

Document No S-HSBR-001-00	HEALTH, SAFETY	
Revision 00		
Appointment date 17-June-26		
Construction Health and Safety Baseline Risk assessment AS PER CONSTRUCTION REGULATION 5(1)(b), 2014 OCCUPATIONAL HEALTH AND SAFETY ACT, NO. 85 OF 1993 (Latest Edition)		

Baseline Risk Assessment

Pertaining to the design, manufacture, supply, installation, testing, commissioning, operation, maintenance and performance monitoring of integrated Solar Photovoltaic (PV), Battery Energy Storage System (BESS), Grid-Forming Power Conversion System (PCS), Energy Management System (EMS) and associated balance-of-plant equipment to provide resilient backup power to containerized Pressure Swing Adsorption (PSA) oxygen generation facilities located at healthcare institutions throughout the Republic of South Africa

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1. Definitions and Abbreviations

ABBREVIATION	DESCRIPTION
DSTI	Daily Safe Task Instruction
BESS	Battery Energy Storage System
HME	Heavy Mobile Equipment
PV	Photovoltaic
MDS	Material Data Sheet
EMS	Energy Management System
PPE	Personal Protective Equipment
PSA	Pressure Swing Adsorption
SWP	Safe Work Procedure
DBSA	Development Bank of Southern Africa
PCS	Power Conversion System

1.1 Project Background

The Health and Safety Specifications pertaining to the design, manufacture, supply, installation, testing, commissioning, operation, maintenance and performance monitoring of integrated Solar Photovoltaic (PV), Battery Energy Storage System (BESS), Grid-Forming Power Conversion System (PCS), Energy Management System (EMS) and associated balance-of-plant equipment to provide resilient backup power to containerized Pressure Swing Adsorption (PSA) oxygen generation facilities located at healthcare institutions throughout the Republic of South Africa, it cover the subjects contained in the index and is intended to outline the normal as well as any special requirements of DBSA pertaining to the health and safety matters (including the environment) applicable to the abovementioned project. These Specifications should be read in conjunction with the Act, the Construction Regulations and all other Regulations and Safety Standards which were or will be promulgated under the Act or incorporated into the Act and be in force or come into force during the effective duration of the project. The stipulations

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2. Project Scope

The design, manufacture, supply, installation, testing, commissioning, operation, maintenance and performance monitoring of integrated Solar Photovoltaic (PV), Battery Energy Storage System (BESS), Grid-Forming Power Conversion System (PCS), Energy Management System (EMS) and associated balance-of-plant equipment to provide resilient backup power to containerized Pressure Swing Adsorption (PSA) oxygen generation facilities

located at healthcare institutions throughout the Republic of South Africa.

The objective of the project is to improve energy resilience and operational continuity of critical oxygen generation infrastructure through the deployment of standardized solar hybrid microgrid systems capable of supporting PSA oxygen plants during utility supply interruptions and periods of poor grid reliability.

The preferred technical architecture shall comprise Solar PV generation, Grid-Forming PCS, Battery Energy Storage System (BESS), Energy Management System (EMS), associated electrical infrastructure and integration with new and/or existing standby generator systems. Final plant capacities and equipment ratings shall be confirmed during detailed design based on site-specific load profiles, operational requirements and environmental conditions.

PV arrays may be installed on rooftop structures, solar carport or ground-mounted support structures subject to detailed structural, civil and electrical assessment and approval by the Employer's Representative.

Electrical Load Assessment and Data Logging Prior to final system sizing and detailed design, the Contractor shall undertake site-specific electrical load

monitoring of each PSA oxygen generation facility.

The Contractor shall install temporary power quality and energy monitoring equipment for a continuous monitoring period of not less than seven (7) consecutive days.

Monitoring equipment shall comply with a minimum accuracy class of 0.5 or better and shall record data at intervals not exceeding one (1) minute.

As a minimum, the following parameters shall be recorded for each monitored PSA supply point:

- Phase-to-phase and phase-to-neutral voltages (V)

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- Phase currents (A)
- Active power (kW)
- Apparent power (kVA)
- Power factor (pf)
- Frequency (Hz)
- Active energy consumption (kWh)
- Maximum demand (kW)
- Load profiles and operating cycles

The Contractor shall analyse the collected data and utilize the measured results as the basis for final sizing of the Solar PV system, Battery Energy Storage System (BESS), Grid-Forming Power Conversion System (PCS), standby generator interface and associated balance-of-plant equipment.

