



Lusail Real Estate Development Company

Health, Safety, Security, Environment, Logistics & Quality Department

STANDARD OPERATION PROCEDURE – FIRE PREVENTION

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COMPANY PROPRIETARY INFORMATION

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1.0 PURPOSE & POLICY SCOPE

The purpose of the Fire Prevention and Protection Policy at LREDC is to ensure that fires create no threat to the public or hazards to employees, and to prevent unauthorized, unregulated, and unplanned fires. Property damage from fire must be held to a minimum, as must the impact of fire and related perils on the LREDC mission and programs.

This policy requires adherence to and compliance with all applicable laws, orders, regulations, codes, standards, guides, policies, and good practices pertaining to fire prevention and protection. General fire prevention requirements and roles and responsibilities are provided by this policy.

The purpose of this policy is to create a coordinated response to the implementation of fire safety procedures and fire services installations during construction site operations in accordance with the statutory requirements, which enforce LREDC objectives in mitigating injury and loss of life while promoting quality assurance through an approved Management System.

It is essential for contractors to maintain control and compliance with this policy to facilitate the management of fire risks associated in construction site procedures and storage, and the proper use and installation of fire protection and safety systems. This policy identifies common risks which need to be adequately addressed including processes for continual improvement and the assurance of conformity to statutory requirements. Consistently implementing procedures which are suitably planned reviewed and maintained; that meet the requirements of this policy and applicable local laws will aid and assist in a manageable atmosphere, resulting in a more effective and efficient construction safety programme.

In the development of a coordinated construction programme which complements this policy, good progress can be achieved by implementing the plan-do-check-act process which will help to directly address the objectives as described, allocate necessary resources and encourage voluntary self-imposed obligations to continued corrective actions and quality assurance.

1.1. LIMITS OF THESE REQUIREMENTS

Where these Requirements do not adequately address the contractors responsibilities, the contractor is required to comply with all aspects of the Qatar Civil Defence Department and any other Qatari Regulation pertaining to the design and installation for fire protection systems; and all applicable fire services Standards and guidelines from internationally recognised organisations and associations.

While this policy defines the Requirements for construction site safety service provisions and installations; the appointment of roles and responsibilities and allocation of resources both for procurement and personnel to successfully execute the obligations describe herein, needs to be implemented into the construction programme at an early stage and maintained throughout in accordance with internationally recognised and accepted organization standards.

Failure on the part of LREDC to inspect the work, witness or test the work, or discover defects, or failure to reject any part of the work performed by any contractor shall not relieve the contractor from any liability or obligation under this undertaking letter or under law. Contractors are required to report any deviations immediately upon becoming aware of them, and any such non-compliance shall not be covered or hidden by any contractor. Any latent non-compliance, damage and/or defects shall not relieve the contractor from any liability or obligation under these Requirements or at law.

1.2. COMPLIANCE WITH THESE REQUIREMENTS

The contractor shall comply, and shall ensure that all the contractors/sub-contractors of any tier, consultants/sub-consultants of any tier, personnel, material men, agents, vendors, and suppliers comply,

with the Standards and Codes of Practice and recognised Authorities Having Jurisdiction in the State of Qatar.

Any significant problems between the coordinating appointments leading to the inability to comply with the minimum requirements herein shall promptly be reported to LREDC.

During the course of the construction programme, LREDC shall perform routine inspections of jobsite conditions and documented procedures to ensure compliance with legal regulations and adherence to these Requirements and summarily perform risk assessments against deviations to evaluate possible consequences to the policy and determination of necessary corrective and preventative actions.

Should the contractor show disregard to these Requirements or fail to comply with, implement, impose, or is deemed to be in breach of any of these Requirements mandated by, LREDC shall, without prejudice to any rights afforded to it, (whether contractual or otherwise) be entitled to impose Section 13 of the Lusail HSE General Requirements.

2.0 STATUTORY REQUIREMENTS & OBLIGATIONS

2.1. GENERAL

The installation shall comply with the following Statutory Requirements, Standards, and Codes of Practice to which, the contractor is expected to show an advanced level of knowledge and understanding.

2.2. AUTHORITY HAVING JURISDICTION (AHJ)

The contractor shall recognise the following entities for procedural approval and implementation for compliance of all design, installations, connections, testing and commissioning and fire services related issues, which may impact the coordination of evacuation strategies and First Responder Emergency Personnel.

- Ministry Of Interior State of Qatar (MOI)
- Qatar Civil Defence Department (QCD)
- Kahramaa Utilities
- Lusail HSEELQ
- Lusail Fire Prevention Division

2.3. STANDARDS & CODES OF PRACTICE

- QCS 2010 – Qatar Construction Specifications 2010
- QCD FSS 2 – Fire Safety Provisions for Construction Worksites – Civil Defence Department
- QCD FSS 3 – Building Worksite Safety – Civil Defence Department
- NFPA- Nation Fire Protection Association
- SSFDG-CP23B- Olive Group Stage 3 – Security System & Fire Design Guidelines
- FM Listing - Factory Mutual approved materials and equipment
- UL Listing – Underwriters Laboratory approved materials and equipment
- ISO: 9001 – International Organization for Standardization for Quality Management Systems
- OHSAS: 18001 - International Occupational Health and Safety Management System Specification

Any deviations to the standards and codes of practice above proposed by the contractor which includes, but not limited to; engineered solutions or the installation of equipment which does not comply with their

manufacturer listing for intended use shall be submitted by the contractor for review and approval prior to any works.

2.4. HEALTH & SAFETY STANDARDS

The contractor shall fully understand and continuously participate in accordance with the Lusail Health Safety Environment (HSE) General Requirements.

This includes but is not limited to; obtaining the proper permits in accordance with Lusail HSE General Requirements Section 10; for works involving the following:

- Excavating and trenching (depths greater than 1 meter)
- Confined Space Entry (CSE)
- Hot Works
- Pressurized line testing (in excess of 60 Psi)

The contractor must implement without fail, the objectives and Requirements of Lusail HSE in order to successfully comply with the Requirements of the Fire Prevention and Protection Policy.

3.0 MANAGEMENT SYSTEM

3.1. GENERAL

The Management System shall provide the procedural guidelines for successfully identifying, evaluating, executing and maintaining procedures in accordance with legal requirements and progressively develop to minimise the potential for fire related incidents.

The Management System shall facilitate for a coordinated pre-planned and dedicated fire prevention and protection program schedule which easily identifies projected fire risks that can affect the policy objectives, the preventative measures prescribed and is incumbent of continuous construction site inspections of materials and equipment which has been determined through risk assessment as a source of fire.

To simplify the coordination between organizations, the Management System shall consolidate activities and reporting to supervisory personnel as much as possible. This consolidation should resolve Management System diversity and clearly define the roles and responsibilities in operations and installations.

During construction site procedures, the Management System shall implement controls which demonstrate organisation and compliance to laws and regulations with auditable results for corrective development. These controls are essential for effective planning, operations and maintenance alike.

