



Kwapata: kulahlwa, kushiswe udoti emaxhaphozini



I Manning Avenue ngezinye zezinsuku zemvula enamandla.



Masons Mill: Indawo yokulahla u doti engekho emthethweni



**Inqubo  
 Mgomo  
 Yokuguqugu  
 quka  
 Kwesimo  
 Sezulu  
 Yomkhandlu  
 Wase  
 Msunduzi**



Ukulahlwa Ngokungemthetho kwadoti eKhan Road



Ukuguguleka Komhlabathi e Clarendon



Ashburton isiphehlmanzi



Esiqiwini I Bisley

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1. <b><u>Ithebula 1:</u></b> (B6) Uhlelo senzo lokuguquguquka kwesimo sezulu. Izikhathi eziveziwe zimayelana neminyaka emihlanu yokubuyekeza iSEMP	<b>17</b>
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# 1. ACRONYMS

DEDTEA	Department Of Economic Development, Tourism And Environmental Affairs Previously known as the Department of Agriculture and Environmental Affairs (DAEA)/ Umnyango wezokuthuthukiswa komnotho, ezokuvakasha, kanye nezindaba zezemvelo, phambilini obuwaziwa njengomnyango wezolimo kanye nezindaba zezemvelo.
EIA	Environmental Impact Assessment/ Ukuhlolwa Komonakalo Kwezemvelo.
EMF	Msunduzi Municipality Environmental Management Framework/ Isisekelo soMkhandlu wase Msunduzi Sokulawulwa kweZemvelo.
GHG	Green House Gases/ Amagesi abamba ukushisa emkhathini
I&AP's	Interested and Affected Parties/ Izinhlangano ezinogqozi ne zithintekayo.
IDP	Integrated Development Plan/ Uhlelo lwentuthuko edidiyelwe.
IEMP	Msunduzi Municipality Integrated Environmental Management Policy/ Inqubomgomo edidiyelwe yokulawulwa kwezemvelo yomkhandlu wase Msunduzi.
IPCC	Intergovernmental Panel on Climate Change/Umthimba wamazwe ngamazwe wokugugququka kwesimo sezulu.
KZN	KwaZulu-Natal
LA21	Local Agenda 21
MDGs	Millennium Development Goals
NEMA	National Environmental Management Act (Act 107 of 1998) Umthetho Kazwelonko woKulawulwa kweZemvelo (Umthetho 107 ka 1998)
NGOs	Non-Governmental Organisations/ Izinhlangano ezizizimele ezingekho ngaphansi kuka Hulumeni.
SEA	Msunduzi Municipality Strategic Environmental Assessment/ Umkhandlu wase Msunduzi Uhlolo Masu lwezemvelo
SEASQ	Msunduzi Municipality Strategic Environmental Assessment Status Quo/ Isimo Samanje Sohlolo Masu kweZemvelo somkhandlu Wase Msunduzi
SEMP	Msunduzi Municipality Strategic Environmental Management Plan/ Uhlelo lwamasu okulawula ezemvelo lomkhandlu wase Msunduzi.
UNFCCC	United Nations Framework Convention on Climate Change/ Isisekelo Sombuthano Wenhlangano yezizwe Ngo kuGuquguquka kwesimo sezulu.
WESSA	Wildlife and Environment Society of South Africa/ Ezempilo yasendle Nomphakathi we Mvelo wase Mzansi Afrika.
WWTW	Waste Water Treatment Works/ Imisebenzi yokulashwa kwamanzi adoti
WWTS	Waste water treatment systems/ izinhlelo zokulashwa kwa manzi adoti.

Foot notes njengo; **B7: Uhlelo senzo lokuvuselelwa komhlaba osingethwe wu Msunduzi** – bheka kuhlelo senzo nemisebenzi okuqukethwe ku SEMP (2010).

## 2. GLOSSARY/Isichazimagama

Adaptation/Uzinzo	In the climate change context, adaptation implies an adjustment in natural or human systems in response to a changing/changed climate. Even if emissions are stabilized relatively soon, climate change and its effects will last many years, and adaptation will be necessary <sup>1</sup> / kumongo wokuguquguquka kwesimo sezulu uzinzo lusho ukulungiswa kwemvelo noma izinhlelo zabantu ekuphenduleni ekushintsheni kwesimo sezulu. Ngisho noma umonakalo unganqandwa ngokushesha, ukushintsha kwesimo sezulu nemithelela yako kuyohlala iminyaka kanti nozinzo luyobaluleka.
Adaptive capacity/ Umthamo wozinzo	is the ability to adjust to new climate conditions; for a farmer facing drought, for example, this might mean being able to switch to drought resistant crops, install irrigation systems, or find a different way to make a living (Rattana & Krawanchid, 2012)/kuwukukwazi ukuzinza kwesimo sezulu esisha; ngokomlimi obhekene nesomiso, isibonelo, loku kungasho ukukwazi ukuguqukela ezitshalweni ezikwazi ukuphila ngaphansi kwesomiso, ukufakwa kwezinhlelo zokunisela noma ukuthola indlela yokwakha ukuphila.
Alien Invasive Species/Izinto eziphilayo ezingewona umsinsi wakulelizwe	Species that are classified as such by the Conservation Of Agricultural Resources Act (CARA, Act 48 of 1983)/ Izinto eziphilayo ngokukleliswa kwazo njengoba zinjalo wu Conservation Of Agricultural Resources Act (CARA, Act 48 of 1983)
Anthropogenic influences/Imisebenzi yabantu	Human induced impacts which (in this case refers to climate change) result in climate change affects/ Umonakalo owenziwa abantu okuwukuthi kuloludaba ubhekiswe ekuguquguqukeni kwesimo sezulu noholela kumonakalo wesimo sezulu.
Carbon Footprint	A measurement used to calculate the impact human activities have in the environment. Measured in terms of the amount of greenhouse gases emitted from each activity and reported in units of CO <sub>2</sub> / Yisilinganiso esisetshenziselwa ukubala umonakalo wemisebenzi yabantu onayo kwimvelo. Kubalwa inani lamagesi avimba ukushisa aphuma kusukela kumsebenzi ngamunye ziphinde zibikwe ngazinye noma amayunithi e CO <sub>2</sub>
Carbon Sequestration	Is the process of removing carbon from the atmosphere and depositing it into a reservoir / sink/ inqubo yokususa umoya ongcobile emkhathini nokuwubeka echibini.
Carbon Reservoirs or sinks	Reservoirs or sinks can be natural or manmade ranging from forests (which naturally absorb and store CO <sub>2</sub> ) to underground storage units designed to hold CO <sub>2</sub> pumped from vents (IPCC AR4 WG3, 2007)/ lawa ngamadamu noma o sinki angaba awemvelo noma akhiwe ngumuntu asukela emahlathini ngokwemvelo abamba aphinde agcine umoya ongcobile.
City/Idolobha	Refers to the Msunduzi Municipal area, which comprises of five Area Based Management areas: Vulindlela. Edendale, Imbali, central and northern areas/ Kushiwo indawo yomkhandlu Umsunduzi eyakhiwa izindawo ezinhlanu; Vulindlela; Edendale, Imbali; emaphakathi nezindawo ezise Nyakatho
EIA	A study that determines the direct and indirect impacts of a specific type of development on a specific site. It is used to guide decisions on whether to permit proposed developments, thus avoiding negative impacts on the environment/ Isifundo noma ucwaningo oluthola imithelela ngqo nengekho ngqo mayelana

<sup>1</sup> UNFCCC Glossary of Climate Change Acronyms [http://unfccc.int/essential\\_background/glossary/items/3666.php](http://unfccc.int/essential_background/glossary/items/3666.php)

	nentuthuko endaweni thize. Isetshenziselwa ukuqondisa izinqumo ekutheni kumele yini kuvunyelwe intuthuko ehlongozwayo, kuphinde kuvikelwe imithelela emibi kwezemvelo.
Exposure	“Refers to the extent of which a community or sector is in contact with climate change impacts. For example, if someone lives in an area affected by drought or in a flood zone” (Rattana & Krawanchid, 2012)/ kusho ukuba sezingeni lapho umphakathi noma isikhungo sinokuthintana nomonakalo wokuguquguquka kwesimo sezulu.
Greenhouse Gases	Atmospheric gases that create a greenhouse effect by increasing the amount of heat retained by the Earth’s atmosphere, thus contributing to an increase in global temperatures/ amagesi asemkhathini akha isivuvu ngokwandisa inani lokushisa okugcinwa wumkhathi womhlaba nokuholela ekunyukeni kwamazinga okushisa emhlabeni.
LA21	I Local Agenda 21 uhlelo senzo olususelwa kuhlelo senzo lomhlaba jikelele lwentuthuko esimeme olubizwa nge Agenda 21. Kuhloswe Ngalo ukuhlomula kwentuthuko esimeme kwimphakathi yasemadolobheni ngama 21 <sup>st</sup> century. Ngo 1992, abaholi bamazwe angu 179 babuthanela e Rio de Janeiro behlanganela ingqungquthela yomhlaba yenhlango yezizwe ukuzoqedela loluhlelo. Loku okulandelayo izimiso eziyisikhombisa ze LA21: <ol style="list-style-type: none"> <li>1. Ukwethula kwemikhakha eminingi (Multi-sectoral approach)</li> <li>2. Ukuhlunganisa izindaba zomphakathi, kwezomnotho nezemvelo</li> <li>3. Ukukhathazeka ngekusasa</li> <li>4. Ukulingana kobulungiswa nokuziphendulela</li> <li>5. Ukwazi nokusebenza ngaphakathi kwe ecological limits</li> <li>6. Ukuthuthukisa ubudlelwano nomphakathi</li> <li>7. Ukuxhumanisa izindaba zendawo yasekhaya nezomhlaba jikelele</li> </ol>
Climate Change Mitigation	Climate change mitigation generally involves reductions in human emissions of greenhouse gases. Mitigation may also be achieved by increasing the capacity of carbon sinks. Climate change mitigation can be referred to as a human intervention which can reduce sources or enhance the sinks of GHG’s (IPCC, 2013)/ Ukushintsha kwesimo sezulu ngokuvamile kubandakanya ukunciphiswa kwamagesi abantu abamba ukushisa. Ukunciphisa umonakalo kungazuzwa ngokunyusa umthamo wama carbon sinks. Ukunciphisa umonakalo wokushintsha kwesimo sezulu usho ukungenelela kwabantu nokunganciphisa umsusa nongakhuphula ukucwila kwamaGHG’s
Offset	According to BBOP (nd), refers to “measures taken to compensate for any residual significant, adverse impacts that cannot be avoided, minimised and / or rehabilitated or restored, in order to achieve no net loss. Offsets can take the form of positive management interventions such as restoration of degraded habitat, arrested degradation or averted risks”. A <b>carbon offset</b> is a reduction in emissions of carbon dioxide or GHGs made in order to compensate for or to ‘counterbalance’ an emission made elsewhere (Goodward & Kelly, 2010)/ Ngokusho kwe BBOP (nd), kusho izinyathelo ezithathelwe ukunxephezela noma iwuphi umonakalo ophawulekayo ongeke wanqandeka, wanciphiseka noma wavuselelwa, noma wabuyisela esimweni ukuze kufezwe ukungalahlekelwa. I offset ingathatha ingxenye enhle yokulawula nokungenelela njengokubuyisela amakhaya alahlekile emvelo, ukuqedwa kwengcuphe ukubopha ukukhahlamezeka kwemvelo.  I carbon offset iwukunciphisa umonakalo wokungcola komoya noma ukunqwabelana kwama GHG’s eyenzelwe ukunxephezela ukuze kulinganiselwe umonakalo owenzeke ndaweni thize eceleni.

Open Space Systems	A linkage of various ecological systems (i.e. marine, terrestrial and freshwater) ensuring that the interaction between plants, animals, energy, water nutrients and genetic material can occur in a dynamic and relatively undisturbed manner. It is both a means to conserve indigenous flora and fauna, and an important step in maintaining ecological balance within the city./ loku kuwukuxhumanisa izinhlelo ezechukene kwezemvelo (njenge zasolwandle, zasemhlabeni, namanzi ahlanzekile) kuqinisekiswa ukuthi ukuxhumana phakathi kwezitshalo, izilwane, amandla, amanutrients amanzi ne zakhi zofuzo zingakhandeka ngendlela eguqukayo nengaphazamisekile. Kokubili kuyindlela yokonga izitshalo nezilwane zomsinsi wakullelizwe, nokuyisinyathelo esibalulekile sokugcina ukulingana edolobheni.
Open Spaces	<p>Ama Open space akhiwe yizinhlobo ezimbili Okuyi urban open spaces ne natural open spaces.</p> <ol style="list-style-type: none"> <li><b>1. Urban Open Spaces:</b> are the human made or legally designated spaces and areas within the city that are developed for community use. They include parks, sports fields, agricultural fields, streets, town squares, road reserves such as electricity transmission lines, dams, private gardens etc. / lezi yizindawo ezakhiwe umuntu noma ezihlelwe ngokomthetho nezindawo ezisedolobheni ezithuthukiselwe ukusetshenziswa umphakathi. Zibandakanya amapaki, izinkundla zemidlalo, amasimu ezolimo, imigwaqo, izikwele zedolobha, izinhlangothi zomgwaqo ezibekelwe ukuhambisa inhlanganisela kagesi.</li> <li><b>2. Natural Open Spaces:</b> are the remaining undisturbed natural and undeveloped areas in the city. They are the areas that contain the core terrestrial, freshwater, estuarine, rivers, and wetlands etc. lezi yizindawo ezisele ezingaphazamisekile zemvelo nezingakathuthukiswa edolobheni. Ziyizindawo eziqubekela ama core terrestrial, amanzi ahlanzekile, estuarine, imifula namaxhaphozi.</li> </ol>
Riparian Habitat	According to the National Water Act: includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those adjacent areas/ Ngokusho koMthetho kaZwelonke wezamanzi: kuhlanguka isakhiwo ngokomzimba nokuhambisana nezitshalo zendawo ezihambisana nesizinda samanzi ezivemise ukukhombakaliswa yinhlabathi enesihlabathi futhi egugulekile ngandlela thize nekwazi ngokwanele ukwesekela izitshalo ngokwakheka nangokubonakala kwazo ukwehluka kusuka ezindaweni ezakhelene nayo.
Sensitive Environment/ Imvelo Eyichezecheze	An environment that is or contains species that are highly endangered. This could also be an environment that may be easily damaged and whose damage may reflect negative results/ Imvelo okukuthi noma equbekela izinto eziphilayo ezisengozini kakhulu. Loku kungaba imvelo engalimazwa kalula nokuwukuthi ukulimala kwayo kungaveza umthelela ongemuhle.
Sensitivity/ Ubuchezecheze	“Is the degree to which a community or system can potentially be affected by climate change; for example, droughts will have a much greater impact on agriculture than on transportation” (Rattana & Krawanchid, 2012). Izinga lapho umphakathi noma izinto kungenzeka zithikamezeke ngenxa yokuguquguquka kwesimo sezulu isibonelo; isomiso sizoba nomthelela omkhulu kwezolimo kunakwe zokuthutha (Rattana & Krawanchid, 2012).
Sustainable Development/ Intuthuko Esimeme nenenqubekela phambili	In terms of NEMA (Act 107 of 1998, Section 2), means the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations. Local Agenda 21 emphasizes the importance of balancing institutional, social, economic and environmental considerations as four balancing pillars of sustainable

	development/ Nkokuka NEMA (uMthetho 107 ka, 1998, Isigaba 2) kusho ukuhlanganiswa kwezici zezehlalo, ezomnotho nezemvelo ekuhlweni, ekuqalisweni nasekuthathweni kwezinqumo ukuze kuqinisekise ukuthi intuthuko isiza izizukulwane zamanje nezangomuso. I Local Agenda 21 igcizelela ukubaluleka ukulinganisa izikhungo kwezehlalo, ezomnotho, nezemvelo njengezinsika ezine zokulinganisa zenthuthuko esimeme nenenqubekela phambili.
Vulnerability/Ingcuphe	“Is the degree to which a community or system is actually susceptible to climate change impacts; it increases with exposure and sensitivity, and declines with adaptive capacity” (Rattana & Krawanchid, 2012)./ izinga lapho umphakathi noma izinto ziba sengcupheni kumonakalo wokuguquguquka kwesimo sezulu; loku kukhuphuka ngokuqgqama nokuba yichezecheze kanjalo nokwehla komthamo wozinzo (Rattana & Krawanchid, 2012)
Water Resources/Imithombo yamanzi	According to National Water Act includes a watercourse, surface water, estuary or aquifer/ Ngokusho koMthetho kaZwelonke wezamanzi ubandakanya izizinda zamanzi, amanzi angaphezulu, esizalweni somfula noma ngaphansi komhlaba (aquifer)
Watercourse/Isizinda samanzi	According to the National Water Act means: <ul style="list-style-type: none"> <li>a). A river or spring,</li> <li>b). A natural channel in which water flows regularly or intermittently,</li> <li>c). A wetland, lake or dam into which, or from which, water flows and</li> <li>d). Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse,</li> </ul> and reference to a watercourse includes, where relevant, its bed and banks Ngokusho koMthetho wamanzi kaZwelonke kusho: <ul style="list-style-type: none"> <li>a). Umfula noma Isiphethu,</li> <li>b). Umsele wemvelo ogeleza amanzi njalo noma ngezikhathi ezithile,</li> <li>c). Ixhaphozi, ichibi noma idamu lapho, noma lapho amanzi egeleza futhi</li> <li>d). Noma ikuphi ukuqoqwa kwamanzi lapho uNgqongqoshe, ngesaziso kwiGazethi, angamemezela ukuba kube izizinda zamanzi, futhi ukucashunwa kwezizinda zamanzi kuhlanguanisa, lapho kufanele, embhedeni womfula nonqenqema</li> </ul>
Wetland/ Ixhaphozi	according to the National Water Act means: land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soils/ Ngokusho ko Mthetho ka Zwelonke weZamanzi Kusho: umhlaba ophakathi kwenhlabathi ne mpilo yasemanzini lapho itafula lamanzi livamise ukuba seduze nobuso noma umhlaba ngezikhathi wembozwe amanzi angajulile nalapho umhlaba ujoywele ukuba nezikhathi zokuseka izitshalo ezizenza kahle emhlabathini omanzi.

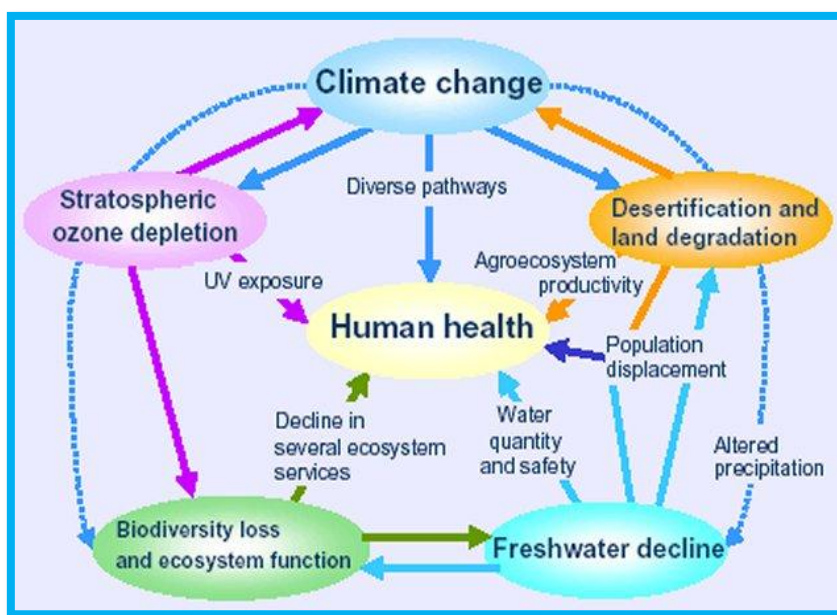
### 3. ISINGENISO

#### 3.1. Ukuchaza ukuguquguquka kwesimo sezulu

Ngokwethimba likazwelonke lokuguquguquka kwesimo sezulu (International Panel on Climate Change) (IPCC, 2007: 23) lichaza ukuguquguquka kwesimo sezulu njengo; *“ukushintha kwesimo sezulu okusabalala ngokuqondile noma ngokungaqondile kwimisebenzi yabantu nokushintsha ukwakheka*

*komkhathi emhlabeni futhi nokuwukwengeza ekuhlukeni kwesimo sezulu sendalo okubonakala emuva kokuqhathaniswa kwezikhathi.”*

Ukubeka ngalula nje, ukuguquguquka kwesimo sezulu kusho ukshintsha kwesimo sezulu okuholela ekungabalekini kokuqondile noma kokungaqondile kwezimo ezikhungatha imvelo kanjalo nakubantu. (Njengoba kukhonjisiwe ephuzwini 1 elingezansi). Ngokusho kwe-Envirokids (2008, ikhasi6) “*akunakungibaza ngokuthi amazinga okushisa ayanyuka nokuthi isimo sezulu siyashintsha, njengoba eminyakeni embalwa eyedlule bekunokushisa ngokwedlulele emlandweni*”. Ukwenyuka kwamazinga okushisa emkhathini adala futhi aholela ezimeni zezulu ezingaqaguleki, uma loku kuqhubeka, kumele silindele ukwenyuka kwamaza, nokwanda komoya oshisayo, isomiso, izikhathi zezimvula ezinamandla nomoya onamandla. (Envirokids, 2008 Page 6-7).



