Annexure – 2 of Addendum no. 1

"Development and Construction of Depot Including OCC and Associated E&M Works near Gyaspur Depot of Ahmedabad Metro Rail Project"

TENDER NO.: GMRC/CONS/DEPOT-1/2026

VOLUME - II

Revised – Condition of Contract on Safety & Health & Environment

Gujarat Metro Rail Corporation (GMRC) Limited

(SPV of Govt. of Gujarat and Govt. of India)

Formerly known as Metro Link Express for Gandhinagar and Ahmedabad (MEGA) Co. Ltd.

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Sector 10/A, Gandhinagar: 382010,

Gujarat, India

Corporate Identification No (CIN): U60200GJ2010SGC059407

Environment, Safety, Health & Social

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PART I: SHE MANAGEMENT

1. GENERAL

1.1. Scope

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

1.1.2. This document also prescribes the measures to be taken by the Contractor / sub-contractor with regard to COVID-19 situation till enforced under Disaster Management Act, 2005. The National Disaster Management Authority (NDMA), Govt. of India under section 6(2)(i) of the Disaster Management Act, 2005, has directed Ministries / Departments of Govt. of India, State Govts. and State Authorities to issue necessary orders. Accordingly, Ministry of Health & Family Welfare, Govt. of India has issued SOPs on preventive measures to contain spread of COVID-19 vide Office Memorandum No. F. NO. Z.28015/19/2020-EMR (Pt.), dated 04.06.2020. The contractor shall remain updated with the orders/guidelines, issued by departments of Govt. of India / State Govt. from time-to-time, as per the evolving situation and comply.

1.1.2.1. With regard to COVID-19 situation, necessary guidelines issued by AFD (Annexure- I), as a reference, may be followed as a good practice, wherever, guidelines of Govt. of India / State Govt. are not issued but, the actual ground situation necessitates additional measures, as per the direction of the Employer.

1.1.3 The recommendations mentioned by CEREMA (Centre for Studies and Expertise on Risks, the Environment, Mobility and Urban Planning) are enclosed as Annexure – II to ESHS Manual and their observations as given their report will form part of tender document. The contractor shall comply the requirements of CEREMA Report while executing the project.

1.1.4 The Contractor shall be responsible for both viz. Safety and Health as well as Environment Management of all activities in connection with the execution of the Contract and shall take all necessary actions to ensure the safety of all persons who may be on or adjacent to the site as well as all contract related works and also ensure that environmental requirements are complied with.

1.1.5 For Effective Site Management, the works have been divided into following five categories:

Category A: All Civil contracts of value more than 500 crore rupees.
Category B: All Civil Contracts of value between 100 crore rupees and 500 crore rupees.
Category C: All Civil Contracts of value less than 100 crore rupees.
Category D: Track Contracts of Supply, Installation, Testing and Commissioning of Ballast Less Track, Supply of Rails, Fastening System, Turnouts, Scissor Crossovers, etc.
Category E: Pre-Engineered Building Contract (PEB) and for the following E&M and Systems Contracts:

- **o** Design, Manufacture, Supply, Installation, Testing and Commissioning of Platform Screen Doors
- **o** Supply, installation, testing and commissioning of Automatic Fare Collection (AFC) system
- **o** Supply, Installation, Testing and Commissioning of 25 kV Overhead Equipment (OHE), 33 kV Auxiliary Power Supply and SCADA Systems
- **o** Design, Manufacturing, Supply, Installation, Testing & Commissioning of Automatic moving walkways
- **o** Design, Detailed Engineering, Supply, Installation, Testing, Commissioning of Auxiliary Sub Station cum Traction Sub Station & HT cabling work of Receiving Sub Station
- **o** Design, Detail Engineering, Supply, Installation, Testing and Commissioning of HVAC System
- **o** Any other E&M or S&T or System contracts not mentioned above.

1.1.6 The decision of the Employer will be final in case there is any dispute regarding placement of a tender in a particular category

1.2. Definition / languages

1.2.1. The Environment, Safety, Health & Social (ESHS) Manual forms an essential part of the overall Safety, Health and Environmental protection system proposed to be employed by GMRC for the construction of Ahmedabad Gandhinagar Metro Rail Project.

1.2.2. Definition & Abbreviations

(a) "Environment" means the total surroundings of an organism including water, air, land and other living creatures.

(b) "Environmental Pollutant" means any solid, liquid or gaseous substance present in such concentration as may be or tend to be injurious to environment.

(c) "Environmental Pollution" means the presence in the environment of any environmental pollutant.

(d) "Nuisance" is annoyance, which results from any construction activity that affects the material comfort and quality of life of the inhabitants of the area surrounding the construction site.

(e) "Monitoring" is the use of direct or indirect reading field instrumentation to provide information regarding the levels of pollutants released during construction.

(f) "Construction Site" is the contract limits for construction. It shall be all the area within the limits of the work as shown on the Plans. Construction Site shall also include staging, and debris disposal areas and transportation routes to and from these areas.

(g) "Noise" is any unwanted sound disturbance of the environment around the area of construction operations.

(h) "Decibel" is a measure on a logarithmic scale of the magnitude of a particular quantity (such as sound pressure, sound power) with respect to a standardized reference quantity.

(i) "A - weighted Noise levels" in Decibels (referenced to 20 micro-Pascal) as measured with A-weighting network of standard sound level meter, abbreviated dB (A).

(j) "Energy Equivalent Level (L_{eq})" is the level of a steady noise which has the same energy as the fluctuating noise level integrated over the period of measurement. L_{max} is the maximum Noise Level during the period of measurement. L_{10} and L_{90} are the percentile exceeding levels of sound which is exceeded 10% and 90% of the time of measurement.

(k) "Waste" is unwanted surplus substance arising from the application of all construction operations and any substance or article, which is required to be disposed.

(l) "Suspended Particulate Matter" is abbreviated as SPM and measured in $\mu g/m^3$.

(m) "Environmental Quality Management Manual" is abbreviated as EQM.

(n) "Air Monitoring and Control Plan" is abbreviated as AMCP.

(o) "Noise Monitoring and Control Plan" is abbreviated as NMCP.

(p) "Ministry of Environment and Forests, Government of India" is abbreviated as MOEF. (q) "Central Pollution Control Board" is abbreviated as CPCB.

(q) "Near Miss" means an incident or a situation with clear potential for an undesirable outcome to occur, even though no actual negative consequences happened. In other words, it is an event with potential to cause injury, property damage, environmental release or an adverse community reaction.

1.2.3. 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) “ESHS” means Environment, Health, Safety and Social

(v) “SHE” means Safety, Health & Environment.

(vi) “Employer” means Gujarat Metro Rail Corporation Limited or GMRC

(vii) Occupational Safety, Health and Working Conditions Code, 2020.

(viii) Occupational Safety, Health and Working Conditions (Central) Rules, 2020

(ix) GBOCWR means Gujarat Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules, 2002, the Gujarat Occupational Safety, Health and Working Conditions Rules, 2025

(x) “DG” means Director General of Ministry of Labour, Govt. of India.

(xi) “BOCWWCA” means Building and Other Construction Workers’ Welfare Cess Act, 1996

(xii) “BOCWWCR” means Building and Other Construction Workers’ Welfare Cess Rules, 1998

(xiii) “GBOCWR” means The Gujarat Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules, 2003

(xiv) “Notifications” (Central and state)–collection of cess.

(xv) “CIIBC” means Chief Inspector of Inspection of Building and Other Constructions of Government of Gujarat

(xvi) “HIRA” means Hazard Identification and Risk Assessment

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 this document is to lay down the guidelines 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 ESHS interfaces between Employer and the Contractor

(ii) Details the processes by which the Contractor shall manage ESHS issues while carrying out the work under the Contract.

1.5. These requirements shall be read together with ISO 45001:2018 Occupational Health and Safety Management System and ISO 14001: 2015 Environmental Management Systems

2. 'SHE' TARGETS AND GOALS

2.1. **The SHE targets, goals and aims 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 to usage of appropriate PPEs at work

(vii) Executing construction work with least disturbance to the environment, adjoining road users and traffic

3. 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. **GMRC's ESHS Policy and Management Systems**

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

3.3. **Method Statement and Risk Assessment**

3.3.1. Method Statement shall be submitted by the Contractor. The Method Statement should include activity list, job step, equipment list, HIRA (Hazard Identification and Risk Assessment) etc.

3.4. **Indian statutory requirements**

3.4.1. **Primary statutory regulations**

3.4.1.1. Contractor shall develop thorough understanding about Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996, Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998, The Building & Other Construction Workers Welfare Cess Act 1996 and Building and Other Construction Workers Welfare Cess Rules 1998, Gujarat Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules, 2003, Notification [Central & State]–Collection of Cess, not only to satisfy the inspectors' perspective but the use of legislation as the strong tool for effective ESHS management at construction worksites. Contractor is strongly advised to practice the principle of voluntary compliance.

3.4.1.2. In order to facilitate the Contractor for better understanding on the various provisions of the above Act and 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, cess & welfare, medical facilities and safety requirements are given in Appendix No.:
2. It is an indicative one and not a limiting list.

3.4.2. 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 Electricity Rules 2005

(ii) National Building Code, 2016

(iii) The Occupational Safety, Health and Working Conditions (OSH) Code, 2020 and Gujarat government State Rules.

(iv) Motor Vehicles Act, 1988 with State amendments and The Central Motor Vehicles Rules, 1989

(v) The Motor Transport Workers Act, 1961 & Gujarat Rules, 1965

(vi) Indian Road Congress Code IRC: SP: 55-2001 'Guidelines on Safety In Road Construction Zones'

(vii) The Petroleum Act, 1934 and The Petroleum Rules, 1976

(viii) Gas Cylinder Rules, 2016

(ix) Explosives Rules, 2008,along with the Explosives substance Act 1908 and the Explosives Rules 1983

(x) Boilers Act, 2025, IBR 2026.

(xi) The Public Liability Insurance Act 1991 and Rules, 1991

(xii) The Minimum Wages Act, 1948 and The Minimum Wages (Gujarat Rules) 1961

(xiii) The Contract Labour (Regulation & Abolition) Act, 1970 & The Contract Labour (P&R) (Gujarat) Rules, 1972

(xiv) The Child Labour (Prohibition & Regulation) Act, 1986 and Gujarat Rules 1994

(xv) Environment Protection Act, 1986 and Rules 1986

(xvi) CPCB Order Dated 7th March, 2016

(xvii) CPCB order Dated 18th November, 2009

(xviii) Dust Control Manual for Industrial Minerals Mining and Processing, CDC NIOSH, RI 9689/2012"

(xix) Air (Prevention and Control of Pollution) Act, 1981 amended in 1987; Air Prevention and Control of Pollution) Rules, 1982

(xx) Water (Prevention and Control of Pollution) Act, 1974 amended in 1988; Water (Prevention and Control of Pollution) Rules, 1975 amended in 2011

(xxi) The Noise Pollution (Regulation & Control) Rules, 2000 amendment in 2010

(xxii) Metro Rail Transit System Guideline for Vibration RDSO, Ministry of Railways September 2015

(xxiii) Notification on Control of Noise from Diesel Generator (DG) sets, 2002

(xxiv) Plastic Waste Management (amendment) Rules 2018 and its amendments.

(xxv) Notification dated 14th January, 1997 - Central Ground Water Board

(xxvi) The Manufacture, Storage and Import of Hazardous Chemical Rules, 1989

(xxvii) The Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996

(xxviii) Solid Waste Management Rules, 2016 & its ammendments

(xxix) The Hazardous Wastes (Management, Handling & Transboundary Movement) Rules, and its amendments, 2016.

(xxx) Construction and Demolition Waste Management Rules, 2016 and its amendments.

(xxxi) Bombay Forest Rules 1942, Bombay Forest (Gujarat Amendment) Rules, 2018

(xxxii) Saurashtra Felling of trees (infliction of Punishment) Act, 1951 & amendment Rule 2008.

(xxxiii) Relevant Rules / Guidelines regarding preservation of trees

(xxxiv) Battery Waste Management Rules, 2022,

(xxxv) Ash Utilisation Notification, 2021 (S.O. 5481(E), 31.12.2021), amended 2022 and 2024.

(xxxvi) Guidelines of Ahmedabad Urban Development Authority

(xxxvii) Guidelines of Gandhinagar Urban Development Authority

(xxxviii) Guidelines of Gujarat Pollution Control Board

(xxxix) The Gujarat Building and Other Construction Workers (Regulation of Employment and Condition of Service) Rules, 2003

(xl) Maternity Benefit Act, 1961

(xli) The Employees Provident Fund and Miscellaneous Provisions Act, 1952

(xlii) Contractor Labour Act, 1970

(xliii) Sexual harassment of women at workplace (Prevention, prohibition & Redressal) Act 2013

(xliv) The Immoral traffic (prevention) Act 1956

(xlv) The Equal Remuneration Act 1976

(xlvi) The UN declaration on the elimination of violence against women

3.4.3. **Workman Compensation Act, 1923 along with allied Rules**

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.

3.4.4. 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.

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

3.5. **Standard Codes to be complied for work**

(i) IS 875-1964 Code of Practice for Structural Safety of Building and loading standards

(ii) IS:1179-1967 Welding helmets

(iii) IS: 1905-1980 Code of practice for structural safety of buildings, masonry walls

(iv) IS: 2171 -1999 Dry chemical powder fire extinguisher

(v) IS 2750-1964 Specification for Steel Scaffoldings

(vi) IS: 2878-2004 Co2 Type fire extinguisher

(vii) IS: 2925-1984 Safety helmet tests

(viii) IS: 3521-1999 Full body safety harness

(ix) IS: 3696 (Part I) -1966 Safety code for scaffolds and ladders: Part I Scaffolds

(x) IS: 3696 (Part II)-1966 Safety code for scaffolds and ladders: Part II Ladders

(xi) IS: 3764-1966 Safety code for excavation work

(xii) IS: 3786 -1983 Methods for computation of Frequency rate and Severity rates for Industrial injuries and classification of Industrial accidents (First revision)

(xiii) IS 4081-1986 Safety code for Blasting and related Drilling Operations

(xiv) IS: 4082-1977 Recommendations on stacking and storage of construction materials at site (first revision)

(xv) IS: 4130-1976 Safety code for demolition of building (first revision)

(xvi) IS: 4770-1991 Safety gloves

(xvii) IS: 4912-1978 Safety requirements for floor and wall openings, railings and toe boards (first revision)

(xviii) IS: 5121-1969 Safety code for piling and other deep foundations

(xix) IS 5216-1982 Recommendations on Safety Procedures & Practices in Electrical Work

(xx) IS: 5914-1970 Safety shoes

(xxi) IS: 5916-1970 Safety code constructions involving use of hot bituminous materials

(xxii) IS: 5983-1980 Testing for Eye protectors

(xxiii) IS: 6994-1973 Canvas hand gloves, Cotton hand gloves, Chrome leather gloves

(xxiv) IS: 7205-1974 Safety code for erection of structural steel work

(xxv) IS: 7293-1974 Safety code for working with construction machinery

(xxvi) IS: 7524 (Part I)-1979 Safety goggles

(xxvii) IS: 7969-1975 Safety code for handling and storage of building materials

(xxviii) IS: 8989-1978 Safety code for erection of concrete framed structures

(xxix) IS 9167-1979 Earmuff / Ear Plugs

(xxx) IS: 10204-2001 Mechanical Foam type extinguisher (Foam used shall conform to IS: 4989 -1974 and CO_2 cartridge shall conform to IS: 4947 -1985)

(xxxi) IS: 10291-1982 Code of dress in Civil Engineering works, safety

(xxxii) IS: 10386-1983 General aspects Part 1 – 1983, Part 2 – 1982, Part 6 – 1983, Part 10 – 1983 Amenities, protective clothing and equipment, construction, storage, handling, detection and safety measures for gases, chemicals and flammable liquids

(xxxiii) IS 10500-1991 Drinking Water Specification

(xxxiv) IS: 11057-1984 Specification for Industrial safety nets

(xxxv) IS: 13415-1992 Protective Barriers in & around buildings (Code of safety)

(xxxvi) IS: 13416-1992 Preventive measures against Hazards at workplaces-Recommendations part-I Falling materials hazards Prevention part-I

(xxxvii) IS: 13416-1992 Preventive measures against Hazards at work places-Recommendations part-II Fall Prevention

(xxxviii) IS: 13849 – 1993 Fire extinguisher for ABC fires

(xxxix) IS: 14489-1998 Code of Practice on Occupational Safety & Health Audit

3.6. **International Standards, Guidelines & ISO Certifications**

3.6.1. **Following International guidelines may also be followed**

(i) EN 50126

(ii) Yellow Book (UK) & Blue Book (UK)

(iii) NFPA 10

(iv) NFPA 14

(v) NFPA 25

(vi) NFPA 70 (National Electric Code)

(vii) NFPA 72

(viii) NFPA 101

(ix) NFPA 130

(x) World Bank E&S Standards

(xi) ESS guidelines

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

ISO 9001: 2008	:	Quality Management System
ISO 45001:2018	:	Occupational Health and Safety Management System.
ISO 14001:2015	:	Environmental Management Systems.

3.6.3. The process of certification shall start immediately after the award of the work and complete within reasonable time. 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.

3.6.4. In case of failure on the part of the Contractor, the Employer at the cost of the Contractor shall do the same.

4. CONTRACTOR SHE POLICY AND PLAN

4.1. The Contractor as per Rule 69 of the GBOCW shall formulate a Safety & Health policy and get it approved by Chief Inspector and display it at conspicuous places at work sites in Hindi and Gujarati i.e. languages 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 Plan. The SHE 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, organisation and arrangements for SHE and Quality policy statement as well as an Environmental and social policy statement.

(ii) The name(s) and experience of person(s) within the Contractor's proposed management who shall be responsible for co-ordinating and monitoring the Contractor's SHE performance;

(iii) The number of SHE staff 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

4.3. The Contractor shall, from time to time and as necessary are required by the Employer to produce supplements to the SHE 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 Plan shall be made to the Employer in accordance with the agreed procedures.

4.4. If at any time the SHE 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 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 SHE Plan or the Employer's acceptance or rejection of the SHE 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 recognised safety practices throughout the execution of the Work.

4.6. The Contractor shall adhere to the SHE 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 Plan and comply with its provisions.

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

5. DESIGNER'S ROLE

5.1. The Designer of Enabling and regular works, while designing and preparing drawings shall take into consideration the Acts, IS codes, International standards etc. mentioned in Clause 3.4, 3.5 and 3.6

5.2. Designer's role in Safety, Health and Environment

5.2.1. Designer's primary role includes to minimise 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.

5.3. General Philosophy

5.3.1. 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 up one consideration against another so the 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.

The role of designer shall be critical in the following activities/works/functions:

i) Launching Girders
ii) Gantriesy
iii) Temporary Support Structures like trusses, Cribs or similar
iv) Scaffolding
v) False Work/ Framework
vi) Erection activities which includes Steel Beams, Precast Girders/segments and Castin-situ works
vii) Excavation
viii) Piling which also includes support Piles
ix) Access ladders for Underground and Elevated works
The above list is not exhaustive, and many more activities/functions may be included.

5.4. Hierarchy of Risk Control

5.4.1. Designers shall need, so far as reasonably practical, 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).

(v) Elimination: Physically remove the hazard - Redesign the job or substitute a substance so that the hazard is removed or eliminated.

(vi) Substitution: Replace the hazard - Replace the material or process with a less hazardous one. For example, use a MEWP to access work at height instead of step ladders. Care should be taken to ensure the alternative is safer than the original.

(vii) Engineering Controls: Isolate people from the hazard - Use work equipment or other measures to prevent falls where you cannot avoid working at height. Install or use additional machinery such as local exhaust ventilation to control risks from dust or fume. Separate the hazard from operators by methods such as enclosing or guarding dangerous items of machinery/equipment. Give priority to measures which protect collectively over individual measures.

(viii) Administrative Controls: Change the way people work - These are all about identifying and implementing the procedures you need to work safely. For example: reducing the time workers are exposed to hazards (eg by job rotation); prohibiting use of mobile phones in hazardous areas; increasing safety signage, and performing risk assessments, providing job specific trainings etc.

(ix) Personal Protective Equipment: Protect the worker with personal protective equipment - Only after all the previous measures have been tried and found insufficient in controlling risks to a reasonably practicable level, must

personal protective equipment (PPE) be used.

The Hazard Identification, Risk Assessment & its Control Measures shall be carried out for each activity involving risks to person and be made in Sample Form (SF– 01). Aspect Impact analysis shall be carried out for all major and critical activities involving Environment degradation and to be made in Sample Form (SF-02) and to be submitted with work method statement.

5.5. **Duty to provide health and safety risks in the drawing itself**

5.5.1. In case of situations where the designers have carried out the design work and concluded that there are risks, which are 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 design information.

5.5.2. 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.

5.6. **Employer's approval**

5.6.1. Every structure like scaffold, false work, launching girder, earth retaining 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.

5.7. 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.

5.8. 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. CONTRACTOR's SHE ORGANISATION

6.1. **Education and Experience**

6.1.1. The Contractor shall appoint the required SHE personnel as prescribed in General Instruction GMRC/SHE/GI/001 (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 GMRC/SHE/GI/002.

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 68.0 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 authorised 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 on immediate basis within one month before relieving the existing manpower and ensure proper handover of all the documents.

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 68.

6.7. **Inadequate SHE personnel**

6.7.1. In case if the Contractors fail to provide the minimum required manpower as illustrated in General Instruction GMRC/SHE/GI/001 or fails to fill up vacancies created within 14 days, the same shall be provided by the Employer at Contractor's cost. Any administrative expenses involved, providing 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. As per Schedule VIII of BOCWR, 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 GMRC/SHE/GI/001

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 / equipments to be provided for SHE personnel are given in the General Instruction GMRC/SHE/GI/003

7. CONTRACTOR's 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 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 SHE 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 meetings 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

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 as per the format provided in Form No. SF/001

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	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
Employer's Representatives	GMRC 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	(i) Labour Welfare Officer (ii) In charge of plant and machinery (iii) In-charge of site electricity (iv) Senior Managers / Engineers heading different sub functions (v) Sub- Contractor's representative (vi) Labour contractor's representative (vii) Workers' representatives (viii) All ESHS Staffs

7.6. **Co-contractors' participation**

7.6.1. In case of depot, station and other contiguous areas where more than one main contractors are 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 of the Contractor 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 SHE inspection

(vi) Sub-contractors' SHE issues

(vii) Safety presentation by Members

(viii) Report from Employer

(ix) Matters arising

(x) Any other business

7.9. **Minutes of the meeting**

7.9.1. The Minutes of the meeting shall be prepared as per the format provided at Form No. SF/002 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 monitory penalty as per the relevant contract clauses, the Employer shall ensure that the same is implemented.

8. 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 training 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. The training shall cover the contents as given in the General Instruction GMRC/SHE/GI/004.

