

Date: 10 December 2013

RHDHV Reference: T01.DUR.000274

Department of Environmental Affairs  
Environmental Impact Evaluation  
Private Bag X447  
Pretoria  
0001

**Attention:** Mr Lucas Mahlangu

Dear Sir,

**RE: CONFIRMATION OF WAY FORWARD ON THE APPLICATION FOR THE SOUTHERN WASTE WATER TREATMENT WORK, MEREWENT, eTHEKWINI MUNICIPALITY, KWAZULU-NATAL**

Your meeting with myself on 6 December 2013 regarding the above proposed project refers.

This letter serves to provide you with a complete planned scope of work as well as current operations at the Southern Waste Water Treatment Works (SWWTW) and thereafter summarises the discussions held in the meeting.

**A) Background**

Location

The SWWTW is located on 2 Badulla Drive, Merewent on the north-eastern bank of the Umlaas Canal. The SWWTW is surrounded by residential and industrial development.

Current Treatment Process

The SWWTW disposes of a large portion of its effluent and sludge to the Indian Ocean through a 4.2 km outfall. The balance is treated in a conventional activated sludge plant.

The works currently treats an average flow of 130 Ml/day from the southern areas of Durban, Chatsworth and Umlazi. The flow contains domestic sewage as well as industrial effluent from the Mobeni/Jacobs area.



Wastewater discharged from road tankers and from sewers owned by industry also enters the works, but bypasses all treatment processes and discharges directly to the sea outfall.

Wastewater received at the head-of-works undergoes screening and degritting before being passed through primary settling tanks. Sludge from the primary settling tank is removed and degrittied in hydrocyclones, before being added back to the primary effluent for discharge to the sea through the ocean outfall.

Scum is removed from the primary settling tanks and disposed of at the Bisasar Road landfill site, together with the collected grit and screenings.

A gravity thickener and anaerobic digesters are available but are no longer used as the discharge licence from the Department of Water Affairs allows raw sludge to be discharged to sea.

The average discharge into the ocean outfall is 130 Mℓ/day. However; the outfall has a design capacity of approximately 215 Mℓ/day under pump discharge.

The conventional activated sludge plant portion of the site has a capacity of 48 Mℓ/day. The feed to this plant is domestic sewage received from the Chatsworth line.

#### Scope of work proposed for the upgrade of the eThekweni Southern WWTW

The aim of the proposed upgrade of the S WWTW is to reduce the quantity of raw industrial sludge being disposed of through the sea outfall, by re-commissioning existing, and, developing new sludge treatment facilities.

The following actions are proposed to be undertaken as part of the upgrade:

##### *General:*

- Replace the sea outfall pipe above high water level with approximately 70m of 1,000 ND HDPE pipe onshore.
- Upgrade existing pump-stations including "low-lift" pump-station which has a capacity of approximately 215 Mℓ/day under pump discharge.
- Construct a second overflow dam before the outfall, with a capacity of 23 Mℓ.
- Construct minor new road-works.
- Refurbish and upgrade interconnecting pipework on-site.

##### *Preliminary Treatment:*

- Convert the grit pump to airlift at the inlet works (degritters 5 and 6)
- Refurbish and equip raw sludge pump-station with new pumps.

##### *Primary Sedimentation:*

- Open up the old channels to primary settlement tanks and install a side-splitter weir.
- Refurbish concrete joints and exposed aggregate on all disused channels.
- Refurbish penstocks / side splitter weirs between channels and primary settlement tanks.
- Install flow measurement at the primary settlement tanks' splitter boxes.
- Refurbish / replace bridges for primary settlement tanks.
- Replace scum plates for primary settlement tanks.
- Remedial concrete work on channels and primary settlement tanks.
- Conditional assessment of feed pipes.

##### *Sludge Processing (Stabilization, Dewatering and Disposal):*

- Refurbish existing primary digesters, secondary digester, gas holder and thickener.
- Construct two, new primary digesters, a new secondary digester and a new thickener.
- Establish a new sludge drying facility.
- Install an additional primary sludge screen and hydro-cyclones before thickeners.
- Install new burners, heating pumps and circulation pumps.
- Install four, new filter belt presses, complete with all dosing equipment and pumps.
- Establish supernatant liquor (SNL) return flow pipeline and pump-station.

