Hydrogeological Risk Assessment in support of Planning Application for the restoration of Churchfield Farm Quarry, Oundle using inert waste

March 2009

Report prepared for:

PGR Construction
6 The Old Quarry
Nene Valley Business Park
Oundle
PETERBOROUGH
PE8 4HN
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Prepared by: HK MacLeod BSc, MSc, FGS

Checked by: C C Leake BSc, MSc, FGS
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Abbreviations

BGS  British Geological Society
EA   Environment Agency
HRA  Hydrogeological risk assessment
mbgl meters below ground level
mAOD meters Above Ordnance Datum
NGR  National Grid Reference
RGN  Regulatory Guidance Note (Environment Agency Landfill guidance notes)
RIGS Regionally Important Geological/ Geomorphological Sites
SPZ  Source Protection Zone
WML  Waste management Licence

Geological Formations
BCF  Blisworth Clay Formation
BLF  Blisworth Limestone Formation
NSF  Northampton Sand Formation (Ironstone)
RF   Rutland Formation
1 INTRODUCTION

1.1 Background

Churchfield Farm Quarry comprises a former limestone quarry. Mineral extraction at the quarry ceased between 2003 and 2004 and it is now proposed to restore the quarry void via the importation of inert wastes and use of overburden material. It is intended to restore the site under an exemption from Waste Management Licensing (WML). Hafren Water has been commissioned by PGR Construction to undertake a Hydrogeological Risk Assessment (HRA) in support of a Planning Application for this development.

1.2 Objectives

The principal objectives of this study are to:

- Determine baseline conditions in relation to the water environment at Churchfield Farm Quarry and its surroundings.
- Establish compliance with Environment Agency Landfill Location Policy.
- Determine a conceptual model for the site including source term, pathway receptor relationship.
- Identify the likely risk to identified receptors due to the proposed site restoration.
- Make recommendations for monitoring.

1.3 Data sources

The following sources of data were used in this study:

British Geological Survey (BGS)
- 1:50,000 scale geological maps: 171 Kettering

Ordnance Survey (OS)
- Landranger 1:50,000 scale map, Sheet 141 Kettering and Corby
- Explorer 1:25,000 scale map, Sheet 224 Corby, Kettering and Wellingborough
- Explorer 1:25,000 scale map, Sheet 227 March, Whittlesey, Chatteris & Oundle

The Environment Agency (EA)
- Licensed abstractions
- Flood risk
- Rainfall
- Surface water quality

Natural England
- Sites of Special Scientific Interest
2 SITE SETTING

2.1 Location

Churchfield Farm Quarry is located approximately 3 km west of the centre of Oundle, East Northamptonshire and 12 km east of Corby. The site is centred about National Grid Reference (NGR) TL 0085 8802 and its location is shown on Figure 1. Access to the site is via Harley Way, off the A427 Benefield Road out of Oundle.

Churchfield Farm Quarry is bounded to the east by existing woodland, to the south by a watercourse with woodland beyond and to the west by arable fields. Land immediately north of the site comprises gardens associated with Chesterfield Lodge and a small area of woodland. Beyond this is the Harley Way unclassified road and arable land.

2.2 Landform

The site is located in an area of low, rolling relief. Elevations fall from a local high of 105 metres Above Ordnance Datum (mAOD) west of Upper Benefield approximately 2 km west-northwest of the site to between 35 and 40 mAOD in the area of the site. South of the site elevations gently rise again to a high of 72 mAOD 2 km to the south.

Within the site ground elevations fall gently from 50 mAOD in the far northwest, where mineral extraction did not take place, until the quarry face is met. The floor of the quarry is between 46 mAOD in the northwest and 40 mAOD adjacent to Lyvenden Dyke in the south as shown on Figure 2.

2.3 Hydrology

The hydrology of the site and its environs has been derived from Ordnance Survey maps, a water features survey and data from the Environment Agency.

The locations of the water features discussed in this section are shown on Figure 3.

2.3.1 Watercourses

The site lies within the catchment of the River Nene which flows southwards just east of Oundle and surface water drainage in the area tends to be in an eastward direction toward the Nene. The Lyvenden Dyke flows eastwards adjacent to the southern site boundary (Photo 1), discharging to the Nene in the south of Oundle approximately 2.5 km east of the site. A tributary of this watercourse runs from the A427 some 500 m northwest of the site, in a southeasterly direction, along the western boundary of the quarry to its confluence with the Lyvenden Dyke.

A small watercourse 1 km south of the Lyvenden Dyke also flows eastwards, through the village of Stoke Doyle, to the River Nene. North of the site a watercourse flows through Lower Benefield in a northeasterly direction to the River Nene. The source of this watercourse is some 5 km west of Lower Benefield.

2.3.2 Springs and wells

Two springs, as shown on OS Explorer Map 224, are located within 2.5 km of the quarry. The Severn Spring (Chalybeate) is some 2.2 km southeast of the quarry at NGR TL 022 862 located to the west of the village of Stoke Doyle. The other spring is located 2.5 km to the northwest of the quarry between the villages of Upper and Lower Benefield. A well, marked on the OS map, is located on Stocks Hill at NGR TL 996 886 some 1.2 km northwest of the site.

An additional spring (observed on a site visit conducted on 13th February 2009) is located at NGR TL 008 881 adjacent to the western boundary of the site (Photo 2). Discharge from this spring (Photo 3) enters the small watercourse on the western site boundary before discharging to the
Lyvenden Dyke. It is understood (pers com Marcus Berridge), land owner, that the spring flows continuously throughout the year.

2.3.3 Ponds and waterbodies

Biggin Fish Pond is a large waterbody, some 600 m x 100 m, located immediately to the east of the site and is formed along the Lyvenden Dyke. Three small ponds/reservoirs are located within the grounds of Biggin Hall 1 km north of the quarry.

Other numerous small ponds are located within 2.5 km of the site as shown on Figure 3.
3 GEOLOGY

3.1 Regional

3.1.1 Solid

The regional solid geology comprises a sequence of easterly and southerly dipping strata which are of Jurassic age (Figure 4). The stratigraphic sequence of the solid geology, taken from BGS Sheet 171, is given below:

<table>
<thead>
<tr>
<th>Period</th>
<th>Formation</th>
<th>Thickness (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle Jurassic</td>
<td>Oxford Clay</td>
<td>Up to 29</td>
</tr>
<tr>
<td></td>
<td>Kellaway Formation</td>
<td>5 – 8</td>
</tr>
<tr>
<td></td>
<td>Cornbrash Formation</td>
<td>0.3 – 3</td>
</tr>
<tr>
<td></td>
<td>Blisworth Clay Formation (BCF)</td>
<td>3 – 6</td>
</tr>
<tr>
<td></td>
<td>Blisworth Limestone Formation (BLF)</td>
<td>4 – 8</td>
</tr>
<tr>
<td></td>
<td>Rutland Formation (inc. Wellingborough Limestone member) (RF)</td>
<td>5 - 14</td>
</tr>
</tbody>
</table>

**UNCONFORMITY**

| Inferior Oolite Group | Lincolnshire Limestone Formation                                          | 0 – 12        |
|                      | Grantham Formation                                                        | 0 – 8         |
|                      | Northampton Sand Formation (NSF)                                           | 0 – 8         |

| Lower Jurassic | Lias Group | Whitby Mudstone Formation                                                | 49 – 58       |
|               |           | Dyramham Formation                                                       | 6 – 12        |
|               |           | Charmouth Mudstone Formation                                              | 150 – 178     |
|               |           | Blue Lias                                                                | 0 - 32        |

Table 3.1.1: Stratigraphic sequence of solid geology

Outcrops of the solid strata are primarily located along the immediate catchment of major watercourses in the region, namely: the River Nene and the River Welland, and their tributaries.

