix) Fire extinguisher not placed in the vicinity during operation 	Rs.10,000 per single violation Compounded to a maximum of Rs.50,000 at any single instance
20.	Fire precaution	<ul style="list-style-type: none"> i) Smoking and open flames in fire prone area ii) Using more than 24V portable electrical appliances in the fire prone area iii) Not proper ventilation in cylinder storage area. iv) Absence of fire extinguishers v) Fire extinguishers not refilled once in a year. vi) Fire extinguisher placed in a not easily accessible location 	Rs.5,000 per single violation Compounded to a maximum of Rs.25,000 at any single instance.
21.	Excavation, Tunneling and confined space	<ul style="list-style-type: none"> i) Non-compliance of clause34.1 ii) Non-compliance of clause34.2 iii) Non-compliance of clause34.3 	<p>For any item from i) and ii) Rs. 20,000per single violation Compounded to a maximum of Rs.1,50,000at any single instance.</p> <p>For item iii) Rs.20,000 per first violation and Rs.1,50,000for subsequent violations</p>
22.	Work permit system	<ul style="list-style-type: none"> i) Non-compliance of clause35.2 ii) Non-compliance of clause21.11.9 	For item I) and ii) Rs.50,000 per first violation and Rs.1,00,000 for subsequent violations

23.	Traffic Management	<ul style="list-style-type: none"> i) Non-compliance of clause 36.4.1 ii) Non-compliance of clause 36.8.3 iii) Non-compliance of clause 36.9.2 iv) Non-compliance of clause 36.9.3 v) Non-compliance of clause 36.9.7 vi) Non-compliance of clause 36.9.8 	Rs.1,00,000 per first violation and Rs.2,00,000 for subsequent violations
		a) Barricades <ul style="list-style-type: none"> i) Not Cleaned ii) Not in alignment iii) Not numbered iv) Not painted v) Red lights / reflectors not working vi) Damages not repaired vii) Not secured properly viii) Barricade inspector not employed ix) Protruding parts / portions repaired x) Barricades maintaining register not properly maintained up to date 	Rs.25,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance
		b) Contractor Vehicles <ul style="list-style-type: none"> i) Over loading of vehicles ii) Unfit drivers or operators iii) Unlicensed vehicles iv) Absence of traffic marshals v) Absence of reversing alarm vi) Absence of fog light (at winter) vii) Power / hand brakes not in working condition. 	Rs.25,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance
		c) Splashing of Bentonite on roads / non-cleaning of tyres of dumpers and transit mixers <ul style="list-style-type: none"> i) Mishandling of bentonite like splashing of bentonite outside specified width of barricading ii) Non-cleaning of tyres of dumpers and transit mixers before leaving the site and thereby creating a traffic safety hazard to road users. 	For item i) and ii) a) Rs.1,00,000 on first observation. b) Rs. 2,00,000 on second observation c) Rs. 3,00,000 on third and subsequent observations
24.	Batching plant / Casting yard	Non-adherence of any of the provisions mentioned in clause 38.0.	Rs. 10,000 for single violation compounded to a maximum of Rs.1,00,000 at any single instant.

25.	PPE	<ul style="list-style-type: none"> i) Not having ii) Not wearing (or) using and kept it elsewhere iii) Using damage done iv) Using wrong type v) Using wrong colour helmet or helmet without logo vi) Using for other operation (e.g., Using safety helmet for storing materials or carrying water from one place to other) vii) Not conforming to BIS standard viii) Non-compliance of clause 39.6,39.7 and 39.8 	<p>From item i) to vi). Rs.200 per single violation</p> <p>For item vii) Rs.10,000 for first violation and Rs.50,000 for subsequent violations</p> <p>For item viii) Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations</p>
26.	Occupational Health	<ul style="list-style-type: none"> i) Fail to conduct medical examination to workers ii) Absence of ambulance van & room iii) Workers not having ID card iv) Inadequate number of toilets v) Toilets not cleaned properly vi) Absence of water facilities for toilets and washing places vii) Toilet placed more than 500m from the worksite viii) Absence of drinking water ix) Absence of first-aid person in work site. x) Absence or inadequacy of first-aid box. xi) Misuse of first-aid box. xii) First-aid box not satisfy the minimum Indian standard. xiii) Smoking inside the construction site xiv) Drink and drive or work xv) Excessive noise and vibration xvi) Canteen not provided xvii) Food stuff not served on no loss no profit basis xviii) Creche not provided xix) Accommodation not provided as per BOCWA xx) Fumigation / insecticides not sprayed to prevent Mosquito breeding xxi) Non-compliance of clause 44.1 and 44.2 xxii) Non-compliance of clause 42.1.3 	<p>For items i) to xxi) Rs. 15,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance</p> <p>For item xxi) Rs. 50,000 for the first observation & Rs. 1,00,000 for the subsequent observations)</p>

27.	Labour Welfare measures	i) Non-adherence of Labour welfare provisions of BOCWA ii) Fail to register establishment and display the registration certificate at workplace iii) Absence of workers register and records iv) Absence of muster roll and wages register v) Fail to display an abstract of BOCWA and BOCWR	Rs.10,000 per single violation Compounded to a maximum of Rs.50,000 at any single instance
28.	Environmental Management	i) Environmental Monitoring not conducted as per National Ambient Air Quality Standard 2009. ii) Environmental Monitoring not conducted as per periodicity defined by law or as per employer/governmental agencies requirements. iii) Non-compliance of clause 47.1 to 47.17 iv) Non-compliance of clause 48.1 to 48.10 v) Non-compliance of clause 51.2 to 51.4 vi) Non-compliance of clause 53.1 to 53.6 vii) Non-compliance of clause 54.1 to 54.7	Rs50,000 per single violation Compounded to a maximum of Rs 2,00,000 at any single instance
29.	Employer's approval	i) Non-compliance of Clause 5.5	Rs. 50,000 for first violation and Rs. 1,00,000 for subsequent violation
30.	Experts / agencies for SHE services	i) Non-compliance of Clause 16.0	Rs. 50,000 for first violation and Rs. 1,00,000 for subsequent violation
31.	Construction machinery	i) Non-compliance of Clause 23.0	Rs. 50,000 for first violation and Rs. 1,00,000 for subsequent violation
32.	SHE Conformity Notice (NCN)	i) Compliance report not submitted within seven days of receiving of NCN ii) Repeated violations observed on the same issues. iii) Failed to submit the NCN closing report on monthly basis with evidences iv) Non-compliance of Clause 10.4	Rs. 25,000 for first violation and Rs. 50,000 for subsequent violations
33.	International Standards, Guidelines & ISO Certifications	The process of certification of the project: i) Non-compliance of Clauses 3.4.1 & 3.4.2	Rs. 1,00,000 for first violation and Rs. 2,00,000 for subsequent violations

56.4 Without limiting to the unsafe acts and or conditions mentioned above in clause 56.3 the Employer shall have the right to deduct charges for any other unsafe act and or condition depending upon the gravity of the situation on a case-to-case basis. The charges shall be in comparison with that of the similar offence

indicated in clause 56.3.

