

NO.	DATE	AFFILIATION	REFERENCE NUMBER	COMMENTS	RESPONSE	RESPONDENT
<b>Comments on initial public participation and Pre-App BAR</b>						
1.	27-02-2019	BGCMA R Makahane	4/C/10/2/J33C/ Klaarstroom 178/RE 32, Prince Albert	<p><b>Appendix F1.1</b> Comment on submitted report dated 08 February 2019 (Background information and BAR summary) refers:</p> <p>The BGCMA has reviewed the submitted document and made the following comments:</p> <p>Based on the provided information in the Notice, the WULA for section 21 (c ), (i) , (e ) and (g) water uses will be required. The anticipated technical reports may include the following:</p> <ol style="list-style-type: none"> <li>1. Relevant EIA studies</li> <li>2. Method statements</li> <li>3. EMP</li> <li>4. Stormwater Management</li> </ol>	<ol style="list-style-type: none"> <li>1. Noted and included in the Pre-App and Post-App BAR.</li> <li>2. Method Statements form part of the EMPr and will be discussed at the Start-up Meeting. Method Statements to be developed by the Contractor and signed off by the ECO before construction starts.</li> <li>3. EMPr is included as Appendix H1 of the BAR. The Operational Manual is included as Appendix H2.</li> <li>4. The freshwater specialist recommends the following: The berms of the pond</li> </ol>	<p>EnviroAfrica</p> <p>EnviroAfrica</p> <p>EnviroAfrica</p> <p>WATSAN Africa (Dr Dirk van</p>

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					<p>must be hgh enough to direct any stormwater around the WWTW. This is a low rainfall area and a very small sub-catchment More than the berms are not required. Please refer to the Storm Water Management Plan, Appendix A.</p>	<p>Driel, Freshwater specialist)  WATSAN</p>
				<p>5. Hydrological Studies</p>	<p>5. According to the Freshwater specialist, apart from the rainfall and estimated runoff from the sub-catchment no more hydrological studies are required.</p>	<p>EnviroAfrica</p>
				<p>6. Design Drawings</p>	<p>6. Pre-lim design drawing were included in the Pre- and Post-App BAR, Appendix B.</p>	<p>WATSAN</p>
				<p>7. Rehabilitation Plan for affected watercourse</p>	<p>7. The Freshwater Specialist states that the WWTW is going to be a permanent feature of the drainage line. It is not ever going to be removed.</p> <p>Rehabilitation of the site to take place as per the EMPr.</p>	<p>EnviroAfrica  EnviroAfrica</p>
				<p>8. Master Layout Plan (Must include all infrastructure, water courses, scientific determined buffers, flood lines, riparian habitat, and ecological values features; on A1 paper).</p>	<p>8. Layout plans included in the Freshwater report (Appendix G) and Appendix A of the BAR.</p>	<p>EnviroAfrica  EnviroAfrica</p>

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				<p>9. Stakeholder consultation for affected watercourse</p> <p>10. Freshwater ecological report with impact assessment associated with the characteristics (flow regime, water quality, biota, riparian and riparian habitat) of a watercourse.</p> <p>11. Geohydrological study</p> <p>12. Water quality report.</p>	<p>9. Please refer to Appendix F of the BAR for the Public Participation Process followed.</p> <p>10.</p> <p>11. Please refer to Appendix G for the Freshwater report.</p> <p>12. According to the freshwater specialist, the groundwater in the Karoo shale is mostly deep down of poor quality (salty) and there is only little of it. It is mostly It is most likely the case at the site of the Klaarstroom WWTW.</p> <p>13. According to the Freshwater specialist, the drainage line is mostly dry, with too little water to sample during rainfall events.</p> <p>According to Bvi there are boreholes on the site, south of the N12 next to the river. Borehole testing should form part of the Operational EMP to evaluate the impact on groundwater quality.</p>	<p>EnviroAfrica &amp; WATSAN</p> <p>WATSAN</p> <p>WATSAN</p> <p>EnviroAfrica</p>
2.	14-03-2019	Prince Albert Local Municipality (Ward Councillor)		<p><b>Appendix F1.2</b></p> <p>I Support the application I wish to be kept informed about the application. Linda Jaquet</p>	<p>Noted. The Post-App BAR will be made available.</p>	<p>EnviroAfrica</p>