*Electrical Work:*

- Install a new medium-voltage (MV) cable network.
- Upgrade communications on-site.
- Install new transformers and switchgear.
- Upgrade certain existing motor-control centre (MCC) panels.

**B) Outcomes of meeting held on 06 December 2013, applicable to the said application.**

The following points of clarity are noted as arising from discussions held:

- i. A WWTW does not recover waste; hence *re-use, recovery and recycling activities* are not applicable to WWTW.
- ii. *Sewage* is defined as *hazardous waste* due to the fact that if ingested, it will cause detrimental affects to one's health.
- iii. The Southern WWTW was commissioned *prior to the enactment of the Environmental Conservation Act* (Act No.73 of 1989, "ECA"), and therefore currently holds no ECA permit or Waste Management License. It is noted that given the upgrades proposed, it is not best practice nor acceptable to proceed without fully licencing what is currently operational in terms of the NEMA
- iv. *Sludge* can be considered a *general waste* (subject to the level of treatment it has undergone). This resulted in the following being identified as the sole possibly applicable listed activity under the NEM: WA GNR. 921 activities (as amended):
  - *Listed Activity 1 of Category A of GNR. 921: The storage of general waste in lagoons.*  
(Where "lagoons" in this instance would refer to sewage treatment facilities).  
*It must also be highlighted that the SWWTW is concurrently conducting the EIA process to install a sludge pelletizing plant which as part of that process should consider the storage of sludge in the interim between treatment and pelletizing. We therefore would appreciate clarity on whether the listed activity 1 of Category A of GNR. 921 is applicable at all to this proposed application.*  
*Please also note that the sludge is inert at the SWWTW. The sludge undergoes the following processes: separation, thickening, digesting, de-watering and drying, where the digestion process makes the sludge inert. However, this does not exclude the presence of pathogens in the sludge which makes the sludge hazardous.*
- v. The following listed activities in terms of the NEMA EIA Regulations GNR 544 to 546 (as amended on 29 November 2013) have been preliminarily identified:

Notice	Listed activity No.	Activity	Description in terms of applicability
GNR 544 Basic Assessment	12	<i>The construction of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50,000m<sup>3</sup> or more, unless such storage falls within the ambit of activity 19 of Notice 545 of 2010.</i>	This activity is applicable to the storage tank to be constructed.
	13	<i>The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500m<sup>3</sup></i>	To be confirmed.
	14	<i>The construction of structures in the coastal public property where the development footprint is bigger than 50m<sup>2</sup>, excluding</i> <i>(i) the construction of structures within existing ports or harbours that will not increase the development footprint or throughput capacity of the port or harbour;</i>	This activity applies for any structures constructed for the upgrading and replacement of 70m of the sea outfall pipeline and which may be kept on site for more than 6 weeks and hence not be considered temporary.

Notice	Listed activity No.	Activity	Description in terms of applicability
		<p>(ii) the construction of a port or harbour, in which case activity 24 of Notice 545 of 2010 applies;</p> <p>(iii) the construction of temporary structures within the beach zone where such structures will be demolished or disassembled after a period not exceeding 6 weeks.</p>	
	16	<p>Construction or earth moving activities in the sea, an estuary, or within the littoral active zone or a distance of 100m inland of the high-water mark of the sea or an estuary, whichever is the greater, in respect of –</p> <p>(i) fixed or floating jetties and slipways;</p> <p>(ii) tidal pools;</p> <p>(iii) embankments;</p> <p>(iv) rock revetments or stabilising structures including stabilising walls;</p> <p>(v) buildings of 50m<sup>2</sup> or more; or</p> <p>(vi) infrastructure covering 50m<sup>2</sup> or more – but excluding</p> <p>a) if such construction or earth moving activities will occur behind a development setback line; or</p> <p>b) where such construction or earth moving activities will occur within existing ports or harbours and the construction or earth moving activities will not increase the development footprint or throughput capacity of the port or harbour;</p> <p>c) where such construction or earth moving activities is undertaken for purposes of maintenance of the facilities mentioned in (i) – (vi) above; or</p> <p>d) where such construction or earth moving activities is related to the construction of a port or harbour, in which case activity 24 of Notice 545 of 2010 applies.</p>	<p>This activity is applicable due to the replacement of the sea outfall pipelines and the subsequent possible requirements for revetments or stabilising structures. The sea outfall pipe above high water level will be replaced with approximately 70m of 1,000 ND HDPE pipe onshore.</p>
	17	<p>The planting of vegetation or placing of any material on dunes and exposed sand surfaces, within the littoral active zone for the purpose of preventing the free movement of sand, erosion or accretion, excluding where the planting of</p>	<p>Planting of vegetation along the dunes for stabilisation post pipe laying may take place.</p>

