

To Whom it may concern,

## **Pollution watch report – Mullaloo beach 25<sup>th</sup> November 2023**

### **Introduction**

This pollution report is additional to many others relating to potential environmental impacts from the Beenyup treatment plant outfall and construction of the Ocean reef marina.

Experiences with water quality this morning coupled with the observations including previous history, leads to a reasonable level of concern that there may be influences from the ocean outfall causing the water quality decline and that it may not be naturally induced.

Clearly, this has to be proved one way or the other as these events are continuing to occur.

### **Concern**

Having spent the morning at Mullaloo beach today, it was clear to me that there was a significant level of suspended matter in the water column with an oily slick apparent on the surface. For normal beach goers without an elevated view or who are used to “normal” water conditions this may not have been apparent to them.

Clear evidence of the compromised water quality is presented in this pollution watch report in an effort to find answers as these situations are becoming more common. The clear concern relates to the adjacent Beenyup outfall facility and whether secondary filtration system flushing was undertaken overnight, or whether this is a totally natural phenomenon.

Unfortunately, in the absence of disclosure and information sharing by WA Water corporation, we have no idea of the periodic activities undertaken involving the flushing of Ultrafiltration and Reverse osmosis membranes where contaminated, nutrient laden membrane plaques are discharged into the marine park with a range of harmful cleaning and flushing chemicals.

Prior to the introduction of the Advanced Groundwater Replenishment Program (AGWRP), clear diurnal surface plumes were always evident around the diffuser array on a daily basis. Since the introduction of phase 2 of the AGWRP, there appear to be no diurnal plumes evident with occasional extensive plumes occurring at different times during the day (not aligning with normal diurnal patterns).

### **Background**

As a daily long-distance swimmer at Mullaloo beach, I know the waters well and along with other swimmers know when the water quality is compromised with pollutant materials. I continue to collate regular satellite imagery that sometimes illustrates extensive sediment laden plumes extending from the outfall diffusers well in exceedance of the “notional” zone of impact recorded for the EPA. Clearly, if wind and currents direct contaminated water towards the popular Mullaloo beach this is of particular concern.

My satellite imagery is restricted to every fourth day as my free Copernicus account limits access. Clearly, DWER and other government agencies will have high-level, high frequency and high-resolution daily imagery better informing the daily activities of the outfall facility.

### Water testing

The community might reasonably assume that regular (and comprehensive) water quality testing is undertaken observing appropriate laboratory protocols. Unfortunately, it appears that the City of Joondalup has the responsibility to test the local waters at Mullaloo beach. It appears that there is **NO** testing during the winter and during the summer it is only undertaken once **every two weeks**.

Given the popularity of Mullaloo beach and the duty of care assumed by the City of Joondalup on behalf of the WA Health department it would be assumed that more regular water quality sampling would be undertaken with full online disclosure of water quality datas. Furthermore, given the proximity of the Beenyup outfall and “notional” status of the zone of influence it would be assumed that Water corporation would liaise with the City of Joondalup and advise when flushing has occurred, particularly when wind, wave and current conditions might aid flow of discharge waters towards Mullaloo beach.

Given community concerns at the inadequacy of water quality testing along the local coastline, quotations have been obtained from a local certified water quality testing laboratory. The costs are significant for the spectrum of tests that we believe are relevant. If needed, there is an intention to “Crowd fund” a local volunteer water quality testing group in the absence of an effective government sponsored program that is fit for purpose given the number of recreational water users and proximity of this high-capacity treated sewage outfall.



Illustrated sampling points – Beach grade sampling.

Local Government / Managing Authority	Water Body	Site Code	Site Name	GPS Deci-Degrees	Monitoring Category	Result Years	No. Samples	95th %tile	Microbial Assess Category (MAC)	1-off Trigger Level (99th %tile)	2-in-a-row Trigger Level (90th %tile)	Sample Analysis Period	Sanitary Assess Category (SAC)	Beach Grade Website Icon	LGA/ MA Sanitary Inspection Report (SIR) Status	Sanitary Actions	Min No. Samples
Joondalup (City of)	Ocean	EV3/731	Pinnaroo Point	-31.80384, 115.728729	1. Program	2017-2022	62	34	A	90	26	Nov - May	Low		Annual SIR Review		13
Joondalup (City of)	Ocean	EV3/732	Mullaloo Beach	-31.784986, 115.732913	1. Program	2014-2022	92	5	A	37	10	Nov - May	Low		Annual SIR Review		5*