The Management System shall remain flexible in the ability for re-appointment of key contributors to processes and procedures while fixed on promoting awareness and training all staff for good housekeeping practices and proactive development in construction site fire safety and prevention.

3.2. PLANNING

Since buildings under construction are more susceptible to a fire incident than those already completed and provided with a building management system and permanently fixed fire systems which compliment the structure, its contents and procedures therein, careful planning must be developed and constantly maintained to ensure the objectives of this policy are successful.

In initial planning preparations before commencement of construction work, it is important to incorporate fire safety measures when drawing out the overall site layout and work activities. Site planning should address suitable locations of temporary buildings and structures, provision of access for fire appliances,

internal fire hydrants to facilitate fire fighting operation and safety provisions for the evacuation of all persons.

3.2.1. RISK ASSESSMENT

In compliance with this policy scope and local legislation, the Responsible Appointment shall carry out a suitable and sufficient fire risk assessment. As with the risk from other hazards, the fire risk assessment should be based on the following approach:

1. Identify the risks
2. Identify the Assets at risk
3. Evaluate, remove, reduce and protect from risk
4. Record, plan, inform, instruct and train
5. Review

The risk assessment will include proximity structures, combustible materials, and procedures, which can contribute to fire ignition and propagation.

The Responsible Appointment shall extensively review the scope of works, the parties involved and develop a fire prevention program which aims to achieve zero incidents to fire occurrence by properly identifying possible sources of ignition.

Many combustible materials are used in constructions site processes and with proper planning, the inventory for materials which are either hazardous or pose a significantly higher risk to fire propagation, can be equally moderated to the needs of the programme schedule. When evaluating the fuel for a fire source, it is important to identify two things; quantity (density) and proximity. Materials which have been identified in the risk assessment as 'significant' to fire propagation should be kept at minimum stockpiles and separated from other combustibles and sources of ignition.

The capacity for additional fire protection measures during building construction can sometimes seem unreasonable given the lack of utilities available on site and to comply with this policy and local laws, the plot developer must provide an approved temporary or permanent water supply as soon as combustibles arrive; however, the provisions required depend heavily on what hazards are to be protected and the inherent risk to all assets involved. Materials and storage which has been separated and properly stored in accordance with QCD regulations, NFPA 241 – Standard for Safeguarding Construction, Alteration, and Demolition Operations, Lusail HSE General Requirements and this policy, can reduce the initial response to fixed fire protection requirements.

The risk assessment must identify people or assets most at risk which can be derivative from the construction processes indicated in the programme schedule, roles and responsibilities thereof, and from members of the public or other property which could be within close proximity.

When parts of a completed refurbishment or new build are handed over to the client on a phased sequence it is important to ensure that all persons and assets which may be affected by fire in either the construction site or the occupied premises have been identified.

Equally as important as occupants inside a premises; the risks associated with first responding personnel, whether Fire Brigade, EMT or Security staff committed to their responsibilities, need to be evaluated and addressed with diligence. Forethought into possible exposure to falling debris and logistic complications such as traffic offsite and perimeter access need to be evaluated and where appropriate, implemented into the fire prevention program.

In an effort to reduce the risk of a fire incident, precautions should be developed which consider the overall site-management and diversity of organizational structures. A coordinated resolve should directly address multiple parties which need to be consolidated in processes where the

opportunity for a fire occurrence is likely to happen, such as smoking areas and hot works within close proximity to other processes.

An overview of the presumed conditions during construction must evaluate these actions and possible consequences to determine what preventative measures should be implemented in the construction schedule. Where reasonably practicable, hazards should be removed; where not possible, alternative measures which aim to reduce risk, such as early development of the permanent fire protection or stair enclosures for escape, can be crucial.

In the process for reduction and removal, ensure that any actions you take are not substituted for other hazards or that the alternative protections provided are in accordance with the criteria of its intended purpose, such as; replacing a flammable liquid with a non-flammable but toxic one and automatic sprinkler protection densities.

It is essential for the Responsible Appointment to have a good understanding of fire propagation and smoke migration and methods which have been proven effective in control or damaging the lack thereof. When what practices will be considered will depend mostly on the stage of construction and construction materials used or already installed.

3.2.2. PROGRAM DEVELOPMENT

In the event of a fire, people must be able to escape from it. The measures which are put in place to aid and assist during a fire incident must provide at a minimum the following functions:

- Alert and awareness
- Direct and unobstructed escape
- Containment

In buildings with multiple levels, fire spread on a lower floor can potentially render evacuation procedures from upper floors ineffective without proper protection. While 'enclosed spaces' may sound unfavorable and to be avoided, if applied with the appropriate fire and smoke protection measures; can create compartments for containment or refuge alike. This is particularly important for safeguarding means of escape and fire isolating emergency egress stairs should be implemented at the earliest stage possible of the construction schedule.

The Responsible Appointment shall have an extensive evaluation of the construction schedule to determine the frequency of risk associated procedures and procurement and be not only accordingly addressed, but also coordinate with and provide instruction to the relevant parties.

Through this investigation, the Responsible Appointment shall establish control documentation for the purpose of identifying gaps in construction site procedures which can lead to a fire incident and facilitate corrective response to eliminate, substitute, design, indicate and protect. This process in development should focus to the following critical components:

- Roles and Responsibilities
- Communications
- Procurement and Logistics
- Training and Awareness
- Emergency procedures
- Inspections and Maintenance

The control documents established shall at a minimum, provide clear indication of continuous inspection, training and monitoring and the resulting reports. These documents shall be capable of summarily executing incident reporting for determining root cause and supporting suggested

corrective actions which will then be evaluated by LREDC for approval and compliance with this policy.

The Responsible Appointment shall monitor suitability for placement of equipment and materials in regards to the likelihood of damage, exposure and obstruction. Equipment, machinery and materials shall be continuously maintained to a standard where workers are consistent with keeping egress routes and high traffic areas free and clear from obstructions, such as electrical cable crossings for both trip hazard and possible electrical short due to negligence.

The Responsible Appointment shall produce controls to guide and direct regularly scheduled training sessions regarding site safety and fire procedures. The training sessions shall reflect lessons learned from inspection and corrective action reports and continuously contribute to the overall effectiveness of the Management System.

The Responsible Appointment shall establish point of contact personnel with all interested parties contributing or directly involved with conforming to this policy. This point of contact shall be recognized and responsible for their organizations participation in compliance with procedural documentation which is auditable.

The Responsible Appointment shall ensure sub-contractors working under their direction and controls have maintained a management system which compliments this policy in both fire safety procedures and procurement of equipment, machinery and materials which have measurable controls.

The Responsible Appointment shall schedule and implement regularly simulated consequence drills which are unannounced and unknown to subordinates to test the integrity of the fire safety strategy and take corrective actions which document and promote preventative actions based on practical results. This includes the integrity and effectiveness of the alarm and alertness system which has been proposed and how personnel react to them.

The Responsible Appointment shall establish planned performance reviews for staff to identify training needs and the overall effectiveness of the Management System.

The Responsible Appointment shall ensure that all procedures and installations are documented and result reporting where applicable is available at the request of LREDC without delay.