All strata were deposited in a marine environment and range from Lower Jurassic to Middle Jurassic in age. This period of deposition is represented by thick mudstones separated by thin, often complex, sequences of limestones, mudstones and sands.

As a result of a very gentle, regional, easterly dip the older rocks outcrop in the west and younger rocks in the east. The oldest outcrops comprise small exposures of mudstones of the Lias Group to the northwest of Corby. These are overlain by the mudstones, limestones and sands representative of the Inferior Oolite and Great Oolite groups, Cornbrash Formation and Kellaway Formation. The youngest solid strata in the region is represented by the Oxford Clay, which covers a significant area in the east.

An unconformity separates the top of the Inferior Oolite Group, marked by the Lincolnshire Limestone Formation, and the base of the Great Oolite Group represented by the Rutland Formation.

A number of normal faults are present in the south of the region, these have a WNW-ESE orientation.

Of regional economic importance is the Northampton Sand Formation (NSF), which is locally
known as Ironstone. This has been extensively quarried over large areas to the north of Kettering and to the northwest of Corby. The Blisworth Limestone Formation (BLF) has also been locally quarried on a much smaller scale towards the east of the region on exposed strata along the Nene Valley.

3.1.2 Superficial
The majority of the region is covered by Quaternary glacial deposits which can be categorised into Till, glaciofluvial sand and gravel, Terrace Deposits or Alluvium. The Alluvium and Terrace Deposits are associated with the courses of the major rivers in the region and their tributaries. Stony and sandy clay Till forms extensive outcrops over much of the region. Glaciofluvial sand and gravel deposits exposure is sporadic located at the margins of the Till and is likely to underlie the Till over greater extents.

Quaternary sand and gravels to the southwest of Corby and River Terrace Deposits along the floodplain of the River Nene are shown on the BGS map as worked and/or backfilled.

3.2 Local geology
The local geology had been derived from the BGS map, geological logs of 4 boreholes drilled in the area (supplied by BGS) and observations made at site. The logs of the boreholes are provided in Appendix A and their location shown on Figure 4.

The site is located on the side of a shallow valley with youngest strata exposed to the north and on the opposite side to the south and oldest strata in the base of the valley to the south and east.

The site is located within the BLF, which formed the economic mineral in the quarry and in the vicinity is up to 5.5 m thick as indicated by BH TL/08NW/9 (10m north of the site). The limestone observed in the walls in the north of the quarry appears thinly bedded, some 5-10 cm, (Photo 4) with both horizontal and vertical fracturing.

The BLF is underlain by the Rutland Formation (RF) which comprises grey and green clays with intermittent beds of limestone (the Wellingborough Limestone member) exposed immediately south and west of the site. Its presence at this location was proven in BH TL/08NW/9 with a thickness of some 17 m. The base of the RF is indicated locally by the Stamford Formation which comprises grey, dark brown and black sand and clays with a total thickness up to 5 m.

The Grantham Formation underlies the RF and comprises sandstones, siltstones and mudstones with a thickness of 0-8 m, as indicated on the BGS map. The nearest marked outcrop to the site is some 4 km to the north. However, located on the eastern boundary of the site, BH TL/08NW/51 recorded a 1.5 m thick layer of grey clay beneath a band of grey sand (the sand was identified as the base layer of the Stamford Formation). As a result, the grey clay is considered to be representative of the Grantham Formation. This band of clay was absent in boreholes TL/08NW/9 (10 m to the north of the site) and TL/08NW/33 (17 m southwest of the site).

Where the Grantham Formation is absent the RF is directly underlain by the NSF. This is an Ooidal Ironstone which is recorded in boreholes to the north, southwest and east of the site (BHs TL/08NW/9, TL/08NW/33 and TL/08NW/51 respectively) as having a thickness in the range of 3.5 to 5 m. Two small faults have resulted in a small outcrop of the NSF along the path of the Lyvenden Dyke some 100 m east of the site.

The BLF, in which the quarry is located, is overlain by the Blisworth Clay Formation (BCF) identified on the BGS map as outcropping beneath Harley Way, an unclassified road north of the site. As indicated by the BGS map the BCF comprises mottled mudstone with a thickness of some 3 – 6 m. However, their presence is only recorded north of the site in BH TL/08NW/9 at a thickness of some 2 m and they are immediately overlain by topsoil.
As expected borehole data in proximity to the site does not confirm the presence of the Cornbrash Formation, Kellaway Formation or the Oxford Clay as the current topography has been eroded to below their expected level of occurrence.

Outcrops of glaciofluvial sand and gravel are located 1 km north of the site and 2 km to the northwest as shown on BGS map 171. Beyond these are extensive deposits of Till. Although not indicated on the BGS map, 3 m of Till was proven in BH TL/08NW/51, east of the site, above a grey sand layer. However, in BH TL/08NW/9, to the north of the site, a sequence of green and brown sandy clays is proven overlying the same grey sand layer. It is a possibility that the deposits identified as Till in BH TL/08NW/51 may actually be part of the Inferior Oolite Group.

Since September 2001 Churchfield Farm Quarry has been designated as a RIGS site (Regionally Important Geological/Geomorphological Sites) by The Wildlife Trust. Conservation of the 3m exposed section, showing the clear junction of the BCF and the BLF, in the northwest of the quarry has been requested. In addition, retention of “as much as possible” of the fossiliferous loose material has also been requested.
4 HYDROGEOLOGY

4.1 Aquifer status and regional context

The majority of Lower and Middle Jurassic Formations comprise low permeability mudstones and siltstones, with the exceptions of the Lincolnshire Limestones, BLF and Cornbrash and some thin sand bands. Of these the BLF is the only formation of significant thickness and respective properties to warrant categorisation as a Minor Aquifer present within 2 km of the site. No Major Aquifers are present in the vicinity of the site.

Data provided by the Environment Agency indicates that the southern half of the site overlies the BLF but the northern half is non-aquifer. Based on the exposures within the quarry the BLF is only present north of the northern quarry face.

4.2 Groundwater abstractions

Data provided by the Environment Agency shows there are no current licensed abstractions within 2 km of the centre of Churchfield Farm (NGR TL 003 876). However, there is one 'deregulated' abstraction at NGR TL 0033 8782. This small volume abstraction (<11.4 m$^3$/day) no longer requires licensing.

East Northamptonshire Council provided details of three private water supplies within a 2 km radius, Table 4.2 and shown on Figure 5.