**Isigaba 1:** ngabe ukuguquguquka kwesimo sezulu kuyiphazamisa kanjani imvelo nabantu (Dissanayake, 2011).

I American Geophysical Union, (AGU, 2013) ithi imisebenzi yabantu ikhuphula isimo sokuguquguquka kwesimo sezulu ngamandla emhlabeni futhi lezinguquko zizoqhubeka nokwenzeka ngenxa yokukwenyuka ngokungefaniswe kokunqwabelana emkhathini Komoya ongolile (Carbon dioxide) kanjalo nezinhlayiya ezincane ezivimbela ukushisa kwelanga (GHG’s). Imisebenzi yabantu iholela ekuguquguqukeni kwesimo sezulu ngokwenza izinguquko emkhathini womhlaba ngezanga lezinhlayiya ezincane (GHGs, aerosols) kanye namafu. Okunye okwaziwa kahulu ngokuholela kulesisimo ukushiswa kwezimbiwa phansi (Fossil Fuels) nokukhiphela umoya ongolile emkhathini.

I AGU (2013), ithi imisebenzi yabantu enyuse amagesi avimba ukushisa emkhathini iyona eholele ekubonakaleni kokukhula kokushisa emhlabeni ngamazinga alinganiselwa ku 0.8°C (1.5°F) emveni



kweminyaka engu 140 eyedlule. Ngoba izinhlelo zemvelo ngeke zisheshe zisuse amanye alamagesi (ikakhulu i carbon dioxide) emkhathini, imuva, nemanje, kanjalo nekusasa lethu ekungcolisekeni lizokhungatha isimo sezulu isikhathi eside okuyiminyaka eminingi (millennia)". I AGU (2013), "inezezela ngokuthi ukuguquguquka kwesimo sezulu ngenxa yemisebenzi yabantu akulindelekile ukuba kufane emveni kwegeba lesikhathi. Ukuphela kwamahlathi, ukwanda kwamadolobha, nokwanda kokungcola kungaba nobunzima kwizigaba zonyaka, nakumonakalo wesikhathi eside emazingeni okushisa, imvula, nakwizimpahla zamafu. Ukwengeza kuloku; ukuguquguquka kwesimo sezulu ngenxa yemisebenzi yabantu ingashintsha ukuzungeza komkhathi, ishintshe ukubekeka kwe phethini yomlando ekuhlukeni kwemvelo ne siphepho".

I Organisation for Economic Co-Operation and Development (OECD, 2007) ithi izinyathelo ezisheshayo ziyadingeka ukuqinisekisa ukuthi umonakalo wokuguquguquka kwesimo sezulu nokuphazamiseka kwezinhlayiya ezincane ezisemkhathini ezivimba ukushisa kwelanga (GHG's) kuyanciphiswa eminyakeni ezayo. I OECD (2007), iphinde yengeze ngokuthi "increasing evidence that the overall benefits of strong and early action to reduce GHG emissions outweigh the costs" in the long term. There is a need to reduce emissions at the lowest possible cost to ensure a realistic chance of limiting further climate change.

Iphepha Lebhange Lomhlaba "*Makwehliswe ukushisa: kungani ukwenyuka kwamazinga okushisa ngo 4°C emhlabeni kumele kugwenywe*" liqagula ukuthi kuzoba nokunyuka komonakalo wezehlazakalo zesimo zezulu ezinzima, ezizoba nesiphepho nezikhukhula eziningi, isomiso esikhulu nomoya oshisayo (I Potsdam Institute for Climate Impact Research and Climate Analytics, 2012). Loku kuzoholela ekuphazamisekeni kwendawo enkulu emhlabeni wezolimo futhi kungaholela ekulahlekeni kokunotha kwemvelo. kunezincomo zokuthi ukuqagulwa kwesimo sezulu so Mkhandlu woGu lwase Mgungundlovu (UMDM), KwaZulu-Natal, luzobhekana nokufudumala esikhathini esizayo kanjalo noshintsho olungaqondakali kumlinganiso wezimvula zonyaka, nokunyuka kwezehlakalo zezikhukhula neziphepho ngenxa yokwenyuka kwezimvula zesikhathi esifushane. (Adaption Fund, 2014, ikhasi 20). Ezinye zezinto ezikhathazayo eziye zagqamiswa yi Adption Fund ngezokuthi izikhukhula, iziphepho ezinamandla, nezintabamlilo seziye zabonakala eKZN futhi ukuqagula kuye kwaveza ukuthi lezi zingcuphe zingaya phambili ngenxa yomonakalo ohlobene nesimo sezulu (Adaption Fund, 2014, Ikhasi 20).

### **3.2. Isimo sezulu nezinga lomoya e Pietermaritzburg**

I Strategic Environmental Assessment (SEA) umbiko woMkhandlu wase Msunduzi unikeza injabulo esimeni sesimo sezulu sase Pietermaritzburg, uthi, "*isimo sezulu sase Msunduzi sincike kakhulu ekuphakameni kwendawo. Ezindaweni eziphakeme zase Msunduzi zipholile futhi zithola imvula ethe xaxa*

*lapho ziqhathaniswa nezinye izindawo zedolobha.” (SRK, 2009). Umlinganiso wamazanga okushisa onyakeni ayahluka phakathi kuka 16.3°C no 17.9°C. uMsunduzi ungena ngaphansi kwezindawo ezithola izimvula ngesikhathi sasehlobo, ibonakalisa ubusika obomile nehlobo elimanzi, umbani nokuduma kwezulu kwandile ngesikhathi sase hlobo. Umlinganiselo wemvula emkhandlwini iyahluka phakathi kuka 748mm no 1017mm ngonyaka<sup>2</sup>.*

Idolobha libekeke esigodini esakhiwe amathafa emimfula yase Msunduzi kanye namakhiphelo naholela ekwakheni kongwengwezi lomkhathi (atmospheric inversion layer), ebamba ukungcola iphinde ingakuvumeli ukuba kuphume. Lolu udaba olunzulu olukhathazayo, ikakhulukazi ngesikhathi sase busika. Iningi lezimboni ezakhiwa emsunduzi zakhiwe ngaphansi kwezinga lapho ungwengwezi lwakheka khona njengalokhu lomhlabha uyithafa futhi usondele kakhulu emizileni yezokuthutha (SRK, 2009). ngakhoke, idolobha liyahlupheka ngokungcola ngokuphakama okuncane kongwengwezi nangale kwezimboni ezimbala ezinkulu.

I IDP<sup>2</sup> yedolobha ithi *“ukugcina ‘luhlaza’ kwezemvelo kubalulekilekukona kokubili okuyisithombe sedolobha kanjalo nomphakathi, nezempilo yemvelo kwizakhamuzi.kunesidingo sokugxila ezinhlelweni zokutshala Enkabeni yedolobha (CBD) ukubuyisela okubulawe yisiphepho nokudala/ukususa izihlahla eziyingozi kutshalwe eziwumsinsi wokumila kulelizwe ezikwazi ukuphila nangaphansi kwesomiso. Kunesidingo sokugxila kumasu okuguquguquka kwesimo sezulu, kugxilwe kakhulu nasezintweni zokuvuselela kanjalo nasekubhekeni nakumasu ohlalo zinzo<sup>3</sup> nokuzonyusa uzinzo emphakathini kumonakalo wokuguquguquka kwesimo sezulu.”* Umbono woMkhandlu wango 2030 uthi *“ngo 2030 uMsunduzi uzoba uyidolobha elisebenayo elinamanzi ahlanzekile, nokuithutthwa kwendle okungaphazamisekile, ukuphakelwa kwamandla kagesi okwanele nokuqoqwa kuka-doti- kuwona wonke umakhelwane, izakhamuzi nakwinkaba yama bhizinisi”. Umbono wango 2030 uphinde uqhube uthi okunye kwamaphuzu okugxilwe kuwona ukuthi “ukuhlanzeka nokuba luhlaza kwedolobha, kugxilwe, ekusabalalisweni kwamandla abuyiselekayo, kwakhiwe izindawo ezivulekile zomphakathiukuvuselelwa kwezindawo zasemadolobheni nokuthuthukiswa kokuba luhlaza kwazo.”*

### **3.3.** Amaphutha

I Msunduzi SEA ithi amasu kanye nezinhlelo kumele ziphenywe futhi ziqaliswe ukuze kuqinisekise ukuthi imithombo yemvelo iyongiwa futhi isetshenziswa ngendlela ephisile. Ngokwesibonelo, okuyiyona ngqinamba, ukungabibikho kwezimpendulo ezanele kanjalo nomthamo wokuhlela phakathi eminyangweni yomkhandlu kanye nokwentuleka kwamasu okwandulela kanye nokuqagula imithelela engaba khona ukuze afeze izinhlelo zamasu ohlalozinzo kanye nezinhlelo zokwelapha isimo sezulu

<sup>2</sup> Msunduzi Municipality Integrated Development Process Plan: I IDP eyamukelwa nohlelo lwezimali luka 2014/2015 Unyaka wezimali.

<sup>3</sup> Amasu ohlalozinzo nokunciphisa umonakalo omkhandlu wase Msunduzi ayalungiselelwa.

ezihlobene zezinhlekelele zemvelo. Kubalulekile ukuthi yonke imikhakha kahulumeni izimbandakanye ekusungulweni kwamaqhinga nenqubomgomo yesimo sezulu ukuze kuqinisekise ukuthi ukwenza ngcono kanye nohlalozinzo lifakiwe kuyo yonke imigomo yomkhandlu, amasu mpendulo kanjalo namaqhinga.

Okunye okuyingcuphe okuye kwatholakala kumi kanje:

- Umonakalo wamagesi avimba ukushisa (GHG's) kanye nomoya ongcobile (CO2) womkhandlu wase Msunduzi okwamanje awuqaphiwe awulinganiselwa.
- Ukubuyiselwa kokulahleka kwezindawo ezinothe ngokwemvelo, nezindawo ezivulekile, akukabhalwa, kwamukelwa futhi kwashicilelwa ngokusemthethweni.
- Izakhiwo zomkhandlu/ ezisetshenziswa umkhandlu aziwukali umonakalo wamagesi avimba ukushisa (GHG's) kanjalo nomoya ongcobile (Carbon footprints) futhi azikho izinyathelo zokuthuthukisa nokuqinisekisa kwabo ukusebenza kwemvelo.
- Ukungabibikho kwezimpendulo ezanele kanye nomthamo wokuhlela ngaphakathi eminyangweni yomkhandlu.

#### **3.4. Izinhlangothi ezisengcupheni eziye zabonakala futhi le nqubomgomo ezobe igxile kuzo**

Imikhakha ehlukahlukene iye yakhonjwa nezoba ngeminye ekhahlamezeke kakhulu wukuguquguquka kwesimo sezulu/ imithelela ehlobene nokuguquguquka kwesimo sezulu e Msunduzi imi kanje:

1. Imithelela kwizindawo ezinothe ngokwemvelo, emhlabeni nobucayi bemvelo kwezemvelo.
2. Izinguquko kanye nemithelela ezizindeni zamanzi ikakhulukazi ukutholakala kwamanzi, ukuhlanzeka nobuningi bawo.
3. Imithelela ekuhlinzekweni kokudla, kanye nokusimamiswa kwezolimo.
4. Imithelela empilweni yomuntu ngenxa yokwenyuka kwamazinga okushisa/ nokugcwele/ okuvela nezifo ezihambelana nokushisa.
5. Imithelela kwizi ngqalasizinda zamanzi ezulu kanye nezinye ezakhiwe ezindaweni ezingahle zibe nezikhukhula.
6. Ukulawulwa Ku ka-doti.
7. Ukwenyuka kokusetshenziswa kwamandla kanye nomthelela kwi-ngqalasizinda ka Gesi.
8. Imithelela emikhakheni yezokuthutha ne Ngqalasizinda.

Inqubomgomo yoku guquguquka kwesimo sezulu ihlose ukukhipha lezi zimpikiswano ezijulile kanye nezincomo zohlalozinzo kanjalo nezi nyathelo zokunciphiswa ngemininingwane egcwele, okumele ishicilelwe. ( njengokuthi uhlalozinzo ngalunye kanye nezincomo zokwehlisa umonakalo luyoba indawo ethize) noluyoholela ekuncishisweni kwemithelela ehlobene nokuguquguquka kwesimo sezulu kwimikhakha ngayinye ebalwe ngaphezulu.

## 4. UKUZIBOPHEZELA NGOMTHETHO KOHULUMENI BASEMAKHAYA

Iningizimu Afrika Inemithetho ehluahlukene, iziqondiso kanye nemihlahlandlela, elawula ukuvikelwa nokuphathwa kwe mvelo. Imithetho efanele eyazisa kule nqubo mgomo kuhlanganisa, kodwa akugcini kule elandelayo:

- **Umthetho Sisekelo ka Zwelonke wase Ningizimu Afrika**, Umthetho 108 ka 1996 (Isigaba 24) Uqinisekisa zonke izakhamuzi ilungelo lokuba sendaweni ephophile nenempilo. Uphinde unikeze ilungelo ukuze kuzuze izizukulwane zamanje nezesikhathi esizayo indawo evikelekile ekungcoleni nasekucekelweni phansi ngokusebenzisa umthetho ophusile nezinye izinyathelo. Kungumsebenzi wo Hulumeni Basemakhaya mayelana nomthetho sisekelo ukuqinisekisa ukuthi izakhamuzi ezindaweni abakuzo abancishwa le mithetho yomthetho sisekelo.
- **Izinhlaka Zomkhandlu Wohulumeni Basemakhaya Umthetho 117 ka 1998** (Umthetho Wezinhlaka Zomkhandlu); **Izinhlelo Zomkhandlu Umthetho 32 ka 1998** (Umthetho Wezinhlelo Zomkhandlu). *Kunezimpiko ezimbili kwizibophezelo zohulumeni basekhaya; esokuqala simayelana nezinga elibanzi lemisebenzi enjengo kuhlela kanye nokuthuthukiswa kokuhlelwa kwentuthuko edidiyelwe, umhlaba, ezomnotho kanye nokuthuthukiswa kwezemvelo. Uphiko lwezibili luphathelene noku nikezelwa kwezinsizakalo ezithile ezinenqubekela phambili ezifana ne Zindlu ezine mpilo, amanzi kanye no gesi.*<sup>4</sup>
- Lomthetho sisekelo usuwonke unikeza umkhandlu umongo wokuhlela. Kudingeka ukuthi iziphathimandla zendawo zivumelane ngokuqoka ngohlaka olulodwa lwenqubomgomo ehlanganisiwe ezolawula ukwabiwa kwemithamo kanye nemithombo (resources), okungukuthi I IDP. Ngaphezu kwaloko; imithetho nqubo idinga ukuthi wonke ama Spatial Development Framework, akha ingxenye ye IDP kumele ancike ku kuhlolo masu ukuthola Isimo senqubekela phambil ngemvelo ngentuthuko ehlongozwayo ngaphakathi kohlaka. Izishayamthetho zebdawo zamukele/ zivume ngokuhlanganyela inqubomgomo eyisisekelo elawula ukunikezelwa komthamo kanjalo nemithombo, okuyi IDP. Okunye futhi, imithethonqubo iziqondiso zidinga wonke ama Spatial Development Frameworks, akha ingxenye ye IDP, kumele ithathise kuhlolomasu ukuze kutholakale ukusimama kwezemvelo kwintuthuko ehlongozwayo ngaphakathi kwisisekelo.
- **Iphepha Elimhlophe Likazwelonke lo Ku guquguquka kwesimo sezulu** libuyekeza ukubaluleka kokuthuthukiswa kanye nokuqaliswa kokunciphisa umonakalo kanjalo nezinyathelo zohlalo zinzo kuyo yonke imikhakhaka Hulumeni ukuze kulungiselelwe ukuguquguquka kwesimo sezulu kanye nezinkinga ezihlobene noku guquguquka kwesimo se zulu. Leliphepha lazisa ngezinqubomgomo nezinhlaka zo hulumeni basemakhaya nabezifundazwe mayelana nokulawulwa Koku Guquguquka kwesimo se zulu.

<sup>4</sup> Umbiko wezokulawulwa kwezemvelo ngezinyalelo nezibophezelo kohulumeni basemakhaya.

- **Umthetho Ka zwelonke Wokulawulwa Kwe Mvelo** (NEMA, 2010) odinga ohulumeni basemakhaya ukuthi bahloniphe, bavikele futhi ufeze wonke amalungelo abantu bawo ngesikhathi uqinisekisa ukulethwa kwezidingo ngqangi ikakhulukazi emphakathini eyayincishwe amathuba phambilini. I NEMA iphinde ithi nanoma iyiphi intuthuko esimeme enenqubekela phambili okumele yenzeke kumele kube khona ukuhlanganiswa kokulinganiswa kwezici zenhlalo, ezomnotho kanye nezemvelo. Ngaphezu kwaloko; umthetho unikeza izimiso ezihlanganisa zonke izinhlaka zombusoukuvimbela ukungcoliswa, ukuphazamiseka kanye nanoma yimuphi omunye umthelela ongemuhle kunoma iyiphi ingxenye yemvelo. Lapho ukuvikela kungenakwenzeka, iziphathi mandla zendawo kumele okungenani banciphise noma balungise umthelela. Uhulumeni wasekhaya kumele aqinisekise ukunamathela kulezi zimiso apha nde alandele izinqubo ezifanele ukuze abhekane nezingqinamba zemvelo njengoba zibekiwo kulo mthetho.
- **KwaZulu Natali Ukuguquguquka Kwesimo Sezulu Umbiko weSimo Samanje** iyavuma ukuthi ukuguquguquka kwesimo sezulu kuyindaba ekhathazayo, edinga ukunakwa, nokuthahtelwa izinyathelo ngokushesha. Igqugquzela Ohulumeni basemakhaya ukuba bamukele izinhlelo masu kanye nokuqalisa izinhlelonokungaholela ekushintsheni amazanga okusimama okunenqubekela phambili nokuqiniseka kumonakalo wokuguquguquka kwesimo sezulu.
- **UMgungundlovu Ukuguquguquka kwesimo Sezulu Impendulo Su no Hlelo** iye yathathwa wu Golder Associates futhi iye yathonywa kakhulu ukuthuthukiswa kwalinqubo mgomo. Imiphumela nokubonisiwe iye yavezwa kwi **Inhlolovo Yesimo samanje: Yezinga lesimo sezulu nokuqagulwa kwaso** ithi *“Izinkomba zithi ikusasa lendawo yase Mgungundlovu linokufudumala nokuba manzi, kanye nokwanda kokwahlukaniseka kwezimvula zesikhashana kanjalo nokwenzeka kokwenyuka kwezikhukhula nezehlakalo zesiphapho.”* Lemiphumela iqhakambisa isidingo sopenyo kanjalo nokuthuthukiswa kwezindlela ezifanele zokukunqanda kanye namasu ohlalo zinzo okumele okumele ashicilelwe emazingeni aphantsi ukuze kugwemeke imithelela emibi yokuguquguquka kwesimo sezulu emphakathini nakwi ngqalasizinda.
- **Umkhandlu wase Msunduzi Uhlolo Masu Lwezemvelo (SEA)** Yakha Ingxenye yo Msunduzi EMF. Inhloso yophiko le SEA ukuhlanganisa ndawonye okutholwe ocwaningweni olwehlukahlukene ongcweti, okuye kwenziwa kwisigaba sesimo samanje. I SEA isihlonze izitayela zokuthuthukiswa nezokukhathazeka okumele zilandiswe ekuqalisweni kwe zinhlelo zezinyathelo kanye nemisebenzi ethize eye yatholakala. Ngaphezu kwaloko; Uhlaka lwezokusimama okunenqubekela phambili oluqokethwe I SEA lunikeza uhlaka lokusebenza , ukuqaliswa kwe SEA kanye nezinhlelo zezinyathelo ezihambisanayo. Ihlanganisa imigomo, izinhloso, okubhekwayo kanye nemikhawulo yoshintsho olamukelekile ku Biophysics, Ezomnotho kubantu, kanye nokwengamelwa kwezemvelo.
- **Umkhandlu wase Msunduzi Uhlaka Lokwengamelwa kwe Mvelo Umbiko wesimo Samanje** ngokusebenzisa izifundo zobuchwepheshe lunikeza imininingwane emihle yezimo zemvelo ekhona

endaweni yomkhandlu. Ikhomba izindawo ezikhathazayo nezinezinkinga, ezingathuthukiswa/Zilungiswe ngokuqalisa umsebenzi etholakala kuhlelozenzo ebhalwe ku SEMP.