57.0 Stoppage of work

57.1 The Employer shall have the right to stop the work at his sole discretion, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and / or property, and / or equipments. In such cases, the contractor shall be informed in writing about the nature of hazards and possible injury / accident.

57.2 The contractor shall not proceed with the work until he has complied with each direction to the satisfaction of Employer

57.3 The Contractor shall not be entitled for any damages / compensation for stoppage of work, due to safety reasons and the period of such stoppage of work shall not be taken as an extension of time for Completion of the Facilities and will not be the ground for waiver of levy of liquidated damages.

58.0 Awards

The following categories will be considered for awards as per the scheme in practice of Employer

- i) For every safe million-man hour working without any reportable incidents
- ii) Zero fatality contracts
- iii) 100% adherence to voluntary reporting of all accidents throughout the currency of contract
- iv) Safest project team of the year.
- v) Best SHE team of the year.
- vi) Safest Contractor of the year

APPENDIX NO.:1

Memorandum of Understanding between Uttar Pradesh Metro Rail Corporation (UPMRC) and the Contractor for safe execution of contract work

This Memorandum of Understanding is made and executed by and between Uttar Pradesh Metro Rail Corporation Ltd. (UPMRC), a Company registered under the Companies Act 1956 and having its registered office at _____ or their authorized representative(s), hereinafter referred to as "EMPLOYER" (which expression shall wherever the context so requires or admits be deemed to mean and include its successors in business and assigns) of the one-party

AND

M/s

_____ having its
registered office at _____ hereinafter referred to as the
"CONTRACTOR" (which expression shall wherever the contexts requires or admits be
deemed to mean and include its successors in business and assigns) of the other party

WITNESSETH THAT

WHEREAS the EMPLOYER gives highest importance to the occupational safety, health and environment during execution of work, seeks cooperation from the CONTRACTOR in this endeavor.

Thus, this Memorandum of Understanding is for promoting the safety, health and environment aspects required to be followed at workplace/site and will be applicable to any site job to be done by the CONTRACTOR

AND

WHEREAS the CONTRACTOR has read all the terms and conditions of the EMPLOYER and whereas the CONTRACTOR has studied the following documents:

- (a) Tender Documents, including Notice Inviting Tender, General Conditions, Special Conditions,
- (b) Conditions of Contract on Safety, Health and Environment and Project Safety, Health and Environment Manual.
- (c) Building and Other Construction Workers (Regulations of Employment and Conditions of Service) Act 1996, Central Rules 1998 and subsequent Rajasthan Government Rules 2009, Building and Other Construction Workers Welfare Cess Act and Rules and Rajasthan and Other Construction Workers' Welfare Board Rules and
- (d) Indian Electricity Act 2003 and Rules 1956.
- (e) Corresponding International / Bureau of Indian Standard Codes.

The amendments to any of the above rules and any other rules & regulations or procedures, circulars, notices & advices laid down by the EMPLOYER from time to time.

Now it is hereby AGREED AND DECLARED by and between the EMPLOYER and the CONTRACTOR as follows:

- | | |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Clause - I | The CONTRACTOR shall abide by the terms and conditions stipulated in Condition of Contract on Safety, Health & Environment and Project Safety, Health & Environment Manual. |
| Clause - II | The CONTRACTOR shall undertake full responsibility for safe execution of job at work place/site and safety of his personnel and adjoining road users during work. |
| Clause - III | Without giving any prior notice, the EMPLOYER shall from time to time be entitled to add/or amend any or all terms and conditions with a view to improving safety and occupational health of personnel and safety of work, with immediate effect and the same shall be binding on the CONTRACTOR. The contractor agrees to implement all such amendments, which shall be laid down by the EMPLOYER. |

Clause - IV Besides following the guidelines, safety rules and regulations, safety codes given in various safety procedures/documents mentioned above, the CONTRACTOR shall also prepare detailed method statement which includes job safety analysis wherever there are complicated and hazardous/high risk working involved and get it approved from Employer before execution of work.

Clause - V Any negligence or violation in implementing any of the provision of the conditions of contract on Safety, Health & Environment and Employer project Safety, Health & Environment Manual shall be viewed seriously, and the contractor is liable to compensate the employer for the loss of reputation. The cost of damage shall be fixed on case-to-case basis.

In witness thereof, the Parties hereto by representatives duly authorized have executed this Memorandum of Understanding on ____day of _____ 20_____.

Signed on
For and on behalf of
Employer

Signature:
Name:
Title:

Signed on
For and on behalf of
(Contractor)

Signature:
Name:
Title:

APPENDIX NO.: 2

Safety, Welfare and Occupational Health requirements as per BOCW Act 1996 and Rules 1998 and BOCW Rules 2009.

(This list has been prepared in chronological order with primary importance to **Section** of Act and secondary importance to **Rules**)

- S-** Refers relevant **Sections** in BOCWA
R- Refers relevant **Rules** in BOCWR
C- Refers relevant **Chapter No.** in BOCWR

Sl. No.	Items	Relevant Sections / Rules in BOCWA and BOCWR and UPBOCWR
1.	Registration of establishment	S - 7, R - 23 to 27
2.	Display of registration certification at workplace	R - 26 (5)
3.	Hours of work	S - 28 R - 234 to 237
4.	Register of overtime	S - 28; S - 29 R - 241(1) Form XXII
5.	Weekly rest and payment at rest	R - 235
6.	Night shift	R - 236
7.	Maintenance of workers registers and records	S - 30 R - 238
8.	Notice of commencement and completion	S - 46 R - 239
9.	Register of persons employed as building workers	R - 240
10.	Muster roll and wages register	R - 241(1) (a); Form XVI and XVII
11.	Payment of wages	R - 248
12.	Display of notice of wages regarding	R - 249

