ETHEKWINI MUNICIPALITY
Occupational Health & Safety Unit

BASELINE RISK ASSESSMENT

Document Title	Baseline Risk Assessment
Client	EThekwini Municipality – Water and Sanitation
Project	**Flood Damage Restoration and Functional Upgrades / Rehabilitation to the Kwandengezi Waste Water Treatment Works and Upstream Catchment Network – Ward 12**
Contract Number	WS7672
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BASELINE RISK ASSESSMENT

1. INTRODUCTION: In accordance with the Occupational Health and Safety Act, (Act 85 of 1993) the Legislator places specific requirements on an Employer. One of these is prescribed in Section 8(i) of the Act where it requires the Employer to ascertain the risks and dangers which may occur within the workplace or section of the workplace and then goes on to establish working procedures or practices.

2. PURPOSE: This is conducted to create a benchmark of the potential risks that apply to the whole project or business operation.

3. SCOPE: This assessment could be approached on a site, regional or national level concerning any facet of the business operation or process or activity.

4. REVIEW AND MONITORING PLAN

The risk assessment form part of the health and safety plan to be applied on the site and must include the following:

(a) The identification of the risk and hazards to which persons may be exposed.
(b) An analysis and evaluation of the risks and hazards identified based on a documented method

5. REFERENCES

(a) Occupational Health & Safety Act and its Regulation

(b) Tender document WS7672

6. LOCALITY PLAN

NIL

7. SCOPE OF WORK

- Construction of a new 27m long x 3m wide reinforced concrete inlet channel with associated Grade 304 Stainless Steel pipework and fittings (DN350 – DN150)
- Supply and installation of the following mechanical and electrical equipment:
  - 1 No. retractable trash rack (100mm bar spacing)
  - 2 No. coarse mechanically raked screens (12mm bar spacing)
  - 2 No. fine mechanically raked screens (6mm bar spacing) with associated washer/compactor and screw conveyor
  - 2 No. fine manually hand-raked screens (15mm bar spacing)
  - 4 No. Stainless Steel channel sluice gates
  - 5 No. Anodized Aluminimum hand stops
  - 1 No. flow measurement flume
  - 2 No. Vortex Degrittors with associated grit pumps and classifiers
  - 1 No. Dry Lime dosing pump and Manually-operated bag-splitter
- Demolition of the old inlet channel and construction of an asphalt surfaced access road in its placeConstruction of brickwork kiosks to house the Motor Control Centre, Lime dosing equipment and washer compactors.
- Breaking out of existing coping blocks and levelling of external wall with self-levelling screed
- Clearing of settled sludge from the tank
- Construction of a new inlet pipe and stilling well
- Installation of a new automatic rotating half-bridge scum scraper

Levelling of existing v-notch weirs

Replacement of the existing Biofilter Siphon dome and all associated pipework

- Inspection of the existing biofilter arm and repairs (if required).

Silt and debris is to be cleared from the Biofilter with high-pressure jetting into the existing aeration holes

- A side-entry hole is to be broken out in the digester wall, and the solidified contents are to be removed

- Supernatant pipework and valves are to be replaced with new pipework and valves
- Sludge Outlet pipework and valves are to be replaced
- The Existing DN200 x 45m Long Asbestos Cement sludge outlet pipeline is to be dismantled and replaced with new stainless steel pipework and manholes
- A gas dome and associated flame trap is to be installed on the roof of the digester
- A new jet-mixing pump is to be installed within a brickwork enclosure
- Structural repairs to the interior of the tank may be required
- New Magflux Meters shall be installed on the inlet and outlet of the sludge digestor.
    - Structural repairs shall be performed to the existing concrete pond walls
    - A new reinforced concrete base shall be constructed
    - 2 No. new reinforced concrete scour valve chambers shall be constructed with a pedestrian bridge
    - 2 No. new reinforced concrete overflow chambers shall be constructed
    - New DN160 x xxxx m Long Class 34 uPVC pipes shall be laid from the ponds into existing manholes
    - 2 No. new emergency spillways shall be constructed
    - Approximately xxx m of DN315 Class 34 uPVC pipes shall be laid to the ponds from the inlet works with associated manholes
- The collapsed reinforced concrete wall shall be reinstated
- The washed away DN150 clay supernatant pipeline shall be replaced
- The existing DN150 x 74 m Long Asbestos Inlet Pipeline shall be dismantled and removed and replaced with Class 34 uPVC pipe.
- On-site Sodium Hypochlorite generation equipment shall be installed
- A new 4.4m x 12.5m x 3.0m high brickwork structure shall be constructed
- The laying of approximately 400m of DN32 HDPe Pipe
- A new by-pass DN300 isolation valve chamber is to be installed at the inlet to the contact tank
- Installation of a new final effluent flow recorder
- Remediation works/reinstatement of eroded embankment, by backfilling with suitable granular engineering fill.
- Construction of sub surface drainage system (Herringbone drains) using slotted drainage pipes. Main pipe – 150mm diameter and laterals – 110mm diameter.
- Construction of approximately 285m of 450mm diameter concrete/HDPE stormwater pipeline. Including catchpits, manholes and headwalls.
- Construction 300m of 1m wide concrete V-drains.Construction of an approximately 100m long catchwater bank
- 5 No. new Gorman-Rupp T4 Sludge Pump Shall be installed

