



OFFICE OF LICENSING & GUIDANCE

LICENSING UNIT MEMORANDUM

TO:	Paddy Nolan, Padraic Larkin, Dara Lynott
CC:	J Moriarty, M Keegan
FROM:	J Derham & T McLoughlin
DATE:	25-1-06
RE:	Labre Park & Historical Waste (Waste Register 221-01)

We are in receipt of the communication from the OEE regarding the issue of historical waste at Labre Park, the new waste application for a recycling facility on the site, and the concerns regarding the Ministerial Direction under Section 60 of the WMAs.

The OEE raise reasonable concerns regarding the risk to adjacent houses and to the environment from the historical fill on the application site. There is mention of buried domestic waste and high ammonia levels in the groundwater: the inference being that the groundwater contamination is being caused by leachate from the fill.

We have examined the application file and would make the following observations based on information contained therein. These observations, now documented, informed the drafting of the proposed waste licence for this site.

- The applicant undertook as part of the EIS and the Waste Licence Application extensive ground investigations involving 36 Trial Pits and three boreholes (over a small site area of c. 60m by 150m). Soil and groundwater samples from these excavations were submitted to detailed geochemical analysis and assessment.
- Historical fill on the site typically varies 0 to 2m in depth. Of this depth, it is recorded in a few of the Trial Pits that some of the fill comprises historical degraded domestic type wastes, with a fill depth typically varying 0 to 1m (one section of 2m). The remainder consisting of soils and C & D type fill.
- Soil samples from these pits revealed negligible contamination. Minor disconnected anomalies for some semi-volatiles were detected in some pits. These anomalies were not associated with anomalies in BTEX

compounds, DRO or GRO¹, which suggests that the minor anomalies recorded on the site are not associated with more extensive organics contamination, and are more likely associated with road asphalt or the residues of burnt tyres (a number of burnt-out vehicles were on this site, and wire stripping by burning was common). Most notable was that the recorded minor soil geochemistry anomalies were associated with the top 200 to 300mm of the site. This strengthens the likelihood that surface activities such as vehicle or wire burning (rather than primary contaminated soil), were responsible for the elevated results. All metal anomalies were below the Dutch Intervention values.

- In relation to the groundwater quality, all of the parameters analysed (80+ parameters) - bar ammonia, magnesium and nickel - were within the MACs² for drinking water. In the case of Nickel the exceedance was modest.

The question arises whether the ammonia is indicative of leachate from degradation of domestic wastes. The chemistry of such leachates is well understood³, with the strength of such liqueurs varying according to the age and amount of waste. Also notable about such leachates is the standard linked anomalies of certain parameters. For instance, ammonia anomalies in domestic leachate would generally be associated with anomalies in Cl, K, Na and Fe in particular. In the case of this site there are no such associated anomalies.

The mean values for typical domestic leachates for key parameters and that recorded on his site are tabulated below. The comparisons are striking.

Parameter	Typical domestic Leachate (Mean) (mg/l)	Groundwater samples in Labre Park (mg/l)
Ammonia	518	9.9
Chloride	1256	47
Sulphide	123	84
Potassium	491	9.2
Sodium	904	36
Iron	54	<0.0005

In addition, it is relevant to note the Dissolved Oxygen range in the groundwater at Labre Park; these were c.7mg/l which is not abnormal for groundwaters. Such levels would not be possible where domestic leachates with mean COD and BOD levels of 3078mg/l and 800mg/l³ would be present.

1 DRO – Diesel Range Organics; GRO – Gasoline Range Organics; BTEX Compounds – Benzene, Toluene, Ethylbenzene & Total Xylene

2 Maximum acceptable concentrations

3 see EPA publications on landfill site design

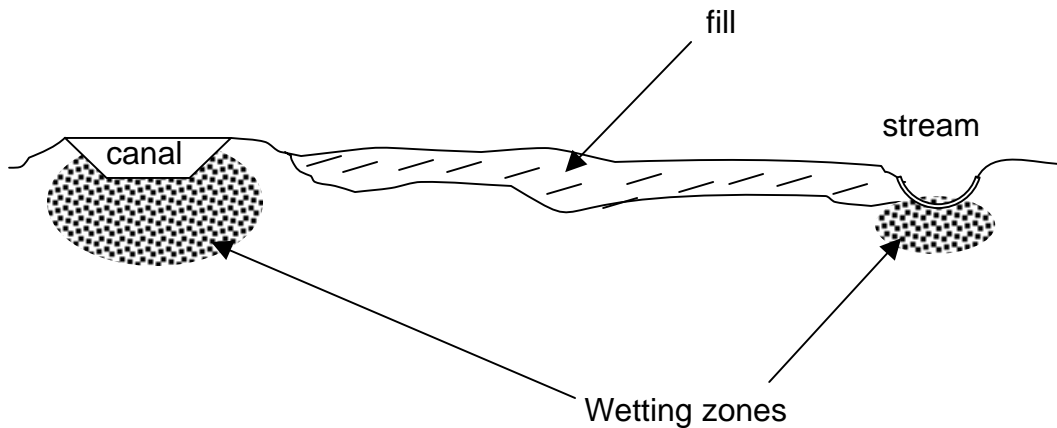
- What this means is that the historical fill in the site is not generating a domestic waste type landfill leachate of any notable strength. The ammonia anomaly is isolated and likely, though not certainly, due to other natural or background causes.
- The concerns regarding the loss of BH1 as an 'up-stream' well are perhaps not hugely significant. The natural regional hydraulic gradient in the area is very low. The existence of the canal and its artificial water level will create a localised hydraulic gradient. BH3 thus may be representative of water flowing into the waste. The loss of BH1 did not in our view diminish to any significant extent the risk assessment provided by the applicants for the site. In any case the proposed RD required the establishment of a monitoring program.
- The existence of any groundwater risk caused by the Labre Park site to the C&C plant - located over 200m north of the site - is also negligible (C&C pump groundwater for their plant). Aside from the very positive solid and wet geochemical quality data, the age and modest amounts of waste on site, and the likely shallow hydraulic barrier provided by the stream which is located between the shallow fill on Labre Park site and C&C, there is (as the borehole information informs) a layer of clay between the fill on the site and the underlying rock aquifer. Moreover, given the contours of the locality (however modest) and the location of the main regional groundwater discharge line (the Liffey), overall basin groundwater gradients in this area are likely to fall to the northeast, which is not in the direction of the C&C plant. The sum of this evidence led us to conclude in the inspectors report to the Board, that the Labre Park site represents a negligible risk to the C&C site.
- As to the risk to the adjacent houses from landfill gases, it can be considered as negligible. Landfill gas production is intimate to leachate production (same acetogenic and methanogenic processes). As noted earlier there is no good evidence of appreciable domestic type leachate formation. Additionally the site investigations records little in the way of landfill gas type odours.

For landfill gas to represent a risk to adjacent buildings there has to be a driver for migration, and migration pathways. The main drivers are;

- Sufficient suitable biodegradable waste,
- Sufficient moisture,
- Capped or sealed surface, and
- No formal collection/venting system.

The amount of fill on Labre Park is modest and the small 'domestic' or gas forming component is noted in the investigations as well degraded. The site is not capped (thus any gas that may be produced is free to vent to the surface). This situation removes the main drivers for migration. Moreover, the site is located between a stream and a canal. The houses are over 100m to the north. The soil wetting zone that naturally occurs below a stream and a canal form an effective hydraulic barrier to gas

migration, particularly where the depth of fill is modest and not substantially below these water courses.



Gas migration will generally obey the laws of physics and follow the path of least resistance. Such a pathway does not include moving through a wetted zone. Methane has a low solubility in water unless under high pressures. Such a situation does not exist in this case.

- Gas migration risk to the houses is negligible. If the development of the recycling facility proceeds, a hard surface will cap the wastes and prevent the vertical venting of any gas that may be produced (however volumetrically small). This is why the RD included conditions requiring ventillation of the slab.

Concluding Remarks

The applicants were not responsible for the illegal fill. However, as part of their application for a recycling facility, they are willing to take responsibility for the historical fill, i.e. become the holder. Their application included a satisfactory risk assessment for the scale of fill encountered.

The Ministerial Direction on illegal waste states;

Where it is deemed appropriate to leave waste in situ the holder of the waste shall:

- *carry out, or arrange for the carrying out, of a risk assessment to determine the environmental impact, if any, of the waste illegally deposited;*
- *make application for a permit or licence to the relevant local authority or the Agency which will determine the actions required by the holder to remediate and manage the site into the future;*

- *comply with any permit or licence so given to ensure that all remediation and management measures determined by that permit or licence are complied with and that the site poses no identifiable future threat to the environment or human health;*

Given the results of the site investigations and impact assessment in respect of the historical waste, the negligible risk determination, and the application to the Agency, it is our view that the applicants have complied with all aspects of this Direction.

The RD as drafted has addressed any residual concerns regarding gas or groundwater risk. There are conditions requiring the establishment for groundwater and gas monitoring, as well as gas ventilation. Should this monitoring suggest a deterioration in ground conditions then appropriate remedial works can be advanced through enforcement actions. We see no reason to further delay the issuing of the licence.

Dr's McLoughlan & Derham