13.	Register of damage or loss	R - 241(1)(a); Form XIX, XX, XXI
14.	Issue of wages book	R - 241(2)(a); Form XXIII
15.	Service certificate for each worker	R - 241(2)(b); Form XXIV
16.	Display an abstract of BOCWA and BOCWR	R - 241(5)
17.	Annual return	R - 242; Form XXV
18.	Drinking water	S - 32
19.	Latrines and Urinals	S - 33, R - 243
20.	Accommodation	S - 34
21.	Creches	S - 35
22.	First-aid boxes	S - 36 R - 231 and Schedule III
23.	Canteens	S - 37, R - 244
24.	Food stuff and other items served in the	R - 245
25.	Supply of tea and snacks in work place	R - 246
26.	Food charges on no loss no profit basis	R - 247
27.	Rajasthan BOCW welfare Board Rules	R - 250 to 296
28.	Safety committee	S - 38, R - 208
29.	Safety officer	S - 38 R - 209 and Schedule VII
30.	Reporting of accidents and dangerous	S - 39, R - 210
31.	Procedure for inquiry in to the causes of	R - 211
32.	Responsibility of employer	S - 44, R - 5
33.	Responsibility of Architects, Project engineer and Designers	R - 6
34.	Responsibility of workmen	R - 8
35.	Responsibility for payment of wages and Compensation	S - 45
36.	Penalties and Procedures	S - 47; S - 55
37.	Excessive noise, vibration etc.	R - 34
38.	Fire Protection	R - 35
39.	Emergency action plan	R - 36
40.	Fencing of motors	R - 37
41.	Lifting of carrying of excessive weight	R - 38
42.	Health, Safety and Environmental Policy	R - 39
43.	Dangerous and Harmful Environment	R - 40
44.	Overhead protection	R - 41

45.	Slipping, Tripping, Cutting, Drowning and Falling Hazards	R - 42
46.	Dust, Gases, Fumes, etc.	R - 43
47.	Corrosive substance	R - 49
48.	Eye Protection	R - 45
49.	Head Protection and other protection apparel	R - 46; R - 54
50.	Electrical Hazards	R - 47
51.	Vehicular traffic	R - 48
52.	Stability of structure	R - 49
53.	Illumination	R - 50; R - 124
54.	Stacking of materials	R - 51
55.	Disposal of debris	R - 52
56.	Numbering and marking of floors	R - 53
57.	Lifting appliances and gears	C - VII; R - 55 to 81
58.	Runways and Ramps	C - VIII; R - 82 to 85
59.	Working on or adjacent to water	C - IX; R - 86 & 87
60.	Transport and earthmoving equipments	C - X; R - 88 to 95
61.	Concrete work	C - XI; R - 96 to 107
62.	Demolition	C - XII; R - 108 to 118
63.	Excavation and Tunneling works	C - XIII; R - 119 to 168
64.	Ventilation	R - 153
65.	Construction, repair and maintenance of step	C - XIV; R - 169 to 171
66.	Ladders and Step ladders	C - XV; R - 172 to 174
67.	Catch platform and hoardings, chutes, safety belts and nets	C - XVI; R - 175 to 180
68.	Structural frame and formworks	C - XVII; R - 181 to 185
69.	Stacking and unstacking	C - XVIII; R - 186 & 187
70.	Scaffold	C - XIX; R - 188 to 205
71.	Cofferdams and Caissons	C - XX; R - 206 to 211
72.	Explosives	C - XXI; R - 212 & 213
73.	Piling	C - XXII; R - 214 to 222
74.	Medical Examination for building and other construction worker, Crane operator a Transport vehicle driver	R - 81; R - 223(a)(iii) and Schedule XII
75.	Medical examination for occupational health Hazards	R - 223(a)(iv)
76.	Charging of workers for Medical Examination	R - 223(b)
77.	Occupational health centers and Medical	R - 225 and Schedule X & XI

78.	Ambulance van & room	R - 226 & 227 and Schedule IV & V
79.	Stretchers	R - 228
80.	Occupational health service for building workers	R - 229
81.	Medical examination for occupational health Hazards	R - 223(a)(iv)
82.	Emergency care services and emergency	R - 232
83.	Panel of experts and agencies	Central Rule 250 Delhi Rule 297
84.	Power of inspectors	Central rule 251 Kerela rule 298

APPENDIX NO.: 3

SITE SHE PLANS

Contract No	
Contractor Name	
Project Name	

1	Project Highlights <ul style="list-style-type: none"> i. Title of the content ii. Contractor Number iii. Brief scope of work iv. Location map/ key plan v. Period of the project
2	SHE Policy
3	Site Organization Chart Chart indicating reporting of SHE personnel
4	Roles & Responsibility Individual responsibility of the <ul style="list-style-type: none"> i. Project Manager ii. Construction Manager iii. Construction Supervisors iv. SHE Committee Members v. SHE In charge vi. Site Engineers vii. First Line Supervisors viii. Sub-contractors
5	SHE Committee <ul style="list-style-type: none"> i. Details - Chairman, Members, Secretary and Employer's representative, ii. Procedures for effective conduct of meeting
6	SHE Training
7	Subcontractor Evaluation, Selection and Control
8	SHE Inspection
9	SHE Audit
10	Accident Investigation and Reporting Procedures
11	Occupational Health Measures

12	Labour Welfare Measures
13	Risk assessment and mitigation procedures
14	Safe Work Procedures <ul style="list-style-type: none"> i. Work at Height ii. Structural Steel Erection iii. Launching of segments iv. Floor, Wall Openings and Stairways v. Welding, Cutting and Bracing vi. Lifting appliances vii. Work Permit Systems viii. Electrical Equipments ix. Mechanical Equipments x. Excavation xi. Fire Prevention xii. Hazardous Chemicals and Solvents xiii. Ionising Radiation xiv. Lighting xv. Abrasive Blasting
15	Work Permit System
16	List of standard job specific PPEs to be used in the site
17	Maintenance of Regime for construction Equipment and Machinery
18	Traffic management
19	Housekeeping
20	Environmental Management
21	Emergency Management
22	Visitors and Security arrangement

APPENDIX NO.: 4

WORKPLACE POLICY ON HIV/AIDS PREVENTION & CONTROL FOR WORKMEN ENGAGED BY CONTRACTORS

"Being mobile in and of itself is not a risk factor for HIV infection. It is the situations encountered and the behaviours possibly engaged in during mobility or migration that increase vulnerability and risk regarding HIV / AIDS."

UNAIDS, Technical update on 'Population, Mobility and AIDS', February 2001, p.5

Uttar Pradesh Metro Rail Corporation Limited (UPMRC) recognizes HIV / AIDS as a developmental challenge and realizes the need to respond to it by implementing regular HIV / AIDS prevention programmes and creating a non-discriminatory work environment for HIV infected workmen engaged by contractors. For the purpose of making conscientious, sensitive and compassionate decision in addressing the realities of HIV / AIDS, Employer has established these guidelines based on ILO code of practice on HIV / AIDS.

- ☐ Creating awareness through professional agency using IEC (Information, Education and Communication) package specially designed for migrant workers.
- ☐ Institutional capacity building by training the project implementation team, Safety, Health & Environment (SHE) Managers, establishing linkages for efficient diagnosis and treatment of the affected workers, effective monitoring of implementation and documentation for further learning.
- ☐ Establishing peer educators by selecting them in consultation with contractors and training them through professional agencies so that they become focal point for any information, education and awareness campaigns among the workmen throughout the contract period.
- ☐ Promotion of social marketing of condoms through concerned State Government body.