Notice	Listed activity No.	Activity	Description in terms of applicability
		<i>vegetation or placement of material relates to restoration and maintenance of indigenous coastal vegetation or where such planting of vegetation or placing of material will occur behind a development setback line.</i>	
	18	<p><i>The infilling or depositing of any material of more than 5m<sup>3</sup> into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 5m<sup>3</sup> from:</i></p> <ul style="list-style-type: none"> <li><i>(i) a watercourse;</i></li> <li><i>(ii) the sea;</i></li> <li><i>(iii) the seashore;</i></li> <li><i>(iv) the littoral active zone, an estuary or a distance of 100m inland of the high-water mark of the sea or an estuary, whichever distance is the greater –</i></li> </ul> <p><i>but excluding where such infilling, depositing, dredging, excavation, removal or moving:</i></p> <ul style="list-style-type: none"> <li><i>a) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or</i></li> <li><i>b) occurs behind the development setback line.</i></li> </ul>	This is of relevance for impacts of infilling and associated with the refurbishing and upgrading of interconnecting pipe-work on site and the replacement of sea-outfall pipe above the high water mark.
	37	<p><i>The expansion of facilities or infrastructure for the bulk transportation of water, sewage or storm water where:</i></p> <ul style="list-style-type: none"> <li><i>a) the facility or infrastructure is expanded by more than 1,000m in length; or</i></li> <li><i>b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more –</i></li> </ul> <p><i>excluding where such expansion:</i></p> <ul style="list-style-type: none"> <li><i>(i) relates to transportation of water, sewage or storm water within a road reserve; or</i></li> <li><i>(ii) where such expansion will occur within urban areas but further than 32m from a watercourse, measured from the edge of the watercourse.</i></li> </ul>	The replacement of 70m of pipeline will be undertaken within 32m from the Umlaas canal.
	40	<p><i>The expansion of</i></p> <ul style="list-style-type: none"> <li><i>(i) jetties by more than 50m<sup>2</sup>;</i></li> <li><i>(ii) slipways by more than 50m<sup>2</sup>;</i></li> <li><i>(iii) buildings by more than 50m<sup>2</sup>; or</i></li> <li><i>(iv) infrastructure by more than 50m<sup>2</sup></i></li> </ul> <p><i>within a watercourse or within 32m of a watercourse, measured from the edge of a watercourse, but excluding where such expansion will occur behind the development setback line.</i></p>	This activity applies to various expansions and upgrades proposed, particularly applicable to this project will be buildings and infrastructure more than 50m <sup>2</sup> within 32m from the Umlaas Canal.
	42	<i>The expansion of facilities for the storage, or storage and handling, of a dangerous good, where the capacity of such storage facility will be expanded by 80m<sup>3</sup> or more.</i>	To be confirmed.