<table>
<thead>
<tr>
<th>Ref No</th>
<th>NGR (TL)</th>
<th>Name</th>
<th>Source</th>
<th>Current status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>500900 288100</td>
<td>Chesterfield Lodge</td>
<td>Spring</td>
<td>Not in use</td>
</tr>
<tr>
<td>2</td>
<td>500299 287699</td>
<td>Churchfield Farm</td>
<td>Borehole</td>
<td>In use</td>
</tr>
<tr>
<td>3</td>
<td>500299 287699</td>
<td>Churchfield Cottages</td>
<td>Borehole</td>
<td>In use</td>
</tr>
</tbody>
</table>

Table 4.2: Private water supply details

Abstraction No 2 above is the deregulated abstraction identified by the Environment Agency.

4.3 Aquifer characteristics

4.3.1 Superficial deposits

In the immediate area of the proposed landfill all superficial deposits have previously been removed due to quarrying. Borehole TL/08NW/51, located in the southwest corner of the site, did indicate the presence of 2.7 m of clay identified as Till (although this may have been incorrectly identified, see section 3.2 above). The composition of Till is highly variable, however such deposits tend to have low permeability and as a result restrict the downward flow of surface water to groundwater.

4.3.2 Solid

The Great Oolite Limestone of Lincolnshire, the Cotswolds and Somerset comprises a thick sequence of fractured limestone and subsequently is categorised as a Major Aquifer. However, in the Midlands the Great Oolite sequence, of which the BLF is a member, contains a higher proportion of clays and shales which reduce water-bearing properties. In addition the high elevation of the BLF here means that these beds tend to be dry. It is therefore classified as a Minor Aquifer in this region. Where groundwater does occur flow is likely to be controlled by the presence of fractures, fissures and bedding planes.

4.4 Groundwater levels and distribution

Churchfield Farm Quarry has no on-site water level monitoring boreholes. As a consequence
local water levels have been estimated using drilling logs, watercourses, springs and estimates of water levels in the private abstraction boreholes described above.

The log for borehole TL/08NW/51 (NGR TL 0098 8801), located on the southeastern boundary of the site, shows two water strikes. The first at 3.6 metres below ground level (mbgl) (estimated at 33.9 mAOD) within the sand layer of the RF and the second at 9.1 mbgl (estimated at 28.4 mAOD) within the NSF. The subsequent rest water levels were 1.2 mbgl and 8.2 mbgl respectively. Rest water levels being higher than the initial water strike indicates that clay layers overlying the water-bearing strata have a confining effect.

The log for borehole TL/08NW/33 located some 17 m southwest of the site recorded water strikes at 1.2 mbgl (estimated at 40.5 mAOD) and 14 mbgl (estimated at 27 mAOD) again located in the RF and NSF respectively. The log for borehole TL/08NW/191, the Churchfield Farm borehole, located some 60 m west-southwest of the site, recorded a water strike at 28.5 mbgl. The strike was at the boundary of a clay and limestone horizon estimated at 23.5 mAOD which would place this in the vicinity of Wellingborough Limestone Member of the RF. The water level rose to 19.35 mbgl (32.65 mAOD) and a water level of 20.93 mbgl (31.07 mAOD) was recorded in August 2005.

The spring located at NGR TL 0072 8808 has an elevation of some 46 mAOD which, based on BH TL/08NW/9 at NGR TL 0073 8818, places it within the BLF. The BLF is underlain by the interbedded mudstones, limestones and sand of the RF. It is likely that this spring issues at the junction of the BLF and the RF where the outcrop of the RF is further north than elsewhere in the Lyvenden Dyke valley (Figure 4).

It is assumed that groundwater flow within the BLF is towards the southeast. As a result groundwater flow in the BLF and the water-bearing strata of the RF is believed to flow towards and discharge to the Lyvenden Dyke.

It is apparent from drilling logs BH TL/08NW/51 and BH TL/08NW/9 that the NSF is water-bearing. These strata are overlain by the low permeability Grantham Formation or the RF and form a separate aquifer to that in the BLF. Water strikes within the NSF aquifer (28.4 mAOD and 27.4 mAOD) are at a lower elevation than Lyvenden Dyke (35 to 40 mAOD) and therefore groundwater is more likely to discharge to the River Nene down-gradient.

4.5 Hydraulic conductivity

Laboratory or field hydraulic conductivity tests have not been conducted on the BLF and, therefore, approximate values have been assigned based on accepted texts\(^1\), field observation and geological data.

Generally limestones have a low effective porosity which refers to the percent of interconnected pore spaces. This characteristic should result in a low permeability rock. However, many limestones have significant fractures along which water flows, this is known as secondary porosity. Dependent on the fracture network, the resulting hydraulic conductivity of limestones are generally in the range $8.7 \times 10^{-5}$ to 0.5 m/day for massively bedded formations and 0.01 to 1730 m/day for Karst and reef limestones. The BLF is not karstified or a reef limestone hence the former range may apply.

\(^1\) Domenico and Schwartz. Physical and Chemical Hydrogeology. 1997
The RF that underlies the BLF is predominantly comprised of clays and siltstones and would be expected to have a hydraulic conductivity of $9 \times 10^{-7}$ m/day to $4 \times 10^{-4}$ m/day with the limestone and sand bands being significantly more permeable.

4.6 Baseline groundwater quality

No groundwater quality data was available for this site.

4.7 Water management

As discussed above the quarry is located within the BLF. Water management was not required during the operation of the quarry and it does not accumulate in the current quarry void. Details of boreholes drilled in the vicinity of the site indicate the absence of a watertable within the BLF therefore the closest water bearing strata underlying the site is the RF. The underlying RF comprises mudstones interbedded with thin limestone and sand bands which have been proven to be water-bearing. As a consequence of the hydraulic properties within this formation (mudstone having low permeability and limestone and sand higher), water will only flow at a significant rate horizontally within the limestones and sand horizons, which thereby form small confined layered aquifers. As a result of the general low permeability of the RF vertical flow of groundwater is highly restricted and groundwater levels are not expected to rise above the base of the quarry.

The topography of the site naturally directs surface flow and run-off in a southeasterly direction into the Lyvenden Dyke. The drainage ditch located to the north and following the western boundary of the site prevents the majority of surface flow from up-gradient entering the quarry. Therefore due to the hydrogeology and topography at the site neither surface water nor groundwater requires active management.

4.8 Conceptual hydrogeological model

A conceptual understanding of the hydrogeological regime in the vicinity of Churchfield Farm Quarry and proposed landfill has been derived from an assessment of previous work undertaken in the area and a review of published information.

Churchfield Farm Quarry is excavated into the BLF, a Minor Aquifer. Dewatering was not undertaken in order to permit mineral extraction, hence the base of the site is above rest groundwater levels. Water strikes within this formation were not noted on logs from boreholes drilled in the area, hence it is assumed that a water table does not exist within the BLF. Hydraulic conductivity for the BLF has been estimated based on accepted texts and a range of $8.7 \times 10^{-5}$ – $0.5$ m/day is assumed.