Recorded sampling points – Beach grade information (Inconsistent with map locations)

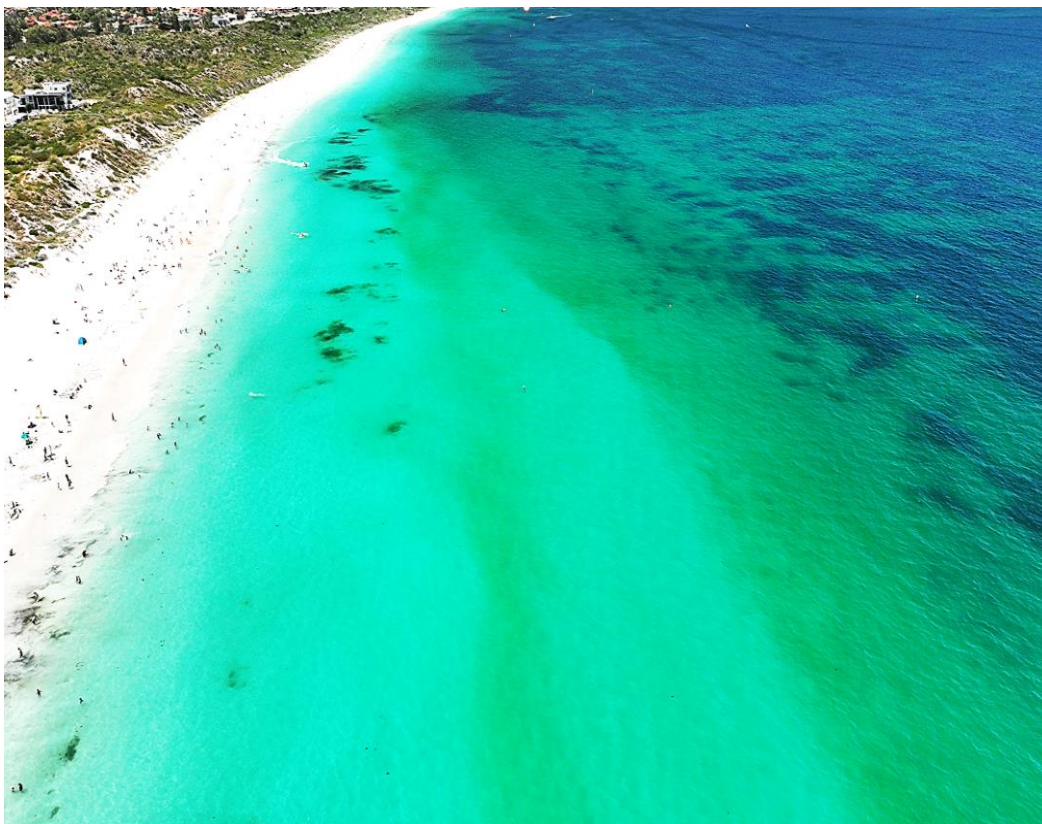
## Observations

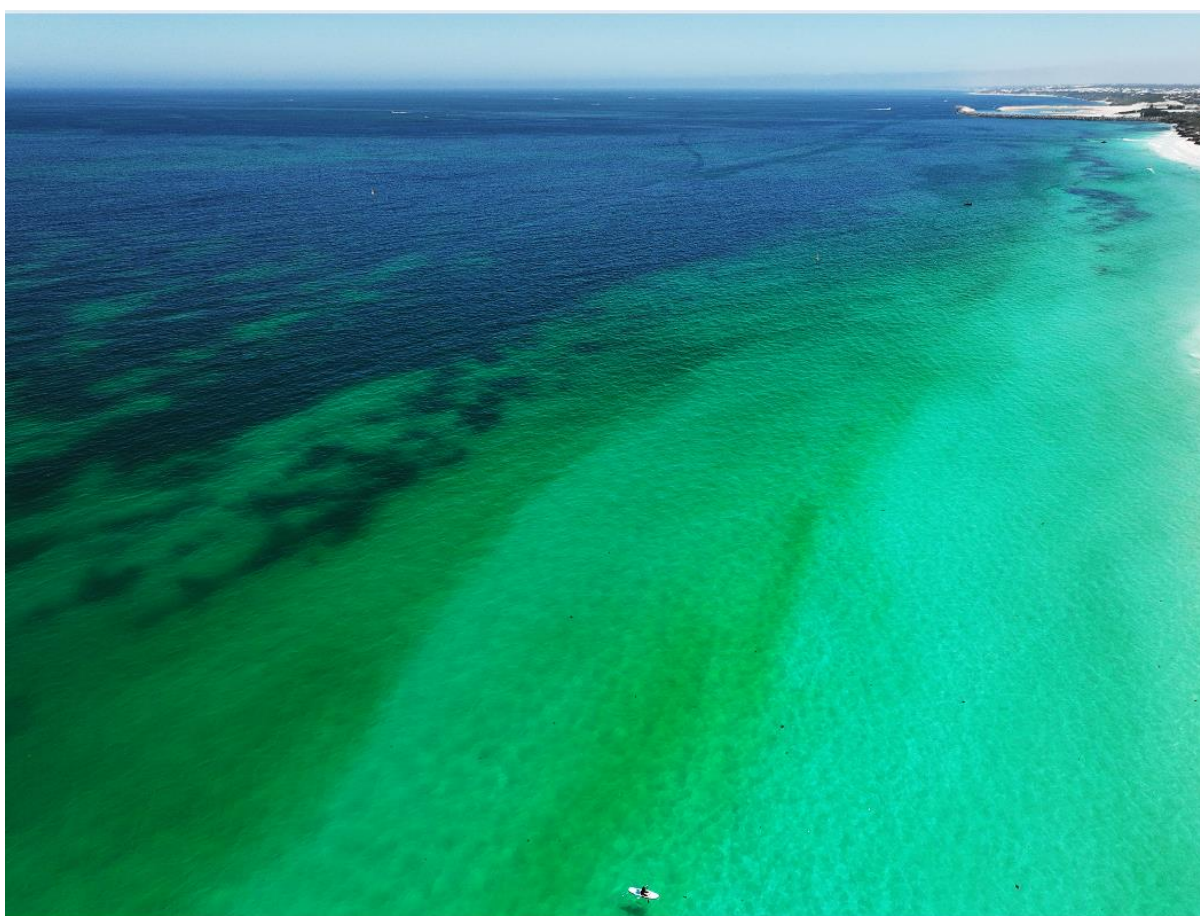
Oily slick along the surface along a large stretch of Mullaloo beach. Reduced visibility in the upper water column (< 1 metre), sweet pungent smell similar to previous morning events.

Clear drone photographic evidence of significant suspended matter along the beach moving in from offshore.

In the absence of daily (diurnal) surface plumes as previously witnessed, its concerning that flushing may occur at night meaning that these plumes wouldn't be visible during the day. If a flushing event did occur on Friday night, the wind direction from 6pm to midnight was westerly, potentially bringing any discharge plumes towards the beach overnight if flushing did occur.

Following are some drone images for the suspended sediments along the coastline at Mullaloo beach.





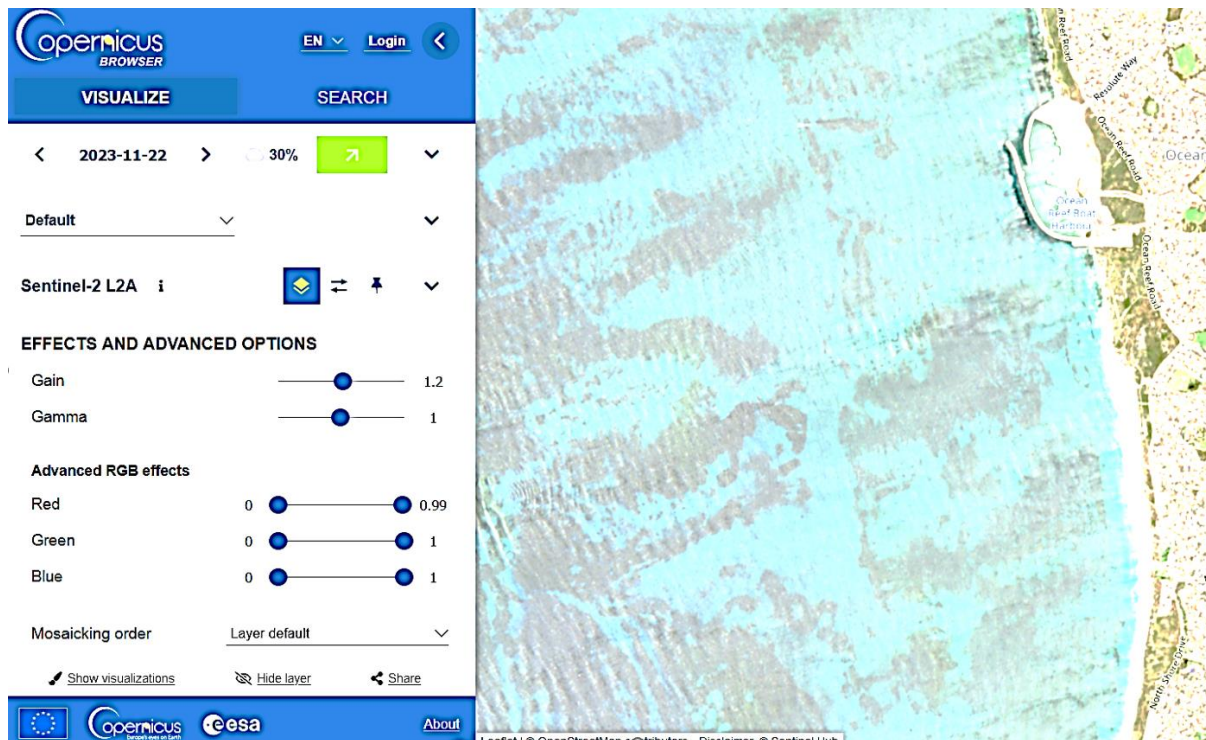


If required, high resolution images are available showing greater detail and demonstrating areas where swimmers are swimming through the particulate matter.

On Friday 24<sup>th</sup>, the water conditions were perfect, drone imagery saw no suspended sediments. For around two weeks prior to today, water conditions have been perfect and drone imagery has seen excellent visibility with no sign of any sediments or particulate matters.



Furthermore, the satellite imagery from the morning of 22<sup>nd</sup> November illustrated perfect clarity.



### Further information

As a daily swimmer at Mullaloo beach and living in a property with clear unobstructed visibility of the Beenyup outfall diffuser I have seen no visible surface plumes for several weeks, particularly this week.

During this time, water quality and visibility at Mullaloo beach has been perfect and commented on by many early morning swimmers.

This morning, there appeared to a shiny glaze across the water surface heading towards the shoreline and to the south towards Mullaloo beach.

### Scientific assessment and investigation

Based on a range of observations and previous research findings (including satellite and drone imagery) I have concerns regarding the extent of zone of impact (LEPA and PCZ) from the Beenyup outfall. WA Water corporation are not willing to share information regarding the frequency and approach to AGWRP filtration systems, we can therefore only assume that when large surface plumes are evident this is when flushing is occurring.

The process of secondary filtration of feedwater to be injected into groundwater aquifers requires a significant level of ultrafiltration and reverse osmosis to remove further particles, nutrients and contaminants. All of the waste will accumulate on filter and RO cell membranes as a plaque that will eventually end up in the ocean when it is released through a flushing and back washing process using a range of harmful chemicals. The flushing water used is permeate water that has been treated through the RO process, hence the volume of flushing water isn't that great meaning higher concentration levels of contaminants and nutrients.

Although significant work was undertaken by the inter-agency taskforce to develop protection protocols and Critical control points (CCPs) to protect groundwater aquifers, it appears that despite the receiving waters forming a class a marine park, no consideration was given to the potential adverse impacts of these peak loads of contaminants and nutrients. The annual PLOOM reporting, continues to make no mention of this major change!

***There may be a scientific explanation for today's water discolouration, and it could relate to some form of algal bloom. However, to eliminate the Beenyup outfall, the community might reasonably assume that DWER/EPA ask when the most recent flushing event occurred.***

### **Questions arising**

It is hoped that this pollution watch report will be appropriately investigated and that I will receive an ICMS sequence number and ongoing updates on findings. Given that this is an ongoing concern, this report has been copied to our local MLA (Caitlin Collins) and the Director General (DWER).

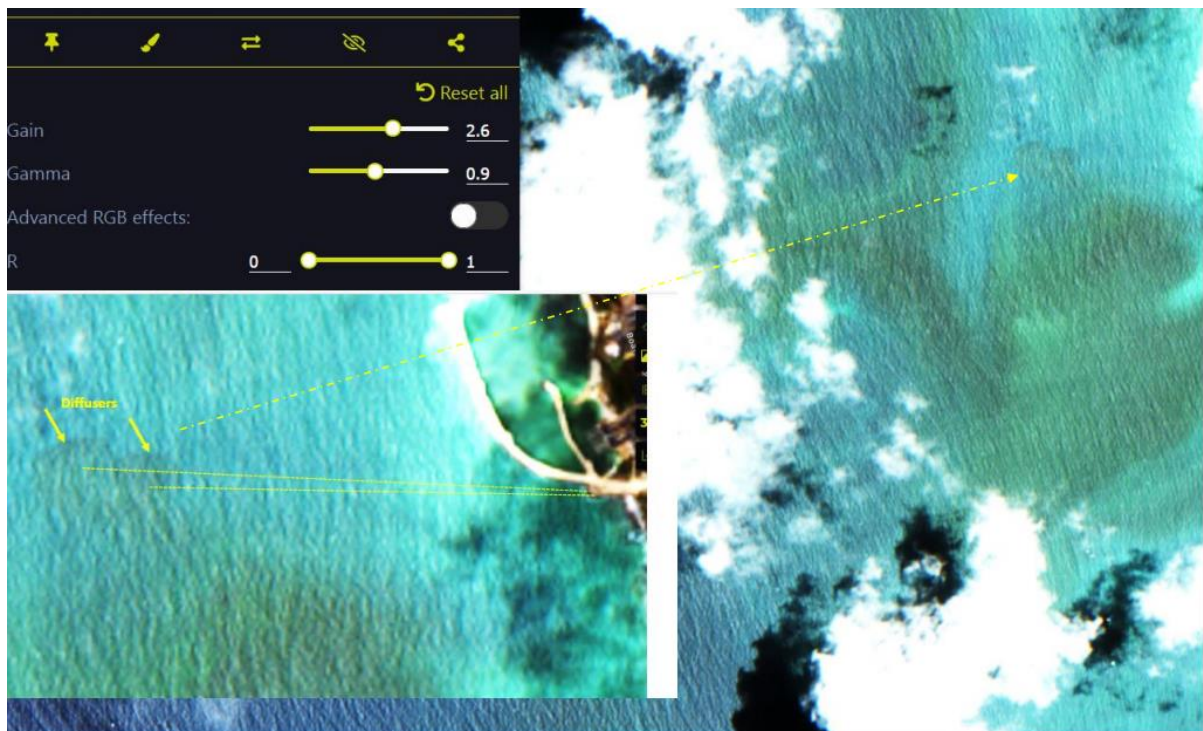
Following are some questions of relevance that a concerned community might reasonably expect to be answered:

1. When was the last WA Water corporation flushing operation conducted to backwash and clean UF and RO membranes?
2. At what time and for long did the flushing take place (if it did)?
3. Are there any explanations from DBCA on potential natural events that might have occurred, noting that this discolouration wasn't evident past Pinnaroo point to the south?
4. When was the last time that CoJ conducted water quality sampling and testing at Mullaloo beach?
5. Given that the zone of impact around the outfall diffusers continues to be categorised as "informal" or "notional" what measures are in place with DWER to monitor the extend of the Primary contact zone following a flushing or bypass event?
6. In the beach water quality information on the WA Health website, the interactive map states that water quality is sampled at Mullaloo (in front of the surf club) and at the northern Ocean reef end. Why does the ongoing information summary omit Ocean reef and include Pinnaroo point?

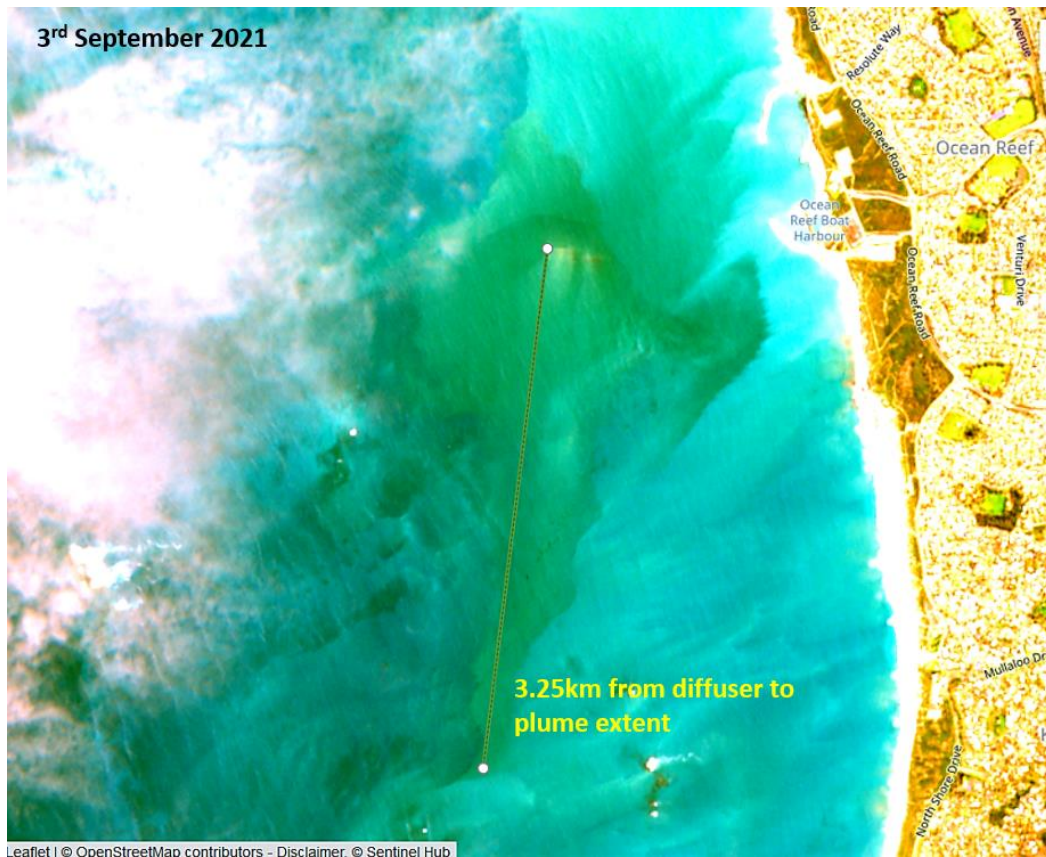
### Previous information relating to the outfall plume

Based on ongoing research and correspondence since 2016, I have concerns relating to the Beenyup outfall and whether the growing nutrient and contaminant burden is affecting local water quality and benthic habitats. Following is further information that further reinstates the concerns presented.

Satellite image showing plume from the outfall tracking towards Mullaloo beach.


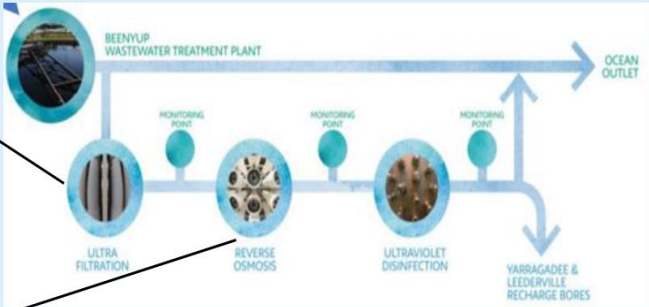






The exceedingly fine filtration membranes are prone to blockage and plaque build-up. As this occurs flux is reduced and more pressure and pumping energy is required to maintain adequate flow. Clearly, where feedwater is more polluted the membranes become clogged more regularly needing flushing more frequently.

## Filtration and Reverse Osmosis membrane fouling

Fouling of both UF and RO membranes and cells is inevitable because of organic, inorganic, and biological constituents, as these plaques build up efficiency decreases and energy use increases. This means that regular flushing and cleaning is required which means that this contaminants are flushed into the marine park.

Since the construction of the 2km marina breakwater wall, the diffuser array is now closer to the structure. It appears however that no scientific hydraulic studies were conducted to determine potential mixing changes of the local waters given the structural influence as well as the major changes to the outfall flow patterns and effluent characteristics.

This illustrates what appears to be a daytime flushing event. Over a number of hours this surface plume continued to extend well in excess of the claimed zone of impact in the “Notional” projection in the ministerial statement.



## **Conclusion**

The poor water quality at Mullaloo today is concerning, we have seen this before and have been unable to explain the source. Given timing, prevailing conditions and ongoing awareness of the Beenyup outfall, without excluding this as a possible source this continues to be a concern.

The community should reasonably assume that the machinery of government maintains water quality to a high standard along our local beaches. Based on over 7 years of investigation, there are many areas of potential concern that need to be investigated.

It is hoped that given the graphical evidence provided, DWER will seek full and comprehensive information of all flushing events that have occurred with the past 36 hours to rule in or out the Beenyup treatment plant. Failing this, if it is viewed that the discolouration is an algal bloom event, perhaps satellite imagery and a robust scientific description can be provided to confirm this theory.

As always, I remain available for discussion or collaboration on this and associated matters.