Notice	Listed activity No.	Activity	Description in terms of applicability
	43	<i>The expansion of structures in the coastal public property where the development footprint will be increased by more than 50m<sup>2</sup>, excluding such expansions within existing ports or harbours where there would be no increase in the development footprint or throughput capacity of the port or harbour.</i>	Some activities of the general upgrades will include expansion of structure in the coastal public property of greater than 50 square metres in total.
	45	<p><i>The expansion of facilities in the sea, an estuary, or within the littoral active zone or a distance of 100m inland of the high-water mark of the sea or an estuary, whichever is the greater, for –</i></p> <ul style="list-style-type: none"> <li><i>(i) fixed or floating jetties and slipways;</i></li> <li><i>(ii) tidal pools;</i></li> <li><i>(iii) embankments;</i></li> <li><i>(iv) rock revetments or stabilising structures including stabilising walls;</i></li> <li><i>(v) buildings by more than 50m<sup>2</sup>;</i></li> <li><i>(vi) infrastructure by more than 50m<sup>2</sup>;</i></li> <li><i>(vii) facilities associated with the arrival and departure of vessels and the handling of cargo;</i></li> <li><i>(viii) piers;</i></li> <li><i>(ix) inter- and sub-tidal structures for entrapment of sand;</i></li> <li><i>(x) breakwater structures;</i></li> <li><i>(xi) coastal marinas;</i></li> <li><i>(xii) coastal harbours or ports;</i></li> <li><i>(xiii) structures for draining parts of the sea or estuary;</i></li> <li><i>(xiv) tunnels; or</i></li> <li><i>(xv) underwater channels –</i></li> </ul> <p><i>where such expansion will result in an increase in the development footprint of such facilities, but excluding where such expansion occurs:</i></p> <ul style="list-style-type: none"> <li><i>a) behind a development setback line; or</i></li> <li><i>b) within existing ports or harbours where there will be no increase in the development footprint or throughput capacity of the port or harbour.</i></li> </ul>	Rock revetments and stabilising structures for the sea outfall pipeline will be installed, as well as possible breakwater structures within 100m inland of the high water mark.
GNR 545 Environmental Impact Assessment	3	<i>The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 m<sup>3</sup>.</i>	To be confirmed.
	24	<p><i>Construction or earth moving activities in the sea, an estuary, or within the littoral active zone or a distance of 100 m inland of the high-water mark of the sea or an estuary, whichever distance is the greater, in respect of:</i></p> <ul style="list-style-type: none"> <li><i>(i) facilities associated with the arrival and departure of vessels and the handling of cargo;</i></li> <li><i>(ii) piers;</i></li> <li><i>(iii) inter- and sub-tidal structures for</i></li> </ul>	The upgrades will involve construction or earth moving activities within 100 metres of the high water mark of the sea for pipeline infrastructure and possible breakwater structures.

Notice	Listed activity No.	Activity	Description in terms of applicability
		<p><i>entrapment of sand;</i></p> <p><i>(iv) breakwater structures;</i></p> <p><i>(v) coastal marinas;</i></p> <p><i>(vi) coastal harbours or ports;</i></p> <p><i>(vii) structures for reclaiming parts of the sea;</i></p> <p><i>(viii) tunnels; or</i></p> <p><i>(ix) underwater channels;</i></p> <p><i>but excluding –</i></p> <p><i>a) activities listed in activity 16 in Notice 544 of 2010,</i></p> <p><i>b) construction or earth moving activities if such construction or earth moving activities will occur behind a development setback line;</i></p> <p><i>c) where such construction or earth moving activities will occur in existing ports or harbours where there will be no increase of the development footprint or throughput capacity of the port or harbour; or</i></p> <p><i>d) where such construction or earth moving activities takes place for maintenance purposes.</i></p>	
	27	<p><i>The construction of facilities for the treatment of effluent, wastewater or sewage with a daily throughput capacity of 15000m<sup>3</sup> or more.</i></p>	<p>The construction of facilities for the treatment of industrial effluent, industrial waste water (from surrounding industry) or sewage (from surrounding communities) will take place. The treatment process at SWWTW does have a daily throughput capacity of 15 000m<sup>3</sup> or more (130 000m<sup>3</sup> currently). As the SWWTW holds no WML, the full works will be licenced under this listed activity.</p>

Should Listed Activity 1 of Category A of GNR 921 be confirmed as not applicable by the National Department of Environmental Affairs (DEA), an application seeking Environmental Authorisation only will be lodged with the KZN Department of Agriculture and Environmental Affairs (KZN DAEA). This is due to the applicant being the eThekweni Municipality, with the DEA being a commenting authority during the EIA process to be undertaken.