APPENDIX NO. 5

MINIMUM MANPOWER REQUIREMENTS OF SHE ORGANIZATION BASED ON CONTRACT

VALUE

	1	2	3	4	5	6
Awarded Contract value (in Cr.)	Chief SHE Manager	Senior SHE Manager	Junior SHE Manager	Safety Steward	Senior SHE (Electrical) Engineer	Junior SHE (Electrical) Engineer
up to 2	-	-	1	Refer Note 1	-	1
up to 10	-	1	Refer Note 1		1	Refer Note 2
up to 25	1	Refer Note 1			1	
up to 100	1				1	
up to 250	1				1	
More than 250	1				1	

	7	8	9	10	11	12	13
Awarded Contract value (in Cr.)	*Junior SHE (Fire) Manager / **Senior	Occupational Health officer with Necessary Nursing	Environmental Manager	Senior SHE (Traffic) Engineer (Refer Note4)	Barricade Maintenance Squad (Refer Note4)	House Keeping Squad	Labour Welfare Officer
up to 2	-	-	-	-	Refer Note 5	Refer Note 6	-
up to 10	-	1 (PT)	1	1			1
up to 25	1*	1 (PT)	1	1			1
up to 100	1*	1 (FT)	1	1			1
up to 250	1**	2(FT)	1	1			1 with support staff
More than 250	2**	2(FT)	1 with support staff	1			1 with support staff

Note1: Adequate, qualified and trained SHE Professionals with required support staff to be deployed at each worksite at each shift.

Note 2: Adequate, qualified and trained Electrical Engineers / supervisors to be deployed at each worksite at each shift.

Note3: (PT) means Part-Time and (FT) means Full-time.

Note4: Senior SHE (Traffic) Engineer Post and Barricade Manager (including the staff) Posts are applicable to contracts where the work has to be executed either below or over the right-of-way like Viaduct, Tunnel Contracts wherein erection and maintenance of barricades are paramount important.

Note5: One Barricade Manager supported by required supervisors and workmen

Note6: One Housekeeping Manager supported by required supervisors and workmen

APPENDIX NO. 6

MINIMUM QUALIFICATION AND EXPERIENCE FOR (SHE) SAFETY, ELECTRICAL, ENVIRONMENTAL, TRAFFIC ENGG. AND OCCUPATIONAL HEALTH PROFESSIONALS

Sl. No	Designation	Qualification	Experience(in years)
	Chief SHE Manager	<p>The Chief SHE Manager shall have qualified in any of the following degree/diploma:</p> <ul style="list-style-type: none"> i) Post Graduate Diploma in Industrial Safety & Environmental Management (PGDISEM)from National Institute of Industrial Engineering, Mumbai ii) M.E. in Industrial Safety from NIT, Trichy, Tamil Nadu iii) M.E. in Industrial Safety from Mepco Schlenk Engineering College, Sivakasi, Tamil Nadu iv) B.E. in Fire and Safety Engg. From Cochin University of Science and Engg. Cochin, Kerala v) B.E. with advanced Safety Management Diploma from CLI / RLI Mumbai / Chennai / Kolkata and Lucknow/Kanpur/Agra. vi) B.E / B.Arch., with one-year Full Time advanced Safety diploma from NICMAR, Hyderabad. vii) B.E/B.Tech with any other equivalent State and Central Govt. recognized full time Degree / Diploma in Safety. viii) International qualifications like CSP (Certified Safety Professional), NEBOSH, MIOOSH, MSISO etc. 	<p>Total Safety Exp: 12yrs</p> <p>Metro Safety Exp: 07yrs</p>

2	Senior SHE Manager (Refer Note 3)	As stated in Sl. No:1 and in addition the following categories: i) B.Sc. (Physics/Chemistry/Maths) with one-year Full Time advanced Safety diploma from NICMAR, Hyderabad ii) B.Sc. / Diploma in Engg. with advanced Safety Management Diploma from CLI / RLI / Mumbai/ Chennai / Kolkata and Lucknow/Kanpur/Agra. iii) B.Sc. (Physics/Chemistry/Maths) with One-year Full Time diploma in Safety Engineering offered by West Bengal State Technical Education Departments and similar courses by other states. iv) Any Graduate or diploma holder with 7 years of work experience in full-fledged SHE department of any Public Sector / Leading Private Sector / MNC/ with prior approval of employer on a case to case basis	Total Safety Exp: 10yrs Metro Safety Exp: 05yrs
3	Junior SHE Manager (Refer Note 3)	i) Degree in Science / Diploma in Engineering with Govt. recognized safety diplomas from Correspondence course of NICMAR, Annamalai University, National and State Productivity Councils, Other State Technical Education Boards etc. ii) Any Graduate or diploma holder with <u>5 years</u> of work experience in full-fledged SHE department of any Public Sector / Leading Private Sector / MNC / with prior approval of employer on a case to case basis	Total Safety Exp: 07yrs Metro Safety Exp: 03yrs
4	Safety Steward (Refer Note 3)	Any basic qualification with any SHE related certificate courses.	2

5	Senior SHE(Electrical) manager	Degree in Electrical Engineering + Govt. recognized Electrical License holder	2
6	Junior SHE (Electrical) Manag	Diploma in Electrical Engineering + Govt. recognized Electrical License holder	1
7	Senior SHE (Fire) Manager	i) B.E. (Fire) from National Fire Service College, Nagpur ii) B.E (Fire & Safety) from Cochin University iii) Graduate with any Govt. recognized diploma in Fire Safety with 5 years of experience	2 (for category (i) and (ii)only)
8	Junior SHE (Fire) Manager	Any Diploma holder with any Govt. recognized diploma in Industrial Fire Safety.	1
9	Occupational Health	MBBS with Govt. recognized degree/diploma in Industrial/ occupational health	1
10	Environment Manager	Degree in Environmental Engineering / Science, 6 years (Experience) With 2 years Metro Rail Experience.	2
11	Senior SHE (Traffic) Engineer	Govt. recognized PG Degree / Degree / Diploma in Traffic/Transportation Engineering or Planning	1
12.	House Keeping Squad -	Any Diploma in Engineering	1
13	Barricade	Any Diploma in Engineering	1
14	Labour Welfare Officer	Any Degree with Govt. Recognized Degree / Diploma / P G Diploma in Labour Welfare related fields like Law, Personnel / Industrial Relations etc.	2

Note1: In some extraordinary cases where the candidate had earlier worked in Metro Project stheycanbe considered for the following posts:

- i) Senior SHE Manager
- ii) Junior SHE Manager
- iii) Safety Steward

depending upon the qualification and no. of years of experience on a case to case basis even if they do not possess the prescribed qualification as listed above.