3.3. IMPLEMENTATION & OPERATION

The Responsible Appointment to the implementation and operation of the Management System shall be required to demonstrate competence in defining the organizational structure and delegation of roles therein to the appropriate members of programme staff which have the requisite experience and certification to adequately perform their responsibilities.

The Responsible Appointment shall clearly educate all members of the programme staff the importance of and their responsibilities and role in; successfully achieving LREDC objectives and the actions, activities and behaviours which contribute to unacceptable consequences to the policy.

The Responsible Appointment shall be available to all persons working under their controls and ensure the proper allocation of resources for both financial procurement and the development of training programs to compliment this policy are established and implemented in the programme schedule.

Throughout the programme, where identified risks to subordinates and external parties directly affected under the Management System echelon, the Responsible Appointment shall provide consultation and instruction, whether individually or in whole, for required remediation and preventative actions pertinent to their roles and responsibilities in accordance with the policy objectives.

The Responsible Appointment shall delegate roles which include training and instruction to other staff, consultant and sub-contractors based on associated responsibility and abilities in English comprehension and vocabulary. Associated controls which are to be implemented include course topics discussed, staff attendance and documentation of valid suggestions from subordinates working in the field.

The Responsible Appointment shall implement controls for internal and external communications and where possible, consolidate and coordinate procedural documentation between trades and other organizations. A filing structure shall also be implemented which facilitates archiving and retrieval.

The Responsible Appointment shall implement controls which promote participation from subordinates in investigation reporting, hazard identification and risk assessment. The objective of these controls will be to establish voluntary obligations to staff for construction site awareness and participation and representation in the development of the Management System.

The Responsible Appointment shall implement documentation controls for approval process which compliment review and response as well as the management of external origin documentation. Controls shall facilitate for updating and be practicable and easily identifiable to prevent obsolete documents from further use.

The Responsible Appointment shall implement controls which measure activities associated to identified hazards and risks and operational procedures which highlight critical points for evaluation prior to commencement of tasks.

The Responsible Appointment shall implement controls for stipulated response for the procurement and installation of fire protection systems such as automatic sprinkler protection and fire hose reels. The controls will clearly indicate location and sizing of sprinklers and piping and connections to source water supplies.

The Responsible Appointment shall implement controls for stipulated response for the procurement and installation of fire safety systems such as draft stops and methodology for calculated fire propagation and smoke migration. The controls will clearly indicate location of vertical openings and storage separations in buildings under construction. In addition, these controls shall indicate protective measures for escape in relation to stairs and common paths of travel.

The Responsible Appointment shall implement controls for stipulated response for the procurement and installation of temporary facilities on-site such as housing, office and storage. The controls will clearly indicate separation distances, locations of fire protection equipment and clearly identify the emergency evacuation methodology in accordance with local laws.

The Responsible Appointment shall implement controls for emergency preparedness for all parties which need to be considered in the event of an emergency situation, including construction operations in neighbouring sites and rite-of-passage and the procedural response aimed at preventing or mitigating deviations from the policy objective.

The Responsible Appointment shall implement controls which monitor and maintain inspections for housekeeping preparedness in the event of an emergency situation. The controls shall indicate compliance with unobstructed paths of egress and continued maintenance of fire protection equipment.

3.4. CHECKING

The Responsible Appointment shall establish the required procedures and supporting documents for internal auditing of the Management System to determine the programme conforms to the planned arrangement and is properly maintained. Internal audits shall be properly structured with sufficient information so external construction management are able to easily identify risks associated to the organizations activities and the procedures associated to responsibilities of competent members of staff. The delegation of audits shall ensure objectivity and impartiality.

The Responsible Appointment shall establish a measurement system, both qualitative and quantitative, which monitor the effectiveness of controls and facilitate proactive response to performance of both the programme schedule and construction site operations.

The Responsible Appointment shall establish a measurement system which is indicative of historical deficiencies in programme performance and implementation of corrective and preventative actions. Recorded data and results of inspections, training and quality assurance for system integrity shall provide

sufficient information for detailed analysis and continued development and corrective and preventative action implementation.

The Responsible Appointment shall establish an incident investigation system developed to identify underlying deficiencies in the programme and controls for implementation of preventative measures and modifications. The investigative documentation shall facilitate communication to external monitors with sufficient information for determination of root cause.

The Responsible Appointment shall establish a corrective and preventative actions review system focused to the identification of deviations and response to summarily mitigate policy consequences. The controls shall facilitate evaluation of frequency deficiencies and actions required to prevent their occurrence. This control shall inherently evaluate the effectiveness of corrective and preventative actions taken and where applicable, identifies new requirements or amendments to the programme schedule and procedures. The corrective and preventative actions which are imposed shall be appropriate to the impact on the policy objectives and consequences thereof.

The Responsible Appointment shall establish controls for records to demonstrate conformity to local laws and this policy. The controls shall be properly maintained to facilitate identification and stored in a manner to which they are readily available for retrieval.

3.5. REVIEW

The Responsible Appointment shall perform assessment for opportunities improvement and implement change in the Management System when needed. Regular reviews of reporting results of controls and audits shall determine and identify overall compliance to the policy and its objectives.

The Responsible Appointment shall ensure incident reporting is thorough and follow up on unresolved investigations and consult where needed. Documentation which reflects consistent and persistent follow up procedures and reports shall be readily available to external auditing.

The Responsible Appointment shall maintain reviews of controls and operations for follow-up actions from previous management reviews and regularly establish the organizations performance and to what extent the objectives have been met.

The Responsible Appointment shall maintain reviews and develop alterations in the Management System to accommodate change from local statutory requirements and this policy.

4.0 GUIDELINES

4.1. SITE FIRE SAFETY PLAN

The Site Fire Safety Plan is to include adequate documentation and be submitted for approval to and archived for reference by LREDC.

The Site Fire Safety Plan shall be a structured Manual type document. It shall contain detailed information covering both detailed layouts of the fire prevention and protection provisions and emergency procedures. The Manual is to provide an overview of the essential information of the fire services installations and the contents shall facilitate comprehension by people with a non-technical background.