Therefore, based on the Scope of Work provided above, and considering the recent amendments of the EIA Regulations (2010) listing Notices to include the construction of facilities for the treatment of effluent, waste water or sewerage, it was evident during our discussions that **no Waste Management License application would have to be submitted to the DEA**. Your confirmation on point B(iv) above is however still required and will influence whether the statement above is in fact correct.

In addition, please note that a separate process will be initiated with the Department of Water Affairs (DWA) to determine the DWA's requirements in terms of the existing Water Use License issued for the SWWTW.

Guidance is therefore sought from you with regard to the above interpretation and a confirmation of the application process to be followed. Your written response addressing these queries will be most appreciated, after which RHDHV will proceed with the application to the Province.

Yours sincerely

Malcolm Roods  
*Market Segment Leader*

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✉: [malcolm.roods@rhdhv.com](mailto:malcolm.roods@rhdhv.com)



## Novashni Moodley ( Sharleen )

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**From:** Lucas Mahlangu <Lmahlangu@environment.gov.za>  
**Sent:** 11 December 2013 04:18 PM  
**To:** Roods, Malcolm  
**Cc:** Griffiths, Bronwen; Novashni Moodley ( Sharleen )  
**Subject:** Re: Southern WWTW - letter confirming our meeting outcomes

Hello Malcolm

The matter refers.

The confirmation of activity 1 Cat A is dependent on you confirming whether the sludge to be stored is hazardous or general and should it be general then you will lodge the application with the province and visa-versa.

Other NEMA activities you need to confirm with the EIA people at the province.

Lucas

>>> "Roods, Malcolm" <[Malcolm.Roods@rhdhv.com](mailto:Malcolm.Roods@rhdhv.com)> 12/11/2013 2:30 PM >>>



[www.rhdhv.co.za](http://www.rhdhv.co.za)

Hi Lucas

As per our recent meeting in your office, please find attached letter for your review and confirmation

It would be much appreciated if you could provide written feedback to us on the interpretation made


Thx so much

Regards

**Malcolm Roods**  
**Principal**

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Date: 11 February 2014

RHDHV Reference: T01.DUR.000274

Department of Environmental Affairs  
Environmental Impact Evaluation  
Private Bag X447  
Pretoria  
0001

**Attention:** Mr Lucas Mahlangu

Dear Sir,

**RE: CONFIRMATION OF WAY FORWARD ON THE APPLICATION FOR THE SOUTHERN WASTE WATER TREATMENT WORK, MEREWENT, eTHEKWINI MUNICIPALITY, KWAZULU-NATAL**

The following are attached and refer:

1. Appendix A: Your meeting with myself on 6 December 2013 regarding the above proposed project and minuted;
2. Appendix B: Letter submitted to you *via* email dated 10 December 2013; and
3. Appendix C: Email received from you dated 11 December 2013.

This letter serves to provide you with our interpretation and response to the applicability of Listed Activity 1 of Category A of GNR. 921, as amended on 29<sup>th</sup> November 2013. A complete planned scope of work as well as current operations at the Southern Waste Water Treatment Works (SWWTW) was provided in the letter of 10 December 2013 and is therefore not repeated here.

RHDHV have interpreted activity 1 of Category A “*The storage of general waste in lagoons*” to **not** be applicable to the said project. Our interpretation is motivated in the points below:

1. While the sludge at the SWWTW is not classified as hazardous waste, where at the end point of treatment post upgrades and developments the sludge will be treated enough to be dried for the use of compost, it is important to highlight that this is also not classified as *general waste* and furthermore will not be stored.
2. The sludge will in fact be a raw product in the overall manufacturing process at the works, where the process will see wastewater and industrial effluent received at the head of works, undergo primary settlement, sludge dewatering, thickening, digesting and dewatering before being dried to a by-product which can be commercially sold.