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 GMRC/SHE/GI/005

8.3. Contractor shall also issue a 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. SHE TRAINING

9.1. **The behaviour of people at all levels of the Contractor is critical for SHE performance.**

9.2. The Contractor shall organise quality SHE training to engage managers, supervisors and other personnel in behavioural change and improve safety performance.

9.3. The Contractor shall analyse 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 behavioural based training programmes for all its executives to identify, recognise and eliminate unsafe act and unsafe conditions. The 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 time of induction. Before posting of any of his workers/staff/employees/subcontractors, the contractor shall give a certificate that the said person had undergone the requisite SHE training.

9.5. The minimum Employer's requirement of training needs for various categories of employees are given in General Instruction GMRC/SHE/GI/007

9.6. The contents of SHE training to managers / supervisors as given in General Instruction GMRC/SHE/GI/006 shall be conducted.

9.7. The refresher-training programme to all employees shall be conducted once in six months.

9.8. Toolbox talk as given in the Employer's Project SHE Manual shall be conducted to all high- risk workmen every day.

9.9. On-the spot practical skill development training on height safety including scaffold safety, crane safety, welding safety, electrical safety, traffic safety for marshals shall also be conducted to all foremen / workmen who were associated to the concerned jobs.

9.10. Every employee including workman shall take safety Oath daily without fail.

9.11. All vehicle drivers including heavy vehicle operators shall be trained on defensive driving at training institute recognized by Gujarat State Road Transport Corporation / Government of Gujarat, or any other driving institute registered under Motor Vehicles Act.

9.12. All the above listed training programs except at Clause 9.11 shall be organised by the Contractor only after taking approval from the Employer for the training faculty / organisation, content and durations.

9.13. 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. 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 sub-contractors site safety committee Inspection.

(ii) Weekly safety 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) Monthly inspection of lifting gears, tools tackles and appliances.
(v) Quarterly Inspection of temporary electrical systems by competent electrical in-charge and of Plant & machines by P&M In-charge.
(vi) Half-yearly inspection of lifting machinery, lifting appliances, equipment and gears by Govt. approved competent person.
(vii) Quarterly colour coding of lifting gears, tools & tackles. The recommended colour coding for the 4 quarters of the years shall be as under:
   a. January – March: GREEN
   b. April – June: YELLOW
   c. July – September: BLUE
   d. October – December: WHITE

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 are 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 formwork erector.

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) GMRC 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.

11. 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 legalisation regulations and requirements of the Employer.

11.1.2. As indicated earlier in this Manual, the Engineer shall undertake regular audits at quarterly intervals,

of the Contractor's onsite practices and procedures as a means of assessing the ongoing performance of the Contractor.

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

11.1.4. **Timing**

The Monthly Audit should be conducted at least 7 days prior to the scheduled date of Monthly SHE Committee meeting as per FORM NO. SF/003

11.1.5. **Evaluation**

11.1.5.1. 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:

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

11.1.5.2. The criticality of the required actions for the respective sections of the Audit will be classified as:

SN	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

This Monthly Safety & Health Audit Rating Score (MARS) report will enable the Employer to evaluate general compliance by the Contractor with the Conditions of Contract, and the Contractor's site-specific Safety & health Plan. A minimum compliance level to achieve 75% overall Audit rating is essentially required. Failing this, the Employer will take punitive action which includes non-processing of Running Account Bills.

11.1.6. **Report**

A copy of each Audit Report will be sent to Employer, the Contractor and 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. **Monthly Electrical Safety Audit**

11.2.1. 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.

11.2.2 A team of all labour welfare officers and employers' representatives shall conduct monthly Labour audit to verify all Statutory Reports and Registers.

11.3. **External SHE Audit**

11.3.1. External SHE audits are to be conducted by external agencies that are competent with ISO qualified auditors with the prior approval of the Employer.

11.3.2. **Areas of competence of Audit team**

11.3.2.1. Practical understanding of OSH&W Code 2020 (Central & State 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.

11.3.2.2. 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.

11.3.3. External SHE audits shall be conducted on a quarterly basis throughout the currency of the Contract.

11.3.4. **Targets of SHE Audit**

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

11.3.4.1. **SHE management**

(i) Organization

(ii) Communication and Motivation

(iii) Time office

(iv) Inspection

(v) Emergency preparedness

(vi) Budget allocation

(vii) Education and Training

(viii) Work permit system

11.3.4.2. **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

11.3.5. **Audit Documents**

11.3.5.1. 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 equipment's

(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

11.3.6. **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 GMRC 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.

11.3.7. **Reporting**

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

11.3.8. **Report contents**

(i) Executive summary: Based on the finalized checklists 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 3 days, if risk potential is high or unacceptable.

b. Priority 2: Actions should be generally implemented or rectified with a maximum of 14-28 days, if not rectified would create a likelihood of minor injury or business loss.

11.3.9. **Conformity Report & Action by Employer**

11.3.9.1. 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.

11.3.9.2. 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.

11.3.9.3. 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 item implemented.

11.3.10. **Failure of Contractor to conduct External SHE Audit**

11.3.10.1. If the Contractor fails to conduct the external SHE audit in time, the Employer at the cost of Contractor shall get it done.

12. 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 raise safety awareness amongst the work force. Posters should be in Hindi, English, Gujarati and other suitable language as 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 GMRC/SHE/GI/008 and printing and displaying safety signage and posters as listed in General Instruction GMRC/SHE/GI/009

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. 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 number of workmen (as given in Clause 13.2)

(ii) Monthly SHE Report (as given in Clause 13.3)

(iii) SHE Committee Meeting Minutes (as given in Clause 7.9.1)

(iv) SHE Inspection Reports

(v) SHE Audit Reports

a. Monthly Safety Audit Scorecard

b. External SHE Audit

c. Electrical Safety Audit

(vi) Air and Noise Quality monitoring report

13.2. **Daily Reporting of total number of workmen**

13.2.1. The Contractor shall report to the Employer the total number 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 report consisting of the following and submit 3 copies on or before 7th of the 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 audit details like electrical audit etc.

(vii) SHE Communication activities under taken in the month indicating the number of posters displayed and balance availability in stock.

(viii) Air quality

(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

14. ACCIDENT REPORTING AND INVESTIGATION

14.1. Reporting to Employer

14.1.1. All near miss, 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.

Reports of all accidents (fatal / injury) and dangerous occurrences shall also be sent within 24 hours as per approved format.

14.1.2. No accident / dangerous occurrence is exempted from reporting to the Employer.

14.1.3. Any willful delay in verbal and written reporting to the Employer shall be penalised as per relevant clause.

14.2. Reporting to Government organizations

14.2.1. In addition to the above verbal and written reporting to the Employer, as per Rule 210 of BOCWR, notice of any accident to a worker at the building or construction site that:

(i) causes loss of life; or

(ii) disables a worker from working for a period of 48 hours or more immediately following the accident;

(iii) 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:

a. the Regional Labour Commissioner, wherein the Contractor has registered the firm / work
b. the board with which the worker involved was registered as a beneficiary;
c. Director General and
d. 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:

(i) causes loss of life; or

(ii) disables the injured worker from work for more than 10 days to

a. the officer-in-charge of the nearest police station;
b. the District Magistrate or, if the District Magistrate by order so desires, to 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:

(i) 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;

(ii) falling of objects from height;

(iii) 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 formwork;

(iv) 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;

(v) fire and explosion causing damage to any place on construction site where building workers are employed;

(vi) spillage or leakage of any hazardous substance and damage to their container;

(vii) collapse, capsizing, toppling or collision of transport equipment;

(viii) 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 Section 39 of BOCWA and the Director General in the specified Form XVIII 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 organised way. The following steps shall be followed:

(a) take photographs and make sketches

(b) examine involved equipment, workplace 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) Submit Report with findings and remedial actions.

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 wilful suppression of information by any person shall be removed from the site immediately and / or punishable as per relevant penalty clause.

15. EMERGENCY PREPAREDNESS PLAN

15.1. The Contractor shall prepare as required under Rule 36 of BOCW R, an Emergency Response Plan for all work sites as a part of the Contractor SHE Plan. 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:

(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.

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 workplace.

15.4. Contractors shall require to tie-up with the hospitals and fire stations located in the neighbourhood 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 and order authorities informed and seek urgent help, as the case may be, so as to mitigate the consequences of an emergency. Prompt communication to GMRC, telephonically initially and followed by a written report, shall be made by the Contractor.

16. EXPERTS / AGENCIES FOR SHE SERVICES

Contractors may utilise the services of experts/agencies empanelled for the purpose of training, audit, ISO certification and any other SHE services with prior approval of the Employer. This approval can be withdrawn at any time if the quality of output of the agency is found not satisfactory by GMRCL.

16.1. As an aide to contractors, a list of experts/agencies and the offered service are given in General Instruction GMRC/SHE/GI/010 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.

16.2. The Contractor shall release the payment due to the Safety & Health and Environment expert agencies within 2 months of the submission of bills failing which the employer may directly make the payment to such agencies/experts and adjust this amount from the payment which is due to the contractor.

17.0 Role of Main/Civil Contractor

The Civil contractor must be identified as the MAIN Contractor. He is the lead contractor whose Safety and Environment system is applied to all contractors and he will be responsible for monitoring and bringing to GMRCL attention any departures from the system. All system contractors shall abide by the lawful instructions of representative of civil contractor.

Although the responsibility of general lighting, area security, drinking water, toilets/urinals and access etc. lies with the main (civil) contractor, the system contractor shall also be required to:

i) Provide adequate task lighting
ii) Guard their assets
iii) Provide adequate amenities like drinking water, rest area, toilet/urinal on viaduct/inside the tunnels etc.
iv) Maintain fire points for protecting their own assets Keep Environment sanitation of acceptable level.

In case of any clarification on the same, Project Manager/Civil/GMRCL shall be the nodal officer.

Stagnant Water: The civil contractor is responsible for removal of water from all the areas of the station except the ECS Plant Rooms which will be the responsibility of ECS contractor. For tunnel works, the civil contractor will hand over this responsibility to the track contractor and subsequently firefighting/ system contractor.

Main civil contractor shall be required to provide Fire extinguishing system and walkway in tunnel and these facilities shall remain till the complete handover.

A notice boards to be maintained by civil contractor wherein all system/track contractors mobilised at station and the level at which they are working can be displayed.

Identification of men and resources of different contractors shall be clearly visible by providing appropriate labelling.

* Installation of CCTV Cameras

The purpose of installing CCTV cameras is to monitor the site activities around the clock. The contractors shall install CCTV cameras at construction sites in such a way that the cameras will provide a view of entire construction site. For this purpose the contractor may have to install cameras at multiple locations in one site.

Storage back-up of minimum 15 days to be ensured at all times, failing which penalty shall be imposed.

PART II: SAFETY

17. HOUSEKEEPING

17.1. Housekeeping is the act of keeping the working environment cleared of all unnecessary waste, thereby providing a first-line of defence 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 GMRC/SHE/GI/001. 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. Team of housekeeping squad shall carry out this.

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, GMRC logo and other details shall be in accordance with specifications laid down in Tender Documents.

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, fire fighting 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 bent or 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 odour 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. All truck driver should be accompanied by a Cleaner.

17.13. No parking of trucks / trolleys, cranes and trailers etc. shall be allowed on roads, which may obstruct the traffic movement.

17.14. 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.

17.15. Water logging or bentonite spillage on roads shall not be allowed. If bentonite spillage is observed on road endangering the safety of road users, the Contractor shall be penalised as per relevant clause.

17.16. 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.

17.17. Flammable chemicals / compressed gas cylinders shall be safely stored.

17.18. Unused / surplus cables, steel items and steel scrap lying scattered at different places within the working areas shall be removed to identified locations(s).

17.19. All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified location(s).

17.20. Empty cement bags and other packaging material shall be properly stacked and removed.

17.21. The Contractor shall ensure that all its sub-contractors maintain the Site reasonably clean through provisions related to house keeping

18. 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 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:

(i) 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

(ii) rope access and positioning techniques;

18.1.5. **"work at height" means:**

(i) work in any place, including a place at or below ground level;

(ii) 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;

18.1.6. “work equipment" means any machinery, appliance, apparatus, tool or installation for use at work (whether exclusively or not) and includes:

(i) a guard-rail, toe-board, barrier or similar collective means of protection

(ii) a working platform

(iii) a net, airbag or other collective safe guard for arresting falls

(iv) personal fall protection system

(v) ladders

18.1.7. **“working platform” means:**

(i) any platform used as a place of work or as a means of access to or egress from a place of work;

(ii) includes any scaffold, suspended scaffold, cradle, mobile platforms, trestle, gangway, gantry and stairway which is so used.

18.2. Organisation 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 jeopardise 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.

(i) his ensuring that the work is carried out:

a. from an existing place of work; or
b. (in the case of obtaining access or egress) using an existing means, complying to the requirements as given in Clause 18.15

Where it is reasonably practicable to carry it out safely and under appropriate ergonomic conditions; and

(ii) 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:**

(i) So far as is reasonably practicable, provide sufficient work equipment to minimise:

a. The distance and consequences; or
b. Where it is not reasonably practicable to minimise the distance, the consequences, of a fall; and

(ii) 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**

(i) 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:

1. The working conditions and the risks to the safety of persons at the place where the work equipment is to be used;

2. In the case of work equipment for access and egress, the distance to be negotiated;

3. The distance and consequences of a potential fall;
4. The duration and frequency of use;
5. The need for easy and timely evacuation and rescue in an emergency; and
6. Any additional risk posed by the use, installation or removal of that work equipment or by evacuation and rescue from it;

(ii) The Contractor shall select work equipment for work at height which:

a. has characteristics including dimensions which:

1. Are appropriate to the nature of the work to be performed and the foreseeable loadings; and
2. Allow passage without risk; and

b. Is in other respects the most suitable work equipment, having regard in particular to the purposes specified in Clause 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:

(i) 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;

(ii) 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 minimise 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:

(i) prominent warning notices are so far as is reasonably practicable affixed at the approach to the place where the fragile surface is situated; or

(ii) 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 Clause 18.10.1, 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 contractor 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.

18.11. **Danger areas**

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

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

a. falling from a distance; or

b. 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 unauthorised persons from entering such area; and

(ii) such area is clearly indicated.

18.12. **Inspection of work equipment**

18.12.1. 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.

18.12.2. The Contractor shall ensure that work equipment exposed to conditions causing deterioration which is liable to result in dangerous situations is inspected

(i) at suitable intervals; and

(ii) each time that exceptional circumstances which are liable to jeopardise 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.

18.12.3. Without prejudice to Clause 18.12.1, the Contractor shall ensure that a working platform

(i) used for construction work; and

(ii) from which a person could fall 2 metres 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.

18.12.4. The Contractor shall ensure that the reports of all inspections are properly maintained and shown to the Employer as and when required.

18.12.5. In this clause "inspection",

(i) means such visual or more rigorous inspection by a competent person as is appropriate for safety purposes; and

(ii) includes any testing appropriate for those purposes,

18.13. **Inspection of places of work at height**

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.

18.14. **Duties of persons at work**

18.14.1. 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.

18.14.2. Every workmen shall use any work equipment or safety device provided to him for work at height by the Contractor, in accordance with:

(i) any training in the use of the work equipment or device concerned which have been received by him; and

(ii) the instructions respecting that use which have been provided to him by the Contractor as per the requirements of the Employer

18.15. **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:

(i) be stable and of sufficient strength and rigidity for the purpose for which it is intended to be or is being used;

(ii) where applicable, rest on a stable, sufficiently strong surface;

(iii) 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;

(iv) possess suitable and sufficient means for preventing a fall;

(v) possess a surface which has no gap

a. through which a person could fall;

b. through which any material or object could fall and injure a person; or

c. giving rise to other risk of injury to any person, unless measures have been taken to protect persons against such risk;

(vi) be so constructed and used, and maintained in such condition, as to prevent, so far as is reasonably practicable:

a. the risk of slipping or tripping; or

b. any person being caught between it and any adjacent structure;

(vii) where it has moving parts, be prevented by appropriate devices from moving inadvertently during work at height.

18.16. **Requirements for guardrails, toe-boards, barriers and similar collective means of protection**

(i) 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 millimetres 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.

18.17. **Requirements for all Working Platforms**

(i) Every working platforms 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 platform shall

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 platform shall

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

1. through which a person could fall;

2. through which any material or object could fall and injure a person; or

3. 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

1. the risk of slipping or tripping; or

2. any person being caught between the working platform and any adjacent structure.

(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 recognised 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.

18.18. **Requirements for collective safeguards for arresting falls**

(i) Collective safeguard are 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; and

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 safeguard 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.

18.19. **Requirements for personal fall protection systems**

(i) A personal fall protection system shall be used only if a. a risk assessment has

demonstrated that

1. the work can so far as is reasonably practicable be performed safely while using that system; and

2. 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 minimise 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.

(v) All fall protection systems should be inspected weekly

18.20. **Requirements for Ladders**

(i) 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

a. The short duration of use; or

b. Existing features on site, which he cannot alter.

(ii) Only metal ladders shall be allowed. Bamboo ladders are prohibited.

(iii) 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.

(iv) A ladder shall be so positioned as to ensure its stability during use

(v) 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.

(vi) A portable ladder shall be prevented from slipping during use by:

a. securing the stiles at or near their upper or lower ends;

b. an effective anti-slip or other effective stability device; or

c. any other arrangement of equivalent effectiveness.

(vii) 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 handhold.

(viii) No interlocking or extension ladder shall be used unless its sections are prevented from moving relative to each other while in use.

(ix) A mobile ladder shall be prevented from moving before it is stepped on.

(x) Where a ladder or run of ladders raises a vertical distance of 9 metres or more above its base, there shall, where reasonably practicable, be provided at suitable intervals sufficient safe landing areas or rest platforms.

(xi) Ladders should be inspected weekly for any damage or corrosion.

(xii) 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

1) the low risk; and

2) the short duration of use.

18.21. Requirements for Scaffold

18.21.1. Definition

(i) Competent Person: one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt, corrective measures to eliminate those

(ii) Qualified Person: one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his or her ability to solve or resolve problems related to the subject matter, the work, or the project

18.21.2. Scaffold General

This procedure provides general information about the competent person, erection, inspection, and use of both welded-frame and tube-and-coupler scaffolds.

(i) Scaffolds are intended to provide safe working positions at elevations. To eliminate fall exposures, scaffolds must have complete handrails, mid-rails, and decking. Do not use fall arrest equipment as a substitute for handrails, mid-rails, or a complete deck.

(ii) Before erecting scaffolds, consider all nearby or overhead hazardous energy sources such as electrical, mechanical, pneumatic, thermal, and chemical.

(iii) Welded-frame scaffolds are made of basic prefabricated end frames, cross-bracing, and frame-connecting devices to hold the parts firmly in place. Tube and-coupler and system scaffolds are made of various lengths of tubing clamped together by special patented couplers to support working platforms of various shapes.

(iv) All complete scaffolds will have a top handrail approx. 1.1 meter above the platform, mid rail approx. 0.6 meter above the platform and a toe plate 10 cm tall from the platform.

(v) Do not inter mix scaffold components manufactured by different manufacturers unless the component parts fit together without force or modification.

(vi) Bamboo components are not permitted on GMRC Sites.

18.21.3. **Erecting Scaffolds**

(i) Only employees who have been trained by and are under the supervision of a competent person will erect scaffolds. The GMRC Project Safety Manager must approve scaffolds higher than 50 feet (15 meters) above the base plates.

(ii) Where fall hazards cannot be eliminated, use fall-arrest systems while erecting, modifying, and dismantling scaffolds. It is the responsibility of the competent person to determine the feasibility and type of fall-arrest system to be used.

(iii) Set scaffold legs on base plates placed on foundations or mudsills that are adequate for supporting the maximum intended loads. Scaffold boards and masonry blocks are not appropriate scaffold foundations. The total load on a scaffold consists of the sum of the weight of the workers and materials on a scaffold plus the weight of the scaffold.

(iv) Install adjusting screws only between the base plate and the vertical frame section. Never use adjusting screws together with casters. Do not extend adjusting screws beyond 12 inches (30 centimetres).

(v) The position and number of braces used on a scaffold not only restricts the amount of side movement, but also determines the strength of the scaffold. Never use cross-braces as substitutes for handrails or mid rails.

(vi) When the height of a scaffold exceeds three times the smallest width of the base, secure it to the building or structure at every other lift and every 9 meters horizontally. The scaffold should be secured by both ties and braces to prevent movement Equip scaffold working platforms with handrails approximately one meter high, mid rails, and toe boards, all secured rigidly. Working platforms should be completely decked with safety planks, manufactured scaffold decking, or laminated wooden planks.

(vii) To allow access to the working platform of a tubular welded frame scaffold, the ladder built into the end frames can be used if it has been specifically designed and constructed by the manufacturer for the purpose of access.

(viii) Employees engaged in erecting or dismantling tubular-welded frame scaffolds may use the end-frame horizontal members for access provided they are parallel, level, and are not more than 22 inches apart vertically. Hook-on attachable ladders shall be installed as soon as scaffold erection has progressed to a point that permits safe installation and use. Consideration should be given to breaking the ladder at approximately 6 meter intervals. Retractable or vertical lifelines should be used for fall protection while climbing more than 20-feet.

(ix) When portable straight or extension ladders are used for access to tube-and coupler scaffolds, the 4-to-1 slope should be maintained to avoid a horizontal tube interfering with the use of the ladder.

(x) Scaffold users should be able to step off the scaffold access ladder directly onto the working platform. Provide entry gates for scaffolds to eliminate the need for users to climb over handrails.

(xi) Tag or otherwise identify scaffolds that should not be occupied or that require particular safety precautions. The tag should indicate special requirements, the date of erection, and the signature of the competent person.

(xii) Scaffolds and their components must be capable of supporting, without failure, at least four times the maximum intended load. Materials should be evenly distributed on platforms and not concentrated in one small area.

(xiii) During erection of scaffolds, the electrical clearances shall be maintained as per the tabulation mentioned herein in this document.

18.21.4. **Scaffold Inspection**

(i) A competent person shall visually inspect all components of the scaffold for defects prior to each shift's use and following any occurrence that could affect the scaffold's structural integrity. Defective components will be immediately discarded.

(ii) Before erecting and while dismantling scaffolds, inspect all components. Scaffold components should be straight and free from bends, kinks, dents, and severe rusting. Immediately discard defective components. Inspections should include an evaluation of the following components:

a. Handrails, mid-rails, toe boards, cross-bracing and steel tubing for nicks and other damage, especially near the centre span, and for signs that welding arcs may have struck the equipment

b. weld zones on the scaffold frame for cracks

c. the end of tubing for splits or cracks

d. manufactured decks for loose bolts or rivet connections and bent, kinked, or dented frames

e. safety planks for rot, cracks, cuts, and other external damage f.tie rods or bolts and angle iron cleats

g. cams, springs, threaded connection, toggle pins, or other quick-connecting devices

h. Casters for rough rolling surfaces, "sticky" swivels, and defective locking mechanisms.