The Site Fire Safety Plan shall be retained at the dedicated construction site command post and provided with the following pertinent information:

- Organisation and responsibility for fire safety, training, record keeping, ect.
- General site fire precautions
- Construction site layout drawings
- Emergency procedures

- Process hazards protection regime
- Waste management regime
- Security measures to minimise the risk of arson and vandalism
- Inspection procedures
- Maintenance procedures

4.2. GENERAL SITE FIRE PRECAUTIONS

This section shall include documentation in determining the prescriptive fire prevention and protection installations. Where applicable, the following information shall be provided:

- **Temporary buildings and structure**
 - Building use
 - Construction type
 - Number of floors
 - Area per floor
- **Temporary enclosures**
 - Use
 - Construction type
 - Area
- **Combustibles Storage**
 - Type of combustible
 - Method of storage (i.e. barrel, box)
 - Quantity or amount
- **Standpipes**
 - Wet or Dry type system
 - Number of active standpipes per level
 - Total flow requirement
- **Sprinklers**
 - Alarm valve installation
 - Sprinkler operating criteria
 - Sprinkler head information
- **Portable extinguishers**
 - Construction site extinguisher schedule
- **Pumps and Water Supply**
 - Pump duties
 - Type and capacity in L/pm of water supply
 - Total water storage tank capacity and anticipated duration

4.3. CONSTRUCTION SITE LAYOUT DRAWINGS

The Construction Site Layout Drawings shall be a minimum 1:100 scale and developed indicating the following:

- **Layout for temporary buildings and structures**
- **Layout for temporary enclosures**
- **Layout for buildings under construction**
- **Emergency egress**
 - Paths of travel
 - Travel distances
 - Lighting
 - Escape stairs
 - Signage
 - Assembly point
- **Hoist and lifting facilities**
- **Compartmentation**
 - Fire rated doors and walls
 - Fire isolated stairs and lifts
 - Draftstops
- **Fire Alarm and Detection**
 - Panel location
 - Alarm points
 - Sounder and beacon points
 - Fire blankets
- **Portable extinguisher location**
 - Type
 - Size
- **Fire protection installations**
 - Hydrants
 - Sprinklers
 - Standpipes
 - Hose reels
 - Piping location and size
 - Fire Department connections
 - Pumps and water supplies
- **Fire Department access**
- **Designated combustible storage and waste location**
 - Type of combustible

- Storage or staging arrangement
- **Location of fire source equipment and machinery**
 - Type of equipment or machinery
 - Size and orientation of equipment
- **Fire command centre**
- **Perimeter fencing and access control**
- **Location of designated smoking areas**

The Site Fire Safety Plan shall be updated regularly and indicate any changes to the fire prevention and protection systems described above.

4.4. EMERGENCY PROCEDURES

The Emergency Procedures for anticipated fire incident response focused at the safe evacuation and protection of all parties involved which at a minimum, concentrate on the following:

- Nomination of personnel for Fire Warden duties
- Nomination of personnel to maintain access and prevent re-entry
- Means of giving warning through audible and visual indication
- Upon initiation of the alarm system, the required response, i.e. assembly point
- Clear access to the site and buildings is maintained at all times
- Temporary emergency lighting
- Clear signs for escape routes

Fire instruction notices must be displayed throughout the site, be of common format and located adjacent to fire alarm call points or sounders, at portable extinguisher points and at entry and emergency exits with the emergency assembly point chosen, clear of risk of QCD access route and marked in a clear and accepted way.

The fire instruction notices are only intended to serve as a reminder. All people onsite, even if just for a few hours, should receive sufficient information to know what to do in the event of a fire.

An emergency telephone facility with direct external communications access shall be provided at an approved location for the construction site. The street address of the construction site and the emergency telephone number of the fire department shall be posted adjacent to the telephone.

People required to perform specific functions in the event of a fire should be given the additional instruction and training needed for them to carry out their responsibilities, such as use of fire hoses and portable extinguishers or shutting down of equipment and machinery.

The nominated Fire Warden shall be responsible for setting the standard for maintaining training and exercising the plan; particularly the register of persons on site that so roll call can be made quickly and accurately. Training should include the following:

- What to do upon discovering a fire
- How to raise the alarm
- What to do upon hearing the alarm
- The procedures for alerting and directing contractors and visitors
- Arrangements for calling the fire and rescue service
- Reporting of incidents and near misses

All emergency procedures and precautions shall be updated regularly to suit onsite conditions.

Where security guard services are provided, the guard(s) shall be trained in the following:

- Notification procedures that include calling the Fire Department and management personnel
- Knowledge of fire protection equipment
- Familiarization with fire hazards
- Use of construction elevators

4.5. INCIDENT REPORTING

See SOP15 – Section 3, 4 and section 5.

5. GUIDELINES

5.1. INSTALLATIONS

5.1.1. TEMPORARY BUILDINGS & STRUCTURES

5.1.1.1. General

The CONTRACTOR shall ensure temporary buildings and structures onsite are located to comply with the following:

- Temporary buildings and structures should be located as close as possible to public roads or internal driveways
- Temporary buildings and structures shall be located at a distance no less than 4 meters to any common boundary unless provided with 1 hour fire rated walls and roof.
- Temporary building and structures used for storing combustible solids shall be located no less than 5 meters to other temporary buildings, structures or enclosures and buildings under construction
- Cooking facilities provided with less than 30 minute fire rated compartment (walls and floor) shall be located not less than 5 meters from other structures.
- Clear spaces located under temporary buildings and structures shall not be used for storage of any kind and shall be inspected regularly for the collection of unwanted waste and debris
- All electrical systems and connections to and within temporary buildings and structures, including the rating of cabling in accordance with its intended purpose shall be installed strictly in accordance with NFPA 70
- Emergency lighting systems shall be installed in accordance with NFPA 10 Chapter 7.9.
- Temporary buildings and structures which are used for storing or staging flammable liquids shall be provided with all electrical wiring, connections and components which are EX rated (explosion proof)

Unless practicably identifiable that a single emergency exit is sufficient, each temporary building or structure shall be provided with at least two (2) means of escape which are in accordance with QCD requirements.

Temporary buildings and structures shall be adequately ventilated.

Temporary buildings and structures shall be checked at the end of each day to ensure all equipment and appliances classified as a fire source are disconnected or switched off.

5.1.1.2. Non-Combustible Construction

Temporary buildings and structures used for occupancy such as office, dormitory or store constructed of shall incorporate the following precautions:

- Temporary buildings and structures with external escape corridors shall be no more than 3 storeys or 10 meters in height
- Temporary buildings and structures with internal corridors serving as a common path of travel for escape shall be no more than 2 storeys
- Staircases and external corridors shall be a minimum of 1 meters width
- Internal corridors shall be a minimum 1.5 meters width
- All staircases provided for emergency egress shall not be enclosed unless provided with 1 hour fire separation
- Manual fire alarm provided within 30 meters of every part of the building and at every exit
- Fire alarm sounders to provide a minimum of 60dB at every part of the building
- 2 portable extinguishers of 6kg next to every staircase at each floor having accommodation facilities
- 2 portable extinguishers of 1.5kg provided at each cooking area
- 1 fire blanket provided at each cooking area

5.1.1.2.1. Escape Distances

Travel distances from temporary buildings and structures constructed of non-combustible or steel materials where the escape route is via EXTERNAL CORRIDOR shall be as follows:

- One-way travel distance from most remote part of the floor to the foot of the escape staircase shall not exceed 20 meters
- Two-way travel distance from most remote part of the floor to the foot of the escape staircase shall not exceed 45 meters

Travel distances from temporary buildings and structures constructed of non-combustible or steel materials where the escape route is via INTERNAL CORRIDOR shall be as follows:

- One-way travel distance from most remote part of the floor to the foot of the escape staircase shall not exceed 15 meters
- Two-way travel distance from most remote part of the floor to the foot of the escape staircase shall not exceed 30 meters

5.1.1.3. Combustible Construction

For temporary buildings and structures constructed of combustible materials such as timber framing and composite panels, the following provisions shall apply:

- The length of any compartment shall not exceed 20 meters
- Non-combustible internal walls with fire rated elements no less 30 minute shall be used for compartmentation
- Minimum 30 minute fire rated doors provided for the internal corridors of each compartment

5.1.1.3.1. Escape Distances

Travel distances from temporary buildings and structures constructed of combustible materials where the escape route is via EXTERNAL CORRIDOR shall be as follows:

- One-way travel distance from most remote part of the floor to the foot of the escape staircase shall not exceed 15 meters
- Two-way travel distance from most remote part of the floor to the foot of the escape staircase shall not exceed 30 meters

Travel distances from temporary buildings and structures constructed of combustible materials where the escape route is via INTERNAL CORRIDOR shall be as follows:

- One-way travel distance from most remote part of the floor to the foot of the escape staircase shall not exceed 10 meters
- Two-way travel distance from most remote part of the floor to the foot of the escape staircase shall not exceed 20 meters

5.1.1.4. Dormitories / Sleeping Accommodations

Temporary buildings and structures used as dormitories or sleeping accommodation for workers shall not exceed:

- 3m² per person occupancy load
- 120m² area of sleeping accommodation
- More than 60 persons exit capacity per 1 meter width of staircase

5.1.2. TEMPORARY ENCLOSURES / COVERING MATERIALS

Temporary enclosures which include materials used to segregate areas, equipment and machinery shall comply with NFPA 241 Section 4.3.

Only non-combustible panels, flame-resistant tarpaulins, or approved materials of equivalent fire-retardant characteristics shall be used. Materials which are provided for this intended use from the manufacturer shall be UL Listed.

Scaffold sheeting shall be flame-retardant and UL Listed.

Where used to enclose structures, forming equipment, and similar items, the enclosing material shall be fastened securely or guarded by construction so it cannot be blown by the wind into heaters or other sources of ignition.

Temporary enclosures shall be provided with a minimum of one fire extinguisher suitable for all classes of fires that are expected inside the enclosure and be located so that the travel distance to an extinguisher does not exceed 15 meters.

Where internal combustion engines and associated equipment such as pumps, air compressors are provided in temporary enclosures, exhausts shall be the spark arresting type and discharge outside the enclosure at least 230mm away from combustible materials.

Temporary enclosures where the accumulation of combustible or flammable vapours is predicted or possible shall be provided with an adequate source of ventilation.

5.1.3. BUILDING UNDER CONSTRUCTION

The following performance based and prescriptive fire safety and protection systems shall be provided to buildings under construction and maintained throughout the construction programme.

5.1.3.1. Advancing Fire Protection

Where possible, the permanent fire services installations shall be installed and commissioned as the building construction progresses.

At a minimum, fire rated stairs and protected paths of travel shall be completed and in service.

Where permanent installations have been provided but are not in use, clear signage shall be provided clearly indicating so.

5.1.3.2. Compartmentation & Draftstops

Fire walls and exit stairways, where required for the completed building, shall be given construction priority for installation.

Fire doors with approved closing devices and hardware shall be installed as soon as is practicable and preferably before combustible materials are introduced.

Where fire doors have been installed with self closing devices in service, they shall not be obstructed from closing at all times.

Fire rated walls of at least 1 hour shall be provided to separate an occupied portion of the structure from a portion of the structure undergoing construction or alterations.

Opening protection of at least 45 minutes shall be provided to separate an occupied portion of the structure from a portion of the structure undergoing construction or alterations.

Non-rated walls and opening shall be permitted when an active automatic sprinkler system is provided to separate an occupied portion of the structure from a portion of the structure undergoing construction or alterations.

Where not adequately fire separated, stairs intended for temporary firefighting access and/or emergency egress shall be provided 'cut-off' sprinklers on the opposite side of the access door at each level which opens directly onto an unsprinklered space.

Temporary draftstops shall be provided around all vertical openings in excess of 3m², at each level with the exception of the uppermost unoccupied levels, where the possibility for smoke migration is possible. Draftstops shall be attached the underside of the slab within 200mm around the opening at a depth of 457mm.

Materials used for cladding and in other protected spaces must be of the approved type.

5.1.3.3. Means of Egress

Emergency egress shall be provided in accordance with NFPA 101 and based on path of unobstructed travel.

Travel distance shall not exceed the following:

- **Enclosed Structures**
 - Alternate Exits – 45 meters
 - Dead-end – 18 meters
- **Semi-open Structures**
 - Alternate Exits – 100 meters
 - Dead-end – 18 meters

Every building or structure shall be provided with exits sufficient to permit the prompt escape of occupants in case of fire or other emergency.

The design of exits and other safeguards shall be such that reliance for safety to life in case of fire or other emergency will not depend solely on any single safeguard

The building or structure shall be so constructed, arranged, equipped, maintained, and operated as to avoid undue danger to the lives and safety of its occupants from fire, smoke, fumes, or resulting panic during the period of time reasonably necessary for escape from the building or structure in case of fire or other emergency.

Each level above the first story in new multi-story buildings that require two exit stairways shall be provided with at least two usable exit stairways after the floor decking is installed. The stairways shall be continuous and discharge to grade level.

Stairways serving more than two floor levels shall be enclosed (with openings adequately protected) after exterior walls/windows are in place.

For new multi-story buildings, one of the required exit stairs may be obstructed on not more than two contiguous floor levels for the purposes of stairway construction (i.e., installation of gypsum board, painting, flooring, etc.).

Alternate exit routes shall be provided during each phase of construction and be identified on the construction drawings.

Adequate and unimpeded means of egress from all parts of the works shall be available and maintained at all times in case fire.

In all buildings over one storey in height, at least one stairway shall be provided that is in usable condition at all times and that meets the requirements of NFPA 101.

Stairwells provided for escape shall extend progressively upward as each floor is installed.

All exits shall be provided with stair identification signs to include the floor level, stair designation, and exit path direction as required for safe egress.

Emergency egress stairs shall be a minimum 30 minutes fire rated enclosure including doors.

Egress routes shall be a minimum of 1 meter wide with doors no less than 750mm.

Ramping shall be provided to all openings along the path of egress travel where the difference in floor level is 150mm or greater.

Emergency lighting shall be installed at a minimum in the following locations:

- Underground or windowless areas
- Stairs without natural light
- Internal corridors without borrowed light, which is sufficient length that the escape route would be unclear
- Where work is expected at night

Emergency lighting shall be provided in accordance with NFPA 101 with a self contained UL Listed and Approved or uninterrupted source of power supply in accordance with NFPA 70.

Emergency lighting shall be continuously inspected and maintained in good working condition.

Emergency lighting shall provide a minimum of 10.8 lux along the entire path of travel.

Emergency exit signage shall be provided in accordance with NFPA 101.

Signage shall be provided in all areas where the direction of travel to reach the nearest exit is not apparent.

Signage shall be installed so they can be clearly seen and less likely to be obscured by smoke in the event of a fire.

Exit, other than main exterior exits doors which are obvious and clearly identifiable as exits shall be marked accordingly.

Where possible, the egress path of travel shall be etched to the floor and clearly indicated with directional markings in a bold distinctive colour.

Where areas lead into 'dead end' routes or are not intended or recommended for emergency egress, signage shall be provided which clearly indicate 'NO EXIT'

5.1.3.4. Temporary Standpipes / Fire Hose Reels

Standpipes shall be made operational all levels, with the exception of the uppermost 3 storeys, as soon as the building under construction reaches 24 meters in height.

Temporary standpipe installations shall be maintained so that the hose valve is located not more than one floor level below the highest form, staging and similar combustibles at all times.

Standpipes shall be conspicuously marked and readily accessible FDC (Fire Department Connection) on the outside of the building at the street level and shall have at least one standard hose outlet at each intermediate landing level.

Standpipes shall be secured at each alternative floor level as the building construction progresses. Where standpipes pass through the floor slab, flexible couplings shall be provided within 300mm either side of the transition at each level.

Dry type standpipes shall be installed progressively for all buildings exceeding 8 storeys or 24 meters.

Wet type standpipes shall be installed progressively for all buildings exceeding 18 storeys or 60 meters.

Wet and dry standpipe stacks shall be labelled and numbered accordingly and provided with earthing and air pressure relief valves.

Standpipe piping shall be a minimum 100mm dia. steel.

There shall be a minimum of one landing valve per floor and with the total number of landing valves located to ensure that all parts of the works are within effective reach of 30m hose travel plus spray.

Landing valves shall be provided with blank caps and strapped and padlocked in the closed position.

Dry rising mains shall be pressure tested to 13.8 bar for at least 2 hours.

Flow rates for wet standpipes shall be as follows:

- Total flow rate from the topmost 3 landing valves is 27 L/s
- Static pressure at landing valve does not exceed 8 bar
- Residual pressure at landing valve between 3.5 and 5.5 bar

Fire Department Connections (FDC) shall be of the siamese type or quad boost type and housed in a protective enclosure or suitably located to prevent damage.

The position the FDC shall be on the street side of the construction site and be fully visible and recognisable from the street or point of Fire Department vehicle access.

The FDC inlet shall be located no further than 30m from the nearest fire feed hydrant and/or approved water supply.

The FDC shall be maintained so that it is free from obstructions and immediately available for the Fire Department.

Each FDC shall be provided with a listed check valve and signage indicating the floors that it serves.

The FDC shall be located so that when attached to the Fire Department pumping appliance, the suction hose does not obstruct Fire Department access

Fire hose reel systems shall be installed in accordance and conforming to the design criteria indicated in the BS EN 671-1.

Fire hose reels shall be located so that all areas can be reached with 30m of travel plus the indicated throw range.

Fire hose reels shall be provided with semi-rigid hose with a nominal bore of 19 mm or 25 mm in accordance with EN 694 with a length no greater than 30m.

Working, test and minimum burst pressure for hose reels shall be in accordance with Table 4.1 of QCS 2010.

5.1.3.5. Automatic Sprinkler Protection

Where storage or staging areas in buildings under construction exceed 10m² floor area, an automatic fire sprinkler system shall be installed and the following shall apply:

- Floor to underside of slab heights shall not exceed 9 meters
- Minimum 500mm clear space between the top of storage and the sprinkler shall be maintained
- Sprinkler spacing shall not exceed 12m²
- Sprinkler coverage shall extend 4.57 meters beyond all edges of the storage boundary
- Draftstops of 1 meter in depth shall be installed to the underside of the slab and located at a maximum of 500mm horizontal distance from the perimeter sprinklers. The draftstop shall be constructed of non-combustible or limited combustible materials which have a minimum fire resistive rating of at least 15 minutes.
- Duration for operation shall be 30 minutes minimum
- 189 L/min hose allowance shall be added to all sprinkler demands
- A water motor alarm shall be provided in the immediate area
- An FDC shall be provided

Provided that no plastic materials used, whether the goods itself or for covering, packing or filling, the following criteria shall apply:

- Class I commodities stored up to 3.7 meters and Class II commodities stored up to 2.4 meters high
 - Ordinary Hazard Group 1 – 6.1mm/min/m² over 139m² or the entire area
- Class II commodities stored up to 3.6 meters high
 - Ordinary Hazard Group 2 – 8.1mm/min/m² over 139m² or the entire area

The listing for commodity classification can be found in Appendix A, Table A.5.6.3 of the NFPA 13 - 2013

The interior of combustible trash chutes shall be provided with not less than one temporary automatic sprinkler within a recess near the top complete with a sprinkler guard.

The temporary sprinkler in trash chutes shall be connected to any available water supply with a UL Listed fire hose or a flexible, commercial rubber hose with a diameter of not less than 19mm and a UL Listed flexible connector.

An alarm valve assembly or signalling device for temporary installations shall not be required for systems with less than 20 automatic sprinklers.

Sprinklers where required for protection of emergency egress stair openings shall be designed to discharge a minimum of 49 L/pm @ .5 bar.

5.1.3.6. Fire Alarm (Detection)

A suitable means of audible alarm indication shall be provided at all times during construction.

The alarm indication system must be clear, distinctive, audible above other noise and recognisable as an emergency situation.

The method chosen must reflect the need and prevent false alarms; 'word of mouth' in some smaller quiet areas; hand operated bells or 'ringers' in larger open spaces; self-contained units for larger areas; electrical alarms meeting full operating standard requirements on the larger sites with progressive introduction of the installed systems as buildings expand and grow.

Visual and radio systems shall be implemented in areas where noise or personal protective safety equipment interferes with hearing or sight.

Where provided or required, all electrically operated fire alarm devices shall be installed in accordance with NFPA 72.

Automatic fire and smoke detection should be provided to enclosed levels of the building.

Manual call points shall be provided so that the travel distance to any alarm point does not exceed 30 meters.

Manual call points shall be provided at every storey exit and adjacent to every fire hose reel.

All electric fire alarm bells and sounders shall be accompanied by a visual alarm beacon.

There shall be a readily available public fire alarm box located at the site command post with telephone services to the responding Fire Department or equivalent facilities.

5.1.4. FIRE DEPARTMENT ACCESS

A suitable location at the site shall be designated as a command post and provided with plans, emergency information, keys, communications and equipment as needed.

Where access to or within an area is unduly difficult because of secured openings or where immediate access is necessary for life-saving or fire fighting purposes, a key box (knock box) shall be provided for Fire Department access.

Every building on the construction site shall be accessible by the Fire Department apparatus by means of roadways having all weather driving surface of not less than 6.1 meters of unobstructed width with the ability to withstand the live loads of fire apparatus and a minimum of 4.1 clear vertical clearances maintained throughout.

Adequate vehicle access for fire fighting to construction sites shall be maintained at all times until permanent fire apparatus access roads are available.

The access road shall extend to within 46 meters of all portions of the exterior walls of the first storey of any building.

Common driveways between and around combustible storage piles shall maintain at least 4.5 meters wide and are to be kept clear of waste material or rubbish

The FDC and Fire Hydrant serving the construction site shall be free and clear from obstruction and damage and readily available to the fire department.