Note2: In all other cases other than listed under note 3 (i), (ii) and (iii) irrespective of their earlier experience with Metro projects the candidates shall qualify as specified above.

APPENDIX NO. 7

MINIMUM REQUIREMENTS OF SHE MONITORING AND AUDIO-VISUAL EQUIPMENTS

1. For the purpose of minimum requirements of Audio-visual and Other equipment the contracts are categorized into the following groups:

Contract Value (Initial awarded value of	Group
up to 25 Cr	A
up to 100 Cr	B
up to 250 Cr	C
More than 250 Cr	D

2. Every contractor falling into the above groups shall provide the following minimum required audio-visual aids for conducting weekly review, monthly safety committee and other post review meeting of all fatal and major incidences effectively. These audio-visual equipments are a must for conducting periodical in-house safety presentations in the training programmes.
3. In addition to the above portable hand-held digital sound level meter (SLM) and portable hand-held digital lux meter are also to be provided.

Sl.No	SHE monitoring and Audio-Visual Equipment details	SHE monitoring and Audio-Visual equipment required for			
		Group A Contract	Group B Contract	Group C Contract	Group D Contract
1.	Portable hand-held Digital Sound Level Meter (SLM)	1	1	1	1
2.	Portable hand-held Digital Lux Meter	1	1	1	1
3.	Laptop Computer with standard configuration including multimedia facilities	1	1	1	1
4.	Colour Printer	1	1	1	1
5.	Computer projector with screen	-	1	1	1

6.	Overhead projector	1			
7.	35mm Camera (For taking accident investigation photos in which case the images cannot be easily altered)	1	1	1	1
8.	Digital camera with flash of minimum 4 mega pixel and video	1	1	1	2
9.	Digital still camera with flash of minimum 4 mega pixel	1	2	4	6
10.	Portable loudspeaker (for tool-box talk and emergency purpose)	1	1	2	6
11.	Communication facility like mobile phone, walky-talky etc	For all supervisors and managers/engineers working in Safety,			
12.	Accident investigation Kit containing the following:	1	1	1	2
a)	Chalk piece for marking				
b)	Measuring tape for measuring• Flexible tape – 2mlength • Metal Foot long scale				
c)	Equipment tags				
d)	Multipurpose Flash light				
e)	Barrier tape of 20m length				
f)	Accident investigation Forms and checklists				
g)	Enough Paper for witness recording and other noting				
h)	Emergency Phone Numbers list				

Hazard Identification Procedure

Hazards on site:

Falls

APPENDIX NO. 8

Training of Contractor's Employees/Staff/Worker's

Contractor shall provide a training/workshop on safety, health & environment (SHE) to all its workers/staff/employees/subcontractors of at least 2 weeks (96 hrs.) at the time of induction. Before posting of any his worker's/staff/employees/subcontractors, the contractor shall give a certificate that the said person had undergone the requisite SHE training. Noncompliance of the above will invoke penalties as per the condition of contract on SHE, Vol-8 of Tender Document.

The training shall cover following aspects: -

- Earthing work
- Electricity Machinery
- Handling materials
- Transport
- Site housekeeping
- Fire

Personal Protective Equipment

- What is available?
- How to obtain it?
- Correct use and care.

Health

- Site welfare facilities
- Potential health hazards
- First Aid/CPR

Duties of the contractor

- Brief outline of the responsibilities of the Contractor by law Details of Contractor's accident prevention policy
- DMRC's SHE manual
- Building and other Constructions Welfare Law

Employee's Duties

- Brief outline of responsibilities of employee under law Explanation of how new employees fit into the Contractor's plan for accident prevention. (Induction and orientation).

Note: This list is not exhaustive, and contractors shall be required to submit their detailed training curriculum subjects wise giving time duration and training faculty details for Engineers approval

APPENDIX NO.9

ID Card Format

(85 mm x 55mm)

Front side of ID

Card:

UPMRC Project	
Company Logo	Name & Address of Main / Sub / Labour contractor
Name: Designation: Blood Group: Valid up to:	Photo
Authorized Signatory	

Backside of ID

Card:

Employee Address: _____ _____ _____ _____
<div>1 This card is the property of "XX"(Main / Sub / Labour Contractor) and must be returned on demand and on transfer / cancellation of employment.</div> <div>2 A change will be levied for replacement of the card due to loss or theft</div> <div>3 If found please return to</div>
Main contractors' Address

APPENDIX NO. 10

DAYS TO BE OBSERVED FOR CREATING SHE AWARENESS

1 st Monday to Sunday of	Road Safety Week (Subjected to confirmation from Ministry of Road Transport, Govt. of India every year.)
16 th February	Kyoto Protocol Day
March	Red Cross Month
May 1 to 7	Emergency Preparedness Week
4 th March	National Safety Day
7 th April	World Health Day
14 th April	Fire Safety Day
April 18 to 22	Earth Week
20 th April	Earth Day
20 th April	Noise Awareness Day
28 th April	ILO World Day for Safety and Health at Work Day
5 th June	World Environmental Day
12 th June	World Day against Child Labours
9 th July	Occupational Health Day
17 th October	World Trauma Day
1 st December	World AIDS Day

APPENDIX NO. 11

Minimum Requirements of SHE Communication Posters / Signages / Video

- For the purpose of Minimum requirements of SHE Communication Posters / Signages / Video the contracts are categorized into the following groups:

Contract Value (Initial awarded value of	Group
up to 25 Cr	A
up to 100 Cr	B
up to 250 Cr	C
More than 250 Cr	D

- Every contractor falling into the above groups shall prepare a SHE Communication Plan as a part of site specific SHE Plan and shall include the following minimum requirement of Posters / Signages / Video as applicable. In case readymade posters are available in any of the category from National Safety Council, Loss Prevention Association of India or any other safety related organizations they may procure the same and display it. In case the same is not available then the contractors shall make necessary arrangements to get the posters designed and

Table No.: 1 - Minimum No. of Posters

Sl.No	SHE Poster Title	Minimum No. of concepts in each title	No. of Posters / Signage / Video			
			Group A Contract	Group B Contract	Group C Contract	Group D Contract
1.	Safety Culture	5	Each 10	Each 50	Each 75	Each 100
2.	Daily Safety Oath	1 English & 1 Hindi	Each 100	Each 200	Each 500	Each 1000
3.	Mandatory PPE Usage					
a)	Signages to display the messages like PPE ZONE,	2 types of sizes	Each 25	Each 50	Each 75	Each 200