(iii) Scaffold Inspection Tag, Boards, identifying that the scaffold is “Safe For Use” or “Scaffolds Under Construction” must be attached to all scaffolds.

18.21.5. **Scaffold Training**

(i) Employees involved in the erection, dismantling, moving, repairing, etc., of scaffolding shall receive training from a competent person. The purpose of the training is to recognize any hazards associated with the work in question. Training shall consist of:

a. The nature of scaffold hazards

b. The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold.

c. The design criteria, maximum intended load-carrying capacity, and intended use of the scaffold.

(ii) Employees who perform work while on a scaffold shall be trained by a qualified person so they will recognize hazards associated with the type of scaffold being used and understand the procedures to control those hazards. Training will cover the following topics as necessary:

a. The nature of any electrical hazards, fall hazards, and falling object hazards in the work area.

b. The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems used.

c. The proper use of the scaffold and the proper handling of materials on the scaffold.

d. The maximum intended load and the load-carrying capacities of the scaffolds used.

18.21.6. **Suspended Scaffolding**

Swinging stages, toothpicks, boatswain chairs, float, and needle beams require special approval prior to use.

Attach and secure safety harness before stepping on these scaffolds and do not remove until clear of the scaffold. Tie off to independent lifeline or building structure. One lifeline per person.

19. OVERHEAD PROTECTION

19.1. All contractors shall provide overhead protections as per Rule 41 of BOCWR.

19.2. 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.

19.3. 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 20º to its horizontal sloping into the building.

19.4. Overhead protection shall not be erected more than a height of 5m from the base of the building.

19.5. Areas of inadvertent hazard of falling of material shall be guarded or barricaded or roped-off thereby by the Contractor.

19 A PRESSURE VESSEL: All the pressure vessel shall be tested & certified by 3rd party competent person approved by Govt. of Gujarat & carry a name plate bearing date of test, expiry date & safe working pressure.

20. SLIPPING, TRIPPING, CUTTING, DROWNING AND FALLING HAZARDS

As per Rule 42 of BOCWR:

20.1. All places should be free from dust, debris or similar materials.

20.2. 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.

20.3. 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.

20.4. 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 work place.

20.5. 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.

20.6. Suitable safety net shall be provided at places of material / man falling is possible in accordance with national standards.

21. LIFTING APPLIANCES AND GEAR

21.1. Lifting appliances means a crane, hoist machinery, derrick, winch, gin pole, sheer legs, jack, hoist drum, slewing machinery, slewing bearing fasteners, loffing 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 eyenuts and other accessories of a lifting appliance.

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 each

(iii) the number and frequency of lifts to be mad

(iv) how long the crane will be required on site

(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

(vii) In its operating quadrants) capacity is normally greatest over the rear, less over the side, and non-existent over the front

(viii) whether loads will have to be walked or carried

(ix) whether loads will have to be suspended for lengthy periods

(x) 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 21.7 is available for all lifting appliances including synchronised 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.

21.7.2. Contractors can utilise 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 GBOCWR 2003, no lifting appliances gear or any other material handling appliance is used, if:

(i) the Inspector having jurisdiction is not satisfied with reference to a certification of test or examination or to an authenticated record maintain as provided under these rules; and

(ii) in the view of such Inspector, the lifting appliance, lifting gear or any other material handling appliance is not safe for use in building or other construction work; and

(iii) no pulley block is used in building or other construction work unless the safe working load and its identification are clearly marked on such block.

21.8.2. Every 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 signaller 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 he:

(i) is above twenty-one years of age and possesses a valid heavy transport vehicle driving licence 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 Schedule VII of BOCW Rules.

21.10. **General requirements of appliances**

21.10.1. **Out-of level**

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 control of out-of-level is of utmost importance.

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 times. No boom section with 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

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 posses good and safe:

(i) structure, windows and windshield wipers
(ii) Drivers chair and foot rest
(iii) Control handles
(iv) Cab instrumentation
(v) Telecommunication
(vi) Cab out fitting
(viii) 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 of floats

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.

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. LAUNCHING OPERATION

22.1. As launching operation is one of the riskiest job, 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 of paramount Importance. 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 39.0

(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, licence, safe worthiness certificate, Employer’s approval certificate, and pollution under check certificate shall only be used for transport of segments.

(vii) All vehicle drivers including heavy vehicle operators shall be trained on defensive driving at training institute recognized by Gujarat State Road Transport Corporation / Government of Gujarat, or any other driving institute registered under Motor Vehicles Act.

(viii) Drivers shall also have undergone proper medical examination as per relevant clause mentioned under ‘Medical Facilities’.

(ix) Necessary arrangements / modifications should be made in the trailer before the transportation starts. Proper approval should be taken from the employer before starting the transportation.

(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. CONSTRUCTION MACHINERY

23.1. Construction machineries may include dumpers and dump trucks, lift trucks and telescopic handlers piling rigs, vibro hammers, rail welding equipments, 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 browsers, trailers, hydraulic and mechanical breakers etc.

23.2. Safe worthiness certificate

23.2.1. Every construction equipment shall be in sound mechanical working condition and certified by either competent person under Factories Act or manufacturers' warranty in case of brand new equipments 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 equipments were used etc as its minimum content.

23.2.3. Overhead Gantries

All gantries shall have designed End Stoppers and Storm Brakes as per OEM. The design shall be submitted to GMRCL after vetting by independent/Third party Designer. As built certification by contractor's Plant & Machinery In charge shall be submitted.

- Railings shall be provided along the gantry track to avoid any worker getting injured from gantry crane or any of its part during its movement.
- Provision of anti-collision devices shall be mandatorily ensured and kept in working condition.
- All gantry crane shall be provided with fail safe devices to avoid any hoist free fall in case of brake failure. Wireless operation of Gantry is prohibited.
- Fall arrestor arrangement shall be made at access location to the gantry to prevent

free fall of the operator during ascend/descend.

- Preventive maintenance of Gantry Crane Hoist by OEM with safe worthiness certification during initial assembly and subsequently on six monthly basis shall be ensured.

In respect of age of lifting appliances as specified below contractor Plant & Machinery In-charge shall give indemnity/undertaking regarding the age of appliance.

MAXIMUM PERMISSIBLE AGE OF CONSTRUCTION PLANT AND MACHINERY

S.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	5 years
6	All other plant and machinery like Transit mixture, Trailers, Dumpers, Boom Placer Excavators, Pressure vessel including Air Compressors, Diesel Generator Sets, and locomotive etc.	10 years.

23.3. Reverse Horns

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 safety 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 manufacturers' recommendations.

(iii) Working on gradients beyond any equipments 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.

(ix) 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.

(x) When operating the backhoe in poor ground conditions, the stabilisers 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 stabilise the machine when the backhoe is employed.

(xi) 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.

(xii) If a tractor dozer is employed on clearing scrub or felling trees, it shall be provided with adequate driver protection.

(xiii) When two or more scrapers are working on the same job, a minimum distance of at least 25m shall be kept between them.

(xiv) In case of hydraulic breakers, hydraulic rams and hoses shall be in good working condition

23.5. All wood working machines 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. **Requirements related to use of Bulldozer**

23.6.1. **General**

(i) Be careful when working near the edge of banks, ditches, cuts or fills, or near overhanging material. The vibration and weight of the machine may cause the edge to give way or overhanging material to fall.

(ii) Before starting work, ensure that an observer is present when plant is required to work in water where the depth may endanger the operator.

(iii) Avoid obstacles such as rocks or logs. If forced to cross them, use extreme caution and change to the lowest gear.

(iv) Ease up to the balance point and ease down to minimise the jolt on contact with the other side.

(v) When receiving a wire rope on a drum or through sheaves, operators should disengage the master clutch, idle the engine, and lock the brakes.

NOTE: All operators should stop engines before working with ropes wound on front-mounted drums.

23.6.2. **Clearing Operations**

(i) When clearing trees, watch out for dead branches in treetops.

(ii) Dozer operators should make sure that all persons are standing clear before pushing over trees, dozing rocks or rolling logs.

(iii) A long rope should be used to pull over large dead trees. (Make sure in advance that a falling tree will clear the machine and operator).

(iv) In excavation work, operators should be alert to dangers from overhanging dirt and rocks. In such cases, dozers should be equipped with the relevant overhead protection.

23.7. **Requirements related to use of Excavators**

(i) When excavating trenches, place the excavated material at a distance of one and a half times the depth of the trench from the edge of that trench. W here this is not practicable, place excavated materials at least one (1) metre from the edge of the trench.

(ii) Ensure the ground beneath the machine is not undercut.

(iii) Watch boom clearance when travelling. Uneven ground may cause the boom to weave and collide with obstructions.

(iv) Avoid jerky slewing or sudden braking. These can make the machine unstable and overload machine components.

(v) Ensure the operator has the appropriate restricted operator's licence if the excavator is to be used in the crane mode.

(vi) When an excavator is used in the crane mode, check that the lifting weight is well within the approved lifting capacity for the machine. This lifting capacity shall be clearly and permanently marked on each machine.

(vii) Only operate attachments while stationary, as operation during travelling may starve one of the track drive motors and result in an unintended turn.

(viii) Consider implementing a 'Permit to Work' system, particularly when working near power lines or underground power for example: - that the height of power lines is known; - that the underground location is known; and - visible measure, such as tiger tails, are put in place.

23.8. Requirements related to use of trucks

23.8.1. General

(i) Drive defensively

(ii) Obey road signs

(iii) Never race with other vehicles

(iv) When following another vehicle, always allow enough distance to stop safely.

(v) One truck length for every 10 km per hour of truck speed should be the minimum distance between vehicles.

(vi) Reversing is the most hazardous truck operation. Reversing alarms, which are fitted on some trucks, are effective in warning persons of the danger. Reverse trucks only when they are under the direction of a signalman.

(vii) Be cautious of spillage from loaded units and any hazards the spillage might present to people on the ground and to the tyres of other plant.

(viii) Trucks sometimes fall over a tip head because the driver backs over the edge or the edge collapses under the weight of the truck.

(ix) Use a protective beam or timber baulk or back under the control of a signalman in order to avoid this happening.

(x) Principal Contractors should provide an earth mound to at least half the wheel diameter. This is a known control that is also used in the mining industry.

(xi) Where ground conditions are soft, or the tip head is likely to subside, dump loads back from the edge and have a dozer move the material over the edge.

23.8.2. Loading

(i) Never enter or leave the cab during loading.

(ii) Watch for and avoid other vehicles, personnel and rock outcrops on entering or leaving the loading area.

(iii) Stay a safe distance from trucks ahead at the loading point, and follow the directions of the signalman or loader operator before moving into the loading position.

(iv) Move off when signalled that loading is complete.

(v) Load material, e.g. timber, so that it does not project beyond the truck body and present a hazard to other plant, people or structures.

(vi) Where material is to be transported on a public road, maintain a distance of 1.2 metre or more beyond the front or rear of the vehicle, or 150 mm on either side, shall have a visible red flag or object fastened to the projecting end.

(vii) Unusually wide or long loads require a permit from the Police Department.

(viii) Secure loads at the lowest possible level on the tray with ropes or chains, and take special care when the truck is to travel over rough terrain.

(ix) Truck operators are responsible for giving load placement requirements to crane operators before loading operations begin.

(x) The load should be placed so that it will remain stable during loading, unloading and travelling.

23.8.3. **Unloading**

(i) Lower truck bodies before leaving the dump area.

(ii) Only raise truck bodies to unload materials on surfaces where the vehicle will remain stable and upright.

(iii) Never raise truck bodies to within a specified distance of overhead power line.

(iv) Take special care when tipping a load or spreading screenings on a road.

(v) With the tray up, trucks are less stable and are more likely to roll over, particularly on hilly sections or roads with surface irregularities or steep shoulders.

(vi) Check that the raised tray will not foul overhead power lines or telephone wires.

(vii) Never place part of your body under a raised truck body unless the truck body is securely propped.

23.8.4. **Transporting Personnel**

(i) Trucks shall not be used to transport personnel unless they are specifically designed to do so.

(ii) Where a bus is employed for the transportation of personnel, the bus shall: -be enclosed; have seats which are attached to the vehicle; have a safe means of access and exit; and, have two means of exit in case of emergency.

(iii) Drivers transporting personnel should be alert, dependable and careful.

(iv) Relevant safety rules include: never allow passengers to ride with their arms outside the vehicle; only start the vehicle after everyone is seated; persons should only get on or off the vehicle when it is stationary; tools, plant or gear should be stored in a compartment separate from passengers, i.e. compartments that are designed for storage and transportation and are separate from where personnel are seated.

(v) All items stored in this compartment should be secured against movement; and ensure that exhaust fumes do not enter the passengers' compartment.

23.8.5. **Towing**

(i) When towing another vehicle, take the following precautions: ensure the towing cable is undamaged and has a safe working load adequate for the job.

(ii) Slings, straps or chains which are used for towing should not be used for lifting any gear or materials and should be identified as such, e.g. slings and chains, etc. should be tagged "not for use in hoisting operations";

(iii) Before reversing, ensure everyone is clear. Get help from a signalman if the rear view is obstructed;

(iv) Attach the towing cable securely to the machines at the points recommended by the manufacturer.

(v) If these are not known, ensure fixing points are selected that will not damage the tow cable or the machine;

(vi) check what brakes are operational on the towed vehicle. There is unlikely to be any power assistance available for the brake system. Do not rely on parking brakes as a means of control;

(vii) When moving off, take up the slack carefully. Do not jerk the cable, and keep it taut to avoid damage;

(viii) keep towing speed down and as constant as possible;

(ix) Keep clear of the area between the towing vehicle and the towed vehicle; and attach a warning sign on the rear of the towed vehicle or machine which reads "Vehicle Under Tow".

23.9. **Penalty**

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. 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.

25. MANUAL LIFTING AND CARRYING OF EXCESSIVE WEIGHT

25.1. The Contractor shall ensure at its 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 Rule 38 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. FORMWORK

26.1. The collapse of formwork in the construction industry has the potential for severe injury and death. The four stages of the use of formwork (erection, adjustment, concrete placement and dismantling) all need to be managed in a risk assessment framework. The Contractor must Implement suitable control measures to eliminate or reduce the potential for events such as the collapse of formwork. Suitable control measures include:

(i) keeping the documentation for the formwork at the workplace;

(ii) following the formwork documentation;

(iii) planning to ensure that all elements of the process are conducted in a safe manner – eg ensuring operators such as crane operators, concrete placers are suitably licensed and trained, appropriate personal protective equipment is used etc;

(iv) erecting the formwork on foundations which will support the loads to be imposed on the formwork;

(v) not erecting formwork near excavation;

(vi) ensuring materials used in the erection of formwork are not defective;

(vii) securing loose material which may be dislodged as a result of inclement weather;

(viii) inspecting the formwork assembly before and during the placement of concrete;

(ix) not attaching equipment to the formwork assembly unless specifically designed for this purpose; and not using a stripping process which may cause damage to the permanent structure.

27. SITE ELECTRICITY

27.1. Competency of Electrical personnel

27.1.1. The Contractor shall employ qualified and competent electrical personnel as specified in General Instruction GMRC/SHE/GI/001.

27.2. Assessment of power

27.2.1. 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.

27.2.2. 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 be obtained before proceeding of the execution of the job.

27.2.3. 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.

27.2.4. 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.

27.2.5. If any unsafe noise making small capacity diesel generators are found used by sub / petty contractors the main Contractor shall only be penalised.

27.3. Work on site

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.

27.4. Strength and capability of electrical equipment

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.

27.5. Adverse or hazardous environments

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, vapours 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.

27.6. **Distribution system**

27.6.1. The Contractor shall provide distribution system for control and distribution of electricity from a main AC supply of 50Hz for typical appliances:

(a) Fixed plant – 400V 3 phase

(b) Movable plant fed via trailing cable over 3.75 kW – 400V, 3 phase

(c) Installation in site buildings – 230V single phase

(d) Fixed flood lighting – 230V single phase

(e) Portable and hand tools – 115V single phase

(f) Site lighting - 115V single phase

(g) Portable hand lamps – 115V single phase

27.7. **Electrical protection circuits**

27.7.1. 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.

27.7.2. Appropriate electrical protection shall be provided for all circuits, against over load, short circuit and earth fault current.

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

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

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

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

27.8. **Cables**

27.8.1. 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 BS 6346.

27.8.2. 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 / BS 7375.

27.8.3. 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 BS 7375.

27.8.4. 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 BS 6708

27.8.5. Cables buried directly in the ground shall be of a type incorporating armour 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.

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

27.8.7. 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 6m above ground.

27.8.8. Cables carrying a voltage to earth in excess of 65V other than supply for welding process shall have metal armour 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 armour should be in addition to the earth core in the cable and shall not be used as the protective conductor.

27.8.9. Armoured 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

27.9. **Plugs, socket-outlets and couplers**

27.9.1. 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 IP44 in accordance with BS EN 60529.

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

(i) 110 volts: Yellow

(ii) 240 volts: Blue

(iii) 415 volts: Red

27.10. **Connections**

27.10.1. 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 connect cables.

27.10.2. 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.

27.11. **Portable and hand-held equipments**

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.

27.12. **Other equipments**

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

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

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

27.12.4. 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.

27.13. **Work on or near live conductors**

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.

27.14. **Inspection and Maintenance**

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

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

28. LIGHTING

28.1. 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.

28.2. **Selection of Luminaries**

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

SN	Type of Lighting	Area of Requirement	Luminaries
1	Area Lighting	Workmen and vehicles to move about in safely.	• Shovel type: non-symmetrical • Symmetrical or non-symmetrical tungsten halogen
2	Beam flood lighting	Concentrated light over an area from a relatively great distance.	• Portable flood light (Conical beam) • Wide angle flood (fan shaped beam) • Medium or narrow angle flood (Conical beam)
3	Dispersive lighting	Lighting for indoor	• Dispersive (Mercury florescent) • Cargo cluster • Florescent trough
4	Walkway lighting	Lighting for stairways, ladder ways, corridors, scaffold access routes, etc.	• Well glass unit • Bulkhead unit (tungsten filament) • Bulk head unit (Florescent)
5	Local lighting	Lighting on sites and fittings are generally accessible to operatives	• PAR (Parabolic Aluminised Reflector) lamp cluster • Festoons (with or without shades) • Adjustable florescent work lamp • Portable flood lamp (mounted on own cable drum)

28.3. 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.

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

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

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

28.7. The Contractor shall take every effort to illuminate the work site as per the Employer's requirement illustrated in General Instruction GMRC/SHE/GI/011.

29. HAND TOOLS AND POWER TOOLS

29.1. General

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

29.1.2. 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.

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

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

29.2. Hand tools

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

29.2.2. The Contractor shall ensure that,

(a) 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.

(b) Mushroom headed chisels shall not be used in the worksite where the fragments of the head may cause injury.

(c) Unless hatchet has a striking face, it shall be used as a hammer.

(d) Only knives of retractable blades shall be used in the worksite.

(e) No screwdrivers shall be used for scraping, chiselling or punching holes.

(f) A pilot hole shall always be driven before driving a screw.

(g) Wherever necessary, usage of proper PPEs shall be used by his employees.

29.3. Power tools

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

29.3.2. **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 equipments, which gives out more noise as mentioned in Clause 60.0 of this 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 need 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 1800 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 moves 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.

30. WELDING, GOUGING AND CUTTING

30.1. 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.

30.2. Hose clamp or clip shall be used to connect hoses firmly in both sides of cylinders and torches.

30.3. All gas cylinders shall be fixed with pressure regulator and dial gauges

30.4. Non-return valve and Flashback arrester shall be fixed at both end of cylinder and torch.

30.5. Domestic LPG cylinders shall not be used for Gas welding and Cutting purpose.

30.6. 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.

30.7. Use firewatchers if there is a possibility of ignition unobserved by the operator (e.g. on the other side of bulkheads).

30.8. Oxygen cylinders and flammable gas cylinders shall be stored separately, at least 6.6 meters (20 feet) apart or separated by a fire proof, 1.5 meters (5 feet) high partition. Flammable substances shall not be stored within 15 meters of cylinder storage areas.

30.9. Transformer used for electrical arc welding shall be fixed with Ammeter and Voltmeter and also fixed with separate main power switch.

30.10. 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.

30.11. Use a low voltage open circuit relay device if welding with alternating current in constricted or damp places.

30.12. 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.

30.13. Avoid being in contact with water or wet floors when welding. Use duckboards or rubber protection.

30.14. All electrical installations shall meet the IS: 5571: 1997 and NFPA 70 for gas cylinder storage area and other hazardous areas.

30.15. The current for Electric arc welding shall not exceed 300 A on a hand welding operation.

31. DANGEROUS AND HARMFUL ENVIRONMENT

31.1. **Definition of Confined Space:**

(i) Its large enough and so configured that an worker can bodily enter (any portion of the body) and perform assigned work,

(iii) Has limited or restricted mean for entry and/or exit,

(iv) Is not designed for continuous occupancy

(v) Contains or has the potential to contain a hazardous atmosphere,

(vi) Contains a material that has the potential for engulfing an entrant,

(vii) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section, or

(viii) Contains other recognized serious safety or health hazard.

31.2. Contractors must ensure all confined spaces are identified and managed using documented site confined space management methods.

31.3. **As per BOCWR Rule 40:**

(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.

32. FIRE PREVENTION, PROTECTION AND FIGHTING SYSTEM

32.1. 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.

32.2. Recharging of fire extinguishers and their proper maintenance should be ensured and as a minimum should meet Indian National Standards

32.3. All drivers of vehicles, foreman, supervisors and managers shall be trained on operating the fire extinguishers and fire fighting equipment.

32.4. The Contractor shall also give consideration to the provision of adequate fire fighting arrangements within the underground and tunnelling operations including the provision of Fire Service compatible hose connections and emergency lighting.

32.5. As per the GBOCW Rules 2003, all lifting appliances' driver cabin should be provided with a suitable portable fire extinguisher.

32.6. Combustible scrap and other construction debris should be disposed off site on a regular basis. in environmentally sound manner, burning of wastes is prohibited.

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

32.8. 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 on site.

33. CORROSIVE SUBSTANCES

As per GBOCWR Rule 44, corrosive substances including alkalis and acids shall be stored in, in dedicated storage area, HSMP (hazardous substances management plan) shall be prepared describing how all handling substances, shall be managed and handled overall. And, Hazardous substances 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.

34. DEMOLITION

34.1. **The Contractor shall ensure that:**

(i) all demolition works be carried out in a controlled manner 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 life 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.

viii) Demolition debris shall be segregated for reuse and recycling purposes.(see 65.3)

35. EXCAVATION

35.1. **Excavation: 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 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 is 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.

35.2. **Tunnelling**

35.2.1. The Contractor shall inform in writing to the Director General within 30 days, prior to the commencement of any tunnelling work.

