PHSEP

PROJECT HEALTH SAFETY & ENVIRONMENTAL PLAN

FOR

MAL PAKISTAN LIMITED

Project: Construction of Head Office Building at Korangi Creek Industrial Parks Karachi

FROM

PARADIGM ENGINEERING

INDEX

HSE POLICY

Paradigm Engineering Health, Safety and Environment policy and practices centers on a zero-harm philosophy towards people, host communities and environment. We consistently enforce a standard approach to HSE and don't compromise its standards of conduct when operating on ground.

HEALTH

Health related employment benefits are part of our recruitment policy. In addition to that provision of all the required first-aid facilities at the execution site is a must. Hygienic workplace and labors accommodation not only provide a better living conditions but also contribute to the Environment in a better way and we focus on these factors. To maintain it regular inspection of site and labor camps is mandatory to assess any unhygienic conditions and do the needful in preventing it. Insecticide sprays and availability of emergency vehicle to provide access to the relief centers in case of emergency is being implemented on our projects.

SAFETY

Safety First, This is our prime objective in delivering the project. At PARADIGM, we have developed a culture that promotes an injury-free environment and provides the safest workplace possible for our employees, subcontractors, clients and others who enter or who near our construction sites. Our catchword is: "Every worker goes home from each of our jobs, every day."

Our Client's expects a safe workplace and we make sure to implement all the safe practices at site to ensure zero injuries/accidents at our projects. Use of PPE's on all sites is mandatory and safety induction training of every new employee is being done. For every individual project a project safety plan is prepared depending on the site conditions and Client's requirement.

ENVIRONMENT

Paradigm Engineering is committed to maintaining a clean environment and as a consequence believes this will create the ability to operate in a disciplined and sustainable manner over the long term which is fundamental in maintaining a competitive advantage and honoring the deliverables of corporate governance. We are fully aware of Green Movement and try our best to actively participates in the preserving the environment. We are committed to a strong set of environmental principles and it is our policy to minimize the impact that may be associated with any of our activities in the project.

2. SCOPE

The present plan contains accident prevention measures and safety program to be followed and implemented by PARADIGM ENGINEERING Group employees and its subcontractor's active in the above said Project.

The prior objective of this action plan is to prevent any material or body damage to the Client's or Contractor's employees or property. Any subcontractor, who enters a binding contractual relationship with PARADIGM ENGINEERING, agrees to adhere to the rules indicated within the action plan, in addition to those stated on the laws and legislations of the host country in effect.

3. ORGANIZATION

This section defines the organizational arrangements required to seamlessly execute the HSE action plan.

Any and all employees of PARADIGM ENGINEERING, shall have direct contribution and responsibility on the execution of the company HSE plan, in accordance with their hierarchic level in the organization chart. The essence of the PARADIGM ENGINEERING HSE policy is to set and uphold HSE applications and procedures as a matter of total commitment, and never allow them to be interpreted or perceived as certain bureaucratic paperwork to be followed up by the HSE Manager only.

The project specific HSE plan shall be announced and taken into effect in a meeting with the attendance of all (direct/ indirect) project staff and labor. PARADIGM ENGINEERING project management shall set up a safety committee to enhance, execute and follow up occupational safety and environmental matters.
Safety Committee shall include the assigned members of the project management team, and representatives from labor, subcontracting firms and other individuals as deemed appropriate. It shall be responsible of:

- Executing the project specific HSE Action Plan.
- Direct and coordinate safety actions.
- Manage the communication of safety rules and norms and any modifications/ alterations thereto.
- Carry out risk assessments ahead of actual work execution and take appropriate measures.
- Investigate safety incidents (if any), analyze root causes, provide feedback to preclude reoccurrence

Under the Safety Committee the members of the project management team shall have the following specific responsibilities:

Project Management:

- Draw up and enforce the environmental, safety plan, including all aspects of welfare, well-being and security.
- Assess potential hazards present and the risks involved throughout, in an ongoing attempt to educate those involved and thus reduce potential risks to the minimum.
- Create an HSE File on all activities and the measures taken to reduce risk, which will be passed onto the Client upon completion of all the project works, so as to aid and foster HSE during subsequent development, modification or demolition.
- Have in place the organization to plan and coordinate the work in a manner that is without risk to the Health and Safety of personnel or the environment.
- Plan the work in a manner that allocates sufficient time and resources to enable the work to be carried safely and efficiently.
- Control all subcontractors to ensure that they are aware and will comply with the HSE plan and CLIENT's procedures.
- Update the HSE plan as required.
- Update the HSE Construction Risk Assessment as required. Establish effective communications throughout the project between all parties.
- Provide adequate security arrangements to augment Client provided security and provide security control in the contractor controlled area.

Project Manager

The Project Manager's duties shall include:

- To ensure or allocate sufficient resources for the management of the HSE plan.
- To contribute as necessary to the plan.
- To agree and approve the HSE plan.
- The development of this plan and associated documentation ensuring that these are updated or modified to suit changes in conditions.
- Ensure that measures are in place to control security on site.
- Ensure that effective communications are in place that advises all parties of risks, concerns, activities etc. as they are identified.
- Ensure that arrangements for the coordination of all parties to prevent interface risks are in place.
- Ensure an HS trainer & sufficient # of HS inspectors for ongoing activities.

HSE plan, as pertinent to this HSE plan, in terms of risk assessment, work method statements, organization, environmental considerations, constructability etc. will be prepared by contractor and

after getting the comments of the client, if there is any ; necessary requirements will be ensured by the contractor.

HSE Manager

- To be familiar with all local, national, and international laws that are applicable to operations.
- To prioritize and produce a strategy for implementing the various elements of the plan and to ensure that it is being communicated effectively throughout the Project Organization and Subcontracting Companies, updating it as required.
- To report to the PARADIGM ENGINEERING Sr. Management on implementation progress, points of concern and any topical points of issue, on a regular basis.
- To establish and maintain a professional relationship with Client and subcontractor representatives.
- To provide direction as necessary to attain HSE management standards and goals required by the project HSE plan.
- To establish a system of audits that measures the effectiveness of the HSE plan and ensures that the requirements are being effectively communicated throughout the workforce.
- To ensure that sufficient training and induction of all personnel is being provided and maintained.
- Visit induction has to be given to all visitors before they are allowed to visit the site.
- To develop the HSE awareness of all personnel employed on the project, via the Safe Worker Observation program, and ensures their participation in all aspects of the health and HSE plan.

Subcontractor(s) Management

- To support and administer the practical implementation of the HSE plan, as appropriate to their scope of work, specifically:
- To liaise with PARADIGM ENGINEERING project management team in ensuring that:

  1. All of their personnel are fully competent for the work tasks and job functions to be undertaken.

  2. Adequate arrangements are in place for their own personnel including sufficient tools, changing facilities, administration support etc.

  3. Joint reviews are carried out for aspects of the work such as operations that may have an impact on construction HSE, or complex tasks that require risk assessments and detailed work method statements.

  4. To effectively coordinate their activities, to eliminate interface problems as far as possible. 5. That the content of this plan is communicated to any subcontractors prior to contract award and that commitments to its objectives are a contractual obligation. 6. Sufficient information is given to the PARADIGM ENGINEERING HSE Manager to enable the HSE plan to be updated and for keeping all personnel informed.

Site Safety Engineers and Supervisors

- To support the HSE Manager in the practical implementation of the HSE Safety Plan and supporting documents
- Provide support to field supervision, provide technical guidance ensuring industry best practices are adhered to on site as a minimum requirements
- Perform periodic inspections, audits in accordance to the project HSE schedule
- Actively participate the project Training and People Based Safety program
- Attend HSE meetings, with client, supervisors and workers as necessary
- Ensure risk assessments, method statements, JSA and STA are performed periodically throughout the project
- Enhance and participate in HSE communication campaigns.
- Assist in the development of trends, review of incident investigation s and project specific HSE reviews such as HAZIDS and SIMOPS.

Supervisors

- Set an exemplary example to others in terms of their commitment to HSE.
- Implement Job Hazard Analyses/STARRT Program.
- Deliver Tool Box Talks to workforce- before beginning of any kind of work.
- Monitor work and ensure compliance with all HSE requirements and procedures.
- Attend Supervisors/Foreman.
- Participate in the PBS program, HSE campaigns.
- Conduct ongoing HSE assessments of work areas and take corrective actions to eliminate sub-standard practices, conditions or behaviors.
- Continually coach employees in safe practices.
- Assist in accident / incident investigations.
- Assist in implementation of the Emergency Response Plan.

Employee / All Personnel

- The product of the persons work and that of any persons under his supervision shall itself be acceptably safe.
- Anyone who becomes aware of an unsafe situation or action – even if they are not directly involved – shall notify their line manager or the HSE Manager at the earliest opportunity and STOP THE JOB.

PRINCIPAL SAFETY RULES

All persons accessing the Paradigm project site shall embrace and abide by the mandatory Principal Safety Rules adopted by Paradigm. Failure to comply will result in disciplinary action, up to and including removal from the site and disqualification from future work with Paradigm for violating employees.

	Only accept and undertake work for which you are trained and competent.
	Do not walk or work under a suspended load.
	Do not smoke outside of designated smoking areas.
	Do not work or drive under the influence of drugs or alcohol.
	Work with a valid Work Permit. (I.E. Task Safety Analysis with Hot Work, Confined Space, Crane Lifting, Excavation, Lockout/Tagout, or Energized Electrical Work Permit as required)
	Do not use your mobile device while performing work, driving (on site or on roadways), or walking in construction areas.
	Obtain written authorization before overriding, removing, or disabling safety critical equipment or devices.
	Violence in any form is prohibited on all sites.
	Verify the isolation, de-energization, and lockout and tagging when required of all energy sources before work begins on any equipment or system and use the specified life protecting equipment for the task.
	Report all hazards, near misses, and incidents immediately.

4. INCIDENT AND ACCIDENT INVESTIGATION, REPORTING AND RECORD KEEPING
Definitions:

Accident Reporting' includes reporting, full investigation and statistical analysis
'Medical Representative" will be either a Paramedic and/or nurses if sufficient calibre and experience.

All reportable incidents shall be investigated to establish why they occurred and if there is a root cause that needs to be addressed to prevent a repetition.

The HSE Manager and Project Manager shall:

- Establish an accident/incident reporting system, appropriate to the project and client requirements.
- Print the necessary forms, distribute them, and train the medical representatives and subcontractors in completing the form.
- Incidents in the context of this plan may include injuries, environmental violations and incidents e.g. property damage, explosions, crane failure, spillages etc.
- Ensure that all injury, damage, near misses and accidents are investigated and root causes are determined, and that subcontractors site supervision are involved in such investigation.
- Examine accident reports, perform statistical analyses and publicise the results as necessary.
- Prepare monthly HSE progress report that reflects the overall HSE performance, and ensure that all participating companies are kept informed.
- Report fatalities and incidents which causes to any damage to human health; in other words, all type of injuries immediately to the Client Representative and Government entity (as required).

Medical Department Representatives shall:

- Inform the Project HSE Manager immediately after treating any injured person.
- Maintain a physical log of all injuries and treatment given.

All Supervision shall:

- Participate in the investigation of any accident and support the recommendations that are made.

Learning from experience

A vital part of HSE practice is to learn from experience, using it as a basis to improve the system. To this effect, record keeping provides a measure of how effective the programme is and facilitates identification of areas where improvement will be beneficial. Feedback, both positive and negative needs to be given to project personnel to make them aware of the effectiveness of the programme and, if necessary, raise the level of awareness of particular concerns.

Record Keeping

Records need to be kept of near misses, hazardous observations, first aid, and injury and lost time accidents per accumulative hours on site. These are to be reported on a monthly basis

5. SAFETY TRAINING, AWARENESS, MOTIVATION AND PENALIZATION

Safety Ownership

A total safety culture cannot exist without a work environment that supports ownership. The expectations of each employee and the role that the individual plays in achieving health, safety and environmental excellence is to be communicated to all employees and is a vital part of the HSE programme.

In addition prior to an individual being allowed to work it is essential that they are trained and educated on the project's needs. During the duration of the contract this will be both assessed and audited on a regular basis and where found or identified corrective measures will be put into place.

It is therefore proposed that a comprehensive induction and training program is established that prepares the employees for working on PARADIGM ENGINEERING Job-site with its stringent HSE requirements and need for world class performance.

HSE Awareness of Project Personnel at Office or Other Locations

At each of Project sites, the Project Management shall have the responsibility of ensuring that the following are in place as a minimum:

- Fire precautions and appropriate extinguishers.
- Persons designated as Fire Marshalls have hands-on training in use of extinguishers.
- Regular fire drills and designated muster areas.
- First Aid provision and arrangements for competent persons to administer.
- Emergency and routine hospitalization facilities.
- Adequate Insurance cover for all reasonably foreseeable risks, this shall as a minimum meet any local requirements.
- Security provisions to allow secure working environments.
- Environmental incident response precautions and equipment.
- Project HSE policy, goals and targets.
- Incident Reporting & Investigation (including near misses and hazardous observations).
- Key Personnel and their contact details.

Competence and Training

A key element in ensuring competency will be the assessment of experienced personnel supplemented by extensive and ongoing training. The project policy is that all personnel associated with the project, at all locations, undergo a mandatory induction, to ensure they are aware of the aims and requirements of the project and the plan for HSE Execution. Emphasis shall be placed on the Incident and Injury Free Philosophy from the outset of the project. Records shall be kept of the names of people receiving HSE training and these records shall be stored on a computerized log.

The training program will be tailored to meet the requirements established from a training needs and competency assessment.

A preliminary training matrix for the project shall be prepared for the project's specific needs. This indicates the type and extent of training courses being planned for each category of worker. It includes senior personnel thorough to site operatives and visitors. Specific groups of personnel who perform safety critical activities, e.g. Crane drivers and operators, truck and bus drivers, fire team members, electricians, scaffolders and medics/first aiders will receive detailed and targeted training to ensure a high level of competence and safety awareness.

Employee Project Safety, Health & Welfare Orientation

All personnel who are to work on the Project shall receive orientation and induction training before starting work.

In addition to task/job specific training, which will be provided for personnel where necessary, every HSE Manager shall ensure that everyone for whom they are responsible shall receive information on the following as appropriate for their duties and location.

Records shall be kept of the names of people receiving HSE orientation and these records shall be stored on a computerized log. Details of HSE Welfare Orientation Training given shall be reported in monthly HSE reports.

PARADIGM ENGINEERING operates the following minimum Orientation Requirements:

- Employer and employee HSE responsibilities
- HSE Philosophy, Goals and Objectives
- Education and training programme
- Fire Prevention and Fire Fighting Arrangements
- HSE Audits and Inspections
- Environmental considerations

- Incident response and reporting, hazardous condition and near-miss reporting

Similarly PARADIGM ENGINEERING sets the following minimum Orientation Requirements for Site Locations.

These shall include the requirements for offices listed above, plus:

- Personal protective equipment
- Incident Investigation and Root Cause Analysis
- Safety incentive programme
- Site Health and Welfare Arrangements
- Mandatory Site Safety, Traffic and Security Regulations
- Construction safety
- Specific HSE training as required, e.g. welding safety, rigging, safe operation and maintenance of specific equipment, fire suppression training

PENALIZATION/ AWARDING

Paradigm Engineering utilizes the three step warning system in its projects, a method which measures the general compliance of employees with the HSE codex, and also spots extreme carelessness or methodical disregard for safety matters. With this system, a company employee who is spotted in a breach of the safety rules is warned orally by its supervisor or reporting line manager. In the second breach a written warning is issued, this time accompanied by a monetary penalty deemed appropriate for that very project and breach. Any oral or written warning is kept under the project safety log by HSE staff.

In case of an unlikely third breach the employment contract of the employee is terminated due to constant safety breaches and increased risk of material/ personal loss incident.

As opposed to the penalties, certain awards are presented to the individuals or teams, scoring the highest HSE audit points in a month. Such awards work as performance increasing motivations, leading to higher HSE awareness, increased rates of compliance and positive safety perception amongst employees.

6. GENERAL SITE RULES

- All employees should be in fit condition suitable to perform their site duties, with no sight or hearing problems, arm or leg adverse conditions, circulation complaints or symptoms of nausea, extreme high or low heart rates.
- Project management shall ensure allocation of suitable vehicles for emergency evacuation at all times of work execution.

- Hand tools, machinery and equipments shall be properly labeled indicating their suitability for use or need for repair. No tool or equipment without the proper color code tags shall be allowed to the job site and any tool or equipment that shows indications of improper operations, presenting safety risks or malfunctioning shall be collected from the job site for evaluation and repair.
- Drug/ Alcohol Abuse: Paradigm Engineering maintains a zero tolerance policy for drug and alcohol abuse. Any employees proven to be under the influence shall immediately be evacuated from the site. Subject employee access shall not be granted until a medical evaluation report. Such employees shall be issued a warning and their condition might be constantly monitored if such abuse is believed to be continuous. Under the PARADIGM ENGINEERING three step warning procedure, abusive employee contracts could be terminated.
- Smoking shall only be permitted in the designated smoking areas, approved by the Client. In such areas, adequate firefighting measures (sand/water/extinguisher or a combination of these) shall be available at all times.
- Warning Signage: In main access points, gathering points and other spot where necessary, HSE signage deemed shall be placed, with specific HSE measures to be taken when entering and working in such zone. Paradigm Engineering employees are bound to comply as indicated on the signage. Such signage, barrier tape, chain link fence, label etc could not be altered or removed without authorization to do so by HSE staff.

7. PERSONAL PROTECTIVE EQUIPMENT (PPE)

Paradigm Engineering is responsible for the provision and use of PPE on site and other appropriate locations for his own personnel and for reasonable numbers of occasional visitors. sub-contractor has a similar responsibility for his own personnel and visitors. Safety gear will be required in accordance with international standards. Project management and Sub-Contractors' management shall: -

- Ensure that all requirements and policies relating to the provision and use of P.P.E is strictly adhered to and that they fully follow the basic Project PPE Assessment. The following minimum requirements will be adhered to: -
- Hard hats, Safety boots and coveralls o Safety harnesses and lifelines will be used for working at elevations in excess of 1.5 meters or where a fall of this distance is possible.
- Personnel will be educated on the mandatory use and care of respiratory protection for required activities.
- Hearing protection will be worn when exposure to noise levels greater than 85 dBA occurs.
- Chemical suits, gloves, face protection, etc. shall be worn for any activity requiring protection from corrosives, drilling fluids, and any other potentially hazardous materials.
- Eye protection shall be worn for any activity that presents risk from flying particles, welding process, fumes etc.
- Cold weather and thermal clothing will be issued that are adequate for the extreme conditions encountered in the area.

Project Management shall:

- Agree with the Project HSE Manager and others as necessary on disciplinary actions relating to P.P.E. use.
- Ensure the Project's P.P.E. needs are adequately funded, resourced and supplied throughout.

8. HAZARDOUS MATERIALS

The HSE Manager shall ensure that for all hazardous materials used by the PARADIGM ENGINEERING, Construction Subcontractors, or others:

Prior approval for use is obtained from himself with regard to the application of such material.

Information on the hazards of the materials is obtained from the manufacturer or supplier and communicated to the users. Employees shall be trained in the safe use of the materials, including personal protective equipment and emergency procedures.

Written procedures exist for their use and disposal.

An inventory is kept and made available on demand. Typically the following should be inventoried.