	NO PPE ZONE, HARD HAT AREA etc.	made up of metal sheet to be mounte				
b)	Helmet	5	Each 25	Each 50	Each 75	Each 200
c)	Shoe	5	Each 25	Each 50	Each 75	Each 200
d)	Goggles & Ear Protection	5	Each 25	Each 50	Each 75	Each 200
e)	Full Body Harness	5	Each 25	Each 50	Each 75	Each 200
f)	Hi-Vi Jacket	5	Each 25	Each 50	Each 75	Each 200
4.	Emergency Management Plan	5	Each 25	Each 50	Each 75	Each 200
5.	Working at Heights	10	Each 25	Each 50	Each 75	Each 200
a)	Ladder, Stairway, Scaffold - Signages to display the messages like SAFE, UNSAFE, FIT FOR USE, AVOID USE etc.	5 types of sizes made up of metal sheet to be	Each 25	Each 50	Each 75	Each 200
6.	Site Electricity	5	Each 25	Each 50	Each 75	Each 200
7.	Crane Safety	5	Each 25	Each 50	Each 75	Each 200
8.	Slings	5	Each 25	Each 50	Each 75	Each 200
9.	Rigging Procedures	5	Each 25	Each 50	Each 75	Each 200
10.	Excavation	5	Each 25	Each 50	Each 75	Each 200
11.	Occupational Health (Mosquito Control, HIV/AIDS awareness, Dust Control, Noise	10	Each 25	Each 50	Each 75	Each 200
12.	First - Aid	3	Each 25	Each 50	Each 75	Each 200

13.	Labour Welfare Measures (Payment of Minimum Wages, Avoidance of Child labour, signing in the Muster Roll, In case of accidents-what to do? etc	5	Each 25	Each 50	Each 75	Each 200
14.	Importance of "Safety Handbook"	1	25	50	75	200
15.	Traffic Safety (Speed limit, safe crossing and working	5	Each 25	Each 50	Each 75	Each 200
16.	Environmental Monitoring (Spillage of Muck, hazardous material, Improper drainage, water spray for dust containment etc.)	5	Each 25	Each 50	Each 75	Each 200
17.	Video in Hindi on PPE usage – 15 minutes duration	1	-	-	-	1

Note 1: Items mentioned under 17 is **video**. Items under 3 (a) and 5 (a) are **metal signage boards** and all other items are **posters**.

Table No.: 2 – Size of Posters / Signages

Sl.No	Item	Size
1.	Posters – Standard	17"x22" –135 GSM 4 Colour
2.	Posters – Special (Wherever required)	17"x22" card laminated FA Poster
3.	Posters - Mega size (Wherever required)	32"x40" Flex FA Poster
4.	First-Aid Booklet	6"x4"
5.	Safety Handbook	6"x4"

LKE(02)-02: "Design, Manufacturing, Supply, Installation, Testing and Commissioning of Heavy Duty Machine Room Less Elevators and Heavy Duty Escalators including Maintenance during 2 Year Defect Liability Period (DLP) and 01 (one) year comprehensive Annual Maintenance beyond DLP Period for Lucknow, Kanpur & Agra Mass Rapid Transport System Project under the Contract LKE(02)-02".

6.	Signages	Small: 12"x6" Big :
7.	Road Traffic Sign Boards	Strictly as per Indian Road Congress (IRC) specifications

Table No.: 3 – Safety Signage Colour (as per IS 9457)

Sl.No	Type of signage	Colour
1	Mandatory	Blue
2	Danger	Yellow
3	Prohibitory	Red
4	Safe conditions	Green

APPENDIX NO. 12

Experts / Agencies for SHE Services

Sl. No.	Organization	Services
Crane and Lifting Appliance Testing, Certification, Crane Safety Training and associated services		
1.	INTENCO Engineering Certifications LLP K - 10, South Extension, Part - 2, New Delhi - 110 049 Phone: 011 - 26254761, 26258130 Mobile: 9312260130 E-mail: info@intenco.in	
2.	Boss Technical Services A-2/295, Pankha Road, Janakpuri, New Delhi-110058 Mobile: 9811144107 E-mail: bosstechnical@yahoo.co.in	
3.	KR Bedmutha Techno Associates Pvt Ltd A-2A/120, Janakpuri, New Delhi- 110058 Tel: 011-25504438, 25504438 E-mail: Bedmutha_124@sify.com Website: www.krbta.com	

4.	<p>Meenal Engineers & Consultants 308, Agarwal Chamber-IV 27, Veer Savarkar Block Vikas Marg, Delhi-110092. Tel: 0120-4132552, 4101552, Mobile: 9811191052 E-mail: pk_bansal25@yahoo.co.in Website: www.meenalengineers.com</p>
SHE Services like ISO Certification, External SHE Audits, Consultancy services and SHE Training	
1.	<p>Bureau Veritas India Pvt. Ltd., B-21 & 22, First Floor, Sector-16, NOIDA-201 301 (U.P.) Phone: 0120 - 2515055, Fax: 0120 - 2515248 E-mail: enp.delhi@in.bureauveritas.com</p>
2.	<p>Quality Growth Services Pvt. Ltd. H-13, Kirti Nagar, New Delhi - 110 015 Fax: 011 - 25431737 / 25438598 / 25918332 E-mail: qgs@qgspl.com Website: www.qgspl.com</p>
3.	<p>EQMS INDIA PVT. LTD. E-49, 1stFloor, Dazzle House, Jawahar Park, Main Vikas Marg, Laxmi Nagar, Delhi 110092 Phone: 91-11-220 17639/2204 4754 Fax: 91-91 2201 5150 E-mail: eqms@eqmsindia.org</p>

4.	<p>Vexil Business Process Services Pvt. Ltd.</p> <p>10184, 3rdFloor (Landmark Inn)</p> <p>Main Arya Samaj Road, Karol</p> <p>Bagh, New Delhi – 110 005</p> <p>Mobile: 9350232711, 98102832201, 9350232714</p> <p>E-mail: info@vexilbps.com</p> <p>Website: www.vexilbps.com</p>
5.	<p>SGS India Pvt. Ltd</p> <p>226, Udyog Vihar</p> <p>Phase-I GURGAON-</p> <p>122016</p> <p>E-mail: brahmpal.upadhyay@sgs.com</p> <p>Website: www.sgs.com,</p> <p>Mobile: 08588839832</p>
6.	<p>American System</p> <p>Registrar 657, 2ndFloor,</p> <p>Sector-15,</p> <p>Part-1, Gurgaon, HARYANA- 122001.</p> <p>Phone: 0124-4271365,</p> <p>Fax: 0124-4271366</p> <p>Mobile: 09811653069</p>
7.	<p>Quality Austria Central Asia Pvt Ltd</p> <p>82, Okhla Industrial Area Phase-III</p> <p>New Delhi-110020</p> <p>Tel: 011-46465100, Fax: 46465101</p> <p>E-mail: marketing@qualityaustriaindia.com</p> <p>Web: www.qualityaustria.com</p>
8.	<p>BSI India</p> <p>The Mira Corporate Suites (A-</p> <p>2) Plot 1&2, Ishwar Nagar,</p> <p>Mathura Road, New Delhi-110065</p> <p>www.bsigroup.co.in</p>