35.2.2. The Contractor shall appoint a responsible person for safe operation for tunnelling work as per Rule 121 & 125 of BOCWR.

35.2.3. The Contractor shall ensure:

(i) every compressed air system in a tunnel is provided with emergency power supply for maintaining continued supply of compressed air as per Rule 155 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 or walkie-talkie are provided and maintained for arranging better effective communication at an excavation or tunnelling work as per Rule 136 of BOCWR.

(iv) all portable electrical hand tools and inspection lamp used in underground and confined space at an excavation or tunnelling 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 of 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 tunnelling.

(vii) adequate number of water outlets provided for fire fighting 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 tunnelling work where workers employed does not exceed 29ºC as per Rule 165 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 m^3/ min for each worker employed in tunnel as per Rule 153 of BOCW R.

35.3. **Warning signs and notices**

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 tunnelling, shall be displayed or erected at conspicuous places in Hindi and in a language (Gujarati) understood by majority of such building workers at such building such excavation or tunnelling work

(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.

36. PILING

36.1. **General Precautions**

There are certain hazards which are common to all types of piling, and the following precautions are necessary:

(i) prior to piling, all underground services should be located and made safe. A check should be made to ensure there are no cellars, underground water courses or ground conditions which might cause hazards; there should be a firm level base for the crane, or crane mats provided;

(ii) when working on piling operations one must wear a safety helmet, and ear and eye protection where necessary;

(iii) All cranes, lifting appliances and lifting gear must have appropriate certificates of testing and

thorough examination, and should be large enough for the job;

(iv) particular attention should be paid to the risk of damage to lifting gear from sharp edges;

(v) Cranes used for raising or lowering workers must be fitted with a dead man's handle and lowering should be done under power; you must be carried in properly constructed cages which cannot spin or tip;

(vi) piling contractors should be asked to provide a written method statement setting out the precautions relevant to the type of piling they are to employ;

(vii) Induction training and information for you as supervisor or operative should be specifically related to the method statement.

36.2. **Bored Piles**

Workers may need to enter a borehole for inspection or for clearing out in undercuts, and there are certain precautions which must be taken prior to entry:

(i) the borehole should be at least 60 cm in diameter;

(ii) the borehole should be treated as a confined space and the precautions which are advised elsewhere to ensure a satisfactory atmosphere must be closely followed;

(iii) waste material from the borehole should be kept clear of the borehole;

(iv) Descent into a borehole should be in properly designed skips, chains or cages fitted with an anti-spin device. The power source of the lifting appliance should be kept running throughout the time someone is underground;

(v) while a worker is working down a borehole he/she must wear a safety harness;

(vi) all workers concerned must be trained and competent in rescue from deep boreholes, and emergency rescue drills should be carried out at regular intervals;

(vii) A banksman who can see workers in the borehole should be present at all times;

(viii) There must be adequate lighting at safe reduced voltage and a means of communication from the borehole.

(ix) Wherever possible, the need for workers to enter pile boreholes should be avoided by the use of television cameras and other techniques for remote inspection.

37. WORK PERMIT SYSTEM

37.1. 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.

37.2. 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

(ix) Tandem Lifting

(x) Control Blasting

(xi) The sample forms for different types of work permit to be adopted as per Sample Form (SF – 20, SF – 21, SF – 22, SF – 23 & SF 24)

37.3. 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;

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

37.5. 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.

37.6. All hot work above the material like escalator etc. belonging to system/track/PEB contracts shall be performed with Hot Work Permit jointly signed by Civil contractor and other contractor of which material belongs. The whole activity shall be performed under the supervision of the both contracts i.e civil contract and system/track/PEB contracts. Fire Retardant covers is mandatory for all hot works above the materials like escalator etc.

37.7. Work permit shall be issued by the Station Manager/In-charge or by qualified & competent person as nominated by the station manager/in-charge. Permit shall be cancelled after the completion of the work activity or 12 hrs whichever is earlier. If any activity requires more than 12 hrs to complete, fresh permit shall be issued/signed.

37.8. Lifting permit shall only be signed by the nominated lifting engineer.

38. TRAFFIC MANAGEMENT

38.1. 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 and also to ensure the safety of workmen at construction sites.

38.2. All construction workers should be provided with high visibility jackets with reflective tapes as most of viaduct / tunnelling 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.

38.3. 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 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.

38.4. **Legal permission**

38.4.1. In all cases, the Contractor shall employ proper precautions. W herever 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 may be.

38.4.2. 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.

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

38.6. 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.

38.7. **Regulatory signs**

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.

38.8. **Warning signs**

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

38.8.2. 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.

38.8.3. A warning sign as given in General Instruction GMRC/SHE/GI/012 shall be installed 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'.

38.8.4. 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.

38.9. **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.

38.9.1. 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 with IRC: 79 - Recommended Practice for Road Delineators.

38.9.2. **Traffic cones and cylinders**

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- reflectorised red and white band shall be used wherever required.

38.9.3. **Drums**

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.

38.9.4. **Barricades**

(i) 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.

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

(iii) All barricades shall be erected as per the design requirements of the Employer, numbered, painted and maintained in good condition and also Barricade in-charge maintains a barricade register in site.

(iv) 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 should be placed at the top of each barricade.

38.9.5. 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.

38.9.6. 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.

38.9.7. **Tow away vehicle**

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.

38.9.8. **Cleaning of roads**

The Contractor shall ensure the cleanliness of roads and footpaths by deploying proper manpower for the same. (see 58.1.13)

39. WORK ADJACENT TO LIVE RAILWAYS

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

(i) The rules provided for in the Railway's manual should be followed.

(ii) No persons are allowed to encroach onto the railway unless the owner/concerned authority has given specific authority.

(iii) Adequate protection in accordance with the railway owner's/concerned authority's requirements shall be followed. (Provision of Block Inspectors, Flagmen and Lookouts)

(iv) All persons shall wear high visibility clothing at all times.

(v) Any induction training requirements of the railways shall be strictly observed.

40. BATCHING PLANT AND CASTING YARD LAYOUT

40.1. 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.

40.2. The batching plant / casting yard shall be barricaded and made as a compulsory PPE zone

40.3. 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.

40.4. 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.

40.5. Drainage shall be effectively provided and waste water shall be disposed after proper treatment

40.6. 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.

40.7. Manual handling of cement shall be avoided to a larger extent. W henever 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.

40.8. The PPEs provided to cement handling workmen shall conform to international standards. Access roads and internal circulation roads shall be well laid and maintained properly at all time.

40.9. Non-adherence to any of the above provision shall be penalised as per relevant penalty clause.

40.10. Any sort of pollution beyond the statutory limits is punishable as per the concerned Rules.

40.11. A separate leakproof tank at each batching plant for the cleaning of concrete trucks' drum, shall be provided and water discharge shall be pumped to Sedimentaiotn tank, water quality shall confirm to

section 59.0.

41. PERSONAL PROTECTIVE EQUIPMENTS (PPEs)

41.1. 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-grap fall arrester, etc)

(v) Eye Protection (Goggles, Welders glasses, etc)

(vi) Protection (Gloves, Finger coats, etc)

(vii) Respiratory Protection. (Nose mask, SCBAs, etc.)

(viii) Hearing Protection (Ear plugs, Ear muffs, etc)

41.2. 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.

41.3. 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 / tunnelling 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.

41.4. 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
Hard hat with company Logo	Hard hat with reflective tape
Safety boots	Safety boots

All employees of the Contractor including workmen	Traffic marshals
visibility waistcoat covering upper body and meeting the following requirements as per BS EN 471:1994: (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 5 cm 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.	Hi-visibility jacket covering upper body and meeting the following requirements as per BS EN 471:1994: (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 500 cm2 (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.

41.4.1. **Colour coding for helmets**

Safety Helmet Colour Code (Every Helmet should have the LOGO* affixed / painted)	Person to use
White	GMRC staffs
Grey	All Designers, Architect, Consultants, etc.
Violet	Main Contractors (Engineers / Supervisors)
Blue	All Sub-contractors (Engineers / Supervisors)
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*

(i) Logo shall have its outer dimension 2"*2" and shall be conspicuous

(ii) Logo shall be either painted or affixed

(iii) 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.

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

41.6. 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.

41.7. 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.

41.8. 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.

42. VISITORS TO SITE

42.1. No visitor is allowed to enter the Site without the permission of the Employer. All authorised 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.

42.2. All Visitors shall be accompanied at all times by a responsible member of the site personnel.

42.3. The Contractor shall be fully responsible for all visitors' safety and health within the Site. All visitor should also receive a site induction awareness, commensurate to H&S risks, before entering the construction site

42.4. The criteria against which the audits will be undertaken shall be derived from the clauses within the Environment Protection Requirements, contract-specific Site Environmental Plan and previous site inspection results.

42.5. In addition to the quarterly audits by the Engineer, site inspection shall be undertaken by the Contractor's staff to inspect the construction activities in order to ensure that appropriate environmental protection and pollution control measures are properly followed and implemented.

42.6. The frequency of site inspection shall be at least once a week.

42.7. The area of inspection shall not be limited to environmental compliance within the site but areas outside the site which are likely to be affected, directly or indirectly by activities at site.

42.8. Results of inspection shall be discussed with Engineer and his recommendations on better environmental protection shall be notified to the Contractor for taking immediate action and rapid resolution of identified non-compliance.

42.9. If significant environmental problems are identified or if there is an environmental complaint or as a part of investigation work, then the Engineer shall also carry out ad hoc site inspection which shall be attended by Contractor's Representative.

42.10. Reporting System

42.10.1. Reporting under the Environmental Management System will contain results of monitoring and inspection programs.

42.10.2. In Site Environmental Plan, the Contractor shall prepare and submit monthly Environmental Quality Management Reports in accordance with requirements as per Contract.

42.10.3. The monthly report shall include (but not limited to) the following:

a. Executive Summary

b. Brief mention of construction activities

c. Monitoring results under AMCP

d. Interpretation of monitoring results, significance and influencing factors

e. Graphical representation of monitored results over past four reporting periods.

f. Measures to control spill under Spill Prevention and Control Plan (SPCP).

g. Action taken on recommendations under site inspection programme or specific directions.

h. Summary of complaints, results of investigations and follow-up action

i. Future key issues

42.10.4. Contractor fulfilled the requirement regarding SHE as per ESMP

42.11. **Complaint Response Process**

42.11.1. Inquiries, complaints and requests for information can be expected from a wide range of individuals **and organizations both private and government. The majority of complaints are likely to be received** by GMRC, although the site offices are also likely to be contacted.

42.11.2. The objective of complaint process is to ensure that public and agency complaints are addressed and resolved consistently and expeditiously.

42.11.3. The Contractor's Site Manager will be notified immediately on receipt of complaint that may relate to environmental impacts. The Site Manager will immediately inform the Engineer and through him the GMRC.

42.11.4. Field investigation should determine whether the complaint has merit, and if so action should be taken to address the impact.

42.11.5. The outcome of the investigation and the action taken shall be documented on a complaint performa prepared by the Contractor and approved by the Engineer in advance of the works.

42.11.6. Where possible, a formal response to each complaint received shall be prepared by the Contractor within seven days in order to notify the concerned person(s) that action has been taken.

42.11.7. A Grievance Redress Mechanism shall be developed at project level, and process shall bring clarity to the communities that might be affected by the project. Also, this Complaint Response Process shall also include project's employees and workers.

42.12. **Completion of the EQM Programme**

42.12.1. The construction of Work/Project will be undertaken as a series of individual construction contracts with necessarily different construction program and completion dates.

42.12.2. The Engineer shall maintain an overview of the 'impact causing potential' of each site or contract and monitoring parameter with a view to maintaining the most cost effective use of the environmental resources dedicated to the Project.

42.12.3. Termination of EQM should focus on the percentage contract completion status and on the basis of a history of environmental impact arising from the site over a representative period of monitoring.

42.12.4. Justifiable application for termination of EQM shall be put forward by the Contractor to the Engineer, as necessary throughout the construction period.

43. FIGHTING

Fighting anywhere on the GMRC Project site, including in parking areas, is strictly forbidden; violators will be barred from site and possibly subjected to legal action by local authorities.

44. HORSEPLAY

Running, pushing, practical jokes, and other horseplay are forbidden on the GMRC Project site

PART III: OCCUPATIONAL HEALTH AND WELFARE

45. PHYSICAL FITNESS OF WORKMEN

45.1. The Contractor shall ensure that his employees / workmen subject themselves to such medical examination as required under the law or under the Contract and keep a record of the same.

45.2. The Contractor shall not permit any employee / workmen to enter the work area under the influence of alcohol or any drugs.

45.3. The Contractor shall arrange dedicated facilities for women and mechanism to prevent gender based violence.

46. MEDICAL FACILITIES

46.1. **Medical Examination**

46.1.1. The Contractor shall arrange a medical examination of all his employees including his sub-contractor employees, persons 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:

(a) General Physique;

(b) Vision: Total visual performance using standard orthorator like Titmus Vision Tester should be estimated and suitability for placement ascertained in accordance with the prescribed job standards.

(c) 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.

(d) 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.

(e) Upper Limbs: Adequate arm function and grip

(f) Spine: Adequately flexible for the job concerned. (g) Lower Limbs: Adequate leg and foot concerned.

(h) General: Mental alertness and stability with good eye, hand and foot coordination.

c. Any other tests which the examining doctor considers necessary

46.1.2. 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 from the payments to be made to the

Contractor.

46.2. **Occupational Health Centre**

The Contractor shall ensure at a construction site that an occupational health centre, mobile or static, is provided and maintained in good order. Services and facilities shall be provided as per the scale laid down in Schedule X of BOCWR. A construction medical officer appointed in an occupational health centre will possess the qualification as laid down in Schedule XI of BOCWR.

46.3. **Ambulance van and room**

The Contractor shall ensure at a construction site of a building or other construction work that an ambulance van and room are provided at such construction site or an arrangement is made with a nearby hospital for providing such ambulance van 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 Schedule IV and Schedule V of BOCWR.

46.4. **First-aid boxes**

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.

46.5. **HIV/ AIDS prevention and control**

46.5.1. 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.

46.5.2. The Employer will engage a professional agency for implementing the guidelines laid down in the policy and communicating to the Contractor.

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

46.5.4. 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.

46.5.5. 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.

46.5.6. 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.

46.5.7. The peer educators will be paid a monthly honorarium as fixed by the Employer for rendering his services in addition to his regular duty.

46.5.8. The total number of peer educators (1 for 100 workers) shall always be maintained by the Contractor.

46.5.9. 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.

46.5.10. 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.

46.6. **Prevention of mosquito breeding**

46.6.1. Measures shall be taken to prevent mosquito 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) There should not be accumulation of water at any site. In case of still water, it should be covered by earth and levelled.

(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.

46.6.2. Posters in Gujarati, Hindi and English, which draw attention to the dangers of permitting mosquito breeding, shall be displayed prominently on the site.

46.6.3. 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.

47. ALCOHOL AND DRUGS

47.1. The Contractor shall ensure at all times that no employee is working under the influence of alcohol / drugs which are punishable under Government regulations.

47.2. Smoking at public worksites by any employee is also prohibited as per Government regulations.

48. VENTILATION AND ILLUMINATION

48.1. Ventilation

48.1.1. 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 system as approved by the DG/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.

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

48.2. Illumination

48.2.1. The Contractor shall take every effort to illuminate the work site as per the Employer's requirement illustrated in General Instruction GMRC/SHE/GI/011.

48.2.2. 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.

49. RADIATION

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

49.2. Operations involving ionising radiation shall only be carried out after having been reviewed without objection by the Employers representative and shall be carried out in accordance with a method statement.

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

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

Government Enactments.

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

50. WELFARE MEASURES FOR WORKERS

50.1. Latrine and Urinal Accommodation

50.1.1. 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 100 workers.

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

50.1.3. 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

50.1.4. **Moving sites**

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.

50.1.5. 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 at the cost of the Contractor.

50.2. Canteen

In every workplace wherein not less than 250 workers are ordinarily employed, the Contractor shall provide an adequate canteen conforming to Section 37 of BOCWA, Rule 244 of BOCWR and as stipulated in Rule 247 of BOCWR the changes 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.

50.3. Serving of tea and snacks at the workplace

As per Rule 246 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 244(1) of BOCWR, the Contractor employing building workers shall make suitable arrangement for serving tea and light refreshment to such building workers at such place.

Proper Housekeeping should be maintained at such locations where tea and snacks are served.

50.4. Drinking water

50.4.1. As per Section 32 of BOCWA the Contractor shall make in every worksite, effective arrangements to provide sufficient supply of wholesome drinking water with minimum quantity of 5 litres per workman per day. Quality of the drinking water shall conform to the requirements of national standards on Public Health.

50.4.2. 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 work sites.

50.4.3. All such points shall be legibly 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 metres of any washing places, urinals or latrines.

50.5. Labour Accommodation

The Contractor shall provide free of charges as near as possible, temporary living accommodation

to all workers conforming to provisions of Section 34 of BOCWA. These accommodations shall have cooking place, bathing, washing and lavatory facilities.

50.6. **Creches**

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 provisions of Section 35 of BOCWA.

51. HEAT STRESS

51.1. Contractors/Subcontractors will establish the necessary programs to ensure that project employees work safely in heat stress conditions. The reduction of adverse health effects can be accomplished by engineering controls, work practices, training, acclimatization, monitoring, water and electrolyte balance and the recognition and treatment of heat stress emergencies.

52. ASBESTOS

52.1.1. Asbestos fibres are naturally occurring and extremely aerodynamic. Because of this, almost everyone is exposed to asbestos. Asbestos fibres can become a health risk if inhaled at high concentrations over extended periods of time. Asbestos is only dangerous if it becomes airborne. As long as asbestos-containing materials are not damaged, the asbestos fibres do not become airborne, and do not pose a health hazard to building occupants.

52.1.2. As a Preventive Action, No Asbestos Containing material will be used during any of the site activity mitigate the hazard

53. DERMATITIS

53.1.1. The substances that cause most skin health problems are:

- wet cement
- epoxy resins and hardeners
- acrylic sealants
- bitumen or asphalt
- solvents used in paints, glues or other surface coatings
- petrol, diesel, oils and greases
- degreasers, descalers and detergents

54. LEAD BASED PAINT

54.1.1. Lead-based paint is a source of lead poisoning. Ingestion and inhalation of lead dust that is created as lead-based paint chips and peels, or from improper sanding or scraping of lead- based painted surfaces can lead to exposure.

54.1.2. Paints and other chemicals used for painting should be stored in a proper contained area.

54.1.3. Empty Paint containers, waste paint brushes, clothes stained with paint should be properly disposed.

55. INSECTS AND SCORPION STINGS

55.1. **Recommendation for Protecting Workers**

55.1.1. Employers should protect their workers from stinging insects by training them about:

- Their risk of exposure
- Insect identification
- How to prevent exposure
- What to do if stung

55.2. Insect Stings

55.2.1. Prevention of Insect Stings

- Workers should take the following steps to prevent insect stings:
- Wear light-colored, smooth-finished clothing.
- Avoid perfumed soaps, shampoos, and deodorants.
- Don't wear cologne or perfume.
- Avoid bananas and banana-scented toiletries.
- Wear clean clothing and bathe daily. (Sweat may anger bees.)
- Wear clothing to cover as much of the body as possible.
- Avoid flowering plants when possible.
- Keep work areas clean. Social wasps thrive in places where humans discard food.
- Remain calm and still if a single stinging insect is flying around. (Swatting at an insect may cause it to sting.)
- If you are attacked by several stinging insects at once, run to get away from them. (Bees release a chemical when they sting, which may attract other bees.)
- Go indoors.
- A shaded area is better than an open area to get away from the insects.
- If you are able to physically move out of the area, do not to attempt to jump into water.
- Some insects (particularly Africanized Honey Bees) are known to hover above the water, continuing to sting once you surface for air.
- If a bee comes inside your vehicle, stop the car slowly, and open all the windows.
- Workers with a history of severe allergic reactions to insect bites or stings should consider carrying an epinephrine auto injector (EpiPen) and should wear a medical identification bracelet or necklace stating their allergy.

55.2.2. First Aid

If a worker is stung by a bee, wasp, or hornet:

- Have someone stay with the worker to be sure that they do not have an allergic reaction.
- Wash the site with soap and water.
- Remove the stinger using gauze wiped over the area or by scraping a fingernail over the area.
- Never squeeze the stinger or use tweezers.
- Apply ice to reduce swelling.
- Do not scratch the sting as this may increase swelling, itching, and risk of infection.

55.3. Scorpion Stings

55.3.1. Symptoms

Symptoms of a scorpion sting may include:

- A stinging or burning sensation at the injection site (very little swelling or inflammation)
- Positive "tap test" (i.e., extreme pain when the sting site is tapped with a finger)
- Restlessness
- Convulsions
- Roving eyes
- Staggering gait
- Thick tongue sensation
- Slurred speech
- Drooling
- Muscle twitches
- Abdominal pain and cramps
- Respiratory depression

These symptoms usually subside within 48 hours, although stings from a bark scorpion can be life-threatening.

55.3.2. Preventing Scorpion Stings

Workers should take the following steps to prevent scorpion stings:

- Wear long sleeves and pants.
- Wear leather gloves.
- Shake out clothing or shoes before putting them on.
- Workers with a history of severe allergic reactions to insect bites or stings should consider carrying an epinephrine auto injector (EpiPen) and should wear a medical identification bracelet or necklace stating their allergy.

55.3.3. First Aid

Workers should take the following steps if they are stung by a scorpion:

- Contact a qualified health care provider or poison control center for advice and medical instructions.
- Ice may be applied directly to the sting site (never submerge the affected limb in ice water).
- Remain relaxed and calm.
- Do not take any sedatives.
- Capture the scorpion for identification if it is possible to do so safely.

56. SNAKE BITES

56.1. Symptoms of Snake Bites

Signs or symptoms associated with a snake bite may vary depending on the type of snake, but may include:

- A pair of puncture marks at the wound
- Redness and swelling around the bite

- Severe pain at the site of the bite
- Nausea and vomiting
- Labored breathing (in extreme cases, breathing may stop altogether)
- Disturbed vision
- Increased salivation and sweating
- Numbness or tingling around your face and/or limbs

56.2. **Recommendations for Protecting Workers**

Employers should protect their workers from venomous snake bites by training them about:

- Their risk of exposure to poisonous snakes
- How to identify poisonous snakes
- How to prevent snake bites
- What they should do if they are bitten by a snake

56.3. **Preventing Snake Bites**

Workers should take the following steps to prevent a snake bite:

- Do not try to handle any snake.
- Stay away from tall grass and piles of leaves when possible.
- Avoid climbing on rocks or piles of wood where a snake may be hiding.
- Be aware that snakes tend to be active at night and in warm weather.
- Wear boots and long pants when working outdoors.
- Wear leather gloves when handling brush and debris.