3. In this regard, the SWWTW is developing a cradle to grave system whereby a greater volume of solids will be removed before disposal out to sea of near stormwater quality water *via* sea outfall and a by-product is being developed from the wastewater and sewage received (i.e. dried sludge either sold as compost material or pelletized for various agricultural purposes). Where by-product is defined in the National Waste Act of 2008 as:  
*“By-product: means a substance that is produced as part of a process that is primarily intended to produce another substance or product and that has the characteristics of an equivalent virgin product or material.”*
4. Further to the fact that the sludge will be a raw product/ material in the manufacturing process of a by-product, it is again emphasized that it will not be stored, as it forms part of a continual process, hence the temporary threshold of 90 days for storage does not apply either.
5. In this regard, there is no waste handling process and therefore should not be assessed in terms of the waste regulations but rather as a waste water process as now governed under the EIA Regulations of 2010 as amended in November 2013.
6. Any minor waste left over from the complete process will be disposed of at a registered hazardous landfill site.
7. Given that the transitional provisions as outlined in GNR. 912 provide for interpretations pertaining to applications which have been lodged or for existing waste management license (WML) holders, but not for facilities operating without licenses prior to the coming into effect of the November 2013 of GNR. 912, RHDHV consider transitional provisions not applicable to the SWWTW. Furthermore, a WML cannot be applied for at this stage, given that no Listed Activities are triggered in GNR. 912.

Should following this interpretation, Listed Activity 1 of Category A of GNR 921 be confirmed as not applicable by the National Department of Environmental Affairs (DEA), an application seeking Environmental Authorisation only will be lodged with the KZN Department of Agriculture and Environmental Affairs (KZN DAEA). This is due to the applicant being the eThekweni Municipality, with the DEA being a stakeholder/ commenting authority during the EIA process to be undertaken.

However, should during the EIA process, it comes to light that any sub-process or sub-activity in the SWWTW triggers a listed activity/ies in terms of GNR. 912 then RHDHV will retrospectively apply for a waste management license separately to the relevant authority, be it DAEA or DEA.

Therefore, based on the above explanation, and considering the recent amendments of the EIA Regulations (2010) listing Notices to include the construction of facilities for the treatment of effluent, waste water or sewerage, it was evident during our discussions that **no Waste Management License application would have to be submitted to the DEA**. The competent authority therefore will be the Provincial DAEA, with the Department of Water Affairs (DWA) and DEA being stakeholders/ commenting authorities. Your confirmation on this is however still required and will influence whether the statement above is in fact correct.

In addition, please note that a separate process will be initiated with the DWA to determine the DWA's requirements in terms of the existing Water Use License issued for the SWWTW and with DEA (Coastal Unit) on the requirements for the Coastal Waters Discharge Permit.

Guidance is therefore sought from you with regard to the above interpretation and a confirmation of the application process to be followed. Your written response addressing these queries will be most appreciated, after which RHDHV will proceed with the application to the Province.

Yours sincerely

Malcolm Roods  
*Market Segment Leader*

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## Meeting Record

Project Number	T01.DUR.000274	Meeting Date	06.12.2013
Project Name	The SWWTW Upgrades and Solids Removal Facility EIA	Recorded By	MR and SM
Meeting / Subject	Application clarification meeting	Venue	DEA Offices, Pretoria

Present	Apology	Copy	Name	Organisation	Contact Details
X		X	Malcolm Roods	RHDHV	011 798 6442
X		X	Lucas Mahlangu	DEA	012 310 3536

Item	Topic	Action By	Action Due
1	A WWTW does not recover waste, therefore activity 5 of Category A of the listed waste activities and 3 of Category B do not apply.	To note	To note
2	EIA will supersede a BA process if required for a WML.	To note	To note
3	Sewage is considered to be hazardous by DEA.	To note	To note
4	SWWTW requires licencing for the entire works, based on the principle that "you cannot renew a drivers licence that you do not have"	To note	To note
5	However, sludge could be classified as general waste dependent on the level of treatment it undergoes and therefore, activity 1 of category A could be applicable.	To note	To note
6	Norms and standard should be included in the relevant EMPr.	To note	To note
7	The meeting was concluded with a request for a letter detailing all aspects of the proposed scope of works and existing works, as well as the interpretation of the applicable listed activities, for confirmation by DEA.	SM	As soon as possible.

Date 2014-03-24

Dear Sharleen

## **EIA FOR SWWTW UPGRADE: SLUDGE CLASSIFICATION**

### **Introduction**

Sludge from a wastewater treatment works has its origin from the food chain and therefore considered appropriate for return to land application subject to meeting the guidelines. To support use of sludge on land, the Water research Commission prepared guidelines as indicated in Annex 1.