9.	<p>Allied Boston Consultants India Pvt Ltd</p> <p>A-2/60, Second Floor, Shiv Arcade, Acharya Niketan, Mayur Vihar Phase-I</p> <p>Delhi-110091</p> <p>Tel: 011-22702467, Fax: 011-22753084</p> <p>E-mail: vishal.khosla@abcipl.co.in</p> <p>Website: www.abcipl.com</p>
10.	<p>TUV SUD South Asia Pvt Ltd</p> <p>C-153/1, Phase-I, Okhla Industrial area New Delhi-110020</p> <p>Tel: 011-30889797, Fax 30889595</p> <p>Website: www.tuv-sud.in</p>
11	<p>URS Certification Ltd</p> <p>F-3,Sector-6,Noida -201301,India</p> <p>Tel: +91-120 4516264-65 Fax+91-120 4297916</p> <p>Email:www.ursindia.com</p>
SHE Trainings and Audits	
1.	<p>Premier Safety & Health Solutions</p> <p>A-703, Ram krishan Apts</p> <p>Plot-12, Sector-23</p> <p>Dwarka, New Delhi- 110075</p> <p>Tel: 28050074, Mob: 935088832, 981007254</p> <p>E-mail: contact@pshs.in, Website: www.pshs.in</p>
2	<p>URS Certification Ltd</p> <p>F-3,Sector-6,Noida -201301,India</p> <p>Tel: +91-120 4516264-65 Fax+91-120 4297916</p> <p>Email:www.ursindia.com</p>

SHE Trainings for Workers and Staff

1	<p>Construction Industry Development</p> <p>Council 801, 8thFloor, Hem kunt Chambers,</p> <p>89, Nehru Place, New Delhi – 110 019</p> <p>E-mail:</p> <p>cidc@cidc.in,cidcindia@yahooo.com</p>
2.	<p>Delhi Productivity Council</p> <p>1E/10, Swami Ram tirath</p> <p>Nagar</p>
3.	<p>Indian Building Congress</p> <p>Sector-VI, RK Puram ,New Delhi-110022</p> <p>Tel: 26169531, 26170197, Fax: 26196391</p> <p>Website: www.ibc.org.in</p>
4.	<p>Manipal City & Guilds Skills Training Pvt Ltd</p> <p>256, Ground Floor, Okhla Industrial Estate</p> <p>Phase-3 New Delhi-110020, Tel: 9313927236</p> <p>E-mail:</p> <p>rajesh.ratnam@indiaskills.com</p> <p>Website: www.indiaskills.com</p>
5.	<p>Labour net Services India Pvt</p> <p>Ltd. A-1/55, Second Floor,</p> <p>Safdarjung Enclave, NEW DELHI-</p> <p>110029. Mobile: 9899151343</p> <p>E-mail: munish@labournet.in</p> <p>Website: www.labournet.in</p>
6.	<p>Renyge Technologies</p> <p>H-13, Second Floor, Kirti Nagar</p> <p>New Delhi-110015</p> <p>Tel: 9811653069, 9811029466</p>
7.	<p>SHELP Consultants</p> <p>241, L-Extn, Mohan Garden,</p> <p>Uttam Nagar, New Delhi-</p> <p>110059 Mob: 9717273812,</p> <p>9958331125</p>

8.	<p>Dolphin Fire EHS Consultants (P) Ltd</p> <p>10, Shanti Vihar, Near Karkar dooma Court</p> <p>New Delhi-110092. Tel: 011- 42147100, Fax: 22374819</p> <p>Mob: 9310464046</p> <p>E-mail: sachin@dolphinehs.com</p> <p>Web: www.dolphinehs.com</p>
9.	<p>Centre for Occupational and Environmental Health Ground Floor, BL Thareja Block</p> <p>Maulana Azad Medical College, New Delhi-110002 Ph:011-23233519,23221515,</p> <p>Telefax: 011-23214731</p> <p>E-mail: ivpss_coeh@yahoo.co.in,joshitk45@yahoo.co.in</p>
10.	<p>Arbrit Safety & Engineering Solutions Private Ltd 510, 5thFloor, Laxmi Deep Building, Distt Centre Laxmi Nagar, Delhi-110092</p> <p>Ph: 011-45636440, Mobile: 9873916087</p> <p>Website: www.arbritonline.com</p> <p>Kerala (Corporate) Office:</p> <p>Arbrit Safety & Engineering Solutions Private Ltd</p> <p>Building No. 34/1810D, 3rdFloor</p> <p>Poom kudy House,</p> <p>Edappally Cochin-682024,</p> <p>Kerala</p> <p>Ph: 0484-2753060, Mobile: 09447063682</p>

Agencies for Specialized SHE Training

.	<p>HSRTC, PENTASAFE, 201, 2ndFloor, Town Centre, Andheri Kurla Road, Marol, Andheri (East), Mumbai-400 059 Phone: 022-2850 2210/20/50 Fax: 022-2850 2260 E-mail: training@penta-safe.com Website: www.penta-safe.com</p>	<ul style="list-style-type: none"> • Training for Height Safety
2.	<p>St. Johns' Ambulance Red Cross Road New Delhi – 110 001</p>	<ul style="list-style-type: none"> • First-aid Training
3.	<p>Institute of Driving Training & Research, Wazirabad Road, Adjoining Loni Road flyover. New Delhi – 110 094 Phone: 011 – 22813474, 22815833 Fax: 011 - 22811131 & Institute of Driving Training & Research, Sarai Kale Khan ISBT New Delhi</p>	<ul style="list-style-type: none"> • Defensive Driving Training for Vehicle Drivers.
4.	<p>Institute of Road Traffic Education College of Traffic Management Aravali Hills, Suraj kund Badhkal Road, Sector-43, Faridabad, Haryana-121001 Regd. Office: B- 128-130 DDA Sheds, Okhla Industrial Area Phase-I, NEW DELHI-110020. Tel: 011-26816868, Fax: 26817965 Mob: 9350232056, Web: www.irte.com E-mail: training@irte.com</p>	<ul style="list-style-type: none"> • Defensive Driving Training for Vehicle Drivers.