The BLF is underlain by the low permeability RF. Water entering the BLF is likely to migrate to the base of the formation and then flow across the upper surface of the low permeability strata of the RF. The Rutland Formation has been proven to exhibit water-bearing, higher permeability horizons (i.e. the water strike in BH TL 08NW191 located in the Wellingborough Limestone Member). Water within these layers is confined by overlying, low permeability mudstone horizons. Estimated water levels within the RF are between 35 and 40 mAO. It is assumed that the low permeability layers within the RF will have a bulk hydraulic conductivity of $9 \times 10^{-7}$ m/day to $4 \times 10^{-4}$ m/day. Due to the layered nature of the RF vertical movement of groundwater is likely to be highly restricted hence it is considered that the small water-bearing horizons are isolated from the site.

A second aquifer within the NSF has been proven at a depth of around 9.1 m below the site (estimated at 28.4 mAO). This is confined and isolated from the site by the Grantham Formation (1.5 m clay at depth of 8.5 mbgl in BH TL/08NW/51) or where absent the RF.
Geological and topographical data was assessed and as a result both groundwater and surface water flow is assumed to be in a south to southeast direction. Groundwater present in the RF and that flowing at the interface of the BLF and RF, is believed to discharge to the Lyvenden Dyke. All surface water from the site is believed to flow to the Lyvenden Dyke.
5 SOURCE TERM CHARACTERISTICS

5.1 The proposed development

The proposed development comprises infilling of the current void of the Churchfield Farm Quarry with inert waste generated from uncontaminated site clearance material and the waste from processing recycled aggregates at PGR Recycling (the sister company of PGR construction). The site will then be restored to a luxury campsite.

5.2 Waste types and acceptance criteria

All waste coming into the site will comprise uncontaminated site clearance material and residues derived from recycling of construction and demolition wastes at PGR recycling. The recycling of aggregate will act as pre-treatment for the inert waste received at the site. No waste will be accepted on an ‘open gate’ basis.

All waste entering the site will undergo the standard, rigorous Waste Acceptance procedure as detailed in Appendix B.

The landfill will therefore accept a strictly controlled waste stream comprising inert waste suitable for landfilling without the need for testing, as described in the Environment Agency Landfill Regulatory Guidance Note 2 (RGN2).

5.3 Site management

The use of fuels, oil storage, waste management etc will be undertaken in accordance with best practice procedures, as detailed in Appendix C. This ensures good housekeeping at all times and hence reduces potential for contamination due to spills and inappropriate handling of potentially contaminating materials.

5.4 Phasing

Importation of 21,100 m³ of inert waste over a 3-year period is planned. Detailed phasing plans are not available at the time of this report, however infilling will commence in the north to provide visual screening for the adjacent property and then work southwards.

5.5 Leachate generation

Due to the proposed inert nature of the waste it is considered highly unlikely that water coming into contact with the proposed waste at Churchfield Farm Quarry will incorporate within it measurable concentrations of pollutants. This can be ensured due to the proposed restricted source of waste materials for the site and stringent Waste Acceptance Criteria. It is therefore considered that List I substances are not expected to be present and List II substances, if present, are expected to be at low or insignificant concentrations with respect to background groundwater quality.

Due to the likely low permeability of the waste, derived from fines from the recycling process and clay based soils from local construction sites, it is considered that the volumes of leachate generated during the landfilling of Churchfield Farm Quarry will be limited.

In summary, it is considered that the total leachability and pollutant content of the wastes and the ecotoxicity of leachate produced will be insignificant. Hence, in accordance with Environment
Agency Guidance\textsuperscript{2}, Churchfield Farm inert landfill will fall outside the scope of the Groundwater Directive (80/68/EEC).

5.6 Proposed engineering

5.6.1 Groundwater management and control
Mineral extraction in the Churchfield Farm Quarry area did not extend below the watertable. It is considered that groundwater management and control measures will therefore not be required.

5.6.2 Basal lining system
Due to the inert nature of proposed waste, and in accordance with Agency guidance, it is considered that there is no necessity to collect leachate at the site hence an ‘artificial sealing liner’ is not proposed. In addition as it is intended to fill the site under a WML exemption the requirement for a geological barrier, under the Landfill Regulations, is not applicable.

However PGR Construction proposes to use selected low permeability wastes across the base of the site to act as further protection to groundwater. Engineering of the landfill sidewalls is not proposed.

5.6.3 Side wall liner
The site is above the groundwater table hence groundwater exclusion is not required. The inert nature of the waste is such that leachate collection is similarly not required.

5.6.4 Capping system
The upper 0.5 m of waste will be selected for its low permeability properties and waste will be graded to encourage surface water run-off.

5.6.5 Restoration and aftercare
The site will be restored to a luxury campsite comprising grassland, woodland, wetland area and pond, a shower block and informal car park (Figure 6). Aftercare will be subject to a 5-year agreement with the Mineral Planning Authority.

5.7 Leachate management and monitoring

As discussed in previous sections, it is considered that the quantity and quality of any leachate generated will be insignificant hence leachate collection and management is not required. Due to this leachate monitoring is not proposed.

5.8 Surface water management

Surface water management bunds and a series of ditchcourses will be constructed as necessary to direct surface water run-off away from the active landfill area during its operational phase.

Post-operation, the restoration profile is such that drainage will occur to the south towards Lyvenden Dyke.

It is considered that no additional surface water management will be required.

\textsuperscript{2} Hydrogeological Risk Assessments for Landfills and the Derivation of Groundwater Control and Trigger Levels. LFTGNO01
6 PATHWAY AND RECEPTOR TERM CHARACTERISTICS

6.1 Pathways

The proposed inert landfill is above the watertable, hence any potential leachate, although highly unlikely, will migrate through the layers of compacted waste to the base of the site and through the unsaturated zone of remaining BLF where attenuation and degradation of contaminants will occur.

Due to the low permeability of the RF, which underlies the quarry, water is then likely to flow across the top of the RF the short distance to the Lyvenden Dyke.

6.2 Receptors

The following are considered to represent potential receptors for any contamination emanating from the proposed inert landfill.

a) Surface water within Lyvenden Dyke to the south and southeast of the site and drainage ditch west of the site.

b) Groundwater directly beneath and down-gradient of the site.

c) A spring located approximately 50 m to the west of the landfill area.

6.3 Pollutant linkages

It is considered that a pathway to the Lyvenden Dyke exists across the upper surface of the RF. The BLF is not water-bearing in the vicinity of the site hence contamination of this 'aquifer' is not possible. It is unlikely that significant vertical flow of groundwater occurs to water-bearing horizons in the RF hence a pathway to groundwater within this strata is not considered significant. The spring located to the west of the site is up-gradient of the current quarry void hence no pathway exists between the site and it.

In addition, with the likely insignificant leachate volume and pollutant concentrations (ensured by strict compliance with Waste Acceptance procedures), it is considered that under normal operation no plausible source term exists.

In summary, although a potential receptor (Lyvenden Dyke) and credible pathway to it have been identified, the absence of a plausible source of contamination and hence pollutant linkage is such that risk of contamination of the receptors is considered negligible.
7  RISK ASSESSMENT

The Environment Agency guidance proposes a tiered approach to risk assessment such that the degree of effort and complexity reflects the potential risk posed by a particular site. This process starts with risk screening, which is the process used to determine whether a landfill development represents, or potentially represents, a risk to groundwater and surface water resources, and at the planning stage whether the site complies with the Environment Agency Landfill Location Policy (RGN3).

7.1 Risk screening

Aspects of the risk screening are summarised below:

- The site lies within a Minor Aquifer but is not within a Source Protection Zone (SPZ)
- The site is underlain by mudstone which restricts vertical flow of groundwater.
- Waste for the site will comprise fines derived from aggregate recycling and soils and other site clearance inert waste from local construction sites. Skip or other such waste will not be accepted.
- Strict adherence to a robust waste acceptance procedure will be insisted upon at all times.
- It is considered that no List I substances and insignificant concentrations of List II substances will be present in leachate during normal operation of the site because of this the Groundwater Directive (80/68/EEC) does not apply.
- Additional 'technical precautions' employed at the site include:
  - removal of any standing water prior to emplacement of waste
  - progressive restoration
  - operation of a surface water management scheme where necessary.

Based on the conceptual hydrogeological understanding of the site, the nature of the waste and proposed measures to minimise impact from the generation of any leachate, it is considered the Groundwater Directive does not apply to the site hence further detailed risk assessment is not required.

Regulatory Guidance Note 3 (RGN3) of the Landfill Directive provides guidance for locational aspects in landfill planning consultation responses and permitting decisions.

The landfill position statement as described in RGN 3 indicates that the Environment Agency would object to landfills being located on Major Aquifers, within Source Protection Zones and below the watertable where groundwater forms a significant contributes to river flow or sensitive surface waters. It is considered that Churchfield Farm Quarry falls outside all the above criteria.

It is also stated that for Minor Aquifers the impact for long-term pollution must be considered in relation to the strata’s natural groundwater quality, hydraulic properties and the ability to attenuate contaminants. The inert nature of the waste proposed for the site has been considered in conjunction with its location, being above both the watertable and the low permeability of the underlying Rutland Formation, and it is believed negligible threat is posed to the groundwater or surface water.

Finally, RGN3 requires mitigation against the long-term degradation of artificial sealing layers put in place to protect groundwater in accordance with the Groundwater Directive. Due to the inert nature of the waste and proposal to landfill under a WML exemption landfill engineering is not required at the site.

It is therefore considered that all the RGN3 position requirements are satisfied and the site complies with the Environment Agency location policy.
8 PROPOSED MONITORING SCHEME

8.1 Groundwater monitoring locations

In order to properly monitor any impacts as a result of the proposed landfill it is necessary to monitor both upgradient and downgradient groundwater levels and quality. Natural groundwater flow is to the south/southeast.

However, as water from the site is considered likely to flow over the upper surface of strata of the Rutland Formation to the Lyvenden Dyke it is considered that monitoring of the water quality of the Lyvenden Dyke up and downstream of the site would be more appropriate and more readily identify any impacts on water quality due to the site restoration.

8.2 Surface water monitoring locations

Lyvenden Dyke is a potential receptor. It is proposed to monitor water quality in the Lyvenden Dyke both upstream and downstream of the site at locations marked on Figure 6.

8.3 Frequency of monitoring

It is proposed to undertake surface water monitoring initially on a quarterly basis for 12 months and then review the frequency.

8.4 Water analyses

It is proposed that the monitoring of surface water quality includes the parameters detailed in the table below at the frequency indicated.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH, electrical conductivity, chloride, sulphate, ammoniacal nitrogen,</td>
<td>Quarterly</td>
</tr>
<tr>
<td>biochemical oxygen demand, chemical oxygen demand, total organic carbon</td>
<td></td>
</tr>
<tr>
<td>and iron</td>
<td></td>
</tr>
<tr>
<td>As above plus: Manganese, cadmium, copper, nickel, lead, zinc, mercury,</td>
<td>Annually</td>
</tr>
<tr>
<td>arsenic, phenols, total petroleum hydrocarbons</td>
<td></td>
</tr>
</tbody>
</table>

Table 8.4: Surface water quality monitoring proposals

8.5 Leachate monitoring

Leachate of significant quantity or quality is not expected to collect in the base of the site hence leachate monitoring is not proposed.
9 CONCLUSIONS

9.1 The site is located on the Blisworth Limestone Formation, a Minor Aquifer, as designated by the Environment Agency. The site was not dewatered in order to extract the mineral and the base of the site is above the rest watertable.

9.2 It is concluded that the site complies with the Environment Agency location policy as set out in their Landfill Directive Regulatory Guidance Note 3 (RGN3) as, although on a Minor Aquifer, the proposed landfill is not within a Source Protection Zone and will comprise strictly inert wastes only.

9.3 Waste brought into the site will undergo a strict waste acceptance procedure. Processing and recycling of material waste before it is brought onto the site will afford pre-treatment which, will help ensure its strict inertness.

9.4 Due to the inert nature of the waste and the technical precautions proposed it is considered that the site will not pose a risk to groundwater or surface water resources, hence the site is considered compliant with respect to the Groundwater Regulations (1998).
FIGURES
Barlors Chambers, Barker Street, Shrewsbury, Shropshire, SY1 1SB
Tel: 01743 355770
Fax: 01743 357771

PGR Construction Ltd
Nene Valley Business Park
Oundle, PETERBOROUGH
PE8 4HN

Approximate site location

Reproduced from OS Landranger map 141 1:50 000 scale by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationary Office. © Crown copyright. All rights reserved. Licence number WL9705.

Site location

P:\Projects\Oundle\Drawings\Figures\Figure 1_Site location
Key

- Watercourses
- Waterbodies
- 2.5 km radius from site
- SP Spring

Approximate site boundary

Well

Biggin Fish Pond

River Nene

PGR Construction Ltd
Nene Valley Business Park
Oundle, PETERBOROUGH
PE8 4HN

Date: 03/02/09
Scale: 1:25,000
Private water supplies

Key
- 2 km radius of site
- Private water supplies
Figure 6

Scale: 1:12,500

PGR Construction Ltd
Nene Valley Business Park
Oundle, PETERBOROUGH
PE8 4HN

Title: Proposed monitoring locations

Client: PGR Construction Ltd

Project: Oundle

Date: 03/02/09

Fax: 01743 357771

Reproduced from OS Explorer map 224 1:25 000 scale by permission of Ordnance Survey on behalf of The Controller of Her Majesty’s Stationary Office. © Crown copyright. All rights reserved. Licence number WL9705.
Photo 1: Lyvenden Dyke

Photo 2: Spring at NGR TL 008 881
Photo 3: Confluence of Lyvenden Dyke and western boundary watercourse

Photo 4: Blisworth Limestone in the Quarry Wall
APPENDIX A

BGS borehole logs
**REcoRD oF SHAFT oR BORE FOR MINERALS**

**Name and Number of Shaft or Bore given by Geological Survey:**

29 9

**Name and Number given by owner (if different from above):**

Burray. XL-80 Z

**Town or Village:**

**Exact site:**

**Date of sinking:**

May 1939

**Purpose for which made:**

**Level at which bore commenced relative to O.D.:**

170.52

**Made by:**

**Information from:**

**Date received:**

Nov. 1940

**Specimens:**

<table>
<thead>
<tr>
<th>Geological Classification</th>
<th>Description</th>
<th>Thickness</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Dried specimen analysis:**

P. 3102. Al2O3. CaO. Fe2O3. 5.

**County:** Northants.

**6° Quarter Sheet:** 18 NE (5)

**1° N.S. Geol. Map:** 177.

**1° O.S. Geol. Map:**

**Whether Confidential:**

Yes.

**A sketch map or tracing from a large-scale map is desirable.**

---

**GEOLOGICAL SURVEY OF MINES, South Kensington, London, S.W.1.**
### GEOLOGICAL SURVEY OF GREAT BRITAIN

#### RECORD OF SHAFT OR BORE FOR MINERALS

**Name of Shaft or Bore given by Geological Survey:**

**33**

**Name and Number given by owner:**

**Churchfield Farm, Xl.**

**For whom made:**

**Mr. and Mrs. Smith**

**Town or Village:**

**Memorial, Xl.**

**County:**

**Northants**

**Exact site:**

**Attach a tracing from a map, or a sketch map, if possible.**

<table>
<thead>
<tr>
<th>Purpose for which made</th>
<th>Ground Level at bore relative to O.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>131' 6''</td>
</tr>
</tbody>
</table>

**Made by:**

**S. L.**

**Information from:**

**S. L.**

**Examined by:**

**S. L.**

**Ground Level at bore relative to O.D.**

<table>
<thead>
<tr>
<th>Ft.</th>
<th>In.</th>
<th>STRATA</th>
<th>Core Obtained</th>
<th>Total Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>Soil</td>
<td>0.3m</td>
<td>310''</td>
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<tr>
<td>6</td>
<td>0</td>
<td>Mixed clays</td>
<td>2.17m</td>
<td>2710''</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>Limestone</td>
<td>2.47m</td>
<td>810''</td>
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<tr>
<td>20</td>
<td>0</td>
<td>Mixed sandy clays</td>
<td>3.5m</td>
<td>2810''</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>Sandstone</td>
<td>9.10m</td>
<td>3010''</td>
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<tr>
<td>4</td>
<td>0</td>
<td>Mixed saxes</td>
<td>10.5m</td>
<td>3410''</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>Black sandy clay</td>
<td>13.1m</td>
<td>4210''</td>
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<td>2</td>
<td>0</td>
<td>Mixed sandy clay</td>
<td>13.4m</td>
<td>4510''</td>
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**For Survey use only:**

<table>
<thead>
<tr>
<th>STRATA</th>
<th>CLAY</th>
<th>Gravel</th>
<th>Sandstone</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>0</td>
<td>Ironstone (sampled)</td>
<td>Grey</td>
<td>5210''</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>Ironstone</td>
<td>Brown</td>
<td>5510''</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>Ironstone</td>
<td>Green</td>
<td>5510''</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>Ironstone</td>
<td>Grey</td>
<td>5510''</td>
</tr>
</tbody>
</table>

**Total limestone bed:**

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<tr>
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<th>In.</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
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</tbody>
</table>

**Surface level:**

<table>
<thead>
<tr>
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<th>In.</th>
</tr>
</thead>
<tbody>
<tr>
<td>135.69</td>
<td>6m</td>
</tr>
</tbody>
</table>

**Depth to Ironstone:**

<table>
<thead>
<tr>
<th>Ft.</th>
<th>In.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4510'</td>
<td>0</td>
</tr>
</tbody>
</table>

**Ironstone level:**

<table>
<thead>
<tr>
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<th>In.</th>
</tr>
</thead>
<tbody>
<tr>
<td>224'</td>
<td>0</td>
</tr>
</tbody>
</table>

**Last water struck at:**

<table>
<thead>
<tr>
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<th>In.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10'</td>
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**Best level:**

<table>
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</tr>
</thead>
<tbody>
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</tbody>
</table>

**2nd water struck at:**

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<thead>
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<th>In.</th>
</tr>
</thead>
<tbody>
<tr>
<td>17'</td>
<td>0</td>
</tr>
</tbody>
</table>

**Best level:**

<table>
<thead>
<tr>
<th>Ft.</th>
<th>In.</th>
</tr>
</thead>
<tbody>
<tr>
<td>66'</td>
<td>0</td>
</tr>
</tbody>
</table>
**GEOLOGICAL SURVEY OF GREAT BRITAIN**

**RECORD OF SHAFT OR BORE FOR MINERALS**

Name of Shaft or Bore given by Geological Survey:

For whom made: [Redacted]

Town or Village: [Redacted]  County: [Redacted]

Exact site: [Redacted]  Attach a tracing from a map, or a sketch-map, if possible.

Purpose for which made:

Ground Level at shaft: [Redacted]  If not ground level give O.D. of beginning of shaft:

Made by: [Redacted]

Information from: [Redacted]

Examined by: [Redacted]

---

**SPECIMEN NUMBERS AND ADDITIONAL NOTES**

**Area:** TL 08/NW 51

**Churfield Farm**

**Hole No.:** 800216  **Started:** 25.11.29  **Finished:** 3.12.29

**B-1598**

**Machine No.:** [Redacted]

<table>
<thead>
<tr>
<th>Ft.</th>
<th>STRATA</th>
<th>Core Obtained</th>
<th>Total Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Soil</td>
<td>0.3 m</td>
<td>1.0 m</td>
</tr>
<tr>
<td>9</td>
<td>Boulder clay</td>
<td>3.0 m</td>
<td>10.0 m</td>
</tr>
<tr>
<td>1</td>
<td>Grey sand</td>
<td>3.3 m</td>
<td>11.0 m</td>
</tr>
<tr>
<td>5</td>
<td>Brown sand</td>
<td>4.8 m</td>
<td>16.0 m</td>
</tr>
<tr>
<td>6</td>
<td>Black clay</td>
<td>6.7 m</td>
<td>22.0 m</td>
</tr>
<tr>
<td>1</td>
<td>Grey sand</td>
<td>7.0 m</td>
<td>23.0 m</td>
</tr>
<tr>
<td>5</td>
<td>&quot; clay</td>
<td>8.5 m</td>
<td>28.0 m</td>
</tr>
<tr>
<td>10</td>
<td>Ironstone (Sampled)</td>
<td>3.8 m</td>
<td>38.0 m</td>
</tr>
<tr>
<td>1</td>
<td>&quot; Holes collapsed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ironstone (Sampled)</td>
<td>12.1 m</td>
<td>43.0 m</td>
</tr>
<tr>
<td>7</td>
<td>&quot; as Broken</td>
<td>15.2 m</td>
<td>50.0 m</td>
</tr>
<tr>
<td>1</td>
<td>' Not recovered - hole abandoned.'</td>
<td>16.5 m</td>
<td>51.0 m</td>
</tr>
</tbody>
</table>

1st water struck at 12 ft.  3.6 m

Rest level 4 ft.  1.2 m

2nd water struck at 30 ft.  9.1 m

Rest level 27 ft.  8.4 m

Surface level 131.1 ft.  40.0 m

---

(For Survey use only)

6-inch Map Registered No. TL 08/NW 51

Nat. Grid Reference: 0048 8801

1st O.S. Map No. 1171  1st O.S. Map No. 1171

Confidential or not: [Redacted]

Date of sinking: [Redacted]

Date received: [Redacted]
RECORD OF WELL

COUNTRY: NORFOLK

For Institute only 
Licence No. TL08/23 
171/223

EXACT SITE OF WELL

Six-inch National Grid sheet and reference: Th.08.NW.00775

For F.E. BEERIDGE F.S., CHURCHFORD, BUDLE, NORFOLK

State whether owner, tenant, builder, contractor, consultant, etc.: Owner

Address (if different from above)


DELETES AS NECESSARY

Level of ground surface above sea level (O.D.)...

If well top is not at ground level state how far above:

SHAFT: depth (m): diameter (m):

HEADINGS (please attach details—dimensions and directions)

BORE: depth (m): diameter at top (m):

at bottom (m):

Full details of permanent lining tubes (position, length, inner and outer diameters, plain slotted etc.):

Material: mm. mm. Plastic.

Plastic with casing 3 mm. Shale.

WELL: mm. mm. mm.

End Cap.

Water struck at depth:

Rest level of water:

Yield on:

= test pumping at: galls per hour with depression to:

Capacity of pump:

Date of measurements:

DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:

Make and/or type:

Motor power:

Capacity:

galls per hour. Suction at:

below well top: Amount pumped:

galls per day. Estimated consumption:

gall per week

Well made by HAMPEY LABORATORIES LTD.

Date of sinking:

ADDITIONAL NOTES 
ANALYSIS (please attach copy if available)

Received from

HAMPEY LABS LTD
Date: 19.1.53

Observation well:

Borehole log:

Site worked on:

1st step—Grid Sheet

Copy by. E.P. S. E.

Date:

British Geological Survey

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[TLO8MW.BJ 191]
<table>
<thead>
<tr>
<th>Nature of Strata</th>
<th>Thickness</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil, brown clay</td>
<td>2.00</td>
<td>0.20</td>
</tr>
<tr>
<td>Blue clay</td>
<td>3.75</td>
<td>0.75</td>
</tr>
<tr>
<td>Limestone</td>
<td></td>
<td>12.00</td>
</tr>
<tr>
<td>Grey clay</td>
<td></td>
<td>18.00</td>
</tr>
<tr>
<td>Hard limestone</td>
<td></td>
<td>24.00</td>
</tr>
<tr>
<td>Grey clay</td>
<td></td>
<td>25.00</td>
</tr>
<tr>
<td>Blue clay</td>
<td></td>
<td>24.00</td>
</tr>
<tr>
<td>Limestone (wombach?) water</td>
<td></td>
<td>30.00</td>
</tr>
<tr>
<td>Grey clay with hard limestone</td>
<td></td>
<td>35.00</td>
</tr>
<tr>
<td>Hardpan</td>
<td></td>
<td>42</td>
</tr>
<tr>
<td>Dark Brown clay</td>
<td></td>
<td>52</td>
</tr>
</tbody>
</table>

*If measurements start below ground surface, state how far.*
APPENDIX B

Generic Waste Acceptance criteria
WASTE ACCEPTANCE PROCEDURE

1 INTRODUCTION

Waste acceptance procedures are required to ensure that all waste accepted for disposal is acceptable under the conditions of the Waste Management Licence exemption for the site, and that it is disposed of in an appropriate manner. This document has been prepared in accordance with Regulatory Guidance Note No 2 – Interim Waste Acceptance Criteria and Procedures (November 2002).

2 PROCEDURE

2.1 Operating Hours

Waste will only be accepted and dealt with at the site between the hours specified in the appropriate Planning Permission:

2.2 Waste Types


3 WASTE ACCEPTANCE

All waste received at the site from the waster recycling centre undergoes characterisation and pre-treatment, prior to being received at the landfill where the waste is weighed and inspected prior to dispatch. It is considered therefore that the requirements of the Waste Acceptance Criteria and Procedures are met, largely, at the recycling centre before the consignment arrives at the landfill.

Some waste consignments may be received at the landfill directly from the source (uncontaminated site clearance soils). If this occurs, the following waste acceptance procedures will be followed.

1. The driver will supply the appropriate waste transfer note (WTN) to the site operator, who will complete the section relating to final disposal of waste. This document will then be returned to the driver, keeping a copy of the WTN to be stored in the site office. A waste transfer note does not need to be completed for every consignment if there has been one completed for the job in question, ie if all material is coming from the same origin. A ‘blanket’ WTN can be used in this instance for up to one year.

2. Any driver who is not in possession of the appropriate WTN for the consignment, or if one has not been completed for the job, then the consignment will be rejected.

3. If a consignment does not comply with the description on the WTN or is not suitably inert, the consignment will be rejected.

4. If a consignment is rejected the Senior Management shall be informed together with the Environment Agency. The reason for rejection must be given. The rejection of a consignment should also be recorded in the site Daily Diary.

5. When the site operative has completed the above procedure, the driver will be directed to the current area of tipping.

6. All vehicles must be operated by registered waste carriers and a copy of their certificate should be held on file at the site. A regular check will be carried out to ensure that licences
are still in date, and where they are found not to be a copy of the new licence will be obtained immediately.

Three levels of ‘testing’ are required to ensure that all waste is suitable for disposal at a particular class of landfill (ie inert). These are set out below and are in accordance with Environment Agency guidance and comprise: Basic Characterisation, Compliance testing and On-site Verification.

3.1 Basic characterisation

Basic waste characterisation must be carried out by, or on behalf of, the waste holder or producer BEFORE the waste is landfilled.

The following information is required:

- Date & time of waste arriving on site
- Site name & company number
- Source and origin of waste (including information on the process producing the waste)
- Type of waste & description
- If applicable, a description of the waste pre-treatment, or a statement of reasons why such treatment is not necessary
- Data on composition of the waste
- Appearance of the waste (odour, colour, physical form)
- European Waste Catalogue Code
- Information indicating the acceptability of the waste for disposal at a non-hazardous landfill
- Any additional precautions that should be taken at the landfill
- Check if waste can be recycled or recovered

All producers/hauliers of waste accepted at the site will be made aware in writing by the site operator that waste deposited at the site should be fully characterised and tested where possible to determine its exact nature and to prove it meets with inert criteria, prior to transport and disposal at the landfill.

Chemical analyses of the waste and source/origin information will be assessed by appropriately trained staff to ensure it complies with the European Waste Catalogue Codes (EWC) stated as to be accepted at the site. If the waste is definitely on the approved EWC list then it can be accepted without the need for further testing. If it is a single consignment and the above basic characterisation data is not complete then further testing may be required as determined by the appropriate person described above.

Certificates of analysis from a competent laboratory to support the waste characterisation carried out by the waste producers shall be obtained by the site operator if available and kept for record purposes.

3.2 Compliance testing

When a waste stream has been deemed acceptable at the site based on the Basic Characterisation, the waste will be subject to compliance checking. Compliance testing will be carried out at least once per year for the individual waste streams to verify the results of the Basic Characterisation to identify any changes in the characterisation of the waste.

The frequency of random checking may vary at the site managers discretion and may be varied based on volume of site inputs, the type of vehicle carrying the waste, the nature and size of the contract, the source of the waste, site history/risk of contamination at the point of production of the waste, etc.
The selection of parameters chosen for compliance testing will be determined based on the source and nature of the wastes and the results of the Basic Characterisation. The choice of parameters will be documented together with a justification of their choice. Records of the results will be kept at the site offices.

3.3 On-site verification

Simple checks will be carried out at the site to ensure that the waste, when it arrives, matches the description in the documentation. This will entail an inspection of the consignment documentation and a visual inspection at the waste face prior to off-loading.

If the consignment is found to be non-conforming, it will be rejected in accordance with either of the following courses of action:

(i) *In the event the waste has not been tipped* – the driver will be immediately informed not to deposit the waste and will be re-directed as authorised by the Environment Agency;

(ii) *In the event that some/all of the waste had been tipped* – such wastes will be immediately removed from the landfill and re-loaded onto the delivery vehicle which will then be re-directed as authorised by the Environment Agency. If it is not possible to re-load the waste onto the delivery vehicle then such material will be stored in quarantine away from the tip face pending instruction/authorisation from the Environment Agency.
APPENDIX C

Generic EMS procedures
1 PROCEDURE FOR CHECKING AND EMPTYING TANK STORAGE BUNDS

Aim

To ensure that all staff are aware of safety measures required, and the environmental risks associated with the above.

Steps to be followed

All oil and leachate storage bunds shall be checked daily. Checks shall also be made for structural soundness, signs of leaks and build-up of oil/water or spillage/debris.

The bunds are designed to contain a maximum of 110% of the capacity of the tanks / barrels they contain, so it is important that this capacity is not reduced, especially by a build-up of water. This shall be checked daily by the Site Supervisor who shall be responsible for ensuring that any emptying required is carried out as instructed.

In the event of an emergency (eg leaking tank or damaged bund wall) the Site Supervisor and Technical Manager shall be informed immediately.

Other agencies that may need to be contacted, as appropriate, are:-

   Emergency Services          999
   Environment Agency          0800 80 70 60

Routine emptying, and emergency emptying, of any bunds on-site shall be recorded in the Site Diary kept at the Site Supervisor’s office.

Consequences of not following procedures

If the above procedures are not complied with, environmental pollution could occur due to over-spilling of bunded area following failure of tank containment. Enforcement action could subsequently be taken against the Company.

2 PROCEDURE FOR HANDLING AND STORAGE OF FUELS AND OILS

Aim

To ensure that all staff are aware of safety measures required and the environmental risks associated with the handling and storage of fuels and oils.

Steps to be followed

2.1 Storage of fuel and oils

All oil and fuel shall be stored within bunded areas each of which are capable of containing 110% of the capacity of the largest container within the bund – ie a gas oil tank must be contained within a bund capable of containing 110% capacity of it, a 210 litre (45 gallon) drum stored in a bunded area with a 45 litre (10 gallon) drum must have a bund capacity of 110% of the 210 litre drum.

All oil and fuel containers shall be clearly marked with their contents and, where possible, their capacity.
2.2 Receipt of fuel and oils

Receipt of fuel and lubricants at the site shall be supervised by a competent person at all times.

In the case of bulk fuels and oils, the supervisor shall physically check that the receiving tank to ensure there is sufficient ullage to accommodate the delivery.

All hoses, connections and bunds shall be checked for leakages or damage prior to offloading from the delivery vehicle.

Any minor spillages shall be cleaned up immediately using the method set out in the Accident Plan. Any major spillage shall be immediately reported to the Site Supervisor and Technical Manager in accordance with the procedure set out in the Accident Plan.

2.3 Refuelling mobile plant

Wherever possible all refuelling shall take place at the workshop area on hardstanding.

The person carrying out refuelling shall be suitably trained and remain with the delivery vehicle at all times observing the operation. The fuel tank on the receiving vehicle must be checked in order to estimate the amount of fuel required before refuelling taking place.

When refuelling remote pumps or vehicles at the landfill area itself, extra care shall be exercised. Any surplus fuel shall be returned to the storage tank.

Any minor spillages shall be cleared up using the appropriate method as described in the Accident Plan. Any major spillage shall be reported to the Site Supervisor and Technical Manager in accordance with the procedure set out in the Accident Plan.

2.4 Storage of fuels and oil drums

All drums of oils and liquid lubricants shall be stored in the workshop in clearly marked and secured containers.

When containers are being moved, they must have a securely fitting cap. When transferring oils and lubricants from barrels to smaller containers, a manual pump shall be used.

Any minor spillages shall be cleaned up immediately, using the method set out in the Accident Plan. Any major spillage shall be reported to the Site Supervisor and Technical Manager in accordance with the procedure set out in the Accident Plan.

2.5 Handling of fuels and oils

Appropriate Personal Protective Equipment (PPE) must be worn when handling any fuel or oil.

Site personnel shall be trained on the necessary safety precautions to be taken when handling lubricants and fuel. Additional information shall be available in the associated COSHH data sheet held in the Site office.

2.6 Consequences of not following procedures

The consequences of not following the procedures above are varied and wide ranging. The storage of oil and fuels on-site can have a serious environmental impact if a major spillage occurs. This could result in Enforcement Action being taken against the Company by the Environment Agency.
The handling of oil/fuel may result in personal injury through inappropriate handling. It is therefore important that personnel wear the correct PPE when handling lubricants and fuels, and to be aware of the safety and environmental risks involved.

3 PROCEDURES FOR HOUSEKEEPING

Aim

To ensure that the site and surrounds are maintained in a safe manner for staff and visitors. This shall also minimise the risk of accidents occurring and complaints from nearby householders.

3.1 Litter

Litter inspections, and if necessary retrieval, shall be undertaken as instructed by the Site Supervisor.

In the event that litter escapes to off-site areas, it shall be retrieved and disposed at the working face.

3.2 Mud on road

Vehicle cleaning equipment is available in the workshop area for use at all times as required. A road sweeper shall also be employed to maintain the access roads in a clean, dust-free condition.

Mud accumulation on access roads within the site shall be cleaned at the end of the working day, or at the end of the operation causing the accumulation.

Mud accumulation on the public highway should be removed immediately on detection.

Regular inspections of mud accumulation of the internal and external roads should be made.

3.3 Septic tank

Foul drainage from the site office/workshop is directed to the site septic tank/biofilter. Treated effluent is discharged to the adjacent ditch. The septic tank is de-sludged approximately annually by a licensed contractor.
APPENDIX D

Restoration Plans