56.4. **First Aid**

Workers should take the following steps if they are bitten by a snake:

- Seek medical attention as soon as possible (dial 911 or call local Emergency Medical Services.)
- Try to remember the color and shape of the snake, which can help with treatment of the snake bite.
- Keep still and calm. This can slow down the spread of venom.
- Inform your supervisor.
- Apply first aid if you cannot get to the hospital right away.
    - Lay or sit down with the bite below the level of the heart.
    - Wash the bite with soap and water.
    - Cover the bite with a clean, dry dressing.

Do NOT do any of the following:

- Do not pick up the snake or try to trap it.

- Do not wait for symptoms to appear if bitten, seek immediate medical attention.
- Do not apply a tourniquet.
- Do not slash the wound with a knife.
- Do not suck out the venom.
- Do not apply ice or immerse the wound in water.
- Do not drink alcohol as a painkiller.
- Do not drink caffeinated beverages

PART- IV ENVIRONMENTAL MANAGEMENT

57. ENVIRONMENTAL MANAGEMENT

57.1. Environmental Monitoring

Environmental Monitoring is devised with the objectives to: (i) evaluate the effectiveness of the proposed mitigation measures and the protection of the ambient environment as per prescribed standards, (ii) suggest improvements in the Env. management plans, if required (iii) verify the statutory compliance and community obligations, and, (iv) use as tool to compare the monitored data against the baseline condition collected during the study period and assess the changes in environmental quality in the project area.

This will be used as performance indicators for the project. This shall not only help in assessing the change due to the project activities, but also the potential impacts due to project activities.

A comprehensive Environment monitoring plan for all environmental management components identified as of particular significance has been prepared for all stages of project and provided in EIA & ESMP of the Project. The Contractor shall implement Environment monitoring plan as prescribed under EMP of EIA & ESMP of the Project.

Environment Monitoring for all phases of the Project, i.e. Pre-construction, construction, and operation shall be done for quality of Air, water(Ground water & Surface water), Noise & Vibration, soil, ecology for the proposed project.

57.1.1. Environment Monitoring shall be carried out by NABL Accredited/MoEFCC recognized private or Government agency monitoring during construction under the supervision of PIU.

57.1.2. The Contractor's Environmental Team shall carry out the monitoring of all environmental components as per EIA with focus on sensitive receivers in the vicinity of the works.

57.1.3. The number of locations, frequencies and parameters of Environment Monitoring shall be as per EIA, National/Local legislative requirements and any specific & additional Environment Monitoring based on Project activities progress.

57.1.4. The Contractor shall keep check of Monitoring equipments of the Monitoring Agency. Calibration, Operation, maintenance, and good state of monitoring equipments of Monitoring agency/Laboratory shall be checked by the Contractor during Monitoring .

57.1.5. The Contractor's Environment Monitoring Team shall ensure that Environment monitoring methods used by Monitoring Agency/Laboratory should be in accordance with standards methods as prescribed by CPCB/MoEF & GPCB for Air, water(Ground water & Surface water), Noise & Vibration, soil, ecology.

57.1.6. Environment Monitoring Reports of Air, Water, Soil, Noise & Vibration, Ecology shall be submitted by the Contractor periodically to PIU as part SHE Report.

57.1.7. The Contractor's monitoring program is summarized in Table 1.This monitoring program shall cover the aspects of Air, water (ground water and (surface water)), Noise, Vibrations , soil with focus on sensitive receptors covering all relevant parameters in each aspects as per SPCB's requirements & CPCB guidelines.

Table 1: Summary of Contractor's Monitoring Programme

Parameter	Aspects
Sampling	Air, water (ground water and (surface water)), Noise, Vibrations, soil with focus on sensitive receptors covering all relevant parameters in each aspects as per SPCB's requirements & CPCB guidelines.
Frequency at each location	as per EIA & ESMP

Locations	To be determined by the Contractor based on sensitive receptors and guidelines of SPCB.
Additional Requirements	Ad hoc monitoring as required

Monitoring Reports should be submitted every month along with the Monthly SHE Report

57.1.8. The Contractor shall prepare an 'Environmental Inspection and Action Reporting System' and submit to the Engineer for approval and make amendments as suggested. It shall contain a contract specific comprehensive Environment Inspection checklist as per the requirements of Site Environmental Plan.

57.2. **Environment Management Plan**

57.2.1. The Contractor shall prepare ENVIRONMENT MANAGEMENT PLAN in accordance with EIA which shall comprises of set of remedial measures to be taken during construction and operation phase of the Project to mitigate , minimize and/or eliminate the adverse environmental impacts to permissible level.

57.3. The contractor shall have to ensure all requisite approvals/Clearances/Consents/NOC under various Environment Rules are in place before Project activities. I.e. Consent to Establish & Consent to operate for Batching plan, NOC for trees Cutting, NOC for ground water withdrawal, CRZ clearances if require, waste disposal etc.

57.4. The Contractor shall comply with Environment remedial measures based on Audit of Phase II by AFD. The requirements are given in Appendix-5.

58. AIR QUALITY

58.1.1. The Contractor shall take all necessary precautions to minimise fugitive dust emissions from operations involving excavation, grading, and clearing of land and disposal of waste. It 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.

58.1.2. The Contractor shall use construction equipment designed and equipped to minimise or control air pollution. It shall maintain evidence of such design and equipment and make these available for inspection by Employer. Workers shall be encouraged to avoid engine idling to prevent unnecessary pollutant emission.

58.1.3. 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.

58.1.4. 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.

58.1.5. 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.

58.1.6. 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 Dust control shall be done in accordance with CPCB'

58.1.7. Dust control shall be done in accordance with CPCB's guidelines, vide its no CUPS/89/2017-18 on dust mitigations measures handling Construction materials & activities.

58.1.8. 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 tailboard or sideboards.

58.1.9. 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 till its further disposal through GPCB Authorized Service Provider.

58.1.10. The temporary dumping areas shall be maintained by the Contractor at all times until the excavator is re-utilised for backfilling or as directed by Employer. Dust control activities shall continue even during any work stoppage.

58.1.11. 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.

58.1.12. 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 especially where the work is near sensitive receptors. Use of potable water for dust suppression shall be avoided and treated water from sedimentation tank or treatment unit shall be encouraged.

58.1.13. 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.
Either a recharge well shall be provided below or near the wheel washing facility or water shall be recirculated for washing tyres.

58.1.14. 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.

58.1.15. The Contractor shall submit to the Employer an Air Monitoring and Control Plan (AMCP) under contract specific Environment Management Plan to guide construction activity in so far as it relates to monitoring, controlling and mitigating air pollution.

58.2. **Air Monitoring**

58.2.1. Ambient Air quality monitoring shall be done by the Contractor in accordance with NAAQS(National Ambient Air Quality standards) as notified by CPCB. Ambient air quality monitoring methods, locations shall be as per Guidelines of CPCB, vide its no NAAQMS/36/2012-13.

58.2.2. The Air Quality Monitoring and Control Plan (AMCP) in contract-specific Site 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 to minimise the air pollution, monitoring program, record keeping and reporting.

58.2.3. The Engineer shall monitor Contractor's performance of tasks specified, and will inspect necessary records, reports and procedures related to the control of air quality given in AMCP.

58.2.4. Information gathered during the AMCP will be catalogued and maintained by the Contractor and shall be available for review by the Employer.

58.2.5. The exact location of the air monitoring stations located near air sensitive receptors adjoining the construction sites, such as residences, schools, hotels and hospitals and placement of monitoring equipment thereat shall be agreed with the Engineer prior to commencement of air monitoring program.

58.2.6. Impact monitoring during the course of the Works shall be carried out at the monitoring stations for two days (continuous twenty-four hours) every fifteen days and where there is a perceived air quality problem.

58.2.7. The Contractor shall construct suitable fence, lockable gate, power point and suitable access at each air monitoring station. Monitoring stations shall be free from local obstructions or sheltering.

58.2.8. Should impact monitoring record dust levels which are:

- indicative of a deteriorating situation such that closer monitoring is reasonably indicated, or
- when in the opinion of the Engineer additional measurements are required in view of deteriorating air quality,

Then the Engineer may require the Contractor to increase the frequency of impact monitoring at any one or more of the monitoring stations until the results indicate an improving and acceptable level of air quality.

58.2.9. The Contractor shall keep records of air quality monitoring (including location, date, time). The Contractor shall submit a copy of monitoring results to the Engineer. The results should represent a statistical evaluation of data by calculating maximum, minimum, mean, standard deviation, geometric mean and percentile calculations for evaluation of frequency distribution, trends, and comparison with emission standards.

58.2.10. Where the Engineer determines that the recorded dust level is significantly greater than the Limit levels, the Engineer may direct the Contractor to take effective remedial measures including, but not limited to, reviewing dust sources and modifying working procedures.

58.2.11. Where the recorded baseline levels exceed the ambient air quality standards, then at such locations the action level is the recorded base line. Contractor shall take all effective remedial measures to contain the levels to their baseline value as a result of his activities. The action level may be varied by and at the sole discretion of the Engineer.

58.2.12. The Contractor shall inform the Engineer of all steps taken to investigate cause of exceeded emission and immediate action taken to avoid further exceeding through written reports and proposals for action under an Event Contingency Plan.

59. WATER QUALITY

59.1. The Contractor shall comply with the Indian Government legislation and other State Regulations in existence in Gujarat 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.

59.2. The Contractor shall provide adequate precautions to ensure that no spoil 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 and drains within or adjacent to the site. In the event of any spoil or debris from construction works being deposited or any silt washed down to any area, then all such spoil, 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.

59.3. The Contractor is not allowed to discharge waste water from the site activities without prior treatment. The Contractor shall obtaine NOC from prescribed Authorities for use of surface water and/or Ground water. The Contractor shall carry out sampling and analysis of ground water in case ground water contamination is suspected due to previous land use or current land use on plots of land located nearby (e.g.: petrol station, industrial facility, etc…),and ground water resulting from dewatering operations. If Analysis Reports shows higher values than prescribed standards (by SPCB/CPCB), then ground water must be treated before being rejected in the natural environment.

59.4. The contractor shall implement measures such as sedimentation tanks on site for batching plants, if necessary. Washing of Construction equipments should be done in environmentally sound manner.

59.5. The contractor shall do quantification of water requirements and shall implement “Water reuse & Reduce Plan” . Use of water efficient fixtures, leak proofing, and avoidance of wastage of water shall be implemented by the Contractor at sites and project offices.

59.6. The contractor shall ensure no leakage of water through pipes and valves.

59.7. The contractor shall ensure that earth, bentonite, chemicals and concrete agitator washings etc. are not deposited in the watercourses but are suitably collected and residue disposed off in a manner approved by local authorities.

59.8. 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.

59.9. Any mud slurry from drilling, tunnelling, 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 etc. The Contractor shall provide treatment facilities as necessary to prevent the discharge of contaminated ground water.

59.10. 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.

59.11. The bentonite/polymer 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.

59.12. 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.

60. NOISE

60.1. 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.

60.1.1. 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.

(iii) Acoustic barriers should be placed near construction sites.

(iv) The maximum noise levels near the construction site should be limited to 75 dB(A) Leq(5 min.) in industrial areas and to 65 dB(A) Leq(5 min.) in other areas.

(v) There should be fencing around the construction site to prevent people coming near the site.

(vi) Materials need not be stockpiled and unused equipment to be placed between noisy operating equipments and other areas.

(vii) Constructing temporary earth bund around the site using soil etc, which normally is hauled away from the construction site.

60.1.2. 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 per CPCB criteria. 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.

60.1.3. The noise monitoring requirements are given in the EIA/ESMP.

60.1.4. Noise limit for construction equipments like Compactors (rollers), Front loaders, Concrete mixers, Cranes(movable),Vibrators and Saws etc shall be 75 dB(A), day time.

60.1.5. The Contractor shall consider the perimeter likely to be impacted by construction worksite noise. This perimeter will be determined on the basis of detailed modelling of the noise sources linked to the worksite using the latest software available on the market (CadnaA, Mithra-Sig, Sound PLAN or similar) ; this modelling will be carried out over each of the regulatory periods (Ld and Ln).

60.1.6. The Contractor shall ensure the organisation and mitigation measures that need to be implemented to limit the noise impact of the construction worksite and comply with the standards laid down by the Indian government.

60.2. **Noise Monitoring**

60.2.1. The activities which are expected to cause noise during the construction of Project, include noise from construction equipment, construction activities such as portal construction, boring for piling, earthwork excavation, concreting, viaduct construction (including shifting of launching truss / girder) and removal of spoil and movement of construction vehicles and delivery vehicles, travelling to and from the construction and disposal sites.

60.2.2. Noise level monitoring should follow protocol of Ambient level Noise monitoring issued by CPCB. Site selection, selection of Noise level meter, calibration, monitoring time, Monitoring parameter & protocol, and monitoring records should be as per guidelines of CPCB.

60.2.3. The Noise Monitoring Control Plan (NMCP) shall be prepared by the Contractor. It shall also address noise performance criteria used in the selection of Construction equipment.

60.2.4. The Noise Control Plan shall provide for:

(i) The inventory of sources of all activities that create Noise with focus on sensitive Receptors. An inventory of all sensitive buildings (education, healthcare, religious buildings) likely to be exposed to site noise .

(ii) Work approach to implement NCP.

(iii) Noise Level Monitoring as per EIA/ESMP and specific as per need.

(iv) Implementation of Mitigation measures and management reviews

(v) Monitoring and Corrective & preventive actions

60.2.5. In defining the requirements of the NMCP, available measures for noise control, such as the use of equipment with special exhaust silencers or enclosures, and the construction of temporary enclosures or noise barriers around specific construction site activity areas shall be considered. It should also specify the measures to be adopted to counter the impact of noise pollution for public and workers working at site during construction.

60.2.6. If the measured noise levels exceed the noise limits, the noise levels shall be reduced by appropriate abatement measures.

60.2.7. The Engineer shall monitor Contractor's performance of tasks specified, and will inspect the procedures related to the control of noise.

60.2.8. In no case shall the Contractor exposes the public to construction noise levels exceeding 90 dBA (slow) or to impulsive noise levels with a peak sound pressure level exceeding 140 dB as measured on an impulse sound level meter.

60.2.9. At the surface of the construction site during night time hours, the Contractor shall use only equipment that operating under full load meets the noise limits specified in Noise Pollution (Regulation and Control) Rules 2000 as amended upto 2010 & 2013, if a sensitive receptor would be affected.

60.2.10. The Contractor shall comply with provision of Environment (Protection) Third Amendment Rules, 2016, while using Generator sets (diesel/petrol/NG/LPG/) while using Diesel Generator (DG) at project site(Casting yard and site)for the Project activites.

60.2.11. Where the Engineer determines that the recorded Noise level is significantly greater than the acceptable levels, the Engineer may direct the Contractor to take effective remedial measures including, but not limited to, reviewing noise sources and modifying working procedures.

60.2.12. The Contractor shall inform the Engineer of all steps taken to investigate cause of exceedance and immediate action taken to avoid further exceedance through written reports and proposals for action under an Event Contingency Plan.

60.3. **Control Requirements**

60.3.1. 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.

60.4. **Occupational Noise**

(i) Protection against the effects of occupational noise exposure should be provided when the sound level exceeds the threshold values..

(ii) When employees are subjected to sound levels exceeding prescribed level, feasible administrative or engineering controls should be utilized.

(iii) Personal protective equipment, shall be provided along with other mitigation measures for reduction of sound level.

(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 computations, as given in project SHE Manual.

60.5. **Vibration Level**

60.5.1. 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.

60.5.2. The Contractor shall consider technical frame for Vibrations as follows;

a) The operating procedure for vibration measurement, by type of effects to be treated and the minimum technical characteristics of the measuring devices.

b) The thresholds applicable to the risk of damage to structures according to their sensitivity and the vibration regime of the sources for the construction and operation phases.

c) The provisions and thresholds applicable to discomfort and ground –borne noise for the construction phase.

In the absence of specifications applicable in India , the Contractor may propose the adoption of international specifications or good practices. The Contractor must check the conformity of preliminary studies and in particular, the project impact study with this technical reference framework and propose additions to it if any shortcomings are found.

60.5.3. The Contractor shall ensure above mentioned technical framework and specifications to be implemented during construction & operation phase in order to minimize the site's vibration nuisance.

60.5.4. Monitoring to be implemented in construction & operation phase and to enable verification of compliance with Employer's commitments.

60.5.5. The Contractor shall consider the perimeter likely to be impacted by construction worksite vibration. These perimeters will be determined by the types of machinery identified according to the execution methods used(pile driving, vibratory driving, compaction, tunnel boring machine etc))based on detailed modelling of vibration sources and vibrating propagation modes in the ground and structures. These modelling will be carried out during each period of activity of the recivers(day/night for residential areas, on/off for sensitive equipments etc.)The service provider will have to explain clearly all the hypotheses used concerning source power, operating rates and propagation conditions(taking into account the vibrative response of soils and structures). The Employer will ensure plausibility of the modelling results.

60.5.6. The Contractor shall ensure the organization and mitigation measures that need to be implemented to limit the vibratory impact of worksite and comply with the recommendations of the adopted technical reference framework.

61. ARCHAEOLOGICAL AND HISTORICAL PRESERVATION

61.1. The Contractor shall seek to accommodate archaeological and historical preservation concerns that may arise due to the construction of the Works especially in close vicinity of such areas where such monuments may be located.

61.2. 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.

61.3. 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.

61.4. The contractor shall develop a Cultural Heritage Management Plan including a Chance Find Procedure

62. Biodiversity management

62.1. As far as is reasonably practicable, the Contractor shall maintain ecological balance by preventing deforestation , defacing of natural landscape and preserving flora & fauna. In respect of ecological balance, the Contractor shall observe the following instructions.

62.2. The Contractor shall develop and implement Biodiversity management plan comprises of the key elements require for protection, and conservation of Biodiversity in working area of Project premises throughout the Project Construction phase.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.

62.3. 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.

62.4. The Contractor shall develop Afforestation plan in alignment with existing National, State & local legislations and International guidelines/agreements where applicable. So, the entire work should be carried out in accordance with Guidelines and methodology set by prescribed Authorities (MoEF & CC, DoEF, Municipal Corporation).

62.5. The contractor shall develop a procedure to protect exiting trees that are located in or nearby the project right of way, including tree trunk's protection and soil compaction prevention

62.6. 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 Project and inform the Employer and apply to the prescribed Authority for NOC of Trees cutting.

62.7. 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 equipments. 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 Works/Project except with the previous permission obtained from the Forest Department/Municipal Corporation.

62.8. The contractor shall arrange permission from the forest department for trees to be felled or transplanted for which necessary letters will be given by the Engineer. The Employer will permit the removal of trees or shrubs only after prior approval.

62.9. Special care shall be exercised where trees or shrubs are exposed to injuries by construction equipment, 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.

62.10. Selection of Plantation species for Afforestation shall be identified according to Forest Department/Municipal Corporation's standards based on the soil and climatic parameters of the planned compensatory afforestation region including soil, moisture, and other climatic conditions. Native species, which are normally prevent in the region shall be preferred for Afforestation.

62.11. The trees which are not possible to transplant/Not-Straight or Tilted or diseased will only be cut.

62.12. The Contractor shall carry out compensatory Afforestation as per Local Requirements of Municipal Corporation and Forest Department.

62.13. The Contractor shall construct the boundary/protection wall and fencing of suitable height to prevent entry of domestic animals, which roam around freely the region. And, shall implement the mitigation measures to protect and preserve biodiversity around the Project site.

63. FLY ASH

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

63.2. 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.

63.3. The Contractor shall explorer the option if another component of concrete (besides fly ash) that can be used in the construction of less technical concrete structures is Recycled concrete aggregates (RCA) replacing natural aggregates.

64. WASTE MANAGEMENT

64.1. The Contractor shall develop and implement the Waste management plan(WMP) comprises of waste management Practices in line with National/local legislative requirements, define Roles & Responsibility, Covers best practices from point of generation of wasters, storage, segregation, transport, to its final disposal with 3Rs concept. Overall objective of WMP should be the Implementation of waste management system to meet Local/National & International norms based on the hierarchy of waste management strategies.

64.2. The Contractor's Waste Management plan (WMP) shall covers all activities involving all types of wastes generation, storage, collection, handling in any form, final disposal, and 3Rs due to construction and accommodation activities in the working area of Project premises throughout the Project Construction phase. WMP should cover management of all categories of wastes that generate during Construction phase in Project premises, i.e Solid wastes, Hazardous wastes, Biomedical wastes, C & D wastes, Muck and other if any generates.

64.3 The Contractor's overall approach to waste management should be as follows,

- Identification of source activity that generate wastes
- Quantification of the each category of wastes
- Daily record of wastes volume
- Source segregation
- Storage in prescribed way for each category of the wastes
- Identification and tie up with local Centralized waste management facilities who are authorized by GPCB for disposal of wastes.
- Transportation and disposal as per prescribed method in environmentally sound manner.
- Monitoring & review with Corrective actions

64.3. 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 opportunities for reuse, recycle & recover of wastes

(ii) Identification of quantities to be excavated and backfilling

(iii) Identification of split between waste and inert material

(iv) Identification of storage area to be stored temporarily on site location.

(v) Identification of intended transport means and route.

(vi) Obtaining permission, where required, for disposal.

64.4. The Contractor shall manage Solid wastes in accordance with Solid Waste Management Rules, 2016.

64.5. The C&D waste generated will be reused and remaining will be disposed in a manner that will not affect the human health and environment in line with C&D Waste Management Rules, 2016 & its amendments and ESS 3 of World Bank.

64.6. The Contractor shall manage Hazardous wastes in accordance with Hazardous and other wastes (management & Transboundary movement) Rules, 2016.

64.7. The Contractor shall manage Biomedical wastes as per Biomedical wastes Management Rules, 2016 as amended upto 2019

64.8. The Contractor shall follow the guidelines of CPCB best management practices of all categories of wastes and ESS3 of World Bank.

64.9. 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.

64.10. Chemicals classified as hazardous chemicals under “Manufacture, Storage and Import of Hazardous Chemical Rules, 1989” of Environment (Protection) Act, 1986 shall be handled in a manner in compliance with the procedure given in the aforesaid rules and/or the aforesaid act.

64.11. The Contractor shall provided separate storage facility for each type of wastes till its final disposal. Dedicated storage area for Hazardous wastes, C & D wastes, and BMW, shall be provided as per provision of applicable Env Rules as mentioned in 64.4 to 64.7. Colour coded bins shall be provided for Solid wastes and Biomedical wastes at site for temporary storage. Display Board at storage area, labelling on storage bins/Containers, Record keeping shall be ensured by the Contractor as part of WMP.

64.12. Burning and dumping of wastes is strongly prohibited. The Contractor shall not burn or dump any type of wastes and ensure its disposal in environmentally sound manner.

64.13. The Contractor shall make arrangement to dispose of metal scrap and other recyclable waste to authorized dealer and make available to the Employer on request, records of such sales.