5.	<p>L & T Eutectic</p> <p>32, Sivaji Marg</p> <p>New Delhi – 110 015</p> <p>Phone: 011 - 51419538, 51419539</p> <p>Fax: 011 - 51419600</p> <p>Website: www.Inteutecticwelding.com</p>	<ul style="list-style-type: none"> • Training for Gas Cutting/ Welding Safety
6.	<p>Modicare Foundation 4</p> <p>Community Centre, New Friends Colony, New Delhi – 110 065</p> <p>Phone: 011 – 5167235059</p> <p>Fax: 011 – 26915469</p> <p>E-mail: nivedita@modi.com</p> <p>nivedita@gmail.com</p> <p>Website: www.modicarefoundation.org</p>	<ul style="list-style-type: none"> • HIV / AIDS awareness
7.	<p>Manitowoc India Pvt Ltd</p> <p>2ndFloor, Plot No 117, Sector-44 Gurgaon-122001.</p> <p>HARYANA</p> <p>Website: www.manitowoc.com</p>	<ul style="list-style-type: none"> • Crane and Lifting Operations
8.	<p>Quench Technologies</p> <p>1/168/1-A, Bappa Rawal Market, Lampur Road Narela, DELHI-110040</p> <p>Mobile: 09212415534</p> <p>E-mail: quenchtech@gmail.com</p>	<ul style="list-style-type: none"> • Fire Fighting Training

9.	Youngman India Private Ltd Youngman Group UK D2, Udhog Kendra Ext- 1, Near Noida Phase-II Eco tech III, Greater Noida Mob: 9810282787 E-mail: vjain@youngmangroup.com Web: www.youngmangroup.com	• Training for Height Safety
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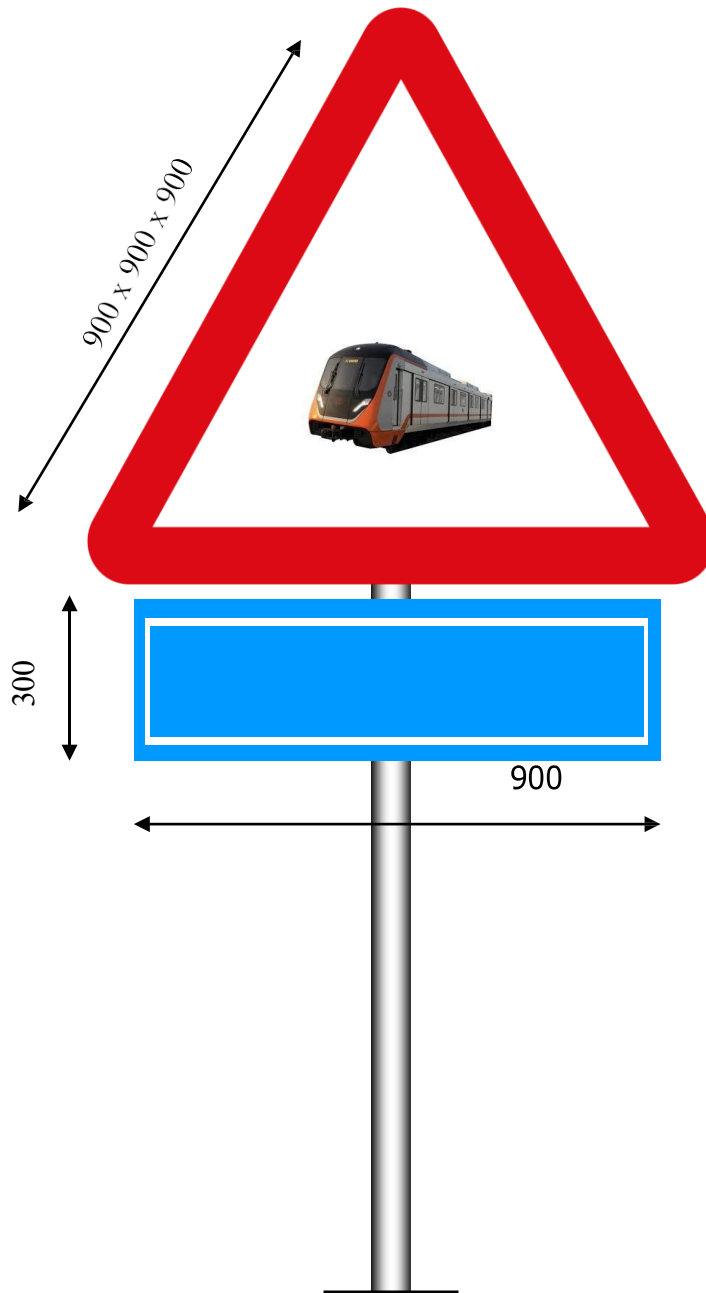
APPENDIX NO. 13

MINIMUM LIGHTING REQUIREMENTS

S.N.	Facility or Function	Luminance – Ix (Im/ft ²)
1.	Administrative areas (offices, drafting and meeting rooms,	540 (50)
2.	Construction areas <ul style="list-style-type: none"> - general indoor - general outdoor - tunnel and general underground work areas (minimum 110 lux required at tunnel and shaft heading during drilling, mucking and scaling) 	55 (5) 33 (3) 55 (5)
3.	Access ways <ul style="list-style-type: none"> - exit ways, walkways, ladders, stairs 	110 (10)
4.	Maintenance / Operating areas / shops <ul style="list-style-type: none"> - vehicle maintenance shop - carpentry shop - outdoors field maintenance area - refueling area, outdoors - shops, fine details work - shops, medium detail work - welding shop 	325 (30) 110 (10) 55 (5) 55 (5) 540 (50) 325 (30)
5.	Mechanical/electrical equipment rooms	110 (10)
6.	Hoists, Elevators, freight and passenger	215 (20)
7.	Warehouses and storage rooms/area <ul style="list-style-type: none"> - indoor stockroom, active/bulk storage - indoor rack storage 	110 (10) 270 (25) 33 (3)
8.	Health Centers and First aid stations and infirmaries	325 (30)
9.	Toilets wash and dressing rooms	110 (10)
10.	Work areas – general (not listed above)	325 (30)
11.	Parking areas	33 (3)
12.	Visitor areas	215 (20)
13.	Laboratories	540 (50)

APPENDIX NO. 14

WARNING TRAFFIC SIGN



All dimensions are in "mm"

APPENDIX No.- 15

Maximum Permissible Age of Construction Plant and Machinery

Sl.No	Construction Plant & Machinery	Maximum permissible age
1	Mobile Crawler Cranes	15 years
2	Gantries	15 years
3	Mobile Tyre Mounted Hydraulic Cranes	10 years
4	Launching Girders	10 years
5	Piling Rigs	10 years
6	All other plant and machinery like Transit mixture, Trailers, Dumpers, Boom Placer Excavators, Pressure vessel including Air Compressors, Diesel Generator Sets, and	10 years.