A load assessment report shall be submitted to the Employer's Electrical Engineer for review and acceptance prior to completion of the contractors detailed design.

The Contractor should ensure that no back feed to the main grid is permitted by making use of the inverter settings in conjunction with CT's (current transformers). Excess energy shall not be clipped after full BESS charge and shall feed into the client grid so as to prevent wastage of harvested energy and offset some client grid use.

The Solar PV generation, Grid-Forming PCS, Battery Energy Storage System (BESS), shall have an energy availability equivalent to the runtime needs of the PSA – 98% available and penalties equivalent to PSA downtime shall apply.

3. Risk Assessment

Risk Assessment Title	The design, manufacture, supply, installation, testing, commissioning, operation, maintenance and performance monitoring of integrated Solar Photovoltaic (PV), Battery Energy Storage System (BESS), Grid-Forming Power Conversion System (PCS), Energy Management System (EMS) and associated balance-of-plant equipment to provide resilient backup power to containerized Pressure Swing Adsorption (PSA) oxygen generation facilities located at healthcare institutions throughout the Republic of South Africa,
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Risk Assessment Team				
	Name and surname	Designation	Contact Number	Email Address
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This baseline risk assessment focusses on the high-level health and safety hazards and risks anticipated during construction taking into consideration all construction methods.

Geographical location: Within various locations of KwaZulu Natal

Legal requirements pertaining to the specific task step's control measures are assumed to be implemented and will not be repeated in the baseline risk assessment. Proposed Risk Controls focus on unique risks anticipated, and/or specific client requirements.

The risks identified are those that will have a direct effect on the contractors during construction but also those that could have a detrimental effect on the project directly or indirectly from a time delay and / or cost point of view.

Baseline Risk assessment							
Site: Hospital		09-July-26	Assessor: C Mgese				
Description/Area/ Activities/Task	Hazards	Damage to property, injury to person	Recommendations to reduce or control	Probabi lity	Severit y	Rating	Rating, L, M, H
Design	Designer not taking 2014 Construction regulation into account during stages 2,3 and 4 Designs does not include safety aspects for safety during constructability, operability and maintainability Designs does not conform to the Design Specification as per the Engineering Scope of Work, checked and signed of by all	Serious injury/Fatal. Property damage Financial loss Environmental impact Prosecution Damage to companies image	Designers are legally required to conform with all legislation and specifically the requirements of section 6 of the 2014 construction regulations.	5	3	15	M

	relevant designers and engineer. Design has made inadequate provision for lightning protection						
Surveys	All relevant surveys not completed Recommendations of surveys not adhered to in planning and designs	Serious injury/Fatal. Property damage. Financial loss Environmental impact Prosecution Damage to companies image	Development Bank of Southern Africa must have relevant surveys done including, geotech, Archaeological, heritage, Asbestos, ground water, environmental impact, traffic, existing services. Information in the report must be used by designers in their designs and information that could affect health and safety in	5	3	15	M

			constructability, maintainability and operability must be reported to the Development Bank of Southern Africa				
Work permits, licences, wayleaves and authorisations	Legal noncompliance Unknown services	Serious injury/Fatal. Property damage Financial loss Environmental impact Prosecution Damage to companies' image	Development Bank of Southern Africa and the principal contractor needs to ensure that all relevant work permits, licences, wayleaves and authorisations are in place before work commences	5	3	15	M
Procurement and cost management	Inadequate funds to complete project safe, expected quality and on time Delays in appointment of contractor, designers and specialists Insufficient technical and safety information in tender document	Serious injury/Fatal. Property damage Financial loss Environmental impact Prosecution Damage to companies' image	Development Bank of Southern Africa project cost management must ensure that the project budget includes all costs including health and safety and procurement must ensure that the principal contractor has provided adequate funds to ensure that the project can be completed safe, on time and to the quality expected by the	5	3	15	M

