

PROJECT DESCRIPTION: SINKHOLES RESEARCH

CLIENT: NTCSA

Summary		
ITEM	DESCRIPTION	Amount
1	BILL NO. 1 - PRELIMINARY AND GENERAL	R -
2	BILL NO 2: TASK SCHEDULE	R -
TOTAL (EXCLUDING VAT)		R -

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BILLED QUANTITIES							
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE		TOTAL	
	BILL NO. 1 - PRELIMINARY AND GENERAL						
	FIXED CHARGE ITEMS						
1	Compile SHE plan and file	Sum	1	R	-	R	-
	<u>Establishment of Facilities on the Site</u>	Sum	1	R	-	R	-
	<u>Facilities for Contractor</u>						
2	Offices and storage sheds	Sum	1	R	-	R	-
3	Workshops	Sum	1	R	-	R	-
4	Laboratories	Sum	1	R	-	R	-
5	Living accommodation	Sum	1	R	-	R	-
6	Ablution and latrine facilities	Sum	1	R	-	R	-
7	Tools and equipment	Sum	1	R	-	R	-
8	Plant	Sum	1	R	-	R	-
9	Other fixed charge obligations	Sum	1	R	-	R	-
10	The Contractor is to allow for compliance with ALL CURRENT Eskom Health and Safety requirements, procedures and legislation (OHSACT)	Sum	1	R	-	R	-
11	The Contractor is to take cognizance of the Environmental Management Programme Act. The Contractor is to allow a lump-sum price which he deems sufficient to enable him to meet any costs he will encounter in the application of the various clauses in the Environmental Management Programme, for the entire duration of the contract	Sum	1	R	-	R	-
12	De-sestablishment	Sum	1	R	-	R	-
	TIME RELATED ITEMS						
	<u>Operation and Maintenance of Facilities on Site for Duration of Construction. (unless otherwise stated)</u>						
	<u>Facilities for Contractor</u>						
13	Offices and storage sheds	Sum	1.00	R	-	R	-
14	Workshops	Sum	1.00	R	-	R	-
15	Laboratories	Sum	1.00	R	-	R	-
16	Living accommodation	Sum	1.00	R	-	R	-
17	Tools and equipment	Sum	1.00	R	-	R	-
18	Access	Sum	1.00	R	-	R	-
19	Plant	Sum	1.00	R	-	R	-
20	Supervision for duration of construction	Sum	1.00	R	-	R	-

21	Complying with Eskom Health and Safety and COVID 19 Requirements	Sum	1.00	R	-	R	-
22	Company and head office overhead costs for duration of construction	Sum	1.00	R	-	R	-
23	Other time related obligations	Sum	1.00	R	-	R	-
24	Complying with Environmental Management Programme and all other statutory environmental requirements	Sum	1.00	R	-	R	-
25	Security for the works for duration of the Contract, .	Sum	1.00	R	-	R	-
26	Detailed "as built" records (as per works information) 3 soft copies and 1 hard copy	Sum	1.00	R	-	R	-
Carried to Summary						R	-
BILL NO 2: TASK SCHEDULE Geotechnical studies <u>Subsurface assessment by non-invasive methods</u> <u>Thermal Imaging with a Drone: A thermal camera, preferably mounted on a drone for comprehensive coverage, is employed to detect abnormal heat spots beneath the surface. This thermal imagery is ideally suited to thermal hot spot detection and for thermal change detection over time.</u> <u>2D Electrical Resistivity Tomography (ERT): Utilized to identify electrical anomalies in the soil that could be potential sources of combustion. Resistivity anomalies are contingent on the soil composition, with dry materials likely exhibiting high resistivity anomalies compared to the host rock.</u> <u>Microgravity Surveys: Applied to map density variations in subsurface formations. Areas with combustible materials are anticipated to display low-density anomalies in contrast to the host rock.</u> <u>Multichannel Analysis of Surface Waves (MASW): This geophysical method maps velocity variations in surface wave propagation, reflecting density distribution within the host rock mass. Areas with combustible materials may exhibit reduced surface wave velocity anomalies due to density changes.</u> <u>Geophysics – Thermal imaging (ERTs, CSW/ MASW) & Remote Sensing) and provide a report</u> <u>20 Rotary drilling (boreholes at max. 20 m) and provide a report</u> <u>Assessment of the underground pillars & intersections (to determine the strength of pillars) and provide report</u> <u>Determine the extent of water flooding & levels of flooding - Report</u>							
27	Subsurface assessment	Sum	1	R	-	R	-
28	Excavation of test pits	Sum	1	R	-	R	-
29	Drilling	Sum	1	R	-	R	-
30	Underground Fires Investigations	Sum	1	R	-	R	-
31	Laboratory tests	Sum	1	R	-	R	-

32	Unforeseen Tests	Sum	1	R	-	R	-
	<u>Final report and recommendation</u>						
	<u>A successful project would establish the way forward in terms of creating a sustainable solution for the safety and integrity of the ESKOM Vulcan Sub-Station and its surroundings. Appropriate remediation measurements should be presented to eliminate the source of combustion and to rehabilitate (and reconstruct, if feasible) any damage to infrastructure.</u>						
33	Report writing with recommendations and provide detail drawings	Sum	1	R	-	R	-

	Gas assessment studies <u>Based on the results of these techniques and the depth of the problematic area, the following steps are recommended to identify the nature of the problem:</u> <u>For a depth of less than 3 m: careful excavation of the soil by hand or Tractor- Loader Backhoe (TLB)-type light mechanical excavator up to the problem area.</u> <u>For a depth of more than 3 m, percussion drilling is used to assess the extent and depth of the problem. Depending on the geophysical results, drilling is usually undertaken 20 Rotary drilling (boreholes at max. 20 m).</u> <u>After the excavation or drilling, a visual examination of the soil should be done to identification gas accumulating areas</u> Gas sampling & analysis Evaluation of the overall gas composition Health & safety risks associated with the gases Potential control measures associated with the gases						
34	Subsurface assessment	Sum	1	R	-	R	-
35	Excavation of test pits	Sum	1	R	-	R	-
36	Drilling	Sum	1	R	-	R	-
37	Underground Fires Investigations	Sum	1	R	-	R	-
38	Laboratory tests	Sum	1	R	-	R	-
40	Unforseen Tests	Sum	1	R	-	R	-
	Final report and recommendation <u>A successful project would establish the way forward in terms of creating a sustainable solution for the safety and integrity of the ESKOM Vulcan Sub-Station and its surroundings. Appropriate remediation measurements should be presented to eliminate the source of combustion and to rehabilitate (and reconstruct, if feasible) any damage to infrastructure.</u>						
41	Report writing with recommendations and provide detail drawings	Sum	1	R	-	R	-
	Rehabilitation of the area <u>The occurrence of underground coal fires requires the three elements shown in Figure 5: coal with a tendency for spontaneous combustion, a certain concentration of oxygen, and a temperature reaching the spontaneous combustion point of coal.</u> <u>Rehabilitating areas affected by underground combustion, especially in mines or areas previously mined, involves isolating the fire, preventing further spread, and potentially extinguishing the fire using methods like water injection, inert gas injection, or excavation. The rehabilitation / remediation options can only be defined and scoped by a suitably qualified engineer once the geoscientific site investigations work is concluded. This Phase of the project falls outside the scope of CGS expertise, and should commence immediately after finalisation of the site investigation work. The CGS could assist with facilitating a turn-key solution of this work, or ESKOM can appoint an engineering firm directly, with advisory support from CGS.</u>						

42	Rehabilitation of the area	Sum	1	R	-	R	-
	Carried to Summary					R	-
	TOTAL (EXCLUDING VAT)					R	-