- Paints, thinners and solvents
- Cleaning agents
- Insulating materials such as fiber glass and ceramics
- Cleaning agents, and sandblasting materials
- Compressed gasses such as oxygen, nitrogen, argon, helium
- Greases, oils, and other lubricants
- Fuel gases such as acetylene & Propane
- Epoxy resins
- Sealants
- Fuels
- Asbestos products such as gaskets and sheeting materials
- Bulk containers of household products and disinfectants
- MSDS (Material Safety Data Sheet) of any material that can be hazardous to human life will be used to train related workforce & all MSDSs will be recorded in file as hardcopy.

9. FIRE PROTECTION/ FIRE FIGHTING

Paradigm Engineering project management shall ensure adequate numbers of fire stations are placed in locations selected after the initial site audit, and after Client/ Representative approval. HSE personnel shall be responsible to maintain these stations and keep them in working condition, with proper logs, labeling and passports. Occasional hot works in other areas shall be commenced after respective hot works permits are issued and mobile extinguishers are made available in close proximity of the working area.

Additionally a Fire Protection Plan will be established by contractor, for preventing, detecting and extinguishing fires during construction and commissioning activities.

10. WORKING PRACTISES

The permit to work system will control most activities. This will be further developed and controlled with certain areas of work supplemented by written procedure.

For this project written procedures will certainly be required for the following, whilst others may be identified later.

- **Working at heights :**
  - The primary means of achieving safe working conditions when working at heights is to provide adequate and sufficient access and egress arrangements and suitable working platforms at the place of work.
  - A toolbox Talk will be given to each person carrying out work at height. Following an assessment of the risks, supervisors will instruct personnel on the instructions and precautions to be followed when working at height.
  - Approved full body safety harnesses should only be used as a last resort where conditions make it impracticable to provide a safe working platform
- **Fall Protection Equipment**
  - All personnel working above ground level will be provided with, and will use, appropriate fall protection equipment and PPE. Appropriate regulatory standards must be observed when using fall arrest equipment.
  - A competent person must regularly inspect fall protection equipment. It should also be maintained so that it remains satisfactory for use during the construction period. Effective actions must be taken to rectify any defects observed as a result of these inspections.
  - Fall protection equipment that has been deployed in a fall must be examined by a competent person and repaired or destroyed, as necessary.
  - Fall protection devices and systems will not be used for any other purpose than those for which they are designed.
- **Safety Harnesses**
  - Fall protection in the form of full body safety harnesses and lifelines must be used in situations where it is impracticable to provide primary systems.
  - Whenever full body safety harnesses are used they must be secured to a secure anchorage point, running line or arrestor device.
  - Safety harnesses and lifelines will be used for working at elevations in excess of 1.5 meters or where a fall of this distance is possible.
    I. A proper anchor, mounted preferably overhead
    II. Full body harness using double latch self locking snap hooks at each connection.
    III. Synthetic fibre lanyards
    IV. oShock absorbers must be provided with the harness system in order to reduce the shock loading in the event of a fall.

V. A visual inspection of the fall arrest equipment and system is completed and any equipment that is damaged or has been activated is taken out of service.

VI. Person(s) are competent to perform the work.

VII. A fixed platform is used with guard or hand rails, verified by a competent person, or the safety harness which restricts to fall must be used. The properties of safety harness is written above.

- **Scaffolding:**

The erection and control of scaffolds will be subject to the following:

- A formal written system for requesting scaffolding, supported by assessments of risks and hazards and method statements based on the former.
- Erection specifications to be adopted e.g. BS 5973 or similar
- Standards for boards, tubes and fittings e.g. fire resistant boards
- Inspection criteria e.g. should be carried out by a competent, certified scaffolding supervisor.
  - Weekly,
  - Before use.
  - After alteration.
  - After periods or days of inclement weather.
  - Scafftag or similar system or similar for authorising use working over the side.
  - Strategic placement of storage racks.
  - Regular inspection of storage facilities.

