



**Appeals Convenor**  
**Environmental Protection Act 1986**

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**REPORT TO THE  
MINISTER FOR ENVIRONMENT**

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**APPEAL IN OBJECTION TO THE AMENDMENT OF A LICENCE  
L7064/1997/11: MILLAR ROAD LANDFILL FACILITY  
BALDIVIS**

**PROPONENT: CITY OF ROCKINGHAM**

Appeal Number 019 of 2019

**August 2019**

## Appeal Summary

This report relates to an appeal lodged by Tellus Holdings Ltd (appellant) in objection to the amendment of licence L7064/1997/11 by the Department of Water and Environmental Regulation (DWER). The licence is held by the City of Rockingham for the operation of the Millar Road Landfill Facility (premises) and was amended to authorise the acceptance, handling and disposal of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) contaminated wastes at the premises on 20 March 2019.

The appellant submitted that conditions authorising the licence holder to accept PFAS contaminated waste at the premises should not have been added to the licence. The appeal was based on two grounds of appeal; inadequate separation distances to surface water bodies and the risk to groundwater/adequacy of liner.

In responding to the appeal, DWER remained of the view that the risk assessment undertaken in considering the amendment was adequate and that the single composite liner installed at the premises was sufficient to protect groundwater. However, DWER acknowledged that the waste acceptance criteria for the premises should be amended to be consistent with the values identified in the PFAS National Environmental Management Plan (NEMP).

Having regard for the information provided during the appeals investigation, including the information provided by the appellant, the proponent and DWER, the Appeals Convenor considered that DWER's risk assessment was appropriate and supported by the available evidence. DWER's recommended amendment to the waste acceptance criteria were also supported.

### Recommendation

The Appeals Convenor recommended that the appeal be allowed to the extent that the waste acceptance criteria for the premises are amended to be consistent with the values identified in the PFAS NEMP.

It was otherwise recommended that the appeal be dismissed.

## INTRODUCTION

This report relates to an appeal by Tellus Holdings Ltd (appellant) against the amendment of licence L7064/1997/11 by the Department of Water and Environmental Regulation (DWER) under Part V of the *Environmental Protection Act 1986* (EP Act). The licence is held by the City of Rockingham (licence holder) for operation of the Millar Road Landfill Facility (premises).

The premises is located on Lot 2170 on Plan 211650, Millar Road West, Baldivis (Figure 1).



Figure 1 – Premises map (boundary shown in green)

The premises is a Category 61A, 62 and 64 prescribed premises. These categories are defined under Schedule 1 of the *Environmental Protection Regulations 1987* as 'Solid waste facility', 'Solid waste depot' and 'Class II or III putrescible landfill site' respectively. The premises is also subject to Ministerial Statement No. 271.

On 13 November 2018 the licence holder applied to amend the licence seeking approval for the acceptance, handling and landfilling (disposal) of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) contaminated wastes within existing Class III landfill cells on the premises. DWER amended the licence to authorise the acceptance, handling and disposal of PFAS contaminated wastes at the premises on 20 March 2019 (Amendment Notice 2). Disposal was only authorised within cells 16 and 17 which are single composite lined with a geosynthetic clay liner (GCL) and a 2.0 millimetre high-density polyethylene (HDPE).<sup>1</sup>

<sup>1</sup> In responding to the appeal and in the risk assessment documented on page 14 of Amendment Notice 2, DWER made reference to a double liner being the applicable liner. DWER has since acknowledged these references were typographical/administrative errors. The correct liner considered by DWER was a single composite liner.

This document is the Appeals Convenor's formal report to the Minister for Environment under section 109(3) of the EP Act.

## OVERVIEW OF APPEAL PROCESS

In accordance with section 106 of the EP Act, a report was obtained from DWER in relation to the issues raised in the appeal. The licence holder also provided a written response to the matters raised in the appeal.

During the appeal investigation the Appeals Convenor consulted the appellant and the licence holder in relation to issues raised in the appeal. The Appeals Convenor also requested and received additional advice from DWER.

The environmental appeals process is a merits-based process. Appeal rights in relation to an amendment to a licence relate only to the amendment, and not to elements of the licence that are not amended. The Appeals Convenor normally considers consistency with any conditions set under Part IV of the EP Act and previous Ministerial appeal determinations, as well as new information or evidence being presented that was not previously considered. Enforcement and compliance with the conditions of a licence is a matter for DWER as the regulator and issues of this nature are considered to be outside the scope of an appeal against an amendment to a licence.

## OUTCOME SOUGHT BY APPELLANT

The appellant submits that the conditions authorising the licence holder to accept PFAS contaminated waste at the premises should not have been added to the licence.

## GROUND OF APPEAL

The appellant's contention that the amendments should not have been made to the licence to allow the acceptance of PFAS contaminated waste is based on two grounds of appeal,

- Separation distance to surface water bodies; and
- Risk to groundwater and adequacy of the landfill liner.

### GROUND 1: SEPARATION DISTANCE TO SURFACE WATER BODIES

The appellant submitted that the premises is located within 1,000 metres of surface water bodies. Given this, the appellant asserts that the amendment should not have been allowed as DWER's *Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (Version 2.1, January 2017)* (Interim PFAS Guideline) outlines that landfills accepting PFAS contaminated wastes:

...must not be located...within 1,000 m of a surface water body that supports an aquatic environment (including groundwater dependent ecosystems); or within 1,000 m of a surface water drain that is connected to groundwater and/or discharges directly into an aquatic environment (including groundwater dependent ecosystems) or a water body that supports fish species that may be caught and consumed.

### Consideration

Table 9 of Amendment Notice 2 published by DWER lists environmental receptors and their distance to the premises. Two wetlands are listed as being within 1,000 metres of the premises; a conservation category wetland 1,000 metres northwest, and an unnamed surface water body 360 metres northwest.

In response to this appeal ground, DWER acknowledged that Table 9 is misleading. DWER reports that the two wetlands listed are actually the same wetland but measured from two

different points (i.e. the longest distance is measured from the closest cell [cell 16], and the shorter distance is measured from the closest point of the premises boundary). A map displaying the measurements is shown below (Figure 2). DWER has also provided more accurate distance measurements of 970 metres and 370 metres.



**Figure 2 – Wetland separation distances**

*(Source: DWER 2019)*

The licence holder has advised that Google Imagery does not show standing water in the subject wetland from at least 2004, this being the date of the earliest available imagery. This is noted in the context of the Interim PFAS Guideline making reference to surface water bodies that support aquatic environments. Whilst the historical imagery may not indicate the presence of standing water, such imagery is sporadic and not considered to provide conclusive evidence of the absence of an aquatic environment. The wetland is included in the Geomorphic Wetlands of the Swan Coastal Plain dataset as a sumpland which is defined as a wetland within a basin landform that is subject to seasonal inundation.<sup>2</sup> Noting this, it is considered that a precautionary approach should be taken and the wetland considered as potentially supporting an aquatic environment. It is on this bases that it is considered that DWER's identification of the wetland as a sensitive receptor is supported.

In relation to the application of separation distances, DWER has advised that distances from sensitive receptors are currently used to inform assessments and decision making on a case-by-case basis, taking site specific circumstances into account. DWER further advises that applications are assessed using a risk-based framework and whilst relevant separation distance guidelines are considered, they are guidance and not mandatory requirements. DWER advised that the Delegated Officer considered the Interim PFAS Guideline in making the decision to amend the licence, coming to the conclusion that a separation distance of

<sup>2</sup> Department of Biodiversity, Conservation and Attractions (2017). A methodology for the evaluation of wetlands on the Swan Coastal Plain, draft prepared by the Wetlands Section of the Department of Biodiversity, Conservation and Attractions and the Urban Water Branch of the Department of Water and Environmental Regulation, Perth.

970 metres did not present a material increase in risk to the wetland (compared to 1,000 metres) given the highly engineered lining system of the landfill. As outlined in Ground 2, DWER considered that the lining system is expected to have a life span of 30-60 years over which period the volume of leachate produced will be significantly reduced, lowering the risk of PFAS contamination.

DWER acknowledged that the Interim PFAS Guideline is not fully aligned with the Department's Part V regulatory framework in regard to the application of separation distances in its assessments and advised that it will be reviewed at the next available opportunity.

## Conclusion

DWER's conclusion that a separation distance of 970 metres does not present a material increase in risk to the nearest wetland (compared to 1,000 metres) given the highly engineered lining system of the landfill is considered reasonable. It is recommended that this ground of appeal be dismissed.

## GROUND 2: RISK TO GROUNDWATER AND ADEQUACY OF LINER

The appellant submitted that the premises is located on a site largely comprising siliceous sands and that the depth to groundwater is between 11.5 and 33.5 metres below ground level (approximately 2 to 3 metres below the base of the landfill cells). The appellant noted that DWER's Interim PFAS Guideline states:

Landfills accepting waste containing PFOS/PFHxS or PFOA must not be located on very high or high vulnerability aquifers.

The appellant asserted that the premises is located on a high vulnerability aquifer and therefore the amendment should not have been allowed. The appellant has also questioned the life expectancy of the liner and whether it will be adequate to mitigate the risk to groundwater over time.

## Consideration

The Interim PFAS Guideline define very high vulnerability aquifers as limestone with known karst features; and sand, peat and clay deposits (wetland areas) with a shallow water table ( $\leq 3\text{m}$ ). High vulnerability aquifers are defined as sand and limestone with a shallow to intermediate water table ( $\leq 30\text{m}$ ); and fractured rocks with a high permeability ( $\geq 40\text{ m/d}$ ) and a shallow to intermediate water table ( $\leq 30\text{m}$ ).

In response to this appeal ground, DWER advised that in assessing the risk to groundwater associated with disposal of PFAS contaminated wastes, the Delegated Officer identified that the site was located on siliceous sands. DWER determined a consequence rating of 'Major' for groundwater in conducting its risk assessment, taking account of the aquifer of high vulnerability. However, DWER considered that the control measures in place for cells 16 and 17 (single composite lined) resulted in a likelihood rating of 'Unlikely'. The risk to groundwater from disposal of PFAS contaminated wastes was therefore determined to be 'Moderate' which was considered acceptable.

DWER also provided advice from its Contaminated Sites team as follows:

In most soil profiles, separation distance to groundwater is not a mitigating factor for PFAS contamination risk to groundwater. PFAS will not be held in the soil profile or otherwise attenuated whilst migrating through a sandy soil profile. Greater separation to groundwater will only lengthen the time taken for the contaminant to intercept groundwater.

The standard of lining of the cells is the key control in mitigating impacts to groundwater from the landfilling of PFAS contaminated wastes in transmissive soils.

In relation to the life expectancy of the liner, the licence holder advised:

Manufacturers of HDPE liner materials provide a warranty of 15 years with the delivery of the materials.

The service life of HDPE geomembrane is typically defined as its half-life, which is the point at which 50% of the geomembrane has degraded. The primary cause of degradation of the HDPE lining system is oxidation of the geomembrane, which eventually weakens the membrane and allows stress cracks to form. Oxidation is inhibited by limiting exposure of the geomembrane to UV radiation and open air environments, and maintaining lower average ambient air temperatures around the lining system.

The HDPE geomembrane will be covered with a cushion layer of geofabric to protect the liner and the HDPE liner will not be exposed to UV radiation.

Durability testing completed in laboratory and field conditions estimates that HDPE geomembrane can have a service life (50% degradation) of over 400 years. Under the conditions described it is reasonable to expect that the service life of the composite lining system is for several centuries or more.

In response to this same matter, DWER advised that HDPE liners are typically quoted as having a life span of 30-60 years. DWER also advised:

It should be noted that it is expected that as the effectiveness of the HDPE gradually reduces over time, that the polluting potential of the waste and leachate contained in the landfill is reduced by degradation processes. This means that as the liner reduces in effectiveness, the quality of the leachate escaping through the liner is such that it does not represent an unacceptable risk to groundwater.

In subsequent consultation with the appellant, the appellant challenged DWER's advice that the polluting potential of the waste and leachate contained in the landfill would be reduced by degradation processes. The appellant cited the nature of PFAS which is known to be persistent, bio-accumulative and toxic. Further advice was sought from DWER in this regard.

DWER advised that the purpose of the liner is to provide a physical barrier to minimise the migration of leachate. DWER noted that the PFAS contaminated wastes that will be accepted at the premises will only be in the form of solids (e.g. contaminated soil). Therefore the primary driver of leachate generation from PFAS contaminated wastes is likely to be the ingress of rainfall, or through the migration of leachate generated from other wastes.

In relation to leachate generation DWER advised:

The majority of leachate generation within a putrescible landfill occurs during operations, while the cell is open to receive rainfall, and during early degradation of putrescible wastes. Once a landfill cell is closed, leachate generation rates decrease over time, as the waste mass settles, and cell capping prevents further ingress of rainfall and runoff into the waste mass.

Once the cell is closed (expected to be around two years after suspension of operations, based on the historical life of similar-sized cells at the landfill) and is compacted and capped, there is limited potential for further leachate generation during the expected lifespan of integrity of the liner.

Given the above, DWER remained of the view that the single composite liner provides sufficient protection to groundwater during the period when the main risk of PFAS contamination is expected to be present. This view is further supported by advice from DWER that extensive construction quality assurance was applied to the landfill and leachate management system to verify it met the design specification. It is also noted that the required

groundwater monitoring program conditioned on the licence will inform any requirements for corrective action, providing further assurances the risk can be managed.

In reviewing the risk of PFAS contamination of groundwater from the premises, it was noted that Table 1.2.3 (Waste acceptance) of the amended licence requires the PFAS contaminated waste accepted to comply with the waste disposal criteria in DWER's Interim PFAS Guideline. Table 1.2.4 (Waste processing) of the amended licence requires the waste concentration to be less than both the relevant leachable concentration and concentration limit values for a Class III landfill. These values are set out in Table 6 of the DWER Interim PFAS Guideline and are shown in Table 1 below.

**Table 1. Interim leachable concentration (ASLP) and concentration limit (CL) values**

Contaminant	Leachable Concentration ASLP (µg/L)	Concentration Limit CL (mg/kg)
PFOS + PFHxS	1.3	5
PFOA	2,200	50

In January 2018, 12 months following the publication of the DWER Interim PFAS Guideline, the PFAS National Environmental Management Plan (NEMP)<sup>3</sup> was published. The PFAS NEMP is a cross jurisdictional collaboration designed to achieve a clear, effective, coherent and nationally consistent approach to the regulation of PFAS. The plan provides guidelines for the regulation of PFAS contaminated wastes including recommended interim landfill acceptance criteria. The recommended criteria for single composite lined landfills are shown in Table 2 below.

**Table 2. PFAS NEMP interim landfill acceptance criteria<sup>3</sup>**

Landfill type	Leachable Concentration ASLP (µg/L)	Concentration Limit CL (mg/kg)
PFOS + PFHxS	0.7	50
PFOA	5.6	50

It is noted that the PFAS NEMP outlines that an environmental regulator may determine that the NEMP criteria are not suitable for a specific landfill and derive and implement alternative criteria. Given the difference in criteria between the two publications, and in particular the higher leachable concentration values in the DWER Interim PFAS Guideline, advice was sought from DWER in relation to this matter. In response, DWER advised:

- the Interim PFAS Guideline is under review following publication of the PFAS NEMP
- until such time as the Interim PFAS Guideline is reviewed, DWER will assess licence applications on a risk basis and shall have regard to current published guidance material including both the Interim PFAS Guideline and the PFAS NEMP
- the approach undertaken for the premises has been reviewed against the approach undertaken for a similar Class III landfill facility in WA currently licensed to accept PFAS contaminated waste

<sup>3</sup> PFAS National Environmental Management Plan, January 2018. Available from: [https://www.epa.vic.gov.au/PFAS\\_NEMP](https://www.epa.vic.gov.au/PFAS_NEMP)

- for the other facility, DWER adopted the waste classification criteria published in the PFAS NEMP on the basis the criteria were determined in a manner equivalent to existing WA approaches for the derivation of landfill acceptance criteria adopted in the *Landfill Waste Classification and Waste Definitions 1996 (as amended 2018)*
- both the premises and the other facility are clay/single composite lined
- on the basis of the environmental siting and landfill design of both the premises and the other facility, the controls applied to address the potential risk associated with the acceptance of PFAS contaminated wastes should be equivalent

It follows that DWER recommended that the waste acceptance criteria for the premises should be amended to be consistent with the values in the PFAS NEMP. Noting this will result in lower allowable leachable concentration acceptance criteria, and therefore a lower level of risk to the high vulnerability aquifer, this recommendation is supported.

### **Conclusion**

It is considered that DWER's finding that the single composite liner provides sufficient protection to groundwater is reasonable, however, it is recommended that the waste acceptance criteria for the premises should be amended to be consistent with the values in the PFAS NEMP. It is otherwise recommended that this ground of appeal be dismissed.

### **CONCLUSION AND RECOMMENDATION**

As outlined above, it is considered that DWER's findings in relation to separation distances and the adequacy of the liner to protect groundwater are supported by the available evidence. However, it is recommended that the appeal be upheld to the extent that the waste acceptance criteria for the premises be amended to be consistent with the values in the PFAS NEMP. It is otherwise recommended that the appeal be dismissed.

Emma Gaunt  
APPEALS CONVENOR

**Investigating Officer:**  
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