- Alterations shall be made to the existing MCC panels and cabling.
- Approximately 425 m of DN200 buttwelded HDPe (PN10) rising mains shall be constructed
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  - A new outlet will be installed from the Chlorine Contact Tank
  - 2 No. (1No. duty / 1 No. stand-by) second class water pumps will be installed complete with a manifold, sand filters and a magflux meter
  - Approximately xx m of pipes (DN110 – DN32) for rising main and reticulation network
  - A 32.8 kℓ sectional steel tank on a 10m high stand shall be constructed with associated stainless steel pipework
  - 2 No. (1No. duty / 1 No. stand-by) second class water pumps installed complete with a manifold to boost supply to the inlet works and primary settling tank.
  - Installation of a new DN150 Stainless Steel Outlet
  - Construction of a reinforced concrete submersible pump sump and valve chamber with associated pipework and valves
  - Reinstatement of layerworks for damaged portions of the road for an approximated length of 20m.
  - Construction of a 20m long x 6m High Gabion Wall for eroded sections of affected segment of the road way.
  - Re-construction of a 525mm Ø stormwater pipe network and manholes for approximate length of 25m.
  - Re-construction of 160mm Ø Sewer pipe network and manholes for an approximated length of 100m.
  - Reconstruction of a 160mm Ø sewer networks for approximate length of 80m
  - Construction of a 40m Long x 2.5m High Gabion Retaining Wall along the tributary as a erosion protection measure for sewer pipe networks adjacent to the stream
  - Unblocking and Jetting of existing sewer networks downstream for an approximate length of 80m.
  - Re-instatement of approximately 10m of the affected pipe segment. This pipeline will be concrete encased.
  - Construction of 10m long x 1.5m high gabion wall adjacent to the pipe network
  - Concrete encasement of the both pipe networks
  - Construction of reno mattresses around the encased pipe networks

1. RISK ESTIMATION AND EVALUATION

RISK CLASSIFICATION USING A RISK SCORE TECHNIQUE

Exposure (E) How frequently does the hazardous event occur	**Risk classification**
Continuously	10
Frequently (daily)	6
Occasionally (weekly)	3
Unusually (monthly)	2
Rarely (few a year)	1

Probability (P) The probability of a loss when the hazardous event does occur	**Risk classification**
Frequent (happens often)	10
Probable (quite possible)	6
Occasional (unusual, but possible)	3
Remotely possible (has happened somewhere)	1
Improbable (practically impossible)	0.5

Severity (S) Consequences of the hazardous event	**Risk classification**
Catastrophic many fatalities; or interruption of longer than 2 weeks; or asset or environmental damage (or both) exceeding R100m	100
Disaster (few fatalities; or interruption between one and 2 weeks; or asset or environmental damage (or both) exceeding R10m)	40
Very serious (one fatality; or interruption of 6 days; or asset or environmental damage (or both) exceeding R100,000	7
Important (temporary disability; or interruption between 6 and 24 hours; or damage exceeding R10,000	3
Noticeable (first aid needed; or interruption of less than 6 hours; damage exceeding R1000)	1

Risk classification (Risk score = E x P x S)

Risk score	**Risk classification**
Over 400---------5	Very high risk – discontinue operation or activity
200 to 400 ------ 4	High risk – immediate correction needed
70 to 200-------- 3	Substantial risk – correction needed
20 to 70--------- 2	Possible risk – attention needed
Under 20 ------- 1	Risk accepted

BASELINE RISK ASSESSMENT WORKSHEET: IDENTIFYING EXISTING & POTENTIAL RISKS

1	**Site Access**								
	Activity	**Hazard**	**Risk**	**Risk Evaluation**			**Risk Score**	**Risk level**	**Risk Rank**
				E	P	S			
	Accessing the site using construction vehicles or walking to site. Delivering of equipment and material to the site	Excessive speed, head on collusion, employees knocked by moving vehicles. Road blocked off due to community protest. Manual Handling and excessive lifting.	Accidents, damage to equipment or severe injuries or death. Back injuries,	6	6	7	252		4
2	**Site Establishment**								
	Manual and mechanical clearing of the land. Off-loading and positioning of offices by mobile crane. Fencing. Installation of temporary water supply, electricity, ablution facilities	Dust, Snakes, Bees & Wasps. Incompetent operator. Poor connection of temporary services.	Poisoned and death. Collision/impacts of mobile lifting equipment loads and dropped loads with process plant, pipe work, electrical cables and people. Water leaks, Electrocution, improper connection	6	6	7	252		4