- **Ladders**

  - Ladders should be used primarily as a means of access, NOT as a working platform.
  - If work is required to be carried out from ladders, personnel shall use and wear approved safety harnesses as a means of fall protection.
  - Ladders should be suited for the purpose for which it is to be used and free from defects.
  - Ladders shall be set on a firm level base. Makeshift props should not be used to gain extra height or to level up stiles.
  - Ladders should not cause a hazard by placing them where they may be struck or dislodged. Barriers should be placed around the foot of the ladder where necessary.
  - Ladders should, wherever possible, be secured at the top and bottom by lashing, irrespective of whether metal clips or clamps are used. In cases where the ladder is unable to be secured, a person must steady the ladder by

standing at the bottom and holding the ladder in place with one foot on the bottom rung. (permitted only if the ladder is shorter than 5 meters).

- Ladders should not rest against any fragile surface or fitting.
- Ladders must extend at least 1.05 meters above the landing place unless some other suitable handhold is available.
- Only ladder which is manufactured by certified standards should be used and any man made ladders should be certified before beginning usage.

- **Excavations**

  - All excavations deeper than 1.5 meters considered as confined space.
  - Excavations 1.25 meters or deeper should be shored or battened/stepped back in order to prevent collapse. (Dependent on the nature of the soil condition)
  - All excavations will be provided with suitable perimeter protection e.g. scaffold barriers.
  - Suitable means of access/egress shall be provided every 7.5 meters to excavations e.g. ladders, scaffold access.
  - The location of the presence of any overhead lines and other obstructions must be identified.
  - Personnel will be kept clear of machinery whilst it is in operation, minimum distance of 5 meters.
  - Barriers and signs will be erected to keep unauthorized personnel clear.
  - Trucks used for the removal of spoil will be controlled and sited by a banksman.
  - The ongoing provision of side supports shall be programmed into the work to maintain the integrity of the excavation.
  - Personnel engaged in hand digging operations will be briefed on the actions to be taken when uncovering marker tiles, cables, pipe work etc.
  - Excavated soil will be stacked a minimum distance of one meter from the edge of the excavation edge.
  - Deep excavations which gets used for sludge pits or in bad weather conditions that could result in the excavation getting filled water should be netted, if near a public right of way or poses a high risk to personnel on the project.
  - All underground hazards, i.e. pipelines, electric cables, etc., have been identified, located and if necessary, isolated.
  - Ground and Environmental conditions must be continuously monitored for change.

- **Cranes and lifting**
    - Crane operators and riggers must be trained, tested, and certified before they can operate a crane or rig a load.
    - Rigging of the load is carried out by a competent person(s).
    - All crane outriggers must be deployed while making the lift. Any exception must be approved by the Work Responsible Person.
    - Cribbing may be necessary so that the load and the weight of the crane is properly distributed on the outriggers.
    - No outrigger or boom extension shall extend beyond the maximum distance recommended by the crane manufacturer.
    - The accessible area within the swing radius of the rear of the rotating superstructure of the crane shall be barricaded to prevent personnel access.
    - A power pole or pipe shall not be used for controlling or supporting a load.
    - No rotating part of a crane shall come within one (1) meter of any building, structure, pipeline, or other load. o When lifting near an excavation, special care must be taken to prevent a cave-in, or to prevent the crane from falling into the excavation. A crane shall not be operated on an earth bank or where an incline exceeds certified crane specifications.
    - Special precautions must be observed when working near electrical hazards.
    - The hook shall be brought over the load in such a manner as to prevent swinging.
    - The cables must not be kinked or twisted around each other.
    - The load must be checked for balance immediately upon placing a strain on the cables. When lifting a load that approaches the rated load of the crane, it should be raised a few inches and the brakes applied before making the lift.
    - The lift must be made slowly to avoid shock and damage to the load and the rigging equipment.
    - Before a load is lifted, check to see that it is not fixed, jammed, or frozen to the ground or to another object.
    - Hand signals must be used for all lifts. Only one Rigger Signal-man) shall be designated to give signals to the Crane Operator.
    - A tag line must be used to steady the load during the lift. Loads must not be steadied by hand.
    - The Crane Operator should never move loads over personnel, live power lines, pressurized pipe work or running machinery.
    - Personnel must stand well away from all suspended loads and cables that are under strain. They must not stay in the cab or bed of a truck that is being loaded or unloaded when the load is more than 6 inches/150 mm off the bed.