3.	22-03-2019	Linda Jaquet SANRAL Nicole Abrahams		<p><b>Appendix F1.3</b> The above listed project bears reference.</p> <ol style="list-style-type: none"> <li>1. I would hereby wish to register as an I&amp;AP for this particular project.</li> <li>2. The South African National Roads Agency SOC Limited (SANRAL) has received background information and a site layout plan for this project and based on the proximity of the pipeline crossing the N12 National Road, it appears that SANRAL could be impacted by this development.</li> <li>3. If services need to be constructed over or under the national road, (in this case the N12 ) or within 60m measured from the road reserve fence, the service owner must apply for a written permission from SANRAL, before any work may be carried out. Attached please find an application form for the proposed encroachment.</li> </ol>	<p>Please refer to <b>Appendix F1.3.1</b> for email correspondence.</p> <p>Dear Nicole Please refer to the engineer , Mr Gert Meiring’s communication with Ms Colene Runkel and Mr Evan Burger with regards to the proposed road crossing (<b>Appendix F1.3.1.1-F1.3.1.4</b>).</p> <p>Mr Runkel states that the N12 which we want to cross is not a proclaimed road and falls in the jurisdiction of PGWC.</p> <p>In the last attached email Mr Burger states that a motivational letter with detailed drawings will be sufficient to serve as an application but that we are not allowed to cross the road through the culvert or trench.</p> <p>The EAP will register PGWC as an I&amp;AP and make the relevant reports available to them for comment.</p> <p>The Applicant will conduct the necessary application and provide the relevant drawings for the proposed road crossing.</p> <p>Pipeline route Alternative A is the Preferred Alternative. It is proposed the pipeline cross the N12 via Horizontal Directional drilling. Pipeline route Alternative D is also a considered Alternative. It is proposed the pipeline cross the road attached to the exiting bridge.</p>	
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4.	27-03-2019	DEADP Jessica Christie	16/3/3/7/1/C2/3/0 013/19	<p><b>Appendix F1.4</b> <b>Acknowledgment of receipt of the Pre-App BAR</b></p> <ol style="list-style-type: none"> <li>1. The abovementioned report, dated 12 March 2019 and received by this Directorate on 14 March 2019, refers</li> <li>2. This letter serves as an acknowledgement of receipt of the abovementioned document</li> <li>3. This Directorate will provide comments on the content of the Pre-App BAR within the period specified i.e. by the 15<sup>th</sup> April 2019.</li> <li>4. Please note that the proposed activities may not commence prior to the EA being granted by the Department.</li> <li>5. The Department reserves the right to revise initial comments and request further information based on any news or revised information received.</li> </ol>	<ol style="list-style-type: none"> <li>1. Noted</li> <li>2. Noted</li> <li>3. Noted. No comments received. Appendix F1.4.1</li> <li>4. Noted</li> <li>5. Noted</li> </ol>	
5.	31-03-2019	J Klue Neighbour		<p><b>Appendix F1.5</b></p> <p>Attention : INGE ERASMUS Regarding the above matter, herewith some comments on above application regarding the above proposal. I am positive with what you want to do, I just have some points that I am concerned about. Please contact me should you require any further information.</p>	Noted.	EnviroAfrica