64.14. The Contractor has to dispose C&D waste as per CPCB guidelines and / or other regulations for Protection of Environment.

64.15. The C&D waste shall be broken in to requisite pieces and handed over to Government Approved Concrete Recycle Plant in a City with a proper certification. In case, such plants are not available or not in operational then such types of Concrete shall be disposed by Contractor in a designated dumping yard arranged by Contractor with the approval of Engineer in- Charge.

64.16. Hazardous wastes, Biomedical wastes, C & D wastes shall be disposed of at Common Disposal Facility, which are authorised by GPCB. Solid wastes shall be collected by Municipal Corporation on daily basis.

64.17. The Contractor shall conduct Training, visual inspection and audit for awareness and implement the waste management policy at project site.

64.18. The Contractor shall ensures timely removal of concrete and other construction wastes at the site.

64.19. The Contractor shall implement concept of 3R, i.e Reuse, Reduce and Recover as far as practicable and shall try to implement sustainable waste management system.

65. MUCK DISPOSAL

65.1. The excavated material shall be graded such that part can be re-used in construction; balance will be disposed. Before excavation, the Contractor will be required to test the soil quality including heavy metals and the results will be compared with standards. If the soil is contaminated, disposal will be done with due treatment or isolation of such muck.

65.2. Disposal sites will be identified by GMRC in consultation with the local Authority, such that pollution of water bodies and green areas are not impacted and displacement of persons is not involved.

65.3. The following activities are involved:

65.4. Disposal sites shall be cleaned and then treated so that leached water does not contaminate the Ground Water.

65.5. Material will be stock-piled with suitable slope.

65.6. Material will be stabilised each day by watering or other accepted dust suppression techniques. The muck shall be filled in the dumping site in layers and compacted mechanically.

65.7. Once the filling is complete, the entire muck disposal area shall be provided with a layer of good earth on the top and covered with vegetation.

65.8. Necessary precautions to be adopted during disposal of muck.

66. ENERGY MANAGEMENT

66.1. The Contractor shall prepare and implement Energy Management plan comprises of the energy conservation measures, define Roles & Responsibility, covers best practices for energy conservation in the working area of Project premises throughout the Project Construction phase.

66.2. 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.

66.3. Energy management plan will be developed and implemented as follows;

a. Declaration of Energy management policy and setting target

b. Initial Review for assessing current energy scenario

c. Identification of focus area and framing strategies for reduction in energy consumption and use of renewable energy

d. Implementation of plan and awareness among the staff in reduction of energy consumption

e. Internal Energy Audit

f. Implementing sound operating & maintenance practises to improve the efficiency of energy use through periodical check & maintenance of equipment's/machineries/vehicles etc.

g. Use of non-conventional energy source, i.e.. solar light, roof top solar panel,

h. Replacement of energy efficient fixtures with conventional fixtures, i.e. replacing sodium/CFL lamps with LED

i. Staff awareness, training on energy conservation

j. Implementing Monitoring & tracking system

k. Management Review & Actions

l. Green procurement and energy demand management programmes.

66.4. The Contractor shall ensures effectiveness of implementation of this plan be periodically review and verification once in week by the SHE Team, and once in month by the management review through visual inspection, field verification, data verification, Records etc

66.5. 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: SOCIAL AND GENDER MANAGEMENT

67. MANAGEMENT OF SOCIAL & GENDER ASPECTS

67.1. **Social**: **Management**

67.1.1. Construction Contractors to ensure that grievances are fully recorded and monitored accordingly

67.1.2. A clear and comprehensive awareness of project and communication actions must be regularly implemented by contractors with the PAPs to ensure a clear and respectful communication.

67.1.3. The Contractor's Social team shall carry out the monitoring of Social impacts during construction. This monitoring shall be based on the following documentation: ESMP, SIA, RAP, SEP and GAP.

67.2. **Gender based Management**

67.2.1. Employer's Gender Specialist should undertake a feasibility assessment of other similar projects that have successfully recruited women in construction for skilled, semi-skilled and unskilled work. The person should also engage with training institutes, colleges as well as with Contractors to explore potential opportunities. Process documentation needs to be in place for all efforts made to recruit women in the Project in the construction phase.

67.2.2. Contractors should provide Awareness and training to construction workers regarding;

i) how to sensitize and inform workers on policies and Codes of Conduct specifically with regard to zero tolerance towards sexual harassment,

ii) how to encourage reporting of GBV and sexual harassment incidents and register complaints,

iii) inform workers about support to be provided by Contractors and Employer for such incidents as well as how to report such incidents to Employer

67.2.3. Employer's Gender Specialist shall conduct monthly monitoring visits to ascertain need for further training as well as the extent to which women friendly measures are being incorporated at worksites and accommodation camps. This should also include separate discussions with women workers on-site to gauge their inputs and recommendations.

67.2.4. ESMP plans submitted by the Contractors (C-ESMP) must include:

i) Plan for Implementation of GBVAP and Accountability and Response Framework;

ii) Code of Conduct, Training Plan for workers on GBV/SEA/SH;

iii) Community Consultation plan and labor Influx Management Plan

67.2.5. This C-ESMP will be reviewed every six months and updated timely by the Contractor.

67.2.6. Safeguards for accommodation of women in labor camp through a Camp Management (establishment and operations) and Workers' Accommodation plan to be developed by the Contractors

67.2.7. To mitigate GBV related risks and potential impact of labor influx on local communities, the following measures can be undertaken by Contractors:

i) Communication to local community, shops and vendors prior to the start of the construction;

ii) Spread awareness among Local community about the grievance mechanism and provide access to them

iii) Restricted access of local residents/ persons in the labor camp;

iv) Movement of migrant labor in the residential areas in the proximity of camps should be restricted.

67.2.8. **GBVH POLICY- 2022**: The contractors and sub-contractors shall abide by the policy and the Grievance procedures to be done on project site. The same may be accessed from GMRC's website The link will be provided to all the bidders and existing contractors for necessary actions.

PART - VI: PENALTY AND AWARDS

68. CHARGES TO BE RECOVERED FROM CONTRACTOR FOR UNSAFE ACT OR CONDITION

68.1. GMRC intends to build an organisation which is highly safety conscious. 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 GMRC. Most of the accidents are avoidable and caused preliminarily due to Contractors' negligence. Hence GMRC shall recover the cost of damages from the Contractors for every reportable incident (fatality / injury).

68.2. In addition every GMRC 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 damage GMRC's reputation. In view of this, GMRC has decided to establish safety-enforcing organisation. The cost of establishing such organisation is to be recovered from Contractor for all observed safety violations at sites.

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

SN	Topic	Unsafe Act / Unsafe Condition	Deductible Amount
1.	SHE Policy & Plan	i) SHE policy a) non-compliance of clause 4.1	Rs 5,000 per single violation, compounded to a maximum of Rs 25,000 at any single instance.
		ii) SHE plan a) Not as per Employers' content and coverage (Clause 4.2, 4.7) b) Delay in submission (Clause 4.2, 4.4) c) Not updated as per Employer's instruction as per Clause 4.4 d) Copies not provided to all required supervisors / engineers (Clause 4.6)	Rs 100000 per single violation, compounded to a maximum of Rs 200000 at any single instance.
2.	SHE Organisation	i) Not complying to the minimum manpower requirements as mentioned in General Instruction GMRC/SHE/GI/001(Clause 6.1.1) ii) Not filling up the vacancies created due to SHE personnel leaving the Contractor within 14 days.(Clause 6.7) iii) SHE organisation not provided with required Audio-visual and other equipments as per General Instruction GMRC/SHE/GI/003 (Clause 6.9.2) iv) Employing through outsourcing agencies and SHE personal are not in the payroll of the main Contractor (Clause 6.5.1) v) Disobedience / Improper conduct of any SHE personnel. (Clause 6.2) vi) Chief SHE Manager not reporting directly to CPM of Contractor. (Clause 6.6)	i) Rs100000 per month for first month and Rs 200000 for subsequent months ii) Rs 50000 per month for first month and Rs 100000 for subsequent months For items iii), iv), v) and vi) – Rs 50000 for first violation and Rs 100000 for subsequent violations
3.	SHE committee	i) Failed to formulate or conduct SHE Committee meeting for any month (Clause 7.4) ii) Contractor and Sub-contractor representatives not attending SHE Committee meetings (Clause 7.10) iii) Failed to conduct Site inspection before conducting SHE Committee meeting (Clause 7.2.1 (viii)) iv) Failed to send SHE Committee Meeting minutes or Agenda to Employer in time (Clause 7.8.1, 7.9.1) v) Non-adherence of Clause 7.7.1 vi) Non-adherence of Clause 7.9	i) Rs 100000 for the first violation and Rs 500000 for the subsequent violations ii) Rs 5000 to the contractor of the member who had not attended the meeting for first violation and Rs 25000 for subsequent violations. For item iii), iv), v) and vi) Rs 25000 for first violation and Rs 50000 for subsequent violations
4.	ID card	i) Non-adherence of Clause 8.1, 8.2 and 8.3	Rs 100000 for first violation and Rs 200000 for subsequent violations
5.	SHE Training	i) Not complying to the requirements as mentioned in conditions of contract on SHE and project SHE manual with regard to: a) Induction training not given (Clause 8.1) b) Supervisor / engineer / manager training not conducted as per Clause 9.6 c) Refresher training as per Clause 9.7 and 9.11 not conducted d) Tool-box talk not conducted as per Clause 9.8	For item i (a) to (g) Rs 50000 for first violation on and Rs 100000 for subsequent violations

SN	Topic	Unsafe Act / Unsafe Condition	Deductible Amount
		e) Skill development training not conducted as Clause 9.9 f) Daily Safety Oath not conducted as per Clause 9.10 g) Top management behaviour based SHE training conducted (Clause 9.4)	
6.	SHE Inspection	i) Not complying to the requirements as mentioned in conditions of contract on SHE and project SHE manual as per Clause 10.0 ii) Non compliance of clause 10.3.6	Rs 50000 for first violation and Rs 100000 for subsequent violations
7.	SHE audit	Internal Audit: i) Not conducted as per SHE Plan (Clause 11.1.3) ii) Report not sent to Employer (Clause 11.1.5) iii) Action not taken for any month (Clause 11.1.4.2)	For item i) to iii) Rs 50000 for first violation and Rs 100000 for subsequent violations.
		External Audit iv) Not conducted as per SHE Plan (Clause 11.3) v) Report not sent to Employer (Clause 11.3.7.1) vi) Action not taken for any quarter (Clause 11.3.9)	For item iv) to vi) Rs 100000 for first violation and Rs 200000 for subsequent violations.
8.	SHE Communication	i) Important days to be observed for SHE awareness as furnished by Employer not observed (Clause 12.2) ii) Posters as furnished by Employer not printed and displayed (Clause 12.2)	i) Rs 10000 for first violation and Rs 50000 for subsequent violations ii) 2,00,000 per contract
9.	SHE Submittals	i) Non compliance of Clause 13.1 ii) Non compliance of Clause 13.2 iii) Non compliance of Clause 13.3	For item i) Rs 50000 for first violation and Rs 100000 for subsequent violations For item ii) and iii) Rs 100000 for first violation and Rs 200000 for subsequent violations
10.	Injury and Incidence reporting	i) Fatal accidents ii) Injury accident iii) Abnormal delay in reporting accidents or wilful suppression of information about any accidents / dangerous occurrence as per Clause 14.1 iv) Non-compliance of the Clause 14.4 The contractor shall create a fund to cater, from which In any case of fatal accident or permanent disability, payments will be made to the aggrieved party over and above the statutory requirements.	i. Rs 500000 for first fatality and Rs 1000,000 for every subsequent fatality. ii. Rs 100000 for first grievously injured person and Rs 200000 for every subsequent grievously injured person (Grievous Injury as defined by Workmen Compensation Act) iii. Rs 100000 for first violation and Rs 200000 for subsequent violations For items iv) and v) Rs 50000 for first violation and Rs 100000 for subsequent violations
11.	Emergency preparedness Plan	Non-compliance of the Clause 15.1,15.2, 15.3, 15.4, 15.5 and 15.6	Rs 100000 for non-compliance of any of the clauses
12.	Housekeeping	i) Housekeeping maintenance register not properly maintained up to date (Clause 17.4) ii) Surrounding areas of drinking water tanks / taps not hygienically cleaned / maintained (Clause 17.4) iii) Office, stores, toilet / urinals not properly cleaned and maintained. (Clause 17.4) iv) Required dustbins at appropriate places not provided / not cleaned. (Clause 17.6) v) Stairways, gangways, passageways blocked. (Clause 17.9) vi) Lumber with protruding nails left as such (Clause 17.10) vii) Openings unprotected (Clause 17.7) viii) Excavated earth not removed within a reasonable time. (Clause 17.11) ix) Truck carrying excavated earth not covered / tyres not cleaned. (Clause 17.11) x) Vehicles / equipments parked / placed on roads obstructing free flow of traffic (Clause 17.13) xi) Unused surplus cables / steel scraps lying scattered (Clause 17.18) xii) Wooden scraps, empty wooden cable drums lying scattered (Clause 17.19) xiii) Water stagnation leading to mosquito breeding (Clause 46.6.1)	Rs 10000 per single violation Compounded to a maximum of Rs 100000 at any single instance
13.	Working at Height / Ladders and Scaffolds	i) Not using or anchoring Safety Belt (Clause 18.8) ii) Not using Safety Net (Clause 18.18) iii) Absence of life line or anchorage point to anchor safety belt (Clause 18.19)	Rs 10000 per single violation Compounded to a maximum of Rs 100000 at any single instance

SN	Topic	Unsafe Act / Unsafe Condition	Deductible Amount
		iv) Non-compliance of Clause 18.17 v) Using Bamboo ladders (Clause 18.20) vi) Painting of ladders vii) Improper usage (less than 1m extension above landing point, not maintaining 1:4 ratio) (Clause 18.20) viii) Aluminium ladders without base rubber bush (Clause 18.20) ix) Usage of broken / week ladders (Clause 18.20) x) Usage of re-bar welded ladders (Clause 18.20) xi) Improper guardrail, toe board, barriers and other means of collective protection (Clause 18.16) xii) Improper working platform (Clause 18.17) xiii) Working at unprotected fragile surface (Clause 18.9) xiv) Working at unprotected edges (Clause 20.0)	
14.	Lifting appliances and gear	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 Clause 21.6 v) Non-compliance of Clause 21.7 vi) Automatic safe load indicator not provided or not in working condition as per Clause 21.8 vii) Age of the operator less than 21 years or without any licence and non-compliance of other item as per Clause 21.9 viii) Non-compliance of Clause 21.10 ix) Non-compliance of any of the items mentioned regarding rigging requirements as per Clause 21.11 x) Failure to submit method statement in case of all critical lifting (Clause 21.3) xi) Person riding on crane. (Clause 21.9.1) xii) Creating more noise and smoke (Clause 48.2) xiii) Absence of portable fire extinguisher in driver cabin (Clause 32.5) xiv) Fail to guard hoist platform (Clause 24.0) xv) No fencing of hoist rope movement area (Clause 24.0) xvi) Hoist platform not in the horizontal position (Clause 21.2)	Rs 50000 per single violation Compounded to a maximum of Rs 500000 at any single instance
15.	Launching operation	Non-adherence of any of the provisions mentioned in Clause 22.2	Rs 50000 for first violation and Rs 100000 for subsequent violations.
16.	Site Electrical safety	i) Non-compliance of Clause 27.1.1 ii) Non-compliance of Clause 27.2.3, 27.2.4 & 27.2.5 iii) Non-compliance of Clause 27.3.1 iv) Non-compliance of Clause 27.7, 27.8 and 27.9.1 v) Non-compliance of Clause 27.10 and 27.13 vi) Non-compliance of Clause 27.3.2 vii) Exposed electric lines (fermentative damage) and circuits in the workplace. (Clause 27.5.) viii) Inserting of wires directly into the socket ix) Improper grounding for the electrical appliances (Clause 27.7.1) x) Electrical cables running on the ground (clause 27.8.5 & 27.8.6) xi) Non-compliance Clause 28.0	Rs 10000 per single violation Compounded to a maximum of Rs 100000 at any single instance
17.	Hand tools and Power tools	i) Non-compliance of Clause 29.0	Rs 10000 per single violation Compounded to a maximum of Rs 100000 at any single instance
18.	Gas Cutting	i) Wrong colour coding of cylinder. ii) Cylinders not stored in upright position. (Clause 30.1) iii) Flash back arrester, non-return valve and regulator not present or not in working condition. (Clause 30.3 & 30.4) iv) Fail to put cylinders in a cylinder trolley. (Clause 30.1) v) Damaged hose and fail to use hose clamps (Clause 30.2) vi) Using domestic LPG cylinders (Clause 30.5) vii) Fail to store cylinder 6.6m away from fire prone materials (Clause 30.8) viii) Fire extinguisher not placed in the vicinity during operation (Clause 30.6)	Rs 10000 per single violation Compounded to a maximum of Rs 50000 at any single instance
19.	Welding	i) Voltmeter and Ammeter not working (Clause 30.9) ii) Non-availability of separate switch in the transformer (Clause 30.9) iii) Improper grounding and return path. (Clause 30.10) iv) Damaged and bare openings in the welding cable. (Clause 30.10) v) Damaged holder (Clause 30.10)	Rs 10000 per single violation Compounded to a maximum of Rs 50000 at any single instance

SN	Topic	Unsafe Act / Unsafe Condition	Deductible Amount
		vi) Fire extinguisher not placed in the vicinity during operation (Clause 30.6)	
20.	Fire precaution	i) Smoking and open flames in fire prone area (Clause 32.6) ii) Using more than 24V portable electrical appliances in the fire prone area (Clause 35.2.3) iii) Not proper ventilation in cylinder storage area. (Clause 30.8) iv) Absence of fire extinguishers (Clause 32) v) Fire extinguishers not refilled once in a year. (Clause 32) vi) Fire extinguisher placed in a not easily accessible location	Rs 5000 per single violation Compounded to a maximum of Rs 25000 at any single instance.
21.	Excavation, Tunnelling and confined space	i) Non-compliance of Clause 35.1. ii) Non-compliance of Clause 35.2.3 iii) Non-compliance of Clause 35.3	For any item from i) and ii) Rs 10000 per single violation Compounded to a maximum of Rs 50000 at any single instance. For item iii) Rs 10000 per first violation and Rs 50000 for subsequent violations
22.	Work permit system	i) Non-compliance of Clause 37.2 ii) Non-compliance of Clause 21.11.9	For item I) and ii) Rs 50000 per first violation and Rs 100000 for subsequent violations
23.	Traffic Management	i) Non-compliance of Clause 38.4.1 ii) Non-compliance of Clause 38.8.3 iii) Non-compliance of Clause 38.9.2 iv) Non-compliance of Clause 38.9.3 v) Non-compliance of Clause 38.9.7 vi) Non-compliance of Clause 38.9.8	Rs 100000 per first violation and Rs 200000 for subsequent violations
		a) Barricades (Clause 38.9.4) 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 25000 per single violation Compounded to a maximum of Rs 100000 at any single instance
		b) Contractor Vehicles (Clause 38.9.5 & 38.9.6) 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 25000 per single violation Compounded to a maximum of Rs 100000 at any single instance
		c) Splashing of Bentonite on roads / non-cleaning of tyres of dumpers and transit mixers (Clause 17.11 & 17.14) 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 100000 on first observation. b) Rs 200000 on second observation c) Rs 300000 on third and subsequent observations
24.	Batching plant / Casting yard	Non-adherence of any of the provisions mentioned in Clause 40.0.	Rs 10000 for single violation compounded to a maximum of Rs 100000 at any single instant.
25.	PPE	i) Not having (Clause 41.1) ii) Not wearing (or) using and kept it elsewhere (Clause 41.1) iii) Using damaged one (Clause 41.2) iv) Using wrong type (Clause 41.5) v) Using wrong colour helmet or helmet without logo (Clause 41.4.1) vi) Using for other operation (e.g. Using safety helmet for storing materials or carrying water from one place to other) (Clause 41.5) vii) Not conforming to BIS standard (Clause 41.2) viii) Non-compliance of Clause 41.6,41.7 and 41.8	From item i) to vi). Rs 200 per single violation For item vii) Rs 10000 for first violation and Rs 50000 for subsequent violations For item viii) Rs 50000 for first violation and Rs 100000 for subsequent violations
26.	Occupational Health	i) Fail to conduct Medical examination to workers (Clause 46.1) ii) Absence of ambulance van & room (Clause 46.3) iii) Workers not having ID card (Clause 8.2) iv) Absence of first-aid person in work site (Clause 46.4) v) Absence or inadequacy of first-aid box (Clause 46.4) vi) Misuse of first-aid box (Clause 46.4) vii) First-aid box not satisfy the minimum Indian standard.	Rs 10000 per single violation Compounded to a maximum of Rs 100000 at any single instance

SN	Topic	Unsafe Act / Unsafe Condition	Deductible Amount
		(Clause 46.4) viii) Smoking inside the construction site (Clause 47.0) ix) Drink and drive or work (Clause 47.0) x) Fumigation / insecticides not sprayed to prevent Mosquito breeding (Clause 46.6.3) xi) Non-compliance of Clause 48.1 and 48.2	
27.	Labour Welfare measures	i) Inadequate number of toilets (Clause 51.1.1) ii) Toilets not cleaned properly (Clause 51.1.3) iii) Absence of water facilities for toilets and washing places (Clause 51.1.3) iv) Toilet placed more than 500m from the work site (Clause 51.1.3) v) Accommodation not provided as per BOCWA (Clause 51.5.1) vi) Absence of drinking water (Clause 51.4) vii) Excessive noise and vibration (Clause 48.0) viii) Canteen not provided (Clause 51.2) ix) Food stuff not served on no loss no profit basis (Clause 51.3) x) Creche not provided (Clause 51.6) xi) Non adherence of Labour welfare provisions of BOCWA (Clause 3.3.1.2) xii) Fail to register establishment and display the registration certificate at workplace (Clause 3.3.1.2) xiii) Absence of workers register and records (Clause 3.3.1.2) xiv) Absence of muster roll and wages register (Clause 3.3.1.2) xv) Fail to display an abstract of BOCWA and BOCWR (Clause 3.3.1.2)	Rs 10000 per single violation Compounded to a maximum of Rs 50000 at any single instance
28.	Environmental Management	i) Wheel wash facility not provided (Clause 59.1.13) ii) Spillage from vehicles not arrest (Clause 59.9) iii) Air monitoring not practiced (Clause 59.2) iv) The values of air monitoring not within acceptable limits (Clause 59) v) Dust control measures at sites not practiced (Clause 59.1.1) vi) Improper disposal of debris / residues vii) Non compliance of Clause 59.1.18, 65.0, 66.0 & 67.0	Rs 10000 per single violation Compounded to a maximum of Rs 50000 at any single instance

68.4. Without limiting to the unsafe acts and or conditions mentioned above in Clause 68.3 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 68.3.