- On truck-mounted cranes, the load must not be lifted over the front area unless it has been approved by the crane manufacturer.
- The crane mechanisms must never be activated when personnel are on the crane (unless they are inspecting or adjusting mechanisms or electrical equipment).
- A load must not be left suspended longer than necessary.
- When a load is moved horizontally, it must be kept at least 0.5 meters above the objects that it passes over.
- Cranes must not be "walked" while carrying a load. The load should be transported and then picked up again as necessary. Cranes should not be used to "slide" loads horizontally. Exceptions must be approved by the Work Responsible Person.
- A sling must not be pulled from under a load while the load is resting on it.
- When wind velocities are above 32 km/h (20 mph), the rated load and boom lengths shall be reduced according to manufactures specifications. Wind forces are greater at height by as much as 35% or more. All lifts above ground level, must account for wind force i.e., side loads, down drafts, etc., as applied to the load and the boom.
- The crane operator must always keep the load in sight. If this cannot be achieved, a Rigger (Signal-man) must be positioned where he can see both the load and the crane operator during the lift.
- Lifting devices and equipment have been certified for use within last 12 months (at a minimum), preferably 6 months.
- Any safety devices installed on lifting equipment are operational.

- **Work permits:**

Before conducting work that involves confined space entry, work on energy systems, ground disturbance in locations where buried hazards may exist, or hot work in potentially explosive environments or for any hazard that can arise in any kind of work, a permit must be obtained that:

- Defines the scope of work
- Identifies hazards and assesses risk
- Establishes control measures to eliminate or mitigate hazards
- Links the work to other associated work permits or simultaneous operations
- Is authorized by the responsible person(s)
- Communicates above information to all involved in the work
- Ensures adequate control over the return to normal operations.

Procedures will be implemented for controlling the work via a permit to work system in recognition of the following guidelines:

Agreement and implementation of proformas and types of permits, including:

- Hot work

- Cold work
- Excavation Work Permit.
- Electrical Work Permit
- Confined Space Entry
- Isolation certificates (mechanical - electrical)
- Gas Testing
- Radiography

Sanction to test Issue and revelation Paradigm Engineering of permits as required by the conditions e.g. blanket permits during hook up Administration and organization for issuing permits Requirements for the different work activities with regard to precautions and protective equipment, e.g. Fire watchers, hot work screening etc.

- **Confined Space Entry**

Entry into any confined space cannot proceed unless;

- All other options have been ruled out.
- Permit is issued with authorization by a responsible person(s)
- Permit is communicated to all affected personnel and posted, as required
- All persons involved are competent to do the work
- All sources of energy affecting the space have been isolated
- Testing of atmospheres is conducted, verified and repeated as often as defined by the risk assessment
- Stand-by person is stationed
- Unauthorized entry is prevented.

- **Energy Isolation:**

Any isolation of energy systems; mechanical, electrical, process, hydraulic and others, cannot proceed unless:

- The method of isolation and discharge of stored energy are agreed and executed by a competent person(s)
- Any stored energy is discharged
- A system of locks and tags is utilized at isolation points.
- A test is conducted to ensure the isolation is effective
- Isolation effectiveness is periodically monitored.

Construction Site Signage

	Description of Signage	Location Required
	MV1 – Eye Protection shall be worn	
	MV2 – Respiratory protection shall be worn	
	MV3 – Head protection shall be worn	
	MV4 – Hearing Protection shall be worn	
	MV5 – Hand protection shall be worn	
	MV7 – Foot protection against crushing shall be worn	
	MV8 – Safety harness & lifelines shall be worn	
	PV3 – Thoroughfare of Pedestrians Prohibited	
	PV6 – Proceeding beyond this point prohibited	
	WW1 – General Warning of Danger	
	WW8 – Warning of Suspended Loads Hazard	
	WW14 – Warning of Workers Overhead	
-	Other – (specify)	