- **Uhlelo Lomkhandlu wase Msunduzi Lwamasu Okulawulwa kwezemvelo** lwakhelwe ukuhlangabezana nezibophezelo zomsunduzi ngokomthetho wase Ningizimu Afrika ikakhulukazi Umthethosisekelo, Umthetho ka zwelonke wokulawulwa kwezemvelo (NEMA) kanjalo ne Municipal Systems Act. I SEMP inikeza isisekelo okuwukuthi yilapho imisebenzi eqhubekayo izothathwa khona ukuze kuthuthukiswe futhi kulungiswe izinhloso ngqangi nemigomo yezemvelo. loku kuyokwenziwa ngokugxila ezindaweni ezizobhekelelwa kuqala ngenxa yokukhathazeka kwazo, futhi nangamagbe atholakala ku EMF/SEA kanjalo futhi nangzinhlelo zokuxhumana nomphakathi. I SEMP nezinhlelo zenzo ezihambisana nayo ngakhoke; ingumqulu onamandla okumele iqhubeke isabalaliswe phambili futhi ishintshwe lapho ukuqonda ngokwezemvelo kuya kuthuthuka.
- **Inqubomgomo Edidiyelwe Yomkhandlu wase Msunduzi Yokulawulwa KweZemvelo**, egunyazwe wu Msunduzi's Executive Committee (EXCO) ngomhlaka 07 May 2007, ihlanganisa umbono wezemvelo wo Mkhandlu. Izimiso zenqubomgomo jikelele kanye namathuluzi okulawulwa kwe Zemvelo eska umbono.
- **I Millennium Declaration kanye ne United Nations Framework Convention on Climate Change.** I MDGs iwumkhiqizo wesivumelwano sikazwelonke kwisisekelo lapho izizwe zingahlola khona inqubekela phambili ephathekayo kwinthuthuko esimeme nenenqubekela phambili. Inthuthuko esimeme kanjalo nomthamo ohambisanayo wokubhekana nokuguquguquka kwesimo sezulu ube sezintweni ezivamile. Ngakhoke; kulula ukuphetha ngokuthi ukuguquguquka kwesimo sezulu kunomthelela kwinnqubekela phambili yezizwe nomphakathi ekuyeni ekusimameni.

## 5. IPHEPHA ELIMHLOPHE LIKA ZWELONKE LOKUGUQUGUQUKA KWESIMO SEZULU

### **5.1. Ipendulo yezinhloso kazwelonke ngokuguquguquka kwesimo sezulu:**

- Ukuphumelela ukulawula umonakalo wokuguquguquka kwesimo sezulu okungalawuleki ngokusebenzisa ukungenelela okwakha kuphinde kusimamise ezenhlalo, ezomnotho, kanjalo nokuqiniseka kwe zemvelo kanjalo nomthamo wezipendulo eziphuthumayo eNingizimu Afrika. (National Climate Change White Paper, Page 11).
- Yenza umnikelo owufefe emzameni kazwelonke ekulinganiseni ukusabalala kwama GHG's emkhathini ibe semazingeni avimbela ubungozi bokuphazanyiswa izenzo zabantu esimweni sezulu kungakapheli isikhathi esibekiwe esivimela umnotho, ezenhlalo, nokuthuthuka kwe zemvelo kuqhubeke ngendlela esimeme nenenqubekela phambili. (National Climate Change White Paper, Page 11).

## **5.2. Impendulo YoHulumeni Wasekhaya: Umhlahlandlela we Ake Siphendule ne Thuluzi Kit**

Ngokusho kwempendulo *kahulumeni wasekhaya: I Lets Respond Guide and Tool Kit* eye yalungiselelwa iziphathimandla zohulumeni basemakhaya nabezifundazwe ukuba basize ekuqalisweni izinhlelo namasu okuguquguquka kwesimo sezulu (National Climate Change White Paper, ikhasi 37), kuye kwasungulwa izindlela zokuqondisa nokugququzela imikhandlu ukuba:

- Ukuqondanisa impendulo yesimo sezulu nesimo sezulu esikhona nezingqinamba zenthuthuko futhi nokujulisa umthamo wezimpendulo ezikhona.
- Ukuthuthukisa ukuxhumana nezikhungo zocwaningo nezinhlaka zomphakathi ukuze kuthuthukiswe ukusabalala kolwazi olunjengezexwayiso ezenzeka kuseva.
- Ukufakwa kolwazi lokuguquguquka kwesimo sezulu emkhakheni wokuhlela nezinhlelo ezinhlobonhlobo zoshintsho lwesikhathi eside.
- Ukuthuthukisa umkhakha owumahlukanondlela wokudidiyela ukulawula nokuthuthukisa izinhlelo.
- Ukuhamba kahle okwengeziwe kokuhlosiwe ngentuthuko ejulile, ukuhlinzekwa kokubiliokwesikhashana nokwesikhathi eside ngemihlomo ezimpdulweni zesimo sezulu.<sup>5</sup>

## **6. IMSUNDUZI'S IEMP NE SEMP**

I Msunduzi IEMP kanye ne Msunduzi SEMP yazisa ngengxenywe yale nqubomgomo njengoba yasungulelwa ukusiza/ iqondise umkhandlu ekufezeni intuthuko esimeme nenenqubekela phambili. Yomibili lemqulu ihlanganisa izinto eziningi eziwukhiye, izinhlelo, amasu, kanye nezindlela eziye zatholakala ezizosetshenziswa isikhathi esideukuthuthukiswa nokugququzela ukusimama nenqubekela phambili kanjalo nokuqinisekisa ukongiwa/ ukugcinwa kwezindawo zemvelo.

Inqubomgomo yokuguquguquka kwesimo sezulu ihlose ukuqinisekisa ukuthi iminyango yomkhandlu isho amashushu futhi iyayazisa imithelela kwezemvelo emsebenzini abayenzayo nokuthi iyaqinisekisa ukuthi kunamasu afanele endaweni avumela ukubambisana no kuhlela ukulawulwa kwezemvelo kuyo yonke imisebenzi nezakhiwo zomkhandlu.

## **7. ISENDLALELO**

<sup>5</sup> Ukuphendula kuka hulumeni wasekhaya: I Lets Respond Guide and Tool Kit (ikhasi 3).

Lenqubo mgomo yakhela phezu kohlaka lomkhandlu wase Msunduzi olulawula ezemvelo olusebenzayo Phecelezi i Environmental Management Framework<sup>6</sup> (EMF), Umbiko wesimo samanje wohlaka olulawula Ezemvelo, Uhlelo masu Olulawula imvelo (Strategic Environmental Management Plan)<sup>7</sup> (SEMP) kanye ne Nomqulu wokugcina wamasu okucubungula Ezemvelo (Final Draft Strategic Environmental Assessment)<sup>8</sup> (SEA); Nokho, inhloso ngqangi ukuhlizeka isqondiso esicacile ekuphenduleni kwisimo sokuguquguquka kwesimo sezulu kwizingozi kanye nezinselelo zakhona. Inhloso eyifolosi yale nqubomgomo ukuqinisekisa ukuthi ukungcoliswa komoya emsunduzi (Carbo footprint) kuyancishiswa futhi idolobha liyakwazi ukuba nohlalo zinzo kwimithelela ehlobene nokuguquguquka kwesimo sezulu kanjalo nokuqinisekisa ukuthi kukhona lapho kungakhethwa khona uma kumele kuthathwe izinqumo mayelana nohlalo zinzo nokunqanda/ ukunciphisa umonakalo. Ukufaneleka, ukusebenza noku hlangiswa kwale nqubomgomo kuyolawulwa kuqaphiwe njalo njalo, kuhlolwe, kubuyekezwe ukuze kuqinisekiswe ukutshengisa intuthuko yakamuva kwezobuchwepheshe ngokuguquguquka kwesimo sezulu iphinde ihlomulise umkhandlu ekuzibophezeleni kwawo.

### **7.1. Ukuzijwayeza/Uhlalozinzo (Adaptation)**

Ochwepheshe kwezozoku guquguquka kwesimo sezulu bavuma ukuthi ngiso ukhhiqizeka kwama gesi abamba ukushisa (GHGs) kuma ngokushesha, kunezinga lokuguquguquka kwesimo sezulu okumanje elingeke lisaguquleka (IPCC, 2007). Uhlelo lo mkhandlu wetheku lokuvikelwa kwesimo sezulu luthi “Uma sifuna ukuqinisekisa ukusimama nenqubekela phambili nokuqina kwedolobha , “kumele sithole izindlela zohlalozinzo (adaptation) kulolushintsho ”<sup>9</sup>. Uhlalozinzo luqinisekisa ukunyuka kokukwazi uku phila ngaphansi kokushintsha kwesimo sezulu kanye nangaphansi kwezimo ezihlobene nokuguquguquka kwesimo sezulu okuhlanganisa ukwehlukana kwazo kanye nezigameko ezimbi ngokwedlulele. Empeleni Uhlalozinzo lokuguquguquka kwesimo sezulu luhlanganisa ukulawula okungagwemeki nokusungula amasu awusizo futhi ashicilelekayo ukuze kunciphiswe imithelela yezehlakalo zesimo sezulu emikhulu. Ngisho noma umonakalo unganqandwa maduze ukushintsha kwesimo sezulu kanye nemithelela yako kuyothatha iminyaka eminingi, futhi uhlalo zinzo luyadingeka (Farber, 2007). Uhlalo zinzo (adaptation) lokuguquguquka kwesimo sezulu lubalulekile kakhulu emazweni asathuthuka njengalokhu lamazwe kuqagulwa ukuthi yiwo kanye angakhahlamezeka kakhulu yimithelela yokushintsha kwesimo se zulu (Daniel, 2008).

Izinhlobo zokulinganisela uhlalozinzo (adaptation) ezibekiwe ziyoncika kwimithelela yoku guquguquka kwesimo sezulu kwizifunda ezithile nakwi mikhakha yezomnotho akuqaguleni nase ku balweni kohlobo lwemithelela engenzeka nasekwenyukeni komthamo wokuvumela loku.

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<sup>6</sup> SRK Consulting (2008). Msunduzi Environmental Management Framework - Status Quo Report.

<sup>7</sup> SRK Consulting. (2010). Msunduzi Strategic Environmental Management Plan

<sup>8</sup> SRK Consulting. (2009). Msunduzi Municipality Environmental Management Framework-Strategic Environmental Assessment

<sup>9</sup> Durban's Municipal Climate Protection Program. (2010/2011). Climate change adaption planning for a resilient city.



## 7.2. Ukunqanda/ Mitigation

Ukunqandwa kokuguquguquka kwesimo sezulu kugxile ekunciphiseni izinga lama gesi abamba ukushisa (GHG's) asabalala emkhathini. Lesi sinyathelo sizosiza ukugwema imithelela yangomuso ye simo sezulu ngale kwaloko esivele isiqaguliwe, nokubandakanya ukuhlaliswa kwamasu anganciphisa aphinde akhawule amaphesenti ama GHG's amanje. Isibonelo samanye ala masu kungaba ukuqapha amagesi ayingozi asabalala nedolobha, ngophenyo olwenziwa mayelana namasu olungahlaliswa ukuze kunciphiswe umonakalo.

Kule nqubomgomo kokubili uhlalozinzo (*adaptive*) kanye no kunqandwa (*mitigative*) kwezilinganiso kutholakala futhi kuxoxwa ngokuhlukana kwi **Sigaba 10**.

Le nqubomgomo ihlelwe yazungeza kulezizindawo ezilandelayo okuqondwe ukunqanda kuzona nokuzobekwa umkhandlu wase Msunduzi.

- *Umkhandlu wokunqanda (Council adaptation)* – ukuphenya ngezindlela zokulinganisela nokusungula imininingwane namazinga emayelana nama gesi abamba ukushisa (GHG's emission). Ukuqinisekisa ukuthi kusungulwa izindlela ezizobheka ukusebenza kokuncishiswa kwamagesi avimba ukushisa (GHG's) emkhandlwini usuku nosuku. Njenge. Izimoto, kanye nezakhiwo, ngokwenza abasebenzi bafundiseke kabanzi ngemvelo ngemisebenzi yabo nokubaluleka kokunciphisa umoya ongolile (carbon footprint). okuhlosiwe, amasu, ne zinhlelo kuyosungulwa ukuze kusize ekuqondiseni ukuqaliswa kwezinqubo.(njenge; zinga lokuqhuba ukusebenza) phecelezi (i.e. Standard operating procedures).
- *Ukunqandwa komphakathi* – ukunciphiswa kwama gesi abamba ukushisa (GHG's) okuqhamuka kwizakhiwo zezakhamizi, izimboni, amabhizinisi nakwimikhakha yezoku thutha (njengo; ukulinganiswa, okuhlosiwe, amasu, ne zinhlelo).
- *Uhlalo zinzo lwe Khansela (Council adaptation)* – kusetshenziswa ukusebenzisana komkhandlu ekulawulweni kwengcuphe, ukuphendula ngokubusa (njengo; ukulinganiswa,okuhlosiwe, amasu, ne zinhlelo).
- *Ubuholi kanye nokuhlelwa kwezinsalelo* – yethulwe ukushintshashintsha kwesimo sezulu laphokulethwa izidingo ngqangi zomphakathi manje noma esikhathini esizayo (njengo; ukulinganiswa,okuhlosiwe, amasu, ne zinhlelo).
- *Okusha / ukufakwa kwezicelo zentuthuko ehlongozwayo*– ukuqinisekisa ukuthi yonke intuthuko entsha ibeka phambili futhi ilandisa imithelela ngqo, nengaqondile nobubanzi bayo kwimisebenzi yabo ehlongozwayo. Intuthuko kumele ihlose ukunciphisa/ nomkhawulo ekungcolisweni komoya ( carbon footprint) nokuthi iqinisekise ukuthi ukwehlisa umonakalo kwimvelo kwenzekile.consider

- Ukuqinisekisa ukuthi izinqumo eziwukhiye kwizinhlelo zentuthuko zibeka phambili izingqinamba zesimo sezulu okungenzeka zibhekane nedolobha esikhathini esizayo. Njengokuthi ukuqagula ukushintsha kwesimo sezulu kuyabhekwa futhi kulandiswe lapho kuthathwa izinqumo.
- Ukuqinisekisa ukuthi izinqubomgomo ziyasungulwa okuyoba ukuqinisekisa ukuthi izimiso zokwakha kanye nomthetho ziyasekelwa, ziqaliswe, ziphinde ziqondiswe uma kunesidingo.
- Ukuqinisekisa ukuthi I *carbon sequestration* iyaziswa, iyanakekelwa nemithetho (bylaws) iyasungulwa neqinisekisa ukuthi loku kwakhiwe kwizinhlelo nakwi nthuthuko.

Ukusungulwa kwale nqubomgomo kwaziswa ucwaningo olunzulu lwengcuphe Yoku guquguquka kwesimo sezulu okwamanje ithuthukiswe ngu Golder Associates, ngokuthunywa wu Wumkhandlu Wesifundazwe uMgungundlovu.

## 8. IMIGOMO, IMBONO NEZINHLOSO ZENQUBOMGOMO YOKU GUQUGUQUKA KWESIMO SEZULU.

Inqubomgomo ye (IEM) yomkhandlu wase Msunduzi ithi umbono womkhandlu ukuba “yidolobha elishukumisayo, eliyinhloko dolobha yesifundazwe sakwa Zulu-Natali elinakekelayo lokuzikhethela.” Umbono Wezemvelo uthi ngonyaka ka 2020 Idolobha liyoba:

- Indawo ephiphile, ehlanzekile, nenemvelo ehlanzekile enezindawo ezivulelekile emphakathini nenezela ukulingana ezindaweni ezisemadolobheni kanjalo nase maphandleni.
- Ukuba nezakhamuzi ezizibophezele kwezemvelo ezinolwazi olwanele ngezindaba zemvelo futhi ezizoba yingxenywe yeqembu elikhuthele eliyohlela ekubeni nokusimama kwezemvelo.
- Liyoba nokuzuzwa ngokomthetho wamazanga okulinganiselwa kokungcoliswa komoya nokusebenza kokulawulwa kwemfucuzwa okuyinqinisekisa ukuthi imigwaqo, izindawo ezivulekile, imimfula nemihosha yedolobha ihlanzekile futhi igcinwa ngendlela efanele.
- Ukuthuthukiswa kanye nokuqaliswa kwezinqubomgomo, imithetho, nezinyathelo ezoqinisekisa ukuthi izimboni zikhiqiza ukungcola okunciphile kwimvelo nokuqinisekisa ukuthi ziyahambisana nemithetho yezemvelo.
- Ukuqhamuka nezindlela ezahlukahlukene zokuqinisekisa ukusimama kwezemvelo kuzo zonke izakhamuzi kanjalo nokuqinisekisa ukuthi ziyahlomula ngemvelo.
- Ukufinyelela ekulinganeni ko mnotho, ezenhlalo yomphakathi, nezemvelo nokulinganiswa phakathi kokonga nokusetshenziswa kwemithombo yezemvelo ezovikela imvelo yezizukulwane zangomuso.
- Ukuthuthukiswa ngokugcwele kwezokuvakasha zedolobha, okwenza umhlahlandlela we Pietermaritzburg “*Idolobha lokuzikhethela*” kube kuqinisekiswa kwamazinga aluhlaza kwezomnotho zqaliswe futhi alandelwe njenge: izikhumulo zokuvakasha kufanele zikwazi ukuzinza ezimweni

zokushintsha kwezimo sezulu futhi zingabi izitha kwezemvelo. (izakhiwo eziluhlaza, solar ukuvuna amanzi ezulu nokunye.).

### **8.1. Umgomo wenqubomgomo wokuguquguquka kwesimo sezulu.**

Umgomo walenqubomgomo ukunikeza isiqondiso esihlukile sokuphendula kwingcuphe, nezinselelo zokuguquguquka kwesimo sezulu. Le nqubomgomo ihlose ukuqinisekisa ukuthi izingozi ezihambisana nomonakalo wokuguquguquka kwesimo sezulu iyatholakala, futhi iyancishiswa kanjalo nohlalo zinzo lubekwa endaweni ukuze kuqinisekise ukuthi imithelela engemihle iyancishiswa. Le nqubomgomo iphinde ibheke ekuqinisekiseni ukuthi iminyango yomkhandlu waseMsunduzi iyakwazi ukuhlanganisa uhlalozinzo, namasu okunciphisa ukuguquguquka kwesimo sezulu emihleni yonke yokusebenza kwayo ukuze ekugcineni kuqinisekise ukuthi idolobha liyakwazi ukuba nozinzo kwimithelela yesikhathi eside ehlobene nokuguquguquka kwesimo sezulu.

### **8.2. Umbono Wenqubomgomo wokuguquguquka kwesimo sezulu.**

Ukuqinisekisa ukuthi izinhlelo, izinqubomgomo kanye namasu akhona ahlose ukunciphisa ubungozi kanye negcuphe eyenziwa ukuguquguquka kwesimo sezulu ( njenge. Imithelela ngqo, nengaqondile emibi). Ukugqugquzela nokweseka ucwaningo nokuthuthukiswa kwa masu nezinhlelo ezihlose ukunciphiswa ubungozi kanjalo nokuhlolwa kwamathuba enziwa ukuguquguquka kwesimo sezulu edolobheni, emphakathini, nasekusebenzeni ku Mkhandlu wase Msunduzi futhi ngokwenzanjalo, yenza ukuvikeleka kwesimo sezulu kwi kusasa.

Lenqubomgomo ihlabahloselwe ukuba ibe indlela emqoka ekulawulweni kokuguquguquka kwesimo sezulu edolobheni lase Mgungundlovu, ukubeka isiqondiso lapho amasu kumele asungulwe, kuvunyelwe izinyathelo yilabo abaneqhaza. Kucatshangelwa ekutheni ubuholi bedolobha, no mphakathi uzosebenza ngokuihlanganyela ekuvikeleni idolobha ekuphenduleni kwimthelela namathuba ethulwa ukuguquguquka kwesimo sezulu (SRK, 2008).

### **8.3. Inhloso yenqubomgomo yokuguquguquka kwesimo sezulu.**

Inhloso yale nqubomgomo ukuhlinzeka nokunikeza iziqondiso mayelana nezinhlelo namasu okumele enziwe iminyango yomkhandlu wase Msunduzi ukuze kuqinisekise ukuthi umkhandlu wase Msunduzi unezinyathelo ezicacile zokwehlisa nokulinganisela endawenilapho zilandisa ngesimo esihlobene nokuguquguquka kwezulu samanje nesangomuso. Le nqubo mgomo iphinde ihlose ekugqugquzeleni abathintekayo Emkhandlwini nabadlali bendima abasemqoka ekuhlanganisweni kokuguquguquka kwesimo sezulu kuwo wonke amazanga okuhlela nemisebenzi, ukuqinisekisa ukuvikelwa kwezi ngqalasizinda zomkhandlu, nemithimbo yemvelo nokuvikelwa komphakathi ngokumelene nezehlakalo zesimo sezulu esikhathini esizayo.

Ekuhlelweni nasekulawulweni iziphakamiso ezibaluliwe ngenhla, inqubomgomo ihlose ukunciphisa izindleko kanye nemithelela yakusasa ngoku landisa izinkinga ngaphambi kokuba zenyukele kwizinkinga ezinkulu okungenzeka zidinge ukungenelela, nezinsiza emazingeni aphezulu.

Ukuthuthukiswa nokuqaliswa kwenqubomgomo yokuguquguquka kwesimo sezulu kwaye kwahlalukwa njengesinyathelo esimqoka ( Uhlelo lwezinyathelo B6) Ku Msunduzi SEMP futhi luzosetshenziswa ngokusebenzisa I IDP . Lolu hlelo senzo kabanzi ngezansi:

<b>Ithebula 4.6: Uhlelo senzo Lokufaka Ukuguquguquka kwesimo sezulu kwimisebenzi Yomkhandlu</b>			
<b>B6: Ukufakwa kokuguquguquka kwesimo sezulu kwimisebenzi yomkhandlu</b>			
<b>IMIPHUMELA YAMASU</b>	Ukunciphisa amaCarbon footprint Omkhandlu nokuzinza esimeni sokuguquguquka kwesimo sezulu	<b>Izinhloso Zamasu</b>	Ukuze kuhlelelwe futhi kuqhutshwe ukushintsha ukusuka ekusebenziseni ama non-renewable kuyiwe kuma renewable resources. Ukuze kugxilwe ekuqhakambiseni ukubaluleka kwemithombo yemvelo yethu engeningi okuwukuthi ukukhiqizwa kwamandla nokusethenziswa kwawo okungaba nawo kweZemvelo.
<b>IZINDABA EZIDINGIDIWE</b>	Ingozi yokuguquguquka kwesimo sezulu nemithelela engahle ibe khona ekulethweni kwezinsiza	<b>Izinhlango ezizibophezele</b>	Umkhandlu – Imisebenzi yentuthuko- Igatsha lokulawulwa kweZemvelo
<b>Umsebenzi</b>	<b>Isikhathi</b>	<b>Abangaba Ophathina</b>	<b>Ukuqagelwa kwezindleko</b>
Carbon Foot print Disclosure (CDP) <sup>10</sup>	Isikhathi esifushane	<ul style="list-style-type: none"> <li>• eThekwini Metro</li> <li>• MIDI</li> <li>• City of Cape Town</li> <li>• Carbon Disclosure Project (CDP)</li> <li>• UKZN</li> <li>• CSIR</li> <li>• Wildlands Conservation</li> </ul>	Ngaphakathi
Ukuqhakambisa ukuguquguquka kwesimo sezulu kuma EIA (ekunciphiseni naseku zinzeni)	Isikhathi eside nesiqhubekayo		Ngaphakathi
Ukuqwashisa ngokuguquguquka kwesimo sezulu (imfundo), njenge. Zethulo	Isikhathi esifushane nesiqhubekayo		Ngaphakathi
Ukuthola amabhizinisi / izinkampani / izinhlaka ezikhipha amazinga aphezulu kumonakalo wama GHG's nokuqinisekisa ukuthi izinyathelo ziyaqaliswa ukuqinisekisa ukuthi loku kuyancishiswa.	Isikhathi eside nesiqhubekayo		Ngaphakathi
Inqubomgomomo yokuguquguquka kwesimo sezulu yomkhandlu wase Msunduzi	Isikhathi esiphakathi nendawo		Ngaphakathi
Ukusungula iznhlelo zozinzo zomkhandlu (MAPs) ukuze kudingidwe ngokuguquguquka kwesimo sezulu.	Isikhathi eside nesiqhubekayo		Ngaphakathi
<b>Inani (Total)</b>			<b><i>Ukuze kutholakale</i></b>

<sup>10</sup> Njengamanje i Pietermaritzburg izibandakanye ku CDP ukubika nge Carbon Disclosure Project esingethwe i United Kingdom.

<b>Inkomba yokusebenza ewukhiye</b>	Ukuguquguquka kwesimo sezulu kuqhakanjiswe ekuhlelweni komkhandlu/ ekusebenzeni namasu abe sendaweni ukunqanda nokwakha uzinzo ekuguquguqukeni kwesimo sezulu.	<b>Okuqononwe nako</b>	Ukuze kuzuzwe okungenani 80% wokuqondenwe nako obekwe ngaphandle wohlelo senzo
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**Ithebula 1:** (B6) Uhlelo senzo lokuguquguquka kwesimo sezulu. Izikhathi ezibekiwe zibonise ukuhlobana neminyaka emihlanu yokubuyekeza ye SEMP (Msunduzi's Strategic Environmental Management Plan, 2010).

## 9. IZINJONGO NGENQUBOMGOMO.

- Ukuqinisekisa ukuthi umkhandlu uyaqhubeka nokuletha izinsiza zawo ngendlela emphakathini yize kunokuguquka kwesimo sezulu.
- Ukunciphisa ubungozi emphakathini wase Mgungundlovu kumonakalo ongenzeka kwikusasa lawo ngenxa yokuguquguquka kwesimo sezulu.
- Ukuvumela izibopho zomthetho nokulindelekile kumkhandlu nomphakathi okuvela kwizehlakalo ezinkulu zezulu, ukuba ihlangabezwe ngokuyicubungula..
- Ukuqiniseka ukuthi impendulo yomkhandlu ekuguquguqukeni kwesimo sezulu ingekhululekile futhi loluchungechunge lusendaweni ukuze luphendule futhi luzivumelanise kakhulu ekushintsheni izivumelwano zikazwelonke zamazwe ngamazwe, ukuthuthuka kwezinga lwezobuchwepheshe, ukulungela komphakathi, izinqubomgomo zezemvelo zase Ningizimu Afrika nokushintsha kwezomthetho, nolwazi oluthuthukisiwe ( Ukuthuthuka kwezobuchwepheshe) njll.
- Ukuhlomisa umkhandlu ngohlaka olondlekile lokufuna kuseva amathuba, ulwazi no phathina ukuze kulawulwe ngendlela izingqinamba namathuba okuguquguquka kwesimo sezulu kwiku sasa.
- Ukwakha umthamo kanye namandla womkhandlu wase Msunduzi ukuba uhole umphakathi ekuphenduleni kwizingqinamba namathuba ethulwa ukushintsha kwesimo sezulu.
- Ukunikeza uhlelo senzo olunamandla nolumqoka lokuhlomisa umkhandlu ngezinhlelo zokusebenza bukhoma nezimpindulo ezisimeme kwimisebenzi yengcuphe yamanje neyangomuso kanjalo nezingqinamba ezihamba nokuguquguquka kwesimo sezulu.
- Ukuhlanganisa ukubukwa kokushintsha kwesimo sezulu zibe no kwengameleka, nezinhlelo zokusebenza kanjalo nokusebenza koMkhandlu usuku nosuku.
- Ukuhlanagnisa ukubukwa kwezemvelo nenhlalo yabantu lapho kuhlelwa, kwakhiwa nokunye okubalulekile emisebenzini yo mkhandlu ukuze kwenziwe izinqumo ezazisiwe kuthuthukiswe ezentuthuko enenqubekela phambili.
- Ukuqinisekisa ukuthi amasu okuguquguquka kwesimo sezulu ayacatshangwa futhi ayaqaliswa kuyo yonke iminyango yomkhandlu.

- Ukuqinisekisa ukuthi umkhandlu wase-Msunduzi unikezela ukuphepha, ukuhlanzeka, nedolobha lenhlanzeko elilawula yonke imikhakha yezemvelo ngendlela ephephile nenokuzibophezela ukuze kunyuke ukuqinisekisa ekuguquguqukeni kwesimo sezulu.
- Ukuqinisekisa ukuqalisa amasu okuhloswe ngawo ukuthola ingcuphe nokugqogquzela ukuhlola ukuqagulwa kwezehlakalo zokuguquguquka kwesimo sezulu.
- Ukuqinisekisa ukuthola, ukuqalisa nokusungula amathuluzi okuhlela okuhlosiwe okuye kwatholakala. Lama thuluzi kumele futhi akwazi ukuqinisekisa ukuthi ayakaleka.

## **10. IMPENDULO MASU YO MSUNDUZIEKUGUQUGUQUKENI KWESIMO SEZULU EHAMBISANA NOHLALO ZINZO NEZINYATHELO ZOKUNQANDA EZIVELA KWI (SMP) NEZINYE IZINSIZA.**

Lesi sigaba sinikeza Uhlalo zinzo kanye nongakhetha kukona ukunqanda ukuze kuqaliswe ezinhlakeni ezahlukene ezingakhahlamezeka kumonakalo ohlobene nokuguquguquka kwesimo sezulu.

Lesi sigaba siphinde siqhakambise zonke izinhlelo ezitholakala kwi SEMP, siphinde sigxile kwimisuka ekhona yezinhlelo egunyaziwe yashicilelwa engaholela ngqo ekulandisweni Kuhlalo zinzo nokunqandwa koku guquguquka kwesimo sezulu. Lezi zimiso zizosetshenziswa njengezizokwazi nesezivele zivunyiwe zabekwa phambili ekwesekweni kokuthuthukiswa ukuvikela nokukwazi ukuzinza kwamasu.



## 10.1. UKUNOTHA KWEMVELO (BIODIVERSITY)

**Isingeniso:** Ukuguquguquka kwesimo sezulu kuthunaza ukunotha kwemvelo ngezindlela eziningi ezazlukene ngokusebenzisa imithelela eminingi ehlukenekumasevisi emvelo<sup>11</sup>. Ngokusho kwe (Millennium Ecosystem Assessment) ukuguquguquka kwesimo sezulu okunye kwezinto ezibaluleke kakhulu lapho kubhekwa izinto eziholela ekulahlekeni kwezindawo ezinothe ngemvelo. (Convention on Biological Diversity, nd.).

### Izihloko Zezinhloso:

- U Konga, ukulondoloza kanye nokulungisa ukunotha kwemvelo kwedolobha kanjalo nezindawo ezivulekile<sup>12 13</sup>.
- Ukunciphisa iphesenti lokulahleka kwezizinda ezinothe ngemvelo ngenxa yokwakhiwa kwezentuthuko edolobheni.
- Ukuncishiswa kokungcoliswa komoya ngokuqaliswa kwesihlahla/Ukutshalwa nokuvikelwa kwezakhamzimba<sup>14</sup>.
- Ukuthuthukiswa kwezemvelo kanye nokuthuthukisa ukusimama kwayo nokusekela inhlalo yakusasa, ezohwebo nezezimbongi ngokuvuselelwa kokuhlaza kwedolobha<sup>15</sup>.

### IZINDLELA ZOKUNQANDA

### NGOKUZIBOPHEZELA

<ul style="list-style-type: none"> <li>• Ukwenyuswa kohlelo lwemisebenzi yokwenza luhlaza<sup>22</sup> (okuhlanganisa amasu okutshalwa kwezihlahla okuhambisana nenqubomgomo yokutshalwa kwezihlahla yase Msunduzi) ukuholela ekutheni kunyuke ukunotha kwemvelo edolobheni nasezindaweni ezilizungezile.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ezamapaki noqedisizungu</li> <li>- Imeninja: Ophikweni Lwezokulawulwa kwemvelo</li> </ul>
<ul style="list-style-type: none"> <li>• Yonke imisebenzi yezentuthuko emisha ihlanganise futhi iqalise ukuhlela igceke lezemvelo (njenge. Ukuhlela amageceke kumele kuqinisekise ukuthi izinto eziphilayo nezingumsinsi wakuleli ziyagcinwa futhi kufakwa ezengeziwe).</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ophikweni Lwezokulawulwa kwemvelo</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuqinisekisa ukuthi izindawo ezibalulekile zibhalwa njengezindawo ezivulekile zomphakathi/ izindawo zokongiwa kwemvelo ezizonwe ngenhlosoaloku ziyagcinwa zongiwe ukuze ziphephise amakhaya nezilwane nezitshalo.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ophikweni Lwezokulawulwa kwemvelo</li> <li>- Imeninja: Ukuhlelwa kwe Dolobha</li> </ul>
<ul style="list-style-type: none"> <li>• Wonke umhlaba olawulwa umkhandlu uhlole mayelana nokunotha ngokwemvelo (njenge. izilwane and izitshalo); izindawo ezinezinga eliphezulu ngokunotha ngezilwane nezitshalo kumele zongiwe ukuze kuphephise imvelo ephilayo kanjalo namakhaya ayo.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ophikweni lwezamapaki nezikaqeda isizungu</li> <li>- Imeninja: Ophikweni Lwezokulawulwa kwemvelo</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuqinisekisa ukuthi imisebenzi yentuthuko / iziphakamiso ezihlanganisa ukubuyiselwa kwezindawo lapho kuvuselelwa.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ophikweni Lwezokulawulwa kwemvelo</li> </ul>

<sup>11</sup> <http://www.cbd.int/climate>

<sup>12</sup> Biophysical Environment:- ikhasi 9 loMkhandlu wase Msunduzi ushicilelo lokugcina lwe Strategic Environmental Management Plan

<sup>13</sup> B7:Uhlelo senzo lokuvuselelwa komhlaba ongaphansi Ko Msunduzi.

<sup>14</sup> B5:Ukusungulwa kohlelo lokunciphisa ukungcola komoya

<sup>15</sup> S1: Uhlelo lokutshala e Dolobheni



<ul style="list-style-type: none"> <li>• Umkhandlu wase Msunduzi uvume ukuthi Cha ekulahlekeni kwezindawo ezi klamwe njenge zivulekile/ izindawo ezivulekile zomphakathi/ zokonga.</li> </ul>	<ul style="list-style-type: none"> <li>- Yonke iminyango yomkhandlu</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuqalisa noku gququzela izinhlelo zokuqwashisa ngokunakekelwa kwemvelo<sup>13</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Yophiko Lwezokulawulwa kwemvelo</li> <li>- Imeninja: Area Based Management</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuncishiswa koku guguleka komhlaba nokwenyusa ukutholakala kwamanzi ngokususa izitshalo ezingewona umsinsi wokumila kuleli ezisendaweni yo Mkhandlu<sup>16</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ezamapaki nezikaqedisizungu</li> <li>- Imeninja: Ophikweni lokulawulwa kwemvelo.</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuncishiswa kokulinyazwa komhlaba nokwenyusa ukutholakala kwamanzi ngokuqinisekisa ukususa zonke izitshalo ezingewona umsinsi wokuzimilela kuleli ezindaweni ezingalawulwa umkhandlu (Ezizimele) phecelezi (privately owned land)<sup>17</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ophikweni lokulawulwa kwemvelo.</li> <li>- DEDTEA (Kwazulu Natali Umnyango wezokuthuthukiswa komnotho, ezokuvakasha kanye nezemvelo)</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuvuselelwa kwezindawo ezilawulwa Umkhandlu ukuze kuncishiswe ukukhahlamezeka komhlaba nokulonda futhi kuthuthukiswe izimpahla namisebenzi yomhlaba nokungenza kwakhe amathuba athe xaxa ekuthuthukisweni komnotho ne zenhlalakahle. Kuvele isu elizokwezeka uzinzo<sup>11</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ezamapaki nezikaqedisizungu</li> <li>- Imeninja: Ophikweni lokulawulwa kwemvelo.</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuhlolwa kwezimpahla nemisebenzi yomhlaba ukuze kuhlanganiswe inani lemisebenzi nezimpahla yomhlaba lapho kuhlelwa intuthuko. Loku kuhlose ukuthuthukisa ukusebenza nokusimama kokusetshenziswa kwemithombo (resources), ehlohlisa umphakathi iphinde ithuthukise ukongiwa kokunotha kwemvelo (Biodiversity)<sup>18</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ophikweni lokulawulwa kwemvelo.</li> </ul>
<ul style="list-style-type: none"> <li>• Uhlelo lokwenza luhlaza idolobha ukuze kufezwe amasevisi, futhi kwakhiwe ubuhle bokubaluhlaza endaweni. Izindawo ezibalulekile zizotholakala e Msunduzi ezinesidingo sokwenziwa luhlaza<sup>15</sup> (e.g. Emigaqweni ematasa nase zimpambanweni, Indawo yase Edendale, izindawo zomphakathi njengamapaki/ izindawo ezivulekile, njll).</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ezamapaki nezikaqedisizungu</li> <li>- Imeninja: Ophikweni lokulawulwa kwemvelo.</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuvuselelwa komhlaba ka hulumeni<sup>19</sup>, kuhloswe ukunciphisa ukukhahlamezeka komhlaba ngokulondoloza noku khuphula izimpahla nenisebenzi yomhlaba ukuze kwakhiwe amathuba athe xaxa ezokuthuthukiswa komnotho nenhlalakahle. Lesi sinyathelo nomsebenzi kuhlose ukuqinisekisa ukuthi ukunotha kwemvelo nezindawo okudingeka</li> </ul>	<ul style="list-style-type: none"> <li>- DEDTEA(Kwazulu Natali Umnyango wezokuthuthukiswa komnotho, ezokuvakasha kanye nezemvelo)</li> </ul>

<sup>16</sup> B1: Uhlelo lokususwa kwezitshalo ezingawona umsinsi wokuzimilela kuleli ezindaweni zomkhandlu waseMsunduzi

<sup>17</sup> DAEA&RD3: Uhlelo lokususwa kwezitshalo ezingawona umsinsi wokuzimilela kuleli ezindaweni ekungesizona ezisingethwe wumkhandlu

<sup>18</sup> E2: Ukuhlolwa kwezimpahla namasevisi omhlaba

<sup>19</sup> DAEA&RD1: Ukuvuselelwa komhlaba : kuzoqaliswa u DAEA ngokwesekelwa wumkhandlu wase Msunduzi

zivuselelwe ziyalondolozwa futhi ziyongiwa.	- Imeninja: Ezamapaki nezikaqedisizungu. - Imeninja: Ophikweni lokulawulwa kwemvelo.
• Izindawo Zamadlelo otshani kumele zifakwe ebalazweni zibe Nokuvuselelwa okungenziwa/okungakhethwa kukona uhlalo zinzo ukuqinisekisa ukuthi lezi zindawo ziyalawulwa futhi ziyalondolozwa <sup>20</sup> .	- Imeninja: Ophikweni lokulawulwa kwemvelo. - Imeninja: Ophikweni lokuhlelwa kwedolobha.
• Ingcindezi yenthuthuko endaweni noma emhlabeni okungabekiwe muntu kuwo wengezela isidingo sokuvikelwa nokongiwa kwezindawo ezivulekile ezindaweni zomkhandlu, yingakho uhlelo lwezinyathelo le ESP ekutholakaleni kwezindawo ezibukeka njengegugu kukona kokubili okuyimbono yemvelo nakwi nhlalakahle ngokusebenzisa I uhlelo lokonga phecelezi I Conservation Plan (C Plan). Loluhlelo lokonga okuyi C plan okumanje luyaqinisekiswa futhi luyahlanganiswa ngobuyoninco, futhi luhlanganisa inqubo yokuhlanganisa ulwazi lwasesigangeni ukuze luqinisekise ulwazi olwathathwa ngemishini yesimanje kusetshenziswa izithombe zebalazwe emoyeni. Lolu lwazi olucwengwe lwahlanganiswa luyobe selwakha ingxenye ye SDF kanye nohlelo lokuhlelwa kwedolobha luphinde futhi lusize abanikazi bomhlaba nabakhi ekutholeni okudingekayo ekulawuleni impahla yabo- ngaleyo ndlela kuqinisekise isikhathi eside sokuvikela ukunotha kwemvelo kuphinde kwakhe idolobha eliluhlaza kanjalo nokwanda kwezindawo ezivulekile <sup>21</sup> .	- Imeninja: Ophikweni lokulawula kwemvelo (okumanje iyenziwa)
<b>IZINDLELA ZOKUNQANDA</b>	<b>NGOKUZIBOPHEZELA</b>
• Ukwandiswa kokuqaliswa kwemisebenzi eyenza luhlaza (okuhlanganisa ukutshalwa kwezihlahla ngokuhambisana nenqubomgomo yomkhandlu yokutshalwa nokulawulwa kwezihlahla) ukuze kuholele ekukhuleni kwezinga lokunotha kwemvelo nasekwehiseni umoya ongcilile edolobheni nasezindaweni ezizungezile.	- Imeninja: Ezamapaki noqedisizungu - Imeninja: Ophikweni lokwengamelwa kwemvelo
• Yonke imisebenzi yentukoko entsha ehlongozwayo kumele iqalise ukwenza luhlaza ibala (Land Scaping).	- Imeninja: Ophikweni lokwengamelwa kwemvelo
• Ukuqinisekisa ukuthi zonke izindawo eziklamwe njengezindawo ezivulekile emphakathini/ nezibekelwe ukonga ziyagcinwa futhi zivikelwe ukuze ziphephise okuphilayo ziphinde zibe amakhaya kokuphilayo.	- Imeninja: Ophikweni lokwengamelwa kwemvelo - Imeninja: Kwezokuhlelwa kwe Dolobha
• Izinhlelo zokwenza luhlaza idolobha zihlose ukwenzangcono nasekwakheni ubuhle bokuba luhlaza kokubukeka kwedolobha. Izindawo ezibalulekile zizotholakala endaweni yase Msunduzi ezizoba zinesidingo sokwenziwa luhlaza (njengasemigaqweni ematasa nasemingenelweni yayo, indawo yase Edendale, izindawo zomphakathi njengamapaki, izindawo ezivulekile njll) <sup>13</sup> .	- Imeninja: Ezamapaki noqedisizungu - Imeninja: Ophikweni lokwengamelwa kwemvelo
• Ukuvuselelwa komhlaba kaHulumeni <sup>17</sup> , okuhlose ukunciphisa ukukhahlamezeka komhla ngokugcina nokwenzangcono	- DEDTEA

<sup>20</sup> DAEA&RD2: Ukuthola izindawo ezidinga ukutshalwa nokuqaliswa kwamasu okweseka ukusetshenziswa komhlaba ngendlela esimeme: izoqaliswa u DAEA ngokwesekwa wuMkhandlu waseMsunduzi

<sup>21</sup> E4: Ukuqaliswa kwe ESP nobunikazi bomhlaba ubuhambisana nayo nenqubomgomo yokulawula.

<p>izimpahla nemisebenzi yasemhlabeni ukuze kwakheke amathuba amaningi kwi ntuthuko yezomnotho nakwi nhlalakahle. Loluhlelo lwezinyathelo nomsebenzi luhlose ekuqinisekiseni ukuthi ukunotha kwemvelo nezindawo ezidinga ukuvuselelwa ziyagcinwa futhi ziyongiwa.</p>	<p>- iMenenja: Ezamapaki nezikaqeda isiszungu. - Imenenja: Ophikweni lokwengamelwa kwemvelo</p>
<p>• Ukulandisa ngezindaba ezimayelana nokungamukeleki kokusetshenziswa nokukhahlamezeka komhlaba<sup>17</sup>, nokuholela ekulahlekeni kwezolimo nemithombo yemvelo. Izindawo ezingaba amadlelo kumele zibekwe kwibalazwe nokungenziwa ukunqanda/ nokungakhethwa kukho uhlalozinzo ukuze kuqinisekise ukuthi lezi zindawo ziyalawulwa futhi ziyagcinwa.</p>	<p>- Imenenja: Ophikweni lokwengamelwa kwemvelo - Imenenja: Ophikweni lokuhlelwa kwedolobha</p>
<p>• Ukuvuselelwa kwezindawo ezilawulwa uMsunduzi<sup>11</sup> ukuze kwehle ukukhahlamezeka komhlaba, kugcinwe kuphinde kwenziwe ngcono izimpahla nemisebenzi yomhlaba ngaleyondlela kwakhiwe amathuba amaningi kwintuthuko yezomnotho nenhlalakahle.</p>	<p>- Imenenja: Ophikweni lokwengamelwa kwemvelo.</p>

## 10.2. IITHOMBO YAMANZI

**Isethulo:** I Msunduzi EMF – Umbhalo wombiko wesimo samanje ukhomba ukuthi inhlanzeko yamanzi kwimfula yase Msunduzi yehlukene kakhulu. Lemifula ngokuqhathaniswa iphilile ezindaweni ezisenhla, kodwa izinga lenhlanzeko lamanzi emhlabathini nasonqenqemeni lwawo lwehla ngokushesha njenga nalokhu lamanzi edlula edolobheni lase Pietermaritzburg. Umthetho kazwelonke wezamanzi (Umthetho 36 ka 1988) ithi kubalulekile ukuba imithombo yamanzi esizwe ivikelwe, isetshenziswe, ithuthukiswe, yongiwe, ilawulwe, futhi iqondise ngendlela esimeme nenqubekela phambili.

### Izihloko zokuhlosiwe:

- Ukuqinisekiswa kwezininga lenhlanzeko lwemithombo yamanzi nokuthi amaxhaphozi akulungele ukugcina ukunotha kwemvelo nokuvekelwa kwempilo yomuntu.
- Ukuqinisekisa ukuhlanzeka kwamanzi agciniwe ahangabezane nokudingwa wumthetho.
- Ukuqinisekisa ukuthi izinyathelo zohlalozinzo, nokundanda ziyatholakala futhi ziyafakwa kwizinqumo nasekwakhiweni kwenqubomgomo ukuze kube nozinzo kumonakalo yemithombo yamanzi ngenxa yokuguquguquka kwesimo sezulu.
- Ukuqashwa kwentuthuko nengcindezi nezindlela ezisebenzayo ezihlongozwayo ekulandiseni ukuze kuqinisekise ukuthi ukumoshwa kwamanzi nokulawulwa kwamanzi okufanele kuyalandiswa<sup>22</sup>.
- Ukulungiselela amakhono okuqapha kwiminyango eyahlukene ukuze kubonakale ibanga kanye nokubaqonda nokumaka ukusebenza kwamasu ohlalozinzo<sup>20</sup>.

<sup>22</sup> Ipendulo ka zwelonke yokuguquguquka kwesimo sezulu (<http://www.climateresponse.co.za/home/gp/5.1>)

IZINDLELA ZOKUNQANDA	NGOKUZIBOPHEZELA
<ul style="list-style-type: none"> <li>• Ukuqaliswa nokuthuthukiswa kwezigcinimanzi nokuthuthukiswa kwamasu okulawulwa kwezimvula zezulu kuzo zonke izindawo zomkhandlu wase Msunduzi<sup>23</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ingqalasizinda nokulawulwa kwamanzi ezulu.</li> </ul>
<ul style="list-style-type: none"> <li>• Ukwakha nokuqguquzela izizinda ezilawula izikhukhula njengo kugudluzwa kwamanzi nokulawulwa kwawo lapho kunezikhathi zezimvula eziningi/ Ukunciphisa nokunqanda izikhukhula (Diederichs, Nichols &amp; van Niekerk, 2009).</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ingqalasizinda nokulawulwa kwamanzi ezulu.</li> <li>- Imeninja: Umnyango wokulawulwa kwemvelo.</li> <li>- Imeninja: Umnyango wokuhlelwa Kwe Dolobha</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuthuthukiswa kwezithwala manzi kanye nokutholakala kwamanzi availability by ngokufakwa kwamaphayiphi amasha phakathi nangaphandle kwedolobha.</li> </ul>	<ul style="list-style-type: none"> <li>- Umgeni Water okumanje uqalisa loku.</li> <li>- Imeninja: Umnyango wezamanzi nokuthuthwa kwendle.</li> </ul>
<ul style="list-style-type: none"> <li>• “Okuyizidingo zekusa” isisekelo Ilungiselelwe yedolobha ngokudingekayo ngamanzi, neyoba isihlolwa ngoku guquguguka kwesimo sezulu/ Izimvula ezenziwe amazinga okushisa.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ingqalasizinda nokulawulwa kwamanzi ezulu.</li> <li>- Imeninja: Umnyango wezamanzi nokuthuthwa kwendle.</li> <li>- Imeninja: Umnyango wokulawulwa kwemvelo.</li> </ul>
<ul style="list-style-type: none"> <li>• Izehlakalo zezimvula ezinamandla kumele zibhekwe lapho kuthuthukiswa imidwebo yamanzi ezulu, ukuhlelwa kokusetshenziswa komhlaba ukuze kugwemeke umonakalo kwingqalasizinda nezakhiwo kwizikhukhula/ nezindawo ezithandwa ukuguguleka komhlaba.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ingqalasizinda nokulawulwa kwamanzi ezulu.</li> <li>- Imeninja: Umnyango wokuhlelwa kwedolobha.</li> </ul>
<ul style="list-style-type: none"> <li>• Ukusungulwa kwemininingwane yeokususa abantu ezindaweni zezikhukhula njenege inundation kanjalo namabalazwe omonakalo kumele asungulwe futhi lemininingwane kumele yenziwe itholakale kubantu abahlala ezindaweni ezisengcupheni<sup>26</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: uphiko lokulawulwa kwezinhlekelele</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuthuthukiswa nokusimamiswa ukuhlanzeka kwamanzi nenani ku mfula yase Msunduzi ukuze kwesekwe ukunotha kwemvelo kamajalo nezimpahla nemisebenzi yomhlaba ehambisana nayo<sup>20</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Umnyango wezamanzi nokuthuthwa kwendle.</li> <li>- Imeninja: Umnyango ewzemplilo yemvelo.</li> </ul>

<sup>23</sup> B3: Ngamafuphi ngokuhlolwa kwengcuphe yezikhukhula.

<ul style="list-style-type: none"> <li>• Imininingwane yokuhlolwa kwencuphe yezikhukhula ehlose ukulandisa imithelela yokulawula amanzi ezulu kwi khwalithi yamanzi nengcuphe ehambisana nentuthuko ebekwe ezizindeni zezikhukhula nezinye inzindawo eziyichezecheze<sup>26</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Umnyango wezamanzi nokuthuthwa kwendle.</li> <li>- Imenenja: Ingqalasizinda nokulawulwa kwamanzi ezulu.</li> <li>- Imenenja: Umnyango wokulawulwa kwemvelo.</li> </ul>
<ul style="list-style-type: none"> <li>• Ukunciphisa ukwentula kwabantu, ukwehlisa ukuukuguguleka komhlaba nokuthuthukiswa kwamathuba ezomnotho ngokuthola izindawo ezingaba nezikhukhula (B3 ithola isidingo sokufakwa komugqa webalazwe lezikhukhula nkuhambisana nokugeleza kwawo njengezindawo ezisengcupheni kakhulu.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Umnyango wezamanzi nokuthuthwa kwendle.</li> <li>- Imenenja: Umnyango wokulawulwa kwemvelo.</li> <li>- Imenenja: Umnyango wezokuhlaliswa kwabantu.</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuthuthukiswa kwenhlanzeko yamanzi ngokutholwa izindawo ezinomnakalo wamazinga amakhulu wokungcoliswa kwamanzi nokuqinisekisa ukuthi abangcolisi bayazibophezela kumonakalo abawenzile kwezemvelo<sup>24</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Umnyango wezamanzi nokuthuthwa kwendle.</li> <li>- Izimboni</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuhlanganiswa kokubiyelwa kakhulu kwezindawo ezinamakhaphozi njenge nqubomgomo nokwenza amakhaphozi/nemiqulu ngemininingwane yamanzi itholakale emphakathini, kumabhizinisi kanjalo nakwizikhungo zezinhlango ezahlukeni<sup>27</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Umnyango wokulawulwa kwemvelo.</li> <li>- Imenenja: Ingqalasizinda nokulawulwa kwamanzi ezulu.</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuze kuvikelwe izifo zamanzi nokusabalala kwazo njenge Cholera (uhudo) ne Bilharzia ukuhlolwa ngokungenamkhawulo kwamanzi kubalulekile.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: umnyango wezempilo yemvelo.</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuhlinzekwa kwemininingwane mayelana nokuthi ongiwa kanjani amanzi ngokuqaliswa kohlelo I (Water Use Efficiency Programme) emphakathini, kumabhizinisi, kanjalo nasezikhungweni ezihlukene njenge: <i>Water Conservation Guidelines</i> (Price, Ross, Rabé, &amp; Diederichs, 2009).</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: uphiko lokulawulwa kwezinhlekelele</li> <li>- Imenenja: Umnyango wezamanzi nokuthuthwa kwendle.</li> </ul>
<ul style="list-style-type: none"> <li>• Ukubuyekwezwa Njalo nokuhlunyelelwa kwamasu Okulawula i Zinhlekelele.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Imenenja: uphiko lokulawulwa kwezinhlekelele</li> </ul>
<p><b>IZINDLELA ZOKUNQANDA</b></p>	<p><b>NGOKUZIBOPHEZELA</b></p>
<ul style="list-style-type: none"> <li>• Ukusungulwa nokuqaliswa kwenqubomgomo yokulawulwa kwamanzi ezulu.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Ingqalasizinda nokulawulwa</li> </ul>

<sup>24</sup> B2: Wetland Functionality Assessment

	<p>kwamanzi ezulu.</p> <p>- Imeninja: Umnyango wokulawulwa kwemvelo.</p>
<ul style="list-style-type: none"> <li>• Ukusungulwa nokuqaliswa kwe mithetho nemigomo yokulawulwa kwamanzi ezikhukhula.</li> </ul>	<p>- Imeninja: Ingqalasizinda nokulawulwa kwamanzi ezulu.</p> <p>- Imeninja: Umnyango wokulawulwa kwemvelo.</p>
<ul style="list-style-type: none"> <li>• Ukuqalisa izbambi manzi ezikhukhula ezenziwe ngcono nokugcinwa kwawo kanjalo namasu okulawulwa kwamanzi ezikhukhula enziwe ngconokuzo zonke izindawo ezingaphansi komkhandlu.</li> </ul>	<p>- Imeninja: Ingqalasizinda nokulawulwa kwamanzi ezulu.</p>
<ul style="list-style-type: none"> <li>• Ukulungiselela “okudingwa yisikhathi esizayo” imininingwane yedolobha, nokudingakalayo ngamanzi angahlolwa mayelana nesimo sezulu/ izimvula ezenzeka ngenxa yamazinga okushisa.</li> </ul>	<p>- Imeninja: Ingqalasizinda nokulawulwa kwamanzi ezulu.</p> <p>- Imeninja: Ophikweni lwezamanzi nendle</p> <p>- Imeninja: Umnyango wokulawulwa kwemvelo.</p>
<ul style="list-style-type: none"> <li>• Ukwandisa umthamo wokubamba amanzi wamabala asemadolobheni, futhi nokuqinisekisa izindawo ezinjengamakhaphozi, imimfula, neziyichezecheze ziyagcinwa futhi lezi zindawo aziphazamiswa nanoma ngayiphi indlela.</li> </ul>	<p>- Imeninja: Ingqalasizinda nokulawulwa kwamanzi ezulu.</p> <p>- Imeninja: Ophikweni lwezamanzi nendle</p> <p>- Imeninja: Umnyango wokulawulwa kwemvelo.</p>
<ul style="list-style-type: none"> <li>• Ukuthuthukiswa/Ukwakhiwa kwemigudu/ imisele yamanzi ezindaweni zasedolobheni.</li> </ul>	<p>- Imeninja: Ingqalasizinda nokulawulwa kwamanzi ezulu.</p> <p>- Imeninja: Ophikweni lwezamanzi nendle</p>
<ul style="list-style-type: none"> <li>• Ukuqalisa nokusebenzisa izigcinimanzi ezikhukhula/ amachibi avalelwe namakhaphozi okwakhiwa ukuze kugcinwe amanzi nokuthuthukiswa kokuhlazeka kwawo. Storm.</li> </ul>	<p>- Imeninja: Ingqalasizinda nokulawulwa kwamanzi ezulu.</p> <p>- Imeninja: Umnyango wokulawulwa kwemvelo.</p>
<ul style="list-style-type: none"> <li>• Ukucabangela izehlo zezimvula ezinamandla lapho kwakhiwa noma kudwetshwa izigcinamanzi ezikhukhula, ukuhlelwa kokusethenziswa komhlaba nemiklamo ukuze kugwenywe umonakalo kwi ngqalasizinda, nakwizakhiwo kwizikhukhula/ nakwizindawo ezithandwa ukuguguleka.</li> </ul>	<p>- Imeninja: Ingqalasizinda nokulawulwa kwamanzi ezulu.</p> <p>- Imeninja: Emnyangweni wokuhlelwa kwe dolobha</p> <p>- Imeninja: Ophikweni lokuhlaliswa kwabantu</p>

<ul style="list-style-type: none"> <li>• Ukusungulwa kwemininingwane ngezikhukhula njenge inundation namabalazwe omonakalo kumele enziwe futhi lolulwazi kumele lwenziwe lutholakale kubantu abahlala ezindaweni ezisengcupheni<sup>26</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Ophikweni lokulawulwa kwezinhlekelele</li> </ul>
<ul style="list-style-type: none"> <li>• Ukwenza ngcono nokusimamisa inhlanzeko yamanzi edolobheni, nokugcina ukunotha kwemvelo nemisebenzi nempahla yemvelo ehambisana nayo.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Emnyangweni wezamanzi nokuthuthwa kwendle.</li> <li>- Imenenja: emnyangweni wezempilo yemvelo</li> </ul>
<ul style="list-style-type: none"> <li>• Imininingwane ethiwe halamuzi ngokuhlolwa kwengcuphe eyzikhukhulaehlose ukulandisa umonakalo yokulawula amanzi ezikhukhula enhlanzekweni noma kwizinga lamanzi nengcuphe ehambisana nentuthuko eyakhiwa endaweni enezikhukhula nasezindaweni eziyichezecheze<sup>26</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Emnyangweni wezamanzi nokuthuthwa kwendle.</li> <li>- Imenenja: Ingqalasizinda no kulawula kwamanzi ezulu.</li> <li>- Imenenja: Emnyangweni wokulawulwa kwemvelo</li> </ul>
<ul style="list-style-type: none"> <li>• Ukunciphisa ingcuphe kubantu, ukunciphisa ukuguguleka komhlaba nokwenza ngcono amathuba ezomnotho, ngoku thola izindawo ezithandwa izikhukhula (njenge: zindawo ezisengcupheni enkulu).</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Emnyangweni wezamanzi nokuthuthwa kwendle.</li> <li>- Imenenja: Emnyangweni wokulawulwa kwemvelo</li> <li>- Imenenja Emnyangweni wokuhlaliswa kwabantu</li> </ul>
<ul style="list-style-type: none"> <li>• Ukwenza ngcono izinga noma inhlanzeko yamanzi ngokuthola izindawo ezinamazinga abalulekile okungcoliswa kanjalo nokuqinisekisa ukuthi abangcolisi bathatha ukuzibophezela ngokukhhlameza imvelo/ umonakalo abawenzileyo.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Emnyangweni wezamanzi nokuthuthwa kwendle.</li> <li>- Izimboni</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuqaphelwa kwemithombo yamanzi ukuvumbela izifo zamanzi nokuqubuka kwezifo ezinjenge: Cholera (Uhudo) ne Bilharzia.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Emnyangweni wezempilo kwezemvelo.</li> </ul>
<ul style="list-style-type: none"> <li>• Ukubuyekezwa njalo nokuvuselelwa kwamasu okulawulwa komonakalo wezulu.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Ophikweni lokulawulwa kwezinhlekelele</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuphenya nokuhlanganisa ukusebenzisa kabusha kwamanzi endaweni yase Msunduzi<sup>25</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Emnyangweni wezamanzi nokuthuthwa kwendle.</li> </ul>

<sup>25</sup> Golder and Associates. (2012). Climate change impact and vulnerability assessment.

<ul style="list-style-type: none"> <li>• Ukukhuthaza ukusetshenziswa kwezobuchwepheshe zokongiwa kwamanzi njengamathange okukhongozela amanzi emvula/ izindlu zangasese ezingawamosi amanzi lapho zishaywa/ namashawa okugeza anagphumi amanzi ngamawala lapho kugezwa.</li> </ul>	<p>- Yonke iminyango yomkhandlu</p>
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Ngokusho kwe SANBI “Izindawo eziyichezecheze eziphilile namaxhaphozi zisiza ukwehlisa umonakalo wezikhukhula nesomiso.ezingxenyeni ezisentshonalanga yezwe lapho liyoba nokukhula kokushisa khona kanye nokoma, ziyosiza ukunqanda ukulahleka kwamanzingenxa yomhwamuko. Ezingxenyeni zasempumalanga yezwe, lapho liyoba nokunyuka kokushisa nokuba manzi, ziyosiza ukwehlisa izkhukhula zamanzi.kukona kokubili loku Inqalasisizinda yomhlaba ingaholela ekuvikelekeni kwamanzi, futhi nasekuvikelekeni kokudla. Le mihlaba ibamba iphinde igcine Ukungcola komoya,ngamazinga ehlukeni<sup>26</sup>”.

### 10.3. EZOKUVIKELEKA KOKUDLA NE ZOLIMO

**Isingeniso:** Ukuvikeleka kokudla kuyinto ebaluleke kakhulu uma kulandiswa ngobungozi bezokuphila. Ezindaweni zasemaphandleni nezisamaphandle ikakhulukazi ezizungeze I Vulindlela nezithile zase Edndale, okuwukuthi ngokwe Msunduzi EMF, zinamathuba amakhulu emkhiqizweni wezolimo, zisengcupheni yemithelela yokuguquguquka kwesimo sezulu nasekuguqukeni kwezimo zezulu kokubili ngokuqondile noma ngokwehlukile okuthinta ukuvikeleka kokudla.

**IZIHLOKO ZOKUHLOSIWE:**

- Ukuvikela imikhakha yezolimo zedolobha engcupheni yokuguquguqukeni kwesimo sezulu.
- Ukuqinisekisa ukuthi umphakathi othembele emikhakheni yezolimo uyazi futhi uthuthukise ukuqiniseka kwemithelela yokuguquguquka kwesimo sezulu.
- Ukuvikela noku sebenzisa ngokuphephile izwe futhi ngokwehlukile komhlaba wezolimo, ezemvelo, kanjalo nasezindaweni ezivikelekile (IDP review for 2013/14-2016/17).

IZINDLELA ZOKUNQANDA	NGOKUZIBOPHEZELA
<ul style="list-style-type: none"> <li>• Ukuthuthukisa imfundo, ukuqeqeshwa kanye nezinsiza ezelulekile ukuze kuvikelwe ukukhahlamezeka komhlaba nokungasimami kwezolimo<sup>11</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Human Resources &amp; Development Unit</li> <li>- Imeninja: Area Based Management</li> </ul>
<ul style="list-style-type: none"> <li>• Ukwethulwa kwamasu ezolimo ahlukile kubalimi abancane mayelana nolwazi ngomonakalo wokuguquguquka kwesimo sezulu kanjalo nezimpendulo ezingaba khona ukuqinisekisa uzinzo ekuguquguqukeni kwesimo zezulu.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Area Based Management</li> <li>- Imeninja: Emnyangweni wokulawulwa kwemvelo</li> </ul>
<ul style="list-style-type: none"> <li>• Ukugquqzelwa ukuqaliswa nokusetshenziswa kwezingadi emadolobheni (uphahla, lwezakhiwo oluluhlaza, nemisebenzi yokwenza luhlaza idolobha)<sup>13</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Emnyangweni wokulawulwa kwemvelo</li> <li>- Imeninja: Emnyangweni wezokuhlaliswa kwabantu.</li> </ul>

<sup>26</sup> Ecological Infrastructure: Nature Delivering Services: [www.sanbi.org](http://www.sanbi.org)



• Ukugqugquzela imphakathi ukuba yakhe izingadi lapho ingakwazi ukuzitshalela izitshalo zayo.	- Imeninja: Emnyangweni wokulawulwa kwemvelo - Imeninja: Area Based Management
• Okuvumelana komphakathi kanye nosizo kumele luqaliswe emiphakathini ukuze kugqugquzelwe imizamo yokwakhiwa komthamo (Allen, 2006).	- Imeninja: Area Based Management
• Ukucinga lapho kufanele khona, kwenziwe umhlaba otholakalayo kukhiqizwe ezolimo.	- Imeninja: Emnyangweni wokuhlelwa kwe dolobha
• Ukuvuselelwa komhlaba olawulwa wu Mkhandlu wase Msunduzi nokungaxazulula ukukhathazeka mayelana nokulahleka komhlaba wokukhiqiza ezolimo nemithombo yemvelo <sup>17</sup> .	- Imeninja: Emnyangweni wokulawulwa kwemvelo - Imeninja kwezamapaki noqedisizungu
• Ukucinga izindawo ezibalulekile ekubeni ngamadlelo nokuqaliswa kwamasu okweseka ukusimama kokusetshenziswa komhlaba <sup>18</sup> – lezizinyathelo zohlelo kanye nemisebenzi yazisa izidingo zokwenzangcono ukusimama komkhiqizo wezolimo.	- Imeninja: Emnyangweni wokulawulwa kwemvelo - Imeninja: Emnyangweni wokuhlelwa kwe dolobha - Imeninja: Area Based Management
• Ukucinga umthamo wokuphilayo ongaqukathwa yindawo ukuze kuqondisiswe indawo ngokuhambisana nobubanzi bamadlelo.	- Imeninja: Emnyangweni wokulawulwa kwemvelo - Imeninja: Emnyangweni wokuhlelwa kwe dolobha
• Ukucinga amasu afanele alawula ukusetshenziswa komhlaba ezindaweni ezithize/ amaphaneka omhlaba.	- Imeninja: Emnyangweni wokulawulwa kwemvelo
• Ukubandakanywa kokunotha kwemvelo kwinqubomgomo yezolimo, iziqondiso kanye nokuthathwa kwezinqumo. Loku kuhlenganisa ukuqaliswa kokungenelela kokuqhakambiswa kokunotha kwemvelo lapho kuhlelwa khona ukusetshenziswa komhlaba, kwinqubomgomo kahulumeni kanye nezinhlango ezizimele, izinhlelo zentuthuko kanye nezinga lezentuthuko.	- Imeninja: Emnyangweni wokulawulwa kwemvelo

#### 10.4. EZEMPILO YABANTU

**Isingeniso:** Okunye okuseqhwilwini koMkhandlu uMsunduzi ukuvikela abahlali bawo kwizinkontileka nasekubhebhethakeni kwezifo (njengo: diarrhoeal diseases, dengue nezinye ezihambisanayo) kanjalo nokuhlupheka ezimweni eziphathelele nokungondleki. Umthelela wokugugququka kwesimo sezulu kuqagulwa ukuba ube

nemithelela enzima kwimpilo yabantu ngenxa yokushintshashintsha kwesimo sezulu, imvula, amazinga okushisa (njenge: ukwenyuka kwegagasi lokufudumala). Imiphakathi ehlwempu ikakhulukazi leyo ehlala emikhukhwini neyentula kwezezimali ukuze kulwisanwe nemithelela yokuguquguquka kwesimo sezulu, iyona eyba ngesengcupheni kakhulu. Ngokombiko woMsunduzi wesimo samanje sezemvelo uthola ukwentuleka kokusabalaliswa kwezinsiza zezempilo, nokwentuleka kwamakhaya/ abantu aba ku 2kms wama clinic (ngokomgomo oshicilelwe kwi CSIR Redbook Planning Standards).

**IZIHLOKO ZOKUHLOSIWE:**

- Ukuqinisekisa ukuthi umphakathi wenziwe wazi kabanzi ngezifo ezingadaleka nokuthi uyazi ngezindlela zokuzelapha.
- Ukuqinisekisa ukuthi izinsizakalo zezempilo Zomkhandlu ziyakwazi ukuphendula kumaphesenti aphezulu alabo asebekhungathekile/ asebehaqekile.(njengo kuhlinzekwa kwezinsiza ezanele nokubakhona kwabasebenzi abaqeqeshwe ngokufanele njll).
- Ukuqinisekisa ukuhlinzekwa kwezempilo ezanele<sup>27</sup>.
- Ukuqinisekisa ukuthi abasebenzi bezempilo yaba sebenzi,baqeqeshiwe futhi balungele ukulwisana nokwenyuka kwalabo abahluphekile ngenxa yemithelela ehlobene nokuguquguquka kwesimo sezulu.
- Ukuqinisekisa ukuthi Umnyango wezempilo kwimvelo ufakiwe ukuze kulwisanwe nokubhebhethaka kwezifo<sup>28</sup>.

<b>IZINDLELA ZOKUNQANDA</b>	<b>NGOKUZIBOPHEZELA</b>
<ul style="list-style-type: none"> <li>• Izinhlelo kanjalo namaqhinga kumele kuqaliswe , nokuhloswe ngakho ukufundisa izisebenzi zomkhandlu nomphakathi ekutheni kungaphendulwa kanjani kwimonakalo ehlukehlekene yezempilo ehlobene nokushintsha kwesimo sezulu.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Human Resources &amp; Development Unit</li> <li>- Imeninja: Emnyangweni wokulawulwa kwemvelo</li> <li>- Imeninja: Area Based Management</li> </ul>
<ul style="list-style-type: none"> <li>• Ukusungula nokuxhumanisa izinhlelo eziphuthumayo zokushisa lapho amazinga okushisa esephezulu kakhulu.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Umnyango Wokulawulwa kwezinhlekelele</li> <li>- Imeninja: Area Based Management</li> </ul>
<ul style="list-style-type: none"> <li>• Ukugqaguzela nokukhuthaza ukunyuka kwezihlahla eziqaqele umgwaqo kuyo yonke imigwaqo emikhulu nemingenelo yayo (ngokuhlobana ne nqubomgomo yomkhandlu wase Msunduzi yokutshalwa kwezihlahla) ukuze kunciphiswe ukushisa/ amazinga okushisa.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ezamapaki noqedisizungu</li> <li>- Imeninja: Emnyangweni wokulawulwa kwemvelo</li> </ul>
<ul style="list-style-type: none"> <li>• Amaqembu ezokulawulwa komonakalo wezemvelo anezinhlelo/ amasu endaweni lapho ebhekana khona nokuphendula ngokubhebhethaka okukhulu kwezifo, izimo eziphathelele nokungondleki, isifo sikanhlangothi, amanzi emzimbeni njll., nokuthi futhi kuqeqeshwe ngokwanele kuphinde kunikezelwe ngezinsiza zokubhekana nalomonakalo ngendlela</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Umnyango Wokulawulwa kwezinhlekelele</li> <li>- Imeninja: Emnyangweni wezempilo yemvelo</li> </ul>

<sup>27</sup> Hospitals and community clinics are the responsibility of the Provincial Department Of Health

<sup>28</sup> Environmental Health is also defined as a Municipal Health Service.

ezosebenza nezogcululisa nenempumelelo.	- Imeninja: Human Resources & Development Unit
• Ukuqinisekisa ukuthi imitholampilo / izibhedlela zihlinzekiwe ngolwazi olumayelana nomonakalo ohlobene nezigameko zokuguquguquka kwesimo sezulu. (Njenge. Unhlangothi, ukuphelelwa ngamanzi emzimbeni, ukunyuka kwezifo njll.).	- Imeninja: Emnyangweni wezempilo yemvelo - Imeninja: Emnyangweni wokulawulwa kwemvelo
• Ukuchazwa kwamagama / amasu mayelana nokwehlisa ukungcoliswa komoya nokuthuthukiswa kokuhlanzeka komoya ezindaweni zase Msunduzi kumele kucutshungulwe.	- Imeninja: Emnyangweni wezempilo yemvelo - Imeninja: Emnyangweni wokulawulwa kwemvelo
• Amasu okuhloswe ngawo ukuthuthukisa inhlanzeko yomoya nokunciphisa ingcuphe kwezempilo yabantu (njenege. Khabhoni enobungozi) kumele kucutshungulwe.	- Imeninja: Emnyangweni wezempilo yemvelo - Imeninja: Emnyangweni wokulawulwa kwemvelo
• Izinhlelo ezilawula ukuhlanzeka komoya kumele zisungulwe nalapho kuyotholakala khona izindawo/ izinhlangothi ezikhiqiza kakhulu umoya ongolile kuphinde kutholwe izinhlelo zokwehlisa ukungcoliswa komoya kanjalo nezindlela zokubikwa kokungcolisa okukhulu <sup>29</sup> .	- Imeninja: Emnyangweni wezempilo yemvelo - Imeninja: Emnyangweni wokulawulwa kwemvelo
• Ukuqinisekisa ukuthi ukungcoliswa komoya kanjalo nama GHG's kuyaqaphelwa futhi kuyabalwa nemiphumela yenziwe itholakale emphakathini.	- Imeninja: Emnyangweni wezempilo yemvelo - Imeninja: Emnyangweni wokulawulwa kwemvelo
• Carbon Emissions Inventory and Offset izinhlelo kumele zicutshungulwe ukuze kutholakale isidingo sokuqaliswa kwezobuchwepheshe zokuluhlaza, amasu kanjalo nemidwebo yezakhiwo ukuze kwakhiwe intuthuko, esimeme ngokusezingeni nobungani nemvelo.	- Imeninja: Emnyangweni wezempilo yemvelo - Imeninja: Emnyangweni wokulawulwa kwemvelo
• Climate Change Risk Assessment and Adaptation nezocubungula izingcuphe zokuguquguquka kwesimo sezulu nemithelela yakhona nezobekwa kumasevisi emvelo nokwethulwa kwawo.	- Imeninja: Emnyangweni wokulawulwa kwemvelo
• Ukuqinisekisa ukuthi ukuhlolwa kwezinga lamanzi kwenziwa njengenjwayelo- imiphumela kumele yenziwe itholakale emphakathini. Izinyathelo kumele zitholakale futhi ziqaliswe lapho izinga lamanzi lisesimeni esibi sokungabi sezingeni.	- Imeninja: Emnyangweni wezempilo yemvelo (this is currently being undertaken at problem areas in Msunduzi)
• Imisebenzi egxile ekuholeleni ekwehliseni ukungcoliswa komoya ngokusebenzisa noma 'carbon sinks' kumele ithuthukiswe futhi igqugquzelwe. Loku kuzobandakanya ukutshalwa kwamahlathi nokuvuselelwa kwezindawo zawo nezindawo phambilini ebezisetshenziselwa ukuwisa amahlathi/ukutshalwa kwezingodo, mjengaloku amahlathi aziwa	- Imeninja: Emnyangweni wokulawulwa kwemvelo - Imeninja: Real Estate & Investment Opportunities

<sup>29</sup> B4: Air Quality Constraints model action plan as part of the Msunduzi Air Quality Management Plan.

## 10.5. AMANZI EZULU

**Isingeniso:** Ingqalasizinda ingaphansi kokwesabeleka ngenxa yokungalawuleki okukhulu kwamanzi ezikhukhula ngezikhathi noma emveni kwe zehlakalo zezimvula ezinkulu. I Msunduzi IDP yenza kucace ukuthi ukwentuleka kokulethwa kwezinsiza ezindaweni ezingaphandle kwedolobha nokuthi kunesidingo sokuthi zenziwe ngcono lesisimo lapho kuhlelelwa ikusasa. Golder and Associates, ku Climate Change Impact and Vulnerability Assessment for the uMgungundlovu District Municipality (2012, ikhasi 15), ithingezikhathi zemvula enkulu nezehlakalo zezikhukhula, kuzoba nokunqwabelana kwamanzi ezikhukhula ku zakhiwo zendle WWTS. Golder and Associates (2012, ikhasi 15) iphinde iqhube ithi “*Ukwenyuka kwamanzi okulindelekile etiyelenis, ngokuhamisana nokuthanda ukwenyuka kwezinto ezintantayo emanzini ngenxa yokuguguleka ngenxa yomdlandla wamanzi kungaholela ekubeni nezikhukhula ngenxa yokungabi nokulawuleka okwanele kwamanzi ezikhukhula noma amapayipi avuleke ngokwanele*”.

### IZIHLOKO ZOKUHLOSIWE:

- Ukuhlinzekwa kokuthuthwa kwendle ngokufanele kuzo zonke izakhamuzi zomkhandlu ukuze kwenziwe ngcono izinga lempilo yazo zonke izakhamuzi.
- Ukugadwa kwemithombo yamanzi ekungcolisweni<sup>30</sup>.
- Ukuqinisekisa ukuthi imisebenzi yokuthuthwa kwendle nemisebenzi yoletwa kwengqalasizinda izezingeni.
- Ukunciphisa ukuphazamiseka kokuthuthwa kwendle kusuka ku 2499 (ngonyaka-2011-2012) ngonyaka ngo 80% kuya ku 500 ngonyaka nokuphendula ngo 100% ekuphazamisekeni kwendle engakapheli amahora angu 8 (umbuyekezo we IDP 2013/14 – 2016/17).
- Ukuqinisekisa ukuthi lapho kuhlela ikusasa kuthathwa ukwentuleka kokulethwa kwezinsiza ezindaweni ezingaphandle kubekwe eqhulwini kanajlo namasu okwenzangcono isimo ayatholakala futhi ayaqaliswa.
- Ukwenza ngcono nokuthuthukiswa kokukhongozelwa kwamanzi ezikhukhula nokuwalawula.

Imidwebo yoMsunduzi ingakhelwa uhlaka lwamasevisi ngalunye ukubonisa loku okulandelayo:

- Isimo sengqalasizinda (okumanje yenziwa wumnyango wezamanzi & nokuthuthwa kwendle).
- Izindawo lapho ingqalasizinda ithuthukiswa khona noma kuhlelwa ukuyithuthukisa.
- Ukwelulwa komthamo e Darvill WWTW.
- Ukuhlolwa nokwehliswa kokungena kwamanzi ezikhukhula emapayipini endle.

Umbiko wokugcina wamasu okuhlola nokwehlisa ukwenzeka kwaloku phecelezi (Final Infiltration Assessment and Reduction Strategy Report); (2013) ithi loku kungaba

<sup>30</sup>This is part of the mandate of the Water and Sanitation Section in the Infrastructure Services Department. The Water and Sanitation Section provides and maintains the sewer collector and trunk infrastructure, whilst the operation of the city’s Darvill Sewage Treatment Works is contracted to Umgeni Water.

kakhulu ukuphazamisa ukulawulwa kokusebenza ngendle wumkhandlu okungaholela ekwntulekeni kwezimali okukhulu kwesikhathi eside. Izinkinga zihlobene kakhulu ngokwesimo sokungena kwindle kwamanzi.	
<b>IZINDLELA ZOKUNQANDA</b>	<b>NGOKUZIBOPHEZELA</b>
<ul style="list-style-type: none"> <li>• Ukubhekelelwa kokwenziwa ngcono kwemisele yamanzi ezikhukhula lapho kunesidingo<sup>31</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Ingqalasizinda nokulawulwa kwamanzi ezulu</li> <li>- Imeneja: Ezamanzi nendle</li> </ul>
<ul style="list-style-type: none"> <li>• Ukusungula nokuqalisa inqubomgomo yokulawulwa kwamanzi ezikhukhula.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Ingqalasizinda nokulawulwa kwamanzi ezulu</li> <li>- Imeneja: Ezamanzi nendle</li> <li>- Imenenja: Emnyangweni wokulawulwa kwemvelo</li> </ul>
<ul style="list-style-type: none"> <li>• Ukusungula nokuqalisa imithetho neziqondiso zokulawulwa kwamanzi ezikhukhula.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Ingqalasizinda nokulawulwa kwamanzi ezulu</li> <li>- Imenenja: Emnyangweni wokulawulwa kwemvelo</li> </ul>
<ul style="list-style-type: none"> <li>• Implement improved storm water capture / retention and improved Storm Water Management Plans throughout the Msunduzi Municipal area.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Ingqalasizinda nokulawulwa kwamanzi ezulu</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuhlenga ukudedelwa kwamanzi esiphapho engangeni ezitamkokweni njengomsebenzi wokwengeza lapho umkhandlu une Mvume yokujezisa futhi nohlaka lokwenza loko ngokusebenzisa amarates ajwayelekile anyanga zonke kanye nezitatimende zezinga<sup>32</sup> (Final Infiltration Assessment and Reduction Strategy Report olungiselelwe u Royal Haskoning DHV yo mKhandlu wase Msunduzi, 2013).</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Ingqalasizinda nokulawulwa kwamanzi ezulu</li> <li>- Imeneja: Ezamanzi nendle</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuvuma<sup>33</sup> liquid wastes according to a costing formula that realistically represents the true cost of additional treatment or requiring a necessary level of pre-treatment trade to be maintained to achieve a standard of effluent that is generally</li> </ul>	<ul style="list-style-type: none"> <li>- Imenenja: Ingqalasizinda nokulawulwa kwamanzi ezulu</li> </ul>

<sup>31</sup>This may apply in housing areas where steep topography and small average ERF size, with a high extent of building coverage, combine to cause impracticable situations with regard to runoff concentration.

<sup>32</sup>The solution lies in placing the prerogative of action on the homeowner of the offending property to demonstrate compliance.

<sup>33</sup>The disposal of untreated industrial wastes by industrial customers in contravention of trade effluent agreements negatively affects the sewers and wastewater treatment facilities or the receiving water environment directly where the discharge is made into the storm water drainage system. Anecdotal evidence is that the frequency of such discharges is increasing. These discharges often occur at night or over weekends and present high concentrations of problematical constituents usually at a high peak loading factor.

acceptable to the WWTW process <sup>34</sup> (Final Infiltration Assessment and Reduction Strategy Report elungiselelwe i Royal Haskoning DHV yo Mkhandlu wase Msunduzi, 2013).	- Imeneja: Ezamanzi nendle
• Ukuqinisekisa ukuthi udoti awungeniswa emiseleni yamanzi eziphephofuthi nokugcina kwenza I blockages. Udoti kumele ususwe emigaqweni nsukuzonke futhi kumele kwenziwe I Recycling.	- Imeneja: Ezokulawulwa kukadoti
<b>Izibonelo zamasu ozinzo, eziye zatholwa wu Mkhandlu wase Thekwini (Durban's Municipal Climate Protection Program, 2010/2011) ezingaziswa futhi ziqaliswe ngokusebenzisa le nqubomgomo, ziyalandela:</b>	
• Ukubuyekwezwa kwemidwebo yengqalasizinda yamanzi esiphepho ukuze zikwazi ukubhekana namazinga ezikhukhula.	- Imeneja: Ingqalasizinda nokulawulwa kwamanzi ezulu
• <i>Umkhankaso wokuqwashiswa komphakathi</i> ukuba unyuse ukuqapha inzuzo yoku fakwa kwezinto zokunciphisa ukwemuka kwamanzi esiphepho njenge. Ukhakhayi lwezindlu oluluhlaza, ukugcinwa / Obheseni abamanzi, detention / Obheseni abomile, Ukugcwaliswa kwabo, Ukukhongozelwa kwamanzi emvula njll. Ukuze kunciphiswe ukugxaza kwamanzi kwintuthuko yangomuso.	- Imeneja: Ingqalasizinda nokulawulwa kwamanzi ezulu - Imeneja: Human Resources & Development Unit - Imeneja: Area Based Management
• Ukuvikelwa nokugcinwa kwezintshalo ezindaweni eziyichezecheze namaxhaphozi/ nezindawo zezikhukhula ukuze kuvikelwe ukuguguleka konqenqema lwemifula nokugcina umlinganiselo wokugwema izikhukhula.	- Imeneja: Emnyangweni wokulawulwa kwemvelo - Imeneja: Ezamapaki no qedisizungu
<b>IZINDLELA ZOKUNQANDA</b>	<b>NGOKUZIBOPHEZELA</b>
• Ukwenza ngcono imisele yamanzi eziphepho lapho kubalulekile khona ezindaweni ezinenkinga.	- Imeneja: Ingqalasizinda nokulawulwa kwamanzi ezulu
• Ukuhlenga ukudelwa kwamanzi esiphepho engangeni ezitamkokweni njengomsebenzi wokwengeza lapho umkhandlu une Mvume yokujezisa futhi unohlaka lokwenza loko ngokusebenzisa amarates ajwayelekile anyanga zonke kanye nezitatimende zezinga.	- Imeneja: Ingqalasizinda nokulawulwa kwamanzi ezulu - Imeneja: Ezamanzi nendle
• Ukusungulwa nokuqaliswa kwenqubomgomo yokulawulwa kwamanzi ezikhukhula.	- Imeneja: Ingqalasizinda nokulawulwa kwamanzi ezulu
• Ukusungula nokuqalisa imithetho neziqondiso zokulawulwa kwamanzi ezikhukhula.	- Imeneja: Ingqalasizinda nokulawulwa kwamanzi ezulu

<sup>34</sup> In either case the process requires objective validation by means of routine flow and quality measurements backed up by inspections and process audits to prove compliance.

<ul style="list-style-type: none"> <li>• Ukuqalisa izibamba manzi ezikhukhula ezenziwe ngcono/ nokugcinwa kwezinhlelo ezenziwe ngcono zokulawula amanzi ezikhukhula.kuyo yonke indawo yomkhandlu.</li> </ul>	- Imeninja: Ingqalasizinda nokulawulwa kwamanzi ezulu
<ul style="list-style-type: none"> <li>• Ukuqinisekisa ukuthi imiphakathi ithola ukufundiseka mayelana nokusebenzisa okufanele ngakwezindle ne ngqalasizinda.</li> </ul>	- Imeninja: Ezamanzi nendle - Imeninja: Area Based Management
<ul style="list-style-type: none"> <li>• Ukuthola imigudu yamapayipi eziteshi zokuphampa ezinesidingo zokuseviswa noma ukuthuthukiswa.</li> </ul>	- Imeninja: Ezamanzi nendle

## 10.6. UDOTI/(WASTE)

**Isingeniso:** Ngokusho Kombuyekezo weMsunduzi IDP ka 2013/14 – 2016/17 (ikhasi 73), ukususwa kukadoti kwamasono onke kuye kwehla kusuka ku 59.5% ngo 2001 kuya ku 53.2% ngo 2011; loku kuthiwa kuye kwadalwa ukwanda kwamakhaya. Ukunyuka kwemizi (ndawo zonke emaphandleni nase dolobheni) kanye nezindlu ziye zabangela umthamo/ izingq inamba kwimithombo yemvelo mayelana nokuqoqwa nokulawulwa kukadoti. Udaba luka doti lutholakala ku SEMP njengenselelo ebalulekile e Msunduzi njenganaloku lokhu kuthikameza ezinye izinhloko zamasevisi njenge ngqalasizinda namanzi eziphepho. Yize noma izinyathelo zedolobha zokulawulwa kuka doti ziholwa imithethonqubo, iziyalelo, nezinqubomgomo okuyi (Waste Management Bylaws ne Draft Integrated Waste Management Plan), ukushoda kwabasebenzi nokwentuleka kwama resources ezinye zezinto ezikhathaza kakhulu, eziholela ekutheni kube nokwentuleka kokulethwa kwezinsiza okwanele nokuqoqwa kuka doti.

### IZIHLOKO ZOKUHLOSIWE:

- Ukuqinisekisa ukuqalisa kokulethwa kwezinsiza, mayelana nokuqoqwa, ukuhlanya, ukususa nokuhanjiswa kuka doti ezindaweni zokuwugcina.
- Ukuguqula umcabango ugxile kwi waste hierarchy principles njenge avoidance, prevention, reduce, re-use, and recycle.
- Ukucubungula amathuba okuqalisa imisebenzi ye recycling indawo ebanzi.
- Ukufundisa umphakathi kanjalo nomphakathi jikelele ngobungozi bomthelela wokulahlwa kuka doti okungafanele.
- Ukuqaliswa kwentunthuko yonyaka yengqalasizinda yokulahlwa u doti, izithuthi kanjalo nempahla.
- Ukuqalisa nokwenza ngcono i Integrated Waste Management Plan yoMkhandlu wase Msunduzi.
- Ukuqaliswa kwe Waste Management Systems esezingeni ekhombisa inani lomphakathi ezungeza ukuncishiswa kuka doti.
- Ukuhanjiswa phambili komkhandlu okuvulekile komsebenzi wezimali egxile eku hlinzekweni okucacile kwama resources nasekukhuphuleni amathuba okwenyusa umnotho.
- Ukususwa kwezindawo zokulahlwa u doti ezingekho emthethweni – Impokophelo enkulu kumele ibhekiswe ku recycling.
- Ukuqinisekisa ukuthi ukushiswa kuka doti akuvumelekile<sup>35</sup>.

<sup>35</sup> Ukushiswa kuka-Doti kuholela kwi carcinogenic emissions ephumayo.

IZINDLELA ZOKUNQANDA	NGOKUZIBOPHEZELA
<ul style="list-style-type: none"> <li>• Ukwenyuswa kokuqaliswa kwemisebenzi ye recycling njengo. Kwandiswa kwe Mondi kerb-side recycling project<sup>36</sup> to ukuze ibandakanye bonke abasebenzisi nabakhiqizi baka doti ihambisana nokusimamisa umkhandlu emkhakasweni ovulekile wokufundisa ngokuqapha.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ukulawulwa kuka doti</li> <li>- Imeninja: Area Based Management</li> <li>- Imeninja: Human Resources &amp; Development Unit</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuqalisa nokwenyusa umthamo we Materials Recovery Facility<sup>37</sup> (MRF).</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ukulawulwa kuka doti</li> </ul>
<ul style="list-style-type: none"> <li>• Ukwenyusa ukuqalisa umquba ngokushiyana kwamazinga kusukela kumakahaya amancane kuya kwizimboni ezinkulu.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ukulawulwa kuka doti</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuqoqwa kuka doti okuthuthukisiwe nokusebenzayo phakathi komkhandlu nabadlala indima ngokuhlukana kwabo okubalwa nezinhlelo ezizimele.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ukulawulwa kuka doti</li> </ul>
<ul style="list-style-type: none"> <li>• Ukgcizelela ukusebenza kwe Polluter Pays Principle (NEMA, 2010).</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ukulawulwa kuka doti</li> <li>- Imeninja: Emnyangweni wezempilo yemvelo</li> </ul>
<ul style="list-style-type: none"> <li>• Ukugcizelela ukusebenza kwe Municipal Bylaws and Regulations.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ukulawulwa kuka doti</li> <li>- Imeninja: Emnyangweni wezempilo yemvelo</li> </ul>
<ul style="list-style-type: none"> <li>• Ukusukumela ukulahlwa kuka doti ezitaladweni / emphakathini kusetshenziswa umkhankaso womphakathi wokuqwashisa nokusimamisa ukugcizelela umthetho.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ukulawulwa kuka doti</li> <li>- Imeninja: Emnyangweni wezempilo yemvelo</li> <li>- Imeninja: Area Based Management</li> <li>- Imeninja: Human Resources &amp; Development Unit</li> </ul>
<ul style="list-style-type: none"> <li>• Ukusungula ithimba lokuqwashisa umphakathi enyangweni wokulawulwa kuka doti.</li> <li>- Lomnyango kumele ugxile ekubhekane nezindaba zokulahla u doti ngokungemthetho.</li> <li>- Udoti nokungcola kungawukhahlameza kanjan umhlaba nokunotha kwemvelo kumele kuqhakaziswe, ngolwazi lokuthi ungehliswa kanjani udoti kuthuthukiswe ne recycling.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Area Based Management</li> <li>- Imeninja: Human Resources &amp; Development Unit</li> <li>- Imeninja: Ukulawulwa kuka doti</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuqaliswa kwe Integrated Waste Management Plan Yo Mkhandlu<sup>38</sup> ezobhekana nokunciphiswa kwadoti namathuba e recycling.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ukulawulwa kuka doti</li> </ul>
<ul style="list-style-type: none"> <li>• Ukulungiselela nokuqalisa amasu mayelana nemithelela yokungcola kwezimboni, ukuguguleka komhlaba, ingqalasizinda yezitamkoko engekho sesimeni, nokulawulwa kwamanzi ezulu kwi khwalithi yamanzi nakwimpilo yasemanzini.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Ezamanzi nendle</li> <li>- Imeninja: Ukulawulwa kuka doti</li> <li>- Imeninja: Emnyangweni wezempilo yemvelo</li> </ul>

<sup>36</sup> Msunduzi Local Municipality: Integrated Waste Management Plan: S2 Integrated Waste Management Plan.

<sup>37</sup> Umkhandlu wase Msunduzi unezinhlelo zokusungula ama Materials Recovery Facility (MRF) e New England Road Landfill (kwa-Dekeza). Inhloso yalesisikhungo kuzoba ukuhlukanisa udoti ofikayo phakathi kwe recyclable fraction kusuka kwi waste component ukuze kunciphiswe ubuningi buka doti ozolahlwa kwa-Dekeza kuphinde kuthuthukiswe I recycling.

<sup>38</sup>S2: Integrated Waste Management Plan.



<ul style="list-style-type: none"> <li>• Ukwenyusa umthamo wokulethwa kwezidingo njengo kuqoqwa kuka doti okucacile nokuhlinzekwa kwemisebenzi yamanzi nendle okwanele.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeneja: Ezamanzi nendle</li> <li>- Imeneja: Ukulawulwa kuka doti</li> </ul>
<ul style="list-style-type: none"> <li>• Ezindaweni lapho abanikazi bezitolo beyinkinga njenge. Kulahlwa kwadoti ngaphandle kwezakhiwo zabo, inhlawulo kumele iphakamiswe kuze kube isimo siyanqandwa nalapho kungasekho kulahlwa Kwa doti, njengaloku udoti u blocker imisele yamanzi ezulu, iphinde yenze umonakalo ongefaniwe kwezemvelo.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeneja: Ukulawulwa kuka doti</li> <li>- Imeneja: Emnyangweni wezempilo yemvelo</li> </ul>
<ul style="list-style-type: none"> <li>• Ukwenyusa ukuhlinzekwa kwemigqomo ama Skips ka doti edolobheni lonkana.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeneja: Ukulawulwa kuka doti</li> <li>- Imeneja: Area Based Management Unit</li> </ul>
<b>IZINDLELA ZOKUNQANDA</b>	<b>NGOKUZIBOPHEZELA</b>
<ul style="list-style-type: none"> <li>• Hlola okukhethwa kuko njenge: <ul style="list-style-type: none"> <li>- Ukuguqula udoti usiwe emandleni (amabiofuels kumele asetshenziswe kuphela uma engakhiqizwa/ akhiwe ngokusebenzisa u carbon emission omncane kanjalo nezolimo ezisimeme.</li> <li>- Imizamo yemisebenzi yokubamba ama gesi kwadekeza.</li> <li>- Ukulawula ngokucacacile kwemayini yakwa dekeza ka doti.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- Imeneja: Ukulawulwa kuka doti</li> </ul>

## 10.7. UKUSETSHENZISWA KWAMANDLA

**Isingeniso:** Ubunzima nokuguquguquka kwesimo sezulu kuthinta futhi kunomthelela omubi ekuhlinzekeni ngogesi na kwi ngqalasizinda yawo, njengalokhu amazinga okushisa ikakhulukazi ethinta ngqo ukudingeka<sup>39</sup>. Ukwanda kokuqina kwezehlakalo zezulu kufaka ingebhe kwi ngqalasizinda ka gesi nokuholela ekutheni kube nokwenyuka kokudingeka kokugcinwa noku thuthukiswa kwengqalasizinda ngabahlinzeki bemisebenzi, kubeke inking enezelayo kuma resources nabasebenzi.

### ISIHLOKO SEZINHLOSO:

- Ukunciphisa ukusetshenziswa kuka gesi kwedolobha kikelele (ukunciphisa amandla adingekayo kwizakhiwo).
- Ukuhlinzeka zonke izakhiwo zomkhandlu ngezobuchwepheshe ezonga amandla ukuze kunciphiswe ukumoseka kuka gesi.
- Ukuze sigudlukele emandleni kagesi awumngani nemvelo (njenge. Eminye yemithombo kagesi efana ne solar, wind njll). Ukuze kuncishiswe ukumoseka kuka gesi ngokukhanyisa phandle.

Umgomo ovezwe kwi IDP<sup>40</sup> okulindeleke kube sekuhlangabezane nawo ngo 2030, umi kanje :

<sup>39</sup> <http://newscenter.lbl.gov/feature-stories/2012/12/18/impact-of-climate-change-on-california-electricity-infrastructure-could-be-costly/>

<sup>40</sup> IDP Umbuyekezo ka 2013/14 – 2016/17

- 30% izidingo zamandla ka gesi kuhlangebezwane nazo ngamithombo evuselelwayo phecelezi (renewable sources).
- 20% wamandla awuketshezi athathwe kuma bio-fuel.
- 50% Intuthuko entsha kwezokuhweba noma kwezezimboni ihlanganise amanye amandla avuselelwayoezobuchwepheshe (renewable energy technology) iwasebenzise lapho kudwetshwa nalapho sekwakhiwa khona.
- 80% wentuthuko entsha kwezokuhlaliswa kwabantu uhlanganise amanye amandla avuselelekayo ezobuchwepheshe (renewable energy technology) iwasebenzise lapho kudwetshwa nalapho sekwakhiwa khona.
- 100% wezinhlalo zokwakha ogunyaziwe ube nokucabangela ukusebenza kwamandla agesi okufanele.

<b>IZINDLELA ZOKUNQANDA</b>	<b>NGOKUZIBOPHEZELA</b>
<ul style="list-style-type: none"> <li>• Ukusabalaliswa kokuqwashiswa komphakathi mayelana nokusetshenziswa okufanele kwamandla kanye nogesi (lapho izinto ezisebenza ngogesi zingasetshenziswa zivalwe, inzuzo yokuqalisa ezobuchwepheshe zokongiwa kwamandla njll).</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Emnyangweni ka Gesi</li> <li>- Imeninja: Area Bases Management Unit</li> <li>- Imeninja: Human Resources &amp; Development Unit</li> </ul>
<ul style="list-style-type: none"> <li>• Ukwethula ukwehliselwa nezibonelelo ukukhuthaza abasebenzisi bakagesi ukuze kuqaliswe amandla aphinde avuseleleke</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Emnyangweni ka Gesi</li> </ul>
<ul style="list-style-type: none"> <li>• Ukunyusa ukusetshenziswa kwe eneji (energy) ehluke / izikhungo ezikhuthaziwe njenge: <ul style="list-style-type: none"> <li>- Amandla eSolar kumalambu omgwaqo, kumarobhothi (traffic lights).</li> <li>- Amandla esolar endaeni encane / amandla ahluke kumaprojekthi (alternative energy projects).</li> <li>- Imizamo yama solar geysers.</li> <li>- Imiklamo yezakhiwo eziluhlaza.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Emnyangweni ka Gesi</li> <li>- Yonke iminyango yo Mkhandlu</li> </ul>
<b>IZINDLELA ZOKUNQANDA</b>	<b>NGOKUZIBOPHEZELA</b>
<ul style="list-style-type: none"> <li>• Ukuqinisekisa ukuthi zonke izakhiwo zomkhandlu zihlinzekwe ngezobuchwepheshe ezonga amandla.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Emnyangweni ka Gesi</li> </ul>
<ul style="list-style-type: none"> <li>• Ukusabalaliswa kokuqwashiswa komphakathi mayelana nokusetshenziswa okufanele kwamandla kanye nogesi (lapho izinto ezisebenza ngogesi zingasetshenziswa zivalwe, inzuzo yokuqalisa ezobuchwepheshe zokongiwa kwamandla njll).</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Emnyangweni ka Gesi</li> <li>- Imeninja: Area Bases Management Unit</li> <li>- Imeninja: Human Resources &amp; Development Unit</li> </ul>
<ul style="list-style-type: none"> <li>• Ukwethula ukwehliselwa nezibonelelo ukukhuthaza abasebenzisi bakagesi ukuze kuqaliswe amandla aphinde avuseleleke</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Emnyangweni ka Gesi</li> </ul>
<ul style="list-style-type: none"> <li>• Ukusungula nokuqalisa imithetho (bylaws) ukweseka nokuqinisa imithetho yokwakha.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Emnyangweni ka Gesi</li> <li>- Imeninja: kwezokuphepha zomkhandlu</li> </ul>
<ul style="list-style-type: none"> <li>• Ukunyusa ukusetshenziswa kwe eneji (energy) ehluke / izikhungo ezikhuthaziwe nakuzo zonke izakhiwo ezintsha njenge: <ul style="list-style-type: none"> <li>- Amandla eSolar kumalambu omgwaqo, kumarobhothi (traffic lights).</li> <li>- Amandla esolar endaeni encane / amandla ahluke kumaprojekthi (alternative energy projects).</li> <li>- Imizamo yama solar geysers</li> <li>- Imiklamo yezakhiwo eziluhlaza.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Emnyangweni ka Gesi</li> <li>- Yonke iminyango yo Mkhandlu</li> </ul>

<ul style="list-style-type: none"> <li>• Ukusebenza ngokuqinisekisa ukuthi lawo makhaya ahola kancane anempumelelo ekushiseni kophahla (ceilings)</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: Emnyangweni ka Gesi</li> <li>- Imeninja: Building Inspectors</li> </ul>
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Kuye kwadalulwa kwi IDP (IDP umbuyekezo ka 2013/14-2016-17, ikhasi 71) ukuthi “*umkhandlu uhlongoza amandla esolar kumalambu emigwaqo nakumalambu ezitaladi kwi nkaba yedolobha (CBD)*”.

## 10.8. EZOKUTHUTHA

**Isingeniso:** Ngokusho kokubuyezwa ko Msunduzi IDP ka 2013/14 – 2016/17 (ikhasi 74), “ukubalwa kwabantu kuka 2001 kwaveza ukuthi ukuhlukana kwezindlela zezokuthutha kwansuku zonke emkhandlwini wase Msunduzi kwakuwu 62% kwezokuthutha zomphakathi no 38% wezimoto ezizimele”. Kwatholakala ukuthi ezokuthutha zomphakathi zidlangile entshonalanga nase mzansi nomkhandlu, nezinga eliphezulu lokusetshenziswa kwezimoto ezizimele enkabeni nakwizindawo ezise nyakatho Mpumalanga womkhandlu<sup>39</sup>.  
*“Ukuthembela kakhulu kwizithuthi zomphakathi kanjalo nezinga eliphezulu lemisebenzi ezindaweni zabahamba ngezinyawo kubeka isidingo sokugxila ekubeni nezinga eliphezulu lemisebenzi yezokuthuthwa komphakathi kuwona wonke umkhandlu, ngokunaka ezokuthutha ezingenayo injini njengama bhayisikili phecelezi non-motorised transport (NMT) ihlanganiswe nohlelo lwezokuthuthwa komphakathi”* Msunduzi IDP umbuyekezo ka 2013/14 – 2016/17 (ikhasi 74).

**Izihloko Zezinhloso:**

- Ukuqiniseka ukuthi imizila yezokuthutha kanye nezikhungo eziqinile kwimonakalo yokuguquguquka kwesimo sezulu.
- Ukuqinisekisa ukuthi isabelo zimali esanele sabelwa ukubhekana nemigwaqo kanjalo nezinyathelo zokulawula ukuminyana kwezimoto okudinga ukuthuthukiswa nokwenziwa ngcono.

Izindlela Zokunqanda	Ngokuzibophezela
<ul style="list-style-type: none"> <li>• Ukuze kwehliswe amazanga okuguguleka kwemigwaqo nemigudu yezitimela (njenge. Zigodi emgaqweni, ukuqhekeka kwemigwaqo njll.), ukuqaliswa kwezinhlelo zemisele yamanzi esiphepho ezenziwe ngcono okumele kucutshungulwe.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: imigwaqo nezokuthutha</li> <li>- Imeninja: iNgqalasizinda nokulawulwa kwamanzi ezulu.</li> </ul>
<ul style="list-style-type: none"> <li>• Ukwenyuka kwezinhlelo ezisebenzayo zezokuthuthwa komphakathi njenge IRPTN nokuwuhlelo olusemgangathweni ukuba lusungulwe luphinde luhlelelwe indawo yase Msunduzi.</li> </ul>	<ul style="list-style-type: none"> <li>- Imeninja: imigwaqo nezokuthutha</li> </ul>

• Indlela yezokuthutha ebalulekile ezoholela ekuthuthukeni komahlukanondlela nemizila yemigwaqo ngaphakathi nasemzungezweni wenkaba yedolobha nokungaholela ekuncipheni kwesiminyamina futhi.	- Imeninja: imigwaqo nezokuthutha
• Ukuhlolwa kwezindleko zengqalasizinda ehlose ukwenza ngcono ukulethwa kwezinsiza nokuhlinzekwa kwezinsiza eziyisisekelo.	- Imeninja: imigwaqo nezokuthutha
<b>Izindlela Zokunqanda</b>	<b>Ngokuzibophezela</b>
• Indlela yezokuthutha ebalulekile ezoholela ekuthuthukeni komahlukanondlela nemizila yemigwaqo ngaphakathi nasemzungezweni wenkaba yedolobha nokungaholela ekuncipheni kwesiminyamina futhi.	- Imeninja: imigwaqo nezokuthutha
• Ukuhlolwa kwezindleko zengqalasizinda ehlose ukwenza ngcono ukulethwa kwezinsiza nokuhlinzekwa kwezinsiza eziyisisekelo.	- Imeninja: imigwaqo nezokuthutha
• Ukuqalisa izinhlelo ezenziwe ngcono futhu ezisebenza kahle kakhulu kwezokuthutha zomphakathi.	- Imeninja: imigwaqo nezokuthutha
• Ukuqaliswa kwezokuthutha ezingenayo injini njengamabhayisikile phecelezi Non-Motorised Transportation (NMT) imizila kanjalo nengqalasizinda.	- Imeninja: imigwaqo nezokuthutha

## 10.9. UWAKHA UKUBUSA NGOKUBAMBISANA NEZINQUBO ZOKUXHUMANA EZENZIWE NGCONO.

**Isingeniso:** Lengxenywe ibhekene ngqo nokuthuthukiswa kokuqwashisa nokuzibandakanya kwayo yonke iminyango yo Mkhandlu kanye nabasebenzi boMkhandlu mayelana nezindaba zezemvelo kanjalo nemonakalo ehambisana nokuguquguquka kwesimo sezulu.

### IZIHLOKO ZOKUHLOSIWE:

- Ukuqinisekisa ukuthi yonke iminyango nabasebenzi bomkhandlu baqaphile ngokukhathazeka kwezemvelo futhi nangezinyanthelo zokunqanda nezokwakha uhlalo zinzo ezingaqaliswa ukunciphisa umthelela omubi ohambelana nokuguquguquka kwesimo sezulu.
- Ukunyusa izinga lokuqwashiseka mayelana nezindaba zezemvelo (njengokuthi. Lokhu kungabandakanya ukongiwa nokulawulwa okwanele kwamanzi Nama resources omhlaba).

### IZINDLELA ZOKUNQANDA

### NGOKUZIBOPHEZELA

- |  |   |
|--|---|
| • Umthamo wokuhlolwa kwezemvelo ukuqinisekisa ukuthi izindaba ezithinta ezemvelo zihanjiswa phambili.  | - Yonke iminyango yomkhandlu                      |
| • Ukuthola umthamo okhona kanjalo nezindawo ezidinga umthamo owandisiwe nokwesekwa emkhandlwini.   | - Yonke iminyango yomkhandlu                      |
| • LA21 Forum Growth <sup>41</sup> igxile ekulandiseni izinkinga ezimayelana nokwentuleka kwamaresources anele azokwabelwa ukusebenza kwezemvelo, iphinde ibhekane nokwenyuka kokusetshenziswa kwezokuxhumana (media) nokusekwa komphakathi ukuze kuqinisekise ukuba nezwi ekuthathweni kwezinqumo. | - Imeninja: Emnyangweni wezokulawulwa kwe Zemvelo |

<sup>41</sup> G2: Grow the LA21 environmental forum.

<ul style="list-style-type: none"> <li>• Uqeqesho mayelana nentuthuko esimeme nenenqubekela phambili ehlose ukwenza ngcono ezokuxhumana namasu phakathi kwabathathi bezinqumo nezinhlela zomphakathi ukuze kuqinisekise indlela ephelile yokuthathwa kwezinqumo.</li> </ul>	<ul style="list-style-type: none"> <li>- Imenja: Area Bases Management Unit</li> <li>- Imenja: Human Resources &amp; Development Unit</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuze kuqinisekise ukuthi umphakathi uqwashisekile mayelana nezinkinga zokuguquguquka kwesimo sezulu kubalulekile ukuthi kusungulwe I khansela kwezokuguquguquka kwesimo sezulu ukuze kudluliselwe izinyathelo zohlalo zinzo nezokunqanda ezibonakalayo (IDP umbuyekiso 2013/14-2016-17).</li> </ul>	<ul style="list-style-type: none"> <li>- Imenja: Emnyangweni wezokulawulwa kwe Zemvelo</li> </ul>
<b>IZINDLELA ZOKUNQANDA</b>	<b>NGOKUZIBOPHEZELA</b>
<ul style="list-style-type: none"> <li>• Umthamo wokuhlolwa kwezemvelo ukuqinisekisa ukuthi izindaba ezithinta ezemvelo zihanjiswa phambili.</li> </ul>	<ul style="list-style-type: none"> <li>- Yonke iminyango yo Mkhandlu</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuthola umthamo okhona kanjalo nezindawo ezidinga umthamo owandisiwe nokwesekwa emkhandlwini.</li> </ul>	<ul style="list-style-type: none"> <li>- Yonke iminyango yo Mkhandlu</li> </ul>
<ul style="list-style-type: none"> <li>• Ukuze kuqinisekise ukuthi umphakathi uqwashisekile mayelana nezinkinga zokuguquguquka kwesimo sezulu kubalulekile ukuthi kusungulwe I khansela kwezokuguquguquka kwesimo sezulu ukuze kudluliselwe izinyathelo zohlalo zinzo nezokunqanda ezibonakalayo (IDP umbuyekiso 2013/14-2016-17).</li> </ul>	<ul style="list-style-type: none"> <li>- Imenja: Emnyangweni wezokulawulwa kwe Zemvelo</li> </ul>

Ngokwakha nokwandisa imfundo nengxenywe yolwazi kwezemvelo, loku kuqinisekisa ukuthi ukuvuleka kwesisekelo kubantu (izikhulu zomkhandlu nezinye zikahulumeni kanye nezizimele, NGO's) zazisiwe futhi ziqaphele ngokukhathazeka mayelana nezindaba zezemvelokanye nokubaluleka kokuguquguquka kwesimo sezulu edolobheni kanjalo nakuma resources. Izinhlelo zenzo ezibalulwe ngaphezulu zingazuzwa ngokubuyekisa ukuqaliswa kwe komidi lezemvelo le LA21<sup>37</sup>, nokungaholela ekubeni neqhaza elikhulu ekufakeni isandla nasekuzibandakanyeni okuvela kuzo zonke izinhlela zikahulumeni mayelana nezemvelo kanjalo nezindaba zokuyonga. Loku kungasiza ekuthuthukiseni ukuqwashiswa, nokuzibandakanya ekuthathweni kwezinqumo inqubo nokuzodlulwa kukona.

## 10.10. UHLELO SENZO OLUFANELE OKUMELE LUHLANGANISWE/ LUFAKWE KWI- IDP

### 1. EZENHLALO

**Isingeniso:** I SEA (2010, ikhasi 2) sithi “*intuthuko esimeme nenenqubekela phambili idinga ukulinganiswa phakathi komnotho, isimo senhlalokanye nokuvikelwa kwemvelo*”. Lokhu kuhlose ukwenza ngcono impilo yabantu ngokuthola ukulingana phakathi komnotho, ezenhlalo kanye nezinguquko kwezemvelo (SEA, 2010). I SEMP yazisa ukuthi ngaphakathi kwezenhlalo inhloso ukuqinisekisa ukuthi izidingo eziyisisekelo kubantu/izakhamuzi zase Msunduzi ziyahlangabezwa ngaphandle kokuqedwa kwemithombo (resources) nokungukuthi lezi zinsiza eziyisisekelo bathembele kuzo.

#### **ISIHLOKO SEZINHLOSO:**

Izinjongo zezinhlelo zenzo ngaphakathi ohlakeni lwezenhlaloluhlose ukuhlangabeza izidingo zabantu ngaphandle kokuyethekisa ezimisweni nalapho izinsiza zitholakala khona.

Lezi zinhlelo zenzo nemisebenzi ehlobene nazo ibheka loku okulandelayo:

- Ukuvikela amathafa o Msunduzi kanye nokuma kwe dolobha ukuze kuqinisekise ukugcinwa kwezindawo zemvelo nemithombo/izinsiza mayelana nomonakalo ohlobene nokuguquguquka kwesimo sezulu.

- Ukunciphisa ubungozi kubantu kube ku qinisekiswa ukugcinwa kwemithombo yemvelo maqondana nomonakalo wesimo sezulu.
- Izinga eliyisisekelo lokusabalaliswa kwamanzi luhinzekwe kuzona zonke izakhamuzi ngaphandle kokuphazamisa ubuqotho bemvelo.

#### **IZINHLELO ZENZO EZITHOLWE KWI SEMP NGAPHAKATHI OHLAKENI LWEZENHLALO:**

- S1: Uhlelo lokwenza luhlaza izindawo ezisedolobheni.
- S2: Uhlelo oludidiyelwe lokulawula kuka-doti (Integrated Waste Management Plan)
- S3: Ukucutshungulwa kobungozi kwi mvelo (Environmental Vulnerability Assessment)
- S4: Ukuhlolwa ko msindo (Noise Monitoring)
- AMAFA1: Ukucutshungulwa kwemithombo yamasiko nemilando (Cultural Heritage Resource Assessment)

## **2. UMNOTHO**

**Introduction:** I SEA (2010, ikhasi iv) siveza ukuthi, “*Ubuthaka kwezokulawulwa kwemvelo nakanjani kuyoholela ekwandeni kokukhahlamezeka kwezemvelo nasekwenyuseni ubungcuphe obuye batholakala kwizinyathelo ezahlukene zokucubungulwa kwamasu (strategic assesment). Ukusetshenziswa komhlaba okungafanele; ukungcolisa okungalawulwa; ikhabhoni engalawulwa nokucekelwa phansi kwezemvelo, kuvimbela ukukwazi kwemvelo ukweseka nokuthuthuka kwezomnotho-nezenhlalo. Izimpahla nezinsizakalo zomhlaba ezibalulekile kwezempilo nakwimpilo yezakhamuzi zomkhandlu ziyaphazamiseka. Ngakhoke; kunokuthintana ngqo phakathi kokulawulwa kwemvelo okuqinile nokwazi ukusimama kokuthuthukiswa kwezinjongo kwezenhlalo-nomnotho. Ukwengeza; ukulahleka kwezimpahla nezinsiza zomhlaba kungaholela kwizindleko ezinkulu emkhandlwini. Lokhu kubhebhethekiswa ukungahlelwa kanye nokungenzeka kube ukumoswa kwemali okusethenziselwa ukuvuselelwa komonakalo wezemvelo okungenzeka ukuthi ngabe ubuvimbelelele ukuba bekukhona ukulawuleka kwezemvelo okuqinile nokwazisa ukuthathwa kwezinqumo kuseva*”. Ukuguquguquka kwesimo sezulu kunemithelela ngqo nengekho ngqo kumnotho wase Msunduzi. Inhloso ngqangi ukuthuthukisa usimamo lapho kuthuthukiswa ezemvelo, ezenhlalo, nezomnotho, nokuqinisekisa ukuthi umphakathi uyaqwashiswa ngenani nokubaluleka kwezimpahla nezinsiza zomhlaba nokuthi uyakwazi ukuthuthukisa ukusebenza kahle nokusimama kwemithombo yemvelo (natural resources).

#### **IZINHLELO ZENZO EZITHOLIWE UKUZE KUNCISHISWE UMONAKALO ZIYALANDELA:**

- Inqalazizinda nezakhiwo iphathwa kahle ukuze kuhlangebezwane nezidingo zabahlali namabhizinisi ngezindlela ezinciphisa umonakalo kwezemvelo neziqinisekisa ukuthi ukungcoliswa komoya kunciphisiwe.
- Ukuqinisekisa ukuthi izidingo zokudla zansuku zonke zo Msunduzi zitshalwa kahle, zilungiswa futhi zihlanganiswe emaphandleni nasedolobheni yisikimu sezolimo edolobheni nase zindaweni zezolimo ezizungezile.
- *Ukusebenzisa izimiso zokwenza luhlaza idolobha* ukuqinisekisa ukusebenza kwezemvelo nokuinciphisa ukusetshenziswa kwama resources ukuze kwehle ukungcoliseka komoya.
- Imithombo yezamandla esebenza kahle, ehlanzekile, nengaphinde ivuselelwe nokukhetha ezokuthutha ziyacutshungulwa futhi ziyaqaliswa ukuze kunciphiswe ukuthembela kwezimbiwa phansi (fossil fuel), ukuze kunciphiswe izindleko zamandla kuphinde kukhiqizwe okumosha ama GHG’s okuphansi nokunye okuthikameza umoya.
- Ukuphakamisa ukusimama okunenqubekela phambili kuko konke izinhlelo, izinqubomgomo, namaqhinga omkhandlu kuqinisekise ukuthi yonke imigudu yokuthathwa kwezinqumo ibhekelele ukuzibophezela nokuhambisa phambili ezemvelo mayelana nemonakalo yezinkinga zokuguquguquka kwesimo

sezulu.

- Ukuqiniseka nokuthuthukisa imisebenzi yentuthuko esimeme futhi eholela kwezenhlalo, ezomnotho nezemvelo ephilile edolobheni.
- Implementation of the ESP with associated land ownership and management policy which aims at promoting alternative livelihood strategies, increase economic opportunities, and encouraging green design principles.
- Ukubuyekeza izindaba ezimayelana nokwenyuka kokudingekala kwentuthuko edolobheni ngokuhambisana nokubaluleka kokuvikela izimpahla nezinsiza zomhlaba.
- Ukuqalisa amasu nezinhlelo zokuqinisekisa ukuthi u 30% womkhandlu uvikelwe futhi uklanywe njengezindawo ezivulekile zomphakathi.

#### **IZINHLELO ZENZO EZITHOLWE KWI SEMP NGAPHAKATHI OHLANGOTHINI LWEZOMNOTHO:**

- E1: Ukudidiyela I EMF ne SDF ibuyekezwe kuphinde kulungiselelwe I LUMS
- E2: Ukuhlola izimpahla namasevisi omhlaba (Ecosystem Goods and Services Assessment)
- E3: Ukuphakamisa ukusimama okunenqubekela phambili kuwo wonke ama qhinga, izinqubomgomo nezinhlelo zomkhandlu.
- E4: Ukuqaliswa kwe ESP nobunikazi bomhlaba ehambisana nabo nenqubomgomo yokulawula.
- E5: I Cost Model yengqalasizinda.

### **3. UKUBUSA**

**Isingeniso:** I SEA (2010) iveza ukuthi, kubalulekile ukwakha isimo esingcono sengxoxo eqhubekayo kubona bonke abadlali bendima. Ukubusa okuhle kubalulekile lapho kubhekwa izinkinga zokuguquguquka kwesimo sezulu zesikhathi esizayo ezingathikameza zonke izihlali zase Msunduzi. Ukuthathwa kwezinqumo kumele kusekelwe ezimisweni ezinomqondo, nokuqonda ububanzi bomonakalo lezizinqumo ezingaholela kuwona. Kumele kube nokuqondisiswa kawo wonke umthetho nenqubomgomo ebekiwe yokuzibophezela yase Msunduzi kuhlangabezwane nayo. Ingebhe kwezemvelo eza nomonakalo woku guquguquka kwesimo sezulu kumele ilungiswe ingakenzeki futhi ngesikhathi esibekiwe ukwenza loko.

#### **IZINYATHELO EZITHOLIWE ZIYALANDELA:**

- Ukuqinisekisa ukuthi izinhlangano ezinensthisekelo nezithintekayo (I&AP's) izikhulu nabathathi bezinqumo bayaxhumana futhi bakha ubambiswano.
- Izindaba zezemvelo zihanjiswa phambili futhi u Msunduzi uzinikele ekuphumeleleni ukusimamisa ezemvelo nokwkhona uzinzo ekuguquguqukeni kwesimo sezulu.
- Izindaba zokushintsha kwesimo sezulu nokuhanjiswa phambili zigxile ekusebenzeni kokulawulwa kwezimiso nezindawo ezibalulekile zokusebenza zazo zonke izinhlelo zomkhandlu futhi zididiyelwe ezinhlelweni zomkhandlu.
- Imigudu yokuthathwa kwezinqumo ingevikelekile, ecacile futhi engachemile.
- Ukuba nezwi ku LA21 kuyanyuka futhi umphakathi uyagqugquzelwa ukuba ube nezwi ekusungulweni kwezinhlelo zamaqhinga omkhandlu.
- Ukutshalwa kwezimali kumaphrojekthi/ imisebenzi ethathwenoma esingethwe umkhandlu ithathise kokudingwa umthetho nakwizimiso zokulawulwa kwezemvelo okudidiyelwe (Integrated Environmental Management principles).
- UMsunduzi ukulungele ukuphendula ngamandla nokubhekana kahle nomonakalo owaziwayo nongakabonakali noma ingebhe eqalisayo ukwehlisa umonakalo omkhulu wezehlakalo nokulawulwa kwezimo eziphuthumayo ngendlela.
- Ukutholakala kolwazi lwezemvelo luyalawulwa futhi luyagqugquzelwa.

- Ukuhlola njalo kuyenziwa ukuze kubikwe igxathu ekuqiniseni ekuguququkeni kwesimo sezulu ukuze idolobha lifunde liphinde libe nozinzo njengoba ludingeka.
- Umphakathi waziswe, unikezwe amandla futhi ubandakanywe kwimigudu yokubusa yentando yeningi ukuqinisekisa ukuthi kunozinzo ekuguqukeni kwesimo sezulu.

#### **IZINHELO ZENZO ETHOLWE KWI SEMP NGAPHAKATHI OHLANGOTHINI LWEZOKUBUSA**

- G1: Ukuhlolw komthamo wezemvelo (Environmental Capacity Assessment)
- G2: Ukukhula kwekomidi le LA21 (Forum Growth)
- G3: Yisisekelo Sokulawula Ezemvelo sitholakale kuma webusaythi (Web-based EMF)
- G4: Uqeqesho lezentuthuko esimeme nenenqubekela phambili (Sustainable Development Training).
- G5: Ungqongoshe wezokuBusa ngokuBambisana nemi Sebenzi (Co-operative Governance).



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Date: October 2014  
Umbiko ulungiselelwe u: Kerina Singh  
Umbiko uye waphasiswa u: Rodney Bartholomew

UMkhandlu wase Msunduzi  
Umnyango wezoKulawulwa Kwezemvelo  
P O Box 31  
Pietermaritzburg  
3200  
South Africa

Tel: 033 392 3245 / 033 392 3240  
Email: [Kerina.Singh@msunduzi.gov.za](mailto:Kerina.Singh@msunduzi.gov.za)  
[Rodney.Bartholomew@msunduzi.gov.za](mailto:Rodney.Bartholomew@msunduzi.gov.za)  
Website: [www.msunduzi.gov.za](http://www.msunduzi.gov.za)

Banga referenswa kanje:

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*Sicela wazi, lenqubomgomo I qondene No Mkhandlu wase Msunduzi kanye neminyango yakhona ethintekayo.*