The parameters in Annex 1 are sourced from: “Guidelines for the Utilisation and Disposal of Wastewater Sludge Volume 2: Requirements for the agricultural use of wastewater sludge Prepared for the Water Research Commission, WRC Report No. TT 262/06, March 2006.

### **Basis for sludge classification at SWWTW**

The targeted stream for sludge processing at SWWTWs would be anaerobically digested sludge. Currently there is no anaerobic digestion process at SWWTWs, therefore it is not possible to obtain a representative anaerobically digested sample from the works. All the sludge from SWWTWs is currently disposed off to sea. However based on sludge classification undertaken at other WWTWs in the eThekweni Municipality, it is possible for a sludge classification to be proposed or predicted.

Based on a report undertaken by Golder and Associates for the eThekweni Water Services “Compliance Review of Sludge Waste Piles and Dedicated Land Disposal (DLD) Sites with Guidelines for Utilisation and Disposal of Wastewater Sludge Volume 3” (November 2012), A summary of the sludge classification is presented in Annex 2.

In addition, Royal HaskoningDHV also analysed raw sludge from the Southern WWTWs. This was report in : “Update on Sludge Investigations: Southern Waste Water Treatment Works and Hammarisdale Wastewater Treatment Works” (August 2013). The summary results are presented in Annex 3.

The general conclusion is as follows:



Metals Contents – the metal contents are Category “a” for all metals with the exception of zinc where they fall into category B which has the range of 2800-7500mg/kg which means that the sludge utilisation/disposal will be limited to a degree.

Poly Aromatic Hydrocarbons (PAH's) – all samples fall well within the category of “No Action Required”

The sludge has a neutral pH and low volatility after drying and exposure and as such is stable.

Based on the sludge classification work (Annex 2), in general for anaerobically digested, it has a microbiological class “B”, stability class “1” and pollutant class “a”. However since SWWTWs effluent has some industrial input, the pollutant class could be “b” or “c” unless proven otherwise.

In Conclusion, the sludge is not likely to be hazardous. The application to land of anaerobically digested sludge from SWWTWs shall be in terms of the WRC guidelines. The precise nature of prior treatment and application rates to land shall be based on routine sludge quality analysis as required by the regulations. The protocol for sampling and analysis is outlined in Annex 4.

Further pollution control efforts shall be put in place to reduce the point source of zinc based effluent discharges to reduce the quantity of zinc in sludge.

Should clarification be required, please call me.

Regards

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Annex 1: Priority heavy metals for analysis in sludge

<b>Aqua regia extractable metals (mg/kg)</b>	<b>Pollutant class</b>		
	<b>a</b>	<b>b</b>	<b>c</b>
Arsenic (As)	<40	40 - 75	>75
Cadmium (Cd)	<40	40 - 85	>85
Chromium (Cr)	<1 200	1 200 - 3 000	>3 000
Copper (Cu)	<1 500	1 500 - 4 300	>4 300
Lead (Pb)	<300	300 - 840	>840
Mercury (Hg)	<15	15 - 55	>55
Nickel (Ni)	<420	420	>420
Zinc (Zn)	<2 800	2 800 - 7 500	>7 500

Note : A 90% compliance is required to comply with the requirements of a pollutant class. The compliance will therefore only be evident once 10 sample results are available.

**Note:** Table 5 requires the analyses of eight (8) potentially toxic metals and elements. These were specifically chosen as they are typically the elements that might be of concern. However, the sludge produced at a specific wastewater treatment plant could be compromised by other elements due to unique circumstances. A full elemental analysis including a number of other trace metals and elements is required for the preliminary classification as detailed in Volume 1. The results of those analyses need to be consulted to determine if any other element is of concern. In cases where additional element(s) were identified, these also need to be included in the analyses for classification and monitoring purposes.