69. STOPPAGE OF WORK

69.1. 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.

69.2. The Contractor shall not proceed with the work until he has complied with each direction to the satisfaction of Employer

69.3. 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/execution of Works and will not be the ground for waiver of levy of liquidated damages.

70. 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.

	Gujarat Metro Rail Corporation (GMRC) Limited.
APPENDIX NO.: 1	

Memorandum of Understanding between GMRC and the Contractor for safe execution of contract work

This Memorandum of Understanding is made and executed by and between Gujarat Metro Rail Corporation (GMRC) Limited., a company registered under the Companies Act,1956 and having its registered office at Block No.1, First Floor, Karmayogi Bhavan, Behind Nirman Bhavan, Sector 10/A, Gandhinagar: 382010, Gujarat, India (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 context so requires or admits be deemed to mean and include its successors in business and assigns) of the other party

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

AND WHEREAS the Employer and the Contractor intends to execute this Memorandum of Understanding for promoting the safety, health and environment aspects required to be followed at workplace / Site and which Memorandum 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 also studied the following documents:

(i) Tender Documents, including Notice Inviting Tender, General Conditions, Special Conditions;
(ii) Conditions of Contract on Safety, Health and Environment and Project Safety,Health and Environment Manual;
(iii) Building and Other Construction Workers (Regulations of Employment and Conditions of Service) Act 1996, Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998, Gujarat Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules, 2003, Building and Other Construction Workers' Welfare Cess Act, 1996 and Building and Other Construction Workers Welfare Cess Rules 1998, and relevant notifications, whether issued by Central Government or State Government, as the case may be, for collection of cess.
(iv) Indian Electricity Act 2003 and Rules 1956 and other applicable laws;
(v) Corresponding International / Bureau of Indian Standard Codes.

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

WITNESSETH THAT

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 the execution of the Works.

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 of SHE Document 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 GMRC 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 authorised have executed this Memorandum of Understanding on _____ day of _____ 20____.

Signed on	Signed on
For and on behalf of GMRC	For and on behalf of Contractor
_____	_____
Signature:	Signature:
Name:	Name:
Title:	Title:

	Gujarat Metro Rail Corporation (GMRC) Limited.

APPENDIX NO.: 2

Safety, Welfare and Occupational Health requirements as per BOCW Act 1996 and Rules 1998 and Gujarat BOCW Rules 2003

(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
P - Refers to relevant rules in BOCWWCR 1998
G - Refers to relevant rules in Gujarat BOCWR 2003

SN	Items	Relevant Sections / Rules in BOCWA and BOCWR and GBOCWR 2003
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 – 30 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 – 240 & 241
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, fines and advances	R – 241(1)(a); Form XIX, XX, XXI
14.	Issue of wages book	R – 241(2)(a); Form XXIII
15.	Service certificate for each workers	R – 241(2)(b); Form XXIV
16.	Display an abstract of BOCWA and BOCWR	R – 241(5)
17.	Deduction of welfare cess by the government agencies	P – 4(3)
18.	Annual return	R – 242; Form XXV
19.	Drinking water	S – 32
20.	Latrines and Urinals	S – 33 R – 243
21.	Accommodation	S – 34
22.	Creches	S – 35
23.	First-aid boxes	S – 36 R – 231 and Schedule III
24.	Canteens	S – 37 R – 244
25.	Food stuff and other items served in the canteens	R – 245
26.	Supply of tea and snacks in work place	R – 246
27.	Food charges on no loss no profit basis	R – 247
28.	GBOCWR 2003 welfare Board Rules	G–CHAPTER IX
29.	Safety committee	S–38 R–208
30.	Safety officer	S–38 R–209 and Schedule VIII

31.	Reporting of accidents and dangerous occurrences	S–39 R–210
32.	Procedure for inquiry in to the causes of accidents	R–211
33.	Responsibility of employer	S-44 R–5
34.	Responsibility of Architects, Project engineer and Designers	R–6
35.	Responsibility of workmen	R–8
36.	Responsibility for payment of wages and compensation	S–45
37.	Penalties and Procedures	S–47; S – 55
38.	Excessive noise, vibration etc	R – 34
39.	Fire Protection	R – 35
40.	Emergency action plan	R – 36
41.	Fencing of motors	R – 37
42.	Lifting of carrying of excessive weight	R – 38
43.	Health, Safety and Environmental Policy	R – 39
44.	Dangerous and Harmful Environment	R – 40
45.	Overhead protection	R – 41
46.	Slipping, Tripping, Cutting, Drowning and Falling Hazards	R – 42
47.	Dust, Gases, Fumes, etc	R – 43
48.	Corrosive substance	R – 44
49.	Eye Protection	R – 45
50.	Head Protection and other protection apparel	R – 46; R – 54
51.	Electrical Hazards	R – 47
52.	Vehicular traffic	R – 48
53.	Stability of structure	R – 49
54.	Illumination	R – 50; R – 124
55.	Stacking of materials	R – 51
56.	Disposal of debris	R – 52
57.	Numbering and marking of floors	R – 53
58.	Lifting appliances and gears	C – VII; R – 55 to 81
59.	Runways and Ramps	C – VIII; R – 82 to 85
60.	Working on or adjacent to water	C – IX; R – 86 & 87
61.	Transport and earthmoving equipments	C – X; R – 88 to 95
62.	Concrete work	C – XI; R – 96 to 107
63.	Demolition	C – XII; R – 108 to 118
64.	Excavation and Tunnelling works	C – XIII; R – 119 to 168
65.	Ventilation	R – 153
66.	Construction, repair and maintenance of step roof	C – XIV; R – 169 to 171
67.	Ladders and Step ladders	C – XV; R – 172 to 174
68.	Catch platform and hoardings, chutes, safety belts and nets	C – XVI; R – 175 to 180
69.	Structural frame and formworks	C – XVII; R – 181 to 185
70.	Stacking and unstacking	C – XVIII; R – 186 & 187
71.	Scaffold	C – XIX; R – 188 to 205
72.	Cofferdams and Caissons	C – XX; R – 206 to 207
73.	Explosives	C – XXII; R – 212 & 213
74.	Piling	C – XXIII; R – 214 to 222
75.	Medical Examination for building and other construction worker, Crane operator and	R – 223(a)(iii) and Schedule XII

SN	Items	Relevant Sections / Rules in BOCWA and BOCWR and GBOCWR 2003
	Transport vehicle drivers	
76.	Medical examination for occupational health hazards	R – 223(a)(iv)
77.	Charging of workers for Medical Examination	R – 223(b)
78.	Occupational health centres and Medical officers	R – 225 and Schedule X &XI
79.	Ambulance van & room	R – 226 & 227 and Schedule IV & V
80.	Stretchers	R – 228
81.	Occupational health service for building workers	R – 229
82.	Medical examination for occupational health hazards	R – 223(a)(iv)
83.	Emergency care services and emergency treatment	R – 232
84.	Panel of experts and agencies	R - 250
85.	Power of inspectors	Rule - 251 G 264 to 266

	Gujarat Metro Rail Corporation (GMRC) Limited.

APPENDIX NO.: 3

SITE SHE PLAN

Contract No	
Contractor Name	
Project Name	

1.	Project Highlights 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 Organisation Chart Chart indicating reporting of SHE personnel
4.	Roles & Responsibility Individual responsibility of the: 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 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 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

	Gujarat Metro Rail Corporation (GMRC) Limited.

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

GMRC 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, GMRC 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 State Aids Control Society

	Gujarat Metro Rail Corporation (GMRC) Limited.

APPENDIX NO.: 5

Environment remedial measures based on Audit of Phase II by AFD:

1. Increase the number of noise monitoring locations and ensure that monitoring is focused on sensitive receptors;
2. Allow for spot noise sampling at the façades/close to sensitive receptors during noisy activities;
3. Provide for vibration monitoring during piling, at sensitive receptors (DP School, St. Xavier, Church, Kadi Serva Vishwavidyalaya and LDRP Institute of Technology and Research);
4. Provide for before and after building inspections for properties considered vulnerable to vibration impact;
5. Avoid locating construction/potentially polluting activities close to surface water courses, identifying the location of abstraction boreholes, ensuring activities where there is a risk of hydrocarbon or hazardous material spill or leak are located in demarcated, hard surfaced areas to prevent soil and groundwater contamination, ensuring areas have sufficient containment, and designing activities to avoid polluted surface run off/storm water during heavy rainfall. Implement risk-based approach to surface and/or groundwater monitoring only where there is a risk to water courses;
6. Define selection criteria for waste contractors (at a minimum, registration with the relevant authorities, but including for example, de-selection of Contractors with a record of legal non-compliance). Implement a program of waste contractor/waste disposal facility auditing to provide the Contractor/GMRC with assurance over the correct management of wastes
7. Implement a risk-based audit program, which selects activities for audit, based on risk/impact profile, while ensuring a representative sample of Project activities are audited with appropriate frequency, which specifies an audit protocol focused on environmental (and H&S) performance, defines the experience and qualifications requirements of auditors and provides for auditor training
8. Implement an EMP for each casting yard;
9. Implement a Management of Change procedure;
10. Consider an Adaptive Management procedure;
11. Review the arrangements for muck disposal against the provisions at Appendix 7.2 of the ESIA, and to ensure that provisions are met, to the degree necessary to prevent risk to the environment and neighboring land uses. Engage with the authorities to review the current muck disposal activities, to establish what, if any, design and environmental protection (lining, gas and leachate monitoring, surface water management) measures are required to be adopted, and to ensure that the disposal activities are in proper compliance with local waste management and environmental regulations.
12. Tree Cutting Plans provide for the use of fungicides where trimming has been undertaken to prevent fungal infections of the tree. The Plans should include directives which demand the use of fungicides as a last resort, and that tree cutting and trimming best practices are employed to minimize the risk of infection and tree damage. The Plans should demand selection of Government approved fungicides only and clear procedures for the proper handling and management of fungicides to safeguard health and safety risks to operatives and prevent environmental risks.
13. A procedure for the identification and removal/management of invasive species is recommended, to ensure that invasives are not inadvertently spread during excavation/construction works.
14. It is recommended that GMRC engage with District Forest Department over the selection of the proposed sites, so that assurance can be provided that there are no environmental and social risks and impacts associated with the selection of the planting sites. Moreover, the planting provides an opportunity to enhance biodiversity by creating a diverse habitat of mixed tree, shrub and flora, creating new faunal habitat.

	Gujarat Metro Rail Corporation (GMRC) Limited.

General Instruction: GMRC/SHE/GI/001

MINIMUM MANPOWER REQUIREMENTS OF SHE ORGANIZATION BASED ON CONTRACT VALUE

	1	2	3	4	5	6
Category	**Chief Safety Manager**	**Senior Safety Manager**	**Junior Safety Manager**	**Safety Steward**	**Senior Safety (Electrical) Engineer**	**Junior Safety (Electrical) Engineer**
Category A	1	1@	Refer Note 1 & **Note 5 for Category E contract only**	Refer Note 1	1	Refer Note 2 & **Note 6 for Category E contract only**
Category B, C, D & E	1 (For Category B only)	1			-	

	7	8	9	10
Category	***Junior Safety (Fire) Manager / **Senior Safety (Fire) Manager**	**Occupational Health officer** with Necessary Nursing Assistants (Refer Note3)	**Traffic Manager** (Refer Note 4)	**Labour Welfare Officer**
Category A	1**	1 (FT)#	1	1 for Every 500 Workmen with Support Staff
Category B, C, D & E	1*	1 (PT)		1 for Every 500 Workmen

@ One each for Station & Viaduct and Launching/Tunneling activity

In tunneling contracts of value above 500 crore, 2 Full time Doctor shall be required to be mobilized for ensuring round the clock presence.

Note 1: One in each shift at every active Site, as per following scale:
a. Two adjoining Stations and Viaduct in between
b. Each Tunnelling activity including cross passage/ Launching work
c. Casting Yard
Note 2: Adequate, qualified and trained Electrical Engineers / supervisors to be deployed at each worksite at each shift.
Note 3: (FT) means Full-time and (PT) means Part Time. The frequency and duration of visit of Occupational Health officer shall be decided by GMRCL.
Note 4: Requirement of Traffic Manager is applicable to contracts where the work has to be executed either below or over the right-of-way like Viaduct, Tunnel Contracts.
Note 5: One (1) number or as decided by Engineer as adequate Junior Safety Manager is required for Electrical Contracts which fall under category "E"
Note 6: Junior safety (Electrical) Engineer is required as per the work program submitted by the Contractor subject to approval by engineer.
Note 7: 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.

Note 8:One Barricade Manager supported by required supervisors and workmen

Note 9:One Housekeeping Manager supported by required supervisors and workmen
Mobilisation schedule of Chief and Senior Safety Manager
i. After award of contract, at least one senior safety manager shall be mobilised within 4 weeks and remain on the project till taking over by GMRCL.
ii. Chief Safety Manager shall be required to be mobilised by 8 weeks after award of Contract and shall remain on the project till opening of line/ROD.

	Gujarat Metro Rail Corporation (GMRC) Limited.
General Instruction: GMRC/SHE/GI/002	

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

SN	Designation	Qualification	Experience (in years)
1	Chief SHE Manager	The Chief Safety Manager (For Category-A contract) shall have qualified in any of the following: i) B.E/B. Tech in Engineering* along with full time Degree / Diploma in Safety from a recognized institution/body(like CLI/RLI,MSBTE, etc.) ii) Two year duration Full time regular programme of M.E. in Industrial Safety from recognised institution /body. iii) B.E. in Fire and Safety Engg. from recognised institution/body (like CUSAT, etc.) *Preferably from Civil/Mechanical/Electrical Engineering Discipline.	10 years {for all category except (iii) where it shall not be less than 12 years}; at least 5 year experience shall be in the capacity of chief/ Senior Safety officer of similar project of equivalent scale.
		The Chief Safety Manager (For Category-B contract) shall have qualified in any of the following: (a) As stated in Sl. No:1 (b) Any of the following categories: i) B.Sc.(with Physics/Chemistry/Maths stream) with one year Full Time Safety diploma from a recognised institution/body(like CLI/RLI,MSBTE, etc.) ii) Full time regular Three Years duration Diploma in Engg* with one year Full Time Safety diploma from a recognised institution/body *Preferably from Civil/Mechanical/Electrical Engineering Discipline	- 7 years for category (a) -10 years for category (b)
2	Senior SHE Manager (Refer Note 3)	As stated in Sl. No:1 and in addition the following categories: (a) As stated in Sl. No:1 (b) Any of the following categories: iii) B.Sc.(with Physics/Chemistry/Maths stream) with one year Full Time Safety diploma from a recognised institution/body iv) Full time regular Three Years duration Diploma in Engg* with one year Full Time Safety diploma from a recognised institution/body.	- 7 years for category (a) -10 years for category (b)

SN	Designation	Qualification	Experience (in years)
3	Junior SHE Manager (Refer Note 3)	(a) As stated in Sl. No:1 (b) As stated in Sr. 2 (b) (c) Science Graduate along with one year Full Time Safety diploma from a recognized institution/body(like CLI/RLI, etc.)	- 3 years for category (a) -5 years for category (b) - 7 years for category (c)
4	Safety Steward	Science Graduate with any SHE related certificate courses.	2
5	Senior SHE (Electrical) Manager	Degree in Electrical Engineering + Govt. recognized Electrical Licence holder	4
6	Junior SHE (Electrical) Manager	Diploma in Electrical Engineering + Govt. recognized Electrical Licence holder	2
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	4 (for category (i) and (ii) only)
8	Junior SHE (Fire) Manager	Any Diploma holder with any Govt. recognized diploma in Industrial Fire Safety.	2
9	Occupational Health Officer	MBBS with Govt. recognized degree/diploma in Industrial/ occupational health	2
10	Environment Manager	Govt. recognized PG Degree / PG Diploma / Degree in Environmental Engineering / Science	4
11	Senior SHE (Traffic) Engineer	Govt. recognized PG Degree / Degree / Diploma in Traffic/Transportation Engineering or Planning	1
12.	House Keeping Squad - Manager	Any diploma/ Graduate	1
13	Barricade Manager	Any diploma/ Graduate	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

Note 1: In some extraordinary cases where the candidate had earlier worked in any metro projects in India, they can be considered for the following posts:

- Senior SHE Manager
- Junior SHE Manager
- Safety Steward

depending upon the qualification and number of years of experience on a case-to-case basis even if they do not possess the prescribed qualification as listed above.

Note 2: In all other cases other than listed under Note 1 irrespective their earlier experience with metro projects in India the candidates shall qualify as specified above.

	Gujarat Metro Rail Corporation (GMRC) Limited.
General Instruction: GMRC/SHE/GI/003	

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 contract)	Group
Upto 25 Cr	A
Upto 100 Cr	B
Upto 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.

SN	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) Noise Monitoring deleted	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 GMRC pixel and video facility	1	1	1	2
9.	Digital still camera with flash of minimum 4 GMRC 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, Health & Environment			

SN	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
12.	Accident investigation Kit containing the following:	1	1	1	2
a)	Chalk piece for marking				
b)	Measuring tape for measuring Flexible tape – 2m length Metal Foot long scale and Metal tape – 30m				
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				

	Gujarat Metro Rail Corporation (GMRC) Limited.
General Instruction: GMRC/SHE/GI/004	

Topics for First day at work SHE orientation training of Workmen

1. Hazard Identification Procedure
   Hazards
   on site:

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

2. Personal Protective Equipment

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

3. Health

   - Site welfare facilities
   - Potential health hazards
   - First Aid / Cardio-Pulmonary Resuscitation (CPR)

4. Duties of the Contractor

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

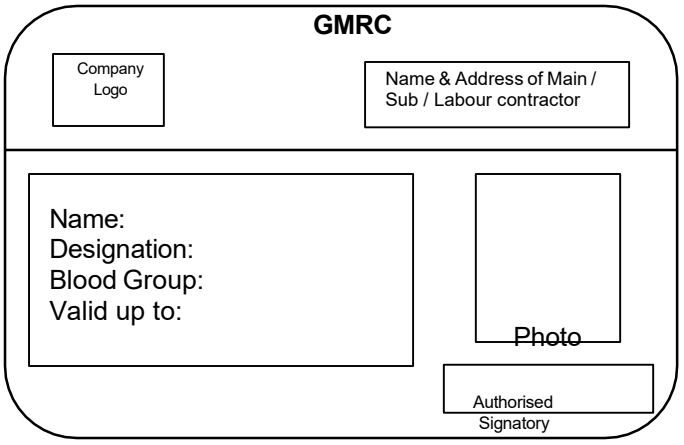
5. Employee's Duties

   - 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).

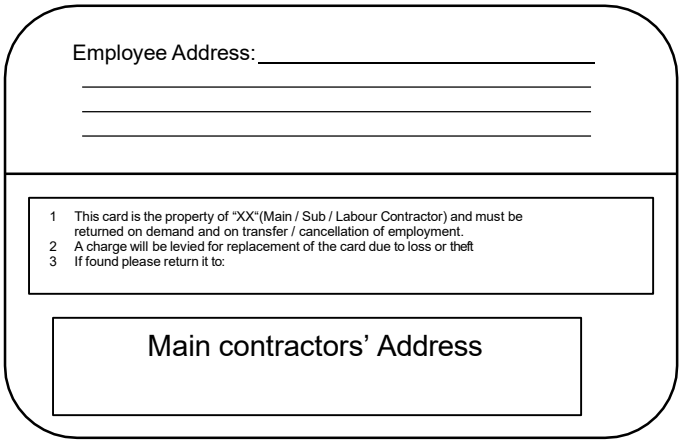
	Gujarat Metro Rail Corporation (GMRC) Limited.
General Instruction: GMRC/SHE/GI/005	

ID Card Format
(85 mm x 55mm)

Front side of ID card:



Backside of ID card:



	Gujarat Metro Rail Corporation (GMRC) Limited.
General Instruction: GMRC/SHE/GI/006	

SHE Training details for Managers and Supervisors

1. The Safety Regulations	2. Policy and Administration
Statutory requirement Appropriate regulations Duties of employer and employee	Effect of incentive on accident prevention Human relations Consultation Safety Officer: duties, aims, objectives
3. Safety and the Supervisor	4. Principles of Accident Prevention
Safety and efficient production go together Accidents affect morale and public relations	Attitudes of management, supervision and operations Methods of achieving safe operations Accident and injury causes
5. Site Inspection	6. Human Behaviour
The role of management Hazard Identification Procedure Records results Follow-up procedures Feedback	Motivating agencies Individual behaviour Environmental effects Techniques of persuasion
7. Site housekeeping	8. Health
Site organization Relationship of site housekeeping to accident occurrence Site access Equipment storage Material stacking Materials handling	Medical examination Hazard to health on site Sanitation and welfare Protective clothing First Aid / CPR
9. Personal Protective Equipment	10. Electricity
Eye, face, hands, feet and legs Respiratory protective equipment Protection against ionizing radiation	Appreciation of electrical hazards Power tools Arc welding Low voltage system Lighting and power system on sites ELCB, RRCB, Grounding/Ground fault circuit interrupters (GFCIs)
11. Oxygen and Acetylene Equipment	12. Equipment
Cylinder storage and maintenance Condition and maintenance of valves, regulators, and gauges Condition and maintenance of hoses and fittings Pressures	Accidents related to moving parts of machinery Appreciation of principles of guarding Importance of regular maintenance
13. Transportation	14. Excavations
Transport to and from site Hazard connected with site transport Competent drivers Dumpers Tipping trucks Movement near excavations	Method of shoring Precautions while shoring Precautions at edge of excavations Removal of shoring Sheet steel piling
15. Working platforms, Ladders, and Scaffolding	16. Cranes and other Lifting Machines

Hazards connected with the use of ladders Maintenance and inspection Type of scaffold Overloading Work on roofs Fragile material Openings in walls and floors Use of safety belts and nets	Licensing, certification and training required for operation of cranes Slinging methods Signalling Access to crane(s) Maintenance and examination Ground conditions Hazards and accident prevention methods connected with the use of different types of cranes / heavy equipment Crane Lift Plan for all lifts
17. Lifting Tackle	18. Fire Prevention and Control
Slings - single and multi-legged Safe working loads (SWLs) Safety hooks and eyebolts Cause of failure Maintenance and examination	Principle causes determining fire Understanding fire chemistry Fire fighting equipment Fire fighting training
19. Communications	20. Manual Handling
Effective methods of communication (particular interest to non-English speaking workers) Method and preparation of reports Safety committees Safety meeting	Body posture and procedure for lifting, pushing, pulling, dragging, sitting and walking Ergonomics Stretching exercises
21.Environment 1. Induction training of Environment Management 2. Solid waste management 3.Hazardosu waste management 4. Water management 5. Biodiversity management 6. Soil pollution prevention 7. Energy management 8 Pollution prevention & Control 9 Environment monitoring 10. Noise & Vibration Control	22.Social 1. HIV awareness 2. Labor welfare 3.Gravience redress 4. Gender based violence