3	**Site Fencing**								
	Clearing bush using bush knives Digging holes using pick and spade	Manual handling of material Dust Moving vehicles	Manual handling injuries Dust being inhaled/getting in eyes Vehicle collision and damage	3	6	7	126		3
4	**Existing Services**								
	Identify the existing services	Snakes Unforeseen hazards Unknown/ Unidentified underground services	Poisoned and death. Personal injuries. Electrocution	6	6	7	252		4
5	**Working at height**								
	Erection of Scaffolding by a Competent person	Unsafe scaffolding/ trestle scaffolds	Unsafe scaffolding could collapse resulting in critical injuries	6	6	7	252		4
6	**Traffic Accommodation**								
	Installation of temporally signs Traffic diverting/ Management	Knocked down by moving vehicles, poor demarcation/ displaying of misleading signs. Poor traffic management plan.	Personal injuries or death. Road Accident	6	6	7	252		4

		Incompetent traffic controllers							
7	**Working within roadways, properties and restricted areas**								
	Provide access to the property owners driveways	Struck by vehicles Hijack Snakes bite Sting by Bees	Injuries/Death Bee & Wasp Stings causing Anaphylaxis (allergic reaction) reaction)	6	6	7	252		4
8	**Construction on Manholes**								
	Manhole access Mechanical lifting of concrete manhole rings and roof slabs. Backfilling around the manhole.	Unsafe access. Unsafe lifting. Incompetent lifting operator.	Fall risks. Personal injuries. Damage to property	6	6	7	252		4
9	**Tie Ins to existing manholes**								
	Blank off all pipelines connected to the manhole	Improper lifting manhole covers Falling in a manhole Oxygen deficient	Personal injuries/death	6	6	7	252		4
10	**Road work construction and asphalting**								
	Layer works Compaction Asphalting	Nose, dust Inclement weather, including localized flooding	Rain causing slippery conditions and localised	6	6	7	252		4

		Smoking/open fires Vibration (rolling compaction) Asphalt emulsion	flooding causing property damage, injury and possible death Heat stroke from being exposed to the sun for too long and sunburn Bush fires caused by cigarette/open fires causing smoke, inhalation possible death						
11	**Excavation Work**								
	Mechanical and manual excavation. Back filling mechanical and manual	Incompetent operator. Machine running out of control. Open excavation. Dust. Operating mobile plant next to open excavation.	Personal injury/possible disabling injuries. Property to damage Respiratory problem.	6	6	7	252		4
12	**Bedding and Pipe Laying**								
	Accessing trenches	Trench collapse, falling objects/material	Personal injuries/death Injury to muscle	6	6	7	252		

	Mechanical lifting of 34 HDuPVC Sewer Pipe	Incorrect lifting of pipes							
13	**Backfilling and Compaction**								
	Lay the soil and weathered rock Operating a Bomag, Roller and a Wacker	Dust Incompetent operator. Noise. Vibration.	Respiratory problem Personal injuries and damage to property. Noise Induce. Hearing loss. Kidney problem. Body pain.	3	6	7	126		3
14	**Removal of rubble**								
	Mechanical and manual loading of rubble Mechanical removal of trees Removal of rubble and trees to damp site	Dust, Mobile plant came into contact with trucks. Incompetent operator and lack of planning. Reckless driving.	Respiratory problem. Damage to equipment. Damage to property. Motor Vehicle Accident.	3	6	7	126		3
15	**Construction of Pedestrian Walkways**								
	Pouring of concrete by ready mix truck. Excavations for walkways. Manual and Mechanical Excavation.	Reckless driving. Incompetent operator. Unsafe hand tools.	Motor Vehicle Accident. Personal injuries.	3	3	7	63		2

16	**Construction Mobile Plant and Equipment**								
	Use of Plant & Equipment on site	Incompetent operator Unsafe plant & equipment. Collusion with other vehicles. Petrol and oil spillages.	Personal injuries. Motor vehicle accident. Environmental contamination.	6	6	7	252		4
17	**Emergency Management**								
	Development and Implementation of an Emergency Management Plan	Failure to have a basic, site specific emergency management plan. Workers not trained in the Emergency Plan. Insufficient or no emergency equipment or personnel.	Injury or damage to property. Inability to respond to emergencies. Insufficient or no emergency equipment.	6	6	3	108		3
18	**Community Risk Management**								
	Managing community risk	Failure to adequately monitor and manage the multi-faced social issues.	Violent protests. Injury to employees and property damage.	6	6	3	108		3

19	**Subcontractor Management**								
	Managing subcontractors	Failure to adequately assess subcontractors S.H.E Management System before work commences and at regular intervals. Inadequate Supervision. Utilizing incompetent Subcontractors.	Injury and non-compliance to legislation. High level of employee unsafe behavior. Accidents and property damage.	6	6	3	108		3

RISK PROFILE: WS7672