## Annex 2: Sludge Classification Summary

Name of WWTW	Microbiological class	Stability Class	Pollutant class
Craigieburn	C	1	a
Genazzano	C	1	a
Hammarsdale	B (based on <i>faecal coli</i> only)	1	a
Isipingo	C	1	a
Kwa Mashu	B	3	a
KwaNdengezi	B	1	a
Mpumalanga	C	1	a
Northern	B	1	a
Phoenix	B	1	a
Umbilo	B	1	c
Umdloti	B	1	b
Umhlanga	B	1	a
Umkomaas	B	1	a
Verulam	C	1	a

Annex 3: Sludge Classification for SWWTW

Determinants	W752/13 SLUDGE SAMPLE 1	W753/13 SLUDGE SAMPLE 2	W754/13 SLUDGE SAMPLE 3	Limits (class a)
Arsenic in ppb	3 088	1 692	2 499	<40,000
Cadmium in ppb	697	607	750	<40,000
Chromium in ppb	209 483	95 949	139 244	<1,200,000
Copper in ppb	273 533	216 084	242 103	<1,500,000
Lead in ppb	61 460	38 320	46 281	<300,000
Mercury in ppb	1 195	836	1 200	<15,000
Nickel in ppb	192 151	101 523	131 947	<420,000
Zinc in ppb	7 163 064 (b)	5 163 332 (b)	6 350 360 (b)	<2,800,000

General Sludge Properties and Nutrients

Determinants	W752/13 SLUDGE SAMPLE 1	W753/13 SLUDGE SAMPLE 2	W754/13 SLUDGE SAMPLE 3
pH in pH units	7.2	7.2	7
Total Solids in %	92	91	91
Volatile Fatty Acids in mg/l CH <sub>3</sub> COOH	279	132	158
Volatile Solids in %	52	60	63
Nitrogen, as N, % m/m [Kjeldahl digestion]	2.95	3.27	3.25
*Potassium in mg/kg	816	719	875

## Annex 4: Protocol for sampling and analysis of sludge

### A. Sampling

Collect monthly composite samples of dewatered anaerobically digested. Send the composite samples to an accredited laboratory for analysis as indicated below. Repeat monthly for 6 months and report on the trends.

### B. Analysis

#### The analysis is required in 2 parts:

Part 1: Sewage sludge classification

The parameters to be analysed and reported on are in Table 1.

Part 2: Australian Standard Leaching Procedure [ASLP]

Samples to be subjected to an Australian Standard Leaching Procedure [ASLP] as per the National Environmental Management Waste Act 59, 2008, for the “Minimum requirements for the Handling, Classification and Disposal of Hazardous Waste”. Scope of parameters to be analysed are outlined in Table 2.

Table 1: Sewage sludge classification

<b>PHYSICAL CHARACTERISTICS</b>
pH (pH units)
Total solids %
Volatile solids %
Volatile fatty acids (VFA) mg/l
<b>NUTRIENTS</b>
Total Phosphorous (TP) ppm
Potassium ppm
<b>METALS &amp; MICRO ELEMENTS</b>
Aqua-Regia digestion
ICP-MS (Heavy metals) ppb
<b>ORGANICS</b>
<b>MICROBIOLOGICAL QUALITY</b>
Faecal coliforms (CFU/100ml)
Total Helminth Ova

Table 2: Measurements for Australian Standard leaching procedure

Lithium	Gold	Chromium
Beryllium	Mercury	Manganese

Boron	Thallium	Iron
Strontium	Lead	Cobalt
Zirconium	Bismuth	Nickel
Molybdenum	Thorium	Copper
Cadmium	Uranium	Zinc
Tin	Magnesium	Potassium
Antimony	Aluminium	Arsenic
Tellurium	Silicon	Selenium
Barium	Phosphorous	Ruthenium
Lanthanum	Sulphur	Rhodium
Iridium	Titanium	Palladium
Platinum	Vanadium	Silver
Results to be reported in (µg/l)		

### **Interpretation of results and ongoing analyses**

The priority heavy metals of concern shall be interpreted in terms of the WRC guideline, Volume 2, March 2006. The results in Table 2 (Leachate) shall be interpreted in terms of: National Environmental Management: Waste Act 59/2008): National Norms and Standards for assessment of waste for landfill disposal Gazette No R635, 23 August 2013.