Where required, Fire Department access shall be provided to within 30m of temporary or permanent water supply (Fire Hydrant or Suction Connection).

For Fire Department response, appliance connections shall be provided at a distance no less than 12m to a building under construction.

Fire Department access shall be located so that the distance between the temporary or permanent water supply is located at a distance no greater than 30m from any Fire Department Connection.

Passenger hoists for Fire Department access requirements shall be provided for all buildings exceeding 8 storeys or 24 meters.

5.1.5. WATER SUPPLIES / HYDRANTS / PUMPS

An approved water supply for fire protection either temporary or permanent shall be provided as soon as combustible material arrives on the site.

Where provided, temporary fire water tanks shall be of a non-corrosive material with an "effective", capacity which can sustain simultaneous operation of automatic and non-automatic demands and durations.

For wet standpipes progressively installed in buildings exceeding 18 storeys or 60 meters, a break tank shall be provided with a minimum capacity of 11,500 litres.

All temporary fire services connections to city utilities shall be safeguarded from cross contamination.

One of the 65mm hose connections provided at the street hydrant may be used as an approved temporary fire services water supply provided fire services demands can be met.

Water supplies shall have adequate capacity for the fire services installed which is to include the hose allowance where the standpipe or hydrant connection is combined with sprinklers.

The use of a single 'Temporary' fire pump shall be allowed during construction and shall be of the diesel type and be automatically controlled by pressure switches.

Fire pump(s) shall be shaded from direct sunlight.

Free access from the street to fire hydrants and to outside connections for standpipes, sprinklers or other fire extinguishing equipment, whether temporary or permanent, shall be provided and maintained at all times.

Pedestrian walkways shall not be constructed so that they impede access to hydrants.

Hydrant connections shall conform to NFPA 24 and be of the male instantaneous type.

5.1.6. MATERIALS STAGING & STORAGE

For the purpose of this section, the definition of storage refers to all materials which are located for retrieval as needed or where materials are staged temporarily while in use.

Storage shall be arranged in such a manner that it does not interfere with the following:

- Adequate distribution of natural light
- The proper operation of any machinery or other equipment
- The unobstructed use of passageways or traffic lanes
- The efficient functioning of automatic sprinkler systems or other fire-fighting equipment

5.1.6.1. Combustible Solids Storage

The storage of plastics and rubber materials within the confines of buildings under construction shall be submitted to LDRC for review and approval prior to arrival onsite.

Where storage within a building under construction exceeds 10m² floor area, supplementary automatic fire sprinkler protection in accordance with Section 4.5 shall be installed to the storage area.

Storage loads shall not exceed foundation tolerances and shall be arranged in a manner which prevents collapse.

Where possible, plastics should not be stored on site. This particularly applies to protective wraps and pallets for shipping. The presence of plastic materials will greatly affect the prescriptive fire protection required.

Open yard arrangement of combustible solid storage shall not exceed 4.8 meters in height.

Open yard combustible solid storage and staging of equipment which has been identified as a fire source shall not be located closer than 9 meters to buildings under construction.

Where combustible solids are stored for extended periods of time, composite breakdown of materials shall be considered and separation distances applied appropriately.

Combustible storage shall not be located within 3 meters horizontal distance below vertical openings in building under construction.

5.1.6.2. Compressed Gas Storage

All compressed gas cylinders shall be stored in an upright position.

All stored cylinders shall be secured by a chain to ensure that they will not be accidentally knocked over.

All storage locations shall be adequately ventilated to where ambient room storage temperatures do not exceed 52°C (125°F).

When rigs are not in use, turn off valves, and bleed down and disconnect hoses, remove regulators, and place safety caps on bottles.

All cylinder storage locations shall be distinctly marked with the names of each compressed gas maintained at the location. Post "NO SMOKING — FLAMMABLE GAS" signs at all entrances to locations where flammable gases are to be stored.

Each compressed gas cylinder maintained at a storage location shall be labelled with proper identification of its contents.

All cylinders in storage shall be provided with valve protection caps at all times except when the cylinder contents which are being dispensed.

Storage locations for oxidizing gas (i.e., oxygen) and flammable gas (e.g., acetylene) cylinders shall maintain a minimum distance of 6.1 m to separate the oxidizing and flammable gas cylinders.

Cylinder storage areas which contain flammable gases shall be segregated to avoid contact with a possible ignition source. Where separation distances cannot be achieved, walls of the storage area must have a fire rating resistance of at least 1 hour, and doors must be in accordance with NFPA 80.

5.1.6.3. Flammable and Combustible Liquids Storage

Fuel for internal combustion engines shall not be stored or staged within structures under construction, alteration or demolition.

Containers intended for gasoline and other flammable liquids to be stored in or dispersed from shall be UL Listed for such use.

Storage of flammable or combustible liquids shall not be sited in areas used for exits, stairways, or normally used for the safe passage of people.

Bulk storage and dispensing stations for flammable liquids in excess of 55 gallons shall be provided with imperforate bunding which is drained to a self-contained UL Listed receptacle.

Storage of flammable and combustible liquids outdoors, containers (no more than 60 gallons each) cannot exceed 1,100 gallons in any one pile or area. Separate piles or groups of containers by a 2.0 m clearance and a distance of 15 meters from any building or structure shall be maintained.

Adequate ventilation shall be provided in storage areas where potential exists for accumulation of combustible or flammable vapours.

Flammable and combustible liquids in excess of 25 gallons shall be stored in a UL Listed and Approved cabinet in accordance with NFPA requirements.

Storage areas for flammable and combustible liquids should be graded to divert possible spills away from buildings or other exposures. When provided with culverts or bunds, make provisions to drain off accumulations of groundwater or rainwater, or spills of flammable or combustible liquids.

5.1.7. PROCESS HAZARD PROTECTION

All permit requirements for hazardous activities shall comply with Section 10.3 of the Lusail HSE - General Requirements. The permit to work order or copy thereof shall be retained by the operative while completing works.

Applications for permits to work shall include the location and nature of works, proposed time and duration of work and the person in direct control of the work.

Prior to the commencement of process hazards, the surrounding area shall be cleared of all loose combustible materials.

Where combustible materials in close proximity to hazardous processes cannot be removed, flame-retardant covering or equally adequate fire protection shall be provided to the combustibles during works.

Gas-operated cutting and welding equipment using multiple oxygen and fuel gas cylinders shall be in accordance with NFPA 51.

When hot works are carried out, a dedicated fire watch shall be assigned for the duration of proposed works and continual inspection for 2 hours thereafter.

LPG and gas fuelled equipment including propane burners shall be fitted with a UL Listed venturi type flashback arrestor which is located as close as possible to the flame

Adequate ventilation shall be provided in work areas where potential exists for accumulation of combustible or flammable vapours.

Affected employees must not work so close to an electric circuit that they could contact the circuit in the course of their work, unless protected by de-energizing and using a Lock-Out Tag-Out system.

Smoking areas shall be restricted to authorized locations only. Smoking shall not be permitted inside structures, office buildings or tunnels, or within 15 meters of combustible or flammable materials storage areas.