GUJARAT METRO RAIL (GMRC) LIMITED

General Instruction: GMRC/SHE/GI/007

SHE Training Matrix

Types of training	Management																				Supervisor											Specific												
	SHE Orientation	SHE Leadership	SHE Plan	SHE Improvement Plan	Management of Change	SHE Audit & Inspection	SHE Emergency Response & Preparedness	Incident/Accident Investigation & Reporting	SHE Communication	SHE Promotion & Incentives	Traffic Management	Hazard Identification & Risk Analysis	Permit to work system	Confined space entry	scaffolding	Waste Management	Environment Monitoring	Labour welfare measures	Behavioural Based Safety Management (BBSM)	Job/Task Safety Analysis (JSA)	Safety Training Observation Programme (STOP)	Industrial First Aid & CPR	Incident / Accident Investigation & Reporting	Fire fighting	Confined Space Testing & Certification	Scaffold Erection & Inspection	Rigging	Wire Rope Inspection	Crane Inspection	Electrical/Mechanical Isolation	Permit to Work System	Confined Space Working	Explosive Handling & Control	Heavy Lifting Operation	Radiography (X-Ray)	HAZMAT Handling & Control	Welding, Cutting & Bracing	Power Actuated Hand Tool	Electrical/Mechanical Isolation	Roofing Work	Steel erection work	Scaffold Erection/Dismantling	False-work Erection / Dismantling	Painting in Confined Area
Project Manager	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•																						
Sr. Construction Managers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•					•								•									
Quality Manager	•	•	•	•	•		•	•	•		•	•	•	•	•	•		•	•	•	•	•																						
Planning engineer	•	•	•		•	•	•	•	•			•		•								•																						
Construction Managers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				•	•	•	•	•													
Construction Supervisors	•		•	•	•	•	•	•	•	•	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Construction Foreman	•		•				•		•			•	•				•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Machinery Operators	•						•				•					•						•		•			•																	
Material Handlers	•						•					•	•		•							•	•	•			•																	
Station Building Workers	•						•						•		•	•						•		•							•			•		•		•		•		•	•	•
Steel workers	•						•						•		•	•						•		•			•				•			•		•	•			•	•	•		
Mechanical workers	•						•									•						•		•			•				•	•		•		•			•	•		•		•
Other Civil workers	•						•									•						•		•			•				•	•	•	•		•			•	•		•	•	•
Electrical workers	•						•									•						•		•			•				•	•		•		•			•	•		•		•
Radiographers	•						•									•						•		•							•	•			•	•						•		
Transportation Drivers	•						•				•					•						•		•																				
Security Officers	•						•	•			•	•	•		•	•						•	•	•																				
Clerical Staff	•						•									•						•		•																				
Medical Doctor	•	•	•				•	•							•	•		•				•																						
Sr. SHE Managers		•					•								•		•					•																						
Jr. SHE Managers	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SHE Supervisors	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

	Gujarat Metro Rail Corporation (GMRC) Limited.
General Instruction: GMRC/SHE/GI/008	

DAYS TO BE OBSERVED FOR CREATING SHE AWARENESS

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

	Gujarat Metro Rail Corporation (GMRC) Limited.
General Instruction: GMRC/SHE/GI/009	

Minimum Requirements of SHE Communication Posters / Signages / Video

1. 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 contract)	Group
Upto 25 Cr	A
Upto 100 Cr	B
Upto 250 Cr	C
More than 250 Cr	D

2. 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 organisations, the contractors 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 printed on their own.

All the above are to be detailed in the Site SHE Plan and get an approval from the Employer before displaying the posters.

Table 1: Minimum number of Posters

SN	SHE Poster Title	Min 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, 1 Gujarati	Each 100	Each 200	Each 500	Each 1000
3.	Mandatory PPE Usage					
a)	Signages to display the messages like PPE ZONE, NO PPE ZONE, HARD HAT AREA etc.	2 types of sizes made up of metal sheet to be mounted at different locations	Each 25	Each 50	Each 75	Each 200
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	5 types of sizes made up of metal	Each 25	Each 50	Each 75	Each 200

SN	SHE Poster Title	Min No. of concepts in each title	No. of Posters / Signage / Video			
			Group A Contract	Group B Contract	Group C Contract	Group D Contract
	messages like SAFE, UNSAFE, FIT FOR USE, AVOID USE etc.	sheet to be mounted at different locations				
6.	Site Electricity	5	Each 25	Each 50	Each 75	Each 200
7.	Fire and Explosion	5	Each 25	Each 50	Each 75	Each 200
8.	Crane Safety	5	Each 25	Each 50	Each 75	Each 200
9.	Slings	5	Each 25	Each 50	Each 75	Each 200
10.	Rigging Procedures	5	Each 25	Each 50	Each 75	Each 200
11.	Excavation	5	Each 25	Each 50	Each 75	Each 200
12.	Occupational Health (Mosquito Control, HIV/AIDS awareness, Dust Control, Noise Control, No Smoking/Spitting, etc.)	10	Each 25	Each 50	Each 75	Each 200
13.	First – Aid	3	Each 25	Each 50	Each 75	Each 200
14.	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
15.	Importance of "Safety Handbook"	1	25	50	75	200
16.	Traffic Safety (Speed limit, safe crossing and working within barricaded area etc.)	5	Each 25	Each 50	Each 75	Each 200
17.	Environmental Monitoring (Spillage of Muck, hazardous material, Improper drainage, water spray for dust containment etc.)	5	Each 25	Each 50	Each 75	Each 200
18.	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 2: Size of Posters / Signages

SN	Item	Size
1.	Posters – Standard	17"x22" –135 GSM 4 Colour Printing
2.	Posters – Special (Wherever required)	17"x22" card laminated FA Poster
3.	Posters - GMRC size (Wherever required)	32"x40" Flex FA Poster
4.	First-Aid Booklet	6"x4"
5.	Safety Handbook	6"x4"
6.	Signages	Small : 12"x6" Big : 24"x12"

SN	Item	Size
7.	Road Traffic Sign Boards	Strictly as per Indian Road Congress (IRC) specifications

Table 3: Safety Signage Colour (as per IS 9457)

SN	Type of signage	Colour
1	Mandatory	Blue
2	Danger	Yellow
3	Prohibit	Red
4	Safe conditions	Green

	Gujarat Metro Rail Corporation (GMRC) Limited.
General Instruction: GMRC/SHE/GI/010	

Experts / Agencies for SHE Services

SN	Organisation	Services
1.	Bureau Veritas Industrial Services (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	• External SHE Audit • SHE Management / Technical Training
2.	Central Labour Institute Post box no: 17851, NS Monkikar Marg Sion , Mumbai- 400 022 Tel.: 022- 4092203 Fax: 022 – 4071986 E-mail: cli@dgfasli.nic.in	SHE Management/ Technical Training
3.	Construction Industry Development Council 801, 8th Floor, Hemkunt Chambers, 89, Nehru Place, New Delhi – 110 019 E-mail: cidc@vsnl.com	SHE Management / Technical Training
4.	Delhi Productivity Council 1E/10, Swami Ramtirath Nagar New Delhi – 110 055 Tel.: 23522835	SHE Management / Technical Training
5.	Det Norske Veritas AS, 203, Savitri Sadan 1, 11 Preet Vihar Community Centre, New Delhi-110 092 Phone: 011-22531502/2253/1503, 22427688/22531278 Fax: 011-2253 0247 Website: www.dnv.com	• External SHE Audit • SHE Management / Technical Training
6.	Dr AV Baliga Memorial trust Link House, Bagadur Shah Zafar Marg Press Area New Delhi – 110 002 Phone: 011 – 23311119	HIV / AIDS awareness
7.	Dr. Cris Research Centre For Occupational Health & Safety 306, Guru Arjuna Dev Bhawan, Ranjit Nagar Complex, New Delhi – 110 008 Phone: 9810040406 Fax: 011 – 25702929 E-mail: team@drcris.com Website: www.drcris.com	• Ambulance Room & Van • Communication Materials • First-aid box • First-aid Training • HIV / AIDS awareness • ID Card • Medical Facilities • SHE Orientation Training
8.	DuPont Safety Resources, E.I. DuPont India Private Limited, Arihant Nitco Park 6th Floor, 90, Dr. Radhakrishnan Salai, Mylapore, Chennai-600 004	SHE Management Training

SN	Organisation	Services
	Phone: 044-2847 2800, 2847 3752 Fax: 044-2847 3800 Mobile: 9381201040 Website: in.dupont.com	
9.	EQMS INDIA PVT. LTD. 304 & 305, 3rd Floor, Rishabh Towers, Plot No. 16, Community Centre, Karkardooma, Delhi - 110092. Phone: 011 - 22374729 / 22374775 Fax: 011- 22374662 E-mail: eqms@eqmsindia.org Website: www.eqmsindia.com	• ISO Certification • SHE Management / Technical Training
10.	Green Cross Consultants 59, 7th Cross, 1st Floor, Jai Bharath Nagar, Banglore-560 033 Phone: 080-2549 6782 E-mail: etgrangan@yahoo.com	SHE Management / Technical Training
11.	HSRTC, PENTASAFE, 201, 2nd Floor, 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	SHE Practical Field Training for Height Safety
12.	Institute of Driving Training & Research, Wazirabad Road, Adjoining Loni Road flyover. New Delhi – 110 094 Phone: 011 – 22813474, 22815833 Fax: 011 - 22811131	SHE Technical Training for Vehicle Drivers.
13.	Institute for Research, Development & Training of Construction Trades & Management, An Educational Institute, Society and Trust, 1st Floor, UVCE Alumni Association Building, K.R. Circle, Bangalore-560 001 Phone: 080-22294291/22243257 Fax: 080-22243257 E-mail: ubrco@vsnl.com Website: www.instructindia.org	SHE Technical / Field Training
14.	International Engineering Company K – 10, South Extension, Part – 2, New Delhi – 110 049 Phone: 011 – 26254761, 26258130 Mobile: 9312260130 E-mail: ashok@intenco.net	• Crane and Lifting appliances and Gears Certification • SHE Practical Field Training for Crane Safety
15.	L & T Eutectic 32, Sivaji Marg, New Delhi – 110 015 Phone: 011 - 51419538, 51419539 Fax: 011 - 51419600 Website: www.lnteutecticwelding.com	SHE Practical Field Training for Welding Safety
16.	Loss Prevention Association of India Ltd. Warden House, Sir P.M. Road, Mumbai – 400 001 Website: www.lpaindia.org	SHE Management / Technical Training
17.	MFA Crucial Moments Healthcare Pvt. Ltd., 42, Okhla Industrial Estate, Phase – II New Delhi – 110 020 Phone: 011 – 55624000	First-aid Training

SN	Organisation	Services
	Fax: 011 – 55624010 E-mail: contact@crucialmoments.net	
18.	Modicare Foundation 4 Community Centre, New Friends Colony, New Delhi – 110 065 Phone: 011 – 5167235059 Fax: 011 – 26915469 E-mail: nivedita@modi.com nivedita@gmavil.com Website: www.modicarefoundation.org	HIV / AIDS awareness
19.	National Safety Council HQ and Institute Building 98A, Sector 15, industrial Area C.B.D Belapur, Navi Mumbai – 400614 Phone: 27579924	SHE Management / Technical Training
20.	NICMAR (National Institute of Construction Management and Research) 910,9th Floor, Hemkunt Chambers, 89, Nehru Place, New Delhi – 110 019 Phone: 011 – 51618415, 51618417, 51618418 Fax: 011 – 51618416	SHE Management / Technical Training
21.	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	ISO Certification
22.	Safety Engineers Association / Safety Educational Trust – India 2/257, First Floor, Dr. Ambedkar Nagar, Manapakkam, Chennai – 600 116 Phone: 044 – 22523461 E-mail: safetrustindia@rediffmail.com	SHE Management / Technical Training
23.	SHE Management Consultancy & Support Services, 145 A, Pocket-VI, (DDA Flats), Kondli Gharoli, Mayur Vihar-II, Delhi-110 096 Fax: 011-2262 5015 Mobile: 9811153873 E-mail: r_k_p@vsnl.net	SHE Management / Technical Training
24.	St. Johns' Ambulance Red Cross Road New Delhi – 110 001	First-aid Training
25.	Vexil Business Process Services Pvt. Ltd. 208, A/4, Savitri Nagar, New Delhi – 110 017 Mobile: 9350232714, 98102832201, 9350232716 E-mail: info@vexilbps.com Website: www.vexilbps.com	• Emergency Preparedness Mock drill • SHE Management / Technical Training
26.	Welding Research Institute Bharat Heavy Electricals Ltd. (BHEL) Trichirappalli, Tamil Nadu – 620 014 Phone: 0431 – 2577029, 2577283 Fax: 0431 – 2520770 E-mail: wri@bheltry.co.in	SHE Practical Field Training for Welding Safety

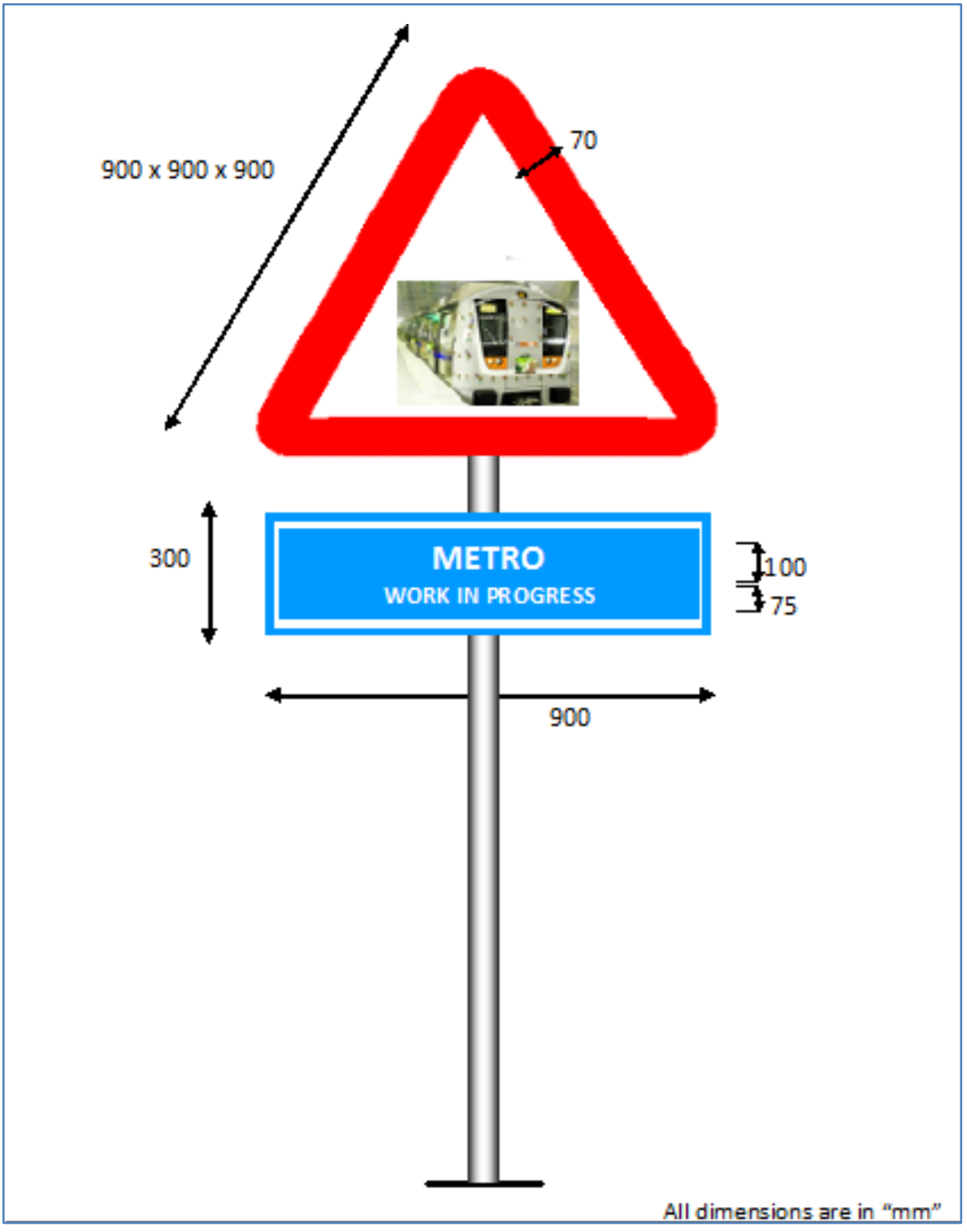
	Gujarat Metro Rail Corporation (GMRC) Limited.
General Instruction: GMRC/SHE/GI/011	

Minimum Lighting Requirements

SN	Facility or Function	Luminance – lx (lm/ft2)
1.	Administrative areas (offices, drafting and meeting rooms, etc.)	540 (50)
2.	Construction areas • 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 • exit ways, walkways, ladders, stairs	 110 (10)
4.	Maintenance / Operating areas / shops • 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) 325 (30)
5.	Mechanical/electrical equipment rooms	110 (10)
6.	Hoists, Elevators, freight and passenger	215 (20)
7.	Warehouses and storage rooms/area • indoor stockroom, active/bulk storage • indoor rack storage • outdoor 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)

	Gujarat Metro Rail Corporation (GMRC) Limited.
General Instruction: GMRC/SHE/GI/012	

Warning Traffic Sign



	Gujarat Metro Rail Corporation (GMRC) Limited.
Form No.: SF/001	

FORMATION OF SITE SHE COMMITTEE	
Contract No.	
Contractor Name	
Contract Title	

CIRCULAR

Committee

The following SHE Committee is constituted with immediate effect:

Chairman:
Members:

1.
2.
3.
4.
5.

Secretary

Periodicity

The committee will meet at least once in a month on the day (specify date)

Agenda

Secretary will circulate agenda of the meeting at least two days in advance of the schedule date of the meeting.

Circulation

Gist/summary of proceedings of the meeting will be recorded in a minute book in the standard format and circulated to the following under the signature of the secretary

1. Chairman
2. Members
3. GMRC Representatives
4. Others concerned

Date: Signed By: ----------

CHAIRMAN

	Gujarat Metro Rail Corporation (GMRC) Limited.
Form No.: SF/002	

MINUTES OF SHE COMMITTEE MEETING			
Contract No.			
Contractor Name			
Contract Title			
Meeting No.		Date of Meeting	
Location of Meeting			

MEMBERS PRESENT	INVITEES	MEMBERS ABSENT

REPORT SENT TO					
No. of Copies	Name / Dept.	No. of Copies	Name / Dept.	No. of Copies	Name / Dept.

Prepared by: Location: Date:

MINUTES OF SHE MEETING

Item No.	Description of Discussion	Action By	Target	Remarks
1	Complaints received from Clients and corrective and preventive action			
2	Review of MOM of previous meeting			
3	NCR's / Observation from third party			
4	First - Aid cases / Reportable accident cases			
5	Future jobs and specific requirement			
6	Status of implementation of Safety plan			
7	Sub-contractor performance			

Item No.	Description of Discussion	Action By	Target	Remarks
8	Analysis of first-aid cases			
9	Need for any specific system / training / PPE's / resources			
10	Observation of SHE committee during last walk down			

Next SHE Meeting is scheduled on:

Date: Chief SHE Manager (Signature & Name)
Date: Project Manager (Signature & Name)

	Gujarat Metro Rail Corporation (GMRC) Limited.
Form No.: SF/003	

SITE SAFETY AUDIT SCORECARD				
	Description		**Score (1-10)**	**Wtd score**
A. GENERAL SAFETY PRACTICES		**25%**		
A1	Usage of proper PPE	5%		0
A2	Barricading	3%		0
A3	Safety sign boards	2%		0
A4	Identification of work areas	2%		0
A5	Defined path for vehicle movement	1%		0
A6	General site layout	2%		0
A7	General housekeeping	3%		0
A8	Stacking and storage practices	2%		0
	Weighted Score for Section A	**2.5**		**0**
B. EMERGENCY PROCEDURES		**20%**		
B1	Posting emergency numbers	3%		0
B2	Fire safety measures	4%		0
B3	Emergency evacuation procedures	4%		0
B4	First aid facilities	4%		0
B5	Emergency procedure for accidents	5%		0
	Weighted Score for Section B	**2**		**0**
C. SAFETY RECORDS/ STATISTICS		**15%**		
C1	Contractor's job site safety plan	3%		0
C2	Material Safety Data sheets	2%		0
C3	Pre task plans arranged chronologically	2%		0
C4	Records of accidents/ incodents/ Near misses	2%		0
C5	Records of periodic safety reports	2%		0
C6	Records of safety meetings, Tool box/ pep talks	2%		0
C7	Records of new workers safety orientation	2%		0
	Weighted Score for Section C	**1.5**		**0**
D. VISITOR SAFETY PROTOCOL		**5%**		
D1	Site safety orientation	2%		0
D2	Requirement of PPE	2%		0
D3	Identification badges	1%		0
	Weighted Score for Section D	**1**		**0**

E. SPECIFIC WORK PROCEDURES		**20%**		
E1	Working at heights	3%		0
E2	Electrical safety	4%		0
E3	Hot work permit procedures	2%		0
E4	Excavation procedures	3%		0
E5	Working with ladders	2%		0
E6	Secured area access procedure	1%		0
E7	Working with lifts/ cranes	1%		0
E8	Working with aerial platforms	2%		0
E9	Working with chemicals	1%		0
E10	Environmental clean-up procedures	1%		0
	Weighted Score for Section E	**2**		**0**
F. SAFETY ATTITUDE OF PROJECT PARTICIPANTS		**15%**		
F1	GMRC team's approach to safety	5%		0
F2	Client's approach to safety aspects	5%		0
F3	Contractor's approach to safety implementation	5%		0
	Weighted Score for Section F	**1.5**		**0**
Consolidated Site Safety score (all sections)		**10**		**0**

SCORE INTERPRETATION:
8-10: Excellent management from safety aspects - Continue with current practices
6-8: Good management from safety aspects - scope for further improvements
4-6: Just adequate management from safety aspects - definitely needs improvement
<4: Site is poorly managed from safety perspective - Needs immediate improvement measures
NOTES:
1. Under Section A, if A5 is NA, then delete this row and change A3 to 3%
2. Under Section C, if C2 is NA, then delete this row and make C6 and C7 each 3%
3. Under Section E, if **E4 is NA, make E1 as 5% and E2 as 5%**
if **E7 is NA, make E5 as 3%,** if **E8 is NA, add 2% to E1**

EIA, SIA, GAP, Environmental and Social Management Plan (ESMP)

Ahmedabad Metro Rail Project Phase-II

E&S documents are under revision. Once, the documents are finalized, the same will be uploaded on GMRC Website. The link of the same will be shared on finalization: