To:	Aleks Dragicevic	**At:**	Viridor Energy Limited
From:	Rich Johnson	**At:**	SLR Consulting Ltd
Date:	25/11/2022	**Ref:**	Runcorn ERF
Subject:	RUNCORN ERF - ALTERNATIVE QUEUING LOCATION MODELLING		

1.0 INTRODUCTION

In September 2022, SLR was commissioned to undertake an odour assessment[1] of the Energy Recovery Facility (ERF) in Runcorn ('the Site') operated by Viridor, in support of an Environmental Permit (EP) variation application. The EP variation application was seeking to facilitate the receipt of up to 110,000 tpa of MSW at the Site, to be offset by an equivalent volume of RDF, therefore not resulting in an increase to the permitted volume of material which can be received at the Site (up to 1,100,000 tonnes per annum).

Following this EP variation application, a request for further assessment has been received from the Environment Agency (EA) in the form of a 'Schedule 5 No. 2' document[2]. Item two within this document outlines the following (in regard to further assessment of odours):

2. *"Location B is in close proximity to residential receptors DR-1 and DR-2 as described within the Odour Impact Assessment. It is considered, given the proximity to residential receptors and layout of the site, vehicles present in location B present a higher risk of creating an odour nuisance when compared to location A and the Tipping Hall ramp. […] provide information on:*

    a. *what other solutions there are instead of using location B, for example the use of a location onsite further away from residential receptors…"*

As such, the use of an alternative area to Location B for trucks queuing to access the Tipping Hall has been investigated through dispersion modelling.

[1] SLR report reference: 416.00036.00973_Runcorn ERF_Odour Assessment_v2.2, dated September 2022.

[2] Viridor Runcorn EfW - S5 no2 – FINAL, dated 11th September 2022.

2.0 METHODOLOGY, SITE SETTING AND MODEL INPUTS

The dispersion model established for the September 2022 Odour Assessment produced by SLR (as submitted to the EA in support of the EP variation application) has been updated to investigate an alternative queuing location. The September 2022 Odour Assessment should be referred to alongside this technical memo. The methodology, parameters and assumptions applied within this assessment are as outlined within the September 2022 Odour Assessment, unless stated otherwise within the following sections.

2.1 Identification of Odour Sources

The odour sources identified are as outlined within the September 2022 Odour Assessment, with the exception that refuse trucks queuing to access the Tipping Hall would utilise an alternative area, designated as the Flue Gas Treatment (FGT) area. Location B would no longer be utilised for queuing trucks. This variation has been adopted to increase the separation distance between potential odour sources and sensitive receptors DR1 and DR2, as requested by the EA within item 2 of the Schedule 5 No. 2 document.

Trucks would access the FGT area from the southern extent of the designated area, queuing clockwise in an arc to the eastern extent of the area (near the base of the stack). Trucks queuing to access the Tipping Hall would first queue on the Tipping Hall Ramp, then at Location A (when the Tipping Hall Ramp queue is full), and subsequently at the FGT area (when the Tipping Hall Ramp and Location A are full). The location of the FGT Area for queuing trucks is presented in Figure 1 below. The railhead is outlined in purple, the Tipping Hall Ramp in green and the designated overflow queuing areas Locations A and FGT Area in orange and yellow (respectively).

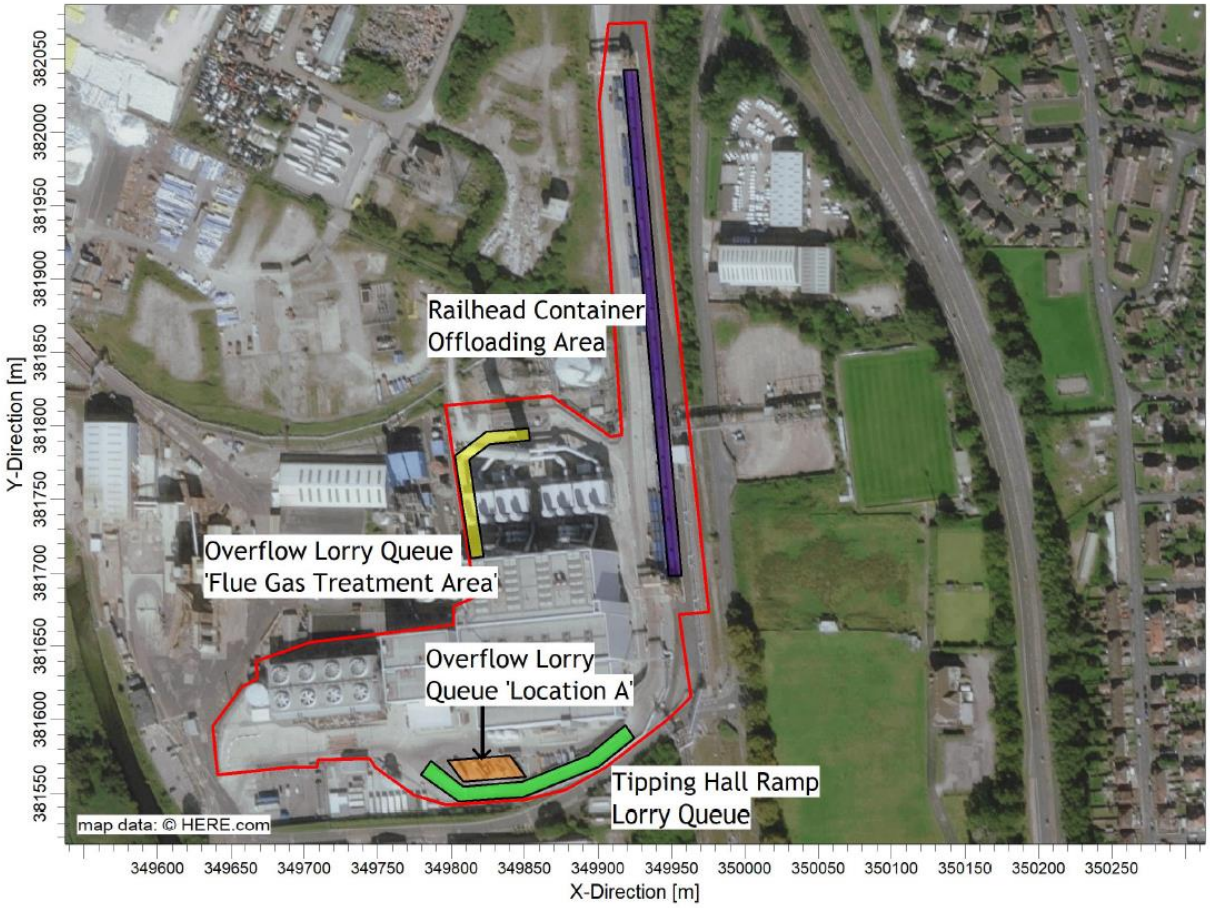

Figure 1
Runcorn ERF – Identification of Odour Sources

2.2 Model Input Data

2.2.1 Modelling scenarios

The operation of the ERF has the potential to generate odours. An updated 'proposed permit variation' modelling scenario is presented in Section 3.0 of this technical note, representing normal Site operations in consideration of the proposed permit variation (diversification of feedstock types to include 110,000 tpa of RDF), with utilisation of the FGT Area (in place of Location B) for queuing trucks.

2.2.2 Model Assumptions

This assessment considers odour emissions from all sources during normal operating conditions, adopting the assumptions outlined in the September 2022 Odour Assessment, but with the following exceptions:

- during peak periods (06:30 to 12:00), there may not be sufficient space on the Tipping Hall Ramp (which can accommodate up to 7 trucks) for incoming vehicles to queue, at which point vehicles would first be directed to overflow Location A (which can accommodate up to 4 trucks) and subsequently the overflow location in the FGT area (which can accommodate up to 8 trucks); and
- the number of trucks queuing on the Tipping Hall Ramp and Location A, and the timings in which these trucks are present, remains unchanged from the September 2022 Odour Assessment. The

number of trucks queuing within the FGT area is variable across the operational hours of the Site, and is presented in detail in Section 2.2.3 below.

2.2.3 Modelled Sources and Emission Rates

Emission parameters have been calculated on the basis of the data presented in the September 2022 Odour Assessment.

The location and number of trucks queuing has been updated, and is presented in Table 1 and Table 2 below.

Table 1
Odour Emission Sources – Weekdays

Emission Source	Number of sources (a), (b)	Waste Type	Area Odour Emission Rate ($ou_E/m^2/s$)	Odour Emission Rate (ou_E/s)	Applicable Times (weekdays)	Release Height (m)
Road trailer (RDF)	Up to 15	RDF (Fresh)	67.8	Up to 34,324	06:00 to 23:00	4.5
Road trailer (MSW)	Up to 4	MSW (Fresh)	10.1	Up to 1,364	06:00 to 23:00	4.5

Table note:

a) Number of trucks queuing is variable throughout the day, see Table 2 below. Maximum number of trucks queuing is 19 (7 on Tipping Hall Ramp, 4 at overflow location A and 8 at the FGT area).

b) The number of trucks containing either RDF or MSW has been determined in consideration of the average waste volumes of each waste type anticipated to be received over the year: 80% RDF to 20% MSW.

Table 2
Truck Queue Profile – Normal Operations

Day	Time Period	Number of Trucks Queuing (a)			Location of Trucks Queuing
		RDF	MSW	Total	
Weekdays	06:00 to 12:00	6	1	19	Tipping Hall ramp
		9	3		Locations A and the FGT area (b)

Table note:

a) The number of trucks containing either RDF or MSW has been determined in consideration of the average waste volumes of each waste type anticipated to be received over the year: 80% RDF to 20% MSW.

b) Trucks queuing at the FGT area are assumed to be located sequentially, starting at the eastern extent, extending back to the southern extent.

The maximum number of queuing refuse trucks at the Site during normal operations would be 19. To manage the number of trucks arriving at the Site, specifically during peak operational periods, a control mechanism would be implemented as follows:

- Where the total number of queuing refuse trucks reaches 14, the operator would contact the customers to ensure a managed flow of incoming vehicles, thus ensuring that the total number of refuse trucks queuing at the Site (under normal operations) does not exceed 19.

Figure 2 presents the modelled odour emission sources (orange outlines) in relation to the permit boundary (red outline).

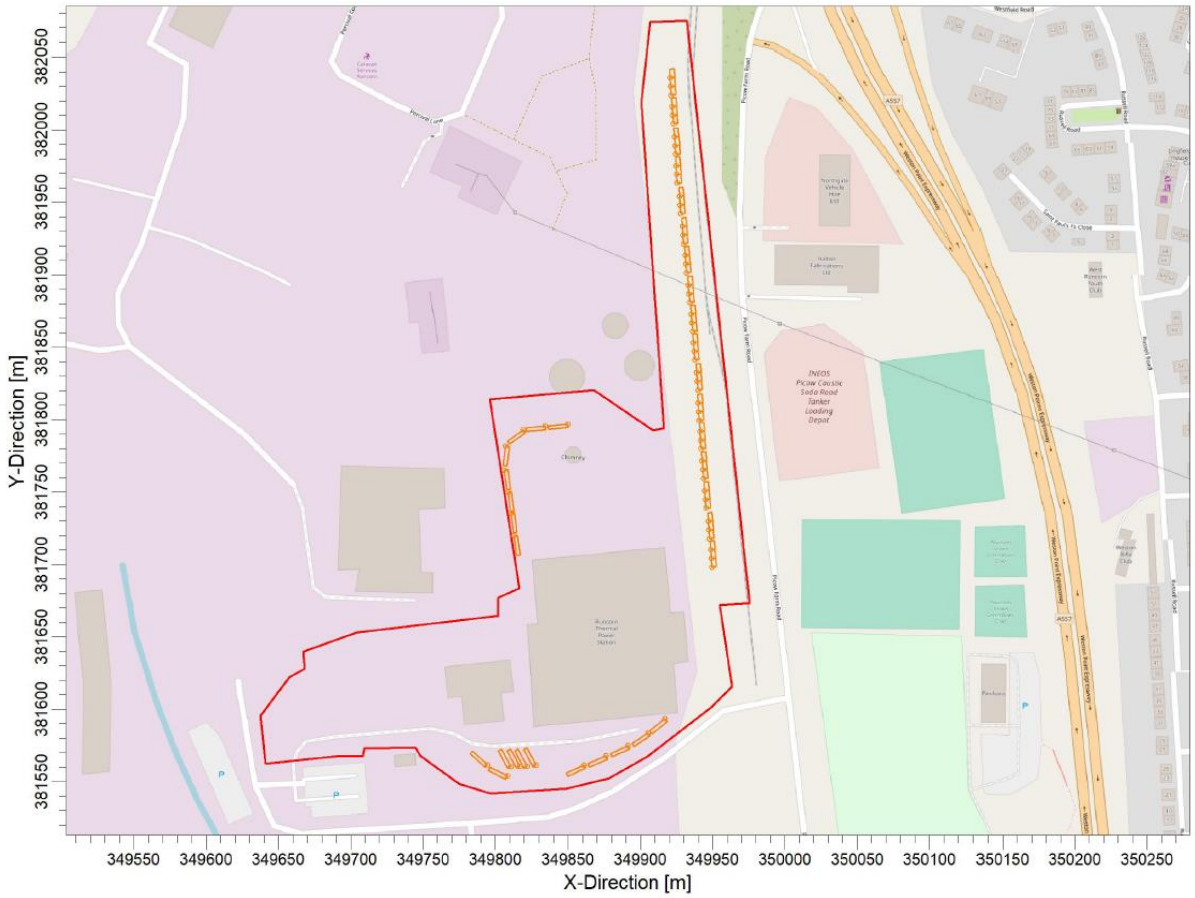

Figure 2
Runcorn ERF – Odour Emission Sources

3.0 PREDICTION OF IMPACTS

This section provides a presentation of the predicted odour impact of the Site, as determined through the detailed dispersion modelling study.

The results of the dispersion modelling have been presented as isopleths of 98th percentile of 1-hour mean concentrations. The predicted concentrations may be compared against the relevant benchmark criterion of 1.5ou_E/m^3 for 'most offensive' odours.

Figure 3 presents the modelled dispersion of odours from the ERF in consideration of normal Site operations, with utilisation of the FGT area for queuing vehicles (to replace Location B), over the 5-years of meteorological data investigated.

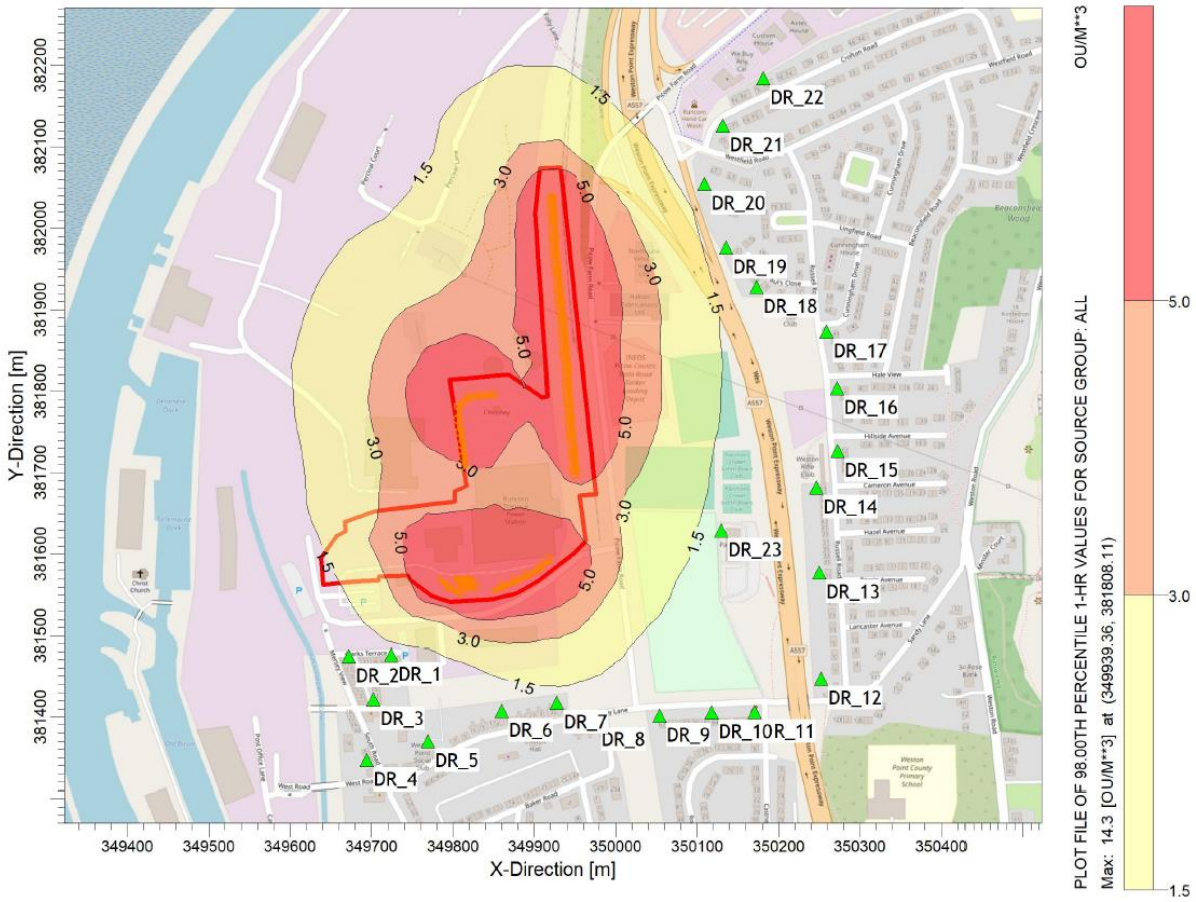

Figure 3
Modelled Odour Concentrations, Average of 2015-19 Meteorology: Updated Proposed Permit Variation Scenario

4.0 INTERPRETATION OF RESULTS

The modelling assessment of normal Site operations has been undertaken in consideration of the proposed permit variation (with utilisation of the FGT area for queuing vehicles), and with utilisation of the FGT area for queuing vehicles (Location B would not be utilised). The results of the assessment indicate that the predicted odour concentrations at sensitive receptors surrounding the Runcorn ERF are below the benchmark criterion of $1.5ou_E/m^3$ as a 98th percentile of 1-hour mean concentrations at all sensitive receptors identified. Therefore, in accordance with the EA's H4 Odour Guidance[3] this indicates that no sensitive receptors are subject to 'unacceptable odour pollution'.

The findings of the dispersion modelling are supported by the observations from the CAR reports[4] (that waste odours are often not detectable at sensitive receptors, and where odours are detectable, it does not constitute pollution). Furthermore, the findings of the dispersion modelling corroborate with odour monitoring commissioned by Viridor by a third-party over the 2020 Christmas period (no detectable waste odours off-site). Whilst these observations were undertaken during periods when only RDF was received (i.e. no MSW) at the facility, it should be noted that the proposed receipt of MSW represents a likely reduction in odour generation from the Site (as the area odour emission rate measured from MSW was lower than that measured for RDF and the volume of MSW received would

[3] H4: Odour Management – How to comply with your Environmental Permit, EA, 2014.

[4] As presented within the September 2022 Odour Assessment.

be offset by an equivalent volume of RDF (i.e. no increase in overall waste volumes received at the Site)).

5.0 SUMMARY AND CONCLUSION

The dispersion model established for the September 2022 Odour Assessment produced by SLR (as submitted to the EA in support of the EP variation application) has been updated to investigate use of the FGT area, as an alternative to Location B, for queuing trucks.

The potential odour impact from the Runcorn ERF has been quantified by dispersion modelling using Lakes AERMOD, applying a precautionary assessment approach, applied as part of a robust assessment. The methodology, parameters and assumptions applied within this assessment are as outlined within the September 2022 Odour Assessment, with the exception of the use of the FGT area (as opposed to Location B) for queuing trucks, and a small increase in the overall maximum number of trucks queuing at the Site (from 14 to 19) during peak operations.

As previously, the results of the dispersion modelling have been compared against the $C_{98,1\text{-hour}}$ $1.5ou_E/m^3$ odour impact criterion (for 'most offensive' odours), in accordance with the H4 Odour Guidance, reflecting a worst-case assessment approach.

The results of the assessment indicate that predicted odour concentrations from normal Site operations in consideration of the proposed permit variation (and utilisation of the FGT area for queuing trucks) are below the benchmark criterion of $1.5ou_E/m^3$ as a 98^{th} percentile of 1-hour mean concentrations for 'most offensive' odours at all sensitive receptors. Therefore, it is concluded that the proposed variation to Site operations as outlined in the environmental permit variation (i.e. receipt of MSW) do not result in adverse odour effects at sensitive receptors, in accordance with the EA's H4 Odour Guidance.

The findings of the dispersion modelling are further supported by the observations from recent CAR reports (and third-party monitoring previously commissioned by Viridor), which conclude that waste odours are often not detectable at sensitive receptors, and that where odours are detectable, they do not constitute pollution.