	Delay in start date will cause pressure on contractor to make deadline Appointment of contractor based on cost and not on competence and health and safety performance		Development Bank of Southern Africa				
Time constraints	Client has not allowed for adequate time to complete project to standard and on time	Serious injury/Fatal. Property damage Financial loss Environmental impact Prosecution Damage to companies' image	It is important to ensure that time for the construction is realistic and takes all possible aspects that can cause delays into account	5	3	15	M
Site Establishment							
Fencing of laydown area	Access to laydown are accessible by unauthorised persons Laydown area too small for volume of construction material	Muscular skeletal injurie. Back injuries Cuts, bruises, and fractures Injury to employees Damage to property	Planning of material deliveries to prevent this situation. Prior arrangement and planning with Development Bank of Southern Africa terminal management	5	2	10	M

Preparing laydown area for office, store	Preparing bases for containers Exposure to traffic Lifting/sling of containers in position on bases with a crane Connecting to electric connection provided by Development Bank of Southern Africa	Cuts, bruises, and fractures Injury to employees Damage to property	Pre-planning of site lay-out and activities Ensure that crane and lifting operations are planned equipment certified, operators competent, risk assessment completed, and work permit is in place Certified electrician and plumber to connect services and COC issued	5	2	10	M
Transportation of personnel to site	Sub-standard/un-roadworthy vehicles, Driver under the influence, of intoxicants, incompetent/unlicensed drivers, speeding by driver, overcrowding of vehicles, loading equipment and tools with employees, vehicle not fitted with seat belts,	Road accidents with potential for injuries and fatalities, Property damage	Use of Vehicles to comply with the National Road Traffic Act (No, 93 of 1996),	5	6	30	EH

Use of equipment and tools	Improper use of tools and equipment Incompetent/untrained operators/users' Substandard tools and equipment No safeguards where required Homemade tools, no SWP,	Pinch points, cuts, laceration, incidents, (caught by, in between) resulting in LTI's, medical treatment cases or first aid cases, Damage to property,	Compliance to Project Health and Safety Specification, Correct tools for the job and, correct use of the tools, All tools and equipment to be numbered and placed on registers and inspected when required by competent persons, Operators/users to have competency/training and experience, All machine guarding to be in place before equipment is used, PPE (use of suitable gloves mandatory, eye protection),	5	1	5	L
Lifting Operation- Placement of containers/offices	Incompetent crane drivers/operators, Heavier loads exceeding lifting capacity of cranes, no rigging studies done, Mobile cranes/lifting equipment not safe and serviceable, no inspections and	Objects falling onto people (employees) and/or property Fatalities, Injuries Property Damage	Compliance to Project Health and Safety Specification, Crane operator and rigger competency to be verified before activities take place, Rigging studies to be done where required, Ground stability, weights and placement of outriggers to be verified and ensured, Load test certificates and	5	6	30	EH

	load test certificates available, Sub-standard lifting tackle equipment, Incorrect use of Lifting tackle, Use of mobile cranes in high wind conditions, Employees falling from top of containers while tying/untying rope, Uneven/unsuitable surfaces on which crane will stand,		Inspections by competent persons to be in place prior, Ensure registration and verification of LMI's and LME's, Wind monitoring tools to be available, Employees to undergo formal height work training,				
Underground services	Failure to detect or undetected existing underground services,	Electrocution by live electrical wires, Damage to cables and services results in disruption to operations and services, Fires, explosions	Permit system must be followed, Survey and detection results to be made known, Additional use of detection equipment where required, Updated drawings indicating services, Manual proof trenching,	1	3	3	L

Employees facilities	Failure to provide employees facilities on site (i.e, eating and ablution facilities)	Health, hygiene and environmental damage/ sicknesses, (i.e, food poisoning)	Compliance to Project Health and Safety Specification, Awareness Training on health and hygiene requirements, Comply to Facilities Regulations,	1	1	1	L
Temporary electrical Installations	Incompetent Installers, Unsafe installations due to faulty wiring, Lack of insulation, Substandard electrical tools (e.g, portable electrical grinders, drills) being used, Contact with live electrical conductors Failure to adhere to isolation and lockout procedures	Fatality, Injuries resulting in permanent disabilities (electrocution, burns etc,) and property damage	Compliance to Project Health and Safety Specification, Ensure competency of electrical installers and use of certified equipment, Inspections of installations and fire safety equipment by competent inspectors, Task Risk assessment with SWP and work permits, Issuing of COC upon completion,	5	3	15	M
Stacking and Storage	Incorrect control of stacked materials, incorrect method of stacking materials/articles	Medical treatment injury, Lost time injury, Damage to property,	Compliance to Project Health and Safety Specification, PPE compliance, Appointment of stacking and storage personnel,	1	1	1	L

	may cause injury to Employees and property damage						
Site Access	Failure to obtain site access certificate, Failure to provide security or unauthorised person entering site, Failure to test for intoxication	Injuries, Property damage/loss and theft	Compliance to Project Health and Safety Specification, Security management plan including site access control, Mandatory alcohol testing,	5	1	5	L
Occupational Health & Hygiene							
Noise - Working close or adjacent to the moving of construction plant (equipment and machinery and public/Hospital vehicles)	Ergonomics – including Manual handling	Over exposure to noise levels - short and long term may result in potentially permanent health impact (noise induced hearing loss)	Occupational hygiene monitoring and medical surveillance, Hearing conservation programme, PPE (Ear protection-ear muffs), Compliance to Project Health and Safety Specification	5	2	10	M

Working in extreme temperatures/adverse weather conditions	Exposure to extreme ambient temperatures during winter and summer days, UV exposure, windy/rainy conditions	Overexposure may result in health conditions such as heat exhaustion and hypothermia, Lung/chest/eye infections from particles being blown into eyes and inhaled,	Occupational hygiene monitoring and medical surveillance, Specialised PPE (e.g., lined gloves, balaclavas, eye protection, dust masks/specialised FFP1/FFP2), Compliance to Project Health and Safety Specification, Drinking sufficient potable water,	5	2	10	M
Ergonomics – including Manual handling	Working on awkward work positions (i.e, restricted space), Use of self-improved /improper tools and machinery, Heavy load manual handling, repetitive work	Musculoskeletal injuries due to manual handling, bending, twisting, prolonged, muscle strains, fatigue	Compliance to Project Health and Safety Specification (i.e,, lifting techniques), Task based risk assessment, DSTI and Toolbox Talks, Correct lifting and handling practices and ergonomic awareness,	5	1	5	L
Dust Particles – i.e, demolition and drilling	Excessive exposure to solid dust airborne particles from construction activities,	Inhalation exposure to solid dust results in Respiratory infection (potentially permanent health impact), Lung	Compliance to Project Health and Safety Specification, Occupational health assessment, Hygiene monitoring, Medical surveillance, Dust suppression,	5	2	10	M

		Irritation/damage to eyes/red eyes,	FFP2 dust masks and safety goggles,				
Operational activities resulting in Asbestos dust exposure	Exposure to Asbestos dust during loading operations and from stockpile areas which is in close proximity to the Hospital	Inhalation exposure can result in respiratory infection (potentially permanent health impact), Lung Irritation/damage to eyes/ red eyes, lung disease, Cancers,	Inductions to be arranged with DBSA before any work commences in/near such areas so that PPE and safe work requirements can be communicated, Client to obtain a schedule of when such operations will be taking place i.e, loading of manganese and inform Contractor so that extra precautions can be taken during these periods, PPE requirements to be adhered to,	5	3	15	M

Vibration and fumes – HCS related activities	Exposure to vibrations as well as fumes emitting from various construction activities such as drilling, demolition and associated plant/equipment, Fumes from various HCS used,	Vibrations from various plant/equipment can result in carpal tunnel syndrome vibration as well as have an effect on employees kidneys Inhalation exposure to fumes results in Respiratory infection (potentially permanent health impact), Irritation/damage to eyes/ red eyes,	Compliance to Project Health and Safety Specification, Occupational health assessment, Hygiene monitoring, Medical surveillance, FFP2 masks and safety goggles and all other required PPE	6	2	10	M
Communicable and other infectious diseases (e.g, COVID-19, HIV/AIDS, etc,)	Contact with an infected person or area, Sneezing or coughing without closing the mouth, Unhygienic practices, unprotected sexual practices	Fatalities and diseases	Training on communicable and infectious diseases during DSTI and Toolbox talks, Practice social distancing, Washing of hands regularly, use of face masks, Employees reporting to management when sick, Drink plenty of water and keep hydrated,	5	6	30	EH

			Practice protected sex e.g., use protection,				
Project Construction Activities							
Clear and grub - bush clearing by means of HME (Heavy Mobile Equipment)	Incompetent person operating Heavy Mobile Equipment (HME), Operators not medically fit, Operators under the influence of alcohol while operating HME, HME operators expose to high levels of noise and vibration, HME not in safe and serviceable condition, collision between operators and site personnel,	Exposure to venomous, snakes, insects, poisonous spiders and scorpions, resulting in to fatalities, injuries, Property damage,	Compliance to Project Health and Safety Specification and Client inductions, Contractor emergency management plan including employee awareness training, Verification of competent operators training and appointments as well as medical assessments, Dedicated pedestrian walk ways to prevent man/machine interface, Flagmen/spotters to be appointed to regulate	5	6	30	EH
Use of Temporary Works (scaffolding, false work, formwork and support work)	Incompetent erectors and inspectors when building support structures, Incomplete support	Incidents resulting in fatalities, injuries such as cuts, lacerations, Property damage from	Compliance to Project Health and Safety Specification, Temporary works to comply with SANS 10085 (scaffolding) and Construction Regulations,	5	6	30	EH

	structures (i.e, no access ladders, no toe boards, insufficient bracing), Overloading support structures, Support structures not erected as per drawings, No CR 12 (temp work designer) appointee or incompetent CR 12,	structures and material falling,	Competent and certified temporary works personnel to be appointed, inspections of temporary work as required, Temporary work design and drawings to be signed off by competent CR 12 appointee and constructed accordingly, Permits to be obtained where legally required, Rebar to be closely monitored with regards to exposed and sharp edges and to be capped with rebar caps,				
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Use of mobile Plant (i,e, HME - TLB, graders, excavators, tipper trucks, water trucks, cranes)	Defective mobile plant, incompetent operator, open/uneven surfaces, collision with Hospital equipment, intoxicated operator, medically unfit operator, lack of plant inspection and service history, man/machine interface, congested areas, speeding of operators, collision of operators with Hospital users, property damage caused by operators	Multiple injuries/fatalities, Property damage	Policies and procedures, Development Bank of Southern Africa inductions to be conducted before work to commence, Pre-use and daily inspections of Plant, Plant to be checked and approved for site before plant mobilisation on site, plant service history to be available, Competence verification of operators including valid medical assessments, Solid barricading of potential hazards, daily alcohol testing of all personnel, Required PPE to be worn and especially reflector vests for high visibility, Appointment of spotters/flagmen,	5	6	30	EH
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Bricklaying	Working at height, Manual handling, repetitive motions Exposure to hazardous substances	Cuts and lacerations, Back strains, Dermatitis, Occupational diseases	Compliance to Project Health and Safety Specification, Regular change of work activities and positions, Compliance to PPE requirements, Procedure to handle hazardous substances,	5	2	10	M
Excavation and Trenching (i.e, foundation) Mechanical failure of machines (brakes, steering, park brake, leaks, etc.), Machines not in safe and serviceable condition, Unprotected excavations, Unsafe access and egress into and from excavations, Unstable excavation walls (even after inclement weather),	Inclement weather (poor visibility conditions i.e, fog, rain, blind spots), Poor soil conditions, Lack of inspections	fatality, Injuries resulting in permanent disabilities, Property damage, Collapsing of excavation resulting in to injuries and fatalities,	Project health and safety specification, Ensure competent trained personnel are used, Dedicated pedestrian walk ways where practical, Adequate barricading of excavations, Safe access and warnings, Inspections of excavations by competent and appointed persons to ensure compliance including checks pertaining to inclement weather, Excavators/TLB used for deep excavations, Competent and certified operators,	5	3	15	M

Loose objects on the side walls of excavations, Underground services being struck/damaged,			Inspections according to Construction regulations section 13,				
Backfilling	Movement of machinery (TLB), Dust emissions, Noise, Improper use of tools,	Injuries/fatalities, Property damage, Lung infections and to be placed on registers	Dust suppression, methods to be implemented, Trained flagmen/spotters to be appointed, All tools to be inspected before use	5	6	30	EH
Concrete Work,(Pouring, levelling, floating)	Improper handling or working with concrete,(i.e, contact with eyes or skin), Holding of concrete weighted equipment Incompetent concrete mix operator, Spillages of concrete,	Skin and or eye irritation, Back pain, Fatalities,	Project health and safety specification, Medical Surveillance (Fitness for Duty Certificate), Employee Dossier, Concrete mix equipment inspection, DSTI and Toolbox Talk, Use of correct PPE (i.e, long sleeve overall, footwear, eye and hand protection etc), Spotter	5	6	30	EH

			for concrete truck mixer, Supervision, Communication of the MDS relating to concrete/cement,				
Working at elevated position	Working on unprotected edges, Poor housekeeping leading to accumulation of waste and loose materials, Incorrect methods of getting materials, equipment or tools from and to ground (i.e, throwing), Working during inclement weather conditions, Medically unfit and untrained employees working at heights,	Injuries, Fatalities, Property loss due to tools/equipment falling and being damaged	Project health and safety specification, Fall protection plan to be developed and employees to be trained on it, Use fall protection and prevention equipment (i.e, guardrails, solid barricade, harnesses), Formal working at heights training, valid medicals to include working at height assessments, Weather conditions to be monitored and documented,	5	6	30	EH

Construction plant	Man/machine interface within restricted areas,	Injuries/fatalities/property damage due to close proximity of plant/ equipment to employees,	Procedures to be communicated with regards to working conditions/environment and a sequence of events to be implemented which minimises man/machine interface, Competent flagmen to be appointed to regulate the man/machine interface process,	5	6	30	EH
Additional deterioration and further collapse of hospital/ all Installations	Exposure to vibrations emitting from various construction activities such as earthworks, drilling and associated plant/ equipment,	Vibrations from various plant/equipment can result in carpal tunnel syndrome/ white finger vibration as well as have an effect on employees' kidneys Inhalation exposure to fumes results in Respiratory infection (potentially permanent health impact), damage to eyes/red eyes,	Continuous monitoring and assessment of existing structures during operations, Identification of minimum impact of vibrating tools and equipment, Appointed Feasibility Service provider to implement methods to ensure hospital/ all Installations stabilisation before commencement of activities,	5	6	30	EH

		Fatalities, injuries, property damage,					
Construction within operational areas	Congested work areas, man/machine interface,	Fatalities, Injuries, Property damage,	Construction methodology to identify procedures of staggered operational/construction areas, Signages to be placed informing affected people of the construction activities and the hazards, Communications to be sent out informing the tenants/affected people about the construction activities taking place,	5	6	30	EH
Use of Ladders	Person falling from the ladder, Carrying tools while	Injury requiring medical treatment, Fatality,	Project health and safety specification, Inspection of Ladders before	1	3	3	L

	ascending/descending ladder, Defective ladder used		use, Three point contact when climbing ladders,				
Hot Works – Welding, Grinding, Cutting	Incompetent Operators, Substandard Electrical Tools (e.g, reportable Electrical Grinders, Drills, Welding Machines, Generators) being used, Performing hot work activities in wet weather conditions, Oil/Fuel leaking generators Not adequate fire prevention measures,	Injury requiring medical treatment, Fatality, Fires and explosions, Environmental damage,	Project health and safety specification, Daily electrical equipment/tools inspection by a competent person, Verified competency training for any person operating electrically driven tools and equipment, All electrical equipment run from reportable generators to be double insulated, Generators to be inspected daily, Proper earthing processes to be followed for all activities, All tools to be inspected and checked before use including use of correct cutting disk and backing plates, Grinders may only be used on	5	3	15	M

			solid surface, All electrically driven tools must be double insulated and must have a dead man switch fitted, Fire extinguisher and fire fighter to be available during execution, Hot work permit must be applied for before execution,				
Plastering	Defective/handmade tools In-adequate or incorrect PPE, Incompetent personnel, Working at height,	Cuts, lacerations, bruises, Fractures, Eye injuries, Dermatitis,	All tools/equipment to be placed on a register and inspected before use and at regular intervals, No handmade tools, Mandatory PPE to be worn at all times, Only competent person to do the job, Safe work platforms to be provided,	5	2	10	M

Painting	Repetitive movements Paint splashes in the eye Exposure to paint fumes Paint spillages Skin irritation Incompetent painter	Back injuries, Eye injuries, Inhalation/pulmonary problems, Dermatitis, Environmental pollution,	Frequent rest breaks and rotation of activities, All mandatory PPE to be worn with additional PPE depending on the specific activity, MDS of the various HCS to be obtained and communicated to all employees working with the substances,	5	2	10	M
Installation, commissioning and testing of installation	Incompetent installer, incorrect plant and equipment used, not adhering to design plan,	Injuries, Property damage,	Project health and safety specification, approved design specification, appointment of competent person for installation, commissioning and testing, Compiling and acceptance of commissioning plan,	1	2	2	L
Contractor Interface activities with other Contractors	Numerous contractor activities within restricted areas, Lack of planning	Fatality, Injuries resulting in permanent disabilities, Property damage,	Co-ordination meetings with all stake holders must be conducted on regular basis to manage SIMOPS Compliance to Project health and safety specification and Client inductions, contractors to do site specific induction and indicate in their	1	3	3	L

			SHE plans how will they control interface on site,				
Ongoing Hospital operations	Unstable hospital/ Installations wall collapsing, Unstable foundations resulting in collapse of structure	Fatality, Injuries resulting in permanent disabilities, Property damage,	Feasibility studies, methodology to include temporary relocation of factory operations, partial relocation, planned staggered construction operations,	1	3	3	L
Close out of construction activities	Poor housekeeping	Injuries, Property damage,	Adherence to project health and safety specification, close out checklist to be conducted before product handover to Client	5	1	5	L
Driving inside the hospital traffic	Incompetent drivers, LV not in safe and serviceable condition, Uneven road conditions, Speeding, Fatigue, Poor visibility dust/sun, Heavy loaded trucks	Multiple Fatalities, Injuries resulting in permanent disabilities, Property damage, Explosions,	Project health and safety specification, Ensure drivers are competent including random verification of licences and competencies of operators, Daily inspections of vehicles, Ensure selection of correct vehicle type for conditions - including tyre	5	6	30	EH

	transporting HCS and other commodities, Pedestrians walking in the Hospital area, Train shunting/ movements,		selection, Fatigue management plan as working hours,				
Local community strikes	Community riots,	Injuries, Project delays, Property damage, Theft (Looting)	Local Economic Development of personnel, Stakeholder engagement, Supplier development, targets as per Development Bank of Southern Africa procedures, Security management plan, Emergency preparedness plan,	5	2	10	M
Public Safety/Protection of 3rd parties	Public gaining access into construction sites due to lack of security, Gates not locked and locks broken into, Lack of barricading	Public could get injured/ fatalities occur by construction plant, equipment and operations,	Security to be appointed by the Contractor throughout the project duration, covering day/night shift, Construction site to be fenced off and demarcated, Signage to be placed at strategic places informing	5	6	30	EH

	or failure to adhere to barricading requirements,		public of the dangers in languages relevant to the area,				
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4. Risk Hazard Matrix

Risk Hazard Matrix Probability: 1) Unlikely - 5) Rare - 6) Possible - 8) Likely - 10) Almost certain Occurrence Consequences: 1) minor or no injury/damage - 2) serious injury/damage - 3) Fatality, major injury/damage - 6) multiple fatalities, major injuries/damage Rating: less than 7 - Low risk. >< 7 and 15 - Moderate risk. >< 16 and 29 - High risk. > than 29 - Extreme High risk						
Multiply the score of the consequence with the score of the probability to get the risk rating		Probability				
		Unlikely	Rare	Possible to occur over time	Likely to occur under routine conditions	Will almost certain occur under current conditions
Consequences		1	5	6	8	10
Multiple fatalities, major injuries/damage	6	6	30	36	48	60
Fatality, major injury/damage	3	3	15	18	24	30
Serious injury/damage	2	2	10	12	16	20
Minor or no injury/damage	1	1	5	6	8	10