Smoking areas shall be provided with a minimum of 1 portable extinguisher

5.1.8. EQUIPMENT PROTECTION

Internal combustion engines and associated equipment shall be shut down and allowed to cool sufficiently prior to refuelling

Service areas for equipment shall not be located within structures under construction, alteration, or demolition

All equipment control panels which are likely for exposure shall be provided with a minimum rating of IP55 enclosure

Unless otherwise specified, all MEDIUM VOLTAGE equipment, materials (fire pump control panels) and wiring shall be suitable for use with a 3 phase + Neutral, 4 wire, 415 V, 50 Hz supply of adequate capacity and having the following tolerances:

- voltage $\pm 6\%$
- frequency ± 0.1 Hz (short term ± 0.15 Hz for a duration of only a few seconds)

Unless otherwise specified, all NORMAL VOLTAGE apparatus, equipment, materials and wiring shall be suitable for use with a single-phase, 220-240V $\pm 6\%$, 50 Hz. $\pm 4\%$.

Electrical equipment within a flammable storage shall be in accordance with NFPA 70.

High voltage distribution locations shall be safeguarded from damage and immediate areas surrounding are free from water collection

Temporary sprinkler and hydrant control valves shall be operated only by properly trained personnel.

Preventative measures shall be maintained to ensure that all fire services valves and associated equipment is safeguarded from damage at all times.

All supports for fire protections services shall be in accordance with the relevant NFPA.

Drainage systems shall be properly designed and installed to remove water from sprinkler and fire hose streams.

Wherever self-propelled equipment is used underground, a fire suppression systems or a fire extinguisher rated at least 4-A:40-B:C shall be provided on that equipment.

5.1.9. PORTABLE EXTINGUISHERS

The suitability, distribution and maintenance of fire extinguishers shall be in accordance with NFPA 10 unless otherwise required by QCD.

For open yard protection, portable fire extinguishers shall be sited so that the travel distance to the nearest extinguisher does not exceed 30 meters.

At least 1 portable fire extinguishers consisting of carbon dioxide and/or dry chemical type shall be provided at cylinder storage locations and sited so that the travel distance to the nearest extinguisher does not exceed 23 meters.

At least one portable fire extinguisher (with a rating of no less than 20-B units) shall be provided between 7.6 meters and 22.9 meters from any flammable/combustible liquid storage area located outdoors.

For buildings under construction, 1 portable fire extinguisher of 6kg minimum shall be provided for every 500m² of floor area or maximum travel distance to the nearest extinguisher does not exceed 23 meters.

At least one approved fire extinguisher shall be provided in plain sight on each floor at each usable stairway as soon as combustible materials accumulate.

5.1.10. LIGHTING & POWER SUPPLIES

Temporary wiring for electrical power and lighting installations used in connection with the construction shall comply with NFPA 70.

A project-specific assured grounding plan shall be provided in accordance with Qatari Law. The assured grounding plan shall cover all cord sets, receptacles that are not part of the building or structure, and equipment connected by cord and plug that are available for employee use.

All electrical installations shall have sufficient capacity for the intended use and designed, installed, inspected and maintained by competent personnel.

No person may install or maintain electrical equipment unless that person has been approved by the Responsible Appointment. Such personnel shall administer or strictly monitor the following functions/duties:

- Operate any circuit switching device of 480 V or greater, except motor starters and valve operators from pushbutton stations
- Test or troubleshoot electrical equipment
- Repair or alter electrical equipment
- Remove or install fuses
- Perform work on non-insulated energized circuits and apparatus over fifty (50) V.
- Without prior consideration, work within 3 meters of non-insulated energized circuits and apparatus that are not barricaded, covered, or otherwise guarded to prevent electrical shock hazards and contact by tools, equipment, or personnel shall not commence.

Cabling with a voltage at and above 100mA shall be secured and protected to all persons inherent to risk.

Flexible electrical cables shall be UL Listed and Approved and suitable for the method and location where they are used. Flexible cabling shall be used only for the following equipment or purpose:

- Wiring of temporary equipment and appliances
- Wiring for temporary fixtures
- Appliances that have been designed to permit removal for maintenance and repair if the appliance is equipped with an attachment plug energized from a UL Approved outlet and not designated for permanent installation.

Connections to portable lamps or appliances shall be provided with a UL Listed and Approved outlet and attachment plug

Connections to stationary equipment that is frequently charged with an attachment plug energized shall be UL Listed and Approved.

Flexible electrical connections shall not be used in the following ways:

- As a substitute for fixed wiring within a structure
- To run through holes in walls, ceilings, floors or similar openings which are to be otherwise to be fire stopped.

If an electrical circuit breaker trips, that breaker shall not be reinstated until a qualified electrician has investigated the tripping of the breaker.

All electrical housing components shall be periodically checked to ensure that covers and screws are securely fastened.

All electrical installations shall be periodically checked to ensure that they are safe and free from any damage or deterioration.

All electrical installations shall be thoroughly inspected prior to any additions or modifications to ensure the existing cabling and connections are safe and free from any damage or deterioration.

Socket splitting shall not be permitted. Routine inspections of electrical distribution panels shall ensure that sockets are not overloaded and plug-ins secure.

Intentional defeating of safety devices such as fuses or circuit breakers is strictly forbidden. Routine inspections of electrical connections and equipment shall ensure that safeguard components are installed and maintained.

Electrical installations shall be provided with detailed wiring schematics and manufacturer data sheets which can be retrieved at the request of LREDC.

5.1.11. ARSON & VANDALISM PROTECTION

Open fires shall be prohibited on the construction site

Control valves associated with the fire services water supply shall be tamper resistant, provided with a strap and padlock and remain in the active position.

The construction site shall be adequately secured from intrusion, including but not limited to children and young adults.

Where possible, perimeter fencing shall be sited as close as possible to the plot boundary enclosing the entire construction site.

Where appropriate, CCTV, lighting and security guards shall be provided.

Areas which have been determined as high risk such as flammable storage shall be separately secured inside the site with restricted access controls.

The perimeter and security fencing shall be inspected regularly for gaps or damage resulting in decreased integrity.

5.1.12. WASTE MANAGEMENT

Materials susceptible to spontaneous combustion, such as oily rags, shall be stored in a UL Listed disposal container.

Accumulations of combustible waste material, dust, and debris shall be removed from buildings under construction and its immediate vicinity at the end of each work shift.

All debris, rubbish and waste materials which are to be staged temporarily shall be located at a safe distance from the structure and are properly scheduled for removal to prevent build-up.

All combustible debris, rubbish and waste material shall be disposed of properly.

Skips and waste containment shall not be located under canopies or overhanging eaves

Where skips are located within 3 meters to a structure, the structure shall have a fire resistive barrier which is high enough to prevent fire from reaching other flammable parts of the structure.

The construction site shall be regularly maintained for cleanliness and rubbish collection consistent as required.

Trash chutes provided to the exterior of a building shall be constructed of non-combustible materials, or protected by automatic sprinkler protection.