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				<p>Comment on the report is captured as follows:</p> <ol style="list-style-type: none"> <li>1. Water het vroeer oorgeloop on the Sandrivier in wat weer afvloeï na grootriver waar kinders swem. Roovin vissies voorkom en boorgate se drinwater vandaan kom, water was toe nie geklorineer nie. Almal moet seker maak dit gebeur nie weer nie.</li>   <li>2. Dit is waar pyplyn deur die pad kom nie soos aangedy nie.</li>   <li>3. Hier is waar aangrensende eienaar gebruik om vee mee deur te trek. 'n Verbindingspad twee spoor ner verby die rioolwerke geloop, alternatiewe paadjie moet net beskikbaar wees.</li> </ol>	<ol style="list-style-type: none"> <li>1. Noted and agreed. Hence the urgent need to upgrade the existing Klarstroom WWTP to produce a final effluent of an acceptable quality and to ensure that the plant is managed and maintained correctly to ensure the facilities optimal use.</li>   <li>2. Please note that the pipeline that is being referred to here is the "Proposed pipeline Alternative A". This is a <u>new</u> pipeline alternative proposed to carry final effluent to a proposed new galvanized storage dam on the sportfield. Final effluent to be treated with a calcium hypochlorite solution before being used for irrigation of the sportfield. Please refer to Appendix A, Locality Maps for the figure indicating the existing <u>pipelines</u>. Please also note that new/ additional pipeline alternatives are being considered to carry final effluent to the proposed dam. Alternatives discussed in the BAR.</li>   <li>3. Noted.</li> </ol>	
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				<p>4. Sandrivier (nie groot rivier nie)</p> <p>5. Dit is waar pyplyn deur die pad kom nie soos aangedy nie.</p> <p>6. Privaat grond</p> <p>7. As krag afgaan wat gebeur dan</p>	<p>4. Noted and corrected.</p> <p>5. Please refer to the explanation, point 2 above.</p> <p>6. Noted.</p> <p>7. Please note that the Klaarstroom WWTW makes use of oxidation ponds and constructed wetlands/reed beds, which means that waste water is treated under naturally occurring conditions. The advantage of natural systems are that they continue to function even if they are severely neglected as they are dependent on naturally occurring process. The proposed design and layout for the upgrade was chosen so that the natural slope assists gravity flow through the system – no electricity required to pump effluent through the system. The final effluent to flow to the storage dam via a gravity pipeline for irrigation.</p> <p>The only component which will require electricity is a small pump station which will be provided at the dam to feed the crawling irrigator which will be used to irrigate the sportfield. Should the electricity be off, irrigation will have to be placed on hold or a generator will have to be used.</p>	
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				<p>8. Die water het 2 jaar gelede afgelepp in Sandrivier in, aangrensende eienaar het vir jare gekla daarvoor end at dit rou riool is en st diere drin water. Toe is daar ekstra ten ken chlorineerder ogesit en water in meentgrond se veld ingepomp om ook te dien as voedingsbron vir diere op gemeenskapsgrond, my insien dit het goed gewerk en moet daar weer voorsiening gemaak word vir iets soortgelyk as te veel water vir sportgronde is en water moet weer in sand rivier inloop. Gemeenskap se kinders swem partykeer in grootrivier en gekontamineerde water kan baie gevaarlik wees.</p>	<p>8. Noted and agreed. Please see BVI Engineer – Gert Meiring’s response:</p> <p>The annual evaporation rate at Klarstroom is in excess of 2200mm per annum. This means that the average volume that will be evaporated from the ponds’ surface is in the order of 22m<sup>3</sup> per day average. This varies from about 8m<sup>3</sup>/day in winter up to 26m<sup>3</sup>/day in summer months. The result of this is that the water available for irrigation will only be about 4mm per day on average. The risk that there will be any runoff from the irrigation is therefore very small.</p> <p>Additionally, given the design of the “new” treatment plant and the relatively long retention periods allowed for in the process, the chances of the final effluent not meeting irrigation standard is very low. If, for whatever reason, the final effluent does not meet irrigation standard, the only alternative would be to recycle the final effluent from the storage pond back to the Inlet Works using a portable petrol powered pump and a lay flat hose.</p>	<p>Gert Meiring, BVI Engineers</p>
6.		DEADP, Directorate:	19/2/5/3/C2/3/WL 0037/19	<b>Appendix F1.6 Comments on Pre-App Draft BAR</b>		



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		Waste Management Etienne Roux		<ol style="list-style-type: none"> <li>1. The above-mentioned document (the Report), dated March 2019, as received by the DEADP, Directorate: Waste Management (the Department) on 19 March 2019, refers</li> <li>2. The Department has reviewed the documentation and has the following comments:</li> <li>3. According to page 12 of the BAR, the existing system has a design capacity of 50m<sup>3</sup>/day. It is proposed that the current capacity to the Klaarstroom WWTS be upgraded to new capacity of 61m<sup>3</sup>/day (11m<sup>2</sup>/day expansion) for dry weather and the peak wet weather flow was calculated to be 127m<sup>3</sup>/day or 1.47l/s. The report also states on the same page "records indicate a measured peak daily flow of 80m<sup>3</sup>/day which is approximately 60% higher than the current design capacity". Based on the above, will the upgrade to 61m<sup>3</sup>/day be sufficient to handle the measures peak daily (80m<sup>3</sup>/day) and calculated peak wet weather flow (127m<sup>3</sup>/day)?</li> </ol>	<ol style="list-style-type: none"> <li>1. Noted</li> <li>2. Noted</li> <li>3. Mr Gert Meiring, BVI Engineer had the following response: The water supply to Klaarstroom is provided from 2 boreholes located south of the town. The geohydrological assessment of these two boreholes indicate that the maximum water that they can provide is 86m<sup>3</sup>/day. (<i>"Groundwater Management and Artificial Recharge Feasibility Study" : Sept 2007 : Groundwater Africa, Dr.R Murray</i>). The peak Wet Weather Flow is calculated using a peak factor of 1.8 + 15% infiltration rate into the system due to stormwater leakage into the reticulation system, hence the calculated peak of 127m<sup>3</sup>/day. Due to the peak flows always being considerably higher than the Average Dry Weather Flow, it is not financially viable to design the complete WWTP for the peak flow, as this is an irregular occurrence. Subsequently, it is common practice to design the Inlet Works to accommodate the peak flows,</li> </ol>	<p>EnviroAfrica</p> <p>EnviroAfrica</p> <p>Gert Meiring, Bvi Engineer</p>
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				<p>4. The report states "the depth of the current single anaerobic pond is unknown, and the volume thereof probably completely filled with sludge. These exiting ponds need to be de-sludged. This sludge is considered difficult to handle, with a black jelly-like consistency and difficult to pump it is</p>	<p>and then the unit processes to deal with the Average Dry Weather Flow. Due to the allowance of 500mm freeboard on pond systems, a large degree of attenuation is achieved by the ponds during the occurrence of peak flows. For example, the area of the two proposed anaerobic ponds is approximately 60m<sup>2</sup>. At a peak flow of 127m<sup>3</sup>/day, the peak hourly flow will be 5.34m<sup>3</sup>/h. This flow will only increase the depth of the ponds by 87mm in an hour. All the other ponds have an even greater surface area, which means that the effect will be even less.</p> <p>In addition to the above, it must be taken into consideration that all the wastewater from Klarstroom is pumped. A pump has a fixed flow rate, which means that the flow to the plant will ALWAYS be the same, only the frequency of pumping will increase, that is the pump will switch on and pump the wastewater more often in peak flows than during average dry weather flow.</p> <p>4. The current anaerobic pond has approximate dimensions of 12.5m x 12.5m and an average depth of 1.5m which is common for this type of design. The side slopes are 1 : 1.5. This equates to a total usable volume of 160m<sup>3</sup>. Lets make an assumption and</p>	
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				<p>therefore suggested that the existing sludge be buried on site and contained within the fenced off area.” Kindly indicate the estimated volume of sludge contained in the pond and kindly provide comment on the nature if the sludge based in any tests that was performed on the sludge.</p>	<p>say that the pond is 60% filled with sludge. This equates to a volume of 96m<sup>3</sup>, say 100m<sup>3</sup> that needs to be dealt with.</p> <p>No analysis of the sludge within the existing ponds was done. Typically, anaerobically digested sludge which has been in this pond for years is fairly stable and similar in nature to what is found in a septic tank after 3 months retention. It is what remains after all the biodegradable components have been digested. It will be a brown to black finely graded material with the consistency of jelly. Of course, there will be a portion of this sludge which is not fully digested as it has only recently entered the pond. Typically, anaerobically digested pond sludge could have the following basic characteristics, but it is highly variable and dependant on the characteristics of the incoming raw sewage, retention time in the pond and degree of degradation already achieved.</p> <ul style="list-style-type: none"> <li>• Inorganic components- grit, gravel, bone fragments</li> <li>• Organic Non-Biodegradable fraction- Predominantly cellulose material such as hair or grass and straw</li> <li>• Bacteria- hydrolysing, acid forming and methane forming bacteria</li> </ul>	
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				<p>5. According to the report, tests will be performed on sludge during the operational phase to determine the best method of disposal, which may include land farming or composting has any of these possibilities been considered for the sludge currently in the oxidation pond present on the site.</p>	<ul style="list-style-type: none"> <li>• Endogenous Residue - from death of bacteria\</li> <li>• Organic Biodegradable fraction-Untreated settled material not yet hydrolysed</li> </ul> <p>5. These possibilities have been considered, however, based on the financial constraints for the project, as well as the nature of the sludge in the existing ponds, these possibilities have been ruled out as not feasible. The jelly like consistency of the sludge make it very difficult to handle, temporary drying beds will have to be established for the sludge to dry out and sludge would have to be transported for many kilometres to a registered facility (closest facility is Oudtshoorn) which presents an even greater risk of uncontrolled spillage occurring. The financial cost is simply too high. Therefore it is proposed that an area be dedicated to the safe disposal of the sludge on site. This area must be contained within the fenced off area of the site. The area selected for the disposal site is previously disturbed land as it is the site where the old septic tank was situated. The proposed site does not fall within any drainage lines. Composting is not a viable option due to the need for copious amounts of organic bulking material. Similarly,</p>	
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				<p>6. What is the expected volume of sludge which will be produced by the proposed upgrade, to be removed from the ponds every 5 – 7 years?</p> <p>7. Kindly elaborate on how the dedicated areas identified for sludge and screening disposal on site was selected with specific reference as to how the associated risks or impacts has been considered.</p> <p>8. This report states that the final effluent will be sent to a lined galvanised dam with a roof, located close to the sport field, which will be irrigated with the effluent. Kindly confirm id this dam will be lines and also what the quantity of the dam will be as the report states conflicting volumes.</p>	<p>Land Farming would require transport of the sludge which has its own risks.</p> <p>6. Literature on the subject indicates that domestic effluent contains approximately 0.08 liter per capita per day of undigested sludge (<i>WRC Report No. 544/1/00, GA Norris, CSIR</i>). This equates to approximately 17 cubic meters per annum, but will probably be less, as the volume decreases by about 65% after digestion with only the non-biodegradable fraction remaining. Therefore we are probably looking at a volume of about 43 m<sup>3</sup> after 7 years based on our assumptions above.</p> <p>7. There areas were selected as they do not fall within the drainage lines on site. The area selected for disposal of sludge and grit is also considered transformed and disturbed as it is the site where the old septic tank is situated which will be demolished.</p> <p>8. The proposed irrigation dam will have a storage volume of 121m<sup>3</sup> and will have dimensions of 10m diameter x 1.55m high covered with a galvanized sheeting roof structure. The dam is fire retardant and manufactured from Aluzinc corrugated sheets of 0.8mm thickness. The dam is provided with an 800g/m<sup>2</sup> supported PVC Liner which</p>	
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				<p>9. How will the chlorine dosing be managed? Will it be an automated or manual system?</p> <p>10. What will happen to effluent that does not meet irrigation standards?</p>	<p>carries a 12 year warrantee. The liners are UV stabilized and contain biocides to minimize fungus growth, thus making it suitable for water storage.</p> <p>9. Calcium Hypochlorite will be provided in “chip” form and a “chip doser” will be utilized to dose the chlorine solution into the irrigation water. Typically, a chip doser consists of a plastic basin filled with Calcium Hypochlorite chips. A stream of water is directed to the base of the basin at a controlled flow rate, where the water serves to dissolve the calcium hypochlorite chips. The solution then flows through the perforated base of the basin into the dam to disinfect the water within. The system is semi-automated in that the water for dissolving the chips is sourced from the irrigation pump outlet as a side stream. This means that as soon as the irrigation pump is started, chlorine solution will be dosed into the dam contents.</p> <p>10. Given the design of the “new” treatment plant and the relatively long retention periods allowed for in the process, the chances of the final effluent not meeting irrigation standard is very low. If, for whatever reason, the final effluent does not meet irrigation standard, the only alternative</p>	
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				<p>11. Kindly include this Department's Directorate: Pollution and Chemicals Management as an interested and affected party in order for them to provide comment on the application, once the application is lodged.</p> <p>12. Should there be any major spills of hazardous substances at the facility which could lead to environmental degradation, the management of such spills should adhere to section 30 of the NEMA as amended, which includes reporting responsibilities.</p>	<p>would be to recycle the final effluent from the storage pond back to the Inlet Works using a portable petrol powered pump and a lay flat hose.</p> <p>The annual evaporation rate at Klaarstroom is in excess of 2200mm per annum. This means that the average volume that will be evaporated from the ponds' surface is in the order of 22m<sup>3</sup> per day average. This varies from about 8m<sup>3</sup>/day in winter up to 26m<sup>3</sup>/day in summer months. The result of this is that the water available for irrigation will only be about 4mm per day on average. The risk that there will be large volumes of poorly treated effluent irrigated onto sportsfields is therefore very small.</p> <p>11. Noted and included.</p> <p>12. Agreed.</p>	<p>EnviroAfrica</p>
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				13. The Department reserves the right to revise initial comments and request further information based upon the information received.	13. Noted and agreed.	
7.	15-04-2019	Cape Nature Colin Fordham	14/2/6/1/5/3_ PA/178/32RE_ 2019/CF002	<p><b>Appendix F1.7</b></p> <p>Following the review of the PreBAR, and appendices; and given the above mentioned sensitivity of the site, CapeNature would like to make the following comments/ recommendations:</p> <ol style="list-style-type: none"> <li>1. Any indigenous vegetation that require removal should be rescued and used for rehabilitation purposes. CapeNature would like to reiterate that all endangered species or protected species listed in Schedules 3 and 4 respectively, in terms of the Western Cape Nature Conservation Laws Amendment Act, 2000 (Act No. 3 of 2000) may not be picked or removed without the relevant permit, which must be obtained from CapeNature. This is also to ensure plants that rescued plant material is accounted for and used in the rehabilitation or relocation process. To obtain such permits please contact the relevant Conservation Services Officials at the George CapeNature Regional Office or use the following website address <a href="http://www.capenature.co.za/permits-information/">http://www.capenature.co.za/permits-information/</a>.</li> <li>2. CapeNature would also like to remind the landowner that, in terms of the</li> </ol>	<ol style="list-style-type: none"> <li>1. Noted and agreed. Condition was added to the BAR.</li> <li>2. Noted and agreed. Condition added in the BAR.</li> </ol>	<p>EnviroAfrica</p> <p>EnviroAfrica</p>



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				<p>Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (“CARA”), landowners must prevent the spread of alien invasive plants on the property. The level of alien infestation is therefore not be seen as reducing the sensitivity of a site, nor is the subsequent removal of alien vegetation from a property regarded as a mitigation measure due to this is being a legal requirement. Infestation by alien does not necessarily mean that an area is not important for biodiversity as some vegetation types are particularly prone to invasive alien infestation, but may recover when cleared of alien vegetation.</p> <p>3. In addition to CARA, in terms of the Alien and Invasive Species Regulations, NEM:BA, 2014, specific alien plant species (e.g. <i>Opuntia ficus-indica</i>) are either prohibited or listed as requiring a permit; aside from restricted activities concerning, inter alia, their spread, and should be removed.</p> <p>4. Given the location of the facility within a non-perennial drainage line it is unclear how the design would accommodate for potential flash flooding events (which Karoo is know for). It is recommended that an appropriate storm water management plan be compiled to ensure that the infrastructure is adequately protected and</p>	<p>3. Noted and agreed. Condition added in the BAR.</p> <p>4. Gert Meiring from BVI Engineers gave the following response(s):</p> <p>Your concerns in this regard are noted and subsequently we propose that a low earth embankment (1.0m high) be placed on the northern side of the proposed works to channel any stormwater around the proposed</p>	<p>EnviroAfrica</p> <p>Gert Meiring, BVI Engineers</p>
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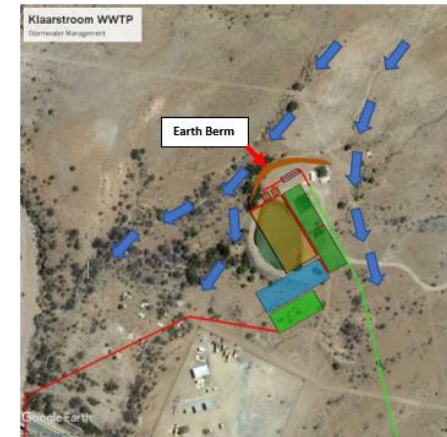
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that the risk of contaminated spills entering the freshwater resources is minimised.

works as indicated on the image below. The primary concentrated runoff from the drainage lines as indicated will then be mitigated. Similarly, the second drainage line from the east could be diverted using a trench along the toe-line of the eastern ponds to ensure that stormwater is diverted to the south of the works.



The Storm water Management Plan is included as Appendix A.

5. Will there be any run-off from the sport fields is the evaporation rate significant enough to ensure that runoff will not contaminate the nearby runoff.

5. The annual evaporation rate at Klarstroom is in excess of 2200mm per annum. This means that the average volume that will be evaporated from the ponds' surface is in the order of 22m<sup>3</sup> per day average. This varies from

				<p>6. Given the current volume of sludge that has accumulated in the systems, it is recommended that this should be removed and disposed of at a suitably registered facility and not disposed of on-site like proposed.</p>	<p>about 8m<sup>3</sup>/day in winter up to 26m<sup>3</sup>/day in summer months. The result of this is that the water available for irrigation will only be about 4mm per day on average. The risk that there will be any runoff from the irrigation is therefore very small.</p> <p>6. This possibility has been considered, however, based on the financial constraints for the project, as well as the nature of the sludge in the existing ponds, this has been ruled out as not feasible. The jelly like consistency of the sludge makes it very difficult to handle, temporary drying beds would have to be established for the sludge to dry out and sludge would have to be transported for many kilometres to a registered facility (closest facility is Oudtshoorn) which presents an even greater risk of uncontrolled spillage occurring. The financial cost is simply too high. Therefore it is proposed that an area be dedicated to the safe disposal of the sludge on site. This area must be contained within the fenced off area of the site. The area selected for the disposal site is previously disturbed land as it is the site where the old septic tank was situated. The proposed site does not fall within any drainage lines. Composting is not a viable option either, due to the need</p>	
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				<p>7. Future proposed on site disposal should be located outside the extend of any areas that would be prone to flooding events. CapeNature understands the financial constraints of the applicant, and the small volume of sludge that may be generated on a monthly basis. It is recommended that a broad chemical description of what the sludge consists of and how this process breaks down sludge into its various components is required. Cape Nature required this information to understand how the onside disposal of sludge will not result in contamination of the property (and CBA), over the long term. It is however still preferable for the sludge to be disposed of at a registered facility.</p>	<p>for copious amounts of organic bulking material to make it work. Similarly, Land Farming would require transport of the sludge which has its own risks.</p> <p>7. Noted. As stated in point 4 above, it is proposed that a low earth embankment (1m high) be placed on the northern side of the works as stated in point 4 above. The runoff from the drainage lines will be mitigated. Similarly, the second drainage line from the east could be diverted using a trench along the toe-line of the eastern ponds to ensure that stormwater is diverted to the south of the works.</p> <p>The bulk of the sludge is removed from the incoming raw sewage by the settlement in the anaerobic primary ponds. These ponds are typically deep (&gt; 1.50m) in order to create anaerobic conditions, i.e. without free available dissolved oxygen.</p> <p>Anaerobic ponds, to function correctly, must establish a population of hydrolysing anaerobic bacteria, acid forming bacteria and methane forming bacteria. The hydrolysing bacteria break down the complex biodegradable organic material to simpler compounds that are then transformed to short chain fatty acids by the acid forming bacteria. These</p>	
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					<p>short chain fatty acids then serve as food or substrate for the methane forming bacteria. The methane bacteria are extremely sensitive to dissolved oxygen. Thus, for satisfactory operation of the anaerobic pond, it is essential that either oxygen diffusing into the surface of the pond is rapidly scavenged or the surface of the pond is covered to prevent oxygen diffusion. Rapid scavenging of diffused oxygen can be achieved by ensuring that the biodegradable organic load (COD load) discharged to the pond is as high as possible.</p> <p>Prevention of oxygen diffusion can be achieved by permitting a stable crust to form on the surface of the pond naturally, or by provision of an artificial cover for the pond. In South Africa, the latter is seldom done. In addition, the inlets to the anaerobic ponds are positioned below the surface water level, preferably on the floor of the pond. This serves two purposes, firstly, it prevents entrainment of oxygen by the water stream falling on the surface of the pond, and secondly, anaerobic bacteria are non-motile, so the incoming stream on the floor of the pond serves to mix the incoming raw sewage with the anaerobic bacteria, thereby enhancing contact.</p>	
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					<p>Typically, anaerobically digested sludge which has been in this pond for several years would be fairly stable and similar in nature to what is found in a septic tank after 3 months retention. It is what remains after all the biodegradable components have been digested. It will be a brown to black finely graded material with the consistency of jelly. Of course, there will be a portion of this sludge which is not fully digested as it has only recently entered the pond.</p> <p>Typically, anaerobically digested pond sludge could have the following basic characteristics, but it is highly variable and dependant on the characteristics of the incoming raw sewage, retention time in the pond and degree of degradation already achieved.</p> <ul style="list-style-type: none"> <li>• Inorganic components- grit, gravel, bone fragments</li> <li>• Organic Non-Biodegradable fraction- Predominantly cellulose material such as hair or grass and straw</li> <li>• Bacteria- hydrolysing, acid forming and methane forming bacteria</li> <li>• Endogenous Residue - from death of bacteria</li> <li>• Organic Biodegradable fraction- Untreated settled material not yet hydrolysed</li> </ul>	
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				<p>8. It should be noted that Cape Nature will not support the use of any alien invasive plant species within the proposed reed beds. Only the use of cosmopolitan or indigenous plant species can be supported. It is recommended that an <u>Operational EMP be compiled detailing the sludge disposal and reef bed maintenance activities</u> that are proposed for the facility.</p>	<p>It is almost impossible to provide even a guess of what the concentrations of chemical constituents of such a sludge would be, as there are too many variables that could affect the composition. The only possible means of knowing this would be to take a sample and have it analysed at a laboratory.</p> <p>8. The proposed plant species for the Klaarstroom reed bed is <i>Phragmites Australis</i>, or the common reed. There are however a wide range of plants that can provide a similar function such as <i>Typha Augustifolia</i>, <i>Typha Capensis</i>, <i>Cyperus papyrus</i>, <i>Scirpus lacustris</i> and many others.</p> <p><u>An abbreviated Method Statement for the removal and disposal of the sludge would be as follows:</u></p> <ol style="list-style-type: none"> <li>1. Anaerobic Pond liquid fraction to be removed by pumping the water out of the pond using a suitable pump.</li> <li>2. Pumping must continue until all visible liquid has been removed from the pond and the remaining sludge fraction is clearly visible.</li> <li>3. The contractor must now prepare the area where the sludge is to be buried by excavating a hole of</li> </ol>	
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					<p>suitable size to accommodate all the sludge.</p> <ol style="list-style-type: none"> <li>4. A portion of the excavated material not containing any rocks larger than 50mm diameter is then taken from the spoil heap and mixed into the wet sludge remaining in the pond.</li> <li>5. The mixed material is then allowed to stand for two days to allow most of the moisture to be absorbed by the soil mixed into the sludge.</li> <li>6. This will stabilize the material and make it easier to handle. If not mixed with soil, the sludge will run out of the excavator bucket faster than what the operator can scoop it up. In addition, streams of sludge will be spilled onto the surrounds as the excavator is rotated to move the sludge from the pond to the truck transporting it.</li> <li>7. The soil/sludge mixture can then be removed mechanically with an excavator by scooping it out of the pond, and loading it onto a tipper truck for transport to the prepared excavation. If after the first attempt at loading, it appears as if the sludge is still too fluid, more soil can be added until a stable mixture that can be handled is reached.</li> <li>8. The soil sludge mixture is then placed in the excavation in layers of</li> </ol>	
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					<p>300mm thick. After each layer, a layer of clean soil is placed over the sludge 150mm thc, followed by another layer of soil/ sludge mixture.</p> <ol style="list-style-type: none"> <li>9. Stop filling the excavation with the soil/sludge mixture approximately 300mm from the natural ground level.</li> <li>10. Fill the remaining 300mm depth with clean excavated soil and course material such as rocks and stones to provide a cap over the excavation which stands 150mm proud of the normal ground level. This is to accommodate for differential settlement of the soil, as it compacts the layers below due to gravity.</li> <li>11. Continue this process until all the sludge has been removed from the pond in question.</li> <li>12. On completion of the capping process, the area where sludge has been buried shall be clearly marked with posts and fenced off from access.</li> <li>13. The site will be monitored for a period of 1 year after completion of the process for any signs of leaking, erosion or washout. In case of any of the above occurring, the contractor will make the needed repairs within his retention period.</li> </ol>	
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				<p>9. The minister has not officially adopted WCBSP (2017), although it has been endorsed. Therefore the presence of CBA does not trigger NEMA Listing Notice Activities, however the WCBSP (2017), needs to be referred to and referenced where required. The WCBSP (2017) data is of particular importance to biodiversity specialist reports.</p> <p>10. CBA regions are areas delineated that are in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure. As stipulated in the Land Use Advice (LUA) Handbook (Pool-Stanvliet et al. 2017)<sup>5</sup> although the property selected may have undergone a level of disturbance, this cannot be used as motivation for establishing of development within CBA or ESA areas. It should be noted that it is the landowner's responsibility to ensure his property is suitably maintained at a level consistent with LUA guidelines. The loss of the CBA does compromise conservation targets and the loss of ESA would compromise the CBA. Could the EAP discuss this development in context with the</p>	<p>Please also refer to the EMPr and the Operations Manual Appendix H1 &amp; H2.</p> <p>9. Noted.</p> <p>10. Noted. The guideline was consulted with regards land use advise and developments in CBAs/ EAs. The Handbook was referenced in the BAR. Please also note that the Sensitivity Maps, Appendix D have been updated.</p>	
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**UPGRADE OF KLAARSTROOM OXIDATION POND  
WASTEWATER TREATMENT SYSTEM**

**COMMENTS AND RESPONSE REPORT**

**DATE: APRIL 2019**

				<p>CapeNature LUA guideline document? <b>Particular reference should be made to the reasons GIS layer. Reference to this document was not found within the Pre-BAR.</b></p> <p>11. Using specialist findings, a detailed No-Go Areas map should be compiled and appended to the Environmental Management Programme (EMPr). The aim of this map is to sensitise the contractor to the location of sensitive habitat relative to construction footprints. This will also empower the Environmental Control Officer (ECO) to ensure the strictest level of compliance regarding the protection of sensitive habitat.</p> <p>12. To conclude, the upgrading of WWTW is essential for improving the water quality of our freshwater resources. CapeNature encourages all such systems to be rigorously monitored and compliance strictly enforced throughout the project lifecycle to ensure that such systems do not fall into a state of disrepair. Training of municipal staff regarding the operation of such facilities should already being in the construction phase of the project to ensure that all such personnel are fully skilled in terms of ensuring the facilities optimal use. CapeNature reserves the right to revise initial comments and request further</p>	<p>11. Noted and included, Appendix B.</p> <p>12. Noted. Condition included in the BAR.</p>	
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Comments on Initial Public Participation & Pre-App